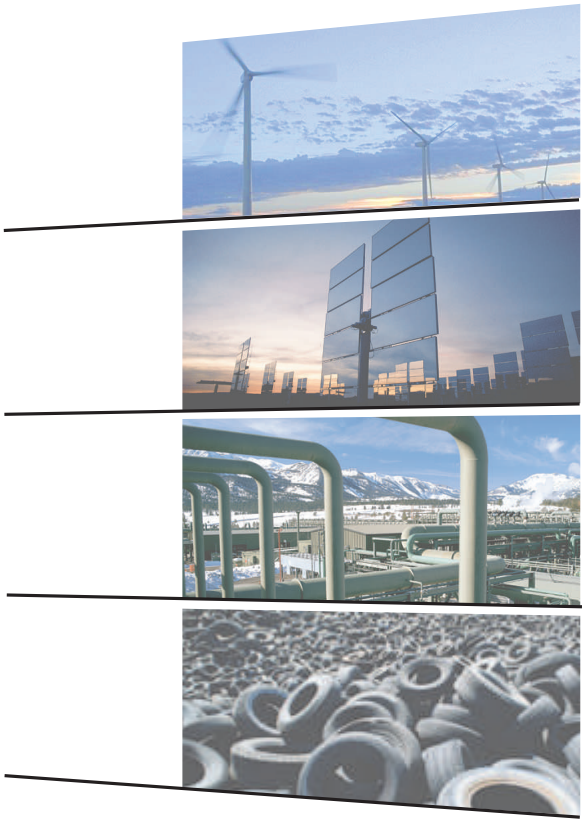
U.S. Trade and Development Agency

Waste-to-Energy and Renewable Energy Regional Conference

Prague, Czech Republic December 9-11, 2002



Project Resource Guide

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The U.S. Trade and Development Agency

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Waste-To-Energy and Renewable Energy Projects in Central and Eastern Europe

Owners, operators and sponsors of waste-to-energy and renewable energy projects from eight (8) Central and Eastern European countries: the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia and Slovenia will present over 30 projects at this conference. U.S. companies will have an opportunity to meet with over 40 industry and government executives from these countries to discuss these upcoming projects and identify new opportunities to work together.

Restructuring of the electric power sector, an increasing demand for clean and in some cases green energy, efforts to reduce the amount of biodegradable material being land filled, and increasing private sector participation in Central and Eastern European countries is creating a market for the development and implementation of waste-to-energy and renewable energy projects. At the same time, these countries are raising their pollution-control standards to meet those of the EU. This requires closing or modernizing older power generation facilities, switching from fossil fuels to biomass, or installing cleaner and more efficient power systems that help protect the environment by minimizing air and water pollution, and the need for landfills.

As the countries of Central and Eastern Europe move toward EU accession, they are also paying closer attention to the diversity and security of their energy resources. As a result, they are relying less on nuclear power generation, imported oil and gas, and domestic coal resources, while seeking more efficient utilization of their energy resources. Most electric power end-users will also be able to purchase their power from third parties. These market pressures combined with low labor costs are aiding the development and creation of a waste-to-energy and renewable energy industry that is expected to become an important player in each country and the region as a whole. This new energy industry includes the development of a new biomass resource supply chain incorporating the production of energy crops, a new fuel processing industry for the production of biogas, liquid biofuel, and biomass pellets, and new technologies for clean electric power and heat generation. Technologies are also needed for converting biomass to biodiesel and other transportation fuels or additives.

The conference will highlight a number of large and small waste-to-energy and renewable energy projects. These projects range in cost from a few million dollars to several hundred million dollars. Many of the smaller projects are “pathfinder” type projects and their successful implementation will lead to the accelerated development and implementation of many more similar projects. The project sponsors include established utilities, CHP plant operators, local municipalities, energy associations and recently established enterprises dedicated to developing and implementing “green energy” projects.

The projects featured in this *Project Resource Guide* are either in the early planning stages and require feasibility assessments, or EPC or equipment bid packages are about to be issued. Sponsors of some of these projects are seeking joint venture partners, technology licensors, or equipment suppliers as partners for the export of technology or equipment and services.

Projects included are:

- A 250 MW_e, $400 million, offshore wind power project in Poland.
- Five wind power park projects ranging from 32 MW_e to 100 MW_e, $40 million to $100 million, in Hungary and Poland.
- Waste rubber and plastic gasification, combustion, and pyrolysis projects ranging from $11 million to $87 million in the Czech Republic, Hungary, and Poland.
- MSW-to-energy projects ranging from $26.2 million to $41.5 million in the Czech Republic and Poland.
- Agricultural waste-to-energy projects ranging from $1.2 million to $4.5 million with opportunities to duplicate similar projects at 10 to 100 other sites in the Czech Republic.
- An $11.5 million rapeseed bio-refining project in Poland.
- Boiler replacement or conversion projects, ranging from $10 million to $86 million, for firing biomass for power generation and district heating applications in Estonia, Hungary, Lithuania and Poland.
- A $15 million co-generation project using pulp sludge in Slovakia.
- 40 MW_e of hydropower projects in Slovakia promoted by SE.
- Geothermal/district heating projects, in Hungary and Slovakia, ranging from $3 million to $120 million.
- A $30 million industrial waste-to-energy project sponsored by Slovnaft.

Those projects that are in the early planning stages but are well defined; have a high potential for the export of U.S. technology, equipment and services; meet a potential market need; and have a high likelihood of obtaining financing were recommended to be considered by USTDA for feasibility study grants. Grant agreements for up to five of these projects are anticipated to be executed by USTDA and project sponsors during the course of the conference in Prague. Other feasibility study grants agreements may also be announced at the Prague Conference.

Identifying and Developing Projects

USTDA seeks to assist Central and Eastern European countries and increase their use of waste-to-energy and renewable energy technologies. USTDA believes U.S. companies can make a significant contribution to that effort. This conference has been convened to stimulate conversation among U.S. companies and developers of waste-to-energy and renewable energy projects in the region. Since 1995, USTDA has provided over $12 million to promote development of waste-to-energy and renewable energy projects worldwide. In the last two years, USTDA has provided over $2 million to support 10 waste-to-energy and renewable energy projects in Central and Eastern Europe.

Princeton Energy Resources International, LLC (PERI), a consulting and engineering firm with extensive experience in the energy and environmental fields, was retained by USTDA to identify, characterize, and assess the viability of the projects presented in this guide. PERI assembled a team including Sentech Inc. (Sentech), Narodowa Agencja Poszanowania Energii s.a. (NAPE), and Co-Energy Consulting Engineering Ltd. (Co-Energy). Sentech is a consulting and engineering firm in the U.S. with experience in Central and Eastern Europe. NAPE is an energy-consulting firm in Poland, and Co-Energy is a Hungarian consulting firm. The approach included a review of projects

previously supported by USTDA and an assessment of their current status and identification of new projects. The PERI team explored potential projects with the project sponsors to determine ***their priority*** and likelihood that the projects could ***attract financing*** and be completed within the planned schedule and budget.

The PERI team requested project sponsors and owners provide certain information regarding each project. This information was initially screened to identify projects meriting further consideration. A team of experts then visited the sponsors of the selected projects to collect additional information. The available information was then used to determine project viability. The PERI team also assisted project sponsors in preparing project profiles for inclusion in this guide and presentation at the Waste-to-Energy and Renewable Energy Regional Conference to be held December 9-11, 2002 in Prague, Czech Republic. Project profiles include the following:

- Sponsor's corporate history;
- Technical and commercial description of the project;
- Discussion of the potential support or the driving forces for implementation of Waste-to-Energy and or Renewable Energy;
- Budget level cost estimates;
- Financing strategy; and
- Assessment of the potential for exported U.S. goods and services during project implementation.

The project profiles are designed to provide engineering, construction and financing firms, potential investors, and equipment and technology suppliers with sufficient technical, commercial, and economic information to make a preliminary assessment of their interest in the project.

Briefing Book Organization

This Project Resource Guide is available on both CD-ROM and in hardcopy. Project Profiles are grouped by country and are presented following a brief Country Profile.

Acknowledgements

Project Sponsors and Owners

The PERI team wishes to express its deepest appreciation to project owners, sponsors, and developers in Central and Eastern Europe for their superb cooperation with the team prior to, during, and following the team visit to region. The project team also wishes to acknowledge the contribution of the project sponsors who submitted project descriptions, costs, financial data and other information that was used to compile the Project Profiles.

U.S. Trade and Development Agency

The Waste-to-Energy and Renewable Energy Conference and the work presented in this Project Resource Guide was funded by USTDA. PERI wishes to express its deepest appreciation for the leadership and timely guidance provided by USTDA.

U.S. Commercial Services (CS)

The CS provided valuable background information and supported the team with contacts and logistics in the countries visited.

Sentech Inc.

Sentech provided invaluable support with identifying, assessing, and providing input for preparing the Project Profiles for the projects in Poland and Slovakia. Sentech also visited project sponsors in these countries. PERI would like to especially

thank Sentech for their contribution to the preparation of this Project Resource Guide.

NAPE

NAPE provided invaluable support with identifying and providing technical input for preparing the Project Profiles for the project in Poland. PERI and Sentech would like to express their gratitude to NAPE for their support.

Co-Energy

Co-Energy provided exemplary support with identifying, assessing, and providing input for preparing Project Profiles for the projects in Hungary. PERI would like to especially thank Co-Energy for their technical and logistical support and their contribution to the preparation of this Project Resource Guide.

Others

Many information sources were used to develop background information for preparing this Project Resource Guide. In particular, the Country Profiles include information provided by the European Bank for Reconstruction and Development, The World Bank, and the U.S. Commercial Service.

Notes

Below is a listing of the abbreviations used throughout the *Project Resource Guide*.

Acronym	Description
$	U.S. Dollar
BFTA	Baltic Free Trade Agreement
BGK	Poland National Bank of Economy
Btu	British Thermal Unit
°C	Degrees Celsius
CA	State of California
CEFTA	Central European Free Trade Agreement
CEI	Czech Ecological Institute
CEZ	Czech National Power Company
CHP	Combined Heat and Power
CIT	Corporate Income Tax
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CWM	Center for Waste Management
CZK	Czech Republic Koruny
DH	District Heating
DHA	District Heating Association
DM	Deutsche Mark
EBRD	European Bank for Reconstruction & Development
EC	European Commission
ECCN	Synergy Eastern Climate Change Network project
EcoFund	EcoFund Foundation
EDF	Electricite de France
EEK	Estonian Kroon
EERI	Estonian Energy Research Institute
EIA	Environmental Impact Assessment
ELARG	Enlargement Service
EPC	Engineering, Procurement, and Construction
EPHA	Estonian Power and Heat Association
EPI	Energy Products of Idaho
ERU-PT	Emission Reduction Unit-Procurement Tender

Acronym	Description
ESP	Bio Energia ESP
EU	European Union
Ex-Im	Export-Import Bank of the U.S.
°F	Degrees Fahrenheit
FDI	Foreign Direct Investment
GATT	General Agreement on Tariffs and Trade
GDP	Gross Domestic Product
GE	General Electric
GEF	Global Environmental Facility
GJ	GigaJoule
GM	General Motors
GW_e	GigaWatts Electric
h	Hour
ha	hectares
HFO	Heavy Fuel Oil
HRSG	Heat Recovery Steam Generation
HSAD	High Solids Anaerobic Digestion
HUF	Hungarian Forint
IBM	International Business Machines
IESSCO	International Environmental Systems and Supplies, Inc.
IFC	International Finance Corporation
IL	State of Illinois
IMF	International Monetary Fund
IPGCC	Integrated Plasma Gasification Combined Cycle
ISPA	Instrument for Structural Policies for Pre-Accession
JI	Joint Implementation Mechanism
JIA	Joint Implementation Agreement
kg	Kilogram
kJ	Kilojoule
km	Kilometer
kV	Kilovolt
kW	kiloWatt

Acronym	Description
kW_e	kiloWatts Electric
kWh	kiloWatt Hour
lb	Pound
LE	Lietuvos Energija
LEI	Lithuania Energy Institute
LEIF	Latvian Environmental Investment Fund
LEIF	Lithuanian Environmental Investment Fund
LVAF	Latvian Environmental Protection Fund
m	Meter
m/s	Meters per second
m^3	Cubic meter
MA	State of Massachusetts
MJ	Megajoule
mm	millimeter
MOL	Hungarian Oil and Gas Company
MSW	Municipal Solid Waste
MTD	Metric Tons per Day
MVM	Hungarian National Power Company
MW	MegaWatt
MW_e	MegaWatts Electricity
MWh	MegaWatt Hour
MW_t	MegaWatt Thermal
NATO	North Atlantic Treaty Organization
ND	State of North Dakota
NFOS	National Fund for Environmental Protection and Water Management
NJ	State of New Jersey
nm^3	Normal Cubic Meter
NO_x	Nitrogen Oxides
NPF	National Property Fund
NPV	Net Present Value
NY	State of New York
OECD	Organization for Economic Co-operation and Development
OPIC	Overseas Private Investment Corporation

Acronym	Description
ORC	Binary System Electricity Generation Unit
PA	State of Pennsylvania
Pannonpower	Pannonpower Ltd.
PCB	Polychlorinated Biphenyl
PCF	Prototype Carbon Fund
PGV	Plasma Gasification and Vitrification
PHARE	Poland and Hungary Action for the Restructure of the Economy
PIT	Personal Income Tax
PLN	Polish Zlotych
PPA	Power Purchase Agreement
PSE	Polish Power Grid Company
psig	Pounds per Square Inch Gauge
PVC	Poly-vinyl Chloride
RDF	Disposed Rubber Fuel
s	Second
SAPARD	Special Accession Program for Agriculture and Rural Development
SEF	Czech State Environmental Fund
SEZ	Special Economic Zone
SO_2	Sulfur Dioxide
SO_x	Sulfur Oxides
sq. km	Square kilometer
sq. mile	Square mile
T/D	Tons per Day
TAG	Texas Adriatic Group
TE	TransElektro
TJ	TeraJoule
tpd	Tons per day
U.S.	United States of America

Acronym	Description
U.S. DOE	United States Department of Energy
U.S. EPA	United States Environmental Protection Agency
U.S.A.	United States of America
U.K.	United Kingdom
UNDP	United Nations Development Program
U.S.AID	United States Agency for International Development
USTDA	U.S. Trade and Development Agency
VAT	Value Added Tax
WA	State of Washington
WMA	Czech Waste Management Act
WTE	Waste-to-Energy
WTO	World Trade Organization

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Introduction

Central and Eastern European countries are undergoing significant industrial and economic reforms, and restructuring. Eight of these countries are the focus of this conference. They are:

- Czech Republic
- Estonia
- Hungary
- Latvia
- Lithuania
- Poland
- Slovakia
- Slovenia

This section provides an overview of their use of renewable energy sources and potential for waste-to-energy as well as their political, economic and investment climate.

Waste-to-Energy and Renewable Energy

As the eight focus countries in the conference move closer to EU accession in 2004, several EU policies and directives are creating a driving force in the target countries for the development of new, advanced, cleaner, and more efficient power generation technologies.

The first of these directives is the Integrated Pollution Control Directive 96/61/EC. This directive mandates that any power generation facility greater than 50 MW capacity using a combustion technology must obtain a permit proving that it is using the best available control technology. If the facility is not using the best control technology it may be shut down. This directive also applies to the incineration of municipal and hazardous waste. Since much of the combustion based power generation capacity in the focus countries suffers from decades of neglect and has outdated and inefficient, generation technologies that lack sufficient environmental safeguards, each of the countries is facing a decision to pay a significant expense in ensuring compliance or to simply shutdown the capacity in question.

A second directive derived from the EU white paper, *Energy for the Future: Renewable Sources of Energy (1997)* is 2001/77/EC. This directive has set an objective of a 12% contribution from renewable energy sources to the EU gross energy consumption by 2010. In addition, there is also a target of increasing energy efficiency by 18% over 1995 levels by 2010. The eight focus countries must comply with this directive by expanding their use of renewable energy sources, although the

exact contribution of renewable energy and the timetable for compliance is being set individually for each of the eight countries during accession negotiations.

Wind and biomass are expected to be the largest sources of renewable energy in the EU. Biomass, including municipal solid waste (MSW), is expected to produce 8% while wind will provide 2.8% of the EU's electricity supply by 2010. Solar (photovoltaic) and geothermal resources are expected to account for less than 0.2% of the EU's electricity supply by 2010.

MSW is expected to become a significant contributor to biomass sources of renewable energy. European Commission directive 99/31/EC dictates the handling and disposal of waste in the EU, and has several articles that apply to MSW that can be used in waste-to-energy applications. For example, EU member nations will now no longer be able to landfill whole used tires or landfill shredded tires after 2005. In addition, 99/31/EC also requires member nations to reduce all biodegradable waste going to landfills through the use of recycling, composting, conversion to biogas, and energy recovery. This directive also mandates that member states reduce biodegradable MSW to less than 50% of their 1995 levels by 2010.

Several EU funds and programs are available to support waste-to-energy and renewable energy projects. They include: ISPA, PHARE, and pre-accession facility of the European Investment Bank. The aim of these programs is to enable the accession countries to adopt EU legislation including implementation of EU *environmental acquis communautaire.*

Most countries in the region have also established programs, special funds, or agencies to encourage development of environmental projects. These programs and funds are discussed in the *Country Profile* section for each country.

Waste-to-energy and renewable energy projects in Central and Eastern European countries could also benefit — from the financing point of view — from the Global Environment Facility (GEF), the Prototype Carbon Fund (PCF), and the Joint Implementation Mechanisms.

The Global Environment Facility is a financial mechanism established by the United Nations Development Programme, UNEP, and the World Bank. It provides grant and concessional funds for projects that address climate change, biological diversity, international waters, and depletion of the ozone layer. Most waste-to-energy and renewable energy may address one or more of these concerns.

The PCF's objective is to demonstrate how the project's approach results in reduced greenhouse gas emissions and supports sustainable development. Projects supported by PCF should be viable for registration under the United Nations Framework Convention on Climate Change as contributing to meeting the requirements of the Kyoto Protocol. The PCF will focus mostly on the development of renewable energy projects. The PCF could provide financing for design and construction of projects. The most important consideration to the PCF is emission reduction, not whether or not a project is a "demonstration" or commercial project.

Currently the governments of a few European countries (Denmark, Austria, and the Netherlands) are preparing JI programmes addressed to Central and Eastern European countries. Other countries, including the U.S. and Canada, are also interested in the purchase of emissions reduction units. In a JI project, government participation is always required, but the revenue stream could be private sector to

private sector. The projected value is not per kWh, but per emission reduction unit. One implemented program by the Dutch government, the ERU-PT *(Emission Reduction Unit-Procurement Tender)*, is supporting renewable energy investment through the purchase of emission reduction units of greenhouse gases (CO_2). In the first tender under this program in 2000, a 60 MW wind farm in Poland (Skrobotowo, on the Baltic Sea coast) was accepted for implementation.

Political and Economic Climate

In general, the EU accession process shapes the transition to a market economy and the development of commercial rules and regulations in these countries. Poland and Hungary signed framework agreements for Central and Eastern European countries to prepare for membership in the EU in 1991. The Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, and Slovenia were invited to begin accession negotiations in the EU.

These countries must meet a series of requirements, generally referred to as the "Copenhagen Criteria," before they can become a full member of the EU. These requirements include:

- Political Criteria – achieving stability of institutions guaranteeing democracy, the rule of law, human rights and respect for and protection of minorities.
- Economic Criteria – establishing a functioning market economy, and the capacity to cope with competitive pressure and market forces within the EU.
- Administrative Criteria – demonstrating the ability to take on the obligations of membership, including adherence to the political, economic, and monetary goals of the EU.

Accession candidates must also bring their legislation into line with EU's common body of law "*acquis communautaire."* However, acceding to the EU does not guarantee inclusion in the European Monetary Union (EMU). To become a member of the EMU, countries must meet four additional criteria, known as the Maastricht Convergence Criteria. They are:

- Inflation – a rate within 1.5% of the best performing EU countries in terms of price stability.
- Public Finance – absence of an excessive government deficit and debt.
- Exchange Rate Stability – observance of the normal margins of the exchange rate mechanism without severe devaluation for two (2) years.
- Long Term Interest Rates – a rate within 2% of the rates in the three countries with the lowest inflation rates.

The eight focus countries are members of a group of 10 countries that are expected to join the EU in 2004. The candidate countries are focusing on implementing major political and economic reforms. These reforms include industry restructuring and privatization; the development of viable legal structures, contract laws, regulatory systems, capital markets, and trade policies for meeting the Copenhagen Criteria. They are also implementing specific legislative and regulatory policies to conform to stringent EU environmental, health, and safety regulations and product standards.

Each country has a unique socioeconomic context, causing variation in the transition

process and different privatization schemes. Reform has continued, even in the face of economic decline, decreased production, and loss of traditional markets. These countries have recently begun to recover economically mostly due to the infusion of foreign capital and increased exports, as well as increased domestic demand. The energy and environment sectors in these countries require a significant capital investment in renewable energy, fuel switching, and waste-to-energy projects in order for these countries to comply with EU energy and environmental directives and meet their national energy and environment policy goals.

Conclusion

Replacement of generating capacity in Central and Eastern Europe to comply with the Integrated Pollution Control Directive and other related directives has provided an excellent opportunity for implementing renewable energy and waste-to-energy technologies and projects.

These developments have also created a significant opportunity for further cooperation among U.S. industry leaders and their counterparts in these countries, where U.S. technologies and past experience could potentially be advantageous.

Useful Web Sites	
Global Environmental Facility (GEF)	http://www.gefweb.org
European Bank of Reconstruction and Development (EBRD)	http://www.ebrd.com
DOE Office of Fossil Energy	http://www.fe.doe.gov/international/
DOE Energy Information Administration (EIA) Country Analysis Brief	http://www.eia.doe.gov/emeu/cabs/contents.html
European Union Enlargement	http://www.europa.eu.int/comm/enlargement/
Prototype Carbon Fund	http://www.prototypecarbonfund.org

2001 GDP (in $ Billion)	56.7
2001 GDP Growth	3.3%
2001 GDP Per Capita ($)	5,550
2001 Population (Million)	10.22
Credit Rating (8/8/2002)	A-

Source: The Economist, 2002; Standard & Poor's, 2002

Executive Summary

As the Czech Republic nears possible EU accession in 2004, it is engaged in the process of upgrading its environmental and energy laws and policies to match those of the EU. In order to accomplish this, the Czech Republic is increasing its share of renewable energy, closing landfills, increasing recycling, decreasing its dependence on coal as a fuel source, and is making support available from the State Environmental Fund for a variety of environmentally related purposes.

The Czech Republic has a stable, growing economy and welcomes foreign investors. The Czech Republic has enjoyed one of the highest rates of direct foreign investment in Central and Eastern Europe over the last 10 years.

Waste-to-Energy and Renewable Energy

Even though the Czech Republic has installed waste-to-energy facilities in Central and North Bohemia, as well as in South Moravia, during the last decade, less than 5% of solid wastes generated in the country are currently being used for energy recovery. Waste-to-energy projects are under consideration in South Bohemia and in other parts of the country. A recent report by the Center for Waste Management (CWM) in the Czech Republic states that 30.72 million metric tons of agricultural and forestry, industrial and municipal solid waste were generated in the country in 2000. Of this amount, approximately 6.78 tons is either land filled or exported. The remaining is either recycled, incinerated, or used for composting. However, regions without adequate capacity for burning municipal wastes have been either using industrial furnaces or are relying excessively upon the use of landfills, which could be phased out in order to meet EU environmental policy.

The Czech Ministry of Environment has drafted a new Waste Management Act (WMA), which is expected to reduce the use of landfills. The new WMA is designed to ensure that Czech environmental laws conform to the directives of the European Commission (EC) on the handling and disposal of solid wastes. EC directive 94/62/EC requires that at least 50% of packaging wastes are recovered and that at least 15% of packaging materials are recycled by the end of 2005. EC directive 99/31/EC states that land disposal of whole tires will not be allowed after 2002 and that land disposal of shredded tires will not be allowed after 2005. In addition, waste must be reduced by recycling, composting, biogas production, and energy recovery. Specifically, biodegradable municipal solid wastes going to landfills by the end of 2005 should be less than 75% of the 1995 amounts. By the end of 2009, the land

disposal of biodegradable MSW should be reduced to at least 50% of the 1995 levels. The new WMA is expected to follow these EC directives accurately with some delay for implementing some of the measures.

As it prepares for possible accession to the EU in 2004, the Czech Republic has also been harmonizing its renewable energy policies with those of the EU. In the EU white paper, *Energy for the Future: Renewable Sources of Energy (1997)*, the EU set the objective of a 12% contribution of renewable energy to gross energy consumption by 2012. In addition, a EU policy relating to the Kyoto Protocol involves cutting CO_2 emissions by 8% of 1990 levels by 2008-2012. The Czech Republic is adopting both of these EU policies. To help meet these goals, the Czech Energy Act of 2000 states that a distribution system operator is obliged to purchase electricity from renewable sources and heat and power produced by cogeneration in a manner that is prescribed in an implementing regulation. The implementing regulation is established by decree by the Energy Regulatory Office. In 2001, it set the 2002 mandatory purchase prices for different types of renewable energy.

Current Electricity Purchase Prices (Czk/kWh)

Source	Price
Hydropower (up to 10 MW)	1.50
Wind	3.00
Biomass and Biogas	2.50
Geothermal	3.00
Solar	6.00
CHP Generation	0.97

The purchase prices are established for one year and can change from year to year.

Following the recommendation of the EC, direct support through subsidies and loans and indirect support through credit guarantees exist from the State Environmental Fund of the Czech Republic for a variety of short and long term objectives, including the direct and indirect promotion of renewable energy sources. In addition, the European Bank for Reconstruction and Development (EBRD) is actively seeking viable renewable energy projects to support in the Czech Republic.

EBRD is currently assessing the potential for renewable energy in the Central and Eastern European countries to identify a pipeline to projects suitable for further investigation and possible future funding by the EBRD. This effort is supported by the USTDA Evergreen Fund and the U.K. Technical Cooperation Fund. For additional information on this EBRD project, please visit http://projects.bv.com/ebrd/.

Heat and Power Generation

The Czech Republic's primary source of energy is coal. The Czech Republic possesses total recoverable coal reserves of 5.7 billion short tons, natural gas reserves of 500 billion cubic feet, and no significant oil reserves.

Most of the Czech Republic's thermal power stations are coal fired and almost all of them are at least 20 years old. Thermal power accounted for 11,300 MW_e of installed capacity in the Czech Republic in the year 2000 and about 2000 MW_e of coal fired capacity will be retired as new capacity comes on line.

The Czech Republic has 1,001 MW_e of installed hydropower capacity. The country also possesses two small wind plants and a small photovoltaic facility. The Czech Republic has two nuclear facilities, one of which was commissioned in 2002. Renewable energy sources – other than hydropower – including waste-to-energy, biomass, wind, solar, and geothermal

account for less than 1% of the primary energy supply in the Czech Republic.

The Czech Republic is a net exporter of electricity. In 2000, the country generated 60.6 billion kWh of electricity, of which 18.7 billion kWh was exported.

The power sector has been divided into the generation, transmission, and distribution sub-sectors. The generation and distribution companies are joint-stock ventures that are still state-owned, but are to be privatized. All consumers are to have third party access to electricity by 2002. CEZ, the Czech national power company, still owns the transmission grid and will continue to do so.

The Czech Republic possesses 251 district heating plants and 63 combined heat and power (CHP) facilities with a total output of 41,300 MW. Currently, coal is the fuel source most commonly used in heating and CHP plants. However, many heating and CHP plant operations are considering switching to biomass firing.

Economic Climate

Following the break-up of Czechoslovakia, the Czech Republic was internationally recognized in 1993. In the early 1990s, the country launched a radically liberal economic transition program that included a large-scale devaluation of the local currency, price and trade liberalization, a rapid enterprise transformation, and an innovative voucher privatization program. While there was initial success, the economy began to flounder in 1996 partially because of a lack of reforms in the state-dominated banking sector. Following three years of decline, the Czech economy turned the corner in 2000 and has embarked on the path of economic recovery and growth. Even with the decline in the late 1990s, the Czech Republic is one of the most economically advanced countries in Central and Eastern Europe, and it has stable and well functioning democratic institutions. The country is one of the signatories of the Central European Free Trade Agreement (CEFTA). Bulgaria, the Czech Republic, Hungary, Poland, Romania, Slovakia, and Slovenia are current members of CEFTA. In addition, the Czech Republic is also a member of the WTO, NATO and the OECD.

The economy grew by 3.3% in 2001 as a result of large FDI inflows in the past few years; the growth rate is projected to be the same in 2002 as the Czech Republic's growth stabilizes.

The inflation rate was 4.7% in 2001 due to price deregulation. The decision to complete price deregulation by the end of 2002 may affect the inflation rate in the next few years.

Investment Climate

The Czech Republic has been one of the region's most successful countries in attracting FDI with over $26 billion of foreign investment recorded since 1990. The campaign to attract foreign direct investment has been extremely successful over the last few years, as net FDI investment has averaged $5.0 billion each year since 1999. The sharp increases in FDI that started in 1998 can be attributed to two factors: the introduction of investment incentives for both foreign and domestic investors and an acceleration of the privatization process.

A new investment law was passed in May 2000 that codified and simplified the original legislation. The following incentives are currently offered: tax holidays of 10 years for new companies and 5 years for expansions of existing companies; job creation grants in regions with high unemployment; training and retraining grants in regions with high unemployment; and local incentives, such as the provision of low cost development land. These incentives

have requirements, however, such as the requirement that the investment be made in the manufacturing sector, the investment be at least $10 million equivalent with at least $5 million equivalent in equity, and investment in machinery be at least 40% of the total investment. In addition, the Czech Republic allows duty free import of machinery and equipment and provides special support for small companies.

The Czech Republic has 8 free trade zones established in several cities throughout the nation. The rules for operation within a commercial or industrial customs free zone are the same as in the EU. Czech tax codes are generally in line with European tax policies with corporate income tax set at 31% and the VAT generally set at 22%.

Foreign investors have been interested in both new and existing enterprises. There are about 37 companies that had been awarded incentives to invest more than $1.5 billion in new or greenfield enterprises. The most notable greenfield investments has been in the electronics and automotive sectors, with Philips, a Dutch company, starting the construction of a $624 million television plant, the largest greenfield investment to date in the Czech Republic. Privatization has also been and is expected to continue to be a significant source of FDI, with the privatization of the banking and financial sectors being important over the past few years and the telecommunications and electronics sectors gaining in importance over the next few years. Germany leads the world in foreign investment in the Czech Republic, followed by the Netherlands, Austria, U.K., and the U.S.

The EU countries, particularly Germany, are the Czech Republic's most important trading partners. The Czech Republic also does a significant amount of trading with CEFTA and Slovakia, with which it shares a customs union.

The main Czech exports are manufactured goods. The main imports are food, energy and capital goods.

U.S. Presence

The Czech Republic encourages U.S. equipment imports by not applying duties and VAT to foreign imported equipment and machinery. Successful U.S. investors in the Czech Republic include Black & Decker, Proctor & Gamble, Eastman Chemicals, Verizon, and Dupont Chemical & Energy Operations.

