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MACEDONIA ENERGY EFFICIENCY AND RENEWABLE ENERGY ASSESSMENT

**FINAL REPORT
June 2009**

In Relation to:
**MACEDONIA ENERGY EFFICIENCY AND RENEWABLE
ENERGY ASSESSMENT**

Table of Contents

EXECUTIVE SUMMARY	5
1. INTRODUCTION	14
1.1 Project Background and Purpose of Assessment	144
1.2 Methodology and Data Sources	15
1.3 Acknowledgements	16
2. ASSESSMENT OF THE CAPACITIES AND NEEDS FOR CLEAN ENERGY IN MACEDONIA	18
2.1 Introduction to Energy Efficiency	20
2.1.1 Residential Sector	21
2.1.2 Municipal Sector	222
2.1.3 Industrial Sector and Hospitals	22
2.2 Introduction to Renewable Energy	23
2.2.1 Small Hydro	25
2.2.2 Biomass	25
2.2.3 Wind	26
2.2.4 Solar	26
2.2.5 Geothermal	27
2.3 Main Barriers and Opportunities	28
2.4 Donor Assistance: Existing Facilities and Technical Assistance/ Capacity Building Programs	32
2.5 Financial Environment	36
2.6 Project Development	37
2.7 Opportunities for jobs creation	38
2.8 Conclusions	39
3. RECOMMENDATIONS FOR NEW PROGRAM ACTIVITY	40
3.1 ENERGY EFFICIENCY	40
3.2 RENEWABLE ENERGY	45

List of Attachments

- Attachment 1: Assessment Scope of Work
- Attachment 2: Team composition and study methods
- Attachment 3: A list of documents consulted
- Attachment 4: Schedule of meetings and contact details

ACRONYMS

ADA	Austrian Development Agency
ASE	Alliance to Save Energy
BEA	Business Environment Activity
CER	Certified Emission Reduction
DBOT	Design Build Operate Transfer
DCA	Development Credit Authority
DNA	Designated National Authority
EA	Energy Agency
EBRD	European Bank for Reconstruction and Development
EC	European Commission
EE	Energy Efficiency
ELEM	Macedonian Power Plants
EPBD	Energy Performance of Buildings Directive
ERC	Energy Regulatory Commission
ERRA	Energy Regulators Regional Association
ESCO	Energy Service Company
EU	European Union
FIs	Financial Institutions
GDP	Gross Domestic Product
GEF	Global Environment Facility
GoM	Government of Macedonia
GTZ	German Technical Cooperation Office
HCA	Heat Cost Allocator
IRG	International Resources Group
MABEU	Macedonian Association for Biomass Energy Utilization
MACEF	Macedonian Center for Energy Efficiency
MAGA	Macedonian Geothermal Association
MANU	Macedonian Academy for Sciences and Arts
MEEP	Municipal Energy Efficiency Plan
MEPSO	Macedonian Transmission System Operator
MLGA	Macedonia Local Government Activity
NALAS	Network of Associations of Local Authorities in South-East Europe
NGO	Non-Government Organization
OECD	Organization for Economic Cooperation and Development
PDD	Project Design Document
PEP	Primary Education Project
PV	Photovoltaic
REC	Regional Environmental Center

RE	Renewable Energy
RES	Renewable Energy Sources
SEE	South-East Europe
SHPP	Small Hydro Power Plant
SMEs	Small and Medium-sized Enterprises
TPP	Thermal Power Plant
TRV	Thermostatic Radiator Valve
UNDP	United Nations Development Program
UNIDO	United Nations Industrial Development Organization
USAID	U.S. Agency for International Development
VAT	Value Added Tax

Units of Measurement

GW	gigawatt
GWh	gigawatt hour = 10^6 kilowatt hour
kg	kilogram
m	meter
km	kilometer
ktoe	kilo tonnes of oil equivalent = 10^3 tonnes of oil equivalent
kV	kilo volts = 10^3 volts
kW	kilowatt
kWh	kilowatt hour
m ³	cubic meters
MW	megawatt = 10^6 watts
MWh	megawatt hour = 10^3 kilowatt hour

EXECUTIVE SUMMARY

BACKGROUND/ IMPORTANCE OF CLEAN ENERGY TO MACEDONIA

Macedonia is highly dependant on energy imports (oil, natural gas, and electricity), which have grown rapidly in recent years. All of Macedonia's oil and natural gas is imported, and electricity has been imported since 2000. Consequently, domestic energy production covers about 60% of demand and 40% are provided from imports. The cost of imported energy is quite high: \$774 million, including \$253 million for imported electricity in 2007. The situation will be exacerbated in coming years, as Macedonia's primary domestic source – lignite – is the source of 70% of electricity generation, yet its supply is dwindling.

At the same time, Macedonia has a high level of energy intensity (energy consumption per unit of GDP). Macedonia's energy use is highest in industry and households, with 33.8% and 29.2%, respectively of the country's consumption, followed by transport at 20.5%, and commercial and service sector 13.1%. A key factor in Macedonia's high energy intensity is the heavy use of electric heating in the residential sector. This fact drives the need for electricity imports, while to the extent that lignite represents such a large share of domestically-produce electricity, also makes Macedonia very carbon-intensive.

Expanding the use of clean energy (i.e., energy efficiency and renewable energy) offers the potential to reduce energy imports, thereby improving balance of trade and relieving pressure on the Treasury. Implementing the recommendations of the USAID-funded 2004 national Energy Efficiency Strategy would reduce total energy use by 6% and lower expected growth in energy consumption by 2020 by 17%. Improving energy efficiency in various sectors offers the potential to improve industrial competitiveness; increase household affordability and comfort, thereby making it easier to rationalize tariffs; improve the quality of public services such as education, health care, and public safety; and create jobs. Clean energy will also produce important reductions in greenhouse gas emissions.

The Government of Macedonia (GOM) is in the process of considering approaches to increase the use of clean energy to meet energy security and related goals, and therefore is developing new or revised strategies for energy efficiency and renewable energy. Clean energy been also been adopted as a USAID strategic priority of the E&E region and is a priority for the Obama administration.

The Assessment examined the potential of clean energy to help Macedonia reduce the need for imported energy, improve energy security, and provide the other benefits mentioned above. The Assessment suggests programmatic options that USAID/Macedonia may take to stimulate the implementation of clean energy.

FINDINGS

Macedonia has promising indigenous renewable energy resources. These include hydropower, geothermal energy, biomass energy, solar and wind energy. Existing use of renewable resources in Macedonia includes large hydro power for production of electricity, biomass in the form of firewood and briquettes for heating of households, geothermal energy for heating greenhouses, and solar energy for heating sanitary hot water for households. In the Energy Balance these forms of energy represent about 10% of the total annual primary energy consumption.

At present, the potential for use of renewable energy sources in Macedonia is underutilized. Even though various project developers have identified a pipeline of financially viable renewable energy projects, these have not yet been implemented because of financial and institutional constraints.

Energy efficiency has been an area of USAID assistance through E&E regional activities and mission programs for several years. Previous and ongoing, work includes the following activities, which indicate that energy efficiency is needed and can provide cost-effective results.

- National Energy Efficiency Strategy, prepared through E&E regional program in 2004 by Nexant. The Strategy was adopted by GoM in 2004, but implementation has been limited, to a large extent attributable to insufficient capacity and resources.
- Municipal energy efficiency demonstration projects: 12 projects in schools and other municipal buildings in five cities. Follow-up activities under the Macedonia Local Government Activity program provide assistance on municipal energy efficiency planning, project preparation, and municipal creditworthiness analyses, conducted in conjunction with Norwegian-funded ENSI program. The Primary Education Program conducted energy efficiency improvements and associated building rehabilitation in over 40 primary schools through 2008, with a total goal of 120 schools.
- Development Credit Authority facilities established in September, 2007 with UniBanka and NLB Leasing. The facilities provide loan guarantees for municipal and residential energy efficiency loans, with a total combined portfolio size of \$10 million. One project has been implemented to date.
- The USAID Macedonia mission's EG office has conducted programs on competitiveness and workforce development that should be relevant to the Clean Energy area. The mission is considering development of a Green Jobs Corps to build low-skill employment opportunities for youth.
- E&E's regional SYNENERGY program activities include Strategic Planning for Energy Efficiency and Renewables; Energy Efficiency in Municipal and Residential Buildings; and Regional Assessment of Renewable Energy.

Other Donor/IFI activities are also addressing clean energy. **ENSI (Norway)** focuses on municipal energy efficiency planning in about a dozen cities, resulting in plans being formally adopted or under consideration by the municipal councils and awaiting Ministry of Finance certification to borrow in order to finance project implementation. **Austrian Development Agency (ADA)** in mid- 2009 will start a three-year project of enabling the environment for introducing energy efficiency in buildings in Macedonia, with a focus on improving administrative capabilities including secondary laws related to energy efficiency in buildings and building the capacity of the Macedonian Energy Agency. **UNDP Macedonia** is focused on municipal decentralization in support of ADA, developing a climate map and data for methodology calculation in Macedonia, and biogas production from swine farms. **Italy Ministry for Environment** is identifying and proposing CDM project ideas for Italian investors, including an assessment on optimization of electricity and weatherization measures and potential use of photovoltaics and geothermal heat pumps at pilot schools in several municipalities. **GTZ Macedonia** is supporting regional projects in energy efficiency and renewable energy. There are no current bilateral programs. **European Commission** will soon work with ERC to address tariff issues, including feed-in tariffs. **World Bank** recently approved a credit line of US\$ 25 million to support municipal infrastructure projects in Macedonia, including energy efficiency projects. Since 2005 World Bank has used GEF funds to implement the Sustainable Energy Program, with a grant of \$5.8 million intended to stimulate investments by removal of institutional and financial barriers through technical assistance to the Government in designing and implementing policy and secondary legislation on renewable energy, and project development and project investment support including a Sustainable Energy Financing Facility (loan guarantee facility and a debt fund), support to a Utility-based ESCO. **EBRD** is launching two regional investment, which provide debt financing for renewable energy and industrial energy efficiency projects to small and medium-sized enterprises in the Western Balkans including Macedonia.

The USAID-funded National Energy Efficiency Strategy was adopted by GoM in 2004. The Strategy recommendations, and implementation status, are as follows:

Institutional and Capacity Building:

- Establishment of an Energy Efficiency Agency: accomplished (with GEF funding).
- Energy Auditor Certification: Not in place; preparation of secondary law is underway through USAID regional SYNENERGY assistance.
- Building Energy Code: accomplished; work on enforcement/training is underway.
- Appliance Efficiency Standards: accomplished.
- Energy Efficiency Fund: Not in place.

Technical Programs: The Strategy recommended (and outlined) five programs: Residential buildings; Commercial buildings; Institutional buildings; Industry; and Street Lighting. None of the recommended programs are in place.

The Ministry of Economy requested USAID to fund an update of the National Energy Efficiency Strategy earlier in 2009; the work on the update is underway.

The June, 2009 draft National Energy Strategy set a target of reducing energy intensity (i.e., energy use per unit of GDP) by 30% from 2006 to 2030, and set a renewable energy target of 20% of total final energy consumption by 2020. The draft Energy Strategy did not specify how the targets should be met, but it did provide both a business-as-usual scenario and a high energy efficiency scenario. The latter assumed implementation of the 2004 National Energy Efficiency Strategy, which would reduce the average growth in by 17% compared to the business-as-usual scenario (from 2.6% average growth through 2020 to 2.16% average growth). The draft Energy Strategy also noted that Macedonia's use of natural gas is quite low and the use of electricity is high, particularly in residential heating, and stated that the high energy efficiency scenario envisages maximal use of natural gas.

The Assessment identified the following significant barriers to clean energy:

- **Low electricity prices** -- Electricity prices are far behind the electricity price of not only the EU countries but are 30-50% lower than in other SEE countries as well, especially in residential sector. The low prices fail to fully recover costs and therefore distort consumer decisions as they fail to provide proper motivation for reducing use or encouraging the use of alternative heat supplies. The need to provide more rational electricity prices brings the associated need for the government to build a social safety net for the poor and introduce relevant program mechanisms to address high electricity costs for the low-income families.
- **Lack of effective, coordinated policy framework** -- There is a lack of coordinated approach between key institutional stakeholders (MEPSO – market operator, ERC, Energy Agency, Ministry of Transport and Communications, and Ministry of Economy) that should be addressed to convey the Government's interest in promoting clean energy and the ensure the interest is consistently manifested throughout the various governmental institutions, policies, regulations, etc.
- **Cumbersome, complicated administrative procedures** -- Although some supportive legislation is in place, a clear set of rules and enforcement measures need to be put in practice. Administrative procedures involving multiple institutions and ministries extend the project preparation phase and make the projects costly and risky. The administrative procedures should be simplified to reduce the time for project preparation and investors' financial risks and decrease development costs. There is a lack of capacity and awareness for energy conservation potential in municipalities.

- **Low awareness of the economic benefits of EE and RE** -- Given the limited track record of EE and RE projects in Macedonia, there is a low level of awareness regarding the financial benefits that can be achieved through clean energy projects. In addition, there is a lack of awareness, information, and confidence on the part of Small and Medium Enterprises (SMEs), industrial facilities, Government/budget entities, and residential consumers, on the efficiency of EE investments and technology.
- **Limited development of a local energy services industry** – There is a lack of available energy experts and services to perform essential tasks necessary to implement projects, such as project identification; design/specification; installation; financing; monitoring and verification. Some local companies provide a limited range of services, but there are few private firms that offer the comprehensive set of energy services required to move a project from inception to completion.
- **Lack of local financial institution experience in technical evaluation of EE and RE projects** -- Local banks have little or no experience in technical evaluation of clean energy projects, which hinders their willingness to finance attractive projects. FIs are unfamiliar with how to assess the project risks and with ESCO performance contracting practices. Further, current loan evaluation procedures focus almost exclusively on collateral with limited analysis of the cash flow that a project would generate.

CONCLUSIONS

There are compelling reasons for donor assistance to stimulate clean energy in Macedonia. While significant barriers exist, there are a variety of options available through assistance programs that could address the barriers and thereby create a successful environment for projects to move forward. There is considerable interest among other donors, although most assistance falls in narrow areas, such as World Bank and EBRD financing facilities; Italy's focus on CDM projects; Austria's focus on laws related to energy efficiency in buildings. USAID has provided the broadest set of assistance among donor and IFIs, spanning legal/regulatory frameworks, municipal/school projects, and a financing facility. However, as shown many gaps remain to be addressed. Working in a coordinated fashion with the other donors and IFIs, USAID is well positioned to provide additional assistance to meet the remaining gaps.

Energy Efficiency

In examining potential priority activities for future assistance, the team assessed each sector in terms of importance; past accomplishments; and other donor activity; and identified useful cross-cutting and sector-specific activities.

Importance: The residential and industrial sectors are the most important. These are they two largest sectors in terms of final energy consumption

(industrial 34%, residential 29%). The residential sector is characterized by a high level of electric heating, which is not profitable to the electricity provider due to low tariffs, and which can be addressed through improvements in buildings and substitution of fuel source. The industrial sector should provide good potential for savings if barriers can be overcome given the profit motivation to reduce operating costs. The municipal and hospital sectors are less important in terms of their energy significance, but improvements there are important to the success of municipal decentralization efforts and provide significant social benefits including indirect benefits of improved quality of education, public safety, health care, and other public services. In addition, the municipal and hospital sectors represent stable organizations that are likely to remain in place long enough to repay investments in energy efficiency improvements.

Past Accomplishments: The municipal sector has been the focus of most past accomplishments. Once they are made aware of potential savings, municipalities become interested, and there have been successful results with short payback periods.

Other Donors: Most previous and ongoing activities by other donors address the municipal sector. Very limited activities to date address the residential and industrial sectors, although the new EBRD credit lines that will become available later this year will target the industrial sector. No donor activities address the hospital sector.

