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**FEASIBILITY ASSESSMENT:
SUPPORTING INCREASED ENERGY
EFFICIENCY IN KAZAKHSTAN**
Energy IQC Task Order OUT-LAG-I-806-98-00006-00

FINAL REPORT

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Prepared for:
**USAID/CAR/Office of Energy and Environmental Initiatives
Almaty, Kazakhstan**

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The US Agency for International Development Central Asia Region (USAID/CAR) has provided assistance to Central Asian nations in the area of energy restructuring and policy reform since 1994. Energy sector technical assistance to both power and petroleum industries has focused primarily on privatization, pricing, regulation, and institutional development. As energy sector structural and pricing reforms progress, the economic incentive for energy consumers to utilize energy more efficiently will increase. There has been little effort to date to stimulate demand for energy-efficient technologies or develop the energy-efficiency service sector.

In August 1999, USAID/CAR's Office of Energy and Environmental Initiatives retained Bechtel National, Inc. to conduct a study to assess the feasibility of an energy efficiency and conservation (EEC) activity that would complement ongoing CAR energy and environmental initiatives. The study focuses on Kazakhstan because of the country's progress in energy sector privatization and reforms and because of the country's leadership in climate change issues. Bechtel's project team was comprised of Messrs. Richard P. Smith and Terry Fry.

The remainder of this section presents an overview of the national economy, energy sector, and prior and ongoing initiatives relevant to the development of a market for energy efficiency services. Section 2 describes the team's workplan and methods, and Section 3 discusses the team's findings, recommendations, and suggestions for next steps.

1.1 General Economic Conditions

Since declaring its independence in 1991 following the collapse of the former Soviet Union, Kazakhstan has followed a path of aggressive market liberalization. The privatization of state-owned companies promoted growth in the early 1990s. The country has retained close trading ties and economic links with Russia, however, and the collapse of the Russian economy has severely affected Kazakhstan's exports and general economic situation. The country has accepted bartered terms for payment in kind for a significant portion of exports to neighboring countries, and the government has declared import substitution to be a high priority to stem outflows of hard currency.

Since 1995, the Kazakh economy has contracted significantly, and is expected to decline an additional two to four percent in 1999. Inter-enterprise debt is high and a tight monetary policy exacerbates the crisis. As bankruptcy procedures are weak and the GOK is reticent to close insolvent firms, the workforce has been hard hit. Official unemployment figures are low, but hide large numbers of underemployed workers and many more on unpaid leave. The country has experienced significant emigration of ethnic Russians and Germans, depleting ranks of technologists and management talent. Population has declined from 16.9 million in 1993 to 15.5 million in 1999.

Several economic forecasts project resumed economic growth in 2000, led by anticipated growth in oil and agricultural production. Interest rates will remain high and inflation will increase as a result of expected devaluation of the tenge. Rising oil prices will boost export revenue, limiting the current account deficit, and foreign direct investments should continue to cover much of the deficit.

1.2 Energy Situation

Kazakhstan is rich in natural resources including oil and natural gas and, with participation of foreign firms, is rapidly developing its potential to develop and export oil and gas. Official Kazakh estimates routinely exaggerate the extent of hydrocarbon resources, however, and the extent of the country's reserves are difficult to assess.

Much of the country's domestic energy consumption derives from high-ash domestic coal, and the country is striving to substitute cleaner and more efficient fuels. Natural gas supplies are not yet reliable for most industrial and population centers, although new pipelines and local distribution networks are either underway or planned. The energy intensity of the country is roughly twice to three times that of industrialized Western countries, partly due to structural differences in economic activity, but largely due to inefficiencies in energy production and use.

As a direct result of its high energy-intensity and relatively high economic output, Kazakhstan is the largest emitter of greenhouse gases (GHG) in Central Asia, and particulate pollution is very high as well due to the dependence on low quality coal. The Government has established regional leadership in climate issues, however, having announced its intention to join Annex 1 and Annex B of the UNFCCC and Kyoto Protocol. USAID is assisting the Government in its efforts to identify a credible GHG emissions reduction target in time for the next Conference of Parties in October 1999.