Useful Web Sites	
Global Environmental Facility (GEF)	http://www.gefweb.org
European Bank of Reconstruction and Development (EBRD) Investment Profile	http://www.ebrd.com/pubs/index.htm
DOE Office of Fossil Energy Country Profile	http://www.fe.doe.gov/international/e-eur.shtml
DOE Energy Information Administration (EIA) Country Analysis Brief	http://www.eia.doe.gov/emeu/cabs/contents.html
World Bank Country Profile	http://lnweb18.worldbank.org/eca/eca.nsf
Czech Republic State Environmental Fund	http://www.sfzp.cz

New Plant Technology & Equipment
• Microturbines • Bioreactor • Heat exchangers • Scrubbers • Chillers • Control system

Project Summary	
Sector	Waste-to-Energy
Location	Kutna Hora, Czech Republic
Capital Required	$1.2 million
Export Potential	$700,000
Project Sponsor	District Heating Association of the Czech Republic
Project Status	Pre-Feasibility

Project Discussion

Project Background

The District Heating Association of the Czech Republic (DHA) was founded in 1991 to promote district heating to national and local authorities in the Czech Republic.

Since then, DHA has become a leader in promoting new technologies for use in district heating and in co-generation; a member company installed one of the first co-generation plants in the Czech Republic.

In order to maintain its leadership position in advanced technologies and in co-generation, DHA plans to implement through one of its member companies, KH Tebis s.r.o. (KH Tebis), a demonstration project in Kutna Hora that will utilize biogas generated from biomass, for heating and power generation. KH Tebis owns and operates the municipality's district heating system, including the combined heat and power plant.

The proposed project will generate between 250 kW and 400 kW of electricity through a microturbine and between 400 kW and 800 kW of thermal energy. Biomass fuel for the project is readily available from municipal solid waste (MSW), town-owned forests, and energy crops. An anaerobic digester will process the biomass to produce the biogas for generating the heat and electricity. The new plant will be designed to comply with all Czech and EU emissions limits.

This project, when completed, will successfully demonstrate how municipalities can meet upcoming Czech requirements for reducing MSW land filling and can help the country meet its renewable energy generation commitments to the EU.

Project Location

The project site is in the Municipality of Kutna Hora, located 35 miles southeast of Prague.

Project Sponsors

The project is sponsored by DHA through one of its member companies, KH Tebis.

KH Tebis will provide the project site and will own and operate the facility.

Project Description

The proposed operation of the plant will be fueled by biogas produced in anaerobic digesters from MSW and other biomass material. A large amount of biomass and biodegradable MSW is expected to be available as fuel since the Czech Republic has committed to reduce the amount of biodegradable MSW being land filled by 25% by 2006 and by another 25% by 2009.

The project will be composed of a bioreactor system, a microturbine, scrubbers, chillers, heat exchangers, and a control system. The anaerobic digesters will generate biogas from MSW and other biomass materials. The biogas will then be used to generate between 250 kW and 400 kW of electricity through use of a microturbine and between 400 kW to 800 kW of thermal energy.

Successful implementation of this project could lead to the implementation of other projects. Estimates from DHA and the Czech Government show that 100 to 150 municipalities in the Czech Republic could potentially deploy similar systems.

In January 2002, the state-guaranteed price of electricity produced from biogas and landfill gas at CZK 2.50/kWh, or $0.081/kWh. This guaranteed minimum price is important for a project to be able to obtain financing.

Project Guidance Parameters

Project Costs

The demonstration project at Kutna Hora is expected to cost $1.2 million. If the demonstration project is successful, subsequent commercial systems are expected to cost $1,000,000 each, of which $700,000 is the value of the equipment that needs to be imported.

Known Initiatives

DHA members visited the U.S. on two separate occasions to study a Department of Agriculture program for small farms utilizing biomass and biofuels, and to examine U.S. microturbine technology.

Project Schedule

Planned Completion Schedule		
Activity	**Qtr**	**Year**
Feasibility Study	2nd	2004
Financial Close	1st	2005
Engineering Design and Construction	1st	2006

Project Financing

DHA and KH Tebis expect to fund 60% of the project from their own sources and obtain the remaining 40% from bank loans. DHA and KH Tebis are currently negotiating with the Czech Ministry of the Environment and the State Environmental Fund for financial support for the project.

U.S. Competitiveness

DHA considers U.S. microturbine technology to be superior to the technology found in Europe, and plans to use U.S. technology for the microturbines. U.S. suppliers of microturbines that are expected to compete for these sales are Ingersoll-Rand, Capstone Turbine Corp., Vericor Power Systems, and Solar Turbines. However, European manufacturers such as Turbec AB of Sweden and Bowon of the U.K. are expected to compete with U.S. suppliers.

Conclusion

This project is an important first step in the use of biomass in a co-generation application in the Czech Republic. The project will help the Czech Republic reduce the need for landfills, diversify its energy portfolio, and increase its share of renewable energy. It also allows KH Tebis to rely on locally available biomass resources with stable prices.

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GRYF Waste Rubber Pyrolysis Project

New Plant Technology & Equipment
• Pyrolysis technology • Pyrolysis reactor system • Cogeneration system

Project Summary	
Sector	Waste-to-Energy
Location	Příbram, Czech Republic
Capital Required	$11 million
Export Potential	$8 million - $9.5 million
Project Sponsor	GRYF, a.s.
Project Status	Pre-Feasibility

Project Discussion

Project Background

GRYF a.s. (GRYF), a private Czech stock company, was established in 1997 to promote and develop projects for recycling plastics and rubber material, especially rubber from used tires. The company's goal is to build waste rubber-recycling plants utilizing an advanced pyrolysis technology in the Czech Republic, developed by Conrad Industries and being marketed by Ecologic Technologies, Inc., U.S.A.

GRYF's management compared different methods of waste rubber recycling and processing and decided to utilize a vacuum pyrolysis technology developed by Conrad Industries. This technology permits the recycling of all plastic and rubber waste including casings from car batteries, thermoses, and laminates. The majority of the waste in the Czech Republic is composed of rubber from used tires but in the future, the share of plastic waste is expected to increase.

GRYF has decided to adopt Conrad Industry's pyrolysis technology because the technology:

- Is environmentally friendly.
- Does not produce a new waste stream and the overall waste is low.
- Produces products and by-products that have a wide range of applications.
- Recycles waste into basic raw materials (oils, gas, and carbon) and by-products (electricity, heat and steel).
- Has costs that are comparable to those of mechanical grinding equipment.
- Has lower energy costs – uses cogeneration systems to generate electricity and heat.
- Operates efficiently.
- Is economically and environmentally advantageous with nearly 100% of input material converted to useful products and by-products.

GRYF Waste Rubber Pyrolysis Project

Project Location

The new recycling plant will be located in Příbram, located in the center of Bohemia. The plant could service the middle and parts of western and northern Bohemia, including the cities of Prague, Příbram and Plzen.

Project Description

The proposed project will be designed to process 16,000 tons of waste annually – 12,000 tons of waste rubber and 4,000 tons of plastics. This material, after some initial processing, will be transferred to a pyrolysis reactor, where it is heated in an oxygen free atmosphere to a high temperature causing the hydrocarbon material in the waste to decompose and vaporize. The product gas leaving the reactor is then condensed to separate non-condensable gases from the oil product. The gas and the oil products are then utilized to produce electricity, heat and dry carbon. The dry carbon is reused in rubber production and for enriching organic-based fertilizer.

The project's annual output includes 3,801,051 m^3 of gas, 6,163 tons of oil, which can produce 4,265 MWh of electricity, 22,958 GJ of heat, 4,090 tons of carbon, and 601 tons of ferrous material.

GRYF has negotiated and is continuing to negotiate contracts for the supply of waste material and the sale of the products.

Project Guidance Parameters

Project Costs

GRYF has estimated that the total project cost for the project is $11 million (355 million CZK). The estimated potential value of U.S. exports is $8 million to $9.5 million.

Project Schedule

Planned Completion Schedule		
Activity	**Qtr**	**Year**
Feasibility study	2nd	2003
Project financing		2004
Engineering, procurement and construction		2005

Known Initiatives

GRYF has been promoting this project since 1997 and the company has focused on obtaining the necessary permits and authorizations for the project implementation and a number of approvals have been obtained.

Project Financing

GRYF expects to finance the project using available subsidies and grants from Czech Agencies, EU programs, and loans from commercial banks.

U.S. Competitiveness

The U.S. would potentially export the pyrolysis technology and the reactor system, turbines, special heat exchangers and engineering services during the design and start-up phase of the project. Conrad Industries and Kleenair will be the suppliers of the pyrolysis technology and system while other companies – such as Dresser Waukesha, and Caterpillar – could compete to supply other equipment.

The U.S. suppliers are expected to meet strong competition from European suppliers of pyrolysis technology and equipment such as Siemens, Noell, Thermoselect, and Global Advance Recycling.

Conclusion

This project is of strategic importance to GRYF, the region, and the Czech Republic. The project, if successful, enables GRYF to open the Czech and Central and Eastern European market to the deployment of a new technology for the recycling and processing of waste rubber and plastics. The project is consistent with the Czech government goals for meeting EU directives. The project could also result in substantial environmental benefits by reducing the dependence on landfills, thereby minimizing risks to the environment. In addition, the project provides export opportunities for U.S. equipment suppliers.

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PDI Plasma Gasification

New Plant Technology & Equipment
• Plasma gasification technology • Plasma torches • Plasma reactor • Power generation system • Waste handing equipment

Project Summary	
Sector	Waste-to-Energy
Location	Prague, Czech Republic
Capital Required	$87 million
Export Potential	Over $40 million
Project Sponsor	PDI a.s. and Solena Group
Project Status	USTDA funded feasibility study on-going.

Project Discussion

Project Background

Prvni Dubska Investorska a.s. (PDI), a Czech corporation specializing in energy production from biomass and waste, and Solena Group (Solena), a Washington D.C. based renewable energy company, are developing one of the first large scale waste-to-energy projects in the Czech Republic. The proposed project will be designed to process 160,000 metric tons per year of waste and convert it to energy in a plant utilizing an Integrated Plasma Gasification Combined Cycle (IPGCC) process. Solena is the licensor of the plasma gasification and vitrification (PGV) technology.

Project Location

The project sponsors have selected a location in Prague. The site location was determined based on the availability of waste, tipping fees, and optimization consideration.

Project Sponsors

PDI and Solena are the project sponsors.

PDI, established in 1999, is a Czech Republic registered company. PDI's primary business focus is the development, implementation, and operation of distributed cogeneration projects using landfill gas or other renewable resources. Since January 2001, PDI has been generating 12.5 MW of electricity and heat from one project using landfill gas.

Solena is a promoter and developer of waste-to-energy projects using Solena's PGV technology.

Project Description

The proposed project will be designed to convert 120,000 tons of MSW as well as 40,000 tons of tires and plastics annually. The source of the fuel is local industries that will sign long-term contracts guaranteeing a minimum amount of waste. The project will use Solena's IPGCC process, which is based on Solena's PGV technology. This technology gasifies organic wastes and

produces a clean synthetic gas that will be fired in a gas turbine in a combined cycle mode to generate electricity. The turbine exhaust will then be directed to a heat recovery steam generation (HRSG) unit for heat recovery and steam generation. The steam leaving the HRSG unit will either be exhausted into a steam turbine to generate additional electricity or sold to district heating systems and other steam users. The electrical output of the plant is estimated to be about 45 MW_e.

Solena's PGV system, utilizing plasma torches in a controlled environment, is able to generate plasma at temperatures as high as 14,000°C. At these high temperatures, organic material such as plastics, paper, coal, and tires dissociate into basic gases, most of which are converted by the Solena's PGV process into carbon monoxide and hydrogen. This synthesis gas is used in a turbine to produce renewable power. The plasma reactor operates in an oxygen-deprived atmosphere. Thus, the PGV system is neither an incinerator nor a combustion system, but it is a gasification and vitrification system. Any inorganic material, such as metals, glass, and soils contained in the feedstock, is melted and cooled into a vitrified and inert slag, which can be used as construction material.

Scope of the Feasibility Study

The objective of the on-going feasibility study, funded by USTDA, is to evaluate the technical and economic viability of the project. The feasibility study's major tasks include:

- Feedstock data collection and analysis
- Conceptual design
- Estimating capital and operating costs
- Economic analysis

Project Guidance Parameters

Project Costs

The total capital cost for the project is estimated to be about $87 million, of which $40 million to $70 million will account for the value of the goods and services that are expected to be exported from the U.S.

Known Initiatives

Solena and PDI met with and received firm interest from both Czech and European utilities interested in investing and/or participating in the project. PDI and Solena have also met with both Czech and international financial institutions for the arrangement of the project debt financing. In addition, the sponsors met with the City of Prague and its City Council, Ministry of Environment, and with other companies and municipalities interested in working with Solena and PDI on new projects in the Czech Republic.

Project Schedule

Planned Completion Schedule		
Activity	**Qtr**	**Year**
Feasibility Study	1st	2003
Financial Close	4th	2003
Engineering Design and Construction	4th	2003

Project Financing

The proposed structure for the financing of the capital investment will consist of approximately 30% equity and 70% debt financing. This ratio may change depending on the number of interested equity investors, the lending institutions' requirements, and on subsidies from Czech Government Agencies and the European Union.

PDI, Solena and other investors will arrange for the equity. Solena has already contacted

some potential equity investors. Debt financing is anticipated to be arranged through a consortium of international financial institutions in the Czech Republic, the EU and the U.S. including IFC and Ex-Im.

U.S. Competitiveness

Solena has assembled a group of U.S. companies including Stone & Webster, Westinghouse Plasma Corp, WRIB Manufacturing, and GE Power Systems to provide the engineering design, procurement, and construction (EPC) services, and equipment that would be required for implementing this project. European suppliers such as Europlasma of France and MGC Plasmox of Switzerland are expected to compete with U.S. suppliers for the project.

Conclusion

The project feasibility study is underway and the preliminary results are encouraging. The implementation of the IPGCC plant in Prague addresses the Czech Republic's need to meet EU requirements for waste management and production of renewable power. The feasibility study will demonstrate that such an IPGCC plant has a high probability of success. The project sponsors presented the project to national and international financial institutions and the financial closing is expected to take place in the fourth quarter of 2003.

In addition, the implementation of this project will benefit the environment and the public health in the Czech Republic, and provide a new source of clean and safe renewable power.

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Plzenska Teplarenska Waste-to-Energy

New Plant Equipment
• Mass burning incinerators • Air pollution control equipment • Boilers

Project Summary	
Sector	Waste-to-Energy
Location	Plzen, Czech Republic
Capital Required	$41.5 million
Export Potential	$24.6 million
Project Sponsor	Plzenska Teplarenska
Project Status	USTDA funded feasibility study in progress

Project Discussion

Project Background

Plzenska Teplarenska, a.s. (PT) is the largest thermal energy generator and distributor in West Bohemia. It was incorporated as a joint stock company in 1994. The company's primary interests are the production and distribution of heat and power in Plzen, where it serves nearly 40,000 households and several government and commercial building operations. The company was authorized by its largest shareholder, the City of Plzen, to build and operate a combined heat and power plant, which uses MSW as fuel. MSW feedstock would be obtained from private solid waste collectors both from within Plzen and its outskirts. PT estimates that about 120,000 metric tons of MSW is available as feedstock per year.

Project Description

The project envisions two incinerators each capable of handling 12 metric tons of waste per hour plus additional systems for co-generating heat and power at its main CHP plant. The project is also considering burning municipal wastewater treatment sludge as a supplemental fuel source.

The main CHP station is equipped with six coal-fired boilers and has a total thermal energy capacity of 468.4 MW_t, plus two generator-turbines with a total electricity capacity of 105 MW_e. The thermal energy capacity of the station has been supplemented, to meet seasonal demands, with heat boilers installed in five satellite stations with a combined capacity of 157 MW_t. In 1999, PT sold 3,587 TJ of heat and 342.7 GWh of electricity. The total revenue in 1999 (predominantly from sales of heat and power) was about $35 million. Recent discussions with corporate managers indicate current revenues to be comparable to the 1999 data.

MSW will be burned in the incinerators and the heat released will be recovered to produce steam. The steam will then be used either for district heating or in a turbine-generator for generating electricity. The energy generated by the waste-to-energy project would be a small but significant addition to the company's revenue. Due to its central location for receiving MSW and the existence of some of the auxiliary equipment needed in the project, the main heat and power station at Doubravecka is the

preferred location for the waste-to-energy project. Plzen has a good infrastructure with roads and rail to the rest of the region, providing easy access for plant feedstock. The CHP at Doubravecka is located in an industrial zone and can receive MSW directly by rail, which is currently being used to receive coal.

The City of Plzen expects the municipal charge on landfills in the region to be around 300 CZK (about $9.30) per metric ton next year. This charge will gradually increase in the following years by about 100 CZK per metric ton per year. This project offers significant reductions in disposal fees and should yield net revenues through sale of energy generated by burning the solid wastes.

Project Guidance Parameters

Project Costs

Budgetary estimates, based on a pre-feasibility study for the construction of a new facility is about $41.5 million.

Scope of Feasibility Study

A feasibility study has been commissioned by USTDA. The main objective of the feasibility study is to screen the appropriate technologies and establish both the technical and economic basis for implementing the proposed waste-to-energy project. In achieving this objective, the feasibility study will consider alternative locations for the project and the needs for connecting these locations to the existing heat and power distribution networks in the Plzen region. The study will also consider the possibility of using the wastewater treatment sludge being generated at the local sewage treatment plant as supplemental fuel in the project.

Project Schedule

This project is in the early stages of development with long lead times.

Planned Completion Schedule

Activity	Qtr	Year
Feasibility study	1st	2003
Construction contract documents and final environmental impact assessment		2003
Permits and approvals of project location and product standards		2004
Construction permits and application for project financing		2005
Contractor selection, final project financing		2006
Construction		2007

Known Initiatives

PT has conducted preliminary studies that resulted in tentative decisions on the size and location of the project. PT also recognized the need for a detailed feasibility study and requested a USTDA Grant to perform this study. The feasibility study will enable the selection of a location and technology for the project. HDR Engineering, Inc. of Minneapolis, MN was selected to perform the feasibility study.

Project Financing

PT expects to finance a portion of the total project cost from its own resources. In addition, debt financing could be available from Czech Savings Bank and the Raiffeisenbank. The feasibility study will examine financing options in greater detail.

U.S. Competitiveness

This facility was estimated to have a U.S. export potential of $24.6 million. The U.S. export potential would involve the supply of equipment as well as the supply of engineering services during project implementation. It is estimated that U.S. exports in the project will create about 25 to 30 man-years of work, with most of the jobs being created in the manufacturing sector. The equipment cost, which offers the greatest U.S. potential, would mainly involve the purchase of incinerators, boilers and air pollution controls.

There would be significant competition from European companies such as Martin GmbH of Germany and SLP Engineering of the U.K. for supplying the incinerators, boilers and auxiliary systems for the project. Some of these companies are providing waste-to-energy technologies in the Czech Republic.

Conclusion

This project is of strategic importance to the region and the Czech Republic. The project enables the City of Plzen to assist the Plzen region in preparing a program for integrated waste management in the region. The Czech Ministry of Environment has required the development of regional waste management programs as a part of the implementation of the new WMA nationwide. The regional programs for waste management can also be used by the government to support its application for a transition period for meeting the environmental objectives of the European Commission and to accelerate the process of joining the European Union. The project could result in substantial environmental benefits by reducing the dependence on landfills, thereby minimizing risks to the environment. It will also provide significant export opportunities for U.S. technology providers.

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City of Valasske Mezirici Waste-to-Energy Project

New Plant Technology & Equipment

- Shredders and conveyors
- Fluidized bed combustor/gasifier
- Heat recovery boilers
- Steam hot water exchangers
- Hot-water gas boiler
- Steam turbine
- Magnetic separator, air/gas compressor, pumps, tanks, switch gears, etc.

Project Summary	
Sector	Waste-to-Energy
Location	Valasske Mezirici, Czech Republic
Capital Required	$24.1-$26.2 million
Export Potential	$20 million
Project Sponsor	Municipality of Valasske Mezirici
Project Status	USTDA funded feasibility study completed

Project Discussion

Project Background

The DEZA chemical plant supplies heat to the Municipality of Valasske Mezirici for use at the municipality central heat distribution system. The existing system is old and in poor condition, requiring Valasske Mezirici to engage in a comprehensive re-construction of the central heat generation and distribution system. The municipality is planning to build a waste-to-energy plant for the generation of both heat and electricity. This plant will consume a maximum of 89,100 metric tons of waste and biomass a year and provide 314 TJ/year of heat and between 3.0 - 6.5 MW of electricity. Studies show that there is an abundant supply of MSW in the area – 90,000 metric tons a year. In addition, 29,217 metric tons a year of biomass, in the form of wood waste, can be purchased from wood processing companies in the area. Currently, MSW is deposited at landfills that charge a "tipping fee". The Municipality will charge a lower fee for accepting the area's MSW. The new plant will also be designed to meet Czech Republic and EU emissions limits, especially for dioxins and furans.

When completed, this project will help the Municipality of Valasske Mezirici meet its heating requirements while meeting regulatory and compliance requirements established by the government. This project will also help reduce pressure on the area's landfills.

Project Location

Two project sites, located in the Municipality of Valasske Mezirici; about 90 miles southeast of Prague, have been evaluated.

Project Sponsors

The project is sponsored by the Municipality of Valasske Mezirici. The Municipality will provide the project site and will own and operate the facility.

Project Description

The Municipality of Valasske Mezirici plans to build and operate a modern central heat co-generation plant that will be fueled by the region's MSW and wood-waste. The Municipality decided on the use of MSW and wood waste as a fuel source for the new plant because of the availability of local supply capable of meeting the plant's fuel requirements and because the Municipality could charge a tipping fee for the disposal of the MSW. Valasske Mezirici requested and received funding from USTDA for a feasibility study assessing the technical, economic and financing viability of the project. This feasibility study was completed and the results are promising.

The feasibility study examined two technologies for use in the project: a gasifier and a fluidized bed combustor. In the first case, volatiles and organic matter are converted to a combustible gas that is then burnt in a cycloburner in a highly turbulent environment. The heat from the combustion chamber is then used to generate steam in a heat recovery boiler. In the latter case, the waste is burned in fluidized bed combustion boiler to generate steam.

In both cases, the steam is then sent to a steam turbine capable of producing between 3.0-6.5 MW of electric power. This power can be used in the plant or sold to the local grid. Steam can be extracted from the turbine as needed and sent to steam-hot water exchangers in order to meet Valasske Mezirici's heating requirements of 314 TJ per year. The plant will also be equipped with an auxiliary hot-water gas boiler in order to meet peaking heat demand requirements.

Any residual solids – clinker, bottom ash, and fly ash – will be continuously removed, processed and then stocked at a secured city landfill. The landfill size required for the depositing the residual solids will be significantly smaller than the size required for disposal of the MSW.

Project Guidance Parameters

Project Costs

This Valasske Mezirici facility is estimated to cost between $24.1 and $26.2 million with over $20 million potential for the import of technology, equipment, and services from the U.S.

Known Initiatives

Duke Energy Services carried out a USTDA funded feasibility study that assessed the technical, economic, and financing viability of the project. The Study was completed successfully in 2000.

Project Schedule

Planned Completion Schedule		
Activity	**Qtr**	**Year**
Feasibility Study	1st	2000

Project Financing

The sponsor is investigating a variety of methods to finance the project including: obtaining an equity partner, debt financing from domestic and international commercial banks, bank credits, grants, and subsidies.

U.S. Competitiveness

Studies of the project show that negotiations for a sole source contract are unlikely due to Valasske Mezirici's desire to minimize costs

by arranging for competitive bidding by the suppliers of the various components of the plant.

The fluidized bed combustor technology evaluated by the feasibility study is licensed by Energy Products of Idaho (EPI), a U.S. based company.

Since Valasske Mezirici is looking to minimize costs, pricing will be critical for U.S. equipment suppliers. U.S. firms such as Modular Manufacturing of Vancouver, WA; York Shipley – Donlee Technologies of York, PA; Church & Dwight Co., Inc. of Princeton, NJ; and Trigen Ewing Power of Turner Falls, MA are expected to be competitive in bidding equipment such as waste sorting equipment, waste-heat boilers, flue-gas cleaning equipment, and the steam turbine.

Conclusion

The project feasibility study was completed. The results are encouraging and the project sponsor is seeking financing for the projects. The project is consistent with Czech government goals for meeting EU directives. The project could also result in substantial environmental benefits by reducing the dependence on landfills, thereby minimizing risks to the environment. In addition, the project provides export opportunities for U.S. equipment suppliers.

In addition to the environmental benefits, the implementation of this project will have positive economic impact for the Municipality of Valasske Mezirici.

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Druid Biomass Waste-to-Energy

New Plant Equipment
• Microturbine
• Gasifiers
• Gas compressors and turbines
• Heat exchangers
• Agricultural machines
• Communication and control systems

Project Summary	
Sector	Bio-energy Utilization
Location	Plzen, Czech Republic
Capital Required	$1.5 million
Export Potential	$1 million
Project Sponsor	Druid a.s.
Project Status	USTDA funded feasibility study underway

Project Discussion

Project Background

Druid a.s. (Druid) is an agricultural firm providing agricultural and forest products in West Bohemia. Druid was formed in 1996 as the holding company for nine agricultural companies with operations spanning over 18,000 hectares of land. In addition to selling agricultural products, Druid is involved in the distribution and sale of fuel and fertilizers. Druid subsidiaries are also involved in the processing of food and the manufacturing of furniture. Its capital investment included the purchase of U.S. equipment from John Deere, Massey, Ferguson and Ford. Druid anticipates its agricultural activities to expand to 50,000 hectares, which would increase its annual revenues to $80 million from its current level of about $54 million. This expansion is also expected to increase its annual investments to $6 million – from $3 million – in the near future.

Druid is seeking suitable technology and a viable strategy for implementing bio-energy projects throughout its business units. It is considering the installation of co-generation units that could utilize the waste generated from Druid's operations. This project will commence with the installation of a plant at Podhoran Cernikov a.s., a subsidiary of Druid. Based on the performance of this plant, Druid would consider similar installations at 9 or 10 other subsidiary companies. Druid is also interested in supplying similar co-generation units to other rural areas in the Czech Republic.

Project Description

The plant will be designed to supply heat and electricity for poultry farming at Podhoran Cernikov. This operation is very sensitive to energy supplies and currently uses about 2,000 MWh of heat and 1,000 MWh of electricity per year. The pilot plant should meet peak demands of 400 kW to 500 kW of heat and 200 kW to 250 kW of electricity. The pilot plant could also supply some electricity to the local grid. Heat supply to the poultry farm has been unreliable because the local boiler is old and has limited access to gas. Podhoran Cernikov generates adequate quantities of

biomass (sawdust, wood chips and agricultural product residues) from its other operations to meet its energy needs.

Druid contacted USTDA for a grant to perform a feasibility study of the project. USTDA has approved Druid's request; and Druid will soon select a feasibility study contractor on a competitive basis.

Druid will obtain the necessary local information for the study. In-country technical support to the study will be provided by SUDOP Praha a.s., which is providing consulting services to Druid. The feasibility study will also enable Druid to evaluate alternative technologies and alternative mechanisms for implementing the project.

Project Guidance Parameters

Project Costs

Druid estimates that the first plant would cost between $1.2 million to $1.5 million. After deducting construction costs from this estimate, Druid estimates that the U.S. export potential for this project is around $1 million and would be around $7.5 million for all similar projects at Druid subsidiary companies.

Scope of Feasibility Study

A feasibility study has been recommended to assess alternative technologies for co-generation of energy in the pilot plant and to assist in making technical and financial preparations for installing the pilot plant. The study will also develop an economically viable strategy for the remaining phases of the project and develop a business plan for implementing this strategy.

Project Schedule

This project is in the very early stages of development and a schedule has not been developed beyond the feasibility study that is expected to be completed within the first quarter of 2003.

Known Initiatives

Druid is working with a local consulting firm to facilitate the feasibility study. They have made estimates of the total capacity requirements for heat and electricity that can be used at ten of their subsidiaries. Druid reported that the Board of Directors for Podhoran Cemikov has already decided to install new energy generating capacity and commenced a preliminary study to find a site for the pilot plant. Its current priority is to make a decision on suitable technology for the pilot plant.

Project Financing

Druid expects to finance 40% of the project's total capital cost from its own resources and the remaining 60% from bank loans. Druid is also exploring the opportunities for receiving financial assistance in the form of subsidies and/or low interest loans from the Czech Ministry of Environment. A successful completion of a pilot plant will improve Druid's chances for assistance from the Czech Republic government agencies.

U.S. Competitiveness

Druid estimates that the U.S. export potential of the first plant is around $1 million. If similar systems are installed to meet the energy needs of other locations, it can be further estimated that the U.S. export potential of all units in Druid's project portfolio is about $7.5 million.

The U.S. export potential would be mostly in the purchase of advanced systems for wood or mixed fuel gasification and energy generation by using gas directly. The boiler systems might need special heat exchangers in combined heat and power generators. The engineering services would be limited to system design and assistance during plant start up. Potential U.S. suppliers of equipment/systems include microturbines (Capstone, Elliott), gasifiers and boilers (HS TARM), gas compressors and turbines (Atlas, Copco, Solar), and heat exchangers (Solar, NREC). Additional export potential exists in engineering design and the supply of auxiliary equipment and systems for the project. These items would include agricultural machines for preparing biomass for use in the gasifiers and communication and control systems for remote operation of the co-generation units. Druid has estimated that these items would cost around $2 million for the entire project.

There are several co-generation technologies utilizing biomass in Sweden and Denmark, which lead Europe in waste-to-energy projects. Germany has also been developing new technologies and applications for biomass utilization.

Conclusion

Despite the fact that this project is small, it has significant environmental benefits that make it attractive and a strong candidate for subsidized funding. The project will prevent the need for land disposal of nearly 30,000 tons of biomass per year and replace the use of large quantities of brown coal in the Czech Republic. Advanced wood gasification and combustion technologies can also reduce ammonia and NO_x emissions.

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New Plant Technology & Equipment
• Anaerobic gasification • Microturbines • Control system

Project Summary	
Sector	Waste-to-Energy
Location	Oder, Czech Republic
Capital Required	$4.5 million
Export Potential	$1 million
Project Sponsor	Statek Dalovice a.s.
Project Status	Pre-Feasibility

Project Discussion

Project Background

Statek Dalovice, a.s. (SD), an agricultural concern located in West Bohemia, is planning to construct bio-energy plants for the production of heat, electricity, organic fertilizers and compost. These plants will be fueled mainly by waste slurries generated at SD's operations in the Karlovy Vary region. The first project will be installed as a demonstration plant at a pig farm in Oder.

SD was established in 1992 as the managing entity for a pig breeding business based in Oder and is a member of ZRUD a.s., one of the largest meat producing, processing and slaughtering companies in the Czech Republic. In the Czech language, the letters ZRUD stand for farming, butchers, and pig butchers trade and distribution – the main activities of the member organizations. SD is also concerned about the disposal of waste and the remediation of soil in the Karlovy Vary region.

SD anticipates that its agricultural and other activities will expand to 2,000 hectares in the near future.

Currently, SD raises approximately 18,000 pigs annually, producing 2,800 tons of meat. In 2001, SD's revenue was about $3.6 million.

It is estimated that SD spends nearly $210,000 per year in purchasing heat and electricity for its operations.

Project Location

The plant will be located at Oder in the Karlovy Vary region of the Czech Republic.

Project Description

Pig breeding operations are very sensitive to energy supplies. SD currently requires about 15,000 GJ of heat and 2,300 MWh of electricity per year. The proposed plant will be designed to meet peak demands of 1,500 kW of heat and 550 kW of electricity. The plant will supply electricity to SD and any excess electricity will be sold to the local utility. Heat will be used for the operation of the farm.

The project is anticipated to be economical due to savings in energy, sale of excess power, and a prevention of loss in revenues

due to interruptions in the supply of heat or electricity.

The plant will be designed to convert waste to biogas in anaerobic bio-reactors. The gas will be used to generate heat and electricity, primarily, to SD's pig breeding operation in Oder. The residual solid products from the anaerobic reactors will be supplied to SD and other customers as organic fertilizers and compost.