Based on these considerations, the Assessment concludes that the Residential sector warrants the most attention of future activity, but notes that addressing the sector will require a substantial effort. There are some straightforward approaches to helping consumers reduce household electricity needs, such as building envelope improvements and more efficient lighting and water heating. However, the most significant progress would come from encouraging households to switch from electric heat to wood pellet heat, which would require retooling production of both the wood stoves and the wood pellets including mobilizing a system of collecting biomass for the production process. While this is a daunting undertaking, it has significant economic growth implications in areas of SME development, job creation, etc.

The industrial sector could be well served by an appropriate set of activities that makes it convenient for the companies to further their profit motives by implementing projects. The sector can be addressed through a relatively modest set of packaged services that reduce the burdens of companies to determine what actions are appropriate for their facilities, preparing the projects, and obtaining financing, while taking advantage of financing sources including DCA for smaller projects and EBRD's new facilities for larger projects (coordination would be required to ensure EBRD would accept projects identified by USAID). In addition, a similar set of activities is appropriate for hospitals, which have social importance and typically provide good project opportunities as a result of their round-the-clock operation and use of energy for a wide variety of applications.

The municipal sector has received the most attention from USAID and other donors. While the concepts and a few projects have been introduced, energy efficiency is not yet on a sustainable basis for the sector. Modest resources would be helpful to build an institutional approach to continue progress in this sector on a more sustainable basis.

There are several cross-cutting activities that are important to all of the sectors. Public information is vital to make consumers aware of the potential to save on energy bills, what actions are most effective, and the sources of products and services. Training is needed for a variety of service providers. Capacity building is needed for implementation and enforcement of new laws, regulations, and standards. Assistance is needed on the use of energy performance contracting to establish the structure for ESCOs to design and install projects and to be repaid through the resulting energy bill savings.

The Recommendations section suggests a programmatic approach for addressing the challenges in these sectors.

Renewable Energy

MANU determined the following order of priority among renewable energy technologies: 1) Small hydro. 2) Biomass. 3) Wind. 4) Solar. 5) Geothermal. While hydro and wind have been adequately analyzed, there is need for resource potential assessments for biomass, solar, and geothermal. To guide implementation under the mechanisms expected from the upcoming Copenhagen GCC negotiations, economic analysis of greenhouse gas reduction from the various technologies would be useful to prospective investors as a means to stimulate their interest.

A key objective of assistance should be to coordinate among the relevant GoM organizations to streamline procedures and to provide clear procedural guidance to prospective investors. Assistance could also improve the GoM support mechanisms to provide effective financial incentives. Pilot activities could demonstrate the viability of promising technologies in priority sectors, e.g. biomass-fueled Combined Heat and Power in industry, hospitals, and municipalities.

RECOMMENDATIONS

Based on the Findings and Conclusions, the top priorities for potential program activities are as follows:

Residential Electric Heat Energy Efficiency: A program would promote savings, with an emphasis on electricity, in three ways: 1) Improved building envelopes (insulation, weatherization, windows) and compact fluorescent lamps (CFLs). 2) Solar water heating. 3) Conversion to wood pellet heating (requires furnace and pellet production, biomass collection system). The three components would not be mutually exclusive, although Skopje District Heat consumers would not be a priority target for component 3. The program would

offer consumers the three packages, coordinated with relevant financial incentives that may be provided by GoM. Consumers would solicit bids from certified contractors and ESCOs. Financing would be available through DCA.

Residential Low Income Energy Efficiency: A program would help qualifying low income households reduce energy bill payments through energy efficiency as an alternative to energy social safety net payments. The program would work with the Ministry of Labor and Social Affairs to help finance building envelope improvements, thermostatic control valves (for Skopje DH consumers) and CFLs. The program would seek to develop partnerships with Habitat for Humanity and EVN. A job training component would train installers.

Industrial/Hospital Packaged Energy Efficiency Services: A program would provide the following integrated set of services: 1) Providing preliminary energy audits at no cost, and discussing results to determine commitment to proceed. 2) Providing detailed feasibility study, to be cost-shared to gain the industry or hospital commitment to act on the recommendations. 3) Facilitate financing through DCA, EBRD, and other sources, including preparation of business plan, loan application, and presentation to lenders.

Municipal Clean Energy Resource Center: An institution serving municipalities (e.g., ZELS, regional centers, or other NGOs) would be trained to offer services to municipalities for a fee. The services to be offered would include municipal energy efficiency planning; and development of municipal energy use database. In addition, customized assistance would be provided, perhaps through a participating network of specialists, to provide specific services upon request such as detailed project preparation for projects identified through the municipal plan; renewable energy information and studies; tender assistance in the form of bundled procurements and ESCO tenders; and development of Programmatic CDM proposals (or analogous approach under Copenhagen GCC negotiations)

Cross-Cutting Public Information Campaigns: Content and marketing strategies would be developed, tailored to the priority sectors.

Renewable Energy Economic Resource Potential Assessments: Assessments would be conducted for biomass, solar and geothermal.

Coordination and Streamlining of Renewable Energy

Legal/Regulatory/Administrative Procedures: TA would be provided to mobilize relevant GoM institutions and stakeholders to reach agreement on improving the process and making it more transparent. Outputs would include an investors guide; public information campaign and workshops.

Small Hydro Clarification of Legal Issues: TA would be directed to clear up legal impediments that are preventing projects from being implemented – no contracts have been signed despite three tenders resulting in concessions for 85 locations (about 100 MW) largely due to unresolved legal issues such as land ownership. Legal assistance would be provided in a neutral manner such

that it would be found acceptable by relevant parties including MoE, the Energy Agency, and developers.

Biomass Collection Approach: Development of attractive biomass options such as wood pellets and CHPs will require developing a systematic approach to collect biomass from available sources, including forest waste, furniture/wood processing waste, winery and agricultural residue, and deliver the biomass to pellet production facilities. A collection approach would be designed and tested in cooperation with municipalities, wineries, farms, and pellet producers.

In addition to these top priorities, the Assessment identified a set of useful but lower priority program activities:

- Residential appliance labeling enforcement
- Municipal promotion of residential energy efficiency.
- Cross-cutting capacity building:
 - ESCO contracting
 - Bank training
 - Energy audit training/certification
 - Building certification methodology and enforcement.
- Biomass analysis and pilot activity for biomass-fueled Combined Heat and Power in industry, hospital, and municipal applications.
- Solar energy
 - Collector testing and certification
 - Improved GoM support mechanisms
 - Municipal pilot
- Municipal pilot
- Geothermal feed-in tariff (electric)

Other Considerations

One of the top priorities of the Macedonian Government is to reduce the level of unemployment by creating new opportunities in various sectors. Implementation of energy efficiency measures and development of renewable energy sources is still untapped potential in Macedonia and clearly is an area of opportunity. Traditionally, energy efficiency and renewable energy business activities, involving broad-based deployment of technologies and project activities, are labor intensive and create employment. Given that Macedonia is at early stage of development in the area of energy efficiency and particularly in the area of renewable energy, the job creation potential can be fairly significant and cost effective.

Energy efficiency and utilization of renewable energy are economically viable in Macedonia. By implementation of a number of measures there is a significant potential to reduce energy consumption, generate economic growth and improve the environment. The Technical Programs described in Section 3 of this document can be successful in Macedonia. USAID along with other donor organization have a critical role to contribute for meeting the objectives of further development of energy efficiency and renewable energy in the country.

1. INTRODUCTION

1.1 Project Background and Purpose of Assessment

This document is the deliverable for the Energy Efficiency and Renewable Energy Assessment in Macedonia under the Contract for Consulting Services between Ira Birnbaum, Energy Efficiency and Global Climate Change Coordinator at Europe and Eurasia Bureau and Dragan Blazev, Energy Expert (comprising the Assessment Team), and the USAID Mission in Macedonia. The main assessment objectives were to assess the current situation with respect to the development of energy efficiency and renewable energy in Macedonia and their importance for energy security, economic growth, and environmental improvement, and to develop conclusions and recommendations with respect to future USAID programming in this area.

Energy efficiency and renewable energy warrant strong consideration for potential USAID program activity due to the important benefits they offer to Macedonia. Increasing the use of energy efficiency and renewable energy reduces the need for conventional energy sources. In light of Macedonia's current reliance on a dwindling supply of lignite and the associated need to import electricity, there are important benefits in energy security and in the macroeconomic situation and the balance of trade as a result of reducing consumption of electricity and therefore reduction of energy imports and in job creation. By reducing consumers' energy costs, industries become more competitive; public services (health, education, public safety) are improved; and households have more disposable income. An additional important benefit is reduced emission of greenhouse gases. The Obama Administration has quickly made energy efficiency and renewable energy an important part of U.S. policy, both domestically as evidenced by the Economic Stimulus package and The American Clean Energy and Security Act of 2009 (the energy and climate change bill that was passed by the U.S. House of Representatives on June 26, 2009); and internationally in the strong priority being given by State Dept. to USAID clean energy and climate change related activities.

Being a candidate country to the EU, Macedonia aims to harmonize its policies, laws, regulations and standards with those of the EU. This includes measures to promote energy conservation and energy efficiency and to increase the share of electricity produced from renewable energy sources. In order to meet growing demands and partly substitute imported electricity, Macedonia needs to improve the energy efficiency mechanisms and stimulate the use of renewable energy sources that eventually shall lead to reduced energy consumption, reduced energy bills and increased savings. Therefore, it is critically important for the country to continue to meet the challenges for improving energy efficiency and increase the share of renewable energy in the overall energy balance.

The purpose of this assessment is to provide USAID/Macedonia with an in-depth analysis of the potential for development of energy efficiency and renewable energy sector, with a heavy focus on lessons learned from the experiences of previous years of effort in the sector, both by USAID and other donors in Macedonia, and provide insights as to whether and where USAID assistance would be most effective in further supporting energy efficiency and

renewable energy programs. This Assessment report is part of the broader action of USAID/Macedonia to determine what its programming should be in energy efficiency and renewable energy field in Macedonia for five years under the extension of Mission programming beyond the original planned close-out date of 2010.

The Assessment team held over 40 meetings from May 25 to June 5, 2009. The meetings were held with relevant Ministries, Agencies, Municipalities, NGOs, ESCOs, local and international FIs, local and international Project Developers, Suppliers and Equipment Manufacturers, Consultants, Academia and University professors. Additional donor coordination discussions included representatives of EC, GTZ, UNDP, and ADA. Two roundtable discussions were organized with project developers and local equipment suppliers/contractors and industry consultants under an ongoing UNIDO project. In addition, the assessment team met and interviewed three ongoing USAID programs that target energy efficiency and renewable energy development in the country to determine implementation status. Assessment team was supported by the USAID Macedonia mission, and included participation of Margareta Lipkovska-Atanasov from the Economic Growth Office. A schedule of the meetings and contact details of interviewed individuals appear in Appendix 4.

The Assessment Report covers the tasks identified in the Terms of Reference (see Appendix 1).

A presentation of the key findings from the assessment team was made to the USAID mission in Skopje on June 5, 2009.

1.2 Methodology and Data Sources

In order to assess the current stage of penetration of energy efficiency and utilization of renewable energy resources in the country, the assessment team collected technical data and information about the relevant legislative provisions, policy instruments and institutions available and in place. The assessment team gathered data with site visits and interviews directly from national-level institutions, regulatory agency, academia, in-country experts, suppliers and equipment manufacturers, and the leading literature on energy efficiency and renewable energy developed in the country.

To create an initial list of institutions to be visited, the following sources of information were used:

- Chamber of Commerce
- Business directories
- USAID reports and input on relevant companies and institutions that participated in prior projects
- Information from the local energy expert
- Other available sources of information provided by contacted institutions

Institutions were contacted by electronic e-mail and phone to schedule meetings. The introduction for the mission of the assessment team and objectives of visit were supported by request letter for meeting provided by the USAID mission in Macedonia.

During the visits discussions were held about past and current activities of the relevant institutions in the development of energy efficiency and renewable energy projects, difficulties and barriers to project development including legal and regulatory framework, policies and programs, and opportunities and recommendations for future where USAID could be of assistance.

The information evaluated in this assessment comes primarily from the following reputable sources:

- Interviews with the experts from MANU, Energy Regulatory Commission, Energy Agency, business associations, professors, energy consultants, project developers and organizations that participate in energy efficiency and renewable energy related activities as well as state and municipal representatives in Macedonia
- Energy Efficiency Strategy of Macedonia, 2004, Nexant
- Strategy for Energy Development of Macedonia 2008-2020 with a vision to 2030, MANU
- Energy Efficiency Stocktaking report 2008, ASE
- Renewable Energy Stocktaking report 2009, IRG
- National Environment Investment Strategy 2009-2013
- Study on Renewable Sources of Energy in Macedonia 2008, USAID's Business Environment Activity
- First draft of National Energy Efficiency Action Plan 2009-2016, IRG/MACEF
- Macedonia Sustainable Energy Financing Facility 2005, Nexant
- Macedonia Energy Policy Paper 2004, World Bank
- Urban Heating in the Republic of Macedonia, AES
- Macedonia in-dept review of the investment climate and market structure in the energy sector, 2006, Energy Charter Secretariat
- Summary of municipal energy efficiency demonstration projects 2005-2006, IRG
- Statistical yearbook for the Republic of Macedonia, 2007
- Macedonian Law on Energy and relevant secondary legislation on energy efficiency and renewable energy sources
- Other web and published sources, such as websites of the ministries, donor organizations, agencies, etc.

The report presents the findings of the assessment including main activities for sustainable development and implementation of actions over the life of the follow-on program and the timeframe required to achieve results.

1.3 Acknowledgements

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- Vlatko Gavrilov, Energy Regulatory Commission
- Vladimir Sarac and Ognen Dimitrov, Energy Agency
- Gligor Kanevche, Jordan Pop Jordanov, Tome Boshevski and Natasha Markovska, Macedonian Academy for Sciences and Arts
- Daniel–Alexander Schroth, EU
- Anita Kodzoman, UNDP
- Francesco Corbo and Vlado Bojadzievski, EBRD
- Frosina Nikolovska and Aleksandar Manevski, UNI Bank
- Marija Tanasoska, NLB Leasing
- Strahil Panev, GTZ
- Christian Melis and Goran Kovacevic, Italian Ministry of the Environment, Land and Sea
- Sasho Saltirovski, EVN Macedonia
- Zoran Kostov, Habitat for Humanity
- Katerina Stojkovska, REC
- Slave Armenski, MABEU
- Konstantin Dimitrov, MACEF
- Rubin Taleski, FEIT
- Dusica Perisic, ZELS
- Kiril Popovski, MAGA
- Dimitar Hadzimisev, Toplifikacija
- Aleksandar Tolevski, Fonko ESCO
- Heinz Hebertheuer and Robert Sarlamanov, ADA
- Atanas Kochov and Predrag Popovski, Faculty of Mechanical Engineering
- Representatives from municipalities of Karpos, Prilep, Bitola, Veles, and Kocani
- Representatives from local suppliers, manufacturers and project developers

2. ASSESSMENT OF THE CAPACITIES AND NEEDS FOR CLEAN ENERGY IN MACEDONIA

In 2006 the total primary energy consumption in Macedonia was 2,759 ktoe while the final energy consumption was 1,708 ktoe¹. In primary energy consumption, coal accounted for 45.5%, imported crude oil and oil derivatives for about 35%, biomass 6%, hydro power 5.1%, natural gas 2.4%, geothermal energy 0.4% and the remaining 5.6% was electricity from import. Domestic energy production covers about 60% of demand and 40% are provided from imports.

The table below shows the cost of imported energy carriers in Macedonia according the planned Energy balance of 2007².

	Energy carrier	Planned import	Unit price (US\$)	Total price (US\$)
1)	Electric energy	2,947 mil kWh	0.086	253,442,000
2)	Coal (Anthracite)	74,390 tonnes	250	18,597,500
3)	Coke	5,914 tonnes	286	1,691,404
	- Petrol Coke	109,100 tonnes	107	11,673,700
4)	Liquid fuel	1,147,600 tonnes	395	453,302,000
5)	Natural gas	113,000,000 m3	0.316	35,708,000
	Total:			774,414,604

The energy consumption in Macedonia is concentrated in four sectors. The highest consumption of final energy is in the industry 33.8%, residential sector for about 29.2%, transport 20.5%, and commercial and service sector 13.1%. The consumption in agriculture and forestry is about 1.8% and for non-energy use is consumed around 1.7%.