Kazakhstan is a net energy exporter, primarily of oil, led by the Tengizchevroil joint venture and Kazakhoil, a nominally state-owned oil company formed in 1997. Regions of the country depend on imported power (from the Russian supplier, Unified Energy Systems) and natural gas (from Uzbekistan). The inter-enterprise debts in Kazakhstan results in frequent build ups of payment arrears, however, and both power and gas imports are regularly interrupted as a result. Transmission and distribution systems are in poor condition, and still suffer from network designs that were predicated on the geopolitical boundaries of the former Soviet Union: the power grid lacks capacity to serve the country's requirements independently and still relies heavily on Russia, and gas supplies are physically separated into two pipeline systems. Losses in supply of power and heat are excessively high and remain a top priority of the Government.

Table 1 presents estimated sectoral shares of final energy consumption; the high share of industrial consumption reflects the relatively high concentration of extractive and heavy industry and the low share of service industries in the national economy.

Table 1
Sectoral Shares of Final Energy Consumption

	1995	2000
Industrial	38	43
Agricultural	21	20
Transportation	13	13
Residential	18	15
Public/Other	10	9
Total	100	100

Source: IRG (1995)

Statistical data on sectoral shares of final energy consumption are difficult to obtain, yet even the available estimates are useful as comparative indicators of where priorities for energy consumption efficiency might best be placed. Most data are based on top-down approaches that estimate both sectoral shares of GDP and of energy intensity (energy consumption per unit of economic output). The project team was unable to identify the existence of any data or estimates of consumption shares by end use (e.g., heating, lighting, motors, ventilation, etc.).

1.3 Prior and Ongoing Initiatives Relevant to EE

USAID and other international development organizations have actively supported energy and environmental objectives for more than five years. Most of the prior and ongoing donor-assisted interventions have focused on one or more of the country's highest priority objectives: energy policy reforms, efficiency improvements in power and heating supply systems, and global climate change mitigation strategies. Several of the initiatives described below seek to stimulate investment through identification of project opportunities and development of a pipeline of feasible projects. None of the initiatives directly targets market barriers to more efficient energy consumption in industry and commerce, nor seeks to develop the supply of energy-efficiency goods and services.

USAID has assisted Kazakhstan's energy and environmental sectors with several major initiatives that help to establish necessary conditions for energy-efficiency services markets to develop. These include:

- Support for development of a National Program for Energy Savings (1994-1995). The study evaluated energy savings potential in the heat supply sector and outlined policies to support increased energy end-use efficiencies.
- Energy Efficiency and Market Reform Project (ongoing). This regional program has supported Kazakhstan's dramatic restructuring of its energy supply systems, leading to a high rate of privatization. The project continues to provide support to regulatory reforms that will eventually lead to more rational pricing. More efficient pricing will establish more commercially viable conditions necessary to stimulate badly needed investments to upgrade generation and distribution facilities in the power and heating supply infrastructures, as well as investments in more efficient customer end-use technologies. The project has also supported audits of district heating systems, identifying technical and financial requirements for upgrades.
- Environmental Policies and Institutions for Central Asia (ongoing). The EPIC project, a regional initiative supporting a broad range of environmental objectives, provides technical assistance to Kazakhstan in developing and conducting its global climate change analyses. Studies on potential GHG mitigation strategies point to the role of energy efficiency in reducing the regional and global environmental impacts of energy production and use.
- Central Asian-American Enterprise Fund (ongoing). CAAEF is a regional enterprise fund, capitalized at \$150 million, providing credit to commercially sound local enterprises, primarily for investments in modernization. Industrial modernization investments may include, but are not limited, to increased operating efficiencies.
- EcoLinks (ongoing). The recently initiated project is designed to help solve urban and industrial environmental problems in Kazakhstan and other countries in Central and Eastern Europe and the New Independent States (CEE/NIS). The project provides

information on environmental best practices, identifies opportunities for trade and investment, and provides limited grant assistance to local businesses to support projects related to environmental management systems, cleaner production practices, and global climate change.