The technical and economic viability of installing a co-generation unit using biogas at this location need to be assessed. The appropriate anaerobic technology needs to be selected and demonstrated for converting slurry waste to biogas. Fuel quality and quantity at other locations should also be closely examined to assess the viability of duplicating the project at other sites. The total capacity of co-generation units that could be potentially installed at all nine locations would be at least 4.0 MW for heat and 2 MW for electricity.

SD's project, if successful, also has the potential to be implemented by other agricultural firms in remote locations in West Bohemia and the Czech Republic.

Project Guidance Parameters

Project Costs

SD estimates the total project cost for the first project is $4.5 million to $5.0 million. The estimated U.S. export potential for this project is approximately $1.0 million. The total estimated costs for all the SD's bio-energy projects is $10 million to $15 million with a minimum U.S. export potential of $6.5 million.

Project Schedule

This project is in the early stages of development with the following planned schedule, for completion of the various activities.

Planned Completion Schedule		
Activity	**Qtr**	**Year**
Feasibility study	1st	2003
Construction contract documents and final environmental impact assessment	2nd	2003
Project financing		2004
Engineering, procurement and construction		2004 - 2005

Known Initiatives

SD's Board of Directors has already decided to install new bio-energy plants to produce energy, compost, and organic fertilizer. Arrangements have also been made for financing the project, based on the Czech government support provided by the State Environmental Fund (SEF), corporate resources, and bank loans. SD's current priority is selecting the appropriate technology for the project.

Project Financing

SD expects to finance the first project by obtaining 30% from grants, 40% from a zero percent interest loan payable in 12 years, and 30% from equity. Equity will be provided from internal resources and bank loans secured by current assets.

SD has explored the potential for receiving subsidies and other types of financial support from SEF and believes that SEF will support other projects, provided that this first project is implemented successfully.

U.S. Competitiveness

The U.S. export potential would mostly include advanced systems for power generation, special heat exchangers and limited engineering services during the

design and start-up phase of the project. Potential U.S. equipment suppliers include Dresser Waukesha, Caterpillar, Corken, Airel Corportation, FlatPlate, and Paul Mueller Company.

The U.S. equipment suppliers are expected to meet strong competition from European suppliers such as Inventor ApS of Denmark and Proman Energy Ltd of the U.K. European companies are known as the leaders in manufacturing and supply of co-generation systems for biogas applications.

Conclusion

This project is of strategic importance to the region and the Czech Republic. The project enables SD and the Karlovy Vary region to meet new requirements for waste management. The project is consistent with Czech government policies for meeting EU directives. The project could result in substantial environmental benefits by reducing the dependence on landfills, thereby minimizing risks to the environment. It could also provide export opportunities for U.S. equipment suppliers.

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2001 GDP (in $ Billion)	5.5
2001 GDP Growth	5.0%
2001 GDP Per Capita ($)	3,929
Population (Million)	1.4
Credit Rating (8/8/2002)	A-

Source; The World Bank, 2002; Standard & Poor's, 2002

Executive Summary

Estonia is a net exporter of electricity and hopes to sell excess power to Finland and Sweden through an underwater cable. Estonia's primary energy resource is oil shale. Estonia is the world's largest producer of oil shale. Unfortunately, oil shale is a highly polluting fuel source and EU accession requirements dictate that Estonia must decrease its reliance on oil shale. Estonia desires to continue to export electricity and to meet EU environmental requirements. Therefore, it is increasing its share of renewable energy and making financial support available from state funds available for renewable energy projects, closing oil shale mines and landfills. State funds such as the Environmental Investment Center, support activities that reduce pollution, promote renewable energy, and encourage the recycling and recovery of waste through grants. The EIC was established in May 2000 as a successor to the Estonian Environmental Fund and EIC. Its funds are appropriated by mostly national and local governments.

Estonia's desire to join the EU has resulted in implementing policies that have led to macro-economic stability, a friendly investment climate, and economic success. The government's policies have also attracted a high rate of foreign direct investment (FDI).

Waste-to-Energy and Renewable Energy

As it prepares for possible accession to the EU in 2004, Estonia has been harmonizing its renewable energy policies with those of the EU. In the EU white paper, *Energy for the Future: Renewable Sources of Energy (1997)*, the EU set the objective of a 12% contribution of renewable energy to gross energy consumption by 2012. In addition, EU policy relating to the Kyoto Protocol involves cutting CO_2 emissions by 8% of 1990 levels by 2008-2012. Both of these EU policies are being adopted by Estonia. To help meet these goals, Estonia has been pursuing and implementing a variety of programs, incentives, and policies that will help promote the use of renewable energy. These policies include: amending the Energy Act to establish favorable terms for the purchase of renewable energy, amending the value-added tax (VAT) Act to eliminate the VAT on renewable energy sources, providing funding for renewable energy pilot projects, and developing state and foreign assistance based programs for developing biomass, peat, and other renewable energy projects.

Estonia has also been drafting policies and regulations on the handling and disposal of solid wastes based on EC directives. EC

directive 94/62/EC requires that by the end of 2005 at least 50% of packaging wastes are recovered and that at least 15% of packaging materials are recycled. EC directive 99/31/EC states that land disposal of whole tires will not be allowed after 2002 and that shredded tires will not be allowed after 2005. Also, biodegradable waste going to landfills must be reduced by implementing recycling, composting, biogas production, or energy recovery programs and projects. Specifically, biodegradable municipal solid wastes going to landfills by the end of 2005 should be less than 75% of the 1995 amounts. By the end of 2009, the land disposal of MSW should be reduced to at least 50% of the 1995 levels. In support of these directives, Estonia is implementing the gradual closure of environmentally hazardous small landfills by 2009, preparing policies for the separation and recycling of biodegradable and packaging wastes.

Estonia is providing funding for these programs through a variety of national funds, local funds, and foreign assistance. In addition, EBRD is also actively seeking renewable energy projects to support in Estonia.

Heat and Power Generation

Estonia's primary source of energy is oil shale; the country accounts for 70% of the world's oil shale production. Estonia does not posses any significant coal, natural gas, or oil reserves.

Estonia has 14 thermal power stations, four of which are fired by oil shale, nine by diesel, and one by natural gas. Two of the oil shale plants, the 1.6 GW Eesti Power Station and the 1.39 GW Balti Power Station, produce 90% of Estonia's electricity. The oil shale plants and the natural gas plant are also heat co-generation plants.

A few small hydropower plants serve some villages and some peat and wood waste is used at some district heating plants.

Estonia is a net exporter of electricity. In 2000, Estonia generated 7.1 billion kWh of electricity, of which 1.2 billion kWh was exported. Estonia is hoping to be able to export power to Finland and Sweden through the Estlink Project, which is an underwater cable crossing the Baltic Sea. The project is expected to cost $100 million and is accepted by the Trans European Networks financial aid program of the EU. However, a decision on implementation of the project has been delayed due to the low electricity prices in the Nordic electricity market. As of the spring of 2002, all consumers, large and small, have the right to choose their electricity supplier.

Estonia possesses five combined heat and power plants with a total capacity of 2,283 MW_t. Of this capacity, 64% is fueled by oil shale and the remaining 36% is fueled by natural gas. Estonia has over 4,500 boilers producing over 8,000 GWh of heat; the country has been decommissioning oil shale fired heat capacity in order to meet EU air emission requirements.

Political and Economic Climate

Since regaining independence in 1991, Estonia has embraced market reforms and has sought a place in the European Union by introducing price and trade liberalization, small and large-scale privatization, and financial sector reform. These reforms led to a balanced budget, a stable currency, and liberal trade and investment laws. A decade of macro-economic stability, a growing integration with Scandinavian and other western markets, and a faithful adherence by the government to the policy of unity with the rest of Europe all provide a basis for Estonia to become one of the first transition countries to achieve accession with the EU.

The economy grew by 5.5% in 2001 and has averaged a growth rate of over 5% since 1995 due to the increase in exports and a high level of investment. Growth of the economy in the near-term is expected to be between 5% and 6% as Estonia nears accession with the EU in 2004.

The inflation rate increased from 5.0% in 2000 to 5.8% in 2001 due to a change in oil prices and the stability of the Euro, to which the Estonian kroon (EEK) is pegged. The inflation rate is expected to be in the 4% to 5% range for the near term.

Investment Climate

Foreign domestic investment in Estonia has steadily increased each year since 1996 and was $354 million in 2001. Cumulative net FDI in Estonia through 2001 totaled $2.7 billion. The U.S., with a 9.5% share of cumulative net FDI, is the third ranked investor in Estonia with a 9.5% share of cumulative net FDI. Sweden and Finland rank first and second with respective shares of 39.5% and 25.4%. In recent years, most of the FDI has come from the financial sector, but FDI from the privatization of large-scale infrastructure and utilities is expected to dominate the next few years. Pending the actual final sale of the remaining state-owned enterprises, the privatization process is considered to be complete in Estonia.

Estonia's goal of EU accession has created one of the most favorable investment climates and consistent open-market-oriented economies in Central and Eastern Europe. Business laws and practices in Estonia are harmonized and are in line with EU laws and regulations. Foreign investors do not encounter obstacles. They are permitted in all areas of industry and are granted national treatment. In addition, there are no restrictions on the repatriation of profits. The only capital transactions that have some restrictions are investments in real estate by non-residents.

The individual corporate and income tax rate in Estonia has a flat rate of 26%. In addition, the government has abolished the taxation of profits as long as the profits are re-invested within Estonia.

Estonia is a member of the World Trade Organization (WTO), and the Baltic Free Trade Agreement (BFTA). As a member of the WTO, Estonia is essentially a duty-free country with few non-tariff barriers. Finland and Sweden are Estonia's two most important trading partners with 31.3% and 19.8% shares respectively of Estonia's exports and 37.2% and 10.6% shares of Estonia's imports. Machinery and equipment, timber and paper products, and clothing are Estonia's primary exports. Machinery and equipment, chemical products, and clothing are Estonia's primary imports.

U.S. Presence

U.S. companies have had success in doing business in Estonia. Up to August 2002, Cinergy Global Power Incorporation was a major shareholder in the Narva Utility at which time Cinergy shares were sold to Sthenos Group, Estonia. Other U.S. companies that have successfully invested in Estonia are Bristol Meyers Sqibb in pharmaceuticals; Coastal Holding Inc. in oil terminals; Oracle in computers; Velsicol Chemical Corp of Rosemont, Illinois in refined benoiz acid and other chemicals; DeRoyal of Powell, Tennessee in medical equipment and supplies; American International Group in insurance; Stanton Capital Corporation in shipping; and Coca Cola in soft drinks.

Useful Web Sites	
Global Environmental Facility (GEF)	http://www.gefweb.org
European Bank of Reconstruction and Development (EBRD) Investment Profile	http://www.ebrd.com/pubs/index.htm
DOE Office of Fossil Energy Country Profile	http://www.fe.doe.gov/international/e-eur.shtml
DOE Energy Information Administration (EIA) Country Analysis Brief	http://www.eia.doe.gov/emeu/cabs/contents.html
World Bank Country Profile	http://lnweb18.worldbank.org/eca/eca.nsf
Environmental Investment Center (EIC)	http://www.rec.org/REC/Programs/REAP/REAP19/PDF/visit_prague_eefinancing.pdf

Ahtme CHP Plant Renovation

New Plant Equipment
• Boilers • Steam turbines • Emission monitoring and control systems • Fans, blowers, heat exchangers, etc.

Project Summary	
Sector	Renewable Energy
Location	Ahtme, Estonia
Capital Required	$41 million
Export Potential	$20 million
Project Sponsor	Kohtla-Järve Soojus AS
Project Status	Pre-Feasibility

Project Discussion

Project Background

Kohtla-Järve Soojus AS (The Company) is a joint stock company owned by the City of Kohtla-Järve and Eesti Energia, a State-owned energy company. The City of Kohtla-Järve holds 40.8% of The Company's shares and Eesti Energia holds the remaining 59.2%.

The Company operates the Kohtla-Järve and Ahtme combined heat and power (CHP) plants in Ida-Viru County in Northeast Estonia.

In 1999, The Company produced 605,886 MWh of thermal energy – 228,365 MWh at Kohtla-Järve and 377,521 MWh at Ahtme CHP plant. In 1999, the total electric power output was 141,764 MWh, of which 89,305 MWh were produced at the Kohtla-Järve CHP and 52,459 MWh at the Ahtme CHP. Both plants use oil shale as their main fuel source.

The Company is:

- The second largest heat network operator in Estonia;
- The third largest seller of heat in Estonia;
- The third largest producer of electricity in Estonia;
- One of the few oil shale fueled utilities in the world

Sales of heat, district heat with household water supply, and industrial steam account for 78.8% of The Company's net sales. The majority, 74%, of heat is sold to residential consumers. Electricity is sold to electric power distribution companies such as Eesti Energia AS, Eesti Põlevkivi AS, Silbet AS, and Viru Energia AS.

The Company has approximately 25,000 clients with nearly 70,000 consumers. It provides heat to the town of Kohtla-Järve (Järve and Ahtme districts), the town of Jõhvi, as well as the Jõhvi and Kohtla rural municipalities. The Company's district heating market share is about 95% – one of the highest in Estonia.

The cities of Ahtme and Jõhvi are supplied with heat produced at the Ahtme CHP plant.

Jõhvi is located 165 km east of Tallinn, the capital of the Estonian Republic, has a population of 14,000, and is the seat of Ida-Viru County.

Project Description

The existing CHP plant at Ahtme is old. It was commissioned in 1951. The plant consists of five oil shale fired boilers, with a capacity of 48 MW_t each, and two turbines. Two of the boilers operate at 40 bars and the other three operate at 30 bars; steam temperature is 420°C.

One of the turbines generates 20 MW of electricity and 102 MW of heat and is operated in back pressure mode in the winter. The second one is a condensing turbine with extraction, capable of generating 10 MW of electricity and 36 MW of thermal energy and is used mostly in the summer time. The plant's efficiency is rather low because of old technology.

Multicyclones and electrostatic precipitators were installed at the Ahtme CHP plant but flue gas cleaning efficiency is very low. The plant does not have any flue gas desulfurisation systems. Therefore, atmospheric emissions are high: 728 tons/year of particulate, 2,661 tons/year of SO_2, and 227,082 tons/year of CO_2.

In addition, the fly and bottom ash is removed and deposited in a 44.6-hectare ash pond, which is causing high environmental risk and has a negative impact on the environment. One of the primary concerns is the alkaline nature of any water run-off or leaching from the pond.

Although the plant is operating in compliance with current environmental requirements and operational permits, it will not meet future environmental requirements set by EU directives 2001/8/EC and 1999/31/EC, which Estonia has agreed to meet by early 2008 for air emission and for oil shale ash disposal by mid-2009.

To meet these requirements, The Company plans to replace the existing systems at the Ahtme CHP plant with a new system. The new system will consist of a bio-fueled[1] CHP unit that produces 50 MW of thermal energy and 20 MW of electricity and three or four natural gas-fired boilers. The gas-fired boilers will meet the thermal peak load and will serve as a back-up bio-fueled unit. The new system will be equipped with the necessary emission monitoring and controls as well as waste management systems.

Project Location

The Ahtme CHP plant is located in Ida-Viru County in Northeast Estonia and has existing infrastructure to support the construction and operation of the proposed plant.

Project Guidance Parameters

Project Costs

The total cost of the project is estimated to be approximately $41 million. The U.S. export potential is estimated to be about $20 million for this project.

Schedule

This project is in the early stages of development. The technical and economic viability of the project needs to be assessed and financing alternatives need to be developed and evaluated before a project schedule can be competed. However, The Company plans to have this plant operational by 2007.

[1] Peat is considered to be a bio-fuel.

Ahtme CHP Plant Renovation

Planned Completion Schedule		
Activity	**Qtr**	**Year**
Detailed feasibility study	2nd	2003
Financing, engineering, design and procurement		2004 - 2005
Plant construction and start-up		2005 - 2006

Known Initiatives

A pre-feasibility study was completed in late 2001. This study screened various options for meeting the future energy load, both thermal and electric, at the Ahtme CHP plant. Based on this study, The Company has submitted an application for technical assistance from ISPA[2].

Project Financing

The Company anticipates financing this project using a combination of internal resources, loans, and grants.

U.S. Competitiveness

Foster Wheeler, one of the world's leading suppliers of boilers and other power plant equipment, is one of the candidate suppliers being considered by The Company. Foster Wheeler could competitively supply the required biomass-fired boiler including the necessary emission control systems as well as other power plant equipment provided the project financing is not tied.

Foster Wheeler is also expected to meet strong competition from Finnish equipment suppliers such as Fortum, Empower, Sermet, and Wartsila.

[2]ISPA funds are tied and cannot be used for the purchase of U.S. equipment or services.

Conclusion

This project is of great importance to the development of the biomass based energy market in Estonia. CHP and power plants using oil shale as fuel face difficulty meeting anticipated environmental emission limits. Oil shale mines are also being closed. Successful implementation of this project could lead to the development and implementation of a number of other projects. This project also has a high priority for The Company, as the existing plant is old, inefficient, and would not be able to meet upcoming environmental regulations. It could also provide significant export opportunities for U.S. equipment suppliers, particularly Foster Wheeler.

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New Plant Equipment
• Biomass fuel handling equipment
• Boilers
• Turbines
• Windmills

Project Summary	
Sector	Renewable Energy
Location	Various towns in Estonia
Capital Required	$35 million
Export Potential	Unknown
Project Sponsor	Various Estonian Companies
Project Status	Pre-feasibility and planning

Project Discussion

The Estonia Energy Research Institute (EERI) is a public institution providing technical and policy support to the government and private sector. EERI is currently focusing on:

- Analysis of the Estonian fuel and energy economy.
- Development of a national energy strategy, taxation policy and pricing policy.
- Analysis of the performance and development of electrical systems and control options.
- Development and elaboration of effective and environmentally sound combustion technologies for oil shale and other solid fuels.
- Developing optimal solutions to energy related environmental problems.
- Co-administering with the Ministry of Economic Affairs the development of an energy database.

EERI is also a participating member of the Synergy Eastern Climate Change Network (ECCN) project, which is supported by the EU. The goal of this project is to identify "green" or clean energy projects that would qualify under Joint Implementation Agreements (JIA) with other EU countries, particularly Denmark and Finland. Table 1 provides a listing and a brief descriptions of projects identified by EERI for joint implementation in Estonia.

U.S. companies interested in pursuing these potential project opportunities are encouraged to contact EERI.

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Table 1. EERI Identified Projects						
Project Name	**Sponsor/ Owner**	**Location**	**Cost ($1000)**	**Financing Sources**	**Planned Start-up Schedule**	**Description**
Kirde Boiler Plant	OÜ Märja	Elva, Märja, Tartu County	8,555	Own resources plus bank loans	Early 2004	Kirde Boiler Plant serves a growing industrial area and 15 multistory residential buildings with over 600 inhabitants. Currently, shale oil is used as fuel. The company is planning to reconstruct the boiler and switch fuel from oil shale to biomass, wood waste, and saw dust.
Kadrina Boiler Plant	AS Kadrina Soojus	Kadrina	770	Foreign aid	2004	AS Kadrina Soojus is a municipality owned company that provides heat to the village of Kadrina near the town of Rakvere. The municipality is planning to convert the existing oil shale water boilers to fire biomass.
Leetse Windpark	AS Evmet-Mehaanik	Paldiski	18,220	20% equity from ABB and Trigon, 80% credit from Norddeutsche Landesbank	2003	AS Evmet-Mehaanik is developing the project. The local municipality is providing 100 hectare of land and ABB is supplying the equipment, 8 wind generators with a total capacity of 12 MW. The estimated wind speed is about 7 m/s.

Table 1. EERI Identified Projects						
Project Name	**Sponsor/ Owner**	**Location**	**Cost ($1000)**	**Financing Sources**	**Planned Start-up Schedule**	**Description**
Hydropower Project	Jägala Energy OÜ	Jõelähtme Parish, Jarju County	1,660	Shareholders, suppliers credits, and commercial bank loans	2004	This company bought an old hydropower plant in 1999. The buildings, the dam, in flow channel but no power generation equipment are still in place. The company owns the buildings and has leased the dam and canal for 50 years. The dam height is 17.5 m and the monthly water flow ranges from 5 m^3/s to 24 m^3/s. Estimated annual generation is about 4.7 GWh.
Viiratsi Boilerhouse and Heating Network	AS AVM-TERM	Viiratsi, Jõgeva County	640	50% Finnish Ministry of the Environment and 50% NORDA Bank of Estonia	2004	Installing 1 MW bio-power water boiler to produce 115°C, 6 bar steam to replace 4 MW heavy fuel oil container mounted boilers and replacing 3 km of 50 to 125 mm diameter pipelines.
Tarmeko Boiler Plant	Tarmeko Ltd	Tartu	5,400	20% owner source and 80% bank loans	2004	This company, one of the largest furniture manufacturers in Estonia, plans to replace existing, old, heavy oil fired boilers with a new CHP plant. The manufacturing facility consumes over 9,000 MEH of electricity and 57,000 MWh of heat annually.

New Plant Equipment
• Pipes • Low NO_x burners • Boilers • Fuel storage tanks

Project Summary	
Sector	Renewable Energy
Location	Various towns in Estonia
Capital Required	Over $90 million
Export Potential	Unknown
Project Sponsor	Various CHP and Utilities
Project Status	Pre-feasibility and planning

Project Discussion

The Estonian Power and Heat Association (EPHA) is a non-profit, non-governmental association of Estonian energy utilities, boiler plants, district heating and network enterprises, and affiliated suppliers of equipment, fuel, and services.

EPHA was established by the 26 largest Estonian energy enterprises in 1995. Today, it has 49 members and represents 80% of the heat market and 50% of the total heat and electricity market in Estonia. The main activities of EPHA include:

- Developing legislative proposals on behalf of its members.
- Collecting and analyzing information from its members and developing approaches to a more efficient and environmentally friendly supply of energy.
- Cooperating with sister organizations in Estonia and abroad.
- Assisting members in the implementation of international projects.

Table 1 provides a listing and a brief description of projects being considered for implementation by EPHA members.

U.S. companies interested in pursuing any of these potential project opportunities are encouraged to contact EPHA.

Key Contacts

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Table 1. EPHA Members' Projects			
Project Sponsor/Owner	**Project Description**	**Planned Implementation Schedule**	**Capital Investment and Funding Sources**
Tallinna Soojus AS (Tallinn City Government)	Connecting district-heating pipeline including 2.7 km of transmission pipelines and pumping stations between Central City and Mustamäe boiler house. This project will increase market share of the Iru CHP station while reducing oil shale consumption at Balti and Estonia Power Plants.	2002-04	1.93 Million Euro ISPA 6.39 Million Euro TOTAL
Tallinna Soojus AS (Tallinn City Government)	Connecting consumers of six small boiler-houses to the district heating network and closing those small boiler-houses. This project will reduce heat losses by about 57,000 MWh/year and help to reduce air pollution concentration in the region.	Sõle tn. Prk. 2002-05 & Kristiines 2003-04	1.28 Million Euro ISPA 4.28 TOTAL
Tallinna Soojus AS (Tallinn City Government)	Replacing existing burners with "Low NO_x" burners in water boilers and automating the boilers work. This project will reduce NO_x emission levels from 213 mg/nm^3 to 110 mg/nm^3.	2002-05	1.686 Million Euro ISPA 5.62 TOTAL

Table 1. EPHA Members' Projects			
Project Sponsor/Owner	**Project Description**	**Planned Implementation Schedule**	**Capital Investment and Funding Sources**
Tallinna Soojus AS (Tallinn City Government)	This project consists of removing 29 old liquid fuel tanks, replacing five (5X2000 m^3) old liquid tanks with modern tanks in Mustamäe boiler-house, and renovating HFO unloading station in Ülemiste boiler-house.	2001-06	
Kohtla-Järve Soojus AS Eesti Energia/ Kohtla-Järve City Government	Converting 70MW_e and 110 MW_t shale oil CHP plant to biofuel CHP plants.		13.5 Million Euro ISPA 45 Million Euro TOTAL
Kohtla-Järve Soojus AS, Eesti Energia/K-J City Government	Replacing insulation at Kohtla-Jarve DH network.		
Tartu Energia AS	Converting a 15MW_e and 45MW_t, shale oil CHP plant a bio-fuel plant.	2002-03	9.34 Million Euro ISPA 31.14 TOTAL

Table 1. EPHA Members' Projects			
Project Sponsor/Owner	**Project Description**	**Planned Implementation Schedule**	**Capital Investment and Funding Sources**
Pärnu Soojus AS, (Pärnu City Government)	Closing of Uus-Sauga boiler house and connecting its consumers to the Parnu-Tervis DH network using 6 km of 200mm to 250 mm pipeline. This project will eliminate a major source of pollution at the middle of a population center. A major portion of heat supplied to Parnu-Tervis DH network is generated using bio-fuel.		
Rakvere Soojus AS (Rakvere City Government)	Installing a $3MW_e$, $10.4MW_t$ bio-fuel CHP plant.		1.61 ISPA 5.37 TOTAL
Valga Soojus AS	Renovating Kuperjanovi Street boiler-house and constructing a fully automated, 5MW boiler-house, and eliminating use of HFO.		
Valga Soojus AS	Construction of a new 6MW bio-fuel boiler at the central boiler house and renovation and automation of bio-fuel storage and transport as well as of the boilers work. This project will reduce CO_2, NO_x, and SO_x pollution in the Valga City Center area.		
Valga Soojus AS	Renovating 600m of old DH pipeline.		

Table 1. EPHA Members' Projects			
Project Sponsor/Owner	**Project Description**	**Planned Implementation Schedule**	**Capital Investment and Funding Sources**
Kuressaare Soojus AS (Kuressaare City Government)	Installing 1.8MW cooler-condenser to recover waste heat from 5MW and 6 MW boilers. This project will save 3,000 MWh of energy, reducing HFO consumption by 300 ton/year, CO_2 emission by 900 ton/year and SO_2 emission by 11 ton/year.		
Võru Soojus AS (Võru City Government)	Converting 7MW boiler to use bio-fuel, building additional fuel storage and installing 500m pre-insulated pipelines.		
Võru Soojus AS (Võru City Government)	Renovating $1MW_e$, $7MW_t$ CHP plant, building additional fuel storage, and installing 500m pre-insulated pipelines.		
OÜ Pogi	Installing a bio-fuel boiler, renovating fuel storage and boiler house building and equipment.		
Keila Soojus AS	Implementing a 7MW boiler bio-fuel project including construction or renovation of boiler, boiler-house building, fuel storage, and 500m of pre-insulated pipeline. This project will reduce CO_2 emission by 77% and HFO consumption by 1,300 ton/year.		

Table 1. EPHA Members' Projects			
Project Sponsor/Owner	**Project Description**	**Planned Implementation Schedule**	**Capital Investment and Funding Sources**
Elveso AS, Rae Village Municipality	Addition of 1.8MW bio-fuel boiler including all the necessary equipment and fuel storage at Vaida Boiler-House. This project will reduce CO_2 emission by 10 ton/year and HFO consumption by 500 ton/year.		
Alto Soojus OÜ, Kehtna Village Municipality	Addition of a 2MW bio-fuel boiler, fuel storage and all necessary equipment. This project will reduce SO_2 emissions by 13.3 to 14,1 ton/year, NO_x emissions by 4 to 4.3 ton/year, CO emissions by 2.7 to 2.9 ton/year, CO_2 emissions by 2051 to 2178 ton/year and HFO consumption by about 750 ton/year.		
Alto Soojus OÜ, Kehtna Village Municipality	Insulating 1,500m of DH pipelines, which will result in reduction of 1.5 to 1.6 ton/year of SO_x, 0.4 to 0.5 ton/year of NO_x, 0.3 ton/year of CO and 225 to 240 ton/year of CO_2 emissions as well as in reducing HFO consumption by 75 ton/year.		
ESRO OÜ, Viljandi	Converting existing 6MW boiler to use bio-fuel to reduce emissions and HFO consumption.		
Haljala Soojus AS Haljala Village Municipality	Bio-fuel 1.5MW boiler conversion.		

Table 1. EPHA Members' Projects			
Project Sponsor/Owner	**Project Description**	**Planned Implementation Schedule**	**Capital Investment and Funding Sources**
Haljala Soojus AS Haljala Village Municipality	Installing 2.5km of pre-insulated DH pipelines.		
Haljala Soojus AS Haljala Village Municipality	Installing flue gas cooler		
Haljala Soojus AS Haljala Village Municipality	Installing a 250 kW steam engine.		
Fortum Põltsamaa AS	3.5MW boiler conversion to use bio-fuel.		

2001 GDP (in $ Billion)	47.41
2001 GDP Growth	3.8%
2001 GDP Per Capita ($)	4,648
2001 Population (Million)	10.2
Credit Rating (8/8/2002)	A-

Source The World Bank, 2002; Standard & Poor's, 2002

Executive Summary

As Hungary nears EU accession in 2004, it is engaged in the process of upgrading its environmental and energy laws and policies to meet the EU accession requirements. In order to accomplish this, Hungary has drafted legislation promoting development of renewable energy, closing landfills, and recycling. Hungary is also decreasing its dependence on coal as a fuel source.

Hungary has a stable, growing economy, welcomes foreign investors and has enjoyed a high rate of foreign direct investment (FDI) over the last 10 years.

Waste-to-Energy and Renewable Energy

Hungary is preparing for membership in the EU in 2004. As a result, environmental laws are being harmonized with EU standards. The new laws include provisions related to renewable energy. Hungary has committed to generating 6% of its electricity needs from renewable sources by 2012. Special legislation has been drafted to support electric power and heat generation from renewable resources including wind, biomass, and biodegradable waste.

Beginning the 1st of January 2003, prices for electricity generated by renewable sources will be set between 7 to 8 eurocents per kWh, and are proposed to remain fixed for a period of 6 years. In most EU countries, these prices are fixed for a period between 15 and 20 years so it is reasonable to expect that the Hungarian government will ultimately modify and extend the guaranteed price period. Co-generation projects, defined as those that generate at least 65% heat, are also eligible for the minimum price. Average electricity tariffs in Hungary are higher than 6 eurocents per kWh. Prices are expected to increase and a new law establishing procedures for increasing tariffs is expected to be adopted in 2003.

In addition, electric utilities are obligated to buy the produced electricity and the grid operator is obligated to allow access to the grid. This means that producers of electricity from renewable sources have a "feed in" right to the grid.

Hungary is also changing its laws and policies regarding waste management and landfills to match those of the European Commission. EC directive 94/62/EC requires that at least 50% of packaging wastes are recovered and that at least 15% of packaging materials are to be recycled by the end of 2005. EC directive 99/31/EC states that land disposal of whole tires will not be allowed after 2002 and that shredded tires will not be allowed after 2005. In addition, biodegradable municipal wastes going to landfills by the end of 2005 should be less than 75% of the 1995 amounts. By the end of 2009, the land disposal of biodegradable wastes should be reduces to at least 50% of the 1995 levels. To minimize use of landfills, Hungary has established tipping fees and other incentives to

encourage the collection and proper disposal of waste materials. The Hungarian National Environmental Action Plan calls for construction of regional waste disposal sites.

Hungary established the Hungarian Environmental Fund in 1993 to assist in implementation of a national environmental policy. The fund supports a variety of projects including waste-to-energy and renewable energy projects. The fund's revenue sources include air emission fees, wastewater charges, and taxes on fuel, car tires and batteries, and packaging waste fees. This fund provides grants to municipalities, NGOs and R&D institutions and loans to industrial and commercial enterprises.

Since 2000, the EU has provided Hungary three pre-accession instruments for financing agricultural and rural development and environmental and transportation infrastructure projects. These instruments are the PHARE Program, SAPARD, and ISPA. The European Bank for Reconstruction and Development (EBRD) is also actively seeking to support renewable energy projects in Hungary.

EBRD is currently assessing the potential for renewable energy in the Central and Eastern European countries to identify a pipeline of suitable projects for further investigations and possible funding by the EBRD. This effort is supported by the USTDA Evergreen Fund and the U.K. Technical Cooperation Fund. For additional information on this EBRD project, please visit http://projects.bv.com/ebrd/

Heat and Power Generation

Hungary's primary source of energy is fossil fuels. Hungary possesses hard coal reserves of 600 million short tons, lignite reserves of 3,000 million short tons, brown coal reserves of 1,000 million short tons, and natural gas reserves of 3.4 trillion cubic feet. Hungarian coal is high in sulfur and ash.

Hungary has 49 power generating facilities, but only 16 have installed capacities greater than 100 MW_e; these 16 units represent 94% of Hungary's total generating capacity. Fifteen of the major units are thermal power stations. Hungarian thermal power accounts for over 75% of the country's installed capacity and uses all fossil fuels.

Hungary has 24, mainly small, operating hydropower plants totaling about 57 MW_e. Hungary also has two wind power facilities with 850 kW_e total capacity. Hungary has one nuclear facility, with an installed capacity of 1,851 MW_e, which accounts for about 25% of the country's installed capacity.

Hungary is a net importer of electricity. In 2000, Hungary generated 33.4 billion kWh of electricity, and imported 5.2 billion kWh.

The process of privatization in the electricity sector is almost completed. The power sector has been divided into the generation, transmission, and distribution subsectors. The generation and distribution subsectors have already been privatized; the transmission subsector is still owned by MVM, the Hungarian national power company. Hungary is in the process of allowing consumers to select their electricity provider. This process should be complete in 2010.

Hungary possesses 282 district heating plants and 43 combined heat and power (CHP) facilities with a total output of 17,800 MW. Coal is the fuel source most commonly used in heating and CHP plants.

Political and Economic Climate

Historically, Hungary enjoyed one of the most liberal and advanced economies of the

former Eastern bloc countries. By the late 1980s, Hungary had taken a number of economic and market oriented measures such as passing a joint venture law, joining the IMF, and enacting significant corporate and income tax legislation that paved the way for the ambitious market-oriented reforms of the 1990's. Consecutive governments since 1990 have aimed to build an open and free market economy and a democratic political system. Today, Hungary is a well functioning and stable multi-party democracy with a prosperous economy and has one of the most stable and mature financial markets. Hungary has attracted over $20 billion in foreign investment in the last decade – more than any other country in Central and Eastern Europe on a per capita basis. Hungary is a member of WTO, CEFTA, and NATO.

Hungary is also a front-runner among Central and Eastern European countries for full membership in the EU. The EU began accession negotiations with Hungary in 1998. The Hungarian government has committed to complete its preparations and fulfill its requirements for full membership by the end of 2002, with possible accession occurring as early as 2004.

Hungary experienced economic growth of 3.8% in 2001 and it is projected that the economy will grow at about 5% annually in the near-term. Inflation was 7.8% in 2001, down from almost 10% in 2000.

Investment Climate

Since 1990, Hungary has attracted over $23 billion in FDI, about one-third of all FDI in Central and Eastern Europe. The U.S., with 35% of total investment, is the largest single investor. Much of the early investment was the result of the privatization of state-owned enterprises. In recent years, however, most of FDI has been directed toward greenfield projects. Foreign-owned companies generate about 77% of Hungary's exports, 33% of GDP, and 25% of private sector employment. The EBRD reports that more than 18,000 joint ventures are registered in Hungary and more than 35 of the world's 50 largest multinationals have a Hungarian subsidiary. Eighty multinational companies are reported to have their regional headquarters in Hungary. Hungary's well-developed financial and commercial infrastructure, well educated and skilled labor force, and transparent transactions have been the primary factors in continuing to attract foreign investors. Favorable policies toward foreign investors and special tax incentives (which were in place until 1995) contributed to early foreign investment.

The privatization of state-owned enterprises is about 80% complete. The state still owns some large companies such as the main electric grid company, the railways, and 25% shares in a pharmaceutical company and MOL, the Hungarian Oil and Gas Company.

The establishment of foreign-owned companies is governed by the 1998 Act on Investments of Foreigners in Hungary. This act also grants significant rights and benefits to foreign investors. It provides protection against losses resulting from nationalization, expropriation, or similar measures, and guarantees free repatriation of invested capital and dividends. Hungary has also adopted the EU's anti-discrimination laws; therefore investment incentives are available to all qualified investors, regardless of their nationality. Current investment incentives include:

- 100% corporate tax holiday through 2011 for investments greater than HUF 10 billion (about $42 million).
- 100% corporate tax holiday through 2011 for investments greater than

HUF 3 billion (about $12.6 million) in designated underdeveloped areas.

- Regional support in Hungary's 19 counties in the form of grants, loans, support for interest payment for greenfield projects creating more than 100 jobs.
- Interest support for capacity-increasing investments by small and medium size enterprises.
- Wage support, training subsidies, social security cost reimbursement, and commuting expenses.
- Export credit subsidies including subsidies for promotions.
- Custom-free zones.

Currently, the corporate tax rate is 18%, the VAT rate is 25% and employer's social security contribution rate is 33%. The top personal income tax rate is 40%.

Tariffs for industrial products imported from the EU were eliminated in 2001. About 90% of all industrial products are also traded duty free among the members of CEFTA, which includes Hungary, the Czech Republic, Slovakia, Poland, Bulgaria, and Romania (Croatia is in the process of joining CEFTA). The EU countries account for about 75% of exports and 67% of imports. Germany, Austria and Italy are Hungary's most important trading partners and Russia is Hungary's primary provider of energy resources. In recent years, exports of apparel and clothing accessories, automobile parts, and machinery have increased while the share of its food industry, although still important, has dropped. Hungary primarily imports fuel and capital goods.

Hungary is a member of the International Center for Settlement of Investment Disputes, and is a signatory to the 1958 New York Convention on the Recognition and Enforcement of Foreign Arbitral Awards. Hungary accepts binding international arbitration where conciliation of disputes between foreign investors and the state is unsuccessful.

U.S. Presence

General Electric (GE) purchased a 51% ownership in a light bulb plant in Tungsram. General Motors (GM) took over an engine production plant in Szentgotthard in order to produce engine parts in cooperation with its Vienna plant. In addition, Ford has opened an electric parts plant in Szekesfehervar that now supplies its Europe division. Alcoa has taken over the Hungarian Aluminum Works production capacity and IBM has moved its production capacity from Singapore to Hungary. Coca-Cola and Pepsi Cola also have facilities in Hungary.

Useful Web Sites	
Global Environmental Facility (GEF)	http://www.gefweb.org
European Bank of Reconstruction and Development (EBRD) Investment Profile	http://www.ebrd.com/pubs/index.htm
DOE Office of Fossil Energy Country Profile	http://www.fe.doe.gov/international/e-eur.shtml
DOE Energy Information Administration (EIA) Country Analysis Brief	http://www.eia.doe.gov/emeu/cabs/contents.html
World Bank Country Profile	http://lnweb18.worldbank.org/eca/eca.nsf
Hungarian Environmental Ministry	http://www.ktm.hu
Hungarian Energy Efficiency Credit Programme	http://www.ecee.org/pubs/hungary.htm

Ajka High Solids Anaerobic Digestion Project

New Plant Technology & Equipment
• Shredders and conveyors • HSAD technology • Digester, agitator • Screw feeder/presser • Magnetic separator, air/gas compressor, pumps, tanks, switch gears, etc.

Project Summary	
Sector	Waste-to-Energy
Location	Ajka, Hungary
Capital Required	$4.2 million
Export Potential	$3.1 million
Project Sponsor	Municipality of Ajka, Alpha-Gamma Technologies, Inc. AP International Finance Corporation
Project Status	USTDA Funded Feasibility Study was completed in mid 2002.

Project Discussion

Project Background

Presently, the Municipality of Ajka collects about 66 tons per day (tpd) of municipal solid waste, which is land filled. The Municipality is planning to build a 100 tpd High Solids Anaerobic Digestion (HSAD) facility to serve Ajka and the surrounding area. The project supports the Hungarian National Environment Action Plan, which calls for construction of regional waste disposal sites.

According to a 1997 national survey conducted by the Regional Environmental Center for Central and Eastern Europe, the MSW generation rate in Hungary had doubled in fifteen years. In addition, most landfills do not meet current national standards and are approaching their maximum capacity limits. To address these challenges, the Hungarian National Environmental Action Plan promotes:

- Construction of nine regional disposal sites with up-to-date technologies,
- Reduction of waste by selective waste collection, and
- Recycling activities.

This project when completed will help Ajka Municipality meet the national regulatory and compliance requirements established by the European Union.

Project Location

The proposed project site is located in the city of Ajka. Ajka is located north of Lake Balaton in the Veszprem county about 130 km (about 81 miles) northwest of Budapest.

Project Sponsors

The project is sponsored by the municipality of Ajka, Alpha-Gamma Technologies, Inc. and AP International Finance Corporation.

Alpha-Gamma Technologies, Inc., a U.S. based company, is the licensee for the proprietary HSAD technology, and has on-going technology projects in Hungary and Lebanon.

AP International Finance Corporation is headquartered in New York and has offices

in Budapest; is familiar with trade, financing, and investment issues in Central and Eastern Europe; and is developing projects in the region and arranges financing for those.

Project Description

The Municipality of Ajka plans to build and operate a modern regional Municipal Solid Waste (MSW) facility to manage and dispose of the region's growing MSW in an environmentally safe manner. The Municipality, after considerable evaluation, selected HSAD technology, and requested USTDA to fund a feasibility study to assess the technical, economic and financing viability of the project. This feasibility study was completed in mid-2002, and the results are promising. Project financing is expected to be finalized later this year, and project implementation is scheduled to begin in early 2003.

The HSAD is a microbial bioconversion technology that produces valuable products, namely biogas fuel, liquid fertilizer, and compost from MSW. After recyclables – plastic, glass, metal and paper – are removed, the waste is shredded and fed to a HSAD reactor. Approximately 75% of the organic material is converted to biogas. The biogas consists primarily of methane (about 60%) and carbon dioxide (about 40%). The biogas is used as fuel for a cogeneration system or the gas can be upgraded to a high-Btu product equivalent to pipeline-quality natural gas.

The balance of the organic carbon and the bulk of all other nutrients emerge as an effluent sludge, which is then processed using a screw-press to separate the liquid fertilizer from the solid compost. The compost easily meets all EU standards.

Project Guidance Parameters

Project Costs

The total capital cost for this Ajka facility is estimated to be about $4.2 million with $3.1 million potential for the import of U.S. technology, equipment, and services from the U.S.

Known Initiatives

In 2000-2002, the project sponsors carried out a USTDA funded feasibility study to assess the technical, economic, and financing viability of the project. The study was completed in mid-2002 and project implementation is expected to begin in late 2002/early 2003.

Project Schedule

Planned Completion Schedule		
Activity	**Qtr**	**Year**
Feasibility study	2nd	2002
Financial close	4th	2002
Engineering design and construction	1st-3rd	2003

Project Financing

The proposed structure for the financing of the capital investment will consist of approximately 42% equity and 58% debt financing. The debt financing portion will be eligible for export credit agency funding from Ex-Im Bank on 85% of the U.S. export content plus local cost coverage equal to 15% of the U.S. contract price.

Equity financing will consist of a combination of cash and non-refundable Hungarian state subsidies. Sources of equity will include principal members of the special purpose company, as well as other private and/or institutional investors or investment funds.

The project was presented to the Export-Import Bank of the U.S. and private and institutional investors and the results are encouraging. The Export-Import Bank of the U.S. has expressed an interest in financing this project.

U.S. Competitiveness

As indicated earlier, Alpha-Gamma Technologies, Inc., a U.S. based company, holds the license for the HSAD technology. The technology and technology supplier are pre-selected even though European firms supplying anaerobic digestion technology can claim commercial operating experience. The HSAD technology is more advanced than those provided by European firms, being able to process effluents with higher solid concentration and minimizing water requirement and wastewater discharge. The U.S. Ex-Im Bank participation in the financing of the project is a key factor in the competitiveness of the U.S technology, equipment and service providers.

Conclusion

The project feasibility study has been completed and the results are encouraging. The implementation of an HSAD facility in the city of Ajka is a feasible solution to the waste problems facing Hungary today. On both a technical and financial level, the feasibility study has demonstrated that such a project has a high probability of success. The project sponsors presented the project to financial institutions and financial close is expected to take place shortly.
In addition to the environmental benefits, the implementation of this project will have a positive economic impact on the Ajka region and Hungary.

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New Plant Equipment
• Wind turbines • Substations, grid connection and control equipment • Analytical equipment and tools

Project Summary	
Sector	Wind Energy
Location	Budapest, Hungary
Capital Required	$80-$100 million
Export Potential	$60-$80 million
Project Sponsor	Greenergy Kft.
Project Status	Pre-feasibility

Project Discussion

Project Background

Greenergy Kft. (Greenergy) is a project development and management company in Hungary, established in the beginning of 2002 that is committed to developing projects in the area of renewable energy. The founders of Greenergy have extensive experience in project development and finance in Hungary as well as in other Central and Eastern European countries. For example, they developed the First Pest Telephone Company, a network consisting of 90,000 telephone lines and necessary equipment at a cost of $100 million.

Greenergy and their U.S. based financial investors, Texas Adriatic Group (TAG), have a strong commitment towards the realization of wind energy projects in Hungary. Greenergy has already committed about $1 million to identifying and collecting wind measurement data at eight different sites. Despite the fact that Greenergy is relatively new to the field of renewable energy, it has experienced personnel and the necessary resources to successfully start and complete large development projects.

Project Description

Greenergy is presently conducting wind measurements in Hungary at 8 locations. But in order to develop projects on a much larger scale, it is necessary to conduct a much broader feasibility study to include additional measurements on alternative locations in Hungary and to perform other wind development tasks such as wind plant and interconnection design, environmental assessments, geological studies, economic analysis, wind flow modeling, etc. Expanding efforts already underway would allow the realization of several different wind-parks with a total capacity of 80-100 MW and an investment of $80-$100 million.

Greenergy with the help of the Hungarian Wind Association, which is affiliated with the University of Göddölö, has identified eight sites in addition to those sites where wind data is currently being collected that have promising wind development potential. These sites were identified by a review of historical wind data and input from the Hungarian Wind Association.

Greenergy is planning to conduct a study to collect and verify wind data at these eight new sites and the development, financing, construction and operation of wind parks at selected locations among the new and previously identified sites.

Wind Energy in Hungary

Currently, only one 600 kW wind generator is operating in Külcs, Hungary. The first

year yield of this generator was 1,250,000 kWh, higher than expected and calculated energy production estimates. This generator is majority owned by E.ON, a German electricity company and one of the largest electric utilities in Europe. Other utility companies such as RWE, EdF, that have a presence in the Hungarian market are also planning wind energy pilot projects.

Approximately 100 MW of wind energy projects are expected to be constructed in Hungary by 2010. Given that Hungary has only one installed wind generator at the present time, the opportunities for wind projects are promising.

Project Guidance Parameters

Project Costs

The development of 80 to 100 MW of wind energy parks is estimated to cost between $80 million to $100 million of which $60 million to $80 million is expected to be the value of imported equipment and services.

Scope of the Feasibility Study

The proposed feasibility study will be carried out in two phases over a period of two years.

Phase 1 will include site identification, monitoring tower installations, data collection and analysis for one year, wind mapping, infrastructure assessments, and preliminary economic analysis.

Phase 2 will consist of wind plant design, electrical systems design and costing, environmental assessments, community consultations, identification of funding sources, and financing plan development.

Schedule

Planned Completion Schedule		
Activity	**Qtr**	**Year**
Activity	1st	2004
Wind Data Verification	1st	2004
Detail Feasibility Study and Financing	3rd	2004
Engineering Design and Construction	1st	2005

Known Initiatives

Greenergy has committed over $1 million to the development of renewable energy projects in Hungary. In addition to collecting wind data at eight sites, Greenergy is developing a 3 MW pilot plant project wind farm near Budapest. This project will utilize two 1.5 MW GE turbines. Greenergy is also active in the development of the biomass market and projects in Hungary.

Project Financing

Greenergy's U.S. based financial investor, TAG, intends to provide approximately 30% of the project capital costs. The debt portion for the project is expected to be arranged through financial institutions such as U.S. Ex-Im Bank, OPIC, EBRD and commercial banks. Many major European and some American banks have subsidiaries in Hungary and these banks have international experience in renewable energy project financing. Greenergy has already been in contact with some of these banks, and they are very interested in the proposed projects.

U.S. Competitiveness

The possibilities for U.S. exports are quite significant. Based on the installation of 80-100 MW, the opportunities for export from the U.S. will be $60 million to $80 million. Several wind technology providers have production plants in the U.S. and can supply the necessary equipment. A tender will be

required for the acquisition of the wind technology, wind generators and other necessary equipment, to be used in the projects.

Conclusion

This project is of great importance to the development of wind energy in Hungary and will result in substantial environmental benefits including reduced fossil fuel plant emissions. It will also provide significant export opportunities for U.S. technology providers.

Hungary is considered to be one of the key wind energy markets among the EU accession countries and the proposed project is expected to facilitate the market's development.

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Pecs Power Plant of Pannonpower Inc. Biomass Firing and Gas Turbine Project

Equipment & Services
• Fluidized bed boiler • Gas turbine • Fuel handling system • Ash handling system • Plant control system

Project Summary	
Sector	Renewable Energy
Location	Pecs, Hungary
Capital Required	$76-$86 million
Export Potential	$30 million
Project Sponsor	Pannonpower Ltd.
Project Status Phase I: Phase II:	 Tender documents are being prepared Pre-feasibility

Project Discussion

Project Background

Coals mined in Hungary have high sulfur content; therefore coal-fired power plants are not able to meet EU air emissions requirements without additional capital expenditures. Owners of these coal-fired plants have had to decide whether to install de-sulfurization equipment, convert the plant to another type of fuel, or face shutting down the plant.

The Pecs power plant has been in operation since 1959, using coal mined in the vicinity of Pecs as fuel. Since PANNONPOWER Power Generation, Trade and Services Ltd. (Pannonpower) has decided not to install de-sulfurization, it decided to retrofit the Pecs power plant in several steps so that it can comply with new environmental regulations.

Project Location

The proposed project site is located in the city of Pecs. Pecs is located about 200 km south of Budapest, at the foot of the Mecsek Hills. The city has a protected historical downtown.

Project Sponsor

Pannonpower is the owner of the Pecs power plant and is an investor in the project. In May 2001, The company name Pecs Power Plant Ltd was changed to PANNONPOWER Generation, Trade, and Services Ltd. to reflect the full range of services that the company is providing. The company is headquartered in Pecs, Hungary.

Project Description

Retrofitting the power plant consists of the following two phases:

Phase I:

- Conversion of two boilers from coal firing to gas firing.
- Conversion of one boiler from coal to biomass (woodchip) firing. This boiler will supply steam to a 50 MW_e turbine.

Phase II:

- Construction of a 70 MW_e to 90 MW_e combined cycle plant, provided that economic circumstances and competition make it feasible.

Pecs Power Plant of Pannonpower Inc. Biomass Firing and Gas Turbine Project

After the implementation of Phase I, approximately 377 GWh of electricity will be generated from biomass. After Phase II is implemented, about 700 GWh to 900 GWh total of electricity will be generated.

Project Guidance Parameters

Project Costs

- Total project costs for Phase I are estimated to be about $26 million.
- Total project costs for Phase II are estimated to be between $50 million and $65 million.

U.S. export potential for Phases I and II are expected to be over $30 million.

Known Initiatives

Feasibility studies for Phase I have been completed. Presently, the tendering of suppliers for the project is commencing. The financing structure for Phase I has been determined.

Project Schedule

Planned Completion Schedule		
Activity	**Qtr**	**Year**
Phase I tendering process	1st	2003
Phase I engineering, permitting, building, erection	1st	2004

The schedule for Phase II has not yet been determined.

Project Financing

The financing of the Phase II project is not structured yet and investors are still being sought.

U.S. Competitiveness

U.S. suppliers of equipment and engineering services such as Foster Wheeler are expected to be competitive in providing equipment during Phase I of the project. German, Finnish, Austrian, and Hungarian firms are expected to compete for the supplying of equipment and services. Pannonpower's board of directors will select who will be invited to compete for supply of equipment and services. In Phase II, U.S. firms such as GE are expected to be competitive in supplying gas turbines for the project.

Conclusion

The project is a high priority for Pannonpower and is expected to reduce emissions of air pollutants in Hungary.

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Tapioszele Disposed Rubber Processing Project

New Plant Equipment
• Pyrolysis plant • Flue gas cleaning system • Shredders and conveyors • Sidewall cutter & de-rimmer • Carbon black pelletizer and bagging system • Steel baler • Oil condenser, magnetic separator, screw feeder, ball mill, classifier, baghouse, etc.

Project Summary	
Sector	Waste-to-Energy
Location	Tapioszele, Hungary
Capital Required	$28.8 million
Export Potential	$15.7 million
Project Sponsor	AP International Finance Corporation, Tire Recycling Inc.
Project Status	USTDA Funded Feasibility Study completed.

Project Discussion

Project Background

Hungary is currently producing over 100,000 tons per year of rubber waste. There is also a substantial amount of waste tires and other rubber wastes that have accumulated and are in need of disposal. In order to solve this environmental problem, Hungary, consistent with EU model regulation, has established by law a tipping fee and other incentives to encourage the collection and proper disposal of waste tires. The tipping fee in 2001 was about three cents (HUF 10.50) per kg and by law can increase to as high as 18 cents (HUF 50) per kg as EU accession approaches.

Project Location

One of the project sites being evaluated is located in the city of Tapioszele about 68 km (about 42 miles) southeast of Budapest.

Project Sponsors

The project is sponsored by a joint venture of two companies – AP International Finance Corporation and Tire Recyclers Inc. The project is also supported by Metso Minerals/Svedala Industries Inc., an equipment vendor and technology developer.

AP International Finance Corporation (AP) has offices in both New York and Budapest and is familiar with trade, financing, and investment issues in Central and Eastern Europe. AP is developing projects in the region and arranges financing for those projects.

Tire Recyclers Inc. is a U.S. company with extensive experience in the collection and processing of waste tires and rubber waste.

Metso is a $5 billion multinational company that in 2001 acquired Svedala Industries Inc. and their Pyro System Division, which now operates under the name Metso Minerals. The company has manufacturing facilities in the U.S. (the former Allis Chalmers Company in Milwaukee, Wisconsin).

Tapioszele Disposed Rubber Processing Project

Project Description

The project sponsors plan to finance, build and operate a facility to process 100 tons per day of rubber waste, including waste tires. The waste tire and other rubber materials are first shredded to about 10 centimeter size and then heated in a reducing environment in a rotary kiln to convert the rubber material to pyrolysis gas (33%), oil (25%) and carbon black (28%) and to recover any steel material as scrap steel (14%). The pyrolysis gas, primarily pentane and lighter hydrocarbons, has a heating value of approximately 44.6 MJ/kg; the oil is similar in most respects to middle distillate or No. 2 oil and has a heating value of approximately 41 MJ/kg. The scrap steel, pyrolysis oil, and carbon black are salable products while the gas will be used to provide the heat needed for the pyrolysis process. According to the sponsors, carbon black has a market value of approximately $0.20 per pound.

The pyrolysis process takes place in a rotary kiln, where the tires and other rubber waste material undergo thermo-chemical decomposition in a reducing environment at about 900°F (480°C).

Project Guidance Parameters

Project Costs

The total project cost for this rubber waste-processing facility is estimated to be $28.8 million with potential import value of $15.7 million for U.S. technology, equipment and services.

Known Initiatives

In 2001-2002, the project sponsors carried out a USTDA funded feasibility study to assess the technical, economic, and financing viability of the project. The study was completed in mid-2002 and project implementation is expected to begin in late 2002/early 2003. The sponsors also undertook a comprehensive assessment of likely sources, quantities and qualities of waste tires and other rubber materials and their current uses. The project sponsors also completed a preliminary assessment of the legal and regulatory environment affecting tire and waste rubber collection and disposal in Hungary. These studies were updated as a part of the USTDA funded feasibility study.

Project Schedule

Planned Completion Schedule		
Activity	**Qtr**	**Year**
Financial close	4th	2002
Engineering design and construction	1st-4th	2003

Project Financing

The proposed structure for financing the project consists of 20% equity and 80% debt financing. Debt financing will consist of a refundable, interest-free loan from Hungarian state agencies and approximately 73% of the financed portion is eligible for funding from Ex-Im Bank due to the content of the U.S. contract price.

Equity financing will consist of a combination of cash and non-refundable Hungarian state subsidies. Sources of equity will include principal members of the special purpose company, as well as other private and/or institutional investors or investment funds.

The project has been presented to the Export-Import Bank of the U.S. and private and institutional investors, and the results are encouraging. The Export-Import Bank of the U.S. has expressed its interest in this project.

Tapioszele Disposed Rubber Processing Project

U.S. Competitiveness

As indicated by the financing plan, the U.S. suppliers will provide most of the equipment and services required for this project. Two companies, Tire Recycling, Inc. and Metso Minerals/Svedala Industries with operating and/or manufacturing facilities in the U.S. have been pre-selected to participate in this project. The Export-Import Bank's participation in the financing of the project is a key factor in the competitiveness of the U.S. technology, equipment, and service providers.

Firms in the U.K. and Korea have developed competing pyrolysis technologies and may choose to compete along with European suppliers of shredders, conveyors, balers and other equipment against their U.S. competitors.

Conclusion

The project feasibility study is completed and the results are encouraging. The project sponsors have presented the project to financial institutions and financial close is expected to take place shortly.

The project sponsor is a joint venture of several organizations with the necessary skills to develop and implement this project.

In addition to the environmental benefits, the implementation of this project will have a positive economic impact for the region and Hungary.

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Inota Waste-To-Energy Project

Equipment & Services
• Steam generators • Steam turbines • Instrumentation and controls • Balance of plant equipment • Engineering & construction management

Project Summary	
Sector	Waste-to-Energy
Location	Varpalota, Hungary
Capital Required	$70 million
Export Potential	$39 million
Project Sponsor	TransElektro Co., Ltd.
Project Status	USTDA Funded Feasibility Study on-going.

Project Discussion

Project Background

TransElektro (TE) is planning the construction of a disposed rubber fuel (RDF) facility for the generation of electric power. TE is currently operating two units with total capacity of 40 MW. TE is expected to retire these units shortly as a consequence of the Hungarian government's initiative to reduce coal use for power generation and environmental emissions from power generation units. The proposed project site, the Inota Power Plant, accommodated the generation of 130 MW at one time and includes substantial infrastructure such as buildings, material storage and handling facilities, water supply and treatment facilities, and a substation. TE plans to identify and install a new, environmentally friendly generation technology that can benefit from the existing infrastructure. TE staff conducted preliminary studies and concluded that conversion of waste rubber, including discarded tires, to energy or co-firing this material with coal at the site could potentially be feasible.

Project Location

The Inota Plant is located near Varpalota, approximately 70 km southwest of Budapest.

Project Team

TE, a power generating company in Hungary, is the project sponsor. Black and Veatch of Kansas City, Missouri, was competitively selected by TE to perform a USTDA funded feasibility study for the project.

TE owns and operates two small coal-fired plants in Northwest Hungary. TE purchased these plants during recent privatization initiatives. One of these plants is the Inota facility.

Black and Veatch is one of the U.S.'s leading engineering and consulting firms with extensive experience in power generation.

Project Description

The Inota plant is connected by a 120 kV transmission line to the Hungarian Power Company's (MVM) grid and by 6 kV feed line to an adjacent aluminum processing facility for the sale of electricity. The plant also provides heat to the aluminum facility and a nearby housing complex.

The plant was developed in the early 1950's with the installation of seven brown coal-fired steam units with an installed capacity of 135 MW. In recent years, TE has retired four units and has completed the removal of the boilers, turbines, generators, condensers, coal silos, and piping. TE plans to install a DRF or a DRF-coal fired unit in the existing boiler building.

Project Guidance Parameters

Project Costs

The total capital cost for the proposed RDF fired plant is estimated to be about $70 million with about $39 million for U.S. exports.

Known Initiatives

TE staff has extensively evaluated availability, costs (procurement and transportation), and characteristics of waste rubber, particularly discarded rubber. They also evaluated the technical viability of European tire burning, but not tire/coal co-firing, technologies.

Project Schedule

Planned Completion Schedule		
Activity	**Qtr**	**Year**
Feasibility study	4th	2002

Project Financing

The project feasibility study was recently completed and is currently being reviewed by TE. A financing plan will be structured depending on the final outcome of the study.

U.S. Competitiveness

U.S. suppliers of steam generators, steam turbines, instrumentation and controls, and engineering and construction management services are expected to be competitive in Hungary. Potential U.S. suppliers include Zurn Industries, Riley Boiler, Foster Wheeler, General Electric, Dresser-Rand, Bailey Control, Foxboro, and Honeywell. U.S. suppliers are expected to meet strong competition from their European counterparts, such as Martin GmbH of German and SLP Engineering of the U.K.

Conclusion

The project feasibility study was recently completed and is under review. The project cost is somewhat more than expected and cost cutting measures need to be considered. The sponsors are currently evaluating the cost of other technologies.

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Tura, Geothermal CHP Project for the Medical Spa and Recreation Center

New Plant Technology & Equipment
• Binary system heat exchangers • Back injection well

Project Summary	
Sector	Renewable Energy
Location	Tura, Hungary
Capital Required	$3 million
Export Potential	$1.5 million
Project Sponsor	Tura Therm Ltd.
Project Status	Pre-feasibility

Project Discussion

Project Background

Medicinal tourism is an industry that has been emerging in rural Hungary. There are a number of geothermal springs in the vicinity of the town of Tura that are considered to have therapeutic properties. The temperature of the water in some of these springs is too high for medicinal use. In such cases, the springs could be used for energy generation.

There are six wells located in the Tura area; one well, T4, has a capacity of 70 m^3/h with a head temperature of 102°C. Based on this well, a medical-recreation center using geothermal energy has been planned at the site. Other wells can be used for therapeutic purposes.

Project Location

Tura is a small settlement with 8,000 inhabitants located in the Galga Valley among the Gödöllő Hills about 45 km east of Budapest.

Project Sponsors

The project sponsors are the Municipality of Tura and the Architekton Building and Historic Monument Renovation Inc., which founded Tura-Therm Ltd.

Project Description

The geothermal power project is a part of a medical-recreation center development plan. The geothermal power project includes:

- Reconstruction of the well T4 and selection of a well suitable for back-injection.
- Installation and connection of a binary system (ORC) electricity generation unit.
- Implementation of the heat distribution system, including low temperature water for greenhouses.

The sponsors are seeking investors for the development of the geothermal power project and the medical-recreation center. The center would consist of:

- Covered spa center
- Swimming pool
- Medical hotel (200 rooms)
- Sport facilities
- Camping
- Golf course
- Folk art center
- Recreation buildings
- Park

Tura, Geothermal CHP Project for the Medical Spa and Recreation Center

Project Guidance Parameters

Project Costs

The total project cost for the medical-recreation center, excluding the geothermal power plant, is about $43 million. The total project cost for the geothermal power plant is about $3 million. The total project costs include, engineering, design, equipment, and construction.

Known Initiatives

A feasibility study for the construction of the medical-recreation center was completed in mid-2002 and the results are encouraging.

Project Schedule

Planned Completion Schedule		
Activity	**Qtr**	**Year**
Feasibility Study (1)	1st	2003
Financial Close	4th	2003
Design and Engineering	1st	2004
Construction		2006

(1) Geothermal Power Plant only

Project Financing

Currently, project sponsors are seeking equity investors for the project. Subsidies are expected to be available for the project from State agencies and the EU.

U.S. Competitiveness

U.S. suppliers of geothermal systems including Ormat, Advanced Thermal Systems, and Geothermal Co. could be competitive in supplying geothermal power plant equipment and services. U.S. suppliers could meet strong competition from other international firms such as Toshiba, Alstorm, and Mitsubishi Heavy Industries.

Conclusion

This project has a high priority for the sponsor. A decision should be made whether to implement the geothermal well by itself, in conjunction with the medical-recreation center, or with the center in phases.

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Marcali Regional Biomass Power Plant

Equipment & Services
• Gasifier reactor • Steam turbine • Boilers

Project Summary	
Sector	Renewable Energy
Location	Marcali, Hungary
Capital Required	$20 million
Export Potential	$12 million
Project Sponsor	BKZ Developments Ltd, Hungary
Project Status	Pre-feasibility study

Project Discussion

Project Background

The Municipality of Marcali is located in a heavily agricultural region. A substantial amount of biodegradable waste is produced in this region from forestry activities, poultry farms, sawmills, and slaughterhouses. Much of these biodegradable wastes are currently land filled. However, new Hungarian waste management laws, promulgated due to EU requirements, will require different and often expensive treatment and disposal for these wastes.

In order to take advantage of this available supply of biomass, BKZ Developments Ltd. (BKZ) is developing a co-generation plant at the Marcali Industrial Park. The project will sell heat to the tenants of the industrial park and will sell the generated electricity to the regional utility, which is required by law to buy it.

Project Location

The proposed project site is Marcali Industrial Park, located in the Municipality of Marcali, approximately 100 miles southwest of Budapest.

Project Team

BKZ is the project developer and was founded in 1989 as a British-Hungarian joint venture. Since it's founding, BKZ has successfully participated in several privatization ventures in Hungary, and has acted as a local consultant for British Gas plc. and El Paso Energy. BKZ is currently working on the expansion of the EMA-Power plant in Dunaferr with El Paso Energy.

PRM Energy Systems Inc. (PRM) of Hot Springs, Arkansas is the proposed technology supplier. PRM was incorporated in 1973 and has provided biomass systems for projects in the U.S., Costa Rica, Malaysia, Australia, and Italy. PRM also provides turnkey EPC contracting services for biomass systems.

Project Description

The co-generation plant will provide heat and power while safely and efficiently disposing of biodegradable waste, especially waste from slaughterhouses, which is difficult and expensive to appropriately treat and dispose. The project will produce 12 MW_e and an amount of heat that will be determined by a planned feasibility study.

Pre-feasibility assessments have determined that the optimal size of the co-generation plant would be able to handle 100,000 tons per year of a variety of different

biodegradable wastes as a fuel source. Initial estimates have determined that there is a sufficient source of fuel in the surrounding area.

The proposed technology is expected to meet all current Hungarian and EU environmental regulations.

Project Guidance Parameters

Project Costs

The total expected capital cost of the project is approximately $20 million, of which $12 million is expected to be the value of imported equipment and services.

Known Initiatives

BKZ has conducted a pre-feasibility study in order to determine the optimal amount of waste that the project can process. BKZ has reached an agreement with the Municipality of Marcali to develop the project and has the municipality's full support. In addition, BKZ has started discussions with local and regional producers of biodegradable waste in order to secure a fuel source.

Project Schedule

Planned Completion Schedule		
Activity	**Qtr**	**Year**
Feasibility Study	1st	2003
Financing	4th	2003
Engineering and Design	2nd	2003
Construction Completed	3rd	2005

Project Financing

The financing for the project has not been structured yet. However, the sponsor is planning to use a combination of its own resources, grants and subsidies from national and international funds, and commercial bank loans for project financing.

U.S. Competitiveness

The U.S. technology supplier is pre-selected. However, other U.S. equipment suppliers such as BG Technologies LLC, Brightstar Synfuels Co., and ThermoChem Recovery International could be competitive in providing equipment, technology, and services to the project. European suppliers such as Ambient Energy LTD of the U.K., Sofresid/Group of France, and UHDE GMBH of Germany could also compete for supplying equipment to this project.

Conclusion

The project has high priority for BKZ and the Municipality of Marcali. The project will decrease the amount of biodegradable waste in the region, especially waste from poultry farms and slaughterhouses, which is expensive and difficult to dispose of under new regulations. The project will also provide heat to Marcali Industrial Park and will be able to sell its electricity at a guaranteed price to the regional utility, which must buy the power according to Hungarian law.

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2001 GDP (in $ Billion)	7.58
2001 GDP Growth	7.0%
2001 GDP Per Capita ($)	3,158
2001 Population (Million)	2.4
Credit Rating (8/8/2002)	BBB

Source: The World Bank, 2002; Standard & Poor's, 2002

Executive Summary

Although it only opened accession negotiations in 2001, Latvia is expected to achieve full membership status in the EU in 2004. Latvia enjoys a high rate of foreign direct investment, due to its macro-economic stability, friendly investment climate, and economic success.

In order to fulfill its energy and environmental requirements for accession, Latvia is further developing its renewable energy resources and is encouraging the development of co-generation plants and biogas/biomass related projects. Renewable energy projects are attractive in Latvia because of electricity prices, which are already higher than six eurocents per kWh.

The privatization process in the electric sector has not yet begun, but is expected to take the same form as privatization and deregulation in the rest of Europe: "unbundling" of services, private ownership, and consumer choice of electricity supplier.

Waste-to-Energy and Renewable Energy

As it prepares for possible accession to the EU in 2004, Latvia has been harmonizing its renewable energy policies with those of the EU. In the EU white paper, *Energy for the Future: Renewable Sources of Energy (1997)*, the EU set the objective of a 12% contribution of renewable energy to gross energy consumption by 2012. In addition, EU policy relating to the Kyoto Protocol involves cutting CO_2 emissions by 8% of 1990 levels by 2008-2012. Both these EU policies are being adopted by Latvia. To help meet these goals, Latvia has been pursuing and implementing a variety of programs, incentives, and policies that will help promote the use of renewable energy.

One of these laws is the Law on Energy (1998) that includes requirements for electric utilities to buy power from renewable energy sources at a fixed price depending on the renewable energy sources. Another law in effect requires utilities to purchase excess electricity generated by small co-generation plants of 4 MW or less; this limit is raised to 7 MW if the fuel is municipal solid waste or biogas. This law sets a fixed price for the purchase of surplus power from the facility at a rate that varies by fuel type. There is also a program established to produce biofuel from rapeseed and biogas from industrial and household waste. The average electricity tariff in Latvia is higher than six eurocents per kWh, making renewable energy projects more feasible.

Latvia has also drafted a Waste Management Law that supports the policies and regulations of the European Commission on the handling and disposal of solid wastes. EC directive 94/62/EC requires that at least 50% of packaging wastes are recovered and that at least 15% of packaging materials are to be recycled by the end of 2005. EC directive 99/31/EC states that land disposal

of whole tires will not be allowed after 2002 and that shredded tires will not be allowed after 2005. Also, the amount of biodegradable waste going to landfills must be reduced by recycling, composting, biogas production, or energy recovery. Specifically, biodegradable municipal solid wastes going to landfills should be reduced by 25% and 50% of 1995 levels by 2005 and 2009.

The Ministry of Environment Protection and Regional Development established two funds to support a variety of projects including waste-to-energy and renewable energy projects. The Latvian Environmental Protection Fund (LVAF) provides grants and soft loans for environmental projects. LVAF funds come from fines and charges for environmental damage, national resources tax, and excise tax on oil products. The other is the Latvian Environmental Investment Fund (LEIF) that is operating as a non-profit limited liability company. LEIF combines domestic and international financial resources to provide long-term loans with favorable terms for private and public sector loans.

EU pre-accession funds, such as ISPA, are also available for renewable energy projects in Latvia. EBRD is also actively seeking renewable energy projects in Latvia to support.

EBRD is currently assessing the potential for renewable energy in Central and Eastern European countries to identify a pipeline of projects suitable for further investigation and possible future funding by EBRD. This effort is supported by the USTDA Evergreen Fund and the U.K. Technical Cooperation Fund. For additional information on this EBRD project, please visit http://projects.bv.com/ebrd/

Heat and Power Generation

Latvia's primary source of energy is hydroelectric power. Latvia does not possess significant coal or natural gas reserves, but has estimated offshore oil reserves of 300 million barrels. Latvia produces 500,000 to 600,000 short tons of peat a year and imports all its coal, gas, and oil.

Latvia has two major thermal power plants that are combined heat and power facilities, with a total installed capacity of 520 MW_e and 1,731 MW_t. One plant, TEC-1, has a capacity of 130 MW_e and 616 MW_t and is co-fired with gas and peat. The second plant, TEC-2, has a capacity of 390 MW_e and 1,121 MW_t and is co-fired with gas and heavy fuel oil.

Latvia has three major hydroelectric plants, with a total installed capacity of 1,520 MW. Latvia's share of power generation from renewable sources other than hydropower is negligible.

Latvia is a net importer of electricity. In 2000, Latvia consumed 5.2 billion kWh of electricity, of which 1.9 billion kWh were imported from Lithuania and Estonia.

The process of the privatization of the Latvian electricity sector started in 1996, but was delayed and then reversed by a referendum. An opinion poll showed that 82% of Latvians were opposed to the privatization of the state utility – Latvenegro. However, privatization is required for EU accession, and it is expected that the privatization will take place and will follow the pattern of "unbundling" services and offering consumers a choice of service provider.

Political and Economic Climate

Latvia is one of the most advanced transition countries. With its prime location as a transit

hub for east-west trade, the country has a well-developed service sector, and the economy has a strong industrial backbone inherited from the industrialization process that started in the 1950s to supply the Soviet market. Since its independence in 1991, the country has made rapid advances in its transition towards a market economy and has attracted considerable foreign investment.

The economy grew 7.8% in 2001 after growing in excess of 5% in 2000. Growth in the near term is expected to be at the same level, reflecting Latvia's approaching accession to the EU.

Latvia's inflation rate was 2.6% in 2000 and 2001. This rate equals the inflation level of most EU countries. Inflation is expected to remain constant for the near term due to subdued changes in administrative prices, which account for 21% of the total basket of goods and services.

Investment Climate

FDI in Latvia was $194 million in 2001. Cumulative net FDI in Latvia from 1993 to 2001 is about $2 billion. The telecommunications, oil products, real estate, and finance sectors received the most FDI during this period. The U.S. was the third highest investor, while Denmark and Germany were the top two investors during this period.

Latvia's goal of EU accession led to policies that create a favorable and business friendly investment climate. Foreign investors do not encounter obstacles, are permitted to participate in almost all areas of industry, and are allowed to lease land for up to 99 years. Foreign investors are entitled to national treatment and the OECD noted in a 1998 report that Latvia offered the same standards of protection as OECD member states.

The corporate tax rate is a flat 25% in Latvia and is applicable to most enterprises. There is a standard VAT of 18%. Latvia's VAT laws were harmonized with EU laws on January 1, 2001.

Latvia is a member of the World Trade Organization (WTO), and the Baltic Free Trade Agreement (BFTA). The U.K. and Germany are Latvia's two most important export partners. Germany and Russia are Latvia's two most important sources of imports. Latvia primarily imports capital goods and exports manufactured goods.

U.S. Presence

New Century Holding, an investment fund headquartered in New York, NY, made an investment of $50 million in the Latvian real estate sector. In addition, Polarbek, a U.S. builder, invested $42 million in the Radisson SAS Daugava hotel.

Useful Web Sites	
Global Environmental Facility (GEF)	http://www.gefweb.org
European Bank of Reconstruction and Development (EBRD) Investment Profile	http://www.ebrd.com/pubs/index.htm
DOE Office of Fossil Energy Country Profile	http://www.fe.doe.gov/international/e-eur.shtml
DOE Energy Information Administration (EIA) Country Analysis Brief	http://www.eia.doe.gov/emeu/cabs/ contents.html
World Bank Country Profile	http://lnweb18.worldbank.org/eca/eca.nsf
Latvian Environmental Protection Fund (LVAF)	http://www.lvaf.gov.lv
Latvian Environmental Investment Fund (LEIF)	http://www.leif.lv

2001 GDP (in $ Billion)	11.99
2001 GDP Growth	5.9%
2001 GDP Per Capita ($)	3,633
Population (Million)	3.7
Credit Rating (8/8/2002)	BBB

Source: Lithuania Department of Statistics, 2002; Standard & Poor's, 2002

Executive Summary

Lithuania is preparing for EU membership in 2004. Its goal to join the EU is a driving force for Lithuania's macro-economic stability, friendly investment climate and economic success.

Lithuania is on schedule to take up full EU membership obligations in 2004. In anticipation of accession and in order to meet the requirements of the provisionally closed negotiations of the energy chapter, Lithuania is retiring one of the units at the Ignalina nuclear power plant. Lithuania is promoting the development of environmentally friendly generation projects and hopes to continue to export electricity. It signed agreements to sell electricity to Russia and hopes to sell electricity to Poland and Slovakia through the construction of a new power line.

Waste-to-Energy and Renewable Energy

As it prepares for possible accession to the EU in 2004, Lithuania has harmonized its renewable energy policies with those of the EU. In the EU white paper, *Energy for the Future: Renewable Sources of Energy (1997)*, the EU set the objective of a 12% contribution of renewable energy to gross energy consumption by 2012. In addition, EU policies relating to the Kyoto Protocol involves cutting CO_2 emissions by 8% of 1990 levels by 2008-2012. Both of these EU policies are being adopted by Lithuania. To help meet these goals, Lithuania requires electric utilities to purchase power from renewable energy sources at a competitive rate. These rates are based on the particular connection to the local grid to which the renewable source is connected.

In addition, Lithuania has established an Energy Conservation Fund that will provide funding for renewable energy and energy conservation projects, although this fund is not operational yet.

The Ministry of Economy is promoting policies that will:

- Decrease tax rates for renewable energy projects
- Make fuel import tax revenues available to renewable energy projects
- Establish minimum quotes for use of renewable energy

As EU accession in 2004 approaches, Lithuania is harmonizing its waste management laws and policies so that they

conform to those decreed by the European Commission. EC directive 94/62/EC requires that at least 50% of packaging wastes are recovered and that at least 15% of packaging materials are recycled by the end of 2005. EC directive 99/31/EC states that land disposal of whole tires will not be allowed after 2002 and that shredded tires will not be allowed after 2005. In addition, all biodegradable waste going to landfills must be reduced by recycling, composting, biogas production, or energy recovery. In particular, biodegradable municipal solid wastes going to landfills by the end of 2005 should be less than 75% of 1995 amounts. By the end of 2009, the land disposal of biodegradable wastes should be reduced to at least 50% of the 1995 levels.

The Ministry of Environment established the Lithuania Environmental Investment Fund (LEIF) in 1996 to assist in implementing environmental projects. LEIF receives most of its funds from a 20% pollution tax and from capital funds such as PHARE, which it then disburses to commercial and municipal projects in the form of soft loans and grants.

To date, EU's pre-accession instruments have provided over $125 million for infrastructural developments, agricultural, and rural developments including environmental projects in Lithuania. EBRD is also actively seeking renewable energy projects to support in Lithuania. EBRD is currently assessing the potential for renewable energy in the Central and Eastern European countries to identify a pipeline of projects suitable for further investigation and possible future funding by the EBRD. This effort is supported by the USTDA Evergreen Fund and the U.K. Technical Cooperation Fund. For additional information on this EBRD project, please visit http://projects.bv.com/ebrd/

Heat and Power Generation

Lithuania's primary source of energy is nuclear power. Lithuania does not possess significant coal or natural gas reserves, but possesses onshore oil resources of about 337 million barrels and offshore reserves of between 220-440 million barrels.

Lithuania has seven major thermal power stations; six of them are co-fired with fuel oil and gas and one runs exclusively on fuel oil. One of the co-fired plants, the 1,800 MW_e Lietuvos elektrine plant, accounts for 68% of Lithuania's thermal power capacity.

Since most of Lithuania is lowlands, the country does not have large amount of hydropower potential. However, Lithuania possesses two major hydropower plants and several private small hydropower plants with an installed capacity of 900 MW_e. Renewable energy, including hydropower, accounts for 6.4% of Lithuania's primary energy.

Lithuania has one nuclear power plant, the 3,000 MW_e Ignalina nuclear power plant, which accounts for over three-quarters of all the electricity generated in Lithuania.

Lithuania is a net exporter of electricity. In 2000, Lithuania generated 11.0 billion kWh of electricity, of which 3.0 billion kWh was exported. In February 2001, Lithuania signed a multilateral agreement with Estonia, Latvia, Russia, and Belarus that gives Lithuania the option to transmit power through Belarus to other markets such as Slovakia. In the spring of 2001, Lithuania signed an agreement to export 7 billion kWh of power to Russia. Lithuania also plans to build a power line to the West that would allow power to be exported to Poland. The Power Bridge Group, a consortium of U.S. companies including CalEnergy, Duke, and the Stanton Group, plans to invest $450 million to build this line.

Lithuania is planning to restructure and privatize Lietuvos Energija (LE), the state energy company. The plans include the separation of LE into transmission, generation, and distribution components.

The Lithuanian District Heating Association plans to increase the efficiency of district heating through equipment renovations throughout the networks of its sixteen members.

Political and Economic Climate

Lithuania has had a successful decade of transition to a market economy. A consistent program of structural reforms, accompanied by large-scale privatization, has enabled Lithuania to achieve substantial results during the transition period. The aim of Lithuania's economic policy is to establish firm foundations for sustainable economic growth, to improve the business environment, to improve tax policy and administration, and to liberalize the labor market. These goals also help Lithuania prepare for accession to the EU.

The economy grew by 5.9% in 2001 after growth of 2.9% in 2000. The increase in growth was due to an increasing demand for Lithuanian exports.

The inflation rate increased from 1.0% in 2000 to 2.1% in 2001 and is expected to remain the same for the near term as reforms required for EU accession continue to improve Lithuania's economy.

Investment Climate

Foreign direct investment in Lithuania was $439 million in 2001. Cumulative net FDI in Lithuania from 1995 to 2001 totaled just over $2.6 billion. The manufacturing sector attracted the most FDI, followed by telecommunications, wholesale and retail trade, and the financial intermediation sectors. Through 2001, the U.S. ranked fifth in investment in Lithuania with an 8.3% share of the cumulative net FDI. Denmark and Sweden were ranked as the first and second highest investors in Lithuania during this period. Their respective shares of the cumulative net FDI were 18.6% and 16.1% respectively. As the privatization process continues, the net FDI is expected to increase.

Lithuania's goal of EU accession has created policies that have led to a favorable and business friendly investment climate. Foreign investors do not encounter obstacles, are permitted in all areas of industry, and are granted national treatment. In addition, there are no restrictions on the repatriation of profits.

The individual income tax rate in Lithuania has a flat rate of 33% and the corporate income tax has a flat rate of 24%. There is no tax on profits if they are re-invested in Lithuania.

Lithuania is a member of the World Trade Organization and the Baltic Free Trade Agreement. As a member of the WTO, Lithuania is essentially a duty-free country with few non-tariff barriers. Latvia and Germany are Lithuania's two most important export partners with respective export shares of 15.4% and 14.5%. Russia and Germany are Lithuania's top two sources of imports, with respective import shares of 28.0% and 14.8%. Mineral products, machinery and electrical equipment, and textiles are the primary import and export products.

U.S. Presence

U.S. companies have had success in doing business in Lithuania. The Power Bridge Group is investing $450 million in a power line linking Lithuania's electric grid to the west. Philip Morris International has

established Philip Morris Lietuva to sell tobacco products. Coca Cola has established a subsidiary in order to sell soft drink products. Motorola has invested in the Lithuanian telecommunication company Omnitel.

Useful Web Sites	
Global Environmental Facility (GEF)	http://www.gefweb.org
European Bank of Reconstruction and Development (EBRD) Investment Profile	http://www.ebrd.com/pubs/index.htm
DOE Office of Fossil Energy Country Profile	http://www.fe.doe.gov/international/e-eur.shtml
DOE Energy Information Administration (EIA) Country Analysis Brief	http://www.eia.doe.gov/emeu/cabs/contents.html
World Bank Country Profile	http://lnweb18.worldbank.org/eca/eca.nsf
Lithuania Environmental Investment Fund (LEIF)	http://www.laaif.lt/eng/info.htm

New Plant Equipment
• Biomass feed handling systems • Engineering and design services

Project Summary	
Sector	Renewable energy
Location	Various
Capital Required	$9.6 million
Export Potential	Unknown
Project Sponsor	Various Lithuanian companies
Project Status	Pre-feasibility and planning

Project Discussion

Lithuania Energy Institute (LEI) is a public institution that was established in the mid-1990's to help meet national needs in the energy sector in an environmentally responsible manner. The institute is responsible for:

- Development of energy economy planning methods and assessing their impact on the environment and energy consumption in the context of integration into the EU.
- Assessing and evaluating the safety and reliability of power plants.
- Conducting laboratory investigations and analyses in thermal physics, fluid mechanics, and metrology fields.
- Simulating complex energy systems and the development of required technologies and control systems.
- Investigating and analyzing refractory, chemical resistant materials, and aging of structural elements as well as their production technologies.
- Investigating combustion and plasma processes for the purposes of fuel efficiency, reduction of environmental pollution, and thermal decontamination.

LEI, through its contacts with industry, has identified a number of boiler conversion and fuel switching projects that are in the early planning stages. A list of these projects along with investment requirements, boiler capacities, and fuel types is presented in the following table. U.S. firms interested in learning more about these projects are encouraged to contact LEI.

Key Contacts

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Boiler Conversion and Fuel Switching Projects

Name of Boiler House	Capacity	Fuel		Investments ($1000)
		Before	After	
Rokiskis City boiler house	10 tons of steam	Mazut	Bio-fuel	1,100
Pakruojis City boiler house	7 MW	Mazut	Bio-fuel	1,622
Silute	7-10 MW	Mazut	Bio-fuel	1,843
Baisiogala	3-4 MW	Mazut	Bio-fuel	885
Taurage	7 MW	Mazut	Bio-fuel	1,888
Druskininkai	2×10 t steam	Mazut	Bio-fuel	2,360

Bio-fuel includes sawdust, wood chips and in some boiler houses mixture of biomass and peat.

GDP (in $ Billion)	172.6
GDP Growth	1.1%
GDP Per Capita ($)	4,559
Population (Million)	38.7
Credit Rating (8/8/2002)	BBB+

Source: Central Statistical Office, Warsaw, 2002; Standard & Poor's, 2002

Executive Summary

Poland is one of the most advanced transition economies in Central and Eastern Europe. Poland has maintained its record of uninterrupted growth for ten years. By continuing to encourage growth, privatization, and foreign investment, Poland has sustained macro-economic stability and continues on its course for membership in the European Union. Poland is a member of the WTO, NATO, CEFTA, and is currently in EU accession negotiations.

As Poland prepares for full entry into the EU, Poland's energy sector faces the major issues of environmental cleanup, modernization, and energy portfolio diversification. This sector requires billions of dollars of capital infusion as well as new and more effective technologies to overcome many years of neglect.

To meet these objectives, Poland is requiring that distribution utilities increase their renewable energy portfolio. In addition, it is encouraging co-generation, and has provided several instruments for the funding of environmental and renewable energy projects.

Waste-to-Energy and Renewable Energy

The Polish Council of Ministries adopted the Development Strategy for the Renewable Energy Sector on December 5, 2000. The Strategy was accepted by the Parliament on August 23, 2001. The Strategy calls for increasing use of renewable energy sources for primary energy production to 7.5% by 2010 and to 14% by 2020. The Polish Government also established a number of national and legal instruments and policy documents in the last couple of years to support the development of renewable energy sources. These initiatives created a favorable central framework for the increased utilization of renewable energy resources. Because of improved legislative conditions, there are an increasing number of potential investors, project developers, financing institutions, and local authorities interested in developing renewable energy projects.

Poland requires that all electric distribution utilities maintain a 2.4% share of renewable energy in their portfolios in 2002. This share will increase each year until reaching a peak of 7.5% in 2010. By law, renewable energy resources include hydropower, wind, solar, geothermal, biomass, biofuel, and biogas produced by animal waste processing installations, sewage treatment plants, and municipal waste landfills. In addition, Poland's Energy Act has recently been amended so that electric distribution utilities are also required to purchase power

produced by combined heat and power plants. Since average electricity tariffs are already higher than six eurocents per kWh, these requirements are not expected to be a significant burden to the utilities.

As EU accession approaches, Poland is also harmonizing its waste management laws and policies to conform to those of the European Commission. EC directive 94/62/EC requires that at least 50% of packaging wastes are recovered and that at least 15% of packaging materials are recycled by the end of 2005. EC directive 99/31/EC states that land disposal of whole tires will not be allowed after 2002 and that shredded tires will not be allowed after 2005. In addition, all biodegradable waste going to landfills must be reduced by recycling, composting, biogas production, or energy recovery. In particular, biodegradable municipal solid wastes (MSW) going to landfills should be reduced from 1995 levels by 25% by 2007 and by 50% by 2010.

Poland has several instruments to help fund renewable energy and waste-to-energy projects. One of these instruments is the National Fund for Environmental Protection and Water Management. It uses its financial resources to provide soft loans and grants to companies and joint ventures to implement waste-to-energy and renewable energy projects. Projects whose implementation helps the Polish government to harmonize internal regulations with the EU in anticipation of Poland's membership are given the highest priority for funding.

A second instrument is the 16 Voivodship Funds of Environmental Protection. The funding sources for the Voivodship Funds is mainly the environment usage fees and fines for non-compliance with environmental standards. These regional sources of funding play an important role in renewable energy projects implementation. Usually, the Funds provide soft loans or grants of up to 50% of the investment cost of the public sector projects and low-interest loans for other organizations.

Another instrument is the EcoFund Foundation (EcoFund) that was established to manage financial resources resulting from a debt-for-environment swap. Poland has signed relevant agreements with the U.S., Switzerland, France, Sweden, and Norway. The statutory objective of EcoFund is to support activities in the field of environmental protection by means of soft loans and non-repayable grants. Renewable energy is recognized as one of the priority areas for EcoFund. Any applicant wishing to receive EcoFund support must present a feasibility study and credible plans for receiving financial support from other sources, including internal sources. Since 1991, EcoFund supported more than 100 renewable energy projects in Poland.

The Environmental Protection Bank is one of the 20 largest banks in Poland and specializes in financing environmentally relevant projects, including investments in renewable energy projects. The maximum credit provided by the Bank is 50% of eligible investment costs.

In addition, the EBRD is actively seeking renewable energy projects to support in Poland. EBRD is currently assessing the potential for renewable energy in the Central and Eastern European countries to identify a pipeline of projects suitable for further investigation and possible future funding by EBRD. This effort is supported by the USTDA Evergreen Fund and the U.K. Technical Cooperation Fund. For additional information on this EBRD project, please visit http://projects.bv.com/ebrd/.

Heat and Power Generation

Poland's primary source of energy is coal. Coal produces 97% of all electric power

produced in Poland. Poland's reserves of hard coal are estimated at over 32 billion short tons while reserves of the so-called "soft coals" are estimated at over 14 billion short tons. Poland also has natural gas reserves of 5.1 trillion cubic feet and proven oil reserves of 115 million barrels. Poland's thermal power plants consist of large power stations and local combined heat and power facilities. Over half of the current thermal capacity in Poland was built in the 1970s and it is estimated that by 2005, over 20 GW_e of capacity will need rehabilitation while almost three GW_e will need to be replaced. The rehabilitation costs, which include environmental protection costs, are estimated to be up to $350 per kW of capacity.

Hydropower comprises the remaining three-percent of Poland's generated electricity. These plants are mostly located in the southern and western parts of the country. Geothermal resources – that are estimated to be significant – also exist in Poland, as well as potential sources of biofuels from Poland's large agricultural sector. Not including hydropower, less than 1% of Poland's primary energy is generated from renewable energy sources.

Poland is a net exporter of electricity. In 2000, Poland generated 145.2 billion kWh of electricity, of which 9.7 billion kWh was exported.

The process of privatization in the electricity sector is still underway. The electricity sector is being divided into the generation, transmission, and distribution subsectors – the generation and distribution subsectors are being privatized. The Polish Energy Regulatory Authority is placing an emphasis on a spot market for short-term contracts for electricity, which would replace the long term Power Purchase Agreements (PPAs) currently in place.

The ten largest CHP plants in Poland are all coal-fired. Their capacity ranges from 3-934 MW_e and 137-5,494 MW_t.

Political and Economic Climate

Poland is one of the most advanced transition economies and has now kept up its record of uninterrupted growth for ten years. The general elections of September 2001 brought a new coalition of parties to power in the Parliament. This change in political power has not affected Poland's central policy aim of joining the EU and further aligning itself with western structures. There is a broad political consensus for reform that has driven the nation's move towards privatization, facilitating foreign direct investment, maintaining economic growth, good export performance, and sustaining macro-economic stability. Poland is already a member of western structures such as the World Trade Organization (WTO), the OECD, NATO, and actively supports the Stability Pact for Southeastern Europe. Poland is currently engaged in EU accession negotiations. Poland is also a signatory to the Central European Free Trade Agreement (CEFTA). Other current members of CEFTA are Bulgaria, the Czech Republic, Hungary, Romania, Slovakia, and Slovenia.

Poland's economy grew 1.1% in 2001 after growing by 2.8% in 2000. The slowdown in the Polish economy during the past year is attributed to a "tight" monetary policy, a constrained domestic demand of the slowdown in Germany. The inflation rate decreased from 10.1% in 2000, to 5.5% in 2001.

Investment Climate

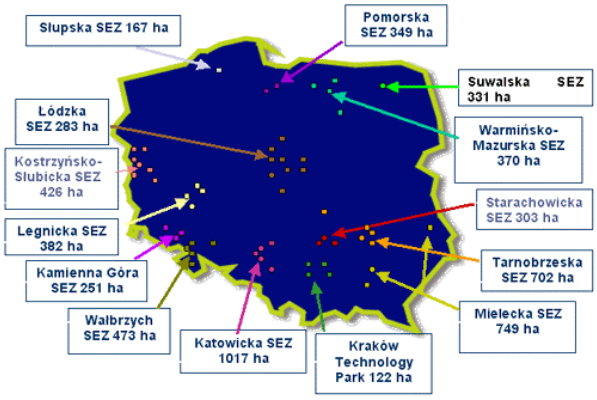
Poland has become a leader in recent years among Central and Eastern European countries in terms of foreign investment. Poland is attractive to foreign investors because of factors such as the prospective

for strong economic growth, relatively low labor costs, large labor pool, domestic market size, prospects for EU accession, and a generally good business climate.

Foreign-owned companies enjoy national treatment in Poland and operate under the same tax and labor codes as domestic companies and are free to repatriate capital.

Corporate income tax is being steadily lowered – from 34% in 1999 to 30% in 2000, to 28% in 2001-2002, to 24% in 2003, and to 22% in 2004. In 2001, several significant legal changes also came into effect that further enhanced the attractiveness of the Polish market and cleared some of the legal barriers that had hindered foreign investors for the past few years. These changes expanded the legal organization to include limited liability companies, limited partnerships, general partnerships and others. They also reduced business activities requiring licensing from 27 to 8.

Poland currently has 14 Special Economic Zones (SEZs), each of them consisting of several sub-zones. In the SEZ, investors may be eligible for the following privileges: full exemption from personal or corporate income tax, a plot prepared for investment available for a competitive price, free assistance in dealing with the formalities related to investment, exemption from real estate tax, grants for employee training programs, and grants for the creation of new jobs and other privileges. The total area of SEZ is 5900 hectares.