The basic energy infrastructure in Macedonia includes the electricity power system, coal mines, gas pipeline system, oil refinery and pipeline, thermal and geothermal systems. The total installed capacity for electricity production is 1,565 MW with annual electricity production of around 6,500 GWh. Of installed capacity, 1,010 MW are at thermal power plants with annual production of 5,200 GWh, and 555 MW are at hydro power plants with annual production of around 1,300 GWh³. The imported electricity share in 2007 was about 30%. In average, the price of imported electricity was three times higher than the domestic regulated production price of electricity. Going forward, lignite supplies from working mines will become exhausted in the medium term. This is a crucial point given that currently around 70% of power is generated from lignite, and power is used extensively in the residential (often for heating) and industrial sectors. The largest mines are part of thermal electricity plants and the coal from these mines is used for electricity production (around 7 million

¹ Strategy for Energy Development of Macedonia 2008-2020 with a vision to 2030, MANU, pg. 61, pg. 63.

² Source: Ministry of Economy; web: www.economy.gov.mk

³ Source: 2007 annual reports of ELEM, TPP Negotino, and EVN Macedonia.

tonnes per year) while around 200,000 tonnes per year of lignite from other smaller mines is used by industrial consumers and households. In addition, energy demand has increased in recent years, a trend that is likely to continue given forecast macroeconomic growth.

Macedonia has no oil or gas reserves. All crude oil is imported and is transported from Thessaloniki (Greece) to the refinery close to Skopje via an oil pipeline with a capacity of 2.5 million tons per year. According to the final energy balance of 2006, the annual consumption of oil products in Macedonia was 824,000 tonnes.

The main gas pipeline system of Macedonia has a capacity of 800 million m³ per year (one 20 inch line). It is around 98 km long, stretching from the border of Bulgaria to Skopje. So far, a few pipeline branches to cities have been built with a total length of 26 km and a distribution gas network exists with a length of 31.5 km. The gas is imported from Russia.

The total heating consumption connected to the central heating systems in Macedonia is about 630 MW. The central heating system of Skopje is the largest in the country of about 550 MW. At present, around 10% of end users or about 50,000 residential and commercial consumers in Skopje use central heating systems powered by heavy oil and natural gas. System losses of around 14 percent are not unduly high by regional standards, although there may be scope for economically viable loss reduction projects. At present, the heat consumption is metered on the level of substations and customers are charged per heated floor area. Toplifikacija, private owned district heating company in Skopje will start introducing consumption based billing next heating season.

By use of vendor financing the company will install heat cost allocators (HCAs) and thermostatic control valves (TRVs). For radiators that are not used there will be no fixed cost tariff charged, as this would dilute the incentive for energy efficiency. For next winter installation of HCAs will be optional, but it will become mandatory by winter 2010-11.

Electricity is widely used for residential heating in Macedonia, particularly in urban areas. Electric heating is both inefficient (as manifest in Macedonia's relatively high energy intensity) and undesirable from an environmental point of view in comparison to the use of gas for heating. Electricity is a highly polluting and GHG-intensive heating source in light of Macedonia's heavy reliance on lignite to produce electricity.

Regulation of the energy market is performed by an independent regulatory body, the Energy Regulatory Commission of Macedonia (ERC). ERC's energy policies aim at creating conditions for secure and efficient energy supply, improve investment climate for building new energy plants, provide competitive and non-discriminatory energy markets, and increase energy efficiency and utilization of renewable energy sources.

According to the statistics, the final energy consumption per capita in Macedonia in 2006 was three times lower than the consumption in OECD countries while the primary energy consumption per unit of GDP is almost four times higher. The reason for high energy intensity can be traced to the heavy

use of energy in metal processing industry, low-efficiency power generation, supply and consumption, and the prevalence of using electricity for residential heating during winter primary in areas outside Skopje.

According to the Macedonian Energy Development Strategy, in 2006 Macedonia had about 5.5 times more electricity consumption per unit of GDP in comparison to the developed European countries. The consumption of electricity has a steady growth of about 4-5% in the last several years. In 2007 the electricity consumption in residential sector accounted for 36% followed by large direct industrial consumers for about 26%, commercial and service sector of 10%, small industry for about 9% and the remaining were transmission and distribution losses.

2.1 Introduction to Energy Efficiency

Energy efficiency is important because it means using less energy to provide the same service or perform the same task. Energy efficiency also contributes for reduced emissions of fossil fuel combustion thereby helping the local and global environment. The reason for steady increase of energy consumption in Macedonia over the last decade is two-fold; the increase of economic activity in the industry on one side and the outdated technological means and old infrastructure that accelerates the inefficient use of energy on other side. Implementation of energy efficient measures shall result in businesses, households, government offices, schools and industries spending less on energy bills. The saved money can be spent in many ways that improve the lives and conditions for workers, consumers and citizens. For example, if all streetlights in Macedonia were exchanged for more energy efficient high-pressure sodium lamps savings of more than 38% of the street lighting electricity use, or the equivalent of 28 GWh of power would be achieved annually⁴. Moreover, if all households in Macedonia had energy efficient lighting, more efficient heating, and improved insulation, they would achieve electricity savings of 20% or more and the country could save another 500 GWh of power per year. Such savings would help reduce Macedonia's import dependence of energy and provide investments on the domestic market.

Combined action for development of energy efficiency and renewable energy projects could bring numerous benefits to the local economy from sustainable industrial and economic activity through improved industrial competitiveness, creation of jobs and thus reduction of unemployment, improved energy security to creation of cleaner environment by reduction of greenhouse gas emissions. Increasing energy efficiency and utilization of renewable energy sources will also reduce the energy cost per unit of output, thereby making Macedonian products more competitive in the EU and other export markets.

Energy efficiency is regulated by the Energy Law. The secondary legislation for EE that has been adopted is listed below.

- Rule book on EE labeling of home appliances
- Rule book on energy efficiency of buildings

⁴ Energy Efficiency Strategy of Macedonia, 2004, Nexant, pg. 1-1.

2.1.1 Residential Sector

Household energy use in Macedonia is inefficient and has a disproportionately high share of electric heat. The residential sector is the second-largest energy consuming sector in the country, representing almost 30% of Macedonia's energy consumption. The residential sector is characterized by very high use of electricity and very low use of natural gas, making the sector less efficient and more energy- and greenhouse gas- intensive than in other countries. According to Energy Development Strategy, the household energy consumption in Macedonia was 498 ktoe in 2006 and it is very high when expressed per unit of GDP. In 2006 the household energy consumption per unit of GDP in Macedonia is 4 times higher than the average in the developed European countries. This implies that, in spite of the relatively low consumption per capita, it is necessary to devote more attention to the measures for energy efficiency in households, i.e. measures for reducing the household energy consumption relative to the households economic power.

The consumption is dominated by the electricity (53% in 2006) and biomass (30%). Their share is even higher when the unregistered use of biomass and electricity is included. The share of thermal energy and oil products is 8% each and the coal has a modest share of 1%.

The relative share of electricity in households is more than twice the share of electricity in households in other European countries.

One characteristic of the European countries, particularly the developed European countries, is the large share of household natural gas consumption (close to 40%). The share of household natural gas consumption in the developed countries has continuously increased. ... The share of both natural gas and oil products consumption in households in the developed European countries is close to 60%. With a share of 8% in 2006, Macedonia has more than two times smaller share of oil products consumption in comparison to the developed European countries and Macedonian households still do not use natural gas. In that context intensive measures have to be taken to introduce natural gas in the households and to increase the share of oil products (LPG, heating oil) on the account of electricity.

The average family consumes 57% of the energy for heating, 25% for the home appliances (stove, refrigerator, vacuum cleaner, washing machines, air conditioning, ventilators, TV-set, computer etc.) as well as for street lighting, 11% for sanitary water and 7% for illumination. For heating energy, the households use primarily biomass with share of 59%, followed by electricity with share of 16%, heat [primarily in Skopje] and oil products with 12% each and coal with share of 1%. The electricity consumption for heating of the households is around 18% of the total electricity consumption in the households.

The considerable potential for improving energy efficiency in buildings, together with the high level of electricity use by households, makes the residential sector a key target for energy efficiency improvement programs. Priority targets for commercial projects include lighting systems, space heating and hot water.

Macedonia depends on imported fuel and increase of energy prices will make wasteful energy consumption an unaffordable burden for income-constrained

consumers. Existing analysis suggests that there is a significant potential for a cost-effective implementation of energy efficiency measures in residential buildings.

2.1.2 Municipal Sector

Energy use in the municipal sector exhibits similarities to the residential sector, i.e., inefficient use characterized by high levels of electricity. Building envelopes tend to be old, poorly maintained, and lacking good insulation and windows due to limited budgets, lack of concern over in light of low energy prices, and until very recently the lack of municipal autonomy.

Macedonia is structured in 84 municipalities and the city of Skopje as a separate unit of local self-government. The regional reform is going ahead with fiscal decentralization in place since July 2005. Following two years grace period, the municipalities gained new responsibility to manage their future investment needs with their revenues. When the second stage of decentralization will be completed, municipalities will be able to borrow directly from financial institutions and to offer financial guarantees in respect of loans.

The Energy Law obliges municipalities and the City of Skopje to develop and implement five-years Local Energy Efficiency and Renewable Energy Programs including action plans for their implementation in schools, kindergardens, libraries and municipal administration buildings. This should create a larger market for energy efficiency and renewable energy utilization in Macedonia.

There are several barriers to energy efficiency and renewable energy utilization in municipalities including rules for public tendering, no departments responsible for energy efficiency and renewable energy, lack of awareness to energy efficiency among municipal decision makers. Changing of staff every four years is also a barrier.

2.1.3 Industrial Sector and Hospitals

The industrial sector is the largest energy user in Macedonia, consuming about 34% of energy used in the country.

According to the draft Energy Development Strategy, the most intensive consumer is the steel and ferroalloy industry with a relative share of 61% from the overall energy consumption in the industry in 2006, followed by the non-metal industry (21%) and food and cigarettes industry (6%).

Macedonia has a relatively high energy consumption in the industry sector even when the analysis is performed using the economic power of the country. The industry sector used mostly electricity and oil products with 33% and 32 % respectively in 2006, followed by coal with 19%, thermal energy with 10%, natural gas with almost 6% and wood with less than 1%.

In order to reduce energy consumption and energy intensity in the industrial sector, a coordinated action needs to take place. This could include seminars of similar industries at the Chamber of Commerce as well as information sharing and technical support in preparing bankable business plans that will target EE projects. Pilot projects might be a viable option.

In the era of globalization, Macedonian industries face a new development cycle aimed at increased productivity, increased value added per employee,

and decreased operational costs. These efforts may also render beneficial advantages from energy efficiency. Potential EE measures in Macedonian industry include increasing efficiency in motor drives and air compressors, efficient utilization at industrial boiler plants, or waste heat recovery.

Although hospitals do not belong to the industrial sector, their high energy consumption, continual operation (24 hours per day; seven days per week), and poor condition of energy systems primarily in the state run hospitals demand for immediate attention. Recent studies reveal that energy savings could be significant if proper action is taken. GoM could be advised on this evident energy efficiency potential that will reduce energy bills and thus improve the economy at the hospitals as well as provide better services to patients including faster recovery times and corresponding lower health care costs.

2.2 Introduction to Renewable Energy

Macedonia has promising indigenous renewable energy resources. These include hydropower, geothermal energy, biomass energy, solar and wind energy. At present, the potential for use of renewable energy sources in Macedonia is underutilized. Even though various project developers have identified a pipeline of financially viable renewable energy projects, these have not yet been implemented because of financial and institutional constraints.

Existing use of renewable resources in Macedonia includes large hydro power for production of electricity, biomass in the form of firewood and briquettes for heating of households, geothermal energy for heating greenhouses, and solar energy for heating sanitary hot water for households. In the Energy Balance these forms of energy represent about 10% of the total annual primary energy consumption.

Another untapped source of renewable energy is the wind potential. According to recent investigations and measurements there are several potential areas that prove to have sufficient wind power for electricity production, particularly in the area around the town of Stip and several mountain ridges in Southern Macedonia.

A positive initiative in Macedonia has been the recent decision by the Government to subsidize the households that install solar collectors by participating with up to Euro 300 for each collector installed. Still, more needs to be done in order to illustrate the possibilities of renewable energy sources and energy efficiency. One way is for the Government to initiate and support subsidized programs for EE and RES equipment on a continuous and sustainable scale. The Ministry of Economy, which is in charge of the legislation for the energy sector has started the development of the Strategy for use of renewable energy sources. This strategy is expected for adoption in late 2009.

Electricity production from renewable energy sources should also be encouraged to reduce fossil fuel use and environmental pollution. An energy regulatory framework has powerful tools (feed-in tariffs) for guaranteeing long-term predictability of demand for such products and boosting the market for electricity from co-generation plants and RES.

Removing barriers for use of these renewable energy supply options would increase the supply from indigenous energy sources, reduce the need for importing energy, create local employment options and mitigate the adverse environmental impact of energy production.

Utilization of renewable energy sources is regulated by the Law on Energy and Law on Construction. Secondary legislation for RES that is adopted in the country is as follows:

- Rule book on renewable energy sources for electricity generation
- Rule book on the method for issuing guarantees of origin of the electricity generated from renewable energy sources and the content, form and method for maintaining the registry of issued guarantees of origin of the electricity generated from renewable energy sources
- Rule book on the methods and the conditions for regulation of the electricity price
- Rule book on the conditions, methods and procedure for issuing, changing and revoking licenses for performing energy activities
- Transmission system Grid Code
- Power distribution system Grid Code

In February 2007, the Rulebook on feed-in tariffs for purchase of electricity produced from small hydropower plants was published by the Energy Regulatory Commission (ERC). The feed-in tariffs apply to the quantity of electricity produced and delivered by newly constructed run-of-river small hydropower plants, which have qualified as privileged producers (Table below). The privileged producer is obliged to use the feed-in tariffs approved for him for 20 years. The electricity market operator (MEPSO, state owned transmission company) is obliged to purchase the total quantity of electricity delivered by the privileged producer under the approved feed-in tariffs.

Feed-in tariffs for the sale of electricity produced by small hydropower plants

Delivered quantity (block)	Monthly quantities of delivered electricity (kWh)	Annual quantities of delivered electricity (kWh)	Privileged tariff (€cents/kWh)
I	1 – 85.000	1 – 1 020 000	12.0
II	85 001 – 170 000	1 020 000 – 2 040 000	8.0
III	170 001 – 350 000	2 040 001 – 4 200 000	6.0
IV	350 001 – 700 000	4 200 001 – 8 400 000	5.0
V	Above 700 000	Above 8 400 001	4.5

The Rulebook on the method and procedure for determination and approving the use of feed-in tariff for purchase of electricity generated by wind power plants was adopted by ERC in May 2007 (8.9 €cents/kWh, ex. VAT).

The Rulebook for feed in tariff for purchase of electricity produced by power facilities using biogas as fuel was adopted by ERC in November 2007 (13

€cents/kWh, ex. VAT for biogas facilities with installed capacity ≤500 kW or 11 €cents/kWh, ex. VAT for biogas facilities with installed capacity >500 kW).

The Rulebook for feed in tariff for purchase of electricity produced by PV power facilities was adopted by ERC in September 2008 (46 €cents/kWh, ex. VAT for PV facilities with installed capacity ≤50 kW or 41 €cents/kWh, ex. VAT for PV facilities with installed capacity >50 kW).

The electricity market should be open from January 1, 2015.

2.2.1 Small Hydro

In 1982 the University in Skopje produced a Study that confirmed there is a potential for construction of 406 mini and small hydro power plants with total installed capacity of about 250 MW. According to the Hydrology base of Macedonia, 1088 GWh of electricity could be generated by SHPPs, representing 17.5 % of the technically available hydropower potential in Macedonia. The units range from 50 to 5,000 kW of installed capacity.

Since 2007 there were three international tenders for SHPPs launched for award of 20-year concessions (DBOT model) of water for production of electricity. In total about 85 locations were awarded. However, no concession agreements are signed with selected contractors yet. Meetings with local FIs and project developers identified legal issues (land ownership, power purchase agreements, etc) for project financing as a main bottleneck that prevents signing of concession agreements with the Ministry of Economy. In addition, there is a long procedure once the concession agreement is signed, which involves dealing with a number of agencies, institutions and ministries to start plant construction. Signing of concession agreements was announced by the Ministry of Economy for mid June but it is still uncertain if this event will occur.

2.2.2 Biomass

According to the energy balance of 2007, biomass contributed about 6% in the primary energy supply while 9.5% of the total final energy consumption in Macedonia. The annual production of firewood use for local supply is about 600,000 m³. The total area under forests in Macedonia is 955,300 ha, that is 37% of the territory of the country. The estimate of the annual woodcutting mass is about 1,3 million m³, and the share of firewood is 80-85% of it. Biomass, in the form of wood and charcoal is almost exclusively used in the domestic sector. Industrial or other uses are very small and represent less than 1% of the total biomass final energy consumption. In addition, there is relatively high potential in the country for utilizing biogas from animal manure for energy generation purposes, as well as growing crops for production of biofuel.

From meetings with relevant institutions the assessment team concluded there is a potential to use wood pellets to replace firewood for heating in the residential sector. The estimated annual wood waste in Macedonia is about 180,000 m³. The wood waste is not being utilized. With proper assessment and clear strategy the wood waste could be used for production of pellets. The initial assessment is that the price for pellets produced locally would be competitive to the ongoing price of firewood while pellets have higher efficiency for heating and are much cleaner, environmental friendly and convenient to use compared to firewood. In order to create the market, sustainable supply of

pellets from the local market will need to be developed. The local manufacturers of firewood furnaces confirm that the switch to production of pellet furnaces is possible to be made if there is a demand from the local market. However, detailed assessment and strategy need to be prepared that will address transition to using technology of pellets. Moreover, better forest practices, reforestation, planting of deserted or marginal land could make a contribution, be it relatively small, to the further development of this sector.

As far as exploitation of the residues of field crops, fruit tree plantations and livestock activities are concerned, there ought to be a significant potential for their collection and utilization, along with waste (including manures from intensive farms). This could be done through incineration or anaerobic digestion technologies. But special studies and surveys will have to be carried out to determine location, logistics, and size of units, economics and viability, likewise with the municipal solid waste and the waste of sewage.

2.2.3 Wind

At present, wind energy is not utilised at all in Macedonia. Over the past three years there have been several activities for measuring wind power at several locations and there are undergoing feasibility studies. With grant support by the Norwegian Government, the Norwegian company (NTE) in cooperation with ELEM has undertaken wind measurements in four sites but no further details have been published yet. In 2005 the preliminary wind atlas was developed by the American company AWS Truewind which estimated the wind potential in Macedonia and determined attractive regions for use of wind power. According to the preliminary atlas the most favourable regions are hills and mountains nearby the Vardar River and between Kavadarci and Gevgelija where the wind speed averages 7.0-7.5 m/s. Several areas have been identified to have potential for wind farms development: Kozhuf, Bogdanci, Shashavarlija, Bogoslovec, Venec, Erdjelija, and Demir Kapija. However, data from measurements are not public which hinders the process of attraction of investors interested in wind development.

In order to facilitate investment in wind energy development in Macedonia, the World Bank is assisting in preparation of wind integration study in order to understand implication of integrating wind farms in the mix and to assist the transmission system operator to deal with issues relating to absorption capacity and connection requirements.

2.2.4 Solar

There is no complete data for the solar energy potential in Macedonia; however, initial indications show promising possibilities. Use of solar energy is limited to a small number of solar water heaters.

According to the energy balance in 2006, the share of solar energy in the final energy consumption was 7.4 GWh (0.6 ktoe), or 0.04%. Macedonian factor of 8 m² solar collector footprint per 1000 inhabitants shows low utilization of solar energy. There are about 16,000 m² total area of installed flat panel solar

collectors for heating domestic water. The solar collectors are used in residential sector, hotels, camps, and dormitories. A residential house uses about 2-6 m² of flat solar collectors which is sufficient to meet the demand for domestic water heating. There are pilot projects where solar systems are used for space heating but their space heating capacity is limited to about 30%. Industrial solar heating water systems are currently not used in Macedonia.

There are local manufacturers of solar collectors in the country. Based on the current production and the level of development there are promising possibilities for the market of solar collectors. The annual rate of growth of the local market is about 10-15%, but much larger for export. The average domestic payback time is 6-7 years. However, several issues need to be resolved as indicated by manufacturers, such as testing/certification/labeling of solar collectors (solar key mark) in order to protect the market from low quality solar collectors, and to provide training to installers for their proper installation. The Government has lowered the VAT rate for solar collectors from 18% to 5%. However, the VAT reduction applies only to the solar collector, which represents about 20% of the cost for the entire system, and therefore does not provide sufficient incentive for their purchase.

PV solar energy is still 300-500% more expensive than alternative fossil fuel derived sources for production of electricity. However, given the high preferential feed-in tariff of 46 €cents/kWh for installed capacity of up to 50 kW, PVs are considered a sound investment. In June 2009 the first PV plant with capacity of 10.2 kW has been commissioned by private investor nearby Skopje.

2.2.5 Geothermal

In general, geothermal waters in Macedonia are of insufficient temperature to be used for electricity production. At present, there are 18 known geothermal fields with more than 50 geothermal sources and wells. The total outflow is about 1,000 l/s with temperatures from 20 °C to 78 °C.

However, geothermal resources are used for heat production as illustrated by investments in the Kocani geothermal district heating system and the development of agricultural related geothermal projects in Gevgelija and Vinica. According to the "Assessment of Geothermal Resources in Macedonia," from 2001 the produced geothermal energy in Macedonia is about 210 GWh while potential for geothermal energy is estimated at about 500-600 GWh annually. Currently there is a substantial exploitation of geothermal energy for individual space heating (2.5 MWth and 25.8 TJ/year), greenhouse heating (58.8 MWth and 557.5 TJ/year), and for balneology and hot water heating (1.0 MWth and 15.3 TJ/year), and there are plans for further development of geothermal projects in Kocani, Bansko and Gevgelija.

Geothermal experts indicated that a feed-in tariff needs to be defined for geothermal energy as well as develop an in-depth feasibility study to investigate the potential areas of geothermal energy.

2.3 Main Barriers and Opportunities

Low electricity price. Although the electricity price increased slightly over the last 2-3 years it is still far behind the electricity price of not only the EU countries but SEE countries as well, especially in residential sector. The table below shows residential electricity price in Macedonia compared to other countries.

4th Q-Electricity Residential tariff US cents/kWh

	2006	2007	2008
Albania	8.78	10.13	11.01
BiH	10.51	11.73	13.51
Bulgaria	8.80	10.63	11.24
Croatia	12.68	14.24	14.76
Hungary	16.91	19.73	20.34
Macedonia	6.33	7.18	7.01
Montenegro	8.81	11.47	13.49
Romania	13.43	15.96	12.14
Serbia	6.57	8.44	7.72
Turkey	11.23	13.11	15.81
Kosovo	4.32	8.57	8.27

Source: ERRRA statistic data

The average price of electricity for households in Macedonia is about three times smaller than the one for households in the EU countries⁵. Moreover, the average electricity price for households in Macedonia is about 30% lower than the electricity price in Bulgaria and roughly half the price in Romania, Montenegro, BiH, and Croatia. The electricity price is regulated by ERC. The low price of electricity impacts the decision of household owners from switching to other ways of heating primarily in areas outside Skopje and hinders the returns of investment due to longer paybacks based on energy savings. At present, the residential electricity price is considered to be a social category in order to protect the low-income households. This situation is likely to change with the deregulation of electricity market that should introduce electricity market price by January 1, 2015. In parallel, the government shall build the social safety net for the poor and introduce relevant program mechanisms to address high electricity costs for the low-income families.

- **Potential USAID Response.** The new Law on Social Protection under approval by the Government addresses the low-income energy interventions by introducing assistance payments to about 60-70 thousand socially vulnerable categories. Assistance payments shall be cash payments provided directly to poor families or to their energy suppliers in order to reduce the size of the electricity bill based on the size of the family and income level. The main advantage of this approach is that it provides immediate tangible relief to households. The main disadvantage is that the

⁵ Eurostat, December 2008 for EU and for the households in Macedonia, Regulatory Energy Commission of the Republic of Macedonia, annual reports for the consumers of 110 kV and of the distribution grid

payments and the administration of the program are expensive for the government. Another disadvantage is that recipients may have little incentive to conserve energy if payments are seen as going directly to the energy suppliers.

Potentially USAID could provide assistance by proposing a low-income energy-efficiency program that will seek to lower poor families' energy bills by installing basic low-cost energy-efficiency measures in their homes. The program should provide free of charge such basic measures as weather-stripping of window and door frames; foil backing for radiators and thermostatic radiator valves (TRV) for radiators in district heating households and compact fluorescent lamps. This kind of energy efficiency improvement can be more cost effective and beneficial than perpetual subsidies. An energy-efficiency program is superior to assistance payment program because it is only need to be provided to a household one time and thus reduce or eliminate the need for assistance payments; it improves comfort as well as energy efficiency; it not as vulnerable to corruption because energy efficiency installers visit the households and can clearly see if the household is not poor; and by reducing energy bills they free up money for low-income families to use on other needs. Such program can be combined with the ongoing program of Habitat for Humanity for helping the socially vulnerable categories by extending loans or developing buildings. A pilot project for a multifamily building that might be developed by USAID is supported by the Ministry of Labor and Social Affairs and could trigger further assistance by the Government in support of energy efficiency program.

By providing well-targeted low income energy efficiency assistance, electricity pricing for the general population could be increased to economically justifiable levels, thereby improving the financial position of the electricity providers and providing motivation to consumers to implement energy efficiency improvements.

Lack of an EE and RE policy framework: Local stakeholders have repeatedly expressed that current regulations are not supportive of EE and RE projects and that there is a need to have local policies reflect the economic and environmental benefits of EE and RE. There is a lack of coordinated approach between key institutional stakeholders (MEPSO – market operator, ERC, Energy Agency, Ministry of Transport and Communications, and Ministry of Economy) that should be addressed in order for the process to be aligned and conveyed in a straight-forward manner for investors. All procedures should be streamlined and clearly coordinated in order to define a set of clear guidelines for investment in EE and RE projects.

- ***Potential USAID Response.*** USAID should request a show of support from the Government in the form of creating a high-level task force involving relevant ministries and other organizations. USAID could support the task force in sharpening and streamlining the legal and institutional framework, including proving best practices from other countries. Once the streamlining improvements have been implemented, USAID could support preparation of a comprehensive investor guide that should include all steps

for developing RE projects and disseminate it to all relevant institutions and stakeholders.

Lack of enforcement of EE and RES legislation and long and complicated administrative procedures. Although there is a progress in defining and adopting the secondary legislation of EE and RES, there is a clear evidence that implementation of legal provisions is lagging behind. Clear set of rules and enforcement measures need to be put in practice. Furthermore, the administrative procedures are still to be tested since there is no single project realized yet. The administrative procedures involve several institutions and ministries which extends the project preparation phase and makes the project costly and risky. A geothermal energy consultant stated that 13 documents are needed from various state institutions to start geothermal exploration. Long administrative procedures increase the risk for entry to RES market in the country.

- ***Potential USAID Response.*** Assist the Ministry of Economy and Energy Agency in preparation and review of secondary legislation by providing best practices of other countries and incorporating them into Macedonian legislation. Laws need to be coordinated with the secondary legislation. The administrative procedures should be simplified which will reduce the time for project preparation and investors financial risks and decrease development costs.

Lack of capacity and awareness for energy conservation potential in municipalities: Since 2005 USAID supported municipalities in developing energy efficiency projects through implementation of pilot demonstration projects in three municipalities and training municipal teams for preparation of municipal energy efficiency plans (MEEP). Overall at present there are six MEEPs developed and other five plans are subject to additional financing by the Norwegian Government. One of the MEEPs resulted in the first project to be financed by a municipality under new decentralization authority – the Karpos school construction project financed under DCA. Other MEEPs are in the process of being formally adopted by the municipal councils, with some now awaiting Ministry of Finance certification to borrow in order to finance project implementation. Elsewhere, Macedonian municipalities have a considerable untapped energy conservation potential, unlocking of which would help to help reduce municipal budget spending and save money for books or cover other municipal costs. The strongest indication of this potential is the high energy intensity in schools and administrative buildings that are under municipal authority. The initial results show about 15%-25% potential in energy savings in projects with payback from several months to about 12 years. Street lighting is identified as highly attractive project where savings range from 25%-40% with payback of 3 to 5 years. There are total of 84 municipalities and the city of Skopje in Macedonia.

- ***Potential USAID Response.*** Establish and train an EE resource center at ZELS that will help establish municipal teams. The resource center would further provide training to municipalities to develop MEEPs and provide any ongoing support on tendering, contracting, licensing (plants with capacities

below 1 MW need to be licensed by municipalities) and developing municipal EE and RES projects. In addition, the EE resource center can provide a central point for developing an energy use database that will include all municipal energy infrastructure. In order for the EE resource center to be sustainable ZELS could charge a fee for participating municipalities. ZELS indicated support for this concept and is willing to work with USAID to meet this objective. Another alternative is to organize existing regional centers to include energy efficiency capacity that will further facilitate the work of municipal teams in their respective regions. At present, there are eight regional municipal centers in Macedonia whose main objective is to foster inter municipal cooperation, information sharing and regional development.

Low awareness of the economic benefits of EE and RE: Given the limited track record of EE and RE projects in Macedonia, there is a low level of awareness regarding the financial benefits that can be achieved through EE and RE projects. In addition, there is a lack of awareness, information, and confidence on the part of Small and Medium Enterprises (SMEs), industrial facilities, Government/budget entities, and residential consumers, on the efficiency of EE investments and technology. In general, benefits from EE and RE investments are perceived as solely environmental or social driven rather than to achieve economic gains.

- ***Potential USAID Response.*** Outreach information campaigns, seminars and workshops should be conducted to promote the benefits of EE and RE to end-users. To the extent possible, marketing materials should be customized to meet the needs and interests of specific end-user segments. One way for this is the USAID to work with EVN Macedonia to disseminate promotional materials to about 720,000 electricity customers in Macedonia. Such information campaign should target EE and RE investments primarily in residential sector with showing direct benefits of return by energy savings and use of energy labeled appliances. For example, local supplier of thermal solar collectors identified that by installation of a solar collector for water provides 90% of energy for water heating throughout a year and has a payback of 5 to 6 years.

Limited development of a local energy services industry. Several meetings with key stakeholders identified a lack of available energy experts and services rendered on the local market as a key barrier. Specifically, at present, there is limited local available assistance with EE and RE project identification, design, specification, installation, financing, monitoring and verification. Although some local companies provide technical and financial support on selected occasions, there are a few private firms that offer the types of energy services that are required to move a project from inception to completion.

- ***Potential USAID Response.*** USAID could provide assistance to develop train-the-trainer services to appropriate technical universities and/or NGOs (e.g., ZELS EE resource center, ZEMAK industrial energy engineering association) that will educate and train local engineers on developing energy audits (for the municipal/residential and industrial/hospital sectors,

respectively) and associated business plans. The energy audit training would provide the basis for certification of engineers -- as required by the national building code -- by the Energy Agency or another independent body appointed by the Ministry of Economy. Furthermore, USAID could assist in organizing a campaign to promote ESCOs which would include a series of investment seminars that seek to engage private sector firms into the energy efficiency business and bringing interested western ESCOs to Macedonia to facilitate joint venture partnerships with local companies. The seminars will review the local investment potential of specific EE and RE measures and highlight the potential economic gains that can be realized through the implementation of projects. The target audience for these seminars should include local equipment suppliers, engineering firms, and environmental consultants. FI representatives should also be included in these seminars in order to increase the level of contact between project developers and financing sources.

Lack of local financial institution (FI) experience in technical evaluation of EE and RE projects: Challenges in financing projects will likely be compounded by the fact that local banks have little or no experience in technical evaluation of EE and RE projects, which hinders decision to provide financing. FIs are unfamiliar with how to assess the risks of financing EE and RE projects and with ESCO performance contracting practices. Further, current loan evaluation procedures focus almost exclusively on collateral with limited analysis of the cash flow that a project would generate.

- ***Potential USAID Response.*** Meetings with local FIs from UNI Bank and NLB Leasing highlighted the importance of providing banks with technical assistance to foster their entry into EE and RE lending. Therefore, it is important that the USAID actively promote and utilize its DCA loan-guarantee mechanism and further raise public awareness. Furthermore, to raise the comfort level and understanding of local FI staff, training courses should be conducted of financing and developing EE and RE projects. They should address the special features of structuring EE transactions, including lending to ESCOs and utilization of project financing schemes. Training efforts should also focus on marketing techniques that FIs can use to successfully market the DCA. Local FIs should be part of a broader campaign that will target public awareness for existence of attractive loans for implementation of energy efficient measures, e.g., brochures promoting the availability of DCA loans in the lobbies of UNI Bank and NLB Leasing branches, bill payment offices of EVN and Toplifikacija, and with utility bills.

2.4 Donor Assistance: Existing Facilities and Technical Assistance/ Capacity Building Programs

There are several current and planned facilities and projects by bilateral and multilateral institutions in Macedonia.

A credit and guarantee scheme for building sustainable energy efficiency and renewable energy sources is established through the state owned Macedonian Bank for Development Promotion (MBDP) and five local, commercial banks:

Komercijalna Banka, UNI Banka, NLB Tutunska Banka, IK Banka, and Ohridska Banka. Energy efficiency projects are financed up to \$500,000 per project with the following financial structure: 60% MBDP, 10% owner's equity, and 30% commercial bank participation, with a repayment period up to 4 years. Renewable energy projects are supported up to \$4 million per project with the same financial structure as for the energy efficiency and a repayment period from 5 to 10 years including a grace period of 3 years.

In March 2009 EBRD has launched two investment facilities that provide debt financing for renewable energy and industrial energy efficiency projects to small and medium-sized enterprises in the Western Balkans including Macedonia, as follows:

- Western Balkans Sustainable Energy Direct Financing Facility. €50 million to provide direct individual loans between €1 and €6 million to industrial energy efficiency and renewable energy projects. The facility is complemented with grant funding for Technical Assistance for project identification, preparation and implementation verification. Incentive payments of up to 15% of the loan principal shall be provided to eligible projects upon successful physical completion of the construction and beginning of operation of project facilities. The repayment period can be up to 12 years including a grace period of 2 to 3 years.
- Western Balkans Sustainable Energy Credit Line Facility. €50 million to provide loans to participating banks for on-lending to sub-borrowers for energy efficiency and renewable energy investments up to €2 million per project in the industrial sector or in buildings used for commercial services. . The facility is complemented with grant funding for marketing and awareness raising, establish technical eligibility criteria, prepare/appraise projects, implementation verification, etc. Incentives payment up to 20% of the loan principal shall be provided to eligible projects. At present, EBRD is under negotiations with two local banks, which finalization is expected by August 2009.

EBRD local representatives expect Macedonia to participate in both facilities with 1 to 2 projects every year. The interest rates are market based. Collateral will be required and will depend on the type of the financing provided.

USAID (E&E Bureau and Macedonia mission) has introduced two DCA (Development Credit Authority) facilities to support small and medium sized enterprises and energy efficiency projects in Municipalities and Residential sector. The SME facility is \$9 million split between two financial institutions – UNI bank (\$5 million) and NLB Leasing (\$4 million). The energy efficiency facility is \$10 million split equally between the same two financial institutions. The maximum loan amount for Municipalities and Residential Sector is set at \$400,000 while for SMEs is extended to \$500,000.

The first disbursements started early 2008. The credit market for municipalities is at early stage of development, and USAID believe that by providing this facility strong and credible relations between the private lenders and the local government units would be established and developed.

In addition, new and existing small and medium enterprises need finance to expand their operations and enhance their growth. USAID also believe that by

this guarantee that covers 50% of the banks risk, banks would engage in more non-traditional lending activities. After one year in operation, SMEs lending has been extended to more than 15 companies with loans ranging from \$6.5k to \$200k. Municipal lending has been extended to one Municipality while no residential loans have occurred yet.

The Ministry of Finance and Association of Local Self Government Units (ZELS) fully support this initiative.

Currently, USAID is supporting development of energy efficiency projects that can be financed by DCA through MLGA, and PEP projects. Building on Norwegian municipal project, MLGA helps five municipalities to establish EE units and prepare MEEPs and assist with creditworthiness to prepare municipalities to borrow, while PEP is renovating primary school buildings that improves their energy efficiency. The measures include window replacement and weatherization measures and improvement of heating systems; the measures are requested by the municipalities rather than selected on the basis of cost-effectiveness analysis and therefore may not represent optimal improvements. By now they have renovated about 50 schools while the target is to do about 100 schools by the close of the program in two years. (Some contractors expressed concern that selection is determined on the basis of lowest bids without consideration of the quality of material used, which can affect energy performance as well as customer satisfaction.)

Joint Office between the Ministry for Environment, Land and Sea of the Republic of Italy and Ministry of Environment and Physical Planning of the Republic of Macedonia was established in 2005, similar offices in other Balkan countries. Their main goal is to identify and propose CDM project ideas, for which Italian and Macedonian companies offer to develop a Project Design Document (PDD). The Joint Office provides technical and legal support for development of CDM projects, promotion of projects to Italian investors, and institutional development (establishment of Designated National Authority [DNA] office and capacity building at the Ministry of Environment and Physical Planning). Currently, the Joint Office is preparing an assessment on optimization of electricity and weatherization measures and potential use of photovoltaics and geothermal heat pumps at pilot schools in several municipalities.

World Bank; In late March 2009 the World Bank approved a credit line of US\$ 25 million to support municipal infrastructure projects in Macedonia, including energy efficiency projects. The interest rate shall be based of LIBOR. The payment of loan shall be up to maximum of 13 years with grace period of up to 6 years. The project aims to improve transparency, financial sustainability, and delivery of targeted municipal services in the participating municipalities. The project has four main components. The first component will provide sub-loans to municipalities for investments in revenue-generating public services and other investment projects of high priority to municipalities and with cost saving potential. The second component will finance technical assistance grants for sub-project preparation, local capacity building for municipalities and Communal Service Enterprises (CSEs) to improve performance in service provision, and national level Institutional strengthening. The project's third component will provide investment grants to municipalities as an incentive and

reward for implementation of reform initiatives aimed at performance improvements in service delivery. The fourth component will assist with project implementation and monitoring.

GEF; In 2005 GEF implemented the Sustainable Energy Program. Under this program a grant of \$5.8 million was awarded to Macedonia, through the World Bank as an implementation agency. The basic objective of this Program is to stimulate investments in energy efficiency and use of renewable energy sources by removal of institutional and financial barriers. The project includes technical assistance to the Government in designing and implementing policy and secondary legislation on the inclusion of renewable energy in the electricity sector, and project development and project investment support. This is being realized through the establishment of 1) State Energy Agency in charge to issue and maintain registry of guarantees of origin for electricity produced from renewable energy resources; 2) Sustainable Energy Financing Facility, consisting of a loan guarantee facility and a debt fund, on a co-financing basis with commercial institutions and the Macedonian Bank for Development Promotion (MBDP); and 3) Support to Utility-based ESCO that will help to stimulate the market for energy services by providing turnkey and performance-based contracting for energy efficiency, and by demonstrating the financial performance of such projects using third-party financing for publicly-owned buildings.

Apart of this program, GEF is implementing a Small Grant Program in Macedonia that supports activities of non-governmental and community-based organizations in developing countries for climate change abatement. The program is implemented by UNDP and channelled directly to NGOs. Several small-scale energy efficiency pilot projects in municipalities are implemented with average grant amount of \$20,000.

ADA; In mid 2009 ADA will start a three-year project of Enabling the environment for introducing energy efficiency in buildings in Macedonia. The purpose of the project is to reduce the energy demand of Macedonia in general, and more specifically to reduce the use of electricity in residential and public buildings by 20-30%. More specifically, the goal of the project shall be met by strengthening the capacities of the Macedonian Energy Agency, establishing of a "Book of Rules", transposition of the EPBD and development of applicable energy efficiency tools, creating an enabling environment for the implementation of energy efficiency regulations in the building sector of the country by development of energy efficiency regulations for the building sector, the demonstration of energy efficiency on one public-building-pilot-project, and by creating a cross-country academic platform on energy efficiency in buildings.

GTZ Macedonia is supporting regional projects in energy efficiency and renewable energy. There are no current bilateral programs. Recently GTZ opened a regional EE fund for cooperation of country's capitals: Zagreb, Podgorica, Sarajevo, and Skopje. In the past, GTZ implemented one project in the building sector in Macedonia which included transposition of EU standards and norms to Macedonian standards and norms, training of planners and architects of how to use technical standards, support to Ministry of Transport and Communications for establishment of the Chamber of Architects and Engineers, and preparation of handbook for energy savings in buildings.

UNDP Macedonia is focused in three areas: environment, social inclusion and support for municipal decentralization. UNDP and Fortis Bank developed a carbon fund where UNDP provides support in soft components until validation while Fortis Bank provides CERs by upfront agreed price. Soon UNDP will start a joint project with ADA to support municipalities in capacity building for development of energy efficiency projects and help prepare municipal energy efficiency plans targeting municipalities where UNDP has prior experience. In addition, UNDP shall finalize the climate map and data for methodology calculation in Macedonia. Currently, UNDP works with a project proponent for developing project for biogas production from swine farms in Eastern Macedonia.

2.5 Financial Environment

International tenders have been organized for a large number of small hydro power plants, several offers received and winners selected. However, yet no contract have been signed. The Government is still discussing how this can be organized properly. Concession can not be given for state owned land, leasing is possible. At some sites the Government would need to expropriate privately owned land, register the land as state owned, and then do leasing. Leasing period shall be 20 years (plus three years for construction). Another barrier is the environmental impact.

ELEM, the state owned electricity generation company, have done some EE projects in their generation facilities. A feasibility study for a 50 MW wind farm, supported by the European Reconstruction Fund, is under development, after which they will start seeking for financing.

According the Energy Law, municipalities should prepare five-year energy efficiency plans (including action plans) and plans for utilization of renewable energy. MANU is preparing a new Energy Strategy on Renewables that is expected to be ready by September 2009.

The MT ESCO established within the GEF/World Bank "Sustainable Energy Project", as a joint venture between MEPSO and Toplifikacija, is still not operational. A new MoU regarding operational support and funding of the ESCO is being prepared, and needs to be approved by the World Bank and Macedonian Ministry of Finance. The plan includes replacing MEPSO with ELEM. It is expected that the ESCO staff will be operational soon and they will be starting from scratch.

Toplifikacija is working on modernization program for their district heating system including sub-station renovation. Toplifikacija is a 20% partner in a new 220 MW co-generation project being implemented through a Kyoto carbon transaction. The plant is built with Russian co-financing.

Toplifikacija Engineering was established in 2007. In addition to provide engineering services to the mother company, they are also providing services to other clients. Their field of business includes design and documentation of central and district heating systems, design and documentation for HVAC systems, energy efficiency projects, and trade of HVAC equipment

Due to the lack of progress with the development of MT ESCO, Toplifikacija decided to offer EE services through their engineering company, and started

the first “ESCO-type” energy efficiency project of reconstruction of heating and cooling system in a hotel in Ohrid.

According Toplifikacija, there is an interest for energy efficiency projects in the private sector. They expect that the market within municipalities could be more interesting when the municipalities get into the second phase of decentralization. Only they will be allowed to take loans. However, the rules for public tendering might be a barrier. Another barrier is that there are no departments responsible for energy efficiency, as well as the lack of awareness to energy efficiency among municipal decision makers. Changing of staff every four years is also a barrier.

Toplifikacija started a project with 20 pilot clients, mostly schools by using remote control of substations to control heating for the time of attendance. This resulted in significant energy savings. Another energy savings are achieved by reduction of specific delivery heat based on climate conditions. Starting this heating season Toplifikacija will introduce a consumption-based billing by installation of heat cost allocators and thermostatic control valves in each apartment.

They have not started to look into RES business yet because of unclear rules and regulations. They expect the new Strategy on Renewables from January 2009 will facilitate RES business.

According the Ministry of Economy, it would be useful to have several ESCO's in operation to ensure sufficient competition.

Within the USAID Development Credit Authority (DCA), a 630.000 USD loan has been provided for an energy efficiency school project in Karpos municipality by Unibanka.

According to discussions held with municipal representatives and consultants, there are several barriers for realization of EE and RES projects:

- Existing legal framework (public tendering, concession, etc);
- Political risk (replacements after elections, incl. at municipal level);
- To provide guarantees – money for lending is available
- Municipalities not allowed to take loan (as of today, only one municipality was approved to take a loan, based on guarantee provided by the Ministry of Finance)
- Ministry of Finance has raised incorrect requirements for municipalities, e.g., asking Karpos mayor to be personally liable for the loan. The mayor refused and showed the Ministry that this is not a valid requirement of Macedonian law and in fact conflicts with EU requirements. Ministry of Finance backed down and issued its first, and to date only municipal certification to borrow to Karpos. If similar requests are being made of other municipalities it would indicate that Ministry of Finance is raising inappropriate obstacles.

2.6 Project Development

The level of capacities and skills operationally available for the development and financing of energy efficiency and renewable energy investments in

Macedonia is present but needs further capacity building. There are experts that seem to have capacities and skills that could be utilized for creating the market, but the resources are limited to support a wider market development. Material and equipment suppliers identified that criteria for selection of contractors for EE and RES projects needs to be more weighted on quality rather than price (e.g., in tenders under USAID's PEP program). According to them municipalities would need assistance in tendering procedures and criteria selection.

FONKO ESCO is using a model to sell their produced geothermal heat pumps by leasing them and charging 80% of kWh price of Toplifikacija. The company is providing service agreements to customers for selling heating and cooling. Such project is being developed for a six-apartment building. At present they do not provide other installation services and EE improvement measures. During the meeting with them, they stated that international support will be requested to create the market for ESCOs by help of financing and extension of direct credit lines to local governments and public institutions.

Regarding energy efficiency in public and private buildings, we only learned about some very few demonstration projects. Without a number of projects being realized, the capacities and skills on development of bankable energy efficiency projects most likely is limited.

The financial due diligence for projects is done by the local banks that provide DCA loans. According to them, financial engineering capacity building (preparation of business plans for energy efficiency and renewable energy projects) is needed. To ensure sustainability, "training of trainers" should be prioritized. Furthermore, "risk management" is an important issue.

According to the Ministry of Economy, there is not enough capacities and skills to utilize the available funds in Macedonia, including how to prepare project proposals properly. Lack of public awareness is another barrier. In municipalities there are not enough capacities to deal with energy efficiency.

On specific questions, all we met with confirmed that there is a need for capacity building and public awareness on development and financing of energy efficiency and renewable energy investments in Macedonia.

Capacity building is also needed to strengthen the various institutions involved in the field of EE and RES, and better coordination and cooperation between them would be helpful.

Marketing and promotional activities is needed to address specific barriers related to lack of awareness in EE/RE, and target at promoting EE/RE technologies, interventions and projects with promising implementation possibilities and significant potential in Macedonia. These activities are not directly related to development of specific projects but they facilitate it through awareness raising, marketing and information dissemination. The activities could be channelled through distribution of electricity or heating bills.

2.7 Opportunities for jobs creation

One of the top priorities of the Macedonian Government is to reduce the level of unemployment by creating new opportunities in various sectors. Implementation of energy efficiency measures and development of renewable

energy sources is still untapped potential in Macedonia and clearly is an area of opportunity. Traditionally, energy efficiency and renewable energy business activities, involving broad-based deployment of technologies and project activities, are labor intensive and create employment. Given that Macedonia is at early stage of development in the area of energy efficiency and particularly in the area of renewable energy, the job creation potential can be fairly significant and cost effective.

Weatherization and insulation measures of homes are energy efficiency measures that can be implemented relatively quickly and cost effectively without requiring skill sets beyond those normally found in commercial activities. It is relatively simple and cost effective to train unskilled personnel to apply energy efficiency methodologies and practices.

Jobs creation can be channeled through several programs identified in this report. For example, NGOs Habitat's for Humanity and Proaktiva's current and past activities involved broader actions of training and employment of individuals for implementation of energy efficiency projects in several municipalities ranging from production of silicon tapes for windows insulation through installation of solar collectors for water heating and implementation of energy efficiency measures at schools to building energy efficient homes.

Another area of significant impact to jobs creation is the Low Income Energy Efficiency Program targeted to the Ministry of Labor and Social Affairs. The program would require energy efficiency improvements to low income households. Given that there are 60-70 thousand socially vulnerable categories, implementation of such project could have a significant impact to jobs creation for the chronically unemployed and low-income families. These people could be also partly paid by the national government.

Finally, jobs can be created through residential sector program activity such as introduction of wood pellet heating. This involves several areas where demand for jobs may be significant ranging from furnace production through pellet production to biomass collection from forest waste, vineyard and agricultural residues.

These programs, along with others proposed in this assessment report could contribute to reduced unemployment by engaging those who need job while also expand the area of opportunities for skilled workers and professional engineers. In this sense, the job creation potential of energy efficiency in Macedonia would mirror that envisioned in the U.S. under President Obama's economic stimulus plan, in which the largest component is energy efficiency improvements in low income households, schools and other public buildings in order to reduce operating expenses while quickly creating jobs.

2.8 Conclusions

Past experience in Macedonia by USAID (under E&E regional and mission programs) and other donors indicates energy efficiency and utilization of renewable energy are economically viable in Macedonia. By implementation of a number of measures there is a significant potential to reduce energy consumption, generate economic growth and improve the environment. The Technical Programs described in this document in Section 3 can be successful in Macedonia. The USAID along with other donor organization have a critical role to

contribute for meeting the objectives of further development of energy efficiency and renewable energy in the country.

3. RECOMMENDATIONS FOR NEW PROGRAM ACTIVITY

3.1 ENERGY EFFICIENCY

The assessment team categorized potential new mission programs by sector. The assessment team ranked the sectors in terms of importance; past accomplishments; and other donor activities. The assessment identified potential program areas as cross-cutting programs affecting all sectors, plus sector-specific programs. (Note: the hospital sector is joined with the industrial sector due to similarities in program approaches.)

Importance: Top ranking was a tie between residential and industrial, followed by municipal.

Past accomplishments: Top ranking was municipal. Residential and industrial trailed far behind.

Other donors: Most activity by other donors was municipal, with limited activities in residential and industrial.

Based on the above considerations, the most essential program options are cross—cutting public information (listed below as Program Area 1); Electric Heat Energy Efficiency and Substitution (Program Area 6); Low Income Energy Efficiency (Program Area 7); Municipal Clean Energy Resource Center (Program Area 9); and Industrial/Hospital Packaged Energy Efficiency Services (Program Area 11).

It should be mentioned that the Program Areas identified are most accurately described as activities or components, and in some cases it would make sense to combine several into larger programs should the mission decide to move forward with them.

Cross-Cutting Program Options

Program Area 1: Public Information Campaigns

Description: In all sectors there is a large need for public information concerning energy efficiency – what it means; the potential benefits; what to do; how to obtain the equipment and services; available financing and other financial incentives. The form of the campaigns can take many forms tailored to the specific markets, e.g.:

- brochures and media announcements for households;
- seminars and documentaries discussing various technologies for municipal and industrial consumers;
- introduction of curriculum in schools and universities.

Level of Importance: Essential, as awareness of energy efficiency in Macedonia is low in light of lack of experience.

Estimated Annual Cost Range: \$100,000 - \$500,000.

Program Area 2: ESCO Contracting

Description: Energy Service Companies (ESCOs) offer great potential to overcome barriers to implementation of energy efficiency improvements in all sectors. ESCOs offer the advantage of providing private sector one-stop shop services to determine appropriate energy efficiency improvements, procure and install the equipment, and provide financing on favourable terms (e.g., no up-front cost, with the investment to be repaid through the resulting energy savings). A few Macedonian companies are starting to provide ESCO services -- including financing the projects and taking the risk of repayment via savings - - to the municipal, industrial, and residential sectors. A USAID ESCO support program could include the following:

- TA ensuring that laws and regulations provide sufficient authorization;
- preparation of model ESCO contracts for each sector;
- project preparation TA for a pilot project in each sector testing the financing concept;
- training on preparation and negotiation of ESCO contracts;
- trade missions bringing western ESCOs to Macedonia to seek joint venture partnerships with interested local firms.

Level of Importance: High, as ESCOs provide a potential solution to important institutional and financial barriers to energy efficiency project implementation.

Estimated Annual Cost Range: \$100,000 - \$250,000

Program Area 3: Bank Training

Description: Provide training to commercial banks on how to evaluate energy efficiency loans. Energy efficiency loans typically use a structure not familiar to banks, i.e. based on improving cash flows by lowering energy costs, rather than increasing profits by expanding business activities. This lending model is not well understood even by the banks participating in DCA, thus training would be useful to them as well as to other lenders, increasing the likelihood that good energy efficiency projects can receive financing necessary to implement the projects.

Level of Importance: High, as without a good understanding banks will not lend and attractive projects will not be implemented.

Estimated Cost Range: \$50,000 - \$100,000, on a one-time basis.

Program Area 4: Energy Audit Training/Certification

Description: This activity would provide a systematic basis for training and certifying energy auditors and thereby providing confidence among consumers that a disciplined approach using a valid methodology is being used to recommend appropriate energy efficiency solutions. Training curricula would be developed, and a train-the-trainer approach would be used to empower interested NGOs to provide training for relevant sectors, e.g. ZELS for municipal and residential audits; ZEMAK for industrial and hospital audits. The USAID contractor would work with the Energy Agency on approval of training curricula and development of a certification system for those passing the training, including assistance on secondary legislation if needed.

Level of Importance: High, to instill confidence among consumers in the validity of energy audits.

Estimated Annual Cost Range: \$100,000 -\$250,000.

Program Area 5: Building Certification Methodology, Enforcement

Description: Energy performance of buildings (residential, municipal, commercial) will be certified under a law being developed with the assistance of Austria Development Agency, reflecting a recent EU directive. There will be a need to develop the methodology to be used in certifying the building energy performance, and to provide enforcement. The result will be to enable prospective occupants to understand the energy bill implications associated with the buildings and encourage them to choose more efficient buildings, and consequently for owners of less efficient buildings to make energy efficiency buildings to improve the buildings' appeal.

Level of Importance: Medium.

Estimated Cost Range: \$100,000 - \$250,000, on a one-time basis.

Residential Program Options

Program Area 6: Electric Heat Energy Efficiency and Substitution

Description: A variety of approaches would be used to reduce the use of electricity in the residential sector:

- Building envelope and lighting improvements (insulation/weatherization/CFLs) – provide low-cost and comprehensive packages of improvements, including estimates of costs and savings; implement pilot projects and seek financing services through DCA; provide job training to installers; provide promotional strategy.
- Solar water heating – provide estimates of costs and savings; implement pilot projects; seek financing services through DCA; develop system of

collector testing/rating/certification; provide job training to installers; provide promotional strategy.

- Introduction of wood pellet heating
 - Furnace production -- small grant for conversion of conventional wood furnaces to burn pellets; product promotion.
 - Pellet production -- assist wood processing companies to produce pellets.
 - Biomass collection – develop process for collecting biomass from forest waste, wood processing waste, vineyard and agricultural residues.
 - Develop promotional campaign.

Level of Importance: Essential, as reducing residential electricity consumption is the most significant potential activity identified by the assessment.

Estimated Annual Cost Range: \$250,000 - \$1 million.

Program Area 7: Low Income Energy Efficiency

Description: Determine the life-cycle cost implications of addressing energy affordability among low income households through energy efficiency improvements rather than energy subsidies. Under a new law, the Ministry of Labor and Social Affairs expects to begin providing targeted energy subsidy payments to low income households in September, 2009. This program area would work with the Ministry and with Habitat for Humanity and EVN to demonstrate whether energy efficiency improvements can lower energy bills by a similar amount at a lower life cycle cost (i.e., paying for the costs one time rather than making subsidy payments every month). The program would begin with pilot projects in a variety of building types (single family homes, apartments) and heating fuel types (district heat, electricity, wood). The results would be presented to the Ministry. If the Ministry agrees, the program would assist in designing a program by which the Ministry would incorporate energy efficiency into its low income energy affordability system.

Level of Importance: Essential, as concerns over affordability of energy bills is used as a reason for keeping electricity tariffs at below cost-recovery levels.

Estimated Annual Cost Range: \$250,000 - \$1 million

Program Area 8: Appliance Labeling Enforcement

Description: This activity would provide a methodology to be followed by Macedonian appliance vendors to implement and promote labelling of the efficiency of residential appliances under a Macedonian law reflecting a recent EU directive. The contractor would train Energy Agency or other appropriate officials on enforcement of the labeling requirement, including assistance on secondary legislation if needed.

Level of Importance: High, as a method of reducing residential electricity consumption by providing information on appliance energy efficiency at the time and place the appliances are purchased.

Estimated Cost Range: \$50,000 - \$100,000, on a one-time basis

Municipal Program Options

Program Area 9: Clean Energy Resource Center

Description: Capacity building will create a Clean Energy Resource Center to provide expert assistance on energy efficiency to municipalities. The Center could be located within ZELS (they expressed interest in the concept) or it could be competed among NGOs. The Center would charge municipalities a cost-sharing fee for the services provided. Train-the-trainer services would be provided to enable the Center to provide basic services such as:

- training municipalities in preparation of municipal energy efficiency plans;
- creating a municipal energy database.

Specialized consulting assistance would be on retainer to provide more customized services, such as:

- detailed project preparation and business plans.
- assistance on tenders
 - Bundled equipment procurement for multiple municipalities.
 - ESCO procurements combining project specification and equipment purchase and installation.
- Information and studies on renewable energy application in municipal facilities.
- Programmatic CDM (i.e., development of city-wide or multi-city energy efficiency projects to attract carbon credits under post-Copenhagen climate change mechanisms).

Level of Importance: Essential to continue momentum providing necessary assistance to municipalities on a sustainable basis.

Estimated Annual Cost Range: \$500,000 - \$1 million

Program Area 10: Municipal Promotion of Residential Energy Efficiency

Description: Assistance would be provided to municipalities that are interested in promoting energy efficiency among their citizens. The municipalities would be provided information about various energy efficiency technologies; estimates of their associated cost and savings; and information about equipment and services providers and financing sources such as DCA. Displays of the technologies, products, and equipment would be provided for display in city halls. Assistance would also be provided on holding municipal energy fairs.

Level of Importance: Medium.

Estimated Annual Cost Range: \$50,000 - \$100,000

Industrial and Hospital Program Options

Program Area 11: Packaged Energy Efficiency Services

Description: The program would provide an integrated package of services needed by industrial facilities and hospitals to implement energy efficiency improvements. The following services would be provided:

- Preliminary energy audit, provided at no cost.
- If the industry or hospital agrees, cost-sharing on the cost of an investment grade audit that will provide detailed project feasibility study.
- Facilitate financing by preparing business plan and assisting in presentation to financing sources including DCA, EBRD credit lines, World Bank, etc.

The preliminary and investment grade audits would be provided by energy auditing subcontractors that have been trained and certified under program area 4.

Pilot projects would be conducted in one hospital and one industrial application. Subsequently the program would be marketed to a broad range of prospective participants.

Level of Importance: Essential, as the industrial sector is the largest energy consuming sector in Macedonia. The program is intended to address the barrier experience under other programs, e.g., UNIDO and TAM-BAS, that provide preliminary energy audits but that don't provide follow-up assistance and therefore there is little follow-through.

Estimated Annual Cost Range: \$250,000 - \$1 million.

3.2 RENEWABLE ENERGY

The assessment team categorized potential new mission programs by technology. MANU ranks the importance of various technologies as follows: 1) Small Hydro; 2) Biomass; 3) Wind; 4) Solar (primarily for water heating); 5) Geothermal. Again, the assessment identified potential program areas as cross-cutting programs affecting all technologies, plus technology-specific activities.

Based on the above considerations, the most essential program options are: economic resource potential assessments for biomass, solar and geothermal (listed below as Program Area 1); coordinate and streamline procedures (Program Area 2); investors guide (Program Area 3); public information

campaign and workshops (Program Area 4); small hydro clarification of legal issues (Program Area 8); biomass collection approach (Program Area 9).

Cross-Cutting Program Options

Program Area 1: Economic Resource Potential Assessments

Description: Assessments of economic resource potential are needed for biomass, solar, and geothermal (note: small hydro and wind have been adequately studied). The assessments would determine the magnitude of economically viable available renewable energy potential. The results of the assessments could guide GoM renewable energy policy and provide important guidance to prospective investors and developers.

Importance: Essential to establish priority of GoM policies, donor activities, and developer interest in the renewable technologies.

Estimated Cost Range: \$150,000 - \$500,000 on a one-time basis.

Program Area 2: Coordinate and Streamline Procedures

Description: While most necessary administrative procedures to be followed by prospective investors for implementing renewable energy projects are in place, the procedures are cumbersome and not easily understood. The process requires various steps involving multiple ministries (Ministry of Economy, Ministry of Transport and Communications, Ministry of Environment and Physical Planning) as well as the Energy Agency, ERC, market operator MEPSO, and in some cases municipalities (for projects <1 MW). This activity would convene an inter-governmental renewable energy procedural task force to coordinate and streamline the process and thereby simplify the requirements for project developers.

Level of Importance: Essential, as the current process appears to impose a barrier to implementing projects despite the presence of the necessary procedures.

Estimated cost range: \$150,000 - \$300,000, on a one-time basis.

Program Area 3: Investor Guide

Description: To ensure the administrative procedures for project approval are clearly understood by prospective investors and developers, an Investor Guide should be prepared and disseminated. Ideally this activity would reflect the outcome of Program Area 1.

Level of Importance: Essential to make sure prospective investors have a clear idea of the process and time requirements to develop projects.

Estimated cost range: \$50,000 - \$100,000, on a one-time basis.

Program Area 4: Public Information Campaign and Workshops

Description: For all technologies there is a large need for public information concerning renewable energy – the characteristics and applicability of the various technologies; the potential benefits; sources of the equipment and services; available financing and other financial incentives. Workshops would be directed at particularly promising markets. The form of the campaigns can take many forms tailored as deemed appropriate, e.g.:

- brochures and media announcements;
- workshops, seminars and documentaries discussing various technologies for municipal and industrial consumers;
- introduction of curriculum in schools and universities.

Level of Importance: Essential, as awareness of renewable energy in Macedonia is low in light of lack of experience.

Estimated Annual Cost Range: \$100,000 - \$500,000.

Program Area 5: Bank Technical Assistance

Description: Provide training to commercial banks on how to evaluate renewable energy loans. Banks are not familiar with renewable energy projects and the risks involved. For example, banks should be provided guidance on the importance of requirements to purchase renewable energy and to provide feed-in tariffs, as well as other support mechanisms that increase the likelihood that investors can earn profits and be able to repay loans. Thus, training would be useful to increasing the likelihood that good projects can receive financing necessary to implement the projects.

Level of Importance: High, as without a good understanding banks will not lend and attractive projects will not be implemented.

Estimated Cost Range: \$50,000 - \$100,000, on a one-time basis.

Program Area 6: Municipal Contracting/Permitting Training

Description: According to Law on Construction municipalities are responsible for issuing construction authorization for projects <1 MW. Most municipalities lack training to carry out this responsibility. This activity would build capacity within municipalities (perhaps in conjunction with the Municipal Clean Energy Resource Center proposed in Energy Efficiency Program Area 9).

Level of Importance: Medium

Estimated Cost Range: \$50,000 - \$100,000, on a one-time basis.

Program Area 7: CO2 Economic Analysis

Description: To focus attention among GoM and prospective investors and developers, an economic analysis could be conducted to determine the cost of greenhouse gas mitigation by various clean energy options. The analysis would estimate the cost per ton of CO2 reductions of renewable energy technologies and energy efficiency sectoral approaches.

Level of Importance: Medium

Estimated Cost Range: \$50,000 - \$100,000, on a one-time basis.

Program Area 8: Post-Copenhagen Transaction Assistance

Description: A successor international agreement to the Kyoto Protocol on Global Climate Change will be negotiated in Copenhagen in December, 2009. The Obama administration hopes to reach an agreement that will include U.S. involvement. U.S. participation, combined with the cap-and-trade system contained in the American Clean Energy and Security Act passed by the U.S. House of Representatives, will provide opportunities to participate in mechanisms similar to the existing Clean Development Mechanism that provide opportunities to meet U.S. targets by investing in clean energy projects in countries such as Macedonia. The U.S. has fallen far behind European countries, which have been actively pursuing similar opportunities. Under this activity, USAID assistance would help develop some early transactions under the new mechanisms established under the Copenhagen agreement.

Level of Importance: Medium, in terms of stimulating clean energy investments in Macedonia. High, in terms of helping provide an early opportunity for U.S. participation in such mechanisms.

Estimated Annual Cost Range: \$100,000 - \$250,000.

Small Hydro Program Options

Program Area 8: Clarify Legal Issues for Project Financing

Description: Implementation of small hydro projects has been severely constrained by vexing legal issues that need to be clarified. For example, as mentioned earlier Macedonia has issued three tenders resulting in concessions for 85 locations (about 100 MW). The estimated payback is about 8 years. However, no contracts have been signed, largely due to unresolved legal issues such as land ownership. TA in the form of legal assistance on such issues could be provided in a neutral manner such that it would be found acceptable by relevant parties including MoE, the Energy Agency, and developers.

Level of Importance: Essential for implementation of small hydro projects, which have been described as the top renewable energy priority by MANU.

Estimated Annual Cost Range: \$100,000 - \$500,000.

Biomass Program Options

Program Area 9: Biomass Collection Approach

Description: Macedonia has abundant biomass available from a variety of sources: forest waste, furniture/wood processing waste, winery and agricultural residue. A systematic approach is needed to recover and re-use the biomass for there to be any appreciable use of the resource.

Level of Importance: Essential for the development of wood pellet heating to reduce electric heating (see Residential Program Area 6).

Program Area 10: Biomass-Fueled Combined Heat and Power (CHP)

Description: There is great potential for use of biomass-fueled CHP in applications such as industry, hospitals, and municipalities. The activity would conduct analyses and implement pilot projects in applications showing high potential. This will reduce present energy consumption for heating generated by other carriers as well as produce electricity and thus decrease the level of electricity import. Municipal pilot project is a viable option to trigger further activities in this area.

Level of Importance: High, as a method to reduce the use of electric heat.

Estimated Cost Range: \$400,000 - \$800,000.

Solar Program Options

Program Area 11: Collector Testing, Certification, and Labeling

Description: There are no current efficiency standards or information available about solar collector efficiency levels. Consumers have no independent source of information by which to compare collectors. GoM's solar water heater rebate payments do not require collectors to meet a specified efficiency level. In addition, solar collector manufacturers in Macedonia produce equipment of sufficient quality to export to Europe, but their sales within Macedonia are limited by lower efficiency imported collectors. The proposed activity would utilize a test facility established at the Hydro-Meteorological Institute with assistance of the Austrian Government and coordinate with MoE and the Energy Agency to develop a collector testing regime that would be used to certify and label collectors sold in Macedonia.

Level of Importance: Medium.

Estimated Cost Range: \$50,000 - \$100,000 on a one-time basis.

Program Area 12: Enhanced MoE Financial Incentive Programs

Description: GoM has implemented several financial incentive programs, but implementation has been constrained by sub-optimal design. For example, a program offered rebates of 30% of the cost, up to Euro 300. However, there was a limit of 500 rebates, and consumers had to purchase and install the solar water heater systems before submitting applications for rebates. Accordingly, the rebates were not available to help consumers who couldn't afford to purchase solar water heaters, and other consumers who needed certainty of receiving the rebates would similarly refrain from making purchases, while other consumers would purchase the systems in expectations of receiving rebates but would be denied if the rebates were all awarded before they could submit their application. Meanwhile, consumer requests for solar systems spiked when the rebate program was announced, putting strain on vendors to meet demand, then dropped sharply when the program maximum was reached, with demand remaining low while consumers wait to see if they program is re-instated. Another GoM incentive reduces VAT from 18% to 5%, but is available only for solar collectors, which represent only 20% of system costs and therefore the economic incentive is diluted. Under the proposed activity, TA would be provided to enhance the financial incentives based on best practices in the region, Western Europe, and the U.S.

Level of Importance: Medium.

Estimated Cost Range: \$50,000 - \$100,000 on a one-time basis.

Program Area 13: Municipal Pilot Project

Description: Municipalities expressed interest in potential for solar water heating and photovoltaics in municipal facilities. The proposed activity would conduct prefeasibility assessments to determine cost-effective applications; install a pilot project in one or more municipalities; and disseminate the results through ZELS, NALAS, and other appropriate means.

Level of Importance: Medium

Estimated Cost Range: \$50,000 - \$100,000.

Geothermal Program Option

Program Area 14: Feed-in Tariff

Description: Most geothermal applications, using water at 78 degrees C, are to provide heating. However, Kocani plans to investigate whether deeper wells, e.g., 200 meters, to determine if water is hot enough (120 degrees C) to

produce electricity. In the event electricity production is possible, TA could be provided to develop a feed-in tariff to put the resource on comparable footing with other renewable energy sources.

Level of Importance: Medium

Estimated Cost Range: \$50,000 - \$100,000 on a one-time basis.

Attachment 1: Assessment Scope of Work

SCOPE OF WORK for One Local Consultant and one USAID/W Energy Expert

I. SUMMARY

USAID/Macedonia seeks the services of a Contractor to: (1) assess the current situation with respect to the development of energy efficiency and renewable energy in Macedonia and their importance for energy security, economic growth, and environmental improvement; (2) develop conclusions and recommendations with respect to future USAID programming in this area.

II. BACKGROUND

USAID has been supporting economic growth, democracy, governance, and social services since opening its Macedonia Mission in 1993. As with many former Eastern European countries, its programs were expected to end by a certain year (in Macedonia's case it was 2010), but a gap analysis done in 2008 revealed that while Macedonia has made substantial progress, critical gaps between 2004 reform projections and the current status of reform threatened the sustainability of Macedonia's transition, as well as its inclusion in NATO and the European Union. Subsequently, it was decided that USAID would remain in Macedonia five (5) years beyond the Mission's planned close-out date of 2010. For this reason, USAID/Macedonia is undertaking assessments of all of its programs and the sectors they operate in, in order to determine what its programming should comprise in the coming 6 years.

Energy efficiency has been an area of USAID assistance through E&E regional activities and mission programs for several years. Previous work includes the following⁶:

- National Energy Efficiency Strategy, prepared through E&E regional program in 2004 by Nexant. The Strategy was adopted by GoM in 2004.
- Municipal energy efficiency demonstration projects, conducted as a joint activity under the E&E regional program by IRG/EcCon Services and the mission's Local Government MDW program by DAI. The program designed and funded implementation of 12 projects in schools and other municipal buildings in five cities, and concluded with a dissemination roundtable conference conducted in cooperation with ZELS.
- Development Credit Authority facilities established in September, 2007 with UniBanka and NLB Leasing. The facilities provide loan guarantees for municipal and residential energy efficiency loans, with a total combined portfolio size of \$10 million.
- Macedonia Local Government Activity, mission program implemented by ARD, providing assistance on municipal energy efficiency planning, project preparation, and municipal creditworthiness analyses, conducted in conjunction with Norwegian-funded ENSI program.

⁶ A list of all acronyms is provided at section IX of this document.

- Primary Education Program, mission program implemented by AED, conducted energy efficiency improvements and associated building rehabilitation in primary schools. Projects have been implemented in over 40 schools through 2008, with a total goal of 120 schools.
- The USAID Macedonia mission's EG office has conducted programs on competitiveness and workforce development that should be relevant to the Clean Energy area. The mission is considering development of a Green Jobs Corps to build low-skill employment opportunities for youth.

In addition to the above programs, recently started activities are being conducted under the E&E regional SYNENERGY program, implemented by IRG, with additional support from the mission. The program will run through FY 2010. The major components include:

- 1) Strategic Planning for Energy Efficiency and Renewables – long term planning assistance reflecting historic and projected energy sources and demands that will allow the Ministry of Economy to examine the impacts of alternative energy policies and their associated impacts on tariffs, imports, and greenhouse gas emissions. This project builds on the earlier Regional Energy Demand Planning project.
- 2) Energy Efficiency in Municipal and Residential Buildings – E&E regional assistance provides assistance on preparation of national and local level planning and program development (i.e., National Energy Efficiency Action Plan [NEEAP] for building sector, with identification of programs to meet energy savings targets), supplemented by mission assistance to cover the industrial and transport sectors and to update the earlier National Energy Efficiency Strategy; preparation of secondary laws needed to effectively implement energy efficiency activities; development of a public awareness campaign on energy efficiency with initial emphasis on residential efficiency opportunities associated with Skopje district heat switch to consumption-based billing; and project preparation for a residential multifamily building.
- 3) Regional Assessment of Renewable Energy – the first phase consists of a stocktaking report summarizing information on available renewable resources, policies and regulatory provisions to promote renewable energy, donor assistance, and project activity to date. The results will be presented to stakeholder including Government and donors/IFIs to identify the key barriers to renewable energy investment that should be addressed in the next phase of the program.

III. PURPOSE OF THE ASSESSMENT

USAID/E&E Bureau has adopted energy security as a strategic priority. Energy efficiency/renewable energy is one component of USAID's strategy to reduce dependence on imported gas, diversify energy sources, and develop environmentally sound indigenous energy resources. The Agency and the new Administration are also giving priority to Global Climate Change and Clean Energy. One of the objectives of this assessment should be to evaluate the potential for energy efficiency and renewable energy development to contribute

to Macedonia's energy security and efforts to reduce greenhouse gas emissions.

The purpose of this assessment is to provide USAID/Macedonia with an in-depth analysis of the potential for development of energy efficiency and renewable energy sector, with a heavy focus on lessons learned from the experiences of previous years of effort in the sector, both by USAID and other donors in Macedonia, and gain insights as to whether and where USAID assistance might be most effective in further supporting energy efficiency and renewable energy programs.

Recommendations for a follow-on program, if appropriate, should take into account the priorities of the Government of Macedonia, assistance provided by other donors, and USAID's comparative advantage in terms of addressing the needs identified.

The anticipated outcome of the assessment will be a blueprint for potential future activity by USAID, with a program parameter in the range of \$1 million - \$3 million per year for up to five year period, reflecting a coordinated donor dialogue on actions needed to stimulate critical investments.

IV. STATEMENT OF WORK

The Assessment Team will look to define the problems and main obstacles to achieve Mission objectives by providing answers to questions such as: what have been the most successful cases and assistance intervention strategies in the region and beyond, and what kinds of impacts have they had; which experiences are most relevant to the conditions in Macedonia; what elements/institutional capacities are missing that are important or could be established? Specifically, the team will perform the following:

A) Assessment of the Capacities and Needs for Clean Energy in Macedonia

- i) Assess the opportunities, barriers (economic, policy, institutional) and need in Macedonia for energy efficiency to reduce electricity, heat and natural gas consumption in buildings and industry.
 - a. National / municipal / industry level policies and future programs not covered by other activities from USAID/E&E, USAID/Macedonia, and other donors. Build on activities identified in the NEEAP.
 - b. Municipal level activities (energy efficiency planning, project preparation, etc.) and assistance to municipalities from ZELS not covered by other activities from USAID/E&E, USAID/Macedonia, and other donors.
 - c. Residential mechanisms for promoting and implementing energy efficiency in multifamily and single family buildings (e.g., legal authority/existence/capacity of Homeowner or Condominium Associations; building codes; tax incentives; targeted low income assistance; public awareness; etc.)

- d. Industrial projects preparation and implementation capacity not covered by other activities from USAID/E&E, USAID/Macedonia, and other donors, i.e., possible mechanisms for promoting implementing energy efficiency in industrial facilities such as tax incentives, etc.
 - e. Availability and applicability of financing for energy efficiency projects in the above areas from IFIs, commercial banks, and dedicated national funds.
 - f. Availability/ legal authority/capacity of ESCOs and energy auditors to provide energy efficiency services in the above areas. Suggest options to develop and broadly promote the ESCO concept, such as showcasing already implemented projects..
 - g. Opportunities for low-skill jobs creation for implementation of energy efficiency projects (possible linkage to Habitat for Humanity and school renovation component of the Primary Education Project or other activities related to renovations of public sector buildings).
 - h. Local availability and potential for local production of energy efficiency materials and equipment. Look into SME development of manufacturing to create skilled jobs and value-added products, and possible linkages to job creation.
 - i. Investment opportunities for both domestic and foreign investors in manufacturing facilities for energy efficiency system components.
 - j. Awareness, institutional capacity, existing training capacity, and activities among GoM, independent analysts, and project developers to participate in carbon markets for eligible projects. Look into possible linkage to a University program or opportunity for specialized training.
- ii) Assess the opportunities, barriers (economic, policy, institutional) and need in Macedonia for renewable energy from wind, solar, geothermal, small hydro, and biomass, including:
- a. Adequacy and need for additional information on availability of various renewable energy resources. Look into possible creation of data bank on all relevant information.
 - b. National level policies, regulatory practices, and incentives not covered by other activities from USAID/E&E, USAID/Macedonia, and other donors.
 - c. Availability and applicability of financing for renewable energy projects from IFIs, commercial banks, and dedicated national Funds.
 - d. Local availability and potential for local production of renewable energy equipment. Look into SME development of manufacturing to create skilled jobs and value added products and possible linkages to job creation.

- e. Investment opportunities for both domestic and foreign investors into manufacturing facilities for renewable energy system components.
 - f. Capacity of the Macedonian electricity grid to absorb new renewable energy generation projects (e.g. intermittent wind farms) and the main weaknesses that would need to be addressed.
 - g. Awareness, institutional capacity, existing training capacity, and activities among GoM, independent analysts, and project developers to participate in carbon markets for eligible projects. Look into possible linkage to a University program or opportunity for specialized training.
- iii) Review results and sustainability of previous efforts from USAID and other donors in the above areas, through discussions with donors, key stakeholders, and technical experts.
 - iv) Prepare an analysis with the following elements:
 - Summary of all the above;
 - Provide a rough estimate of the potential for energy efficiency and renewables to reduce energy import dependence and reduce greenhouse gas emissions, based on existing reports and information developed during the assessment, including scenarios from on-going Markal-Times Strategic Planning project.
 - Identify appropriate areas for potential USAID intervention most critical for the successful development of clean energy project implementation;

B. Recommendations for New Program Activity

Based on the results of the assessment analysis, and considering the anticipated level of available funding, the Assessment Team will formulate potential programmatic options, in a priority order, and consider what are key alternatives (combining options if appropriate) that require a choice to be made.

For each alternative, a set of criteria should be applied and analyzed (e.g. cost, impact, political feasibility, degree of overlap or complementarity with other donors and GOM, sustainability and/or replicability). The basis for choosing among alternatives should be clearly stated and critical or sensitive assumptions identified.

The Recommendations should reflect the following considerations:

- Are Energy Efficiency and Renewable Energy sectors important areas for USAID assistance?
- In the areas where assistance is necessary and appropriate, what is USAID's comparative advantage relative to other donors?
- How can USAID's assistance be most effective?

The following topics are illustrative of the issues that USAID/Macedonia would like the Assessment Team to address in terms of the design of the follow-on activity. These should not constrain the Contractor from pursuing other relevant issues based on the findings of its assessment.