Other US Government and donor-assisted initiatives include the following:

- Technology Cooperation Agreement Pilot Project (ongoing). Kazakhstan is one of the first five countries participating in this global project supported by USAID, USDOE, and USEPA. TCAPP supports development of a framework to prioritize GHG-friendly technology priorities and organize country activities to stimulate technology commercialization and deployment.
- USDOE support of potential project investments that could qualify for Joint Implementation credits (to be coordinated with TCAPP activities). This initiative will attempt to develop and certify a JI investment project.
- United Nations Development Program/Global Environment Facility project to remove barriers to energy efficiency in municipal heat and hot water supply. The project, to be developed by September 2000 in an activity supported by a Project Development Fund grant, will seek to demonstrate technical and commercial feasibility of selected efficiency measures on the supply and demand sides of a selected municipal heating and hot water system in Almaty.
- United Nations Foundation, Inc. and United Nations Economic Commission for Europe have announced an initiative for developing a pipeline of GHG-friendly investments, "Energy Efficiency Investment Project Development for Climate Change Mitigation." The regional initiative provides no direct financial assistance, but seeks to identify and promote investment opportunities.
- EC/Tacis Energy Center (1994-1996). The project established and operated the Energy Center of Kazakhstan with the aim of supporting local enterprises in implementing energy savings policies. The center was closed in 1996 when its lack of commercial sustainability became evident.
- EU/Tacis Bistro program. A program component was designed in 1997 to support energy efficiency in a demonstration project in an Almaty hospital. The program is not yet operational.

2.1 Workplan

The project team, in considering the feasibility of an EEC activity in Kazakhstan, designed a workplan to investigate and analyze local market and institutional dynamics as they relate to the development of commercially-oriented and sustainable markets for energy efficiency technologies and services. Figure 1 illustrates the team's workplan.