Poland set a record for net FDI in 2001 with an estimated $8.8 billion entering the country. In recent years, most foreign investment has been due to the privatization process. The largest privatization deal in 2001 was the sale of a 35% stake in the Rybnik Electric Power Plant to a consortium led by Electricité de France (EDF) and Germany EnBW. The second largest privatization deal in 2001 was also in the energy sector. Vattenfal of Sweden purchased a 25% stake in the Górnośląski Energy Power Plant. As of mid 2002, cumulative net FDI was over $61.6 billion. Sectors attracting FDI as a result of Poland's privatization efforts are the financial, telecommunication, transportation, food processing, automotive, wood processing, printing and publishing, and non-metal goods sectors. France leads all nations in FDI in Poland with a total of $11.5 billion invested through mid 2002. France, the U.S., and Germany jointly account for 43.7% of the total FDI in Poland.

Poland is in EU accession negotiations, and is bringing its tax system into harmony with the EU as well as preparing its markets for the pressures of full market integration with EU by continuing market reforms in the agriculture and heavy manufacturing sectors. Poland's largest trading partners are Germany, France, Italy, and the U.K. with respective export shares of 34.3%, 5.4%, 5.4%, and 5.0%. Although a member of CEFTA, the majority of Poland's trade is

with EU nations. Poland also has free trade agreements with Turkey, Estonia, Latvia, and Lithuania.

The main Polish exports are cars and car parts, wood and timber products, and machinery and equipment. Imports include capital goods, machinery, transportation equipment, mineral fuels, lubricants, and agricultural products.

U.S. Presence

As of mid 2002, the U.S. has the second highest cumulative net FDI, $8 billion, in Poland through 126 major investors.

Useful Web Sites	
Global Environmental Facility (GEF)	http://www.gefweb.org
European Bank of Reconstruction and Development (EBRD) Investment Profile	http://www.ebrd.com/pubs/index.htm
DOE Office of Fossil Energy Country Profile	http://www.fe.doe.gov/international/e-eur.shtml
DOE Energy Information Administration (EIA) Country Analysis Brief	http://www.eia.doe.gov/emeu/cabs/contents.html
World Bank Country Profile	http://lnweb18.worldbank.org/eca/eca.nsf
Polish Agency of Foreign Investment	http://www.paiz.gov.pl
The National Fund for Environmental Protection and Water Management	http://www.nfosigw.gov.pl
Polish Debt for Environment Swap (EcoFund)	http://www.ekofundusz.org.pl
Voivodship Funds of Environmental Protection	http://www.usaid.gov/pl/envirome.htm
The Environmental Protection Bank	http://www.inem.org/htdocs/eco-baltic/workshop-texts/mozaryn.html

250 MW Slupsk Shoal Offshore Wind Project

New Plant Technology & Equipment
• Wind turbines • Substations, grid connection and control equipment

Project Summary	
Sector	Wind Energy
Location	Poland
Capital Required	$400 million
Export Potential	$200 million
Project Sponsor	Elektrownie Wiatrowe S.A.
Project Status	Pre-feasibility study

Project Discussion

Project Background

Offshore wind development in Poland is attracting attention for a number of reasons including: high wind speeds, proximity to major load centers such as Gdansk, extended equipment life, minimal environmental impacts, minimal visual impacts, and larger potential project size. The prospect of offshore wind development is not without its challenges. These challenges include: lack of experience, longer permitting and construction schedules, and higher costs.

Elektrownie Wiatrowe S.A. is planning to install 100 turbines, for a total installed capacity of 250 MW offshore of Poland in the Baltic Sea. The major shareholder of the company, Mr. Wojciech Romaniszyn, has been working in the renewable energy field since 1995. Mr. Romaniszyn is also President of Elektrownie Wiatrowe Joint-Stock Company, established in order to prepare and implement a 5 MW, 26 million PLN wind farm – the first commercial wind farm on Góra Barzowicka. Mr. Romaniszyn is currently engaged in developing several other wind projects in Poland including:

- Several projects on Góra Barzowicka with a total installed capacity of 19.5 MW
- 8 MW and 6 MW projects close to W'gorzewo and GiGycko
- A 6.5 MW project close to Przasnysz
- Offshore wind projects with a total capacity of 500 MW

Mr. Romaniszyn is also one of the founders and current Vice President of the Polish Wind Energy Association.

Project Location

The project will be located offshore of Poland's coast, near Slupsk Shoal in the Baltic Sea.

Project Description

The goal is to develop, finance, construct, and operate a 250 MW offshore wind project. A feasibility study needs to be conducted first to verify the technical, economic and financing viability of the project. The goal of the feasibility study will be to assess the wind resource, conduct an Environmental Impact Assessment (EIA), prepare necessary permit applications, develop an interconnection plan, and

perform an economic analysis for the project.

Project Guidance Parameters

Project Costs

The development of the Slupsk Shoal 250 MW project is estimated to cost $400 million, of which $200 million is expected to be the value of imported equipment and services.

Schedule

This project is in the early stages of development. Offshore wind resources need to be determined, potential sites evaluated, and the technical, economic, and financial viability of the project needs to be assessed.

Planned Completion Schedule		
Activity	**Qtr**	**Year**
Feasibility study	1st	2003
Financing	3rd	2004
Construction	4th	2005

Project Financing

Financing for offshore wind projects in Poland is envisioned as possibly coming from a combination of international as well as domestic sources.

International sources of financing include:

- The Global Environmental Facility (GEF)
- The Prototype Carbon Fund (PCF)
- Joint Implementation Mechanisms (JI)

The GEF finances projects focused on the protection and management of the environment on a global scale including activities in the area of climate change. This project would meet all of the GEF's requirements including: having an active GEF program in Poland since 1994; direct connection between this project and the country's goal to provide 7.5% contribution of renewable energy to primary energy in 2010 as adopted by the Polish Council of Ministries on December 5, 2000; and public-sector involvement in project design and implementation.

The PCF's objective is to demonstrate how the project's approach results in reduced greenhouse gas emissions and supports sustainable development. Projects supported by PCF should be viable for registration under the United Nations Framework Convention on Climate Change as contributing to meeting the requirements of the Kyoto Protocol. The PCF will focus mostly on the development of renewable energy projects. The PCF could provide financing for design and construction. The most important consideration to the PCF is emission reduction, not whether or not a project is a "demonstration" or commercial project. Since the PCF is just starting in Poland, all projects are viewed as demonstration projects.

Currently, the governments of a few European countries (Denmark, Austria, the Netherlands) are preparing JI programmes for Central and Eastern European countries. The implementation of tenders for submission of proposals or direct bilateral agreements with the Polish government is expected in 2003. Other countries, including the U.S. and Canada, are also interested in the purchase of emissions reduction units. In a JI project, government participation is always required, but the revenue stream could be private sector to private sector. The projected value is not per kWh, but per emission reduction unit. The price per ton of CO_2 equivalent provided is between $1.15 and $8. This may be a conservative price

estimate, as recent offers are rumoured to be as high as $25 per ton.

One implemented program by the Dutch government, the ERU-PT (*Emission Reduction Unit-Procurement Tender),* is supporting renewable energy investment through the purchase of emission reduction units of greenhouse gases (CO_2). In the first tender under this program in 2000, a 60 MW wind farm in Poland (Skrobotowo, on the Baltic Sea coast) was accepted for implementation. The Polish Ministry of Environment is currently working on guidelines concerning acceptance of potential JI projects. This work should be finished by the end of 2002.

There are also a number of domestic financial institutions supporting the development of the renewable energy sector in Poland including:

- The National Fund for Environmental Protection and Water Management supporting larger projects and schemes
- Voivodship Funds of Environmental Protection and Water Management supporting local projects in the form of soft loans
- The EcoFund Foundation
- The Environmental Protection Bank.

U.S. Competitiveness

The possibilities for U.S. exports are quite significant. Based on the installation of 250 MW, the opportunities for exports from the U.S. will be $200 million. Several wind technology providers have production plants in the U.S. and can supply the necessary equipment. A tender will be required for the acquisition of the wind technology, wind generators and other necessary equipment to be used in the project.

Conclusion

This project is a necessary precursor to serious development of Poland's offshore wind resources. Although Poland is not lacking potential land-based sites for wind projects, the wind speed onshore in Poland is moderate to good, whereas offshore wind resources in the Baltic Sea are expected to be much more energetic but are as yet unquantified and unqualified. Successful implementation of this project will create additional options for the wind industry and help Poland to meet its goal of a 7.5% contribution of renewable energy to its primary energy supply in 2010 with minimal environmental impact. It is also expected to provide significant export opportunities for U.S. technology providers such as GE Wind that are already active in offshore wind development in Europe (Uttgruden, Sweden).

Key Contacts

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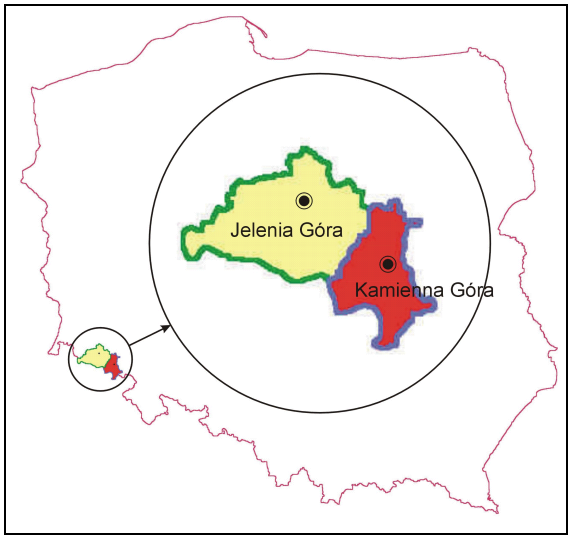
A Feasibility Study for the Realization of Wind Parks in Jelenia Góra and Kamienna Góra



New Plant Equipment
• Wind turbines
• Substations, grid connection and control equipment
• Analytical equipment and tools

Project Summary	
Sector	Wind Energy
Location	Poland
Capital Required	$60-$80 million
Export Potential	$45-$65 million
Project Sponsor	Starosta Jelenia Góra Starosta Kamienna Góra
Project Status	Pre-feasibility study

Project Discussion

Project Background

Jelenia Góra County includes the Karkonosze, Kaczawskie and Izerskie Mountains and the Jelenia Góra valley and most of terrain is located in the Bobr River basin. Jelenia Góra County is part of Dolnoslaskie Province and is divided into five rural municipalities (Janowice Wielkie, Jezow Sudecki, Myslakowice, Pdgorzyn, and Stara Kamienica), and four urban municipalities (Karpacz, Kowary, Piechowice, and Szklarska Poreba). The City of Jelenia Góra is a separate urban county located inside Jelenia Góra County but is not administered by the county. The area of Jelenia Góra County is approximately 628 sq. km, of which 40% is farmland and 47% is forested land.

Kamienna Góra County includes the Karkonoski National Park and the Rudawski Landscape Park, as well as a number of nature preserves. Kamienna Góra County is also part of Dolnoslaskie Province and is divided into three rural municipalities (Kamienna Góra, Lubawka, and Marciszow), and one urban municipality, Kamienna Góra. The area of Kamienna Góra County is approximately 396 sq. km, of which 55% is farmland and 36% is forested land.

Although farmland accounts for a large percentage of the total land area in the two counties, agriculture is not the main source of revenue due to the poor soil quality. The two counties' main sources of revenue are tourism and minerals mining and processing. Due to the high unemployment in the region, a Special Economic Zone was created in 1997 to encourage the development of industry and small business enterprises through tax exemptions. Development of the proposed project will create needed employment and the influx of capital into the region.

Project Description

Wind measurements are currently being conducted at one location in Jelenia Góra County. However, in order to develop projects on a much larger scale, it is necessary to conduct a much broader feasibility study to include additional measurements on alternative locations in Jelenia Góra and Kamienna Góra Counties, and to perform other wind development

tasks such as wind plant and interconnection design, environmental assessments, geological studies, economic analysis, wind flow modeling, etc. Expanding efforts already underway would allow the development of several different wind farms with a total capacity of 60 MW to 80 MW at a total cost of $45 - $65 million.

Project Team

Jelenia Góra County has agreed to be the lead sponsor for the proposed project with the cooperation of the administration in Kamienna Góra County.

Project Guidance Parameters

Project Costs

The development of 60 MW to 80 MW of wind farms is estimated to cost between $60 million to $80 million of which $45 million to $60 million is expected to be the value of imported equipment and services.

Project Schedule

This project is in the early stages of development. Wind data at specific sites needs to be verified and the technical, economic and financial viability of the project need to be further assessed.

Planned Completion Schedule		
Activity	**Qtr**	**Year**
Wind data verification	1st	2004
Detail feasibility study and financing	1st	2005
Engineering design and construction		2005-2006

Known Initiatives

Kamienna Góra County is currently conducting a pre-feasibility assessment in the Lubawka Pass. Both counties have other initiatives ongoing in the area of renewable energy, such as a solar initiative in Kamienna Góra County and a biomass initiative in Jelenia Góra County. Jelenia Góra County has also developed a County Strategy for Sustainable Development that clearly states that local authorities will promote the sustainable utilization of local natural resources and the development of renewable energy systems usage in the County. Kamienna Góra County, while lacking such an official strategy, has a declaration of support for the utilization of renewable energy resources on its web page at http://www.kamienna-gora.pl/index.html. There has been some analysis of local economic potential and goals, with the conclusion that renewable energy development is a necessity in the area.

Project Financing

Financing is envisioned as possibly coming from a combination of international as well as domestic sources, including:

- The Global Environmental Facility (GEF)
- The Prototype Carbon Fund (PCF)
- Joint Implementation Mechanisms (JI)
- The National Fund for Environmental Protection and Water Management supporting larger projects and schemes
- Voivodship Funds of Environmental Protection and Water Management supporting local projects in the form of soft loans
- The EcoFund Foundation
- The Environmental Protection Bank.

A Feasibility Study for the Realization of Wind Parks in Jelenia Góra and Kamienna Góra

U.S. Competitiveness

The possibilities for U.S. export are significant. Based on the installation of 60 MW - 80 MW, the opportunities for exports from the U.S. will be $45 - $65 million.

Wind technology suppliers such as GE Wind-U.S. (CA), The Wind Turbine Company-US (WA), NEG Micon-Danish (IL), and LM Glasfiber-Danish blade manufacturing (ND) have production plants in the U.S. that can supply the necessary equipment. A tender will be required for the acquisition of the wind technology to be used in the projects.

Conclusion

This project is of great importance to the local governments and to the development of wind energy in Poland. It will result in substantial environmental benefits including reduced fossil fuel plant emissions and economic development benefits for Jelenia Góra and Kamienna Góra Counties, which suffer from high unemployment. It also provides significant export opportunities for U.S. technology providers.

Key Contacts

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Suwalki Wind Power Plant

Project Summary	
Sector	Wind Energy
Location	Poland
Project Size	60 MW
Capital Required	$78 million
Export Potential	$45 million
Project Sponsor	Suwalki County
USTDA Funding	$481,000
Project Status	USTDA Funded Feasibility Study near completion

Project Discussion

Project Background

Suwalki County is located in Northeast Poland, is part of the Podlaskie Voivodship and is near the Lithuanian, Belarus, and the Kaliningrad District of Russia borders. The County is an active member of the Niemen Euro Region Initiative that is aimed at multinational cooperation and development in the region.

The total land area of Suwalki County is 1,308 sq. km (505 sq. miles). Of this area, 908 sq. km are farmlands, 228 sq. km are forests and the remaining 172 sq. is used for other purposes. The County consists of nine rural municipalities, namely Bakałarzewo, Filipów, Jeleniewo, Przerośl, Raczki, Rutka Tartak, Suwalki, Szypliszki and Wiżajny and the population of the County is 36,000.

The economy of the County is based on agriculture, as farmlands occupy 70% of the total land area and non-agriculture related businesses are rare.

Project Team

Suwalki County is the project sponsor. Suwalki County was established on January 1, 1999 as a result of state administration reform. In recent years, County Authorities have carried out numerous projects totaling over $40 million.

To execute the feasibility study for a pilot wind farm investment project in Suwalki County, the County Administration has contracted AWS Scientific, Inc. of Albany, NY, to perform the required technical tasks. AWS Scientific is one of the leading firms in the energy industry in providing planning, implementation, and evaluation services to electric utilities, government agencies, and private industry in the field of renewable technologies. In the field of wind energy, AWS has conducted technical and economic feasibility studies for over 200 locations in the U.S. and abroad using field-proven wind measurement and engineering techniques. AWS further subcontracted in-country technical support and coordination to EC BREC Ltd., Warsaw, Poland.

Project Location

Four sites have been selected for evaluation in Suwalki County: Potasznia, Piecki, Bialorogi, and Okliny.

Suwalki Wind Power Plant

Project Guidance Parameters

Project Costs

The total project cost for the proposed 60 MW total development in Suwalki County is estimated to be $78 million. The entire amount is expected to be the value of imported equipment and services.

Schedule

A project schedule, other than a two year duration for the feasibility study, has not been prepared yet.

Known Initiatives

Suwalki County has already conducted a pre-feasibility assessment of potential sites in the County.

The feasibility study for the project is already in progress.

Suwalki County has drafted a Business Plan to attract development and equity partners to complete the construction and own and operate the facilities.

Project Financing

The Polish Government established a number of national legal instruments and policy documents in the last couple of years to support the development of renewable energy sources, and in particular, wind energy. As a result of these improved legislative conditions for renewable energy sources, in particular the green electricity feed-in law in force since January 2001, an increasing number of potential investors, project developers, financing institutions and local authorities have taken up development of wind energy.

Financing for the Suwalki project is envisioned as possibly coming from a combination of international as well as domestic sources, including:

- The Global Environmental Facility
- The Prototype Carbon Fund
- Joint Implementation Mechanisms
- The National Fund for Environmental Protection and Water Management supporting larger projects and schemes
- Voivodship Funds of Environmental Protection and Water Management supporting local projects in the form of soft loans
- The EcoFund Foundation
- The Environmental Protection Bank.

U.S. Competitiveness

The possibilities for U.S. exports are significant. Based on the installation of 60 MW, the opportunities for exports from the U.S. could be as high as $45 million. Several equipment suppliers such as GE Wind-U.S. (CA), The Wind Turbine Company-U.S. (WA), NEG Micon-Danish (IL), and LM Glasfiber-Danish blade manufacturing (ND) have production plants in the U.S. and can supply the necessary equipment. European suppliers such as Eolica s.r.l. of Italy and ALSTOM of France could compete for the project and will be eligible if EcoFund financing is used. A tender will be required for the acquisition of the wind technology.

Conclusion

This project is of great importance to the development of wind energy in Poland and will result in substantial environmental benefits including reduced fossil fuel plant emissions and economic development benefits for Suwalki County. It also provides significant export opportunities for U.S. technology providers.

Key Contacts

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Rapeseed Bio-Refinery

New Plant Technology & Equipment
• Rapeseed press
• Control equipment
• Boiler
• Turbine or engine
• Generator

Project Summary	
Sector	Renewable Energy
Location	Sycewice, Poland
Capital Required	$11.5 million
Export Potential	Up to $4 million
Project Sponsor	Estry Metylowe Ltd.
Project Status	Planning

Project Discussion

Project Background

Poland has entered into negotiations with the European Union to become a Member State in 2004. As a result of these negotiations, Poland has promulgated new environmental laws, such as The Act on Environmental Protection and Development, promoting renewable technologies. This obliges the country to improve its energy balance by increasing the share of renewable energy up to 7.5% by the year 2010 compared to 1% nowadays.

To support investments in bio-diesel production, the Polish government is preparing a regulation regarding the structure of the bio-diesel market. The regulation will introduce quotas and permits for production. The government estimates a quota of 800,000 tons per year of bio-diesel countrywide. Estry Metylowe Ltd. (EM) has been pursuing these developments and is well positioned to acquire a significant portion of the quota production. EM's location near an area with a tradition of production of rapeseed crops and the support of local authorities are advantages that will help the project secure a significant portion of the production quota. It is expected that the project will create new jobs in the agriculture industry. The project also has export potential; it is located near the sea and near a rail junction. Successful implementation of this project is expected to lead to construction of similar projects at 10 other sites in Poland.

Proposed legislation will probably waive the excise tax for bio-fuel. Therefore, the final price of bio-diesel can be 0.10 PLN/liter (2-3 cents) less than diesel. In neighboring Germany, the best price for esters is 0.10 PLN higher than the local diesel. Thus, the danger of import competition is unlikely.

Facility Description

The facility will have the following components:

- Storage and drying equipment
- Presses
- Refinery installation for raw oil including:
  - Cleaning system for raw oil
  - Esters production system

  - Esters treatment unit
  - Methyl esters treatment unit
  - Glycerol treatment unit
  - By-product management system
- Local CHP plant for auto-production as an option

The facility site is already fully equipped with the necessary infrastructure such as access roads and utilities.

Project Team

The project promoter is Mr. Tomasz Niciejewski, the EM owner and also the owner of an international transport company with trucks and lorries servicing all of Europe.

The main contractor is the engineering company WTT. WTT and the construction company Naftobudowa will be the turnkey contractors. Naftobudowa will provide guarantees for quality of their work.

Project Location

Sycewice is located in the north part of Poland, not far from the seacoast. The area is primarily agricultural and has significant unemployment.

Renewables Support in Poland

The Polish Council of Ministries adopted the Development Strategy for the Renewable Energy Sector on December 5, 2000. The Strategy was accepted by the Parliament on August 23, 2001. The Strategy calls for a 7.5% contribution by renewable energy sources to primary energy in 2010, increasing to 14% in 2020. The Polish Government has also established a number of national legal instruments and policy documents in the last couple of years to support the development of renewable energy sources, and in particular wind energy. These initiatives have created a favorable central framework of conditions for the increased utilization of renewable energy sources. As a result of these improved legislative conditions for renewable energy sources, in particular the green electricity feed-in law in force since January 2001, an increasing number of potential investors, project developers, financing institutions and local authorities have taken up the development of renewable energy as an important issue.

Project Guidance Parameters

Project Costs

EM received a project price estimate of $11.5 million from an engineering and construction firm. EM also received a similar offer from Naftobudowa in Krakow.

Known Initiatives

The sponsor has signed intention letters with:

- A local distributor of gasoline
- Local farmers to provide them with oil cake to feed their herds
- Local Agency of Restructuring the Agriculture to help with contracts with rapeseed producers
- Voivodship Fund for Environment Protection for financing
- National Fund for Environmental Protection
- EcoFund for a potential grant

Scope of Feasibility Study

A feasibility study, tailored to the terms of potential international investors is needed.

Rapeseed Bio-Refinery

The sponsor has had a feasibility study prepared for a potential Polish investor.

Project Schedule

Planned Completion Schedule		
Activity	**Qtr**	**Year**
Feasibility study	1st	2003
Financing		2003
Construction		2004

The project team desires to complete the feasibility study in early 2003. During 2003, it plans to finalize financing and start construction.

Project Financing

EM has already arranged funding from NFOS, the Voivodship Fund, and EcoFund. EM has met with the Deputy Minister of Finance about this.

EM will provide 10% of project cost as equity from its own funds. EM seeks an additional equity investor that could invest up to $1.3 million either in cash or in equipment in the project.

U.S. Competitiveness

U.S equipment suppliers who may be interested in supplying equipment for this project include such firms as the Dupps Company, Ohio and Insta Pro International, Iowa. U.S. equipment suppliers are, however, expected to meet strong competition from European firms such as Armfield, U.K.; and PMI Production Machinery, Germany.

Conclusion

Poland and the EU encourage the implementation of biofuel projects. The likelihood for the project success is very high because the technology is well understood and because availability of low interest loans and grants makes the project economically viable. Successful implementation of the project could help U.S. equipment manufacturers enter a growing market in Poland and Central and Eastern Europe.

Key Contacts

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Kaminsk Gora Wind Power Park

New Plant Technology & Equipment
• Wind turbines
• Transformers
• Control equipment
• Interconnection equipment

Project Summary	
Sector	Renewable energy
Location	Gora Kaminsk, Poland
Capital Required	$40 million
Export Potential	$24 million
Project Sponsor	Joint Venture of ESP, Belchatow Power Plant, Thermal, ZE Lodz.
Project Status	Pre-feasibility study

Project Discussion

Project Background

In accordance with the EU White Paper for a Community Strategy and Action Plan issued in 1999, Poland is required to increase the contribution of renewable energy to the country's primary energy. According to Polish regulations, 7.5% of the country's primary energy must come from renewable sources by 2010. These regulations also assume that wind energy will contribute 3% of Poland's primary energy by 2010.
Four parties have signed a letter of intent to develop a wind farm in Gora Kaminsk. They are:

- Belchatow thermal power plant
- Bio Energia ESP (ESP), a subsidiary of the Polish Power Grid Company
- Thermal, Belchatow's construction company
- ZE Lodz, a power purchaser.

The purpose of the project is to improve Belchatow's net emissions. The letter of intent states that the four parties will establish a joint venture company to implement the wind farm project and ESP and the Belchatow power plant, will be the project owners.

The project will consist of 16 wind turbines of 2 MW each for a total capacity of 32 MW.

Project Team

The sponsors will be the Belchatow power plant, ESP, Thermal, and ZE Lodz. The project will be financed by the project team using internal sources.

Project Location

The project is located in Gora Kaminsk, near the City of Lodz.

Project Guidance Parameters

Project Costs

Total project costs are estimated at about $40 million. Based on preliminary cost assessments and information from turbine producers, the average cost of a 2MW wind

turbine is about $ 1.5 million[1], which includes transportation, insurance, and construction costs. The value of the equipment and services that must be imported is about $30 million.

Known Initiatives

The project sponsors are scheduled to complete the first-year wind measurements at 16 sites using 80 m towers in 2002. So far, they have found the wind conditions are comparable to those at the seashore and the results are encouraging.

The sponsors have signed a letter of intent to form a project company and have decided on an ownership structure.

Project Schedule

Planned Completion Schedule		
Activity	**Qtr**	**Year**
Wind Survey	4th	2002
Feasibility Study	2nd	2003
Construction		2003 – 2004

Project Financing

The project sponsors will finance the project using their own funds. It is possible that EcoFund will contribute a grant to the project. If this happens, EcoFund only accepts technology suppliers from countries, such as the U.S., who are partners in the eco-conversion system.

U.S. Competitiveness

The potential for U.S. exports is significant. All major wind turbine equipment has to be imported. The project sponsors are interested in attracting a U.S. equipment supplier, such as GE Wind to participate in the project. U.S. companies could also supply the interconnection, transformation, control and monitoring equipment. The potential value of imported goods for this project is about $30 million.

Conclusion

This project has the necessary political, organizational and financial support. If the wind data justify the project's economic viability, the project is likely to go forward. This project represents a solid opportunity for U.S. products and services.

Key Contacts

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[1] for 16 turbines

EKO – Energia Wind Farm

New Plant Technology & Equipment
• Wind turbines • Control systems • Transformers

Project Summary	
Sector	Renewable energy
Location	Near Ustka, Mid-Coast
Capital Required	$27 million
Export Potential	$20 million
Project Sponsor	EKO - Energia
Project Status	Planning

Project Discussion

Project Background

Polish law requires that by 2010, 7.5% of electric energy produced will come from renewable sources. Wind power is expected to be a major source of renewable energy in Poland; this is supported by the EU White Paper for a Community Strategy and Action Plan, issued in 1999, which assumed that in 2010 about 3% of Poland's energy will be produced by wind plants.

EKO – Energia Sp. z.o.o. (EKO) is developing a wind farm at Gmina Postomino. The wind farm comprised of 12 wind turbines of 2 MW each for a total project capacity of 24 MW. It is assumed that, with an average wind speed of 6.5 m/s, each turbine will produce 5,800 MWh of electricity yearly.

The project will have two phases:

- Phase 1 - construction of necessary roads, foundations, media connection, and all other infrastructure for all 12 turbines, and construction of the first four turbines.
- Phase 2 - construction of the next eight turbines.

Project Team

EKO is a privately owned company with capital of 100,000 PLN ($26,000).

EKO is looking for a strategic investor to invest $2.5 million to $5.0 million in exchange for obtaining 40% to 49% of the project company's shares.

Project Location

The project is located in Gmina Postomino, seven km south from the seacoast, and 10 km from Ustka on 28 ha of land owned by EKO.

The project site has an average elevation of 31 m to 32 m and the nearest farm is 500 m away, which fulfills Polish Building requirements about wind farm locations.

The nearest high voltage transformer is located eight km away from the project site, allowing the wind farm to be connected to the electric grid.

EKO – Energia Wind Farm

Project Guidance Parameters

Project Costs

Total project costs are estimated to be $27 million.

Based on preliminary cost assessments and information from turbine producers, the average cost of a 2MW turbine is about $1.5 million, including transportation, all necessary insurance, and construction costs.

Total turbine costs, approximately $18.0 million, will constitute about 67% of the total investment costs.

The necessary infrastructure such as roads, foundations, and media connections will cost about $6 million.

Preliminary costs estimates for purchasing land, necessary allowances, and an evaluation of the environmental impacts of the project are estimated at about $1.0 million. An additional 10%, equal to $2.0 million, is included as a reserve.

Known Initiatives

1. Company established in May 2000
2. Land purchased in June 2001
3. Business plan and preliminary economic analyses prepared in 2001
4. Application to Prototype Carbon Fund (PCF) for grant submitted in August 2001
5. Local spatial plan filed in August 2001
6. Acceptance of application by PCF in January 2002
7. Negotiation on connection to the electricity network started in March 2002
8. Search for a strategic investor started in 2002

Project Schedule

Planned Completion Schedule		
Activity	**Qtr**	**Year**
Financing	4th	2003
Construction	2nd	2004

Project Financing

The project will be financed mainly from a grant and credits. EKO will finance the costs of preliminary development from its own resources.

Potential donors include PCF, which could finance approximately 10% of the total project cost and EcoFund, which could fund approximately 20% of the total project cost. Total expected donations are expected to equal between 25% and 35% of the total project cost.

Preference credits, equal to up to 50% of the total project cost, could be obtained from the National Fund for Environmental Protection and EcoFund.

The remaining 15% to 25% of the project costs will be financed by EKO using its own resources or by commercial credits.
Credit conditions have already been discussed with one Polish bank; the proposal is a 6% to 7% interest rate and an eight-year tenor including a one year grace period.

Sources of Funds

Source	% of Total Project Costs	Million PLN
PCF (grant)	10	10
EcoFund (grant)	20	20
NFOS (loan)	30	30
EcoFund (loan)	10	10
Banks (credit)	10	10
EKO Capital	20	20
Total	**100**	**100**

EcoFund and other potential lending institutions require a project feasibility study be completed prior to committing to financing the project.

U.S. Competitiveness

The potential for U.S. exports is significant. All major equipment has to be imported and the assessed value of imported goods is equal to $20 million, or approximately 75% of the project cost. American technology suppliers such as GE Wind are expected to compete for the role of technology supplier to the project. Any final decisions about equipment suppliers will be based on the results of an official tender, so cost will be an important part of the choice of the equipment supplier.

Key Contacts

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Olkusz MSW Separation and Gasification Project

New Plant Technology & Equipment
• Gasification technology
• Steam turbine
• Boilers
• Scrubber system
• Baghouse
• Feeders, compressors, fans, conveyors, separators
• Control system

Project Summary	
Sector	Waste-To-Energy
Location	Olkusz, Poland
Capital Required	$26 million
Export Potential	$16-$18 million
Project Sponsor	Olkusz City Government
Project Developer	IKB IESSCO Norcon, LTD
Project Status	Planning

Project Discussion

Project Background

Poland has entered into negotiations with the European Union to become a Member State in 2004. As a result of EU accession negotiations, Poland has promulgated new environmental laws (e.g., Clean and Orderly Act of September 1996) affecting the management and disposal of municipal solid waste (MSW).

The City of Olkusz is planning to develop an integrated waste management program addressing waste separation, recycling, and minimizing solid waste disposal by gasifying the non-recyclable portion of MSW to produce a fuel gas product that can be used to generate steam and electricity for sale. MSW recycling and gasification will significantly reduce the need for land filling.

The city will guarantee, for a 20-year period, a minimum amount of waste to be delivered to the facility site on daily basis for a "tipping fee" to be negotiated. The project company will be responsible for the financing, design and construction of the gasification plant and for the separation and sale of recyclable material, gasification of non-recyclable MSW, generation and sale of electricity or steam, and disposal of any remaining waste.

Separation/Gasification Facility

The facility will be designed to process 300 tons per day of MSW. When operational, trucks delivering MSW to the facility will be weighed and directed to a solid waste receiving/tipping floor where the waste will be inspected and large bulky items and any hazardous packages or boxes will be removed to a designated collection area. Cardboard boxes will also be removed, collected, and stored for bailing at a later time. Following this initial inspection, the waste will be transferred to a separation system by a conveyor. This separation system consists of a series of conveyor belts, mezzanines, screens and magnets. In the first stage the oversized material, over 8 inches in size, will be deposited in a sorting conveyor. Paper and cardboard will be sorted manually

while other material will be sorted using mechanical or magnetic methods. Sorted items will be dropped into containers located below the sorting mezzanine for baling or processing later. Any remaining non-sorted waste material will be conveyed to a gasification facility for further processing.

The screened materials that are less than 8 inches in size are conveyed to a second screening device where the materials smaller than 2-1/2 inches in size are separated from the larger materials. The less than 2-1/2 inches material, "unders", is conveyed to an inerts separator where the light organic fraction is removed and conveyed to a container for later processing. The inert non-organic fraction is taken to a container for further processing or landfilling.

The larger than 2-1/2 inch material, "overs", is conveyed to a sorting conveyor where glass and plastics are removed by hand and dropped into containers below. An overhead belt magnet removes ferrous metals while an Eddy Current Separator removes any aluminum cans. Aluminum cans drop onto a conveyor and are conveyed to a crusher. Cans are then pneumatically transferred into a holding silo prior to baling.

Any remaining non-sorted material joins the non-sorted material from the fiber sorting conveyor and is taken to the gasifier for processing.

The gasification facility will be designed to gasify 200 MTD of non-sorted waste material. It will consist of two air-blown gasifiers (two, two-staged combustors). The solid waste will automatically be loaded into a primary chamber where the air will be controlled to maintain a sub-stoichiometric (oxygen starved) condition. As the gas products from the primary combustion chamber flow into the secondary chamber, additional air will be automatically mixed with the product gas to maintain a pre-set operating temperature. The gaseous product – flue gas – from the secondary combustion chamber will then be directed to a heat recovery boiler to generate steam. The two systems will produce approximately 55,200 lbs/hr of steam at 400 psig and 550°F. The steam produced will be used within the facility with any residual amount being sold to the local utility company.

The gasifiers and heat recovery boilers will be designed to operate 24 hours per day.

Project Team

The project team consists of the city government of Olkusz and IKB IESSCO, Norcon, LTD (IKB). IKB was formed by Norcon International, Inc. (Norcon) and International Environmental Systems and Supplies Inc. (IESSCO) for the development, financing, and implementation of this and other similar projects in Poland.

Norcon is located in Marietta, Georgia, USA and is a Norcon Systems Inc. affiliated company. Norcon provides engineering and consulting services including environmental impact studies, feasibility studies, financial and economic studies, equipment selection and design of waste processing facilities, marketing of recovered materials as well as the operation and record keeping of waste processing facilities.

Norcon Systems, Inc. is a manufacturer and distributor of waste processing equipment. Norcon Systems has over 18 years of experience in the waste processing industry. Norcon Systems has completed many projects with the largest being a $60 million facility, with Norcon Systems' scope of work counting for about 10% of total project cost. Norcon Systems provided the material handling equipment including conveyors and engineering, electrical design, electrical controls, electrical equipment and electrical and mechanical installation for the project.

IESSCO was incorporated in the State of Delaware, USA in 1978.

IESSCO has extensive experience in exporting environmental equipment to Eastern Europe and the Middle East and in providing construction services to many organizations in the tri-state area of New York, New Jersey and Connecticut.

Project Location

The City of Olkusz is located about 35 miles northwest of Krakow.

Project Guidance Parameters

Project Costs

The total project cost is estimated to be $26-$30 million of which $15 - $16 million is estimated to be the value of imported goods and services.

Known Initiatives

Olkusz officials realized the problem that the city is facing in collecting and landfilling municipal waste. The municipality is running out of landfill space and the city officials have expressed their desire to implement a recycling/separation project for recovering valuable recyclable products and for gasifying waste material to minimize landfill needs and to produce steam or electricity for use in their community and to sell to the local utility.

The City of Olkusz has property for the location of the facility and the city officials are offering it for sale to the project company at a discounted price. The property is of sufficient size, is level in grade, and is near a wastewater treatment facility. The location should bring little or no opposition for the construction of this type facility in the area. An application for a feasibility study grant is submitted to USTDA for their consideration.

Scope of Feasibility Study

The study will determine the characteristics of the waste streams, review present collection and hauling practices, and identify markets for recovered materials. It will further determine the technical, economic, and financing viability of designing, constructing and operating an expanded MSW separation/recycling facility in conjunction with a MSW gasification facility.

Project Schedule

Planned Completion Schedule		
Activity	**Qtr**	**Year**
Feasibility study	1st	2003
Financing		2003
Construction		2004

The project team desires to complete the feasibility study in early 2003. During 2003, it plans to finalize financing and start construction.

Project Financing

It is the Olkusz city government's expectation that equity will be provided by other team members. They also expect that debt financing will be arranged through financial institutions and commercial lenders.

U.S. Competitiveness

U.S. manufactured equipment (gasifiers, and MSW sorting equipment) and technology is considered superior to those currently marketed by European suppliers in Poland. U.S. companies with experience in exports and attractive payment terms will enjoy a competitive position.

Conclusion

This project is a high priority for Olkusz and is consistent with the stated goals of the Government of Poland. It will reduce the use of the landfill, potential contamination of ground water sources, and emission of greenhouse gases (methane) from landfills.

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New Plant Technology/Equipment
• Gasification technology
• Steam turbine
• Boiler
• Turbine generator set
• Scrubber system
• Baghouse
• Feeders, compressors, fans
• Control system

Project Summary	
Sector	Waste-To-Energy
Location	Konin, Poland
Capital Required	$26-$30 million
Export Potential	$15-$16 million
Project Sponsor	Konin City Government
Project Developer	IKB IESSCO Norcon, LTD
Project Status	Planning

Project Discussion

Project Background

Poland has entered into negotiations with the European Union to become a Member State in 2004. As a result of EU accession negotiations, Poland has promulgated new environmental laws (e.g., Clean and Orderly Act of September 1996) affecting the management and disposal of municipal solid waste (MSW).

The City of Konin is planning to develop an integrated waste management program addressing waste separation and recycling and minimizing solid waste disposal by gasifying the non-recyclable portion of MSW to produce a fuel gas product that can be used to generate steam and electricity for sale. MSW recycling and gasification will significantly reduce the need for land filling.

The City of Konin recently completed construction of a new MSW recycling/ separation plant. The city will contribute this new facility, including land, buildings and equipment with an estimated value of $4,000,000, to a project company in return for an ownership interest in the project company. The city will also guarantee, for a 20-year period, a minimum amount of waste to be delivered to the facility site on a daily basis for a “tipping fee” to be negotiated. The project company will be responsible for the financing, design and construction of the gasification plant and for the separation and sale of recyclable material, gasification of non-recyclable MSW, generation and sale of electricity or steam, and disposal of any remaining waste.

Separation/Gasification Facility

The new recycling/separating plant will be expanded to improve separation efficiency. The expanded facility will process about 300 tons per day (eight-hours per day) of MSW. When operational, trucks delivering MSW to the facility will be weighed and directed to a solid waste receiving/tipping floor where the waste will be inspected and large bulky items and any hazardous packages or boxes will be removed to a designated collection

area. Cardboard boxes will also be removed, collected, and stored for bailing at a later time. Following this initial inspection, the waste will be transferred to the separation system by a conveyor. The separation system consists of a series of conveyor belts, mezzanines, screens and magnets. In the first stage, items that are smaller than 2.5 inches in size will be removed and conveyed to a roll-off container. This separation stage is designed to remove most broken glass, stones and food waste, and to improve the sorting efficiency of the remaining non-screened, over 2.5 inch in size MSW. This separated material, along with other non-separated materials, will be used as the feed material for the proposed gasification facility.

The over sized material, over 2.5 inches in size, will then be deposited in a sorting conveyor. Paper, cardboard, plastic, aluminum, and glass material will be sorted manually. Sorted items will be dropped into containers located below the sorting mezzanine to be baled or processed later. The remaining non-sorted material will then pass under an overhead belt magnet to remove any ferrous metal items. As noted earlier, the remaining non-sorted waste material will be conveyed to the gasification facility for further processing.

This facility will be designed to gasify 200 MTD of non-sorted waste material. It will consist of two air-blown gasifiers (two, two-staged combustors). The solid waste will be automatically loaded into a primary chamber where the air is controlled to maintain a sub-stoichiometric, oxygen starved condition. As the gas products from the primary combustion chamber flow into the secondary chamber, additional air will automatically be mixed with the product gas to maintain a pre-set operating temperature. The product gas, flue gas, from the secondary combustion chamber will then be directed to a heat recovery boiler to generate steam. Steam is directed to two steam generator sets to produce about 4,100 KWe.

The gasifiers, heat recovery boilers and steam generator sets are designed to operate 24 hours per day.

Project Team

The project team consists of the city government of Konin and IKB IESSCO, Norcon, Ltd. (IKB).

Norcon International Inc. (Norcon) and International Environmental Systems and Supplies Inc. (IESSCO) formed IKB to develop, finance, and implement this and other similar projects in Poland.

Norcon, located in Marietta, Georgia, USA, is a Norcon Systems Inc. affiliated company. Norcon provides engineering and consulting services including environmental impact studies, feasibility studies, financial and economic studies, equipment selection and design of waste processing facilities, marketing of recovered materials as well as the operation and keeping records of waste processing facilities.

Norcon Systems, Inc. is a manufacturer and distributor of waste processing equipment. Norcon Systems has over 18 years of experience in the waste processing industry. Norcon Systems completed many projects with the largest being a $60 million facility, with Norcon Systems' scope of work counting for about 10% of the total project cost. Norcon Systems provided the material handling equipment including conveyors, engineering, electrical design, electrical controls, electrical equipment and electrical and mechanical installation for this project.

IESSCO was incorporated in the State of Delaware, USA in 1978. IESSCO has extensive experience in exporting environmental equipment to Eastern Europe

and the Middle East and in providing construction services to many organizations in the tri-state area of New York, New Jersey and Connecticut.

Project Location

The City of Konin is located in Wielkopolska Voivodship and is 150 miles west of Warsaw.

Project Guidance Parameters

Project Costs

The total project cost is estimated at about $30 million, including $26 million for the design, engineering, and installation of new separation, gasification, and steam and power generation equipment, buildings, and initial working capital. The value of the required imported goods and service is estimated to range from $16 million to $18 million.

Known Initiatives

The Konin city government began preparing for the proper and safe handling of municipal waste in 1997. A program was implemented for selective municipal waste collection by installing special containers at designated locations within the city. As the program grew, storage areas were created at the landfill and a baler was installed. Furthermore, Konin's government began a program for the construction of a separation facility including:

- Improving and upgrading roads into the landfill
- Construction of a facility building
- Installation of new separation equipment
- Addition of new drive-on scales and construction of a new scale house
- Construction of large educational class rooms
- Construction of a storm water runoff system
- Providing utility (water, sewer and electricity) connections, paved roads, and parking lots with concrete curbing and gutters within the facility.

In April 2002, IKB signed a technology agreement with the city of Konin to develop a solution to the solid waste problems in Konin. An application for a feasibility study grant was recently submitted to USTDA for their consideration.

Scope of Feasibility Study

The study will determine the characteristics of the waste streams, review present collection and hauling practices, and identify markets for the recovered materials. It will further determine the technical, economic, and financing viability of designing, constructing and operating an expanded MSW separation/recycling facility in conjunction with a MSW gasification facility.

Project Schedule

Planned Completion Schedule		
Activity	**Qtr**	**Year**
Feasibility study	1st	2003
Financing		2003
Construction		2004

The project team desires to complete the feasibility study in early 2003. During 2003, it plans to finalize financing and start construction.

Konin MSW Separation and Gasification Project

Project Financing

Out of the total project cost of $30 million, Konin is considering contributing 13%, or $4 million, in equipment and buildings, as its investment into the project company. It is their expectation that any additional equity will be provided by other team members. They also expect that the debt financing will be arranged through financial institutions and commercial lenders.

U.S. Competitiveness

U.S. manufactured equipment (gasifiers, and MSW sorting equipment) and technology is considered superior to those currently marketed by European suppliers in Poland. U.S. companies with experience in exports and attractive payment terms will enjoy a competitive position.

Conclusion

This project is a high priority for Konin and is consistent with the stated goals of the Polish government. It will reduce the use of landfills, the potential contamination of ground water sources, and the emission of greenhouse gases (methane) from landfills.

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Chelm Waste-To-Energy Project

New Plant Technology & Equipment

- Material handling/separation systems
- MSW combustor
- MSW feed system
- HRSG
- Steam turbine generator
- Pollution control devices
- Fans, blowers, heat exchangers
- Control system

Project Summary

Sector	Waste-to-Energy
Location	Chelm, Poland
Capital Required	$40 million
Export Potential	Up to $14 million
Project Sponsor	City of Chelm
Project Developer	PCI Energy International, Inc
Project Status	USTDA funded feasibility study on-going

Project Discussion

Project Background

The City of Chelm desires to implement a waste-to-energy project to co-fire RDF with coal in one or more of its existing coal-fired hot water boilers. The municipality's existing heating plant consists of four boilers ranging in age from eight to twenty years. The capacity of the newest boiler, installed in 1994, is 46 MW_t while two units installed in 1984 generate 29 MW_t each. The capacity of the oldest unit, installed in 1983, is 11 MW_t.

Poland has entered into negotiations with the European Union to become a Member State in 2004. As a result of EU accession negotiations, Poland has promulgated new environmental laws, such as the Polish Environmental Act, affecting allowable emission levels of NO_x, SO_x, and particulates from coal-fired plants as well as the management of municipal solid waste (MSW). In addition, Poland desires to increase use of renewable energy resources including biomass and MSW.

To meet these new requirements and to bring Poland's waste management practices in line with EU directives, the City of Chelm has teamed with PCI Energy International, Inc. (PCI) of Schaumburg, Illinois, USA to develop and implement this waste-to-energy project.

Project Description

The proposed waste-to-energy project is expected to have a maximum design heat output of about 20 MW_t. This project will supply the "base load" heat to the Chelm municipal heat system providing approximately 100% of the summer heat and about 35% of the winter heat required.

The project will include a 300 ton per day MSW mass burn combustion system, a high-pressure steam generator, a steam turbine generator, and the required material handling, flue gas scrubbing, and other auxiliary systems. The electrical power from the steam generator will be conveyed to a facility switchyard where a step-up transformer, circuit breaker, and protection equipment will be provided to permit the conveyance of electric power to the local electric distribution utility.

Project Team

Currently, the project team consists of the City of Chelm and PCI.

The City of Chelm will supply the land for the proposed project and will potentially be an equity participant in the project. The city will also provide access to certain grants and low interest loans that may not be available to the project otherwise.

PCI will also be an equity participant in the project. PCI will develop the project and arrange debt and equity financing for the project, should the on-going feasibility study indicate that the project is financially viable.

PCI has extensive experience in developing and implementing electric power generation and cogeneration projects in Poland, U.S., and Canada.

Project Location

The City of Chelm is located in the eastern part of Poland, near the Ukrainian border and is about 250 km (160 miles) southeast of Warsaw.

Project Guidance Parameters

Project Costs

The total project cost is estimated at about $40 million with $14 million in potential imports of U.S. equipment and services.

Known Initiatives

A USTDA funded feasibility study is currently being conducted by PCI. PCI is cost-sharing this feasibility study and is committed to a success fee arrangement with USTDA. Preliminary energy and material balances as well as capital cost estimates for a 300 ton-per-day MSW system are completed. PCI also began preliminary discussions with a number of potential equity and debt providers who have expressed strong interest in the project.

Scope of Feasibility Study

The USTDA funded feasibility study will determine the quality and quantity of the available MSW and assess the technical, environmental, economic, and financing viability of designing, constructing and operating the proposed MSW-to-energy project.

Project Schedule

Planned Completion Schedule		
Activity	**Qtr**	**Year**
Feasibility study	4th	2002
Financing	2nd	2003
Construction	2nd	2004

The project team desires to finalize arrangements for financing the project by mid-2003 and complete facility design, engineering, and construction and start-up by mid-2004. Commercial operation is scheduled to start in mid to late 2004.

Project Financing

PCI is currently preparing a financing plan for the project. In preparing this plan, PCI is canvassing the equity market to determine the best investor options for the financing of this project. PCI is also evaluating options available for debt financing. Potential debt financing sources include the International Finance Corporation, the U.S. Ex-Im Bank, and other export credit agencies. The commercial banks and environmental funds active in Poland and Central Europe are also being considered.

U.S. Competitiveness

The U.S. suppliers of RDF production, mass burning systems and equipment include:

- Babcock & Wilcox
- Foster Wheeler
- Consutech Systems, LLC
- The Barlow Group, Inc.
- Enercon Systems, Inc.
- International Waste Industries, Inc.
- National Recovery Technologies, Inc.
- Warren and Baerg Manufacturing, Inc.
- Hustler Conveyor Company

These and other U.S. equipment suppliers could successfully compete with European suppliers of equipment and services for this project, especially if debt financing can be arranged through Ex-Im bank. U.S. suppliers are most likely to face a strong competition from German and Scandinavian equipment suppliers.

Conclusion

This project has a very high priority for the city of Chelm and is consistent with the stated goal of the Polish government for addressing environmental issues and the Polish Environmental Act. Compared to current land filling practices, successful implementation of this project will allow a more environmentally friendly processing of MSW and energy production from a renewable source.

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Leborc New Straw-Fired CHP Plant

New Plant Technology & Equipment
• Straw-fired boilers • Turbine • Control systems • Insulation

Project Summary	
Sector	Renewable Energy
Location	Leborc, Poland
Capital Required	$10 million
Export Potential	$3.5 million
Project Sponsor	MPEC-Leborc
Project Status	Pre-feasibility study completed

Project Discussion

Project Background

Poland is harmonizing its energy and environmental laws and policies with those of the EU as Poland approaches accession in 2004. One of the commitments that Poland made was to increase the contribution of renewable energy sources to primary energy to 7.5%. In order to accomplish this goal, Polish companies are examining renewable energy resources, such as biomass, when developing new energy projects or replacing existing capacity – especially capacity that is coal-fired.

MPEC-Leborc (MPEC) is the district heat provider for the City of Leborc. Leborc's DH system, including the boilers and the distribution system, is old and inefficient. The current DH system consists of two old coal-fired boilers with a total capacity of 17 MW_t.

MPEC plans to replace the two heat only, coal-fired boilers with a straw-fired steam boiler and two straw-fired water boilers that will have total capacity of 12 MW_e and 4 MW_t. The steam boiler will be used for co-generation and will be the only boiler that will operate year-round. The new system is designed to produce 146,700 GJ/year of heat and 8,425 MWh of electricity per year. In addition, MPEC plans a "thermo-modernization" of the DH system in order to reduce heat consumption by 13,000 GJ. MPEC will sell the generated power to Stoen, an electric utility in Warsaw.

The new system will consume 10,500 tons per year of straw, which is readily available from the local supply. If necessary, the straw can be replaced by willow as a fuel source.

By replacing the existing thermal and electrical capacity with biomass capacity, the project expects to reduce the SO_2, NO_x, CO, CO_2, ash, and benzo-pirens emissions.

Project Sponsor

MPEC, the DH provider for the City of Leborc, is the project sponsor.

Project Location

The project is located in the City of Leborc, Pomorskie Voivodship.

Leborc New Straw-Fired CHP Plant

Project Guidance Parameters

Project Costs

The total project cost is about 40 million PLN, or approximately $10 million out of which about $3.5 million represents technology and equipment that must be imported. Investment costs include design and engineering, equipment, and construction works.

Known Initiatives

To date, MPEC completed a pre-feasibility assessment of the project, started the thermo-modernization of the system and has already arranged for financing for the project.

Project Schedule

Planned Completion Schedule		
Activity	**Qtr**	**Year**
Feasibility Study		2002
Financing		2002-2003
Engineering and Design		2003
Construction		2004-2005

Project Financing

MPEC plans to finance approximately 40% of the project's total cost from its own resources. MPEC also plans to fund the remaining 60% of the project's total cost in the following manner: 25% from an EcoFund grant, 15% from a National Fund for Environmental Protection (NFOS) grant, and 20% from a NFOS loan.

U.S. Competitiveness

The assessed value of U.S. exports potential is about $3.5 million. EcoFund and NFOS require a solicitation for equipment procurement, but EcoFund will only accept tenders from suppliers in the U.S., Italy, France, Norway, Switzerland, Sweden and Poland. Potential U.S. suppliers include Foster, Wheeler, Caterpillar, and Capstone. Potential European equipment suppliers include Riello of Italy and Inteco Bio Solutions of Poland.

Conclusion

This project is a high priority for MPEC and they have already commenced work on parts of the project. The project also supports Poland's policy of increasing its use of renewable energy.

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Bytom Plasma Waste Treatment

New Plant Technology & Equipment

- Plasma gasification technology
- Waste handling equipment
- Plasma reactor
- Plasma torches
- Heat recovery system
- Pollution control devices
- Fans, blowers
- Control system

Project Summary

Sector	Waste-To-Energy
Location	Bytom, Poland
Capital Required	$14 million
Export Potential	$6.5 million
Project Sponsor	Municipality of Bytom
Project Developer	POLUS Technologies International Ltd.
Project Status	USTDA funded feasibility study completed

Project Discussion

Project Background

In 1998, an estimated 1,400,000 metric tons of hazardous waste was generated in Poland, of which 220,000 tons was generated in the Silesian Voivodship, located in the southern part of Poland. The Silesian Voivodship accounts for 13% of Poland's population but more than 50% of Poland's industrial waste is generated in this Voivodship. There are 61 disposal sites for hazardous waste in Silesia, of which 17 are still active. A heavy concentration of lead-zinc smelters and non-ferrous and ferrous metallurgy plants are located in this region along with industrial organic and inorganic chemical production facilities. Large quantities of hazardous waste, containing heavy metals and contaminated by organic compounds, have been land filled due to past industrial practices. Other hazardous waste material land filled in the region include transformers and condensers contaminated by polychlorinated biphenyl (PCB) oils, pesticides and other agricultural chemicals containing arsenic and mercury.

Poland has entered into negotiations with the European Union to become a Member State in 2004. As a result of EU accession negotiations, Poland has promulgated new environmental laws, such as the Polish Environmental Act, affecting the management and disposal of hazardous waste, including requiring State and Regional Authorities to apply the best available technology for the treatment of hazardous waste.

To meet these new requirements and to bring Poland's waste management practices in line with EU directives, the Municipality of Bytom in Silesia teamed with POLUS Technologies International Ltd. (PTIL) of Katowice, Poland to design, finance, build,

and operate a Plasma Processing Center at its landfill site.

Plasma Waste Processing Facility

This facility will be designed to process 13,140 metric tons of hazardous waste per year. The location and the base waste stream from the region were identified. Bytom will provide the land required for the construction and operation of the facility in exchange for equity in the project. PTIL will provide the day-to-day management of the facility.

Plasma technology offers several advantages over existing methods of hazardous waste disposal including lower gaseous emissions relative to standard incineration. The lower gas flows associated with plasma technology relative to standard incineration allows a more economic utilization of state-of-the-art pollution control devices to ensure compliance with the most rigorous emission standards. The intense heat of the plasma torch coupled with state-of-the-art pollution control devices ensures dioxin and furan levels remain below the established limits. The slag waste material leaving the facility requires significantly less volume if destined to be sent to a landfill. The process renders most wastes benign so that they can be used as recycled materials.

Project Team

The project team consists of the Municipality of Bytom and PTIL.

The Municipality of Bytom will supply the land for the proposed project and will be an equity participant in the project. The municipality will also provide access to certain grants and low interest loans that may not be available to the project otherwise.

PTIL will support day-to-day management of the facility. Dr. Ewa Marchwinska and Dr. Clyde Frank are the Principals of PTIL. Dr. Marchwinska is a past director of the Institute for Ecology of Industrial Areas in Katowinska, Poland, a former president of the EcoFund's supervisory board, and internationally renowned in her field. Dr. Frank is a former Deputy Assistant Secretary for the Office of Science and Technology of Environment Management at the U.S. Department of Energy and has been involved both in Poland and in environmental technology development and demonstration.

Project Location

The Municipality of Bytom is located in Silesian Voivodship and is about 300 km (200 miles) southwest of Warsaw and 150 km (75 miles) northwest of Krakow.

Project Guidance Parameters

Project Costs

The total project cost is estimated at about $14 million including the engineering and installation of the new plasma waste processing facility. The value of goods and service that need to be imported for this project is estimated to be about $6.5 million.

Known Initiatives

A USTDA funded feasibility study has been completed. Currently, the project sponsors and some of the financial institutions interested in implementation of this project are evaluating various financing options. Financial institutions and Polish funds interested in this project are also requiring due diligence studies to ensure the proposed option is the least expensive option for addressing the environmental management problems in the region.

Scope of Feasibility Study

The study determined the characteristics of the waste streams as well as the technical, environmental, economic, and financing viability of designing, constructing and operating the proposed plasma-based hazardous waste treatment facility.

Project Schedule

Planned Completion Schedule		
Activity	**Qtr**	**Year**
Feasibility study	4th	2002
Financing	2nd	2003
Construction	2nd	2004

The project team desires to finalize arrangements for financing the project by mid-2003 and complete facility design, engineering, and construction and start-up by mid-2004. Commercial operation is scheduled to start in mid- to late 2004.

Project Financing

This project generated considerable interest among some of the financial institutions and foundations. PTIL, the Municipality of Bytom, and other investors will provide equity financing, debt financing including low interest loans as well as grants could be provided by Upper Silesian Restructuring Fund, the Voivodship Fund for Environmental Protection and Water Management, Poland National Bank of Economy (BGK), and EcoFund.

U.S. Competitiveness

U.S. technology and equipment suppliers include some of the world's leading suppliers including MSE Technology Applications, Inc., Retech Systems, Startech Environmental Corporation, and Solena Group. Other world leading plasma technology suppliers include Europlasma of France, MGC Plasmox of Switzerland, Kobe Steel of Japan, and Samsung of Korea. Technology suppliers with proven technology, the most competitive pricing, experience in exports and the Polish market, and attractive financing and payment terms will enjoy a competitive position.

Conclusion

This project has a very high priority for the city of Bytom, the Silesian Voivodship and is consistent with the stated goal of the Polish government to address environmental issues and the Polish Environmental Act. Compared to current incineration or land filling practices, successful implementation of this project will allow a more environmentally friendly processing of hazardous waste in the Silesian Voivodship will comply with EU directives. The project, when implemented, will address the environmental legacy of past mining, smelting, and organic and inorganic industries including agrochemical industry practices in one of the most polluted regions in Poland.

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Zamosc CHP Plant

New Plant Technology / Equipment
• Fermentation technology • Microturbine • Boilers

Project Summary	
Sector	Renewable energy
Location	Zamosc, Poland
Capital Required	$6.5 million
Export Potential	$3.0 million
Project Sponsor	WKTiR
Project Status	Pre-feasibility study

Project Discussion

Project Background

Poland has entered into negotiations with the European Union to become a Member State in 2004. As a result of these negotiations, Poland has promulgated new environmental laws, such as The Act on Environmental Protection and Development, promoting, renewable technologies. This obliges the country to improve its energy balance by increasing the share of renewable energy up to 7.5% by the year 2010 compared to 1% currently. Other legislation, such as the Polish Environmental Act, affects allowable emission levels of NO_x, SO_x, and particulates from coal-fired plants as well as the management of municipal solid waste (MSW). In addition, Poland desires to increase use of renewable energy resources including biomass.

Accession agreements with the EU will also impose quotas that would prevent Poland from cultivating all of its agricultural land. However, the farmland can be used to grow energy crops.

Project Description

The proposed project will use beets, manure, and other organic wastes in a bioreactor to produce a biogas for use in a 7 MW_t and 5 MW_e combined heat and power plant. Non-woody crops such as beets, grass and straw produce a higher quality biogas that woody crops.

The CHP plant will use a new anaerobic fermentation technology that utilizes three tanks:

- The first tank will mix the biomass with water for 12 to 24 hours.
- The second tank will ferment the biomass mezophyte bacteria for five to six days.
- The third tank will ferment the biomass with thermophyte bacteria.
- The biogas will be collected from the third tank and the remaining biomass will be used as fertilizer.

If the demonstration project is successful, the sponsor hopes to install six commercial scales facilities in the area.

Project Sponsor

Wschodni Klub Techniki I Racjonalizacji W Zamosciu (WKTiR), a local association of individual scientists and technologists and

scientific and technology organizations, is the project sponsor. The sponsor is seeking 6 similar projects.

Project Location

The project is located in Zamosc, about 130 miles southeast of Warsaw. The sponsor is evaluating two sites at the project location.

Project Guidance Parameters

Project Costs

Total project costs for the demonstration facility are estimated to be $6.5 million with a U.S. exports potential of about $3.0 million.

If the demonstration project is successful, up to six commercial scale facilities can be installed, resulting U.S. exports potential of about $25.8 million.

Known Initiatives

The sponsor has completed:

- A technical and economic pre-feasibility assessment
- An environmental impact assessment.
- Notification to the Polish Patent Office and European Patent Office.
- Business plan for the pilot installation 360 kW_e.
- Applications to the National and Voivodship Environmental Fund for pilot installation.
- Purchase land in gmina Łaszczow
- Agreement with CES - Krakow for leasing of the generator for pilot installation

Project Schedule

Phase I – 360 kWe pilot installation

Planned Completion Schedule		
Activity	**Qtr**	**Year**
Business plan	2nd	2002
Financing		2003
Construction		2003
Operation and testing		2004

Phase II – 5 MWe installation

Planned Completion Schedule		
Activity	**Qtr**	**Year**
Feasibility Study	2nd	2003
Financing		2005
Construction		2005

Project Financing

The sponsor expects to fund 20% of the total project cost from its own resources and the remaining 80% from a grant from EcoFund.

U.S. Competitiveness

Major equipment for the project has to be imported. Swiss, French, Italian, Swedish, and Norwegian equipment suppliers will be the only competition for American technology suppliers because the project is obtaining financing from EcoFund.

Possible U.S. equipment suppliers include Aerospace Research Corp., American Biomass Corp., Enerwaste International Corp., Environmental Engineering Corp., Future Energy Resources Corp., Hurst Boiler and Welding Co., Industrial Boiler and Combustion Inc., National Incinerator Inc., Therm-tec Inc., MCX Environmental Energy Corp., Primenergy LLC, and US Plasma Inc.

Key Contacts

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2001 GDP (in $ Billion)	20.0
2001 GDP Growth	3.3%
2001 GDP Per Capita ($)	3,690
2001 Population (Million)	5.4
Credit Rating (8/8/2002)	BBB-

Source: The Economist, 2002; Standard & Poor's, 2002

Executive Summary

Since the 1998 elections, Slovakia has benefited from the government's commitment to become a member of the European Union. By encouraging privatization and foreign investment, Slovakia has improved its macro-economic stability and continues on its course for membership in the EU. Slovakia is a member of the WTO, CEFTA, and OECD and is invited to join NATO.

As Slovakia prepares for full entry into the EU, the country's energy sector is facing environmental cleanup and modernization. Slovakia is seeking to expand its share of renewable energy and by providing tax incentives to renewable energy producers.

Waste-to-Energy and Renewable Energy

As it prepares for possible accession to the EU in 2004, Slovakia has also been harmonizing its renewable energy policies with those of the EU. In the EU white paper, *Energy for the Future: Renewable Sources of Energy (1997)*, the EU set the objective of a 12% contribution of renewable energy to gross energy consumption by 2012. In addition, the EU policy relating to the Kyoto Protocol involves cutting CO_2 emissions by 8% of 1990 levels by 2008-2012. Both of these EU policies have been adopted by Slovakia.

Slovakian energy policy favors the development of renewable sources. However, the only incentive to date that Slovakia has established to assist the development of renewable energy projects is a tax break for renewable energy providers for the first five years of operation.

Slovakia, however, has been able to implement a number of industrial co-generation, biomass, and geothermal projects with the help of the EU, the World Bank, and the GEF.

For possible EU accession in 2004, Slovakia is also harmonizing its waste management laws and policies so that they conform to those decreed by the European Commission. EC directive 94/62/EC requires that at least 50% of packaging wastes are recovered and that at least 15% of packaging materials are to be recycled by the end of 2005. EC directive 99/31/EC states that land disposal of whole tires will not be allowed after 2002 and that shredded tires will not be allowed after 2005. In addition, all biodegradable waste going to landfills must be reduced by recycling, composting, biogas production, or energy recovery. In particular, biodegradable municipal solid wastes going to landfills by the end of 2005 should be less than 75% of the 1995 amounts. By the end of 2009, the land disposal of biodegradable wastes should be reduced to at least 50% of the 1995 levels.

The Slovak State Environmental Protection Fund provides financial support to private and public sector environmental projects including waste management and renewable energy from a combination of budgetary allocations and resource use fees. EU pre-

accession funds are also available to support development of renewable and waste-to-energy projects in Slovakia. In addition, EBRD is actively seeking renewable energy projects to support in Slovakia. EBRD is currently assessing the potential for renewable energy projects in Slovakia and other Central and Eastern European countries to identify pipeline of projects for further investigation and possible future funding by EBRD. This effort is supported by the USTDA Evergreen Fund and the U.K. Technical Cooperation Fund. For additional information on this EBRD project, please visit http://projects.bv.com/ebrd/

Heat and Power Generation

Slovakia's primary source of electricity is nuclear power. Slovakia has recoverable reserves of sub-bituminous coal and lignite equal to 251 million short tons; Slovakia does not possess any significant natural gas or oil reserves.

Slovakia has 6 major thermal power stations, and many smaller heat co-generation plants located in industrial facilities. Two of the major plants are natural gas fired, one is coal fired, and the remaining three are co-fired with gas, coal, and fuel oil.

Hydropower accounts for just over 30% of Slovakia's installed generation capacity. Almost half of the installed hydropower capacity is located in the Váh River valley. Storage reservoirs were completed several years ago in the river valley that allow many of the hydropower facilities along the Váh River to operate at full capacity. Slovakia has two nuclear power plants; one at Bohunic with a capacity of 1,760 MW_e and one at Mochovce with a capacity of 880 MW_e. Two of the units at Bohunice will be shut down in 2006 and 2008 respectively, while the remaining units at Bohunice and the two units at Mochovce will be upgraded for safety reasons. Other renewable sources account for less than one percent of Slovakia's primary energy.

Slovakia is a net importer of electricity. In 1999, Slovakia consumed 26.2 billion kWh of electricity, of which 5.1 billion kWh was imported. Slovakia imports almost all the fuel oil, natural gas, and coal used in its thermal plants.

Privatization of the power sector is underway in Slovakia. The state energy company, SE, is being split into two generation companies and one transmission company. The three regional distribution utilities are all being restructured in anticipation of their upcoming privatization.

Slovakia possesses over 200 heating plants of which combined heat and power plants make up only 5%. The total heat output of the district-heating network in Slovakia is 6,306 MW_t.

Political and Economic Climate

Slovakia became a sovereign country following the dissolution of Czechoslovakia in January 1993. Over the next five years, the restructuring and privatization process was much slower in Slovakia than in other Central European countries. Since the elections of 1998, a broad coalition government in Slovakia revitalized the process of the consolidation of democratic institutions. The coalition government started to rebuild ties with the international community, and took important steps to further economic progress. Current government policies reduced macroeconomic imbalances, significantly reduced both government size and account deficits, eliminated price distortions, made large inroads in restructuring and privatization, and created incentives for foreign investment. The country's international standing has also been

regained, as reflected in Slovakia's accession to the OECD in 2000. Accession to NATO and to the EU is a government priority. Slovakia is currently engaged in accession negotiations with the EU. Slovakia contributed actively to regional stability through a policy of good neighborly relations and regional economic cooperation. Slovakia is a member of the Central European Free Trade Association (CEFTA). Slovakia also operates a customs union with the Czech Republic and is a member of the WTO.

The EBRD reports that the Slovakian government has taken important steps to reduce macroeconomic imbalances. The economy grew by 3.3% in 2001 after growing about 2.2% in 2000. This increase was largely fueled by excellent export performance.

The inflation rate was 7.1% in 2001 and was 8.4% in 2000 due to fiscal consolidation and moderate wage settlements.

Investment Climate

In 1999, the Slovakian government adopted its Strategy for the Support of Foreign Direct Investment Inflow, which sets out measures to increase the level of FDI in Slovakia. As of January 1, 2001 several investment incentives exist in Slovakia. These incentives include a five year corporate tax break to companies that are 60% foreign owned, 50% corporate tax relief for the subsequent five years for companies that invest in districts with high unemployment, zero tariffs on imports of new machinery and equipment for manufacturing, and a state contribution for every job created.

In 2001, estimated net FDI inflows of $2.0 billion were registered. A large portion of foreign investment was related to the privatization of state assets. Almost half of all foreign investment was in the manufacturing sector. Within the manufacturing sector, automotive components, consumer electronics and precision engineering accounted for the largest share of FDI. Further important sectors for FDI are: financial services and trade, real estate, and communications. Germany leads foreign investment in Slovakia, followed by Austria, the Netherlands, and the U.S. Important foreign investments include the sale of a 51% stake in Slovak Telekom (ST), to Deutsche Telekom AG in 2000. In addition, U.S. Steel bought into VSZ, the country's largest steel maker. Hungarian MOL acquired 36.25% of the oil refinery Slovnaft, the dominant player in the Slovakian oil and gas market.

Slovakia is a member of the WTO and is bound by the GATT Agreement on Implementation of Article VII. Customs valuation is based on this agreement and the rules appear to provide a uniform and neutral system of valuation. In addition, documentation standards are harmonized with EU standards.

Slovakia's trade is heavily oriented towards EU member states. Germany is Slovakia's most important trading partner and the Czech Republic is also an important trade partner because the two countries are part of a customs union and pursue a common trade policy.

The main Slovakian exports are manufactured goods such as automotive components. The main Slovakian imports are fuel and energy, food, and capital goods for use in manufacturing.

U.S. Presence

U.S. Steel purchased the steel-making facilities of VSZ, Slovakia's leading steel-maker in 2000.

Useful Web Sites	
Global Environmental Facility (GEF)	http://www.gefweb.org
European Bank of Reconstruction and Development (EBRD) Investment Profile	http://www.ebrd.com/pubs/index.htm
DOE Office of Fossil Energy Country Profile	http://www.fe.doe.gov/international/e-eur.shtml
DOE Energy Information Administration (EIA) Country Analysis Brief	http://www.eia.doe.gov/emeu/cabs/contents.html
World Bank Country Profile	http://lnweb18.worldbank.org/eca/eca.nsf
Slovak State Environmental Protection Fund	http://www.sfzp.sk

Slovnaft Waste-To-Energy Project

New Equipment
• Incinerator
• Boiler
• Pollution control devices
• Feed handling equipment
• Fans, blowers, pumps, etc.

Project Summary	
Sector	Waste-to-Energy
Location	Bratislava, Slovakia
Capital Required	>$30 million
Export Potential	$20 million
Project Sponsor	Slovnaft
Project Status	Pre-Feasibility

Project Discussion

Project Background

Slovnaft, a.s., a joint stock company, is the major downstream oil and petrochemical company in Slovakia. Slovnaft processes crude oil into a range of petroleum and petrochemical products. It is the largest marketer of petroleum products in Slovakia, enjoying a significant wholesale presence in the Czech Republic, Austria and Poland, and also has retail operations in the Czech Republic, Poland and Ukraine. In 2000, MOL, the Hungarian state-owned oil and gas company, became a strategic investor in Slovnaft.

Since the early 1990's, USTDA sponsored a number of feasibility studies at Slovnaft leading to the export of U.S. services, technology, and equipment valued at over $20,000,000.

Project Description

Currently, Slovnaft operates three incinerators for processing solid and sludge waste including hazardous waste at its refinery and petrochemical complex in Bratislava. A municipal waste disposal company for the city of Bratislava and its surrounding area collects and disposes the municipal solid waste from this complex.

The incinerators at Slovnaft are 20 to 30 years old, have low residence time and temperature, are equipped with outdated and insufficient pollution control equipment, and do not meet existing regulations for waste incinerators.

Waste incinerator operators must comply with the Government Regulations that came into effect in 1996 (NV SR No. 92) and in 2000 (NV SR 473). Slovnaft currently does not fully comply with these regulations but is allowed to operate by paying a fee for not complying with the regulations. Under existing laws, waste incinerator operators must meet the existing regulations by December 31, 2006 or risk suspension of operations. A new air pollution control law may come into effect shortly requiring waste incinerator operators comply with the existing regulation by December 27, 2005 or risk suspension of operations.

In 1994-1998, in anticipation of new and stricter environmental legislation, Slovnaft prepared and issued tender documents for replacing all the existing non-compliance incinerators in the company. However, this project was not implemented at that time due to demanding investment requirements for other projects such as Heavy Residue Upgrading (EFPA) at the Bratislava Refinery. Now, with the approaching deadline for complying with the new legislations in 2005 or 2006, implementation

of this project became a high priority for Slovnaft. However, the previous studies need to be updated and new options need to be evaluated in order to identify the most technically and economically viable options for implementation.

Project Guidance Parameters

Project Costs

The capital cost of a new 12,000-ton per year incineration unit is estimated to be about $30 million, of which over $20 million is anticipated to be the value of imported equipment.

Known Initiatives

As noted earlier, Slovnaft prepared a tender document for this project, which needs to be updated. Slovnaft has also discussed this project with potential strategic partners but without conducting a detailed feasibility study it is difficult to judge the economic advantages of any specific option.

Project Schedule

Planned Completion Schedule		
Activity	**Qtr**	**Year**
Feasibility Study	3rd	2003

Project Financing

Slovnaft envisions being an equity participant, depending on the final ownership structure of the project. Debt financing is expected to be arranged through multi-and bi-lateral financial institutions and commercial banks. Some construction grants may also be available through European Union programs such as ISPA, depending on the final ownership structure of the project.

U.S. Competitiveness

The overall relationship between Slovnaft and USTDA as well as American companies has been very fruitful. Slovnaft has been working closely with leading U.S. companies such as Bechtel, Fluor Daniel, Stone & Webster, Raytheon Engineering, MW Kellog, UOP and others in modernizing its refinery complex.

Engineering, Procurement, and Construction firms such as Bechtel, Fluor Daniel and Stone & Webster could competitively provide EPC services for the proposed project while firms such as Babcock & Wilcox, Research Cottrell, Inc., ABB Environmental Systems, Inc., and Wheelabrator Air Pollution Control could successfully compete against their European counterparts such as Electrowatt-Ekono GmbH of Germany and SLP Engineering Ltd. of the U.K. to provide pollution control equipment for the project.

Conclusion

The final decision regarding the ownership structure and the size of the project will be determined based on the outcome of the feasibility study. However, the project has a very high priority for Slovnaft at this time and could potentially attract ISPA funds. The proposed project also would help meet the government goal of reducing environmental pollution in preparation for EU accession.

Slovnaft Waste-To-Energy Project

Key Contacts

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Optimization and Repowering of TEKO Central Heating System Using Geothermal Energy

New Plant Technology & Equipment
• Turbines • Exhaust boilers • Control system

Project Summary	
Sector	Renewable energy
Location	Kosice, Slovakia
Capital Required	$120 million
Export Potential	$80 million
Project Sponsor	TEKO, Kosice
Project Status	Planning

Project Discussion

Project Background

District Heating Kosice (TEKO) is the largest district heating system in Slovakia, producing electricity and heat for the majority of the population of Kosice. An installed thermal capacity of 875.8 MW_t provides heat to 90,000 households and serves industrial facilities, schools, hospitals and other commercial customers. TEKO's installed electrical capacity is 121 MW_e. The system is using coal and natural gas as fuels.

TEKO was recently separated from the Slovak Electric Company (SE) and transferred to the National Property Fund (NPF), with rights and duties to operate assigned to the Ministry of Economy, Section of Energy. It is anticipated that 49% of TEKO's shares will be transferred to the City of Kosice, and some shares may also be offered to a strategic investor. TEKO is an independent entity managed by its board of directors. For all principal decisions, including borrowing and investments, the company is not required to obtain approval from NPF or the Ministry of Economy.

TEKO's equipment, specifically the boilers PK1 and PK2, have surpassed their useful life spans, making it necessary to replace them. Possible alternatives for replacing the capacity include heat from a geothermal source near Kosice, which is being developed by Slovgeoterm, a.s. Slovgeoterm, a company owned in majority by the Slovak Gas Company, plans the construction of a geothermal plant that will supply geothermal heat to TEKO. The capacity of the plant is estimated to be 100 MW_t, with heat pumps utilized for cooling the return water. This geothermal plant will have a substantial impact on capacity replacement options for TEKO, and in-depth assessment of geothermal resource utilization and capacity replacement options must be performed.

Project Team

The project will be organized, financed and implemented by TEKO. The project will be coordinated with the City of Kosice and the Heat Distribution Company (TEHO) that operates the secondary distribution network. Slovgeoterm will develop the geothermal part of the project, which includes drilling wells, installation of pipelines and a pumping station.

Project Location

The project site is located in Kosice, in Eastern Slovakia.

Optimization and Repowering of TEKO Central Heating System Using Geothermal Energy

Project Guidance Parameters

Project Costs

The total project cost is approximately $120 million, out of which about $80 million represents the potential import of technology. Investment costs include design and engineering, removal of old equipment, cost of new equipment, and construction.

Known Initiatives

TEKO is supplying heat to the majority of residents and is determined to maintain a high quality of service at the lowest possible price. So far, TEKO has performed nine pre-feasibility studies and studies of individual segments of the system, including:

1. Optimization of Hot Water DH system in Kosice, 1997, ECONS Kosice
2. Development of Heat Supply System in Kosice, 1997, TEKO
3. Optimum utilization of energy in 10MW range in DH Kosice, 1998, Slovgeoterm Bratislava
4. Utilization of geothermal energy in Kosice valley, 2000, Slovgeoterm Bratislava
5. Assessment of operating conditions and equipment for reliable operation of TEKO Kosice, 2001, EGU
6. Program for Development of TEKO plant, 2002, TEKO
7. Optimization of cooperation of geothermal source with TEKO, 2002, Ortep Prague.

The studies mentioned above analyze a separate section of the system, or a specific issue. TEKO plans to perform a comprehensive feasibility study of the entire proposed system and other capacity replacement options.

Project Schedule

Planned Completion Schedule		
Activity	**Qtr**	**Year**
Feasibility study	1st	2003
Financing	2nd	2004
Engineering and design	4th	2004
Construction completed	4th	2005

Project Financing

TEKO is assuming that 10% of the total project cost, approximately $12 million, will be financed from company resources, 20% will be provided by national and international funds, and the remaining 70% will be sought from local and international lending institutions. Equity financing will also be sought.

U.S. Competitiveness

The potential for U.S. exports is significant. All major equipment has to be imported and the assessed value of imported goods is equal to $80 million. U.S. suppliers such as Ormat and Exergy are expected to compete against international suppliers such as Ansaldo of Italy and Foji of Japan for supply of geothermal systems for this project.

Conclusion

This project has a high priority for SE and is included in their business plan for implementation. It is a relatively inexpensive renewable energy project and is supported by Slovakian national environmental policies.

Optimization and Repowering of TEKO Central Heating System Using Geothermal Energy

Key Contacts

Slovakia
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Energy Recovery From Pulp and Paper Sludge at Zilina CHP Plant

New Plant Technology & Equipment

- Sludge combustor system
- Control system

Project Summary	
Sector	Waste-to-Energy
Location	Zilina, Slovakia
Capital required	$16 million
Export Potential	$10 million
Project Sponsor	Zilinska Teplarenska, a.s
Project Status	Planning

Project Discussion

Project Background

Zilinska Teplarenska, a.s. (Zilinska) is a district heating utility providing heat to residential, industrial and commercial customers in the town of Zilina. Zilinska was founded in January 2000 when it was separated from the Slovak Electric Company and transferred to the National Property Fund. The installed capacity of Zilinska's plant is 450 MW_t, and 49 MW_e. Zilinska is actively marketing their heat supply service and was able to significantly increase its customer base in 2002. Since 2000, Zilinska's production has increased 40%.

TENTO, a paper mill located in Zilina, is utilizing a large quantity of waste paper and also produces a significant amount of sludge that is currently being land filled. Sludge from a paper mill has a heating value of 2500 kJ/kg, which is sufficient for combustion. TENTO is located next to Zilinska's heating plant and is one of Zilinska's larger customers.

The project's objective is to utilize sludge produced at TENTO's operations in order to produce energy in a Zilinska's combined heat and power plant. Zilinska's CHP plant supplies heat for residential and non-residential consumers and produces electricity that is sold to the local distribution network. The CHP plant has an installed capacity of 450 ton/hr of steam and 50 MW_e. It is expected that the project would allow combustion of about 70,000 tons of sludge per year, which would replace the 13,000 tons of coal or 5 million m^3 of natural gas currently consumed annually at the CHP plant.

Project Team

The project will be organized, financed and implemented by Zilinska and will be coordinated with TENTO.

Project Location

The project site is located in Zilina, which is 105 miles Northeast of Bratislava on the Vah River.

Project Guidance Parameters

Project Costs

The total project cost is about $16 million, out of which approximately $10 million represents U.S. exports potential. Total project costs include design and engineering, equipment, and construction.

Known Initiatives

A pre-feasibility assessment of a sludge combustion system was completed in July 2002. The assessment included an estimation of capital costs, a preliminary economic analysis, and an environmental impact

analysis. A tentative agreement between TENTO and Zilinska related to the project has been signed.

Project Schedule

Planned Completion Schedule		
Activity	**Qtr**	**Year**
Feasibility study	1st	2003
Financing	4th	2003
Engineering and design	1st	2004
Construction completed	4th	2005

Scope of Feasibility Study

The project sponsor wishes to conduct a feasibility study to identify alternatives among various combustion technologies, to evaluate retrofitting the existing equipment, and to develop technical and economic criteria for evaluating the various alternatives. The study will recommend an option to Zilinska and will develop a conceptual design and plant configuration for the recommended alternative. It will also include an environmental impact study.

Project Financing

Zilinska is assuming that 10% of the total project cost, or $1.6 million, will be financed from company resources, 10% will be provided by national and international funds, and 80% will be sought from local and international lending institutions. Project financing may also be sought.

U.S. Competitiveness

All major equipment has to be imported and the assessed value of imported goods is about $10 million. U.S. manufactured equipment for sludge combustion is considered to be highly competitive. U.S. potential suppliers include Babcock and Wilcox, GE, and Foster Wheeler. Potential European competitors include ABB, Skoda Plzen, and Tlmace Slovakia.

Conclusion

This project has high priority for Zilinska and TENTO. The project will utilize waste to generate energy, resolve the problems with transporting and disposing the sludge and is consistent with the government's goal of reducing air emissions and use of landfills.

Key Contacts

Slovakia

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Utilization of Hydropower Potential of River Hron in Section Between Dam Velke Kozmanovce and the Danube River

New Plant Technology & Equipment

- Turbines
- Transformers
- Interconnection equipment
- Control systems

Project Summary	
Sector	Renewable Energy
Location	River Hron, Slovakia
Capital required	$20 million
Export Potential	$12 million
Project Sponsor	Slovak Electric Company, Bratislava
Project Status	Planning

Project Discussion

Project Background

The concept of utilization of energy from renewable sources such as hydropower is a priority for the Slovak Electric Company (SE). SE supported solar collector research for the last three years, initiated a wind power utilization project, and also supports the research of the utilization of biomass. In Slovakia, hydropower potential is assessed at 6,607 GWh per year of which only 57.5% is currently being utilized in 220 hydropower plants.

SE's strategy is to retrofit older hydropower plants, implement the 50 MW Sered hydropower plant and the 22 MW Strecno hydropower plant on the Vah River, and install small, economically efficient hydropower plants on the Hron, Upper Vah and Poprad rivers. The most attractive of these rivers is the Hron, where it is possible to install about 30 small hydropower plants with capacity of 0.5 MW to 3.0 MW each and with a total capacity of 40 MW. The total annual production of energy is estimated to be 200 GWh.

The Hron River is divided into three sections and feasibility studies for the utilization of hydropower potential in the upper and the middle parts of the river have already been performed in 2001 and 2002.

Project Team

SE prioritized the use and development of energy from renewable sources such as hydropower. SE supported solar collector research for the last 3 years, initiated wind power utilization project, and also supports the research of biomass utilization.

Project Location

The project site is located along a 73 km stretch of the Hron River between the Velke Kozmalovce Dam and the Danube River.

Project Guidance Parameters

Project Costs

The total project cost is approximately $20 million, out of which about $12 million represents technology and equipment that must be imported. Investment costs include design and engineering, equipment, and construction works.

Known Initiatives

SE has prepared a strategic plan for the utilization of hydropower in Slovakia and performed feasibility studies for the utilization of potential hydropower on the upper and middle parts of the Hron River.

Utilization of Hydropower Potential of River Hron in Section Between Dam Velke Kozmanovce and the Danube River

SE also developed hydropower stations on the Vah River.

Project Schedule

Planned Completion Schedule		
Activity	**Qtr**	**Year**
Feasibility study	2nd	2003
Financing	4th	2003
Engineering and Design	1st	2004
Construction Completed	4th	2007

Scope of Feasibility Study

The project sponsor wishes to conduct a feasibility study to examine the utilization of hydropower on a 73 km stretch of Hron River between the Velke Dam and the Danube River. The study will consider the results from the two previous studies performed on the upper sections of the river and will provide a total assessment of the hydropower potential on Hron River. The study will include a preliminary design of a typical hydropower system with basic technical parameters, environmental aspects and minimization of environmental impacts, and an assessment of the capital cost.

Project Financing

SE is assuming that 10% of the total project cost, approximately $2 million, will be financed from company resources and the remaining 90% will be sought from local and international lending institutions. Project financing by equity investors will also be sought.

U.S. Competitiveness

All major equipment has to be imported and the assessed value of imported goods is about $12 million. U.S. hydropower equipment suppliers such as Canyon Industries, Inc. and Hydro West Group, Inc. could compete against European suppliers such as Wasserkraft Volk AG of Germany and G.E.A. SRL of Italy. U.S. suppliers are expected to be highly competitive.

Conclusion

This project has a high priority for SE and is included in their business plan. The project provides inexpensive, renewable energy and it is supported by Slovakian national environmental policies.

Key Contacts

Slovakia

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2001 GDP (in $ Billion)	18.63
2001 GDP Growth (est.)	3.0%
GDP Per Capita ($)	9,315
Population (Million)	2.0
Credit Rating (8/8/2002)	A

Source: The World Bank, 2002; Standard & Poor's, 2002

Executive Summary

Slovenia is on schedule to fulfill its requirements for EU accession by 2003, with actual accession occurring as early as 2004. Except for privatization, Slovenia has completed its energy sector requirements for EU accession. These requirements include, maintaining a high share of renewable energy, increasing shares of renewable energy in heat generation, and decreasing its reliance on nuclear power, and finding ways to maintain sustainable levels of fossil fuel use.

The privatization process has just begun in the electricity sector. Large-scale consumers and service providers, such as schools, are now allowed to choose a domestic electricity supplier.

Waste-to-Energy and Renewable Energy

Slovenia is harmonizing its renewable energy policies with those of the EU. In the EU white paper, *Energy for the Future: Renewable Sources of Energy (1997)*, the EU set the objective of a 12% contribution of renewable energy to gross energy consumption by 2012. In addition, the EU policy relating to the Kyoto Protocol involves cutting CO_2 emissions by 8% over 1990 levels by 2008-2012. Both these EU policies have been adopted by Slovenia. To help meet these goals, Slovenia has implemented a "carbon-tax" on automotive fuels as well as a value added tax (VAT) on the sale of electricity.

Although it is not a formal law or decree, the Government of Slovenia has an informal agreement with the state utility to purchase small hydropower at preferential rates. Almost one third of Slovenia's electricity is generated from small and large hydropower sources, and many small hydropower plants are currently being refurbished. Average electricity tariffs in Slovenia are over six eurocents per kWh.

Solar, geothermal, and biomass resources are already in use for district heating applications in Slovenia. However, Slovenia is working with the GEF and the UNDP in order to establish a program that will identify and remove barriers as well as expand the use of biomass for district heating in the country.

Slovenia is also harmonizing its waste management laws and policies so that they conform to those decreed by the European Commission. EC directive 94/62/EC requires that at least 50% of packaging wastes be recovered and that at least 15% of packaging materials be recycled by the end of 2005. EC directive 99/31/EC states that land disposal of whole tires will not be allowed after 2002 and that shredded tires will not be allowed after 2005. In addition, all biodegradable waste going to landfills must be reduced by recycling, composting, biogas production, or energy recovery. In particular, biodegradable municipal solid wastes going to landfills by the end of 2005 should be less than 75% of 1995 levels. By

the end of 2009, land disposal of biodegradable wastes should be at least 50% of 1995 levels.

In 1993, Slovenia established the Environmental Development Fund of the Republic of Slovenia (EcoFund). EcoFund operates as a nonprofit financial organization. It provides soft loans on preferential terms to municipalities and commercial entities for environmental projects. These projects include waste management and renewable energy projects. EcoFund's resources mainly come from budgetary allocations, natural resource use taxation (including 66% of the carbon tax) and revenue from privatization programs.

EU pre-accession funds are also available to renewable and waste-to-energy projects in Slovenia. In addition, EBRD is also actively seeking renewable energy projects to support in Slovenia. EBRD is currently assessing the potential for renewable energy projects in Slovenia and other Central and Eastern European countries to identify a pipeline of projects for further investigations and possible future funding by EBRD. This effort is supported by the USTDA Evergreen Fund and the U.K. Technical Corporation. For additional information on this EBRD project, visit http://projects.bv.com/ebrd/

Heat and Power Generation

Slovenia's primary sources of energy are hydro and nuclear power. Slovenia has 250 million short tons of coal and minor natural gas and oil reserves.

Slovenia has six major thermal power stations that are fired by coal or fuel oil. One of these thermal plants, the 745 MW_e coal-fired Šoštanj plant, accounts for 75% of the installed thermal power capacity.

Hydropower supplies one third of Slovenia's electricity generating capacity along three river systems. There are 16 hydropower facilities with capacities larger than 10 MW_e. There is some use of biogas from landfills, sewage and agricultural waste, but the impact is negligible on the overall energy situation. Slovenia also uses waste from the forestry sector for heating.

Slovenia has one nuclear power plant that provides 25% of the country's electricity.

Slovenia is a net exporter of electricity. In 2000, Slovenia generated 12.82 billion kWh of electricity, of which 2.0 billion kWh was exported to Croatia from the Krško nuclear power plant.

In 1996, a law was proposed and submitted that would allow private ownership of up to 49% in energy production companies. It has not yet been approved or implemented. The government is currently reexamining the privatization of the electric power sector.

Slovenia produces over 8,000 TJ of heat a year, approximately one third is produced by heat plants and the remainder is produced by combined heat and power plants.

Political and Economic Climate

Since declaring independence in 1991 and receiving international recognition in 1992, Slovenia has become one of the most economically advanced and prosperous countries in Central Europe. Slovenia's economy has enjoyed a decade of steady and uninterrupted growth. This growth is due to low inflation, privatization (which is almost complete), low government spending, and attracting Foreign Direct Investment. Slovenia was one of the first countries selected to begin the process of accession to the EU and is on track for possible accession in 2004.

The economy grew by 3.0% in 2001 and by 4.6% in 2000. Slovenia has had a steady,

uninterrupted growth rate over the past decade due to trade with the EU and macro-economic stability. Growth of the economy in the near-term is expected to be approximately 4.5% as Slovenia nears EU accession.

The inflation rate was 8.4% in 2001 and 8.9% in 2000 due to a decrease in oil prices, and the introduction of a VAT. The inflation rate is expected to remain in the 7% to 8% range for the near term.

Investment Climate

Following a downward trend in FDI during 1998 and 1999, the government of Slovenia adopted a National Scheme for Attracting Foreign Investment. The government's target is to increase the annual net FDI flows from the current rate 1% of the GDP to 3% of the GDP during the next few years by using a variety of financial and labor related incentives. In 2001, net FDI inflows of $338 million were registered. The U.S. is the sixth highest ranked investor in Slovenia while Austria, Germany, and France are the top three. The electronics, chemicals, transport equipment, and tourism industries are expected to be significant sources of FDI in the near-term.

Slovenia's goal of EU accession has created a favorable investment climate. Business laws and practices in Slovenia are mostly harmonized and are in line with EU laws and regulations in anticipation of meeting accession negotiations by the end of 2002. Foreign investors do not encounter many obstacles and are permitted in an increasing number of sectors.

The individual corporate tax rate in Slovenia is 25%. The VAT and excise duties were harmonized with EU requirements in 2001.

Slovenia is a founding member of the World Trade Organization, and is a member of the Central European Free Trade Association. Germany, Italy, and Croatia are Slovenia's most important export partners; the U.S. is sixth. Germany, Italy, and France are Slovenia's most important import partners; the U.S. is seventh. Capital goods are Slovenia's primary imports and manufactured goods are the primary exports.

U.S. Presence

In 1998, Goodyear tires entered into a strategic partnership with Sava, one of Slovenia's most successful companies, and invested $100 million to create Sava Tires and Goodyear Engineering Products Europe. To date, Goodyear is Slovenia's single largest foreign investor. Other U.S. investors include IBM, and Kirkwood Industries, a carbon component manufacturer headquartered in Cleveland, OH.

Useful Web Sites	
Global Environmental Facility (GEF)	http://www.gefweb.org
European Bank of Reconstruction and Development (EBRD) Investment Profile	http://www.ebrd.com/pubs/index.htm
DOE Office of Fossil Energy Country Profile	http://www.fe.doe.gov/international/e-eur.shtml
DOE Energy Information Administration (EIA) Country Analysis Brief	http://www.eia.doe.gov/emeu/cabs/contents.html
World Bank Country Profile	http://lnweb18.worldbank.org/eca/eca.nsf
Environmental Development Fund of the Republic of Slovenia (EcoFund)	http://www.rec.org/REC/Programs/REAP/REAP19/PDF/visit_prague_sloecofund.pdf