- Identify the principal results sought over the life of the follow-on activity and the timeframe required to achieve these results.
- Identify the main activities anticipated to achieve results.
- Recommend performance indicators for the results to be achieved.
- Identify the primary program elements, with a program parameter in the range of \$1 million - \$3 million per year for up to a five year period.
- Indicate how the proposed program will complement and build on the USAID/Macedonia EG activities on Competitiveness and possibly incorporate the Workforce Development component on Green Job Corps.
- Identify the specific roles Macedonian partners both, private and public sector, should have in the implementation of the activity.
- Identify opportunities for PPP development
- Present a vision of sustainability and clearly identify how activities can be made more sustainable.
- Suggest effective ways to integrate the contributions of other USAID and other donor activities, as well as leverage on their activities to maximize cooperation and increase the likelihood of success and/or heighten impact of the Clean Energy activity.

V. METHODOLOGY

The assessment team, in collaboration with USAID/Macedonia, will finalize the overall assessment methodology once in-country. However, the Mission expects that, at a minimum, the team will:

- 1) Review and analyze the existing results and performance information from USAID's previous and current programs and the associated partners in the subject field;
 - a. Determine implementation status.
 - b. Determine relevance and importance of un-implemented items.
- 2) Review results and sustainability of USAID and other donor assistance.
 - a. conduct site visits among GoM officials, donors and IFIs; sector experts; municipalities; energy efficiency service providers;

project developers; local equipment manufacturers and suppliers; organize roundtable/group discussion of industry representatives that are interested in implementing EE measures.

- 3) Meet and interview related USAID project beneficiaries, partners, host government counterparts at appropriate levels;
- 4) Interview USAID staff and a representative number of experts working in the sector.
- 5) Identify and prioritize areas of potential assistance.
- 6) Determine likely role of other donors/IFIs and USAID comparative advantage.

VI. TEAM COMPOSITION AND QUALIFICATIONS

Assessment Team Members: The team should be comprised of two experts, one USAID Washington Energy Efficiency and Renewable Energy Expert, and a Local Consultant – Expert in this field with experience in such projects/assessments.

The local expert should have significant knowledge in the area of energy efficiency and renewable energy and excellent understanding of the current situation of applying energy efficiency measures and utilization of renewable energy in Macedonia.

The local team member should also be able to establish contacts and communicate effectively with both businesses and government officials.

Knowledge of USAID and other donor assistance in the area of energy efficiency is an advantage. He/she must be proficient in English.

VII. SCHEDULE AND LOGISTICS

The assessment is envisioned to last three (3) weeks. It should commence o/a May 25, 2009. The USAID/Washington Team Member is scheduled to arrive in Skopje, Macedonia on May 24, 2009. The team is expected to spend at least two weeks in Macedonia carrying out this Scope of Work. The 2 weeks would be broken into:

- a. 1 week of meetings in Skopje with GoM officials, donor organizations / projects, IFI's working in this field;
- b. 1 week of field visits to Municipalities and to a few companies, both local manufacturers of equipment for RES and/or EE systems, and include roundtable/group discussions with industry representatives interested in implementing EE measures.

The third week will be split between preparatory work by the Local Expert before the US expert team member arrives; and finalization of the report after completion of the field work. Before arrival in country of the Washington Team Member, he/she and the Local Expert shall familiarize themselves with documentation on previous and current USAID assistance in Macedonia from E&E regional and Macedonia mission activities in the area of clean energy. USAID Macedonia will ensure that this documentation is available to the team prior to their arrival in Macedonia. The literature includes at a minimum:

- 2004 National Energy Efficiency Strategy, provided by E&E Regional program by Nexant.
- 2008 Energy Efficiency Stocktaking report (findings pertaining to Macedonia) provided by E&E Regional program by Alliance to Save Energy.
- 2009 Renewable Energy Stocktaking report (findings pertaining to Macedonia) provided by E&E Regional program by IRG.
- Summary of municipal energy efficiency demonstration projects, provided by E&E Regional program by IRG.
- Relevant reports from USAID/Macedonia Local Government Activity, by ARD, summarizing assistance on municipal energy efficiency planning, project preparation and municipal creditworthiness analyses.
- Relevant reports from USAID/Macedonia Primary Education Program, implemented by AED, summarizing implementation and results of energy efficiency improvements and associated building rehabilitation in primary schools.

USAID/Macedonia will provide the team with input and guidance in setting up a schedule of interviews and site visits, but the responsibility for the schedule resides with the local expert. The draft schedule should be ready for review and discussion at the initial team planning meeting with USAID which should take place o/a May 25, 2009.

The team is encouraged to identify and visit additional Macedonian organizations and groups, both formal and informal, based on its review of materials and its determination of where useful examples might be found.

An initial team planning meeting will be held with USAID o/a May 25, 2009. The goal of this meeting is to establish clear expectations about the outcomes of the assessment and go over the goals, schedule and methodology of the work.

The team will be required to meet with USAID/Macedonia at the end of their first week of work to brief USAID on their progress and findings to date and present written materials if any.

At the end of the second week the team will be required to submit the first draft of the Report to USAID for discussion and comment and have a final de-brief with USAID on the key findings and recommendations. Based on feedback from USAID at this briefing, the Team shall finalize the Report and submit a penultimate draft to USAID no later than ten (10) working days after the final de-brief meeting.

USAID will provide the Team with final comments within 15 working days.

The Team shall incorporate all comments and submit the final Report within 7 days of receiving USAID's final comments.

The USAID/Macedonia Contracting Officer's Technical Representative (COTR) will be responsible for review and approval of the final document.

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VIII. DELIVERABLES

The team will provide the following:

1. Schedule of meetings. (Deliverable No: 1)
2. De-brief for USAID, including first draft report (Deliverable No: 2)
3. The team will prepare an Assessment Review Report. (Deliverable No: 3)

The following sections shall be included in the document:

- An Executive Summary – (3- 5 pages) containing a clear, concise summary of the most critical elements of the report, including the recommendations in a priority order.
- A Table of Contents
- An Assessment Report (no more than 25 pages), which discusses the major findings and the related issues and questions raised.

In discussing these findings, the assessment shall also address the following:

- Purpose and study questions of the assessment;
- Evidence/findings of the study concerning the assessment questions;
- Briefly-stated conclusions drawn from the findings (including lessons learned);
- Specific recommendations based on the assessment's findings and conclusions on interventions in Energy Efficiency, including, but not limited to:
 - Activities related to policy / regulatory issues
 - Industry related activities
 - Municipal related activities
 - Activities related to residential buildings
- Assessment Report Appendices, including:
 - A copy of the assessment scope of work;
 - Team composition and study methods (1 page maximum);

- A list of documents consulted,
- A list of individuals and agencies contacted; and
- More detailed discussions of methodological or technical issues as appropriate.

The documents must be written in Level IV of English. The final report must be reviewed by an English native speaker.

The Team shall be responsible for providing the final deliverables to USAID Macedonia in an electronic form (in Microsoft Word 97) and in hard copy. The Team shall also provide an electronic copy to DEXS, the database of the USAID Development Experience Clearinghouse (DEC) in accordance with normal AID/W requirements.

Deliverables Due:

- | | |
|---|--------------|
| • Timetable for the first week of the field visit | 25 May, 2009 |
| • Initial draft report completed | 5 June, 2009 |
| • Final Report | 7 July, 2009 |

Attachment 2: Team composition and study methods

The assessment team was comprised of two experts; Ira Birnbaum, USAID Washington Energy Efficiency and Global Climate Change Coordinator, and Dragan Blazev, Local Consultant – Energy Expert with experience in energy project development and assessments in Macedonia and the region. Both experts have significant knowledge in the area of energy efficiency and renewable energy and understanding of the current situation of applying energy efficiency measures and utilization of renewable energy in Macedonia.

The assessment team prepared and presented a schedule of meetings with agencies and relevant individuals to the USAID Mission in Skopje. The proposed meetings schedule was discussed, coordinated and approved by the mission. The USAID mission provided documentation on previous and current USAID assistance in the field of clean energy in Macedonia. In addition, other strategic energy related documents prepared by other institutions and available to the USAID mission were provided to the assessment team, including the draft of the Strategy for Energy Development of Macedonia 2008-2020, Energy Efficiency Strategy of Macedonia 2004, Regional Energy Efficiency Stocktaking report 2008, Regional Renewable Energy Stocktaking 2009, Study on Renewable Sources of Energy in Macedonia 2008, First draft of National Energy Efficiency Action Plan 2009-2016, etc. The authors have used this information to assess the current situation and capacity of the country to develop energy efficiency and renewable energy projects in future as well as where USAID could focus their assistance to facilitate such development. More information about consulted literature is presented in Appendix 3.

Institutions were contacted by electronic e-mail and phone to schedule meetings. The introduction for the mission of the assessment team and objectives of visit were supported by request letter for meeting provided by the USAID mission in Macedonia.

The assessment team carried out two weeks of meetings and interviews with relevant institutions and individual experts and discussed about past and current activities in the development of energy efficiency and renewable energy projects in the country, difficulties and barriers to project development including legal and regulatory framework, policies and programs, and opportunities and recommendations for future where USAID could be of assistance.

The main findings were presented on the de-brief for the USAID Mission at the end of the two-week meetings schedule. This final assessment review report provides an overview of the current situation with respect to the development of energy efficiency and renewable energy in Macedonia and their level of importance, past accomplishments, other donors and potential activities as well as conclusions and recommendations with respect to future USAID program activities in this area.

Attachment 3: A list of documents consulted

LIST OF REFERENCES

- [1.] Law on Energy (Official Gazette of the Republic of Macedonia No. 63/06, 36/07 and 106/08)
- [2.] Law on Construction (Official Gazette of the Republic of Macedonia No. 51/2005 and 82/2008)
- [3.] Ministry of Economy, Energy Balance of the Republic of Macedonia 2007
- [4.] Rulebook on energy efficiency labeling of home appliances (Official Gazette of the Republic of Macedonia No. 85/07)
- [5.] Rulebook on energy efficiency of buildings (Official Gazette of the Republic of Macedonia No. 143/08)
- [6.] Rulebook on renewable energy sources for electricity generation (Official Gazette of the Republic of Macedonia No. 127/08)
- [7.] Rule book on the method for issuing guarantees of origin of the electricity generated from renewable energy sources and the content, form and method for maintaining the registry of issued guarantees of origin of the electricity generated from renewable energy sources (Official Gazette of the Republic of Macedonia No. 127/08)
- [8.] Rulebook on the conditions, methods and procedures for issuing, changing and revoking licenses for performing energy activities
- [9.] Statistical Yearbook of the Republic of Macedonia, 2007
- [10.] Energy Efficiency Strategy of the Republic of Macedonia prepared by Nexant Inc., MANU, Organization of Consumers of Macedonia and TimeProject, with financial support by USAID, adopted by the Macedonian Government in 2004
- [11.] Draft of Strategy for Energy Development of Macedonia 2008-2020 with a vision to 2030, Macedonian Academy for Sciences and Arts
- [12.] Energy Efficiency Stocktaking report 2008, Alliance to Save Energy
- [13.] Renewable Energy Stocktaking report 2009, International Resources Group
- [14.] Macedonia Environment Investment Strategy 2009-2013
- [15.] Study on Renewable Sources of Energy in Macedonia 2008, USAID's Business Environment Activity
- [16.] First draft of National Energy Efficiency Action Plan 2009-2016, International Resources Group/ Macedonian Center for Energy Efficiency
- [17.] Macedonia Sustainable Energy Financing Facility 2005, Nexant Inc.
- [18.] Macedonia Energy Policy Paper 2004, World Bank
- [19.] Urban Heating in the Republic of Macedonia, Alliance to Save Energy
- [20.] Macedonia in-dept review of the investment climate and market structure in the energy sector, 2006, Energy Charter Secretariat

- [21.] Summary of municipal energy efficiency demonstration projects 2005-2006, International Resources Group
- [22.] 2007 Annual Reports of ELEM, TPP Negotino, and EVN Macedonia

Attachment 4: Schedule of Meetings and contact details

USAID Energy Efficiency and Renewable Energy Assessment in Macedonia

Schedule of Meetings Week 1: 25-29 May 2009

Mon. 25 May	
18:00 – 21:00	Internal Coordination Meeting
Tue. 26 May	
10:00 – 11:00	USAID's Competitiveness Project
11:30 – 12:30	NGO Regional Environmental Center (REC), Macedonia office
13:00 – 13:45	USAID's Macedonia Local Government Activity (MLGA)
14:00 – 14:45	Austrian Development Agency (ADA)
15:15 – 16:00	Ministry of Environment and Physical Planning
Wed. 27 May	
09:00 – 10:15	Ministry of Economy
10:30 – 11:30	Energy Regulatory Commission of Macedonia (ERC)
11:45 – 13:15	Macedonian Academy for Sciences and Arts (MANU)
13:30 – 14:30	EVN Macedonia, AD (Macedonian Power Distribution Company)
15:30 – 16:30	USAID's Primary Education Project (PEP)
Thu. 28 May	
09:00 – 10:00	NGO Macedonian Center for Energy Efficiency (MACEF)
10:00 – 11:00	Energy Agency
11:30 – 12:30	NGO Proaktiva
13:00 – 14:00	Hydrometeorological Service (HMS), Hydro development department
16:00 – 17:00	European Commission (EC)
Fri. 29 May	
09:00 – 10:00	European Bank for Reconstruction and Development (EBRD) Macedonia
10:30 – 11:30	UNI Bank
11:45 – 12:45	NLB Leasing
13:00 – 13:45	GTZ Macedonia
14:00 – 15:00	EBRD's Business Advisory Service (BAS) Program
15:00 – 16:00	Joint Office between the Italian Ministry for Environment, Land and Sea and the Macedonian Ministry for Environment and Physical Planning

16:00 – 17:00	NGO Habitat for Humanity

Week 2: 01-05 June 2009

Mon. 01 Jun	
09:00 – 10:15	United Nations Development Program (UNDP) Macedonia
10:30 – 11:15	NGO Macedonian Association for Biomass Energy Utilization (MABEU)
11:30 – 12:30	Karpos Municipality
13:00 – 13:45	Ministry of Transport and Communications
14:15 – 15:00	Association of Local Self-Government Units (ZELS) – Skopje
15:15 – 16:30	NGO Macedonian Geothermal Association (MAGA) & NGO Solar Macedonia
19:00 – 21:00	Prof. Rubin Taleski, energy consultant, Electrical Engineering Faculty of Skopje
Tue. 02 Jun	
09:00 – 9:45	ET ESCO and Toplifikacija, AD (District heating company of Skopje)
10:00 – 11:45	FONKO ESCO (manufacturer of geothermal heat pumps)
12:15 – 12:45	Ministry of Labor and Social Affairs
13:00 – 15:00	Roundtable discussion with project developers and equipment suppliers/manufacturers in Skopje (Nova Energija, Ozon, Macedonia Export, Plasma, Energo System)
15:00 – 17:00	Roundtable discussion with UNIDO's industrial consultants
Wed. 03 Jun	Field Trip
10:00 – 11:00	Euroterm – Prilep (solar collectors manufacturer)
11:15 – 12:15	Metalec CS – Prilep (potential manufacturer of wind turbines)
12:30 – 13:15	Prilep Municipality
14:15 – 15:00	Bitola Municipality
15:15 – 16:30	Metalec Bitola, AD – Bitola (manufacturer of furnaces for space heating)
Thu. 04 Jun	Field Trip
09:30 – 11:00	Veles Municipality including site visit of green building development by Habitat for Humanity
12:00 – 13:30	Eko Solar – Stip/ Ekokonsalting – Stip (solar collectors manufacturer)
14:15 – 15:00	Lesnina Engineering Panov – Kocani (production of briquettes)
15:15 – 16:30	Kocani Municipality
18:00 – 19:00	Prof. Predrag Popovski, SHPP expert, Mechanical Engineering Faculty of Skopje
Fri. 05 Jun	
09:00 – 12:30	Assessment team work session
13:00 – 14:30	De-brief at the USAID Mission Office in the U.S. Embassy in Skopje

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Company/Organization/Authority/NGO	Relevant Person/ Contact Details
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