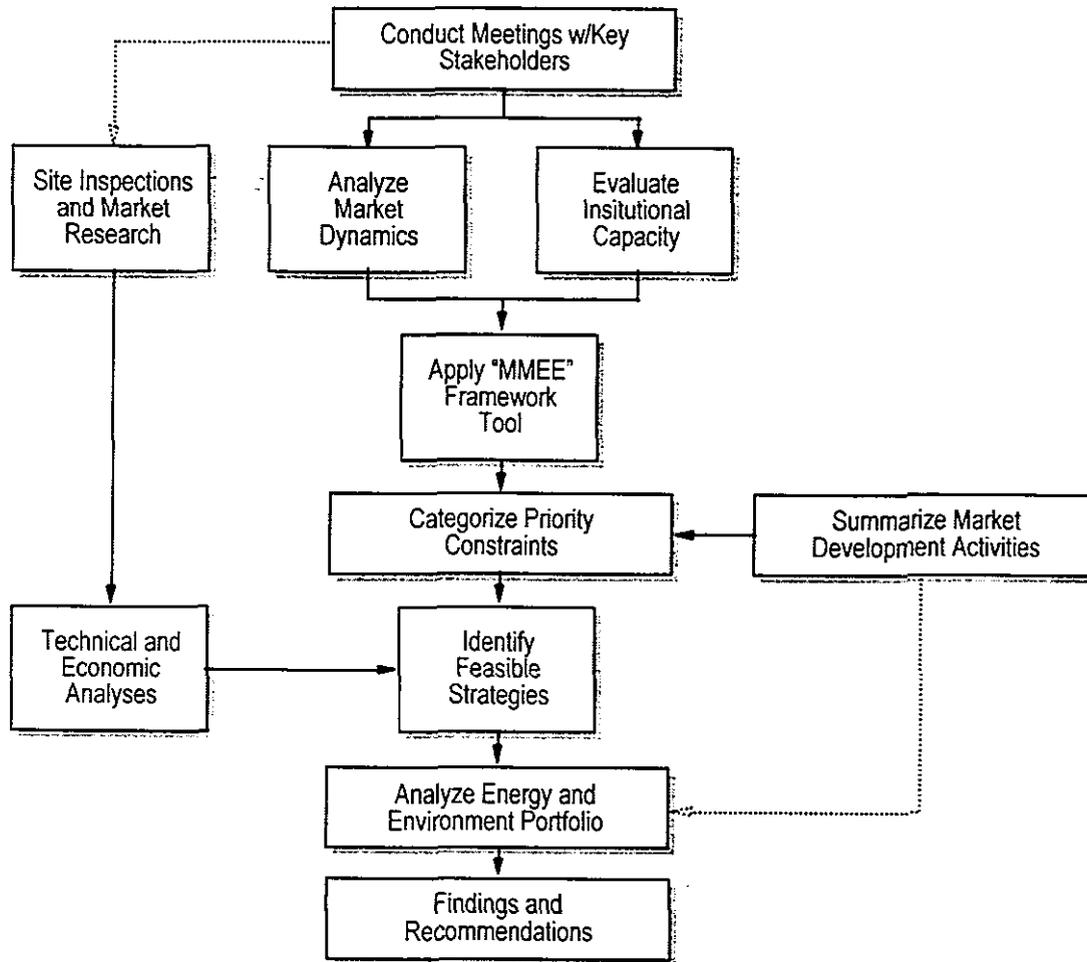


Figure 1 Approach to Determining Feasibility of EEC Activity

The workplan and approach featured direct interaction with key stakeholders in the public and private sector, as well as numerous site observations of energy-intensive enterprises, and a review of pertinent literature. The project team met with representatives of more than 50 organizations, who provided input from the following key perspectives:

- Energy end-users and consumers
- Energy suppliers
- Financial community
- Policy makers

- Development agencies
- Service companies
- Equipment vendors
- Business associations
- Consultants

Appendix A lists references materials and Appendix B lists organizations contacted.

2.2 Analytical Methods

As illustrated above, the project team used the “MMEE framework tool” in a central position in its analysis. The tool, developed by USAID Global’s Office of Environment in its Moving Markets for Energy Efficiency project, is designed to support long-term market transformation by identifying activities necessary to develop a comprehensive enabling framework for stimulating the delivery of energy efficiency services. The MMEE framework categorizes market barriers to deployment of energy-efficient technologies in five broad classes of factors that influence successful delivery of EEC services: macroeconomic conditions, policy and regulatory considerations, customer factors, financing, and market delivery channels. Within the five areas, the framework classifies 38 factors for successful delivery of EEC technologies and services, and examines:

- The existence and magnitude of corresponding local market barriers
- Past and ongoing efforts to address those barriers
- Results and lessons learned from those initiatives, and
- Actions needed to reduce the market barriers

Appendix C presents the framework tool, and its application to Kazakhstan, in more detail. After applying the framework tool, the project team condensed the results to a set of priority constraints and a corresponding set of strategies to address the barriers.

In parallel to the analysis of market dynamics, the project team conducted site inspections and interviewed operations managers of key industrial and commercial energy consumers in the Almaty area.¹ These investigations gathered sufficient technical and economic data to enable the team to characterize financial attractiveness of EEC technology options to energy consumers.

The team’s final considerations in determining feasibility of and recommendations for an EEC activity required examination of ongoing and planned activities of the international development community in general and USAID/CAR in particular. Key criteria were:

¹ The feasibility analysis focused on the greater Almaty area because of its relatively mature commercial orientation, which would present the most favorable conditions for demonstrable and replicable EEC technology deployment.

- Consistency with Strategic Objectives of: A More Economically Sound and Environmentally Sustainable Energy System as an Engine of Growth for Central Asia, and Improved Environmental Management Capacity to Promote Sustainable Growth
- complementary fit with GOK and donor-assisted activities

The analysis of local EEC market dynamics was organized around the five classifications of market success factors described above. The detailