

FINAL REPORT

DEFINITIONAL MISSION FOR ENERGY PROJECTS IN MACEDONIA

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The U.S. Trade and Development Agency

The U.S. Trade and Development Agency (USTDA) advances economic development and U.S. commercial interests in developing and middle income countries. The agency funds various forms of technical assistance, feasibility studies, training, orientation visits and business workshops that support the development of a modern infrastructure and a fair and open trading environment

USTDA's strategic use of foreign assistance funds to support sound investment policy and decision-making in host countries creates an enabling environment for trade, investment and sustainable economic development. Operating at the nexus of foreign policy and commerce, USTDA is uniquely positioned to work with U.S. firms and host countries in achieving the agency's trade and development goals. In carrying out its mission, USTDA gives emphasis to economic sectors that may benefit for U.S. exports of goods and services.



Energy Projects in Macedonia

Table of Contents

I.	Introduction and Overview	
	A. Introduction.....	I-2
	B. Project Cross-Reference	I-2
	C. Project Synopses	I-2
	D. Economic Summary	I-7
	E. Political Background.....	I-8
	F. Financing Overview	I-9
	G. Observations	I-15
	H. Meetings Held.....	I-15
II.	Definitional Report for Negotino Power Plant Repowering in Macedonia	
	II-1
III.	Definitional Report for Technical Assistance for ESM EU Environmental Compliance Strategy in Macedonia	
	III-1
IV.	Contact List	IV-1
	Definitional Mission Consultants.....	IV-1
	USTDA	IV-1
	Financing	IV-2
	Macedonia	IV-4
	Europe.....	IV-7
	United States.....	IV-8



Energy Projects in Macedonia

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Section I

Overview

DEFINITIONAL MISSION FOR ENERGY PROJECTS IN MACEDONIA

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Energy Projects in Macedonia

Table of Contents

A. Introduction.....	3
B. Project Cross-Reference.....	3
C. Project Synopses	4
D. Economic Summary.....	8
E. Political Background	9
F. Financing Overview.....	10
G. Observations.....	14
H. Meetings Held.....	16



Energy Projects in Macedonia

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Energy Projects in Macedonia

A. Introduction

The U.S. Trade and Development Agency (USTDA) contracted Enviromation Inc, to conduct a Definitional Mission of the Energy Projects in the Republic of Macedonia and provide a report which:

- Reviewed and assessed the projects USTDA has funded and the overall USTDA strategy in this Sector;
- Assessed and justified whether or not USTDA should provide funding for the proposed Feasibility Study or other activities;
- Assessed any alternative study or activities which Enviromation saw as viable options for USTDA consideration; and
- Provided supporting analysis and recommendations on the above information on all relevant issues.

The contract called for Enviromation to review and assess two projects and identify other potential projects. By conclusion of the study, the Enviromation team reviewed five projects. The projects are cross referenced to their specific assessment result in the table below. Also provided in this Section are:

- Brief synopses of each project;
- An economic summary;
- A financing overview;
- A discussion of regional issues, observations, and recommendations; and
- A list of meetings held.

Contact points are provided in Section IV of this report.

B. Project Cross-Reference

In total, five projects were reviewed. The table below indicates where in this report the details of each project are located. In section C, a brief synopsis of each project is given. Each project can be located by the number assigned to it shown in the left-most column of the table below.

Project Cross Reference			
	<i>Project Name</i>	<i>Sponsor</i>	<i>Page</i>
1	Negotino Thermal Power Plant Repowering Feasibility Study	A. D. Elektrostopanstvo NA Makedonija (ESM)	II - 1
2	Financial Management System (FMS) Feasibility Study	A. D. Elektrostopanstvo NA Makedonija (ESM)	I – 3
3	EU Environmental Directives Compliance Strategy Technical Assistance	A. D. Elektrostopanstvo NA Makedonija (ESM)	III – 1
4	Renewable Energy Resource Assessment Technical Assistance	Ministry of Economy	I – 4
5	Solid Waste Treatment Options Assessment Technical Assistance	Ministry of Environment	I - 5



Energy Projects in Macedonia

C. Project Synopses

1. Negotino Thermal Power Plant Repowering Feasibility Study: A. D. Elektrostopanstvo NA Makedonija (ESM) has requested a grant from the United States Trade and Development Agency to conduct a Feasibility Study to assess the feasibility of economically repowering an existing oil fired power plant with a modern, high efficiency, environmentally friendlier combined cycle gas turbine power plant.

ESM has identified four options for consideration in evaluating the potential repowering of Negotino. These are:

- *Option 1* – 210 MWe + plant capacity based on converting the existing plant to operate on:
 - Coal, or
 - Gas
- *Option 2:* Increasing the plant capacity to 690 – 710 MWe based on repowering the existing power plant (210 MWe) to operate on coal or gas and adding a new combined cycle power plant in two steps:
 - 1st step will add a peaking combustion turbine (~150 MWe),
 - 2nd step will add a second identical combustion turbine, a heat recovery steam generator, and a steam turbine.
- *Option 3:* ~610 MWe plant capacity based on adding two combustion turbines (2 x ~200 MWe), a heat recovery steam generator, and using the existing steam turbine (210 MWe).
- *Option 4:* 235 – 250 MWe plant capacity based on incorporating efficiency and turbine upgrades that have been achieved at other plants with the same turbine design.

Enviromation recommends funding this request if the timing of the Feasibility Study is consistent with privatization requirements. A detailed description of the proposed Feasibility Study is provided in Section II.

2. Financial Management System Feasibility Stud: ESM requested that USTDA provide a grant for a Feasibility Study to implement a Financial Management System (FMS) into its operations. The World Bank is assisting ESM in restructuring and privatization. A similar request for an FMS was evaluated by the World Bank in a paper entitled “Macedonia Power Sector Development Project (MPSDP): FMS Component”. The following paragraphs are in part a summary from that report verified by visits to ESM.

The current organization of ESM’s financial structure includes a head office function and 20 operating companies each which prepare and submit their own financial statements. The head office prepares consolidated statements that are audited to International Standards on Accounting. A global budget is prepared by the head office along with a more detailed budget for each operating company. The budgeting is mainly carried out on EXCEL spreadsheets and is not integrated into the accounting system. Analysis of budget versus actual is prepared only at the head office.



Energy Projects in Macedonia

The existing computer system is fifteen years old and cannot respond to current internal and external demands. The hardware infrastructure is based on 34 VAX and 7 ALPHA servers on open VMS.

The systems were developed in house on COBOL, implemented on each server, and changes must be done separately at each location. Data is transferred in part manually. Most of the systems are based on older technology that do not provide integrated financial and management systems accounting.

ESM's objectives are to:

- Improve effectiveness and efficiency of the finance and administrative function;
- Implement a computerized accounting system across ESM;
- Develop commercial accounting practices in line with best practices;
- Integrate accounting information to facilitate better management in a timely fashion; and
- Train the staff in modern systems.

The role of the Contractor would be to:

- Review and document the organizational structure;
- Specify the requirements for an integrated computerized accounting system to be implemented throughout ESM;
- Design organization changes to enhance efficiency and effectiveness;
- Provide procurement assistance to ESM for the software and hardware; and
- Establish training requirements.

With restructuring and privatization, at least three new companies are being formed with new requirements. A third party investor in ESM will also have its financial management system requirements. Therefore, it is unlikely that a FMS system can be adequately specified at this time that will meet the future needs of the future entities.

Due to the small size of the potential project (\$1-3 million) and the pending restructuring of ESM, Enviromation does not recommend funding this request.

3. EU Environmental Directives Compliance Strategy Technical Assistance: ESM is obligated to comply with the EU environmental directives in the electricity sector within 10-15 years. This proposed project provides Technical Assistance to define the scope, cost, and timing of the improvements required. The Contractor shall coordinate its effort with USAID, World Bank, GEF, and other multilateral agencies. The proposed scope includes:

- Based upon existing studies, local knowledge, other existing information, and site visits; assess the current state of compliance for each major ESM facility. Establish with ESM which facilities are to be reviewed. Review and reach agreement with ESM on the current state of compliance of each Facility.
- Identify and recommend best available technology, the most economic technology, and the cost of implementation of each recommended technology for each facility. Justify the recommendations in technical and economic terms. For the options



Energy Projects in Macedonia

- identified, address the non-compliance in each major facility and actions required to bring it into compliance to EU Directives over time. Identify potential suppliers of each recommended technology and estimate the implementation schedule
- Evaluate financing options by conducting discussions with potential investors and financing sources including multilateral and bilateral institutions, private investors, and export credit agencies. Debt for equity swaps and greenhouse gas emission credit buyers are also to be considered. Potential financing mechanisms and investment structures should be identified from the discussions held.
 - Evaluate and quantify impact on environment, including potential for greenhouse gas emission credits.
 - Prepare a report including a comprehensive overview of the ESM facilities, potential resolutions, estimated costs, recommended priorities, and estimated timetable for the recommended optimum program.

Enviromation recommends that USTDA fund this program. A detailed Technical Assistance description is provided in Section III.

4. Renewable Energy Resource Assessment Technical Assistance: The renewable energy potential within Macedonia is largely unquantified. A number of small private initiatives are underway but no overall national assessment exists. ESM is initiating the development of a wind atlas for Macedonia. GEF and World Bank are developing a sustainable energy and efficiency fund. USAID is supporting small geothermal projects. These activities are largely uncoordinated and a comprehensive renewable energy strategy has not been developed. The Ministry of Economy has proposed a project to:

- Assess the potential of each renewable energy source (wind, solar, biomass, geothermal, and small hydro.) suitable for economic implementation.
- Identify implementation structures factoring in USAID, World Bank, GEF, and other Agency activities.
- Identify potential investors and developers to implement projects.
- Match experienced implementers with local parties interested in renewable energy development that are willing to train, and work with sponsors develop economic projects and to submit applications for financing.
- Conduct training on Kyoto protocol, greenhouse gas credit development, and expand awareness of the development and use of credits into major industries and government.
- Prepare a final report that quantifies the potential development in each sector, the potential economic impact, the potential environmental impact, and identify the potential renewable resources available that can be used by investors, suppliers and developers as a guide.

The State of Vermont Regulator has indicated a willingness to provide technical assistance from Vermont-based government and private sector participants to their Macedonian counterparts. The State of Vermont is currently assisting the Macedonia energy regulator on establishing structures, organization, and framework due to the similarities between Vermont and Macedonia. Earlier this year, Macedonian officials visited renewable energy sites in



Energy Projects in Macedonia

Vermont. The owners and developers of those facilities have expressed interest to assist Macedonia in the development of renewable energy.

A sampling of funding currently underway by sector demonstrates a high level of activity in this area:

- Wind resources: Norway (AWS of the U.S. has been selected to prepare initial wind map)
- Solar resources: Austria
- Geothermal resources: Italy
- Small hydro resources: Switzerland

Enviromation does not recommend funding this project as there are multiple studies underway in the renewable energy sector and the potential is generally believed to be small. Therefore a limited opportunity for U.S. exports exists.

5. Solid Waste Treatment Options Assessment Technical Assistance: Macedonia is obligated to come into compliance with EU environmental directives within 10-15 years in the solid waste (municipal waste) sector. A solid waste disposal (landfilling) plan has been developed for Macedonia to create regional centers. The proposed project provides Technical Assistance to define the scope of the improvements and technology available to address solid waste disposal to the next stage beyond landfilling and bring Macedonia into full EU compliance. The Ministry of Environment has proposed a technical assistance program that:

- Based upon existing studies, local knowledge, and other existing information, establishes a baseline assessment of the current state of compliance for each major sector.
- Identifies technology options including:
 - Identification and recommendations of best available technology;
 - Identification and recommendation of most economic technology;
 - Estimation of the cost of implementation of each recommended technology for each sector;
 - Evaluation and quantification of the impact on the environment including potential for greenhouse gas emission credits;
 - Justification of recommendations in technical and economic terms based on at least one specific case per technology;
 - Identification of options that address the non-compliance in each major sector and bring it into compliance with EU Directives over time;
 - Identification of potential suppliers of each recommended technology; and
 - Estimation of the implementation schedule.
- Evaluates financing options through:
 - Conducting discussions with potential investors and financing sources including multilateral and bilateral institutions and export credit agencies. Investigating debt for equity swaps and greenhouse gas emission credit buyers; and
 - Identifies potential financing mechanisms.



Energy Projects in Macedonia

- Prepares a report including a consolidated overview for Macedonia, potential resolutions, estimated costs, recommended priorities, potential environmental impact and potential timetable.

The Technical Assistance is proposed to focus on (a) recycling and waste treatment, (b) other disposal options such as compaction, bioreactors, etc. that enhance landfill operation, and (c) waste to energy including production of heat, electricity, biofuels or chemical feedstocks.

A prior project with Waste Management of the U.S. was approved for Paris Club debt for equity swap financing between Macedonia and the U.S. Although this project was cancelled due to issues unrelated to Macedonia, it demonstrates that U.S. technology can be competitive and financed in this sector. Enviromation recommends that USTDA consider funding this Technical Assistance request as U.S. technology could lead to significant exports.

D. Economic Summary

The Republic of Macedonia (“Macedonia”) remains the poorest country of the former Yugoslav Republics. With a population of 2 million, gross national income (GNI) per capita was \$1,980 in 2003. Gross domestic product in 2003 was \$4.7 billion. In 2003, real GDP grew 3.1% and external debt was 36.7% of GDP. Compared to its peers in the lower middle income group of countries as defined by the World Bank, Macedonia has a higher GNI per capita, trade is responsible for a relatively greater portion of its economy and it exhibits a much lower rate of domestic savings than its peers.¹

At independence in September 1991, Macedonia was the least developed of the Yugoslav republics, producing a mere 5% of the total federal output of goods and services. The collapse of Yugoslavia ended transfer payments from the center and eliminated advantages from inclusion in a de facto free trade area. An absence of infrastructure, UN sanctions on Yugoslavia, one of its largest markets, and a Greek economic embargo over a dispute about the country's constitutional name and flag hindered economic growth until 1996. GDP subsequently rose each year through 2000. However, the leadership's commitment to economic reform, free trade, and regional integration was undermined by the ethnic Albanian insurgency of 2001. The economy shrank 4.5% because of decreased trade, intermittent border closures, increased deficit spending on security needs, and investor uncertainty.²

The economy is continuing to recover after the severe negative shock of the security crisis in 2001. Macroeconomic stability has been preserved, inflation is low and monetary policy continues to be based on a de facto near-peg of the denar to the euro. However, there is little sign yet of a sustained take-off in growth. The reported unemployment rate continues to be over 30 per cent and GDP per capita remains low. The IMF stand-by program, approved in April 2003, is on track and the government has made significant progress in reducing the large budget deficit. The economy continues to run large trade and current account deficits.

¹ World Bank Data-at-a-Glance, September 15, 2004.

² CIA World Factbook, November 2004.



Energy Projects in Macedonia

Over the medium-term, export prospects should be enhanced by WTO membership, increased access to EU markets and free-trade agreements with all of the country's neighbors. Despite some recent successes, foreign direct investments with less than US\$1 billion of cumulative investments since 1991, is at a low level as many foreign investors continue to be deterred by a difficult investment climate and perceived political and security risks.

Overall progress in transition has been steady but slow, with the pace of structural reforms in the past two years affected by political uncertainty and changes. Good progress was registered in privatization and the private sector represents 60 per cent of GDP in 2003. Price and trade liberalization and banking sector supervision standards are well advanced, but the regulatory framework for non-bank financial institutions is still weak. In the infrastructure sector, an independent energy regulator was set up in 2003, a restructuring plan for the power company has been approved and its privatization program is on track. A railways restructuring plan was agreed on with the World Bank in spring 2003, but is being implemented very slowly.³

E. Political Background

Macedonia is faced with the dual development challenge of trying to build a stable, multi-ethnic society, while completing the transition to a democratic, market-oriented economy. Its future depends upon successfully managing these development challenges. Macedonia has made significant progress toward reestablishing peace and building the foundations of a functioning democracy. Since the signing of the Ohrid Framework Agreement, which ended the 2001 ethnic conflict, the government has modified the constitution in 16 areas to comply with the peace accord; passed landmark legislation to begin decentralizing government; and implemented an amnesty law that paved the way for former combatants to reintegrate into society.⁴

The new Government elected in September 2002 has continued the implementation of the Ohrid Framework Agreement. Political stability and military security have been restored since the security crisis in 2001. Following the death of President Trajkovski in February 2004, Branko Crvenkovski, Prime Minister since the 2002 elections, was sworn in as the new President in May 2004. A new Government was appointed on 2 June 2004 with Hari Kostov as Prime Minister and with no major ministerial reshuffle. The Republic of Macedonia has continued to promote regional co-operation in southeastern Europe in a number of ways, including through political dialogue, intra-regional trade agreements and regional infrastructural interconnections. Its Stabilisation and Association Agreement with the EU entered into force on 1 April 2004 and the country presented its application for EU membership on 24 March 2004.⁵

³ European Bank for Reconstruction and Development, 2004.

⁴ U.S. Agency for International Development, 2004.

⁵ European Bank for Reconstruction and Development, 2004.



Energy Projects in Macedonia

Despite the general improvement in inter-ethnic relationships, ethnic tensions remain high and ethnically motivated acts of violence still occur sporadically. On a positive note, Macedonia did successfully negotiate a Stand-By Arrangement with the International Monetary Fund (IMF), which frees up \$150 million in donor funding and will give a substantial boost to needed structural reform efforts. The resultant macroeconomic stabilization will generally strengthen the business climate and should improve prospects for next year. But to enable more extensive investment, further action will be needed to reduce corruption and to create a more business-friendly legal environment. Key U.S. national interests in Macedonia include national and regional stability, economic prosperity, and democratization. Macedonia is also in a position to be a helpful partner in combating organized crime and extremists in the region. U.S. Agency for International Development is supporting private sector activities including energy privatization, financial sector reform, active participation in the World Trade Organization (WTO), small and medium enterprise (SME) financing, corporate governance, and quality improvements for agricultural processors.⁶

Macedonia's main export partners are Germany 27.1%, Italy 14.8%, Greece 9.8%, Croatia 7%, US 6.1%, Netherlands 4.8% (2003 est.) Its main import partners are Greece 17.3%, Germany 12.6%, Yugoslavia 9.2%, Slovenia 8.9%, Bulgaria 7.3%, Italy 6.3%, Turkey 5.9% (2003 est.).⁷

F. Financing Overview

Official Development Assistance, Multilateral and Bilateral Donors

The United States and the European Union (EU) are the largest donors in Macedonia. Macedonia had \$1.7249 billion in external debt and received \$250 million in development aid in 2003 (est.).⁸ The European Agency for Reconstruction (the EU development arm) has focused on good governance, institution-building, rule of law, market economy development, environment, infrastructure, social development, and civil society strengthening. The Dutch government is the third largest donor, providing balance-of-payments assistance, support to the education, agriculture and public finance reforms; and assistance for development of a civil society and respect for human rights. Macedonia also receives assistance from the German, British, and Swedish governments. Donor coordination is excellent.⁹

The European Bank for Reconstruction and Development (EBRD), the International Bank for Reconstruction and Development (IBRD), the International Finance Corporation (IFC) and the Global Environment Facility (GEF) are also very active in Macedonia, assisting the country with private sector and environmental development initiatives.

EBRD

The volume and the depth of the EBRD's support to the Republic of Macedonia increased considerably during the last Strategy period (mid-2002 through mid-2004) with nine new commitments for EUR 126 million, representing a 62 percent increase of total cumulative

⁶ U.S. Agency for International Development, 2004.

⁷ CIA World Factbook, November 2004.

⁸ CIA World Factbook, November 2004.

⁹ U.S. Agency for International Development, 2004.



Energy Projects in Macedonia

business volume to date. In 2003, three projects were signed with foreign sponsors, a tentative sign of renewed investors' confidence after the 2001 conflict. The EBRD also promoted SME financing in the country through establishing a micro-finance bank, which has already provided finance for over 3,700 MSEs. All infrastructure projects signed in the last strategy period contributed to further regional integration (e.g. roads, regional electricity interconnection). The low disbursement ratio has started to improve.

In addition to focusing on implementation and disbursement of existing commitments, the EBRD intends to play a crucial role, together with the EIB and the EU, in developing transport and energy projects, with a particular focus on regional linkages, as well as municipal and environmental infrastructure. The EBRD plans to focus on (i) supporting utility restructuring and privatization through the implementation of the pre-privatization agreement for the electricity company, (ii) energy projects that fit the regional energy market development such as regional electricity and gas interconnections, (iii) promoting road network rehabilitation in conjunction with restructuring of the road maintenance sector, and (iv) developing, where possible, municipal guaranteed water sector investments.

Macedonia – Bulgaria Transmission Line Project - EBRD has recently extended a € 40.5 million loan to Elektrostopanstvo na Makedonija (ESM), the state-owned vertically integrated power utility, that will finance the construction of a 400 kV transmission line between Shtip (Republic of Macedonia) and Chrvena Mogila (Bulgaria) as well as the installation of a new sub-station in Shtip. ESM is the borrower for the whole project, while NEK - its Bulgarian counterpart, will repay financing for the Bulgarian section of the transmission line through electricity supply to ESM. Project preparation was assisted by grants from the Governments of Canada and Switzerland.

The project, to be implemented from 2004 through 2006, will increase system stability in the eastern part of the Republic of Macedonia, decreasing system losses. It will also allow the Republic of Macedonia direct access to Bulgaria's considerable generation capacity. The project will have benefits for Bulgaria too, giving it increased trading and reserve capacity as well greater system security. In general, the project will allow both the Republic of Macedonia and Bulgaria, and other countries in the region, to enjoy increased supply options resulting in greater overall efficiency and security. As such, it will help the establishment of a regional electricity market in south-eastern Europe.¹⁰

IBRD

From 1993 till 2001, the World Bank supported the Republic of Macedonia by providing the country long-term loans at no interest through its concessional lending arm - the International Development Association. Although the Republic of Macedonia was to graduate from IDA financing in 2001, the conflict of 2001 and the country's vastly changed circumstances led the World Bank to grant the country exceptional access to additional IDA funds.

¹⁰ European Bank for Reconstruction and Development, 2004.



Energy Projects in Macedonia

The Republic of Macedonia formally graduated from 'Blend'¹¹ to 'IBRD-only' status on July 1, 2001. In 2002, a one-year Transitional Support Strategy (TSS) provided the framework for rapid Bank intervention in the country during the post-conflict period. The Country Assistance Strategy for 2004 - 2006 is the first 'IBRD only' CAS for the Republic of Macedonia and anticipates a lending program of up to \$165 million.¹²

To date, the Bank has approved US\$600 million for 25 projects in the Republic of Macedonia since 1994. The loans have supported projects in agriculture, health, education, private finance and other sectors. The projects have also managed to leverage considerable grant funding from other donors which the World Bank helps implement. Nine investment projects are ongoing. Eight emergency/adjustment and 9 investment projects have been completed. The conservation of Lake Ohrid and the Mini-Hydro Power project have been financed by Global Environment Facility (GEF) grants.¹³

The World Bank has been implementing the \$35 million Power System Improvement Project in Macedonia since February 1998 and expects the project to be completed by June 30, 2005. The loan has been used to support efforts to improve pollution management and environmental health and to slow climate change.

IFC

Macedonia became a member of IFC in 1993. Since then, the country has received commitments of over \$93 million in IFC funds and more than \$25 million in syndications. The IFC has invested in seven key sectors: finance, textile, pharmaceutical, telecommunication, glass-machine production, steel, and tourism. IFC has also attracted foreign investors for the privatization of Stopanska Banka, the largest commercial bank in Republic of Macedonia.

IFC has pledged to continue to support the infrastructure sector, SMEs and micro-enterprises, and post-privatized export-oriented companies. It has been actively providing advice and capacity building assistance to promote private sector growth in the Republic of Macedonia since the mid-nineties when it began advisory support to the textile manufacturer Teteks A.D. Its portfolio has also included auditing and accounting support to several SMEs, and a comprehensive assessment of the legal environment, conducted in 1997.

IFC is also developing the Balkan Infrastructure Development Facility and the facility will become fully operational in FY05. Deficiencies in infrastructure continue to discourage private investors and hinder economic growth in the Balkan region. To support growth and meet the urgent need for private capital to invest in infrastructure, IFC is establishing the Balkan Infrastructure Development Facility in cooperation with USAID and European donors. The facility will help public sector entities in the region attract private sector investments, focusing on the energy, transportation, and water and sanitation sectors. The countries covered by the facility are Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Macedonia, Romania, and Serbia and Montenegro.

¹¹ Blend countries are eligible for funds from both the IDA and the IBRD.

¹² World Bank, November 2004.

¹³ World Bank, 2004.



Energy Projects in Macedonia

Managed by IFC and based in Sofia, Bulgaria, the facility reflects the World Bank Group's strategy to broaden engagement in infrastructure to ensure efficient, affordable, and sustainable delivery of infrastructure services. The facility will help identify, develop, structure, and reach financial closure on infrastructure projects, so that committed public sector entities in the Balkan countries can engage more effectively with the private sector and attract investments critical to the region's economic development.¹⁴

GEF

The GEF is an independent financial organization that provides grants to developing countries for projects that benefit the global environment and promote sustainable livelihoods in local communities. GEF projects address six complex global environmental issues:

- Biodiversity
- Climate Change
- International Waters
- Land Degradation
- The Ozone Layer
- Persistent Organic Pollutants (POPs)

Since 1991, the GEF has provided \$4.5 billion in grants and generated \$14.5 billion in co-financing from other partners for projects in developing countries and countries with economies in transition. GEF funds are contributed by donor countries. In 2002, 32 donor countries pledged \$3 billion to fund operations between 2002 and 2006.

GEF projects are managed by GEF Implementing Agencies:

- the United Nations Environment Program,
- the United Nations Development Program, and
- the World Bank.

"Executing Agencies" contribute to the management and execution of GEF Projects. In 1999, the GEF Council expanded opportunities for seven organizations to contribute to the implementation of GEF projects. These organizations are known as "Executing Agencies" under the GEF's expanded opportunities policy

The seven organizations are:

- The African Development Bank (AfDB)
- The Asian Development Bank (ADB)
- The European Bank for Reconstruction and Development (EBRD)
- The Inter-American Development Bank (IDB)
- The International Fund for Agricultural Development (IFAD)
- The UN Food and Agricultural Organization (FAO)
- The UN Industrial Development Organization (UNIDO)

¹⁴ International Finance Corporation, 2004.



Energy Projects in Macedonia

The GEF currently has five projects under implementation in Macedonia: 1) the Sustainable Energy Program (\$5.35 million), 2) Development of Mini-Hydropower Plants (\$1.5 million), 3) Climate Change Enabling Activities (Phase II) (\$0.1 million) and two others related to slowing climate change. The World Bank is the Implementing Agency for the first two projects and the UNDP is implementing the third. The Sustainable Energy Program will be in operation beginning in 2005.

Local Bank Financing

The IFC was deeply involved in the privatization of Stopanska Bank, which is the country's largest bank, representing about 40% of the country's banking assets. IFC, together with National Bank of Greece and EBRD, have strengthened the capital base of the bank, improved corporate governance, and supported a capital investment program (including modernization of computer systems, branch network upgrading, and personnel training). Stopanska is involved in the EBRD's Macedonia-Bulgaria transmission project and has also provided financing to ESM regularly on a short- and medium-term basis.

G. Observations

There are a number of factors that can positively affect energy projects in Macedonia. These include:

- Debt for equity (and environment) swap funds still exists for Macedonia with the US. The Ministry of Finance is responsible for this area and a formal application structure has not been defined. All projects are handled on a case by case basis.
- The implementation of Kyoto Protocol in Macedonia and in particular the development of a greenhouse gas credit regime has not been defined nor well understood in Macedonia. The Ministry of Environment is leading this effort and assistance has been requested.
- The debt for equity swaps, in this case where Russia owes Macedonia money, is proceeding. One area of focus is the construction of new gas pipelines in Macedonia. This will enhance the power generation market opportunities by providing a new and more reliable fuel supply.
- The Government of Macedonia is still negotiating with MAKPETROL regarding ownership of the gas and the gas system in Macedonia. This dispute must be resolved before any real power plant development involving gas can go forward. The Government of Macedonia expects that this dispute will be resolved in the near future.

In the run up to restructuring and privatization of ESM, numerous studies have been conducted or are underway. These studies are potential information sources that can help minimize the research effort done by Contractors for Feasibility Studies or Technical Assistance. A partial list in the electricity sector in Macedonia includes:

- Bitola Fuel Supply Feasibility Study,
- Least Cost Expansion Planning Studies, Harza Engineering Company International L.P., April 2002,
- Investment Options in the Energy Sector, Exergia S.A., December 2002,

***Energy Projects in Macedonia***

- Feasibility study on the project in the Republic of Macedonia – 190 MW gas fired combined-cycle heat and power plant, Japan Consulting Institute, December 1999,
- ESM distribution system modernization feasibility study, Harza Engineering Company, June 1998,
- Draft Energy Efficiency Strategy, USAID, December 2003,
- FYR Macedonia Energy Policy Paper, World Bank, July 2004,
- Skopje gas distribution pre-feasibility study, COWI, 1998,
- Cost of gas supply to Albania, Bosnia and Herzegovina, Macedonia, and Serbia, Economic Consulting Associates, August 2003,
- Power sector affordability in South East Europe, Ian Pope Associates, November 2003,
- Gas cogenerative thermal power plant – heating TE-TO, Skopje, Enprima, 2004,
- Feasibility Study for Interconnection between Power Systems of Macedonia and Bulgaria on 400 kV Voltage Level, ESM and ETF, Skopje,
- Environmental Impact Assessment Study of 400 kV OHL SS Dubrovo – SS Stip – Macedonian Border,
- Feasibility Study for underground excavation of coal for TPP Bitola from deposits: Brod-Gneotino, Deep underlying seam Suvodol and Zivojno, Rudarski Institut, Skopje,
- Feasibility study for opening and exploration of open-pit mine Brod-Gneotino during 2004-2005, Rudarski Institut, Skopje,
- Action plan for supply with lignite to TEC “Bitola” Investment possibilities in the energy sector, PHARE, 2003,
- Feasibility Study of Boskov Most Hydroelectric Power Plant, Paul C. Rizzo Associates, 2002,
- Study for supply in Skopje with natural gas, Exergia, 2003,

**Energy Projects in Macedonia****H. Meetings Held**

Meetings				
Number	Company	Contact name	Title	Project
1	The World Bank 1818 H Street, N.W. Washington, DC 20433 Washington, DC	David Kennedy	Senior Energy Economist Infrastructure and Energy Sector Europe and Central Asia	Negotino Repowering FMS
2	The European Bank for Reconstruction and Development One Exchange Square London, UK EC2A 2JN	Louis Borgo	Senior Banker Power & Energy Utilities	Negotino Repowering FMS Renewables Assessment EU Timeline Solid Waste Options
3	The World Bank Leninova 34 1000 Skopje	Zarko Bogoev	Operations Officer	Negotino Repowering FMS Renewables Assessment
4	EBRD Dame Gruev 14 Business Centre Intex 1000 Skopje	Biljana Milosheska	Associate Banker	Negotino Repowering FMS Renewables Assessment
5	Stopanska Banka 11 Octombre 1000 Skopje	Irena Nikolovska	General Manager's Office	Negotino Repowering FMS
6	Stopanska Banka 11 Octombre 1000 Skopje	Dimitar Bogov	Chief Economist	Negotino Repowering FMS
7	Komercijalna Banka Kej Dimitar Vlahov 4 1000 Skopje	Margarita Zdravkovska	Manager International Division	Negotino Repowering FMS
8	Komercijalna Banka Kej Dimitar Vlahov 4 1000 Skopje	Vera Bibanovska	Manager Corporate Lending Division	Negotino Repowering FMS
9	Komercijalna Banka Kej Dimitar Vlahov 4 1000 Skopje	Biljana Georgievska	Coordinator Corporate Lending Division	Negotino Repowering FMS
10	Rikom P. Georgiev bb 1000 Skopje	Dusko Nikolov	General Manager	Negotino Repowering FMS Renewables Assessment EU Timeline Solid Waste Options
11	Toplifikacij District Heating of Skopje Ul. Londonska bb 1000 Skopje	Dimitar Hadzi-Misev	General Director	Negotino Repowering Renewables Assessment Solid Waste Options
12	Ul.Dame Gruev br.1-3/16 1000 Skopje	Prof. Dr. Kiril Popovski	Full Professor	Renewables Assessment Solid Waste Options


Energy Projects in Macedonia

Number	Company	Contact name	Title	Project
13	US Embassy bul. Ilinden bb 1000 Skopje	Arben Gega	Commercial Specialist	Negotino Repowering FMS Renewables Assessment EU Timeline Solid Waste Options
14	US Embassy bul. Ilinden bb 1000 Skopje	Victor Myev	Political/ Economic Officer	Negotino Repowering FMS Renewables Assessment EU Timeline Solid Waste Options
15	ESM 11 Oktomvri 9 1000 Skopje	Trajce Cerepnalkovski	Assistant General Director & Head of the Development and Investment Department	Negotino Repowering FMS Renewables Assessment EU Timeline
16	ESM 11 Oktomvri 9 1000 Skopje	Vlatko Cingoski	Assistant General Manager Department of Development and Investment	Negotino Repowering FMS Renewables Assessment EU Timeline
17	ESM 11 Oktomvri 9 1000 Skopje	Jasna Ivanova Davidovic	Department for Development and Investments	Negotino Repowering FMS Renewables Assessment EU Timeline
18	ESM Thermoeltrana Negotino Negotino	Georzgi Kimov	Plant Director	Negotino Repowering
19	Ministry of Environment Drezdenska 52 1000 Skopje	Kiril Nasteski	State Secretary	Renewables Assessment Solid Waste Options
20	ESM 11 Oktomvri 9 1000 Skopje	Mirjana Sareska	Assistant General Manager Financial Department	FMS
21	Ministry of Economy Jurij Gagarin 15 1000 Skopje	Stevcho Jakimovski	Minister of Economy	Negotino Repowering FMS Renewables Assessment EU Timeline
22	Ministry of Economy Jurij Gagarin 15 1000 Skopje	Rakip Doci	Deputy Minister	Negotino Repowering FMS Renewables Assessment EU Timeline
23	Ministry of Economy Jurij Gagarin 15 1000 Skopje	Rilind Kabshi	Advisor	Negotino Repowering FMS Renewables Assessment
24	Ministry of Economy Jurij Gagarin 15 1000 Skopje	Magdalena Manuseva	Head of Unit Electric Power System and Investments Unit	Negotino Repowering FMS Renewables Assessment



Energy Projects in Macedonia

Number	Company	Contact name	Title	Project
25	Ministry of Economy Jurij Gagarin 15 1000 Skopje	Nikola Cerepnalkovski	State Counselor for Energy	Negotino Repowering FMS Renewables Assessment
26	International Center for Preventive Action and Conflict Resolution Krste Misirkov bb 1000 Skopje	Saso Georgievski	Executive Director (an attorney)	EU Timeline Renewables Assessment
27	USAID Jurij Gagarin 15/III 1000 Skopje	Dick Goldman	USAID Mission Director	Negotino Repowering FMS Renewables Assessment
28	USAID Jurij Gagarin 15/III 1000 Skopje	Steve Gonyea	Economic Growth Officer	Negotino Repowering FMS Renewables Assessment
29	USAID Jurij Gagarin 15/III 1000 Skopje	Jovan Madjovski	Project Management Specialist Economic Growth Office	Negotino Repowering FMS Renewables Assessment
30	Ministry of Finance Dame Gruev 14 Skopje 1000	Goran Ancheski	Head of Department	Negotino Repowering Renewables Assessment
31	Meinl Bank Consortium Orce Nikolov 118A/1 1000 Skopje	Zlatko Cherepnalkoski	Team Leader Resident	Negotino Repowering FMS EU Timeline
32	Meinl Bank Consortium Orce Nikolov 118A/1 1000 Skopje	Bereczi Ferenc	Director Energy & Infrastructure	Negotino Repowering FMS EU Timeline
33	Embassy of Macedonia 1101 30th Street, NW, suite #302, Washington DC 20007	Paskal Stojceski	First Secretary	Negotino Repowering FMS
34	US Department of Energy 1000 Independence Avenue, SW Washington, DC 20585	Pam Cochran	Office of European and Asian Affairs	Negotino Repowering FMS
35	NARUC International Partnership Program National Association of Regulatory and Utility Commissioners 1101 Vermont, N.W. Suite 200 Washington, DC 20005	Martina Schwartz	Program Officer International Programs	Negotino Repowering Renewables Assessment
36	Vermont Public Service Board 112 State Street Montpelier, VT 05620-2701	David C. Coen	Board Member	Negotino Repowering Renewables Assessment

***Energy Projects in Macedonia***

Number	Company	Contact name	Title	Project
37	Vermont Public Service Board 112 State Street Montpelier, VT 05620-2701	Susan M. Hudson	Clerk of the Board	Negotino Repowering Renewables Assessment
38	US AID Ronald Reagan Building 1300 Pennsylvania Ave. NW Washington, DC 20523	Jamshid Heidarian	Country Coordinator	Negotino Repowering FMS Renewables Assessment



Energy Projects in Macedonia

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Section II

FINAL REPORT

**DEFINITIONAL MISSION FOR
NEGOTINO POWER PLANT REPOWERING
FEASIBILITY STUDY IN MACEDONIA**

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FINAL REPORT

DEFINITIONAL MISSION FOR NEGOTINO POWER PLANT REPOWERING FEASIBILITY STUDY IN MACEDONIA

TDA-04-Q-7-235

March, 2005

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The U.S. Trade and Development Agency

The U.S. Trade and Development Agency (USTDA) advances economic development and U.S. commercial interests in developing and middle income countries. The agency funds various forms of technical assistance, feasibility studies, training, orientation visits and business workshops that support the development of a modern infrastructure and a fair and open trading environment

USTDA's strategic use of foreign assistance funds to support sound investment policy and decision-making in host countries creates an enabling environment for trade, investment and sustainable economic development. Operating at the nexus of foreign policy and commerce, USTDA is uniquely positioned to work with U.S. firms and host countries in achieving the agency's trade and development goals. In carrying out its mission, USTDA gives emphasis to economic sectors that may benefit for U.S. exports of goods and services.



Table of Contents

	Page
A. Executive Summary	3
Project Location	3
Introduction	3
About The Grantee	3
Project Background	3
Project Structure	4
Legal Regulatory Framework	4
Economic Fundamentals	4
Development Impact	4
Project Grantee’s Commitment	5
Implementation Financing	5
USTDA Evaluation Factors	5
U.S. Export Potential	5
Foreign Competition	5
Impact on the Environment	6
Impact on U.S. Labor	6
Justification	6
Qualifications Required by the Feasibility Study Contractor	6
Aim of the Terms of Reference	6
Outline of the Terms of Reference	6
Period of Performance	7
Budget	7
Recommendations	7
B. Project Description	8
C. Development Impact	16
D. Project Grantee’s Commitment	17
E. Implementation Financing	17
USTDA Evaluation Factors	17
F. U.S. Export Potential	17
G. Foreign Competition	18
H. Impact on the Environment	18
I. Impact on U.S. Labor	19
J. Justification	19
K. Qualifications Required by the Feasibility Study Contractor	19
L. Terms of Reference and Budget	19
M. Recommendations	25
Budget Details	27
N. Contacts	30



Definitional Mission Report – Macedonia
Negotino Power Plant Repowering Feasibility Study

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A. Executive Summary

Project Summary	
Host Country	Macedonia
Project Name	Negotino Power Plant Upgrade
Sector	Energy
Region	Central Europe
Location	Negotino, Macedonia
Capital Required	\$366 million
Export Potential	\$229 million
Project Grantee	A. D. Elektrostopanstvo NA Makedonija Trajce Cerepnalkovski Assistant General Manager & Head of Development and Investments Department Str. 11 Oktomvri 9 1000 Skopje Republic of Macedonia Tel: +389-2-3119-611 Fax: +389-2-3111-160 Email: trajce@esmak.com.mk

Introduction

A.D.Elektrostopanstvo NA Makedonija (ESM) has requested a grant from the United States Trade and Development Agency to conduct a Feasibility Study to assess the feasibility of economically repowering an existing oil fired power plant with a modern, high efficiency, more environmentally friendly combined cycle gas turbine power plant.

About The Grantee

ESM is currently the state owned power generation company. ESM, the Electric Power Company of Macedonia, is currently responsible for all power generation, transmission, and distribution in Macedonia. In 2002, ESM generated 5,618.7 GWh, of electricity, which fell short of the total demand of 6,646.6 GWh. The remaining 1,027.9 GWh were imported to cover the demand. ESM currently has transmission lines connecting it to Greece, Serbia and Montenegro, and Bulgaria and will be constructing others to export and import electricity.

Project Background

The Negotino Power Plant is a standby power plant to stabilize the grid and supply power when all other plants are operating at peak capacity. In recent years it has operated less than 100 hours per year and often not at all.

In order for this plant to be attractive as part of privatization, ESM plans to replace, upgrade, or expand the 25 year old well-maintained oil-fired Negotino plant with a new and efficient combined cycle gas turbine power generation plant. The new plant would increase the electricity capacity to 690 - 710 MWe from the current 210 MWe that presently exists. As part of this program, the



Project Location

The project is in the City of Negotino, located 60 miles southeast of Skopje.



existing power plant will be converted to operate on gas or coal from oil.

The proposed Project for USTDA funding would examine the feasibility of going beyond just switching fuels. This concept is consistent with the original site plan that called for two power blocks to be built and the infrastructure is largely designed for this expansion.

Project Structure

It is expected that ESM in its privatized form will own the plant. It is possible, based upon restructuring and privatization decisions to be made by ESM and the government of Macedonia in the first quarter of 2005, that Negotino will remain in the hands of the government. If privatized, this project is expected to be balance sheet financed.

Legal Regulatory Framework

Macedonia is harmonizing its tax and tariff system with the EU. Macedonia is adopting environmental laws, policies and directives of the EU as it strives to become a future full member of the EU.

After experiencing several delays due to difficulties in Parliament of passing the necessary legislation for the restructuring to proceed, the GOM is proceeding with the restructuring of ESM. The GOM has broken ESM into two separate entities:

- The government will retain the transmission assets of ESM and will therefore, be in charge of the transmission company.
- The generation and distribution assets will remain as one company.

Meinl Bank AG of Austria will manage the actual tender process for the privatization, but according to the GOM there are several other steps that must be

done before it can proceed with the privatization.

Economic Fundamentals

A detailed economic analysis is not currently available for the proposed Project. The Terms of Reference will require an analysis of the long-term power purchase agreements, the potential for long-term electricity sales cross-border to other countries in Southeast Europe, and sales of electricity within Macedonia.

Based upon experience, the economics of the project has been estimated. Assuming that the deregulated market will support the generation cost of \$53/MWh used in this analysis this project should be financially viable. Its net present value is over 33% higher than the equity, the return on investment is over 15%, and debt service coverage is low but adequate. The project has the ability to be enhanced through negotiation of VAT recovery and other investment incentives.

Development Impact

This project will introduce state-of-the-art technology for efficient generation of electricity in a more environmentally friendly manner. The proposed project is expected to reduce the greenhouse gas emissions by replacing coal or oil generated electricity with cleaner gas generated electricity and reduce the emissions of CO₂ arising from power generation. In addition, it will create approximately 2,000 jobs during construction and create 250 new job during operation as well as preserving 100+ jobs on an on-going basis (versus closure of the plant).



The proposed project is expected to:

- Reduce the greenhouse gas emissions from coal and oil fired generation of electricity;
- Introduce state-of-the-art technology into Macedonia that can serve as a model to facilitate development of the cleaner energy in Macedonia; and
- Create approximately 2,000 jobs during construction and 250 new jobs on an on-going basis.

Project Grantee’s Commitment

ESM is committed to this project. This project will enhance the potential for ESM to identify and realize the full potential economic value of the Negotino Power Plant. With restructuring and privatization underway, combined with the emergence of an open electricity market in 2006, ESM is committed to become more competitive.

Implementation Financing

Implementation financing for this project entirely depends on whether the Negotino plant is retained as an asset of the Government of Macedonia (GOM) or its ownership is transferred to the privatized ESM. If the GOM continues to own Negotino and is willing to issue a sovereign guarantee to support bank loans for the importation of foreign equipment to upgrade the plant, the most likely source of the bulk of the implementation financing will be international bank loans covered by export credit agency (ECA) guarantees. It is likely that there would be intense competition among the various ECAs to offer the best terms (i.e., longest tenor, lowest all-in costs) to support exports from their respective countries. If Negotino becomes an asset of the privatized ESM, lenders will review the

requested financing based on ESM’s new balance sheet. They will want to analyze ESM’s long-term power purchase agreements, domestic and cross-border tariff structure and expected value of its greenhouse gas emissions credits. Lenders would analyze its current and expected future cash flows and overall debt service capacity. Since the final ownership decision for Negotino is expected to be determined during the time period of the Feasibility Study, the Contractor will investigate the appropriate sources of implementation financing (equity, vendor financing, ECA, multilateral, bilateral, international and local bank loans) for the ownership model chosen by ESM.

USTDA Evaluation Factors

U.S. Export Potential

The potential for U.S. exports is significant. For each Option, the equipment and services available for export from the U.S. were identified from the cost tables in the “Project Cost” portion of Section C. Based on the capital cost of \$366 million, the opportunities for exports from the U.S. are expected to be \$229 million.

Foreign Competition

U.S. equipment and service suppliers are expected to meet strong competition from global suppliers. Western European firms which specialize in turnkey power station projects will view this project as an attractive opportunity to extend their home markets. The Western European firms are eager to keep U.S. competition out of the region so competition will be intense. However, US companies have demonstrated that they can compete cost-effectively on an international basis.



Impact on the Environment

The proposed project is not expected to have any negative impact on the environment. It should have a positive impact by replacing some fossil fuel generated electricity with electricity generated through more efficient state-of-the-art gas technology. Therefore the emissions of NO_x, SO_x, and CO₂ will be reduced.

Impact on U.S. Labor

Enviromation does not believe that this project will have any negative impact on the U.S. labor. The potential sale of equipment and services for this project is expected to have a positive impact on the U.S. equipment manufacturing and engineering sectors.

Justification

This project is justified because:

- The technology risk involved is low as the proposed technology is operating in power plants around the world;
- This project is attractive as it potentially generates greenhouse gas emission credits that may have substantial economic benefit to ESM;
- These factors enhance the probability that a financially viable and commercially attractive project will result; and
- The Grantee is seeking the most economically and technically appropriate technology. Without this Feasibility Study, it is likely that ESM will not realize full value for Negotino that U.S. technology could otherwise enhance.

Qualifications Required by the Feasibility Study Contractor

The Contractor carrying out this feasibility study shall demonstrate:

- a. Detailed experience in the technology, design, construction, and operation of power generation facilities.
- b. Experience in the economic and business factors associated with generating energy in a newly privatized market.
- c. Proficiency in project and balance sheet finance in Southeast European countries and especially in Macedonia.

Aim of the Terms of Reference

The aims of the Terms of Reference are to develop a study that quantifies the feasibility of multiple proposed options for upgrade of Negotino in the current and anticipated economic and regulatory environment taking into consideration ESM's planned privatization. This study may be used by the ESM privatization bidders for information on valuation options for the Negotino plant.

Outline of the Terms of Reference

The Feasibility Study activities are divided into 11 tasks broken into two phases:

Phase I

- Task 1 – Infrastructure Assessment
- Task 2 – Conceptual Design
- Task 3 – Power Demand
- Task 4 – Fuel Availability
- Task 5 – Environmental Assessment
- Task 6 – U.S. Sources of Supply
- Task 7 – Phase I Report

Phase II

- Task 8 – Electricity Market



Negotino Power Plant Repowering Feasibility Study

- Task 9 – Financial Evaluation
- Task 10 – Development Impact
- Task 11 – Final Report

Period of Performance

The Period of Performance for performing Phase I of this Feasibility Study is four to six months must be completed no later than August 31, 2005. The duration of Phase II is estimated as five months.

Budget

The total cost for conducting the proposed Feasibility Study on an expedited basis is estimated to be \$732,000. Phase I cost is estimated as \$490,000 and Phase II cost as \$242,000.

Recommendations

USTDA support for this Feasibility Study is recommended for the following reasons:

- The positive impact on the environmental conditions, local economy, and greenhouse gas emissions;
- The proven technology employed;
- The project enhances the potential value of Negotino in the privatization process of ESM; and
- The project fosters the export of U.S. equipment and services and providing an opportunity to U.S. companies that may not normally exist both in implementing the project and gaining visibility for U.S. companies to participate in the privatization of ESM.

Enviromation further recommends that USTDA evaluate whether there is sufficient time to execute the Feasibility Study at the time that the Grant award is considered. The timing of the necessary

steps of awarding the Feasibility Study to a Contractor may make it unlikely that the August 31, 2005 completion date can be met. In that case, it is recommended that the Feasibility Study not be approved as it will be too late in the privatization process to justify.

Other considerations that USTDA should take into account are:

- The uncertainty concerning the ownership and privatization of Negotino; and
- The likelihood that US companies will participate in the privatization of Negotino.



B. Project Description

Project Summary	
Host Country	Macedonia
Project Name	Negotino Power Plant Upgrade
Sector	Energy
Region	Central Europe
Location	Negotino, Macedonia
Capital Required	\$366 million
Export Potential	\$229 million
Project Grantee	A. D. Elektrostopanstvo NA Makedonija Trajce Cerepnalkovski Assistant General Manager & Head of Development and Investments Department Str. 11 Oktomvri 9 1000 Skopje Republic of Macedonia Tel: +389-2-3119-611 Fax: +389-2-3111-160 Email: trajce@esmak.com.mk

Introduction

A.D.Elektrostopanstvo NA Makedonija (ESM) has requested a grant from the United States Trade and Development Agency to conduct a Feasibility Study to assess the feasibility of economically repowering an existing oil fired power plant with a modern, high efficiency, environmentally friendly combined cycle gas turbine power plant.

About The Grantee

ESM is currently the state owned power generation company. ESM, the Electric Power Company of Macedonia, is currently responsible for all power generation, transmission, and distribution in Macedonia. ESM has three thermal power stations with a combined capacity of 1,010 MWe and are powered by lignite and oil:

- Bitola - a 675 MWe plant that supplies approximately 70 percent of Macedonia's electricity and is in good condition;
- Negotino - a 210 MWe plant; and
- Oslomej - a 125 MWe plant.



Project Location

The project is in the City of Negotino, located 60 miles southeast of Skopje.

ESM also maintains and operates 14 hydropower stations; the four largest hydropower plants supply approximately 400 MWe of electricity and the 10 small plants supply approximately 36 MWe. In 2002, ESM generated 5,618.7 GWh, of electricity, which fell short of the total demand of 6,646.6 GWh. The remaining 1,027.9 GWh were imported to cover the demand. ESM currently has transmission lines connecting it to Greece, Serbia and Montenegro, and Bulgaria and will be constructing others to export and import electricity.

In early 2001, the Government of Macedonia (GOM) hired a consultant to coordinate the privatization of ESM, by



designing a new company structure model and a detailed restructuring plan. The GOM signed an agreement with an Austrian private investment and merchant bank, Meisl Bank AG, to manage the restructuring and privatization of ESM. Meisl Bank conducted the initial review of ESM in the spring of 2002.

After experiencing several delays due to difficulties in Parliament of enacting the necessary legislation for the restructuring to proceed, the GOM is proceeding with the restructuring of ESM. The GOM has broken ESM into two separate entities.

- The government will retain the transmission assets of ESM and will therefore, be in charge of the transmission company.
- The generation and distribution assets will remain as one company.

Meisl Bank AG will manage the actual tender process for the privatization, but according to the GOM, there are several other steps that must be done before it can proceed with the privatization.

As of January 1, 2005, a new government owned transmission company, *MEPSO*, will be in operation. ESM will then consist of the distribution and generation assets as well as some non-core investments. The “new” ESM will be a holding company composed of three legally separate divisions:

1. Generation: includes three thermal power plants, two coal mines, seven hydroelectric plants, and new hydroelectric plants going out for bid (Boskov Most, Matka II, etc.)
2. Distribution: includes all distribution assets and five hydroelectric plants.

3. Non-Core Assets: Includes portfolio participation in companies and banks

The expected timetable for restructuring and privatization is as follows:

- 2004 - Legislation has been passed to separate transmission from generation and distribution
- 2004 – Decide market model, participants, tariff methodology and implementation by end of years
- 2005 – January: MEPSO begins operation.
- 2005 – 1st quarter: decide what assets will be privatized and in what packages.
- 2005 - Mid-year: New Energy Law approved
- 2005 – Mid year: issue tenders
- 2005 – Year end: select winner(s)
- 2006 – Begin operation as a privatized company(s)
- 2007 – Open market for users of 20 MWe or greater

Project Background

The Negotino Power Plant is a standby power plant to stabilize the grid and supply power when all other generation plants are operating at full capacity. In recent years it has operated less than 100 hours per year and often not at all.

In order for this plant to be attractive under privatization, ESM plans to replace, upgrade, or expand the 25 year old well-maintained oil-fired Negotino plant with a new and efficient combined cycle gas turbine power generation plant. The new plant would increase the electricity capacity to 690 - 710 MWe



Negotino Power Plant Repowering Feasibility Study

from the current 210 MWe that presently exists.

ESM has a Feasibility Study, funded by the French government, underway with CdF Ingénierie of France (CdF) examining the feasibility of converting the plant from operation on oil to coal. If the plant is converted to coal, then fluidized bed technology would be employed. This same study is examining the feasibility of switching the fuel to gas. The CdF study was scheduled to be completed in late 2004.

The proposed Project for USTDA funding would examine the feasibility of going beyond just fuel switching. This concept is consistent with the original site plan that called for two power blocks to be built and the infrastructure is largely designed for this expansion.

Technical Description

The thermal plant Negotino is located on the river Vardar in the Dubrovo region eight kilometers downstream from the city of Negotino. The infrastructure to support two power blocks has been built although only one 210 MWe power block has been built. The first block was connected to the grid in March 1978.

Negotino Power Plant



The technical characteristics of the plant are outlined below:

Fuel Oil

Fuel is supplied from refineries by rail car directly to the plant. Fuel oil is stored in three reservoirs of 20,000 m³. The temperature of the fuel oil is maintained at 60-90°C. Oil is delivered to the boiler at 75 m³/hr at a temperature of 125°C and a pressure of 40 atm.

Natural Gas Reduction Capacity

Pressure: 5/1 to 1.5 kP/cm²
Flow: 30,000 m³/hr
Number of columns: 3

Steam Boiler

Forced circulation
Type P-56
Maximum steam flow: 670 t/hr
Steam pressure: 140/26 atm
Steam temperature: 540/540°C
Exhaust gas temperature: 141°C
Fuel oil consumption: 52 t/hr
Fuel types: Oil: 9,600 Kcal/kg
Natural gas: 8,600 Kcal/ Nm³
Refined gas: 3,400 Kcal/Nm³

Feedwater Pumps

Capacity: 380 m³/hr
Revolutions: 2900 rpm
Feedwater temperature: 158°C

Steam Turbine

Type: K-200-130-3
Rating: 210 MWe (247 MVA)
Steam pressure: 130/24/8 atm
Steam temperature: 535/535°C
Revolutions: 3000 rpm

Generator

Rating: 210 MWe (247 MVA)
Power factor: 85%
Revolutions: 3000 rpm
Stator voltage: 15.75 ± 5% kV
Stator current: 9050 A

Condenser

Two parts
Surface area: 2 x 6590m²
Cooling water: 27,500 m³/hr

Power Transformer

Type: TDC 250,000 kVA/110kV
Nominal power: 250,000 kVA
Transition ratio: 15.75/121 kV



Negotino Power Plant Repowering Feasibility Study

Reserve Transformer

Type: TRDN-32,000/110
Nominal power: 32,000/16,000/16,000 kVA
Transition ratio: 115/6.3/6.3 kV

Transmission Lines

Power: 3 x (2 x 4900 mm²) Al-St, 110 kV
on steel pylons
Reserve: 3 x 240 mm² Al-St 110kV on steel
pylons

Cooling Water

Number of pumps: 2
Type: OPV-110
Capacity: 11,500 – 19,800 m³/hr each
Pressure: 11.5-13 mVS
Revolutions: 500rpm

Forced Air System

600,000 m³/hr centrifugal VDH-32 B
ventilator
680,000 m³/hr centrifugal type DPD-28.5
gm
140,000 m³/hr gas recirculator type VGD
15.5 y
140,000 m³/hr air recirculator type VGD
15.5 y

ESM has identified four options for consideration in evaluating the potential upgrade of Negotino. These are:

Option 1 – 210 MWe plus plant capacity based on converting the existing plant to operate on:

- a. Coal
- b. Gas

A Feasibility Study is underway by CdF addressing this option. A mid term report was issued in August 2004. The final report was due in late 2004. This option is focusing on installing a fluidized bed boiler to burn coal. One coal supply option being considered is importation from Asia. One potential offtaker being considered is the French company "Societe Comercial de Metals at Minerals" (SCMM) who owns the FENI smelter in Kavadarci and the Jugohrom smelter in Tetovo.

Option 2: 210 MWe + (480 – 500) MWe plant capacity based on repowering the existing power plant (210 MWe) to operate on coal or gas and adding a new combined cycle power plant in two steps.

- a. 1st step adding a peaking combustion turbine (~150 MWe)
- b. 2nd step adding a second identical combustion turbine, a heat recovery steam generator, and a steam turbine.

Siemens of Germany has proposed that ESM consider for this option two V94.2 gas turbines combined with a steam cycle to yield a repowered plant with a capacity of 480 MWe for an estimated cost of \$190 million excluding infrastructure improvements.

Option 3: ~610 MWe plant capacity based on adding two combustion turbines (2 x ~200 MWe), a heat recovery steam generator, and using the existing steam turbine (210 MWe).

Option 4: 235 – 250 MWe plant capacity based on incorporating efficiency and turbine upgrades that have been achieved at other plants with the same turbine design.

For the purposes of the Feasibility Study it is assumed that a gas pipeline will exist connecting Skopje and Negotino. Russia has proposed to build this pipeline as part of its inter-country debt settlement procedures. ESM is optimistic that this line will be built. Obviously, if this line is not constructed



then the options for upgrade of Negotino are limited.



Project Cost

As no detailed cost breakdowns are available, the Project cost was estimated based on international experience. The costs were determined by multiplying indicative costs per kWe by the number of kilowatts added relevant to the Option considered. In the tables below CCGT indicates a combined cycle gas turbine and SCGT indicates a simple cycle gas turbine.

Typical Unit Costs \$/kWe	CCGT	SCGT
Engineering	82	56
Civil Works	82	70
Gas Turbine	106	106
Steam Turbine	68	
Balance of Plant	87	80
Electrical & Controls	60	60
Steam Generation	60	
Owners Costs	88	88
Financing & IDC	67	67
Total	700	527

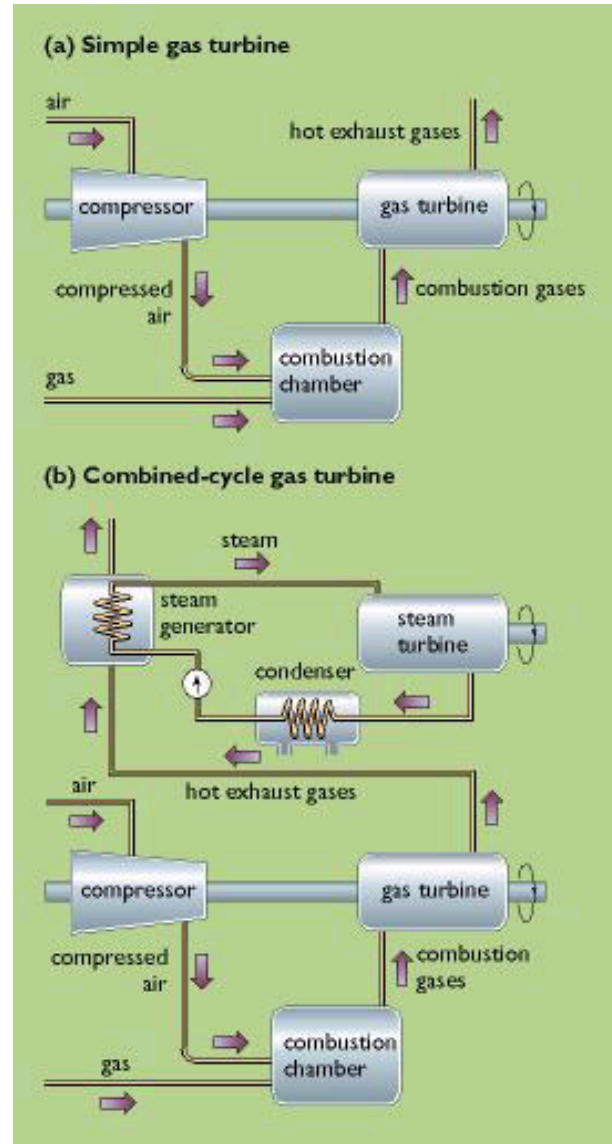


Illustration of Gas Turbine Types



Plant Cost by Option	CCGT*	2xSCGT &HRSG	Upgrade \$100/kW
	Option 2	Option 3	Option 4
Plant Capacity - MWe	480 (plus 210 existing)	610	250
Engineering	39	34	4
Civil Works	39	43	
Gas Turbine	51	65	
Steam Turbine	33		4
Balance of Plant	42	49	
Electrical & Controls	29	37	
Steam Generation	29	37	
Owners Costs	42	54	
Financing & IDC	32	41	
Total – \$ millions	336	358	8

** Additional project costs will be incurred based on the option chosen for repowering the existing plant.*

Project Structure

It is expected that ESM in its privatized form will own the plant. It is possible based upon restructuring and privatization decisions to be made by ESM and the government of Macedonia in the first quarter of 2005, that Negotino will remain in the hands of the government. If privatized, this project is expected to be balance sheet financed on a concession basis and may experience delays in financing due to the reluctance of offtakers to sign long term power purchase agreements.

Legal Regulatory Framework

Macedonia is harmonizing its tax and tariff system with the EU. Macedonia is adopting environmental laws, policies and directives of the EU as it strives to become a future full member of the EU.

The Government of Macedonia (GOM) has hired the Meinl Bank Consortium

(Meinl) to prepare Elektrostopanstvo Na Makedonija (ESM) restructuring and privatization. The restructuring plan proposed by the Meinl Bank Consortium (Meinl) has been adopted by the GOM.

According to Meinl, the restructuring of the electricity sector of the Republic of Macedonia and its eventual privatization is being prepared in an environment of an open Regional Electricity Market (REM), which is driven, by EU integration and the South East Europe Electricity Markets integration. The Government of Macedonia has defined the objectives of such restructuring and privatization process as:

- To protect the national interests;
- To be a strong player in the regional electricity market;
- To meet EU directives and Athens protocol;
- Enable the development of an open energy generation market;
- Implement the regulated electricity market; and
- Prepare the privatization of ESM.

Meinl is proposing that the unbundling of ESM follows the requirement of Athens Memorandum while optimizing the need to keep the company's economy of scale in order to face external competition of REM. The corporate restructuring of ESM will entail the separation from ESM into a new legal entity of the Transmission System Operator whose assets will include the current Dispatching Center of ESM with its logistic units, the high voltage grid transmission lines (at and above 110 KV) and 13 substations, plus one under construction (Skopje 5). This new legal entity will be spun out from ESM but will remain in state hands for the foreseeable future.



The remaining assets of ESM are planned to be unbundled from the generation assets and distribution assets. Currently the generation assets include three thermal power plants, seven main hydroelectric plants, and a set of eleven small hydroelectric plants of which seven are part of a rehabilitate-operate-transfer (ROT) agreement. The distribution assets include 28 distribution units throughout Macedonia.

The legal separation of the distribution assets within ESM into a new legal entity, the Distribution System Operator, whose assets will include all of the remaining 43 high voltage substations and the medium and low voltage grid transmission lines (at and below 110 KV) is also planned.

The site of Energetika, a brownfield site suitable to erect a combined cycle gas power plant, could be sold to a strategic investor in the power generation sector. This could create the first independent power producer in Macedonia and would open the electricity generation market.

Non-core assets of ESM may also be disposed of or liquidated. Portfolio participation in companies and banks may be sold or written off as well as the loans to companies via Balkanska and Stopanska Banks.

ESM will remain as the principal electricity company in Macedonia and will continue to own and operate its current generation and distribution assets for the foreseeable future. The proposed restructuring model is expected to enable ESM to develop in an open and competitive market environment. According to Meinl, the main rationale for this approach is:

- ESM's generation base (1,440MWe) is currently one of the smallest in the region;
- Over 75 % of its current base energy is generated by one power plant (Bitola);
- Hydroelectric power plants represent a very valuable asset whose role is crucial for balancing power;
- The foreseeable domestic growth in energy demand will be largely serviced by ESM and imports;
- There should a sufficient generation base to enable economies of scale and investment to maintain and renew the electricity production base of ESM;
- To secure sufficient cash flow and establish a capital base for financing of the refurbishment of the plants and re-powering the current asset base; and
- A strong relationship between the generation assets and the distribution company will be foster a reliable and continuous supply of electricity service in Macedonia.

After privatization, ESM will retain the right to upgrade or rebuild its power generation assets (mining development, emission upgrade, alternative fuel). However, the Government of Macedonia will retain the right, with the oversight of the newly created Energy Regulatory Commission, to tender any greenfield power generation asset.

A number of Energy Projects are currently underway or planned which must also be factored into the privatization process. These are summarized in the table below.



Energy Project Planned		
Project	Status	Cost
Matka 2 Hydro Plant – 36 MWe	Prequalification underway	\$58 million
Skopje CHP 190 MWe	Tender documents planned	\$180 million
400 kV line to Bulgaria	In Construction	\$65 million
Brod-Gneotino Coal Mine	Design underway	\$150 million
Boskov Most Hydro Plant – 70 MWe	Tender documents planned –BOT	\$90 million
Cebren Hydro Plant – 333 MWe	Tender documents planned – concession	\$415 million
40 small hydro – 80 MWe	Concession planned	\$80 million
Skopje to Negotino Gas Pipeline	Proposed under Russian debt settlement	\$25 million
400 kV Transmission Line to Greece	Tender documentation required	\$13 million
400 kV Transmission Line to Serbia	Feasibility Study Awarded	\$40 million

- Fuel Costs at \$0.034/kWh
- GHG credits at \$2.00 per tonne
- Electricity price of \$53/MWh
- Depreciation over 30 years
- Corporate tax rate of 22%

The energy prices to the end user in Macedonia is \$45/MWh based on wholesale prices to the grid are in the vicinity of \$24/MWh for a spread of \$21/MWh for transmission and distribution cost. As the electricity market reforms and subsidized electricity declines, the prices in Macedonia will tend to converge with regional countries with deregulated markets such as Turkey, Slovak Republic, and Hungary. The World Bank has compiled tariffs from these countries (shown below) which show end user rates averaging \$79/MWh. In addition, the planned reduction of nuclear power generation in Bulgaria due to the closure of Kozloduy 1 & 2 will also put upward pressure on market prices. Therefore, it is probable that tariffs in Macedonia will rise sufficiently to support the repowering of Negotino.

Economic Fundamentals

A detailed economic analysis is not currently available for the proposed Project. The Terms of Reference will require an analysis of the long-term power purchase agreements, the potential for long-term electricity sales cross-border to other countries in Southeast Europe, and sales of electricity within Macedonia.

Based upon experience, the economics of the project has been estimated below. The economics are based on the following assumptions:

- Equity – 30%
- Loan Interest Rate – 6%
- Loan Term – 15 years
- O&M costs at \$0.0032/kWh

2003 Power Tariffs	
Country	End User Price \$/MWh
Macedonia	45
Albania	42
Bulgaria	38
Croatia	71
Hungary	80
Romania	53
Slovak Republic	76
Turkey	82

Based on the analysis above, the deregulated market is expected support the generation cost of \$53/MWh used in this analysis and this project should be financially viable. Its net present value



Negotino Power Plant Repowering Feasibility Study

(NPV) is over 33% higher than the equity, the return on investment (IRR) is over 15%, and debt service coverage is low but adequate. The project has the ability to be enhanced through VAT recovery and other investment incentives.

Economic Analysis		
Guidance Parameters		
Revenue	1st Year	3rd Year
Electricity Sales	\$254,889,720	\$254,889,720
Heat Sales	\$ -	\$ -
GHG Credits	\$ 3,481,890	\$ 3,481,890
By-Product Sales	\$ -	\$ -
Total	\$258,371,610	\$258,371,610
Expenses		
O&M	\$ 15,389,568	\$ 15,389,568
Fuel	\$163,514,160	\$163,514,160
Depreciation	\$ 14,233,333	\$ 14,233,333
Interest	\$ 17,934,000	\$ 16,346,782
Total Expenses	\$211,071,061	\$209,483,843
Gross Income	\$ 47,300,548	\$ 48,887,766
Taxes	\$ 10,406,121	\$ 10,755,309
Net Income	\$ 36,894,428	\$ 38,132,458
Cash Flow	\$ 51,127,761	\$ 52,365,791
NPV - 10 Year	\$170,566,712	
Equity	\$128,100,000	
Grant	\$ -	
Debt	\$298,900,000	\$ 11,200,000
Debt Coverage	1.66	1.70
Free Cash Flow	\$ 20,352,191	\$ 21,590,221
IRR - 15 year	16%	

The need for additional power for Macedonia is significant in the future. The World Bank estimates that by 2008 the need for imported power will rise from 950 GWh in 2003 to 2,238 GWh. A repowered Negotino could meet this need. It is further forecast that, by 2013, over 8,000 GWh will need to be imported if no new capacity is added, representing a required new capacity of around 1,000 MWe.

C. Development Impact

This project will introduce state-of-the-art technology for efficient generation of electricity in a more environmentally friendly manner. The proposed project is expected to reduce the greenhouse gas emissions by replacing coal generated electricity with cleaner gas generated electricity and reduce the emissions of CO₂ arising from power generation. In addition, it will create approximately 2,000 jobs during construction and create 250 new job during operation as well as preserving 100+ jobs on an on-going basis (versus closure of the plant).

The proposed project is expected to:

- Reduce the greenhouse gas emissions from coal and oil fired generation of electricity;
- Introduce state-of-the-art technology into Macedonia that can serve as a model to facilitate development of the cleaner energy in Macedonia; and
- Create approximately 2,000 jobs during construction and 250 new jobs on an on-going basis.

Job Creation

Experience in the US indicated that job creation by energy development is 4 jobs/MWe during construction and 0.5 jobs/MWe during operation. There is no reason to expect that this job creation rate will be lower in Macedonia. On this basis, as noted above, up to 2,000 jobs could be created during construction and 250 jobs during operation.

Economic Impacts

One of the most important economic aspects of the Project is that it provides alternatives to creating economic value at the Negotino Plant that may prevent it



from being shutdown. Continued operation will preserve the local jobs and local economy revolving around the existing power plant.

D. Project Grantee’s Commitment

ESM is committed to this project. This project will enhance the potential for ESM to identify and realize the full potential economic value of the Negotino Power Plant. With restructuring and privatization underway combined with the emergence of an open electricity market in 2006, ESM is committed to become more competitive. ESM has initial feasibility studies underway on fuel switching at the plant exploring alternative technologies. The Grantee is willing to provide resources as described below to support completion of the Feasibility Study.

E. Implementation Financing

The Feasibility Study terms of reference requires the Contractor to analyze each aspect of the project, which will affect cash flows and expected financing. Implementation financing for this project entirely depends on whether the Negotino plant is retained as an asset of the GOM or its ownership is transferred to the privatized ESM. If the GOM continues to own Negotino and is willing to issue a sovereign guarantee to support bank loans for the importation of foreign equipment to upgrade the plant, the most likely source of the bulk of the implementation financing will be international bank loans covered by export credit agency (ECA) guarantees. It is likely that there would be intense competition among the various ECAs to offer the best terms (i.e., longest tenor, lowest all-in costs) to support exports from their respective countries. If

Negotino becomes an asset of the privatized ESM, lenders will review the requested financing based on ESM’s new balance sheet. They will want to analyze ESM’s long-term power purchase agreements, domestic and cross-border tariff structure and expected value of its greenhouse gas emissions credits. Lenders would analyze its expected future cash flows and overall debt service capacity. Since the final ownership decision for Negotino is not yet known, it will be part of the Terms of Reference that the Contractor will investigate all likely sources of implementation financing (equity, vendor financing, ECA, multilateral, bilateral, international and local bank loans).

USTDA Evaluation Factors

F. U.S. Export Potential

The potential for U.S. Exports is significant. For each Option the equipment and services available for export from the U.S. were identified from the cost tables in the “Project Cost” portion of Section C. Based on the capital cost of \$366 million, the opportunities for exports from the U.S. are expected to be \$229 million.

Export Potential by Option	CCGT*	2xSCGT &HRSG	Upgrade \$100/kW
	Option 2	Option 3	Option 4
Engineering	39	34	4
Gas Turbine	51	65	
Steam Turbine	33		4
Balance of Plant	42	49	
Electrical & Controls	29	37	
Steam Generation	29	37	
Total – \$ millions	222	221	8



** Additional export potential exists depending on option chosen for repowering the existing plant*

Selected potential U.S. vendors of the export equipment and services are identified below.

Principal U.S. Exporters	
Product/Service	Company
Engineering	Black & Veatch Bechtel Power Burns and Roe Fluor Corporation Parsons Power Shaw Group
Gas Turbine	General Electric Siemens Westinghouse
Steam Turbine	General Electric Siemens Westinghouse Elliott Turbomachinery
Balance of Plant	General Electric Siemens Westinghouse Black & Veatch Fluor Corporation Parsons Power Shaw Group
Electrical & Controls	General Electric Honeywell Emerson Process Management Invensys Foxboro ABB Power Plant Automation
Steam Generation	General Electric Siemens Westinghouse Nooter

G. Foreign Competition

U.S. equipment and service suppliers are expected to meet strong competition from global suppliers. Western European firms which specialize in turnkey power station projects will view this project as an attractive opportunity to extend their home markets. The Western European firms are eager to keep U.S. competition out of the region so competition will be intense. However, U.S. companies have demonstrated that they can compete cost-effectively on an international basis

and Macedonia should be no exception if they are provided with the opportunity to compete. Potential foreign competitors are numerous but a few major competitors include:

Potential Competition	
Company	Country
Siemens	Germany
Alstom	France
Kvaerner	UK
Hitachi	Japan
LMZ	Russia
Mitsubishi	Japan

H. Impact on the Environment

The proposed project is not expected to have any negative impact on the environment. It should have a positive impact by replacing some fossil fuel generated electricity with electricity generated through more efficient state-of-the-art gas technology. Therefore the emissions of NO_x, SO_x, and CO₂ will be reduced.

The Project should have the potential to create greenhouse gas credits. However, without identifying the energy source that will be displaced it is difficult to quantify this potential. If this project displaces nuclear generated power from Bulgaria then no credits will be derived. If it displaces coal generated power, then up to 1.7 million tonnes per year of CO₂ equivalent will be displaced (approximately 0.36 tonnes/MWh) through the reduction of CO₂ that is associated with coal generated electricity production. The potential value of these credits is \$2.00 or more per tonne per year or \$3.4 million per year. The Feasibility Study terms of reference requires an assessment of greenhouse gas credits that may be achievable



considering the regional electricity market.

I. Impact on U.S. Labor

Enviromation does not believe that this project will have any negative impact on the U.S. labor. The potential sale of equipment and services for this project is expected to have a positive impact on the U.S. equipment manufacturing and engineering sectors.

J. Justification

The proposed Project, if successfully implemented, could have a significant impact on the environmental conditions, local economy, and reduced greenhouse gas emissions. The Project is consistent with Macedonia's restructuring and privatization of the electricity sector. There remain uncertainties in ESM's ability to privatize the Negotino power plant due to its standby nature. The progress made toward privatization and the privatization scope decisions made by ESM affect the scope of the Feasibility Study. For these reasons a two phase Feasibility Study is recommended timed to be consistent with the privatization schedule.

The Feasibility Study could lead not only to the export of U.S. equipment and technical services but also the potential for US companies to participate in the privatization of ESM. To date ESM's focus has been on European companies. Without this Feasibility Study it is likely that European companies will maintain a preferred position. Funding of the Feasibility Study will facilitate the opportunity for U.S. technology to compete for this attractive project.

This Feasibility Study is further justified because:

- The technology risk involved is low as the proposed technology is operating in power plants around the world;
- This project is attractive as it potentially generates greenhouse gas emission credits that may have substantial economic benefit to ESM;
- These factors enhance the probability that a financially viable and commercially attractive project will result; and
- The Grantee is seeking the most economically and technically appropriate technology. Without this Feasibility Study it is likely that ESM will not realize full value for Negotino which U.S. technology could enhance.

K. Qualifications Required by the Feasibility Study Contractor

The Contractor carrying out this feasibility study shall demonstrate:

- a. Detailed experience in the technology, design, construction, and operation of power generation facilities;
- b. Experience in the economic and business factors associated with generating energy in a newly privatized market; and
- c. Proficiency in project and balance sheet finance in Southeast European countries and especially in Macedonia.

L. Terms of Reference and Budget

Aim of the Terms of Reference

The aim of the Terms of Reference are to develop a study that quantifies the feasibility of multiple proposed options for upgrade of Negotino in the current and anticipated economic and regulatory



environment taking into consideration ESM's planned privatization. This study may be used by the ESM privatization bidders for information on valuation options for the Negotino plant.

Outline of the Terms of Reference

The Feasibility Study activities are divided into 11 tasks broken into two phases:

Phase I

- Task 1 – Infrastructure Assessment
- Task 2 – Conceptual Design
- Task 3 – Power Demand
- Task 4 – Fuel Availability
- Task 5 – Environmental Assessment
- Task 6 – U.S. Sources of Supply
- Task 7 – Phase I Report

Phase II

- Task 8 – Electricity Market
- Task 9 – Financial Evaluation
- Task 10 – Development Impact
- Task 11 – Final Report

Phase I

Project Options

ESM has identified four options for consideration. Except for the comparisons required in Task 7, the Contractor shall address in detail only Options 2, 3, and 4 (referred to as the Project Options) in this Feasibility Study.

Option 1 – 210 MWe plus plant capacity based on converting the existing plant to operate on:

- c. Coal
- d. Gas

A Feasibility Study is underway by CdF addressing this option. A mid term report was issued in August 2004. The final report was due late 2004.

This Option is NOT to be addressed in detail by this Feasibility Study. Only the results from the CdF study are to be used for data required to complete the Option comparisons in Task 7.

Option 2: 210 MWe + (480 – 500) MWe plant capacity based on repowering the existing power plant (210 MWe) to operate on coal or gas and adding a new combined cycle power plant in two steps.

- a. 1st step adding a peaking combustion turbine (~150 MWe)
- b. 2nd step adding a second identical combustion turbine, a heat recovery steam generator, and a steam turbine.

Option 3: ~610 MWe plant capacity based on adding two combustion turbines (2 x ~200 MWe), a heat recovery steam generator, and using the existing steam turbine (210 MWe).

Option 4: 235 – 250 MWe plant capacity based on incorporating efficiency and turbine upgrades that have been achieved at other plants with the same turbine design.

Terms of Reference

Task 1 – Assessment of Infrastructure Impact

The Contractor will survey and evaluate the present equipment at the plant site and assess the possible use of the existing site infrastructure and equipment detailing which systems and equipment for each Project Option:

- Can be utilized as is;
- Requires upgrade; and
- Requires replacement.



In addition, the Contractor shall evaluate the cooling system requirements and solutions, factoring in the existing plant equipment for each Project Option. *[This option is only included for purposes of completeness for comparisons in Task 7 of the Terms of Reference (TOR). Any data required by the TOR should be extracted from the CdF study.]*

Task 2 - Plant Conceptual Design and Cost Estimate

The Contractor will meet with ESM and establish the exact plant capacity configurations to be studied in each Project Option. The Contractor, based on the agreement with ESM, will perform conceptual design, develop preliminary cost estimates (+/- 20%), and develop a high level construction schedule for each Project Option including:

- Preliminary drawings for:
 - Plot plan;
 - General arrangement;
 - Electrical and process one line drawings;
 - Outline specifications;
 - Master major equipment list;
 - Utility requirements; and
 - Facility building descriptions.
- Capital cost estimates for:
 - Gas pipeline and reduction station from plant perimeter to point of use in the plant;
 - Power generation equipment and auxiliaries;
 - Commissioning, startup, and spares;
 - Emission control equipment;
 - Cooling water;
 - Building structure;
 - Control room; and
 - Interconnects, transformers and switchgear.

- Indirect cost estimates for:
 - Owner's costs;
 - Permitting fees;
 - Financing costs and interest during construction;
 - Legal fees;
 - Real estate and easement costs, if any;
 - Applicable VAT and duties;
 - Inspection; and
 - Insurance.
- Operating cost estimates for:
 - Operations and maintenance;
 - Fuel;
 - Administrative;
 - Depreciation and amortization;
 - Interest; and
 - Taxes and fees.
- Construction Schedule of at least two levels in the work breakdown structure.

Task 3 - Assessment of Power Demand

The Contractor will for each Project Option:

- Determine planned offtakers;
- Assess impact of congestion, if any, on the ability to supply power to the offtakers;
- Determine, with the assistance of ESM, the estimated power demand by the offtakers projected over at least 10 years;
- Based upon an assumed investment structure establish the optimum economic utilization, factoring in the timing of system demand. Review the results with ESM and revise the size of the plant options, if appropriate, to reflect the economic optimum size; and
- Estimate annual generation and generation cost including capital recovery per kWh.



Task 4 - Fuel Availability Analysis

The Contractor will for each Project Option, based on the expected power generation, estimate the fuel demand and delivery cost of the fuel stream(s) to the Project site. The Contractor is to assume that a gas pipeline will be built from Skopje to Negotino in time for the Project. The Government of Russia has formally proposed that this pipeline be constructed by them at their cost to partially settle open claims resulting from the dissolution of the Soviet Union. This proposal is under active consideration by the Government of Macedonia at present. *[The CdF Study and a planned World Bank study may provide data that can be utilized by the Contractor to minimize effort, if applicable.]*

Task 5 - Environmental Assessment

The Contractor will complete an overview environmental assessment consistent with EU and Macedonian standards as well as those of financing institutions such as World Bank or EBRD. In addition the Contractor will identify mitigation measures and associated costs (within +/- 20%) required, if any, to meet the applicable guidelines and regulations.

Task 6 – U.S. Sources of Supply

The Contractor shall identify potential sources of equipment and services that can be procured competitively from U.S. vendors for the Project Options.

Task 7 - Phase I Final Report

The Contractor shall compare all of the Project Options including Option 1 from the viewpoints of technical feasibility, capacity, limitations, capital cost, operating cost, construction schedule, generation, and dispatch. Project Options to be included as a minimum are:

1. Current plant as is;
2. Current plant converted to gas [Based on CdF Study];
3. Current plant converted to coal [Based on CdF Study];
4. Option 2a;
5. Option 2b;
6. Option 3; and
7. Option 4.

The Contractor will prepare a report for the Feasibility Study in accordance with USTDA content and format requirements. The report must include a comprehensive description of the Project and the results of the individual tasks of the study. In addition to other requirements, the report will detail the Project Option comparisons in a manner that can be readily used by potential privatization investors.

The Contractor will review the status of privatization with ESM and revise the Phase II terms of reference and budget as appropriate if Phase II is recommended to be implemented. The revised terms of reference for phase II and budget shall be included in the report. This report shall be reviewed and approved by ESM.

Phase II

If Phase II is still appropriate considering the status of the privatization schedule, the following terms of reference are recommended. Considerations on appropriateness include:

- Conclusions from Phase I;
- Delays in the privatization process; and
- Negotino remaining as a standalone asset owned by the Government of Macedonia or privatized as a standalone asset



with ESM (the Grantee) holding a significant share.
If a new (non-ESM) owner is involved, then the appropriateness of Phase II would be a matter of agreement between the new owner and USTDA.

Task 8 - Electricity Market

Assuming that the Negotino plant will not be privatized or will be privatized as a standalone asset, the Contractor will:

- Assess the regional electricity market and establish forecast prices for at least ten years;
- Establish the projected offtake from the Negotino and identify potential offtakers and their associated demand; and
- Based upon the market information in consultation with ESM select the economically optimum Project Option.

Task 9 - Financial Evaluation

There are three possible ownership options for the Negotino plant in the next few years, 1) continued government ownership by GOM, 2) transfer of plant to the privatized ESM which owns the generating and distribution assets in Macedonia, or 3) sale of Negotino to private investors as a standalone independent private power project.

For the economically optimum Project Option selected in Task 8, if the GOM continues to own Negotino, the Contractor will:

- Investigate the GOM's willingness to extend a sovereign guarantee to lenders which could finance the necessary equipment and services for the project,
- Contact local and international long-term debt financing sources to discuss their requirements for, and interest in, the project.

Sources to contact include the U.S. Export-Import Bank, other export credit and development agencies, and international and local commercial banks.

If Negotino is privatized as a standalone asset when Phase II commences (assuming that it has been concluded that Phase II should be undertaken by USTDA and the Negotino owner), then the Contractor will:

- Collect available financial data on the proposed offtaker(s), whether they are the GOM or domestic or international private sector electricity buyers.
- Analyze the offtakers' financial creditworthiness from the viewpoint of international lenders. Determine how the offtaker plans to commit to a long-term power purchase agreement.
- Discuss current payment collection processes by the offtaker. Include information on the proposed distribution network and the creditworthiness of the users in this network.
- Develop a proforma analysis of the Project based upon the information developed in previous tasks. The proforma will include all equity and debt assumptions, revenue expectation, operating costs, capital costs, interest, interest during construction, depreciation, financing costs and payments, taxes and all other costs or credits that impact the Project. Develop pro forma financial statements for the project, including pro forma balance sheet and income statements and



Negotino Power Plant Repowering Feasibility Study

- proposed return on investment calculations for equity investors.
- Perform sensitivity analyses on revenue, capital cost overruns, operating cost, and fuel costs.
 - Perform a risk analysis and identify mitigation steps that can be taken.
 - Contact local and international long-term debt financing sources to discuss their requirements for, and interest in, the project. Sources to contact include the U.S. Export-Import Bank, the Overseas Private Investment Corporation, the International Finance Corporation (IFC), the European Bank for Reconstruction and Development, the European Investment Bank, other export credit and development agencies, and international and local commercial banks.
 - Obtain indicative term sheets from potential lenders, and include in the final feasibility study.
 - Develop a financing plan taking into account the comments and requirements of the above-mentioned institutions. The financing plan should include indicative capital structure, covenants and terms and conditions for borrowings. It should address interest rate hedging, import duties, stamp taxes and foreign exchange availability.

Task 10 – Development Impact

The Contractor will address the additionalities associated with the project. These additionalities include:

- a. An estimate of the Project’s potential benefits in the following areas:

- Prepare a statement on the infrastructure impact giving a brief synopsis.
 - Describe any regulations, laws or institutional changes that are recommended and the effect they would have if implemented.
 - Address the number and type of positions that would be needed to construct and operate the proposed Project as well as the number of people who will receive training.
 - Describe any advanced technologies that will be implemented as a result of the Project.
 - Identify any other development benefits to the Project including any spin-off or demonstration effects.
- b. Prepare a statement on the impact on US labor in accordance with USTDA guidelines; and
 - c. Assess the potential for greenhouse gas emission credits and their impact on the financial viability of the Project.

Task 11 - Final Report

The Contractor will prepare a Final Report in accordance with USTDA content and format requirements including a comprehensive description of the Project and the results of the individual tasks of the study. The report will detail the financing strategy and a course of action for Project implementation.

Deliverables

The Contractor shall provide the following deliverables:

- Phase I Report;
- Preliminary Information Memorandum; and
- Final Report;



Tasks to be Performed by Grantee

ESM will provide the following services:

- Set up and coordination of any meeting required with ESM or other partners;
- Set and coordination of meetings with governmental ministries and representatives;
- Provision of work space for the Feasibility Study team when on site;
- Translation of Russian or Macedonian documents as required into English;
- Access to all prior related Feasibility Studies including that of CdF;
- Access to all available plant documentation, drawings, diagrams, and specifications;
- An assigned project manager;
- Technical assistance at Negotino to answer questions or provide information;
- Existing site Geotechnical reports; and
- Translation of Reports prepared by the Contractor in English into Macedonian if required.

Note: The Contractor will be responsible to supply a translator(s) for meetings and miscellaneous translation of documents.

Period of Performance

The Period of Performance for performing Phase I of this Feasibility Study is four to six months from coming into force of a contract between the Feasibility Study Contractor and ESM but must be completed no later than August 31, 2005. The duration of Phase II is estimated as five months.

Budget

The total cost for conducting Phase I and II of the proposed Feasibility Study, in accordance with the Terms of Reference presented herein is estimated to be \$732,000. The budget proposed reflects the costs associated with meeting an expedited schedule by working multiple tasks in parallel and the added staff so required. Phase I cost is estimated as \$490,000 and Phase II cost is estimated at \$242,000.

M. Recommendations

Enviromation recommends that USTDA support this Feasibility Study by providing a grant of \$490,000 to ESM to execute Phase I of the Feasibility Study. Should Phase I show that project implementation is probable and further work is consistent with the timing and needs of the privatization program of ESM, then funding of Phase II of \$242,000 is recommended. USTDA support for this Feasibility Study is recommended for the following reasons:

- The positive impact on the environmental conditions, local economy, and greenhouse gas emissions;
- The proven technology employed;
- The project enhances the potential value of Negotino in the privatization process of ESM; and
- If Project Option 1 is chosen by ESM for implementation, the Feasibility Study will have made available the data to ESM to make a considered judgment on the most appropriate option. By the commitments undertaken by ESM, US companies will be eligible to compete for products and services under this option. There is no obligation on the part



Negotino Power Plant Repowering Feasibility Study

of ESM if USTDA does not provide funding for this Feasibility Study. In this manner the Feasibility Study fosters the export of US equipment and services providing an opportunity to US companies that may not normally exist both in implementing the project and gaining visibility for US companies to participate in the privatization of ESM.

Enviromation further recommends that USTDA evaluate whether there is sufficient time to execute the Feasibility Study at the time that the Grant award is considered. The timing of the necessary steps of awarding the Feasibility Study to a Contractor may make it unlikely that the August 31, 2005 completion date can be met. In that case, it is recommended that the Feasibility Study not be approved as it will be too late in the privatization process to justify.

Other considerations that USTDA should take into account are:

- The uncertainty concerning the ownership and privatization of Negotino; and
- The likelihood that US companies will participate in the privatization of Negotino.



Definitional Mission Report – Macedonia
Negotino Power Plant Repowering Feasibility Study

Budget Details



Definitional Mission Report – Macedonia

Negotino Power Plant Repowering Feasibility Study

Phase 1

TASK DESCRIPTIONS		LABOR IN PERSON DAYS								LABOR RECAP BY TASK		TRIP RECAP BY TASK			
		Project Manager	Senior Engineer	Enviro Engineer	Engineer	Cost Estimator	Support					TOTAL TRIPS	TRIP DAYS	TRIP COST	
TASK	TASK NAME										DAYS	COST			
1	Infrastructure Assessment	10.0	10.0	5.0	20.0	20.0	5.0				70.0	\$58,380	3	20	\$9,320
2	Conceptual Design	20.0	30.0	5.0	60.0	60.0	30.0				205.0	\$154,580	4	25	\$11,950
3	Power Demand	5.0	5.0								15.0	\$15,960			
4	Fuel Availability	2.5	5.0								12.5	\$12,540			
5	Environmental Assessment	5.0	5.0	30.0	10.0		10.0				60.0	\$51,020	3	25	\$10,750
6	US Sources of Supply	2.5	2.5				2.5				10.0	\$8,480			
7	Phase I Report	10.0	10.0	5.0	50.0	10.0	25.0				110.0	\$76,060	2	10	\$5,260
LABOR IN PERSON DAYS		55.0	67.5	45.0	152.5	90.0	72.5	0.0	0.0	0.0	482.5				
											Total Labor Cost	\$377,020			
											Total Trips and Days		12	80	
											Total Trip costs				\$37,280

LABOR INCLUDING OVERHEAD & GENERAL ADMINISTRATIVE

Daily Rate	\$1,368	\$1,140	\$988	\$684	\$684	\$200										TOTAL LABOR COST
TOTAL LABOR	\$75,240	\$76,950	\$44,460	\$104,310	\$61,560	\$14,500										\$377,020

OTHER DIRECT COSTS (ODCs)

Outside Consultants				
Labor Categories:	Average Fully Loaded Daily Rate	Person Days	Cost Extension	Totals
US Nationals				
Subtotal Labor				
Labor Categories:	Average Fully Loaded Daily Rate	Person Days	Cost Extension	Totals
Host Country Nationals				
Translator	\$200	100	\$20,000	
Technical Support	\$200	220	\$44,000	
Subtotal Labor				
Other Direct Costs				
Ground Travel	80 days @\$100/day		\$8,000	
Per Diem				
Admin Costs/Printing/Fax/Phone			\$12,000	
Data Fees				
Subtotal Other Direct Costs				\$20,000
TOTAL OUTSIDE CONSULTANTS:				\$84,000

	Number	Unit	Cost /Unit	Totals
Total Outside Consultants				\$44,000
Air Fare	12	R/T	\$1,200	\$14,400
Per Diem Transit		Pers-Days		
Per Diem Location	80	Pers-Days	\$186	\$14,880
Local Travel & Interpreter				\$28,000
Taxi To & From Airport		R/T		
Admin Costs/Printing/Fax/Phone				\$12,000
TOTAL ODC's				\$113,280

TOTAL PROJECT COST \$490,300



Definitional Mission Report – Macedonia

Negotino Power Plant Repowering Feasibility Study

Phase 2

TASK DESCRIPTIONS		LABOR IN PERSON DAYS										LABOR RECAP BY TASK		TRIP RECAP BY TASK		
		Project Manager	Senior Engineer	Comm. Specialist	Financial Specialist	Engineer	Support						TOTAL DAYS	LABOR COST	TRIPS	TRIP DAYS
1	Electricity Market	5.0	5.0	20.0	5.0	5.0						40.0	\$39,900	2	10	\$5,260
2	Financial Evaluation	5.0	10.0	10.0	40.0	10.0	10.0					85.0	\$84,360	3	15	\$7,890
3	Development Impact	5.0	5.0	5.0		5.0						20.0	\$19,380			
4	Final Report	5.0	5.0	5.0	20.0	10.0	10.0					55.0	\$50,920	1	5	\$2,630
												0.0				
												0.0				
												0.0				
												0.0				
												0.0				
												0.0				
												0.0				
												0.0				
												0.0				
												0.0				
LABOR IN PERSON DAYS		20.0	25.0	40.0	65.0	20.0	30.0	0.0	0.0	0.0	0.0	200.0				
												Total Labor Cost	\$194,560			
												Total Trips and Days		6	30	
												Total Trip costs				\$15,780

LABOR INCLUDING OVERHEAD & GENERAL ADMINISTRATIVE

Daily Rate	\$1,368	\$1,140	\$988	\$1,140	\$684	\$380															TOTAL LABOR COST
TOTAL LABOR	\$27,360	\$28,500	\$39,520	\$74,100	\$13,680	\$11,400															\$194,560

OTHER DIRECT COSTS (ODCs)

Outside Consultants				
Labor Categories:	Average Fully Loaded Daily Rate	Person Days	Cost Extension	Totals
US Nationals				
Subtotal Labor				
Labor Categories:	Average Fully Loaded Daily Rate	Person Days	Cost Extension	Totals
Host Country Nationals				
Technical Support	\$200	65	\$13,000	
Translators	\$200	65	\$13,000	
Subtotal Labor				\$26,000
Other Direct Costs				
Ground Travel	30 days @\$100/day		\$3,000	
Per Diem				
Admin Costs/Printing/Fax/Phone			\$6,000	
Data Fees				
Subtotal Other Direct Costs				\$9,000
TOTAL OUTSIDE CONSULTANTS:				\$35,000

	Number	Unit	Cost /Unit	Totals
Total Outside Consultants				\$13,000
Air Fare	6	R/T	\$1,200	\$7,200
Per Diem Transit		Pers-Days		
Per Diem Location	30	Pers-Days	\$186	\$5,580
Local Travel & Interpreter				\$16,000
Taxi To & From Airport		R/T		
Admin Costs/Printing/Fax/Phone				\$6,000
TOTAL ODC's				\$47,780

TOTAL PROJECT COST	\$242,340
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Definitional Mission Report – Macedonia
Negotino Power Plant Repowering Feasibility Study

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Section III

FINAL REPORT

**DEFINITIONAL MISSION FOR
ESM EU ENVIRONMENTAL COMPLIANCE STRATEGY
TECHNICAL ASSISTANCE IN MACEDONIA**

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FINAL REPORT

DEFINITIONAL MISSION FOR ESM EU ENVIRONMENTAL COMPLIANCE STRATEGY TECHNICAL ASSISTANCE IN MACEDONIA TDA-04-Q-7-235

March, 2005

Prepared by:

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The U.S. Trade and Development Agency

The U.S. Trade and Development Agency (USTDA) advances economic development and U.S. commercial interests in developing and middle income countries. The agency funds various forms of technical assistance, feasibility studies, training, orientation visits and business workshops that support the development of a modern infrastructure and a fair and open trading environment

USTDA's strategic use of foreign assistance funds to support sound investment policy and decision-making in host countries creates an enabling environment for trade, investment and sustainable economic development. Operating at the nexus of foreign policy and commerce, USTDA is uniquely positioned to work with U.S. firms and host countries in achieving the agency's trade and development goals. In carrying out its mission, USTDA gives emphasis to economic sectors that may benefit for U.S. exports of goods and services.



Table of Contents

	Page
A. Executive Summary	3
Project Location	3
Introduction	3
About The Grantee	3
Project Background	3
Project Structure	3
Legal Regulatory Framework	4
Economic Fundamentals	4
Development Impact	4
Project Grantee’s Commitment	4
Implementation Financing	5
USTDA Evaluation Factors	5
U.S. Export Potential	5
Foreign Competition	5
Impact on the Environment	5
Impact on U.S. Labor	5
Justification	5
Qualifications Required by the Technical Assistance Contractor	6
Aim of the Terms of Reference	6
Outline of the Terms of Reference	6
Period of Performance	6
Budget	6
Recommendations	6
B. Project Description	8
C. Development Impact	14
D. Grantee’s Commitment	14
E. Implementation Financing	15
USTDA Evaluation Factors	16
F. U.S. Export Potential	16
G. Foreign Competition	17
H. Impact on the Environment	17
I. Impact on U.S. Labor	17
J. Justification	18
K. Qualifications Required by the Technical Assistance Contractor	18
L. Terms of Reference and Budget	18
M. Recommendations	22
Budget Details	23
N. Contacts	25



***ESM EU Environmental Compliance Strategy
Technical Assistance***

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**ESM EU Environmental Compliance Strategy
Technical Assistance**

A. Executive Summary

Project Summary	
Host Country	Macedonia
Project Name	ESM EU Environmental Compliance Strategy
Sector	Energy
Region	Central Europe
Location	Macedonia
Capital Required	\$80 - 240 million
Export Potential	\$56 – 150 million
Project Grantee	A. D. Elektrostopanstvo NA Makedonija Trajce Cerepnalkovski Assistant General Manager & Head of Development and Investments Department Str. 11 Oktomvri 9 1000 Skopje Republic of Macedonia Tel: +389-2-3119-611 Fax: +389-2-3111-160 Email: trajce@esmak.com.mk

Introduction

A. D. Elektrostopanstvo NA Makedonija (ESM) has requested a grant from the United States Trade and Development Agency to provide Technical Assistance to develop a strategy to comply with EU environmental regulations.

About The Grantee

ESM is the state owned power generation company. ESM, the Electric Power Company of Macedonia, is responsible for all power generation, transmission, and distribution in Macedonia. In 2002, ESM generated 5,618.7 GWh, of electricity, which fell short of the total demand of 6,646.6 GWh. The remaining 1,027.9 GWh were imported to cover the demand. ESM currently has transmission lines connecting it to Greece, Serbia and Montenegro, and Bulgaria and will be constructing others to export and import electricity.

Project Background

The proposed Project for USTDA funding will develop technical and capital expenditure plans and an overall strategy to make ESM’s 21 generating and 187 transmission and non-generating facilities comply with EU environmental standards by 2019. The plans will result in meeting EU standards for emissions, ash disposal, wastewater treatment and other pollution problems within 10 to 15 years if fully implemented.

Project Structure

It is expected that ESM in its privatized form will finance the required capital expenditures through borrowings, retained earnings and aid financing.



Project Location

The project is in various cities in Macedonia where ESM has facilities.



**ESM EU Environmental Compliance Strategy
Technical Assistance**

Legal Regulatory Framework

Macedonia is harmonizing its tax and tariff system with the EU. Macedonia is adopting environmental laws, policies and directives of the EU as it strives to become a future full member of the EU. It applied for EU membership on March 24, 2004. As part of this, ESM has committed to achieve compliance with EU environmental regulations within 10 to 15 years. These obligations will be placed on investors in the upcoming privatization of ESM.

After experiencing several delays due to difficulties in Parliament enacting the necessary legislation for the restructuring to proceed, the Government of Macedonia (GOM) is proceeding with the restructuring of ESM. The GOM has broken ESM into two separate entities.

- The government will retain the transmission assets of ESM and will therefore, be in charge of the transmission company.
- The generation and distribution assets will remain as one company.

Meinl Bank Consortium (Meinl) of Austria will manage the actual tender process for the privatization, but according the GOM there are several other steps that must be completed before it can proceed with the privatization.

Economic Fundamentals

The Terms of Reference for the proposed Technical assistance will require an analysis of the long-term economics of the required environmental improvements in the context of the potential for long-term electricity sales cross-border to other countries in

Southeast Europe and sales of electricity within Macedonia.

Development Impact

This Technical Assistance (TA) will introduce state-of-the-art environmental technology related to the generation of electricity. The proposed TA is expected to help ESM implement a strategy to reduce the greenhouse gas emissions from coal generated electricity through emission clean-up systems. In summary, the proposed project is expected to:

- Reduce the greenhouse gas emissions from coal-fired generation of electricity;
- Introduce state-of-the-art emissions control technology into Macedonia that can serve as a model to facilitate development of cleaner energy in Macedonia; and
- Create new jobs during construction and on an on-going basis.

Project Grantee's Commitment

ESM is committed to this project. With restructuring and privatization underway combined with the emergence of an open electricity market in 2007, ESM is committed to become more competitive. To achieve this goal, it must generate electricity in compliance with EU environmental directives to avoid penalties and forced shutdowns.

ESM must comply with EU environmental requirements within 10-15 years according to an agreement made with the South East Regional Electricity Market (SEEREM) in Athens in October 2004. Whether ESM is privatized or continues to be owned by the government, all of its facilities must either meet EU environmental standards by the



*ESM EU Environmental Compliance Strategy
Technical Assistance*

deadline or they will incur penalties or be forced to close.

Implementation Financing

Of the roughly estimated \$80 to \$240 million required to bring existing facilities in line with EU standards, ESM will need to prioritize and rationalize its capital expenditure plan. ESM needs assistance in developing its capital expenditure plan and preparing financing requests to lenders. Since the final ownership and ongoing operating control decisions for various facilities are not yet known, it will be part of the Terms of Reference that the Contractor investigate all likely sources of implementation financing (retained earnings, aid financing, equity, vendor financing, ECA, multilateral, bilateral, international and local bank loans).

USTDA Evaluation Factors

U.S. Export Potential

The potential for U.S. exports is significant. Assuming that up to 70% of flue gas desulfurization (FGD), wastewater treatment, or ash and mine tailing treatment systems can be imported, it is estimated that \$56 to \$150 million or more of equipment and services are available for export from the U.S.

Foreign Competition

U.S. equipment and service suppliers are expected to meet strong competition from global suppliers. Western European firms, which specialize in turnkey power station and environmental projects, will view this project as an attractive opportunity to extend their home markets. The Western European firms are eager to keep U.S. competition out of the region so competition will be intense. However, U.S. companies have demonstrated that they can compete cost

effectively on emission control projects on an international basis.

Impact on the Environment

The proposed project is not expected to have a negative impact on the environment. It should have a positive impact by reducing emissions from fossil fuel generated electricity through efficient state-of-the-art gas emissions cleanup technology. Therefore the emissions of NO_x, SO_x, and CO₂ will be reduced.

Impact on U.S. Labor

Enviromation does not believe that this project will have any negative impact on U.S. labor. The potential sale of equipment and services for this project is expected to have a positive impact on U.S. equipment manufacturing and engineering sectors.

Justification

This project is justified because:

- It will aid the privatization through increasing ESM's ability to successfully privatize by defining its environmental exposure and potential solutions;
- The technology risk involved is low as the proposed technology is operating in power plants around the world;
- This project is attractive as it potentially generates greenhouse gas emission credits that may have substantial economic benefit to ESM;
- These factors enhance the probability that a financially viable and commercially attractive project will result; and
- The Grantee is seeking the most economically and technically appropriate technology. Without



**ESM EU Environmental Compliance Strategy
Technical Assistance**

this Technical Assistance it is likely that ESM will rely solely on European technology.

Qualifications Required by the Technical Assistance Contractor

The Contractor carrying out this Technical Assistance shall demonstrate:

- a. Comprehensive knowledge of EU environmental directives that pertain to the electricity sector;
- b. Detailed experience in the technology, design, construction, and operation of power generation emission control and environmental management facilities;
- c. Experience in the economic and business factors associated with energy related environmental management projects in a newly privatized market; and
- d. Proficiency in finance in Southeast European countries and especially in Macedonia.

Aim of the Terms of Reference

The aims of the Terms of Reference are to develop a strategy that quantifies the cost, return on investment, and timing for the most economic option(s) from multiple potential options for environmental upgrading of ESM facilities. This TA will assist Meintl and ESM in evaluating the assets of ESM and achieve maximum value in the privatization. ESM must meet EU environmental directives in the current and anticipated economic and regulatory environment taking into consideration its planned privatization. This strategy may be used by the ESM privatization bidders for information on valuation of ESM and for future obligations.

Outline of the Terms of Reference

The Technical Assistance activities are divided into 10 tasks:

- Task 1 – Facility Inventory
- Task 2 – EU Directives
- Task 3 – Environmental Assessments
- Task 4 – Technology Options
- Task 5 – Financing Options
- Task 6 – Strategy Development
- Task 7 – Financial Impact
- Task 8 – U.S. Sources of Supply
- Task 9 – Development Impact
- Task 10 – Final Report

Period of Performance

The Period of Performance for performing this Technical Assistance is six months and should be completed no later than December 31, 2005. The project must be completed in time for ESM to advise the successful privatization bidder of its long-term environmental compliance exposure and plans.

Budget

The total cost to perform the proposed Technical Assistance is estimated to be \$417,000.

Recommendations

USTDA support for this Technical Assistance is recommended for the following reasons:

- The positive impact on the environmental conditions, local economy, and greenhouse gas emissions;
- The proven technology employed;
- The project clarifies the economic risk associated with environmental compliance obligations for U.S. and other



*ESM EU Environmental Compliance Strategy
Technical Assistance*

- bidders associated with the ESM privatization process; and
- The TA fosters the export of U.S. equipment and services providing an opportunity to U.S. companies that may not normally exist both in implementing the TA and gaining visibility for U.S. companies to participate in the privatization of ESM.

Enviromation further recommends that USTDA evaluate whether there is sufficient time to execute the Feasibility Study at the time that the Grant award is considered. The timing of the necessary steps of awarding the Technical Assistance to a Contractor may make it unlikely that the December 31, 2005 completion date can be met. In that case, it is recommended that the Technical Assistance not be approved as it will be too late in the privatization process to justify.

Other considerations that USTDA should take into account are:

- The uncertainty concerning the ownership and privatization of ESM; and
- The likelihood that US companies will participate in the privatization of ESM.



**ESM EU Environmental Compliance Strategy
Technical Assistance**

B. Project Description

Project Summary	
Host Country	Macedonia
Project Name	ESM EU Environmental Compliance Strategy
Sector	Energy
Region	Central Europe
Location	Macedonia
Capital Required	\$80 - 240 million
Export Potential	\$56 – 150 million
Project Grantee	A. D. Elektrostopanstvo NA Makedonija Trajce Cerepnalkovski Assistant General Manager & Head of Development and Investments Department Str. 11 Oktomvri 9 1000 Skopje Republic of Macedonia Tel: +389-2-3119-611 Fax: +389-2-3111-160 Email: trajce@esmak.com.mk

Introduction

A. D. Elektrostopanstvo NA Makedonija (ESM) has requested a grant from the United States Trade and Development Agency to provide Technical Assistance to develop a strategy to comply with EU environmental regulations.

About The Grantee

ESM is currently the state owned power generation company. ESM, the Electric Power Company of Macedonia, is responsible for all power generation, transmission, and distribution in Macedonia. ESM has three thermal power stations with a combined capacity of 1,010 MW and are powered by lignite and oil:

- Bitola - a 675 MWe plant that supplies approximately 70 percent of Macedonia's electricity and is in good condition;
- Negotino - a 210 MWe plant; and
- Oslomej - a 125 MWe plant.



Project Location

The TA is in various cities in Macedonia where ESM has facilities.

ESM also maintains and operates 14 hydropower stations; the four largest hydropower plants supply approximately 400 MWe of electricity and the 10 small plants supply approximately 36 MWe. In 2002, ESM generated 5,618.7 GWh, of electricity, which fell short of the total demand of 6,646.6 GWh. The remaining 1,027.9 GWh were imported to cover the demand. ESM currently has transmission lines connecting it to Greece, Serbia and Montenegro, and Bulgaria and will be constructing others to export and import electricity.

In early 2001, the Government of Macedonia (GOM) hired under the terms of an EBRD loan a consultant to coordinate the privatization of ESM, by designing a new company structure



ESM EU Environmental Compliance Strategy
Technical Assistance

model and a detailed restructuring plan. The GOM signed an agreement with an Austrian private investment and merchant bank, Meintl Bank Consortium (Meintl), to manage the restructuring and privatization of ESM. Meintl conducted the initial review of ESM in the spring of 2002.

After experiencing several delays due to difficulties in Parliament in enacting the necessary legislation for the restructuring to proceed, the GOM is proceeding with the restructuring of ESM. The GOM has broken ESM into two separate entities.

- The government will retain the transmission assets of ESM and will therefore, be in charge of the transmission company.
- The generation and distribution assets will remain as one company.

Meintl will manage the actual tender process for the privatization in accordance with EBRD and international tendering rules, but according the GOM there are several other steps that must be completed before it can proceed with the privatization.

As of January 1, 2005 a new government owned transmission company, *MEPSO*, will be in operation. ESM will then consist of the distribution and generation assets as well as some non-core investments. The “new” ESM will be a holding company composed of three legally separate divisions:

1. Generation: includes three thermal power plants, two coal mines, seven hydroelectric plants, and new hydroelectric plants going out for bid (Boskov Most, Matka II, etc.)

2. Distribution: includes all distribution assets and five hydroelectric plants.
3. Non-Core Assets such as hotels, investments, and financial instruments.

The expected timetable for restructuring and privatization is as follows:

- 2003 - Legislation has been passed to separate transmission from generation and distribution (June 2003, Law for restructuring and privatization of “Elektrostopanstvo na Makedonija” (Official Gazette, 19/2004),)
- 2004 – Decide market model, participants, tariff methodology and implementation by end of year (Implemented December 31, 2004)
- 2005 – January: MEPSO begins operation. (Began operation January 1, 2005)
- 2005 – 1st quarter date unspecified: decide what assets will be privatized and in what packages.
- 2005 - Mid-year: New Energy Law approved. (This represents a key milestone in the privatization schedule and results.)
- 2005 – Mid year: Issue tenders
- 2005 – Year end: Select winner(s).
- 2006 – Begin operation as a privatized company(s).
- 2007 – Any industrial or commercial user of more



**ESM EU Environmental Compliance Strategy
Technical Assistance**

than 20MWe per year may purchase power from any source, including private power producers not affiliated with ESM .

ESM is on course for a year end 2005 selection of the successful bidder. This TA will assist ESM in advising the successful bidder of its environmental obligations and cost to achieve those obligations allowing the bidder to more accurately value the assets of ESM in its final agreement.

Project Background

In order for ESM to increase its attractiveness under privatization, ESM must define a strategy to meet EU environmental directives. The strategy will layout the timing, plans to replace, upgrade, or expand emission control facilities and their associated costs. There have been numerous studies that have evaluated the state of compliance of the assets. This project will collect the critical compliance needs into a single strategy. As part of the privatization Meinl is responsible for the financial evaluation of the assets of the power plants. This TA will assist Meinl and ESM in valuing the assets of the company.

ESM has undertaken numerous studies related to its facilities described in Section I of this report. Selected relevant studies include:

- Bitola Fuel Supply Feasibility Study
- Least Cost Expansion Planning Studies, Harza Engineering Company International L.P., April 2002 – USAID Funded
- Investment Options in the Energy Sector, Exergia S.A., December 2002

- Feasibility Study for Interconnection between Power Systems of Macedonia and Bulgaria on 400 kV Voltage Level, ESM and ETF, Skopje
- Environmental Impact Assessment Study of 400 kV OHL SS Dubrovo – SS Stip – Macedonian Border
- Feasibility Study for underground excavation of coal for TPP Bitola from deposits: Brod-Gneotino, Deep underlying seam Suvodol and Zivojno, Rudarski Institut, Skopje
- Feasibility study for opening and exploration of open-pit mine Brod-Gneotino during 2004-2005, Rudarski Institut, Skopje
- Action plan for supply with lignite to TEC “Bitola” Investment possibilities in the energy sector, PHARE, 2003

Technical Description

ESM has numerous distribution, transmission, mining and power generation facilities. Its mining operations are largely associated with Bitola and Oslomej power plants. A listing of the major generation facilities is provided below.

The scope of the TA is based on the priorities of ESM Both Bitola and Oslomej have needs for sulfur removal systems and treatment systems for mine tailings and ash. Bitola is a particularly important impact as it supplies the vast majority of Macedonia’s electricity and is the 60th largest point source for sulfur emissions in all of Europe.

ESM Generation Facilities		
<i>Plant</i>	<i>Capacity MWe</i>	<i>Fuel</i>
Bitola	675.0	Coal
Oslomej	120.0	Coal
Negotino	210.0	Oil



**ESM EU Environmental Compliance Strategy
Technical Assistance**

Vrben	12.8	Hydro
Vrutok	150.0	Hydro
Raven	19.2	Hydro
Globocccica	42.0	Hydro
Spilje	84.0	Hydro
Tikves	92.0	Hydro
Kozjak	82.5	Hydro
11 Small Hydro	44.6	Hydro

Some environmental improvement projects for ESM have already been identified by GOM. These are:

- Sulfur Trioxide flue gas conditioning system for Bitola;
- Stack emission monitoring for Bitola;
- Fire protection for coal bunkers, steam turbine lube oil system and narrow bridges at Bitola;
- Wastewater treatment station at Bitola; and
- Flue gas desulfurization at Oslomej.

This TA builds on the results of these programs to define an integrated strategy for all priority facilities.

In addition to the generation facilities, ESM has other major facilities. These include:

ESM Non-Generation Facilities		
<i>Facility</i>	<i>Number</i>	<i>Type</i>
Coal Mines	2	Lignite
Sub Stations	3	400 kV
Sub Stations	2	220 kV
Sub Stations	1	150 kV
Sub Stations	60	110 kV
Transmission Lines	7	400 kV
Transmission Lines	3	220 kV
Transmission Lines	1	150 kV
Transmission Lines	108	110 kV

Project Cost

As the detailed compliance requirements have not been defined, no detailed cost breakdowns are available yet. Based on the priorities of ESM the potential cost is estimated to be at least \$80 million and possibly as high as \$240 million. If Bitola and Oslomej flue gas desulfurization (FGD) needs alone are considered, the cost can be estimated. For these plants the minimum Project cost can be estimated based on international experience. The costs were determined by multiplying indicative costs per kWe by the number of kilowatts of capacity installed at each plant. Engineering and hardware are both included in this estimate.

FGD Cost Estimate			
<i>Plant</i>	<i>Unit Cost/kW</i>	<i>Capacity MWe</i>	<i>Cost (million)</i>
Bitola	\$100	675	\$67.5
Oslomej	\$100	120	\$12.5
Total		795	\$79.5

In addition to FGD, there is the potential for:

- Wastewater treatment systems;
- Ash disposal systems;
- PCB cleanup;
- Mine tailing treatment systems; and
- Fuel switching projects.

These activities could double or triple the costs involved just for the generation facilities up to \$240 million.

Legal Regulatory Framework

Macedonia is harmonizing its tax and tariff system with the EU. Macedonia is adopting environmental laws, policies and directives of the EU as it strives to become a future full member of the EU.

The Government of Macedonia (GOM) has hired Meinl Bank Consortium



*ESM EU Environmental Compliance Strategy
Technical Assistance*

(Meinl) under the terms of an EBRD loan to prepare Elektrostopanstvo Na Makedonija (ESM) restructuring and privatization. The restructuring plan proposed by Meinl has been adopted by the GOM.

According to Meinl, the restructuring of the electricity sector of the Republic of Macedonia and its eventual privatization is being prepared in an environment of an open Regional Electricity Market (REM), which is driven, by EU integration and the South East Europe Electricity Markets integration. The Government of Macedonia has defined the objectives of such restructuring and privatization process as:

- To protect the national interests;
- To be a strong player in the regional electricity market;
- To meet EU directives and Athens protocol;
- Enable the development of an open energy generation market;
- Implement the regulated electricity market; and
- Prepare the privatization of ESM.

Meinl is proposing that the unbundling of ESM follow the requirements of the Athens Memorandum while optimizing the need to keep the company's economy of scale in order to face external competition of the REM. The restructuring of ESM will entail the separation from ESM into a new legal entity of the Transmission System Operator whose assets will include the current Dispatching Center of ESM with its logistic units, the high voltage grid transmission lines (at and above 110 KV) and 13 substations, plus one under construction (Skopje 5). This new legal entity will be spun out from ESM but

will remain in state hands for the foreseeable future.

The remaining core assets of ESM are planned to be kept together while there is planned the unbundling of the generation assets involving 3 thermal power plants and seven main hydroelectric power plants and a set of 11 small hydro power plants (of which 7 are part of a rehabilitate-operate-transfer (ROT) agreement) from the distribution assets (currently 28 distribution units throughout Macedonia).

The legal separation of the distribution assets within ESM into a new legal entity, the Distribution System Operator, whose assets will include all the remaining 43 high voltage substations and the medium and low voltage grid transmission lines (at and below 110 KV) is also planned.

The site of Energetika, a brownfield site suitable to erect a combined cycle gas power plant, could be sold to a strategic investor in the power generation sector. This could create the first independent power producer in Macedonia and could open the electricity generation market.

Non core assets of ESM may be disposed of or liquidated. Portfolio participation in companies and banks may be sold or written off as well as loans to companies via Balkanska and Stopanska Banks.

ESM will remain the main electricity company in Macedonia and continue to own and operate its current generation and distribution assets in the foreseeable future. The proposed restructuring model is expected to enable ESM to develop in an open and competitive market



ESM EU Environmental Compliance Strategy
Technical Assistance

environment. The main rationale for this approach is:

- ESM's generation base (1,440MWe) is currently one of the smallest in the region;
- Over 75 % of its current base energy is generated by one power plant (Bitola);
- Hydroelectric power plants (Such as the Boskov Most Plant for which USTDA funded a Feasibility Study for which tendering documents are underway.) represent a very valuable asset whose role is crucial for balancing power;
- The foreseeable domestic growth in energy demand will be largely serviced by ESM and imports;
- There should a sufficient generation base to enable economies of scale and investment to maintain and renew the electricity production base of ESM;
- To secure sufficient cash flow and establish a capital base for financing of the refurbishment of the plants and re-powering the current asset base; and
- A strong relationship between the generation assets and the distribution company will foster a reliable and continuous supply of electricity service in Macedonia.

Under the restructuring proposal, ESM will retain the right to upgrade or rebuild its power generation assets (mining development, emission upgrade, and alternative fuel). The Government of Macedonia with the oversight of the newly created Energy Regulatory Commission will tender any greenfield power generation asset.

The EU directives that potentially apply to the ESM timeline are numerous. A few of the more important or most overarching Directives listed below can serve as a starting point in the TA.

- 2001/80/EC Pollution from Large Combustion Plants issued in November 2001 covers SO_x, NO_x, and dust from plants larger than 50 MWe.
- 96/61/EC Integrated Pollution Prevention and Control: IPPC Directive issues October 1996
- 2001/42/EC Environmental Impact Assessments
- EC DG INFSO – B4 Overview of EU Environmental Legislation in Mining
- COM(1998) 571 Integrating the Environment into Community Energy Policy issued in October 1998
- COM(98) 294 Assessment Strategy for Environment
- The Environmental Chapter (Chapter 2) of the *Acquis Communautaire*

Macedonia is well into adopting legislation complying with the environmental chapter of the “*acquis communautaire*” essential for EU accession. Negotiations on Chapter 2 of the *Acquis Communautaire* (Environmental) have not started. However, ESM has assumed the obligation in the framework of the Treaty for SEE Energy Community to have an audit and establish a plan to meet the requirements. A grace period has not yet been negotiated. Environmental legislation on water and waste management, air quality, nature conservation and an environmental framework law were adopted by the Parliament in September 2004. A number of working groups



ESM EU Environmental Compliance Strategy
Technical Assistance

(encompassing representatives from relevant ministries, various businesses and NGOs) have been established to assist with the preparation of the second National Environmental Action Plan.

Failure of ESM to comply with EU environmental laws will expose it to the potential for significant fines (currently 100 € per tonne of CO₂ equivalent for air emissions) or forced closure of facilities.

Economic Fundamentals

A detailed economic analysis is not currently available for the proposed TA. The Terms of Reference will require an analysis of the long-term economics of the required environmental improvements in the context of the potential for long-term electricity sales cross-border to other countries in Southeast Europe and sales of electricity within Macedonia.

C. Development Impact

This TA will introduce state-of-the-art environmental management and control technology for generation of electricity. The proposed TA is expected to develop a strategy to reduce the greenhouse gas emissions by coal-generated electricity through emission clean up systems. In summary the proposed project is expected to:

- Reduce the greenhouse gas emissions from coal fired generation of electricity;
- Introduce state-of-the-art emissions control technology into Macedonia that can serve as a model to facilitate development of the cleaner energy in Macedonia; and
- Create new jobs during construction and on an on-going basis.

Job Creation

Experience in the US indicated that job creation by emission control projects such as FGD conservatively is 0.5 jobs/MWe during construction. There is no reason to expect that this job creation rate will be lower in Macedonia. On this basis, as noted above, up to 400 jobs could be created during construction.

Economic Impacts

One of the most important economic aspects of the TA is that it provides alternatives to creating economic value for ESM that may prevent it from closing down plants prematurely. Continued operation will preserve the local jobs and local economy revolving around the existing power facilities.

Failure of ESM to comply with EU environmental laws will expose it to the potential for significant fines (currently 100 € per tonne of CO₂ equivalent for air emissions) or forced closure of facilities. Either event will cause economic damage to ESM and potentially Macedonia.

D. Grantee's Commitment

ESM is committed to this TA. This TA will enhance the potential for ESM to identify and realize the full potential economic value ESM through helping Meintl and ESM evaluate the assets to aid privatization.. With restructuring and privatization underway combined with the emergence of an open electricity market in 2007, ESM is committed to become more competitive. To achieve this goal it must generate electricity in an EU compliant manner to avoid penalties and forced shutdowns. The Grantee is willing to provide resources



*ESM EU Environmental Compliance Strategy
Technical Assistance*

as described below to support completion of the Technical Assistance.

E. Implementation Financing

The Technical Assistance Terms of Reference require the Contractor to analyze each aspect of the TA, which will affect cash flows and expected financing. ESM must comply with EU environmental requirements within 10 – 15 years. Whether ESM is privatized or continues to be owned by the government, all of its facilities must either meet EU environmental standards by the deadline or they will incur penalties or be forced to close. Of the \$80 to \$240 million required to bring existing facilities in line with EU standards, ESM will need to prioritize and rationalize its capital expenditure plan. ESM needs assistance in developing its capital expenditure plan and preparing financing requests to lenders. Since the final ownership and ongoing operating control decisions for various facilities are yet undecided, it will be part of the Terms of Reference that the Contractor will investigate all likely sources of implementation financing (retained earnings, aid financing, equity, vendor financing, ECA, multilateral, bilateral, international and local bank loans). The most likely way for ESM to pay for these upgrades is through additional cash flow generated from privatization. Meint Bank has also advised ESM that the primary reason for pursuing privatization is to generate increased cash flow for desired capital expenditures. Cash from the sale of part of ESM will improve its balance sheet position and improve the likelihood that the privatized entity will be able to attract local or international bank loan financing. ESM does not

expect to receive EU funds (ISPA) to assist in the implementation.

External finance and assistance can play a catalytic role and complement domestic financial resources. Donor assistance is mostly in the form of grants, usually for technical assistance. International Finance Institutions (IFIs) channel funds from international capital markets in the form of loans on terms, which are more attractive than those available on the domestic commercial markets of the recipient country. The Project Preparation Committee is a network in which donors and IFIs cooperate in order to accelerate environmental investments. The Global Environment Facility, which provides grants and concessional funding to meet the agreed incremental costs of measures to achieve, approved global environmental benefits. However, assistance from most, though not all, donors appears to have peaked and is now declining.

Donors and IFIs have helped to supplement domestic sources of capital and to transfer know-how. Domestic financing mechanisms have evolved but there is a continuing challenge to ensure that soft financing is used transparently and in the most cost-effective manner and that it does not inhibit the emergence of more market-based mechanisms. This is also true for finance provided directly from the State budget. Strengthening financing mechanisms in the context of higher costs of compliance with EU legislation and the potential benefits of facilitating access to EU sources of financing will become the major challenge in Macedonia.



**ESM EU Environmental Compliance Strategy
Technical Assistance**

Environmental funds, capitalized largely by environmental charges and taxes, continue to play an important role in the region. A number of types of funds have been established, capitalized by donor grants and/or IFI loans:

- Debt for environment swaps;
- Environmental Investment Funds; and
- Environmental Development Fund.

Institutions established by donors and/or IFIs can have a catalytic effect in mobilizing other resources and enabling the establishment of solid institutional capacity that encourages greater financial discipline and improved accountability and transparency. The opportunities for replicating financing mechanisms using IFI loans and/or donor grants are probably greater across the region than the opportunities for establishing new mechanisms based on debt for environment swaps.

IFIs and donors have established credit lines for environmental investments in co-operation with financial intermediaries in the region. With the local partner sharing the credit risk, these credit lines can reduce the costs of preparing projects and conducting financial appraisals of borrowers, and facilitate IFI support for smaller loans than would be available directly from the IFI. In addition, this co-operation often contributes to the strengthening of the local financial intermediary, particularly in appraising environmental projects and non-environmental projects with environmental components, and demonstrating the financial attractiveness of win-win environmental investments.

The Kyoto Protocol to the Framework Convention on Climate Change (FCCC) provides for several co-operative mechanisms. If the operational rules of these mechanisms are agreed, there is considerable scope for ESM to benefit from the opportunities provided.

USTDA Evaluation Factors

F. U.S. Export Potential

The potential for U.S. exports is significant. Assuming that up to 70% of \$80 –240 million associated with FGD, wastewater treatment, or ash and mine tailing treatment systems can be exported, \$56 to \$150 million or more of the equipment and services are available for export from the U.S. Selected potential U.S. vendors of the export equipment and services are identified below. Direct contact was made with those companies with asterisks below.

Principal U.S. Exporters	
Product/Service	Company
Engineering	Black & Veatch* Bechtel Power Metcalf & Eddy Burns and Roe Fluor Corporation Parsons Power Shaw Group Washington Group*
FGD Equipment	General Electric Foster Wheeler Babcock Power Wheelabrator Air Pollution Control* Envitech
Wastewater Equipment	Ionics GE/Osmonics Tyco/EarthTech Krofta Technologies US Filter ITT Sanitaire*

Selected contact points are:

ITT Sanitaire	Kenneth George
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**ESM EU Environmental Compliance Strategy
Technical Assistance**

9333 North 49 th Street Brown Deer, WI 53223-1472	Phone: 414-365-2200 Fax: 414-365-2210 Email: ken.george@itt.com
Black & Veatch 11401 Lamar Overland Park, KS 66221	Dave Still Phone: 913-458-8444 Fax: 913-458-2029 Email: StillDR@bv.com
Washington Group International Energy & Environment 12131 South Centennial Avenue Aiken, SC 29803	David Pethick Phone: 803-502-9972
Wheelabrator Air Pollution Control Inc. 441 Smithfield Street Pittsburgh, PA 15222	Tony DoVale Phone: 412-562-7300

One of the key parameters relating to the competitiveness is the intentions of US Companies to compete for the privatization of ESM. Discussions with Meinl and US companies indicate that at least one and possibly two US companies intend to bid on the privatization of ESM. One US company confirmed it intended to participate in the bidding for the ESM. A successful bid by a US company enhances the potential of US suppliers of equipment and services. Unconfirmed European bidders include ENEL (Italy) and CEZ (Czech Republic). At the moment EdF (France), RWE (Germany), and International Power (UK) do not appear to be pursuing this privatization. On this basis, under the present understanding of bidding intentions, a US company has roughly a 33% to 50% chance of winning the bid.

G. Foreign Competition

U.S. equipment and service suppliers are expected to meet strong competition from global suppliers. Western European

firms, which specialize in power station environmental projects, will view this project as an attractive opportunity to extend their home markets. The Western European firms are eager to keep U.S. competition out of the region so competition will be intense. However, US companies have demonstrated that they can compete cost effectively in the international environmental market and Macedonia should be no exception if they are provided with the opportunity to compete. Potential foreign competitors are numerous but a few major competitors include:

Potential Competition	
Marsulex	Canada
Alstom	France
Hitachi	Japan
Steinmueller	Germany
Mitsubishi	Japan

H. Impact on the Environment

The proposed TA is not expected to have any negative impact on the environment. It should have a positive impact by reducing emissions from fossil fuel generated electricity and with electricity generated through more efficient state-of-the-art gas technology. Therefore the emissions of NO_x, SO_x, and CO₂ will be reduced and quantified under the Terms of Reference for this TA.

I. Impact on U.S. Labor

Enviromation does not believe that this TA will have a negative impact on U.S. labor. The potential sale of equipment and services for this TA is expected to have a positive impact on the U.S. equipment manufacturing and engineering sectors.



*ESM EU Environmental Compliance Strategy
Technical Assistance*

J. Justification

The proposed TA, if successfully implemented, will have a significant impact on the environmental conditions, local economy, and reduced greenhouse gas emissions. The TA is consistent with Macedonia’s restructuring and privatization of the electricity sector. The progress made toward privatization and the privatization scope decisions made by ESM affect the scope of the Technical Assistance. For these reasons, the Technical Assistance is recommended to be timed consistent with the privatization schedule.

The TA could lead not only to the export of U.S. equipment and technical services but also the potential for U.S. companies to participate in the privatization of ESM. To date, ESM’s focus has been on European companies. Without this Technical Assistance, it is likely that European companies will maintain a preferred position. Funding of the Technical Assistance will facilitate the opportunity for U.S. technology to compete for this attractive project.

This TA is further justified because:

- The technology risk involved is low as the proposed technology is operating in power plants around the world;
- This TA is attractive as it potentially generates greenhouse gas emission credits that may have substantial economic benefit to ESM;
- These factors enhance the probability that a financially viable and commercially attractive project will result; and
- The Grantee is seeking the most economically and technically appropriate technology. Without

this Technical Assistance, it is likely that ESM may not realize the full value in privatization, which could be achieved through implementation of U.S. technology.

K. Qualifications Required by the Technical Assistance

Contractor

The Contractor carrying out this Technical Assistance shall demonstrate:

- a. Comprehensive knowledge of EU environmental directives that pertain to the electricity generation sector;
- b. Detailed experience in the technology, design, construction, and operation of power generation emission control and environmental management facilities;
- c. Experience in the economic and business factors associated with energy related environmental management projects in a newly privatized market; and
- d. Proficiency in finance in Southeast European countries and especially in Macedonia.

L. Terms of Reference and Budget

Aim of the Terms of Reference

The aim of the Terms of Reference is to develop a study that quantifies the feasibility of multiple proposed options to environmentally upgrade ESM facilities in the current and anticipated economic and regulatory environment taking into consideration ESM’s planned privatization. This study may be used by the ESM privatization bidders for information on valuation options for the facilities of ESM.



**ESM EU Environmental Compliance Strategy
Technical Assistance**

Outline of the Terms of Reference

The Technical Assistance activities are divided into 10 tasks:

- Task 1 – Facility Inventory
- Task 2 – EU Directives
- Task 3 – Environmental Assessments
- Task 4 – Technology Options
- Task 5 – Financing Options
- Task 6 – Strategy Development
- Task 7 – Financial Impact
- Task 8 – US Sources of Supply
- Task 9 – Development Impact
- Task 10 – Final Report

Terms of Reference

Task 1: Identification of Facilities

The Contractor shall gather an inventory of assessments already performed for ESM facilities with the assistance of ESM. The results of the inventory will be reviewed with ESM and the scope of additional assessment needs for each of the priority facilities for establishing the strategy agreed. The priority facilities are:

Priority Facilities	
Facility	Quantity
Bitola	2
Bitola Coal Mine	1
Oslomej Coal Mine	1
Oslomej	1
Negotino	1
Globocccica	1
Vrben	1
Vrutok	1
Raven	1
Spilje	1
Tikves	1
Kozjak	1
Total	14

Task 2: EU Directives Identification

The Contractor will collate the EU Environmental Directives that may potentially apply to the ESM facilities.

These Directives will be reviewed with ESM and agreement reached on the specific Directives that are to be considered in establishing the strategy for each facility.

Task 3: Environmental Assessment

The Contractor shall prepare an overview environmental assessment of each specific facility included in the strategy consistent with 2001/42/EC “Environmental Impact Assessment” to establish the current state of compliance for each relevant ESM facility by:

- a. Utilizing existing studies from the inventory completed in Task 1, local knowledge, and other existing information; and
- b. Conducting site visits to perform cursory assessments.

The results will be reviewed with ESM and agreement reached with ESM on the current state of compliance of each relevant Facility. If agreement cannot be reached the Contractor shall document his best professional judgment and discuss ESM’s basis for differing with this judgment. If agreement cannot be reached, the ESM conclusions shall be used in further tasks.

The budget was developed on the basis that the Contractor will perform a Phase 1 environmental assessment or equivalent at all facilities over priority facilities. The Phase 1 assessment scope envisaged under this task is to be consistent with American Society of Testing & Materials Standard E-1527-00 or equivalent that complies with 2001/42/EC Environmental Impact Assessments and World Bank or EBRD environmental guidelines and does not include site sample analysis.



**ESM EU Environmental Compliance Strategy
Technical Assistance**

Upon completion of Task 3, the Contractor shall prepare an Environmental Assessment Report that includes by facility the results of the assessments, the applicable EU Directives, and identification of prior studies performed that reflect the agreements reached with ESM.

Task 4: Identify Technology Options

Based on the results of Task 3, the Contractor shall identify and recommend technology options available to bring each facility into compliance and recommend the most economic technology that bring each facility into compliance based upon:

- a. Estimated costs (+/- 35%) of implementation of each recommended technology for each relevant facility;
- b. Quantified impact on the environment including an assessment of greenhouse gas emission credits potential;
- c. Justified recommendations in technical and economic terms based on at least one specific option per relevant facility; and
- d. Implementation schedules developed for each facility of the most economic technology.

The Contractor shall also develop lists of U.S. sources of supply for the recommended technology options.

Task 5: Evaluate Financing Possibilities

The Contractor will conduct discussions with potential investors and financing sources including multilateral and bilateral financial institutions, private sources, and export credit agencies. Debt for environmental credits exchange managed by the Ministry of Finance and greenhouse gas emission credit buyers

are also to be considered. The mechanism for the greenhouse gas credits within Macedonia is developing but not complete. With this in mind, the Contractor shall identify to ESM the requirements of the identified greenhouse credit buyers in order to execute a sale. From these discussions, potential financing mechanisms and investment structure will be identified.

At the end of Task 5, the Contractor shall prepare a Technology Option Report that summarizes for each technology option its cost, implementation time, environmental impact, financing structure, applicable EU Directives addressed, potential US suppliers and recommendations. This document will serve as the basis of the Strategy Development.

Task 6: Strategy Development

Based upon tasks 3 through 5, the Contractor shall develop a prioritization strategy with ESM that will result in a realistic timetable that optimizes the implementation of upgrades to facilities and methodologies that is based upon availability of financing and rate of expenditure balanced against environmental impact. The Contractor shall review the proposed strategy and its impacts with ESM and make recommended changes. It is probable that multiple iterations of the strategy may have to be developed to attain the strategy that meets all of the needs and limitations of ESM.

Task 7: Financial Impact Analysis

The Contractor shall analyze the financial impact on ESM to come into compliance with EU Directives under the agreed strategy from Task 6. This analysis will consider:



**ESM EU Environmental Compliance Strategy
Technical Assistance**

- a. Capital Costs;
- b. Financing Costs;
- c. Financing Structure;
- d. Operating Costs; and
- e. Environmental Benefits.

Task 8: U.S. Sources of Supply

The Contractor shall modify the supplier list developed in Task 4 to identify and provide a complete list of potential U.S. suppliers of the technology recommended after considering Tasks 5, 6 and 7..

Task 9: Development Impact

The Contractor will also address the additionalities associated with the TA. These additionalities include:

An estimate of the TA’s potential benefits in the following areas:

- Prepare a statement on the infrastructure (buildings, facilities, and supporting systems) impact giving a brief synopsis.
- Describe any regulations, laws or institutional changes that are recommended and the effect they would have if implemented.
- Address the number and type of positions that would be needed to construct and operate the proposed upgrades as well as the number of people who will receive training.
- Describe any advanced technologies that will be implemented as a result of the TA.
- Identify any other development benefits to the TA including any spin-off or demonstration effects.
- Prepare a statement on the impact on U.S. labor in accordance with USTDA guidelines.

Task 10 - Final Report

The Contractor will prepare a Final Report in accordance with USTDA content and format requirements including a comprehensive report of the findings of the Project, all deliverables from Tasks 1 through 9, and the results of the individual tasks of the study. The report will also include a comprehensive overview of the ESM Facilities, potential resolutions, estimated costs, recommended priorities, and the estimated timetable for the recommended optimum program. The report will detail the financing strategy and a course of action for Project implementation.

Deliverables

The Contractor shall provide the following deliverables:

- Environmental Assessment Report;
- Technology Options Report; and
- Final Report.

Tasks to be Performed by Grantee

ESM will provide the following services:

- Set up and coordination of any meeting required with ESM or other partners;
- Set up and coordination of meetings with governmental ministries and representatives;
- Provision of work space for the Technical Assistance team when on site;
- Translation of Russian or Macedonian documents obtained from ESM as required into English;
- Access to all prior related studies;



**ESM EU Environmental Compliance Strategy
Technical Assistance**

- Access to all available plant documentation, drawings, diagrams, and specifications;
- An assigned project manager;
- Technical assistance at ESM to answer questions or provide information; and
- Translation of Reports prepared by the Contractor in English into Macedonian if required.

Note: The Contractor will be responsible to supply a translator(s) for meetings and miscellaneous translation of documents not obtained from ESM.

Period of Performance

The Period of Performance for providing this Technical Assistance is estimated to be six months from coming into force of a contract between the Technical Assistance Contractor and ESM, but must be completed no later than December 31, 2005. The TA must be completed in time for ESM to advise the successful privatization bidder of its long-term environmental compliance exposure.

Budget

The total cost of performing the proposed Technical Assistance, in accordance with the Terms of Reference presented herein, is estimated to be \$417,000. The budget proposed reflects the costs associated with meeting an expedited schedule by working multiple tasks in parallel and the added staff so required.

M. Recommendations

Enviromation recommends that USTDA support this Technical Assistance by providing a grant of \$417,000 to ESM to execute the Technical Assistance. Implementation of the Technical

Assistance must be consistent with the timing and needs of the privatization program of ESM. USTDA support for this Technical Assistance is recommended for the following reasons:

- The positive impact on the environmental conditions, local economy, and greenhouse gas emissions;
- There is a reasonable probability (33% to 50%) that a US company will be successful in their bid to participate in the privatization of ESM;
- The proven technology employed;
- The TA enhances the potential value of ESM facilities in the privatization process of ESM; and
- The TA fosters the export of US equipment and services providing an opportunity to US companies that may not normally exist both in implementing the TA and gaining visibility of the opportunity for US companies to participate in the privatization of ESM.

Enviromation further recommends that USTDA evaluate whether there is sufficient time to execute the Feasibility Study at the time that the Grant award is considered. The timing of the necessary steps of awarding the Technical Assistance to a Contractor may make it unlikely that the December 31, 2005 completion date can be met. In that case, it is recommended that the Technical Assistance not be approved as it will be too late in the privatization process to justify.

Other considerations that USTDA should take into account are:



***ESM EU Environmental Compliance Strategy
Technical Assistance***

- The uncertainty concerning the ownership and privatization of ESM; and
- The likelihood that US companies will participate in the privatization of ESM. At least one US company has confirmed its intention to participate.



*ESM EU Environmental Compliance Strategy
Technical Assistance*

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Section IV

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Energy Projects in Macedonia

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Energy Projects in Macedonia

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Energy Projects in Macedonia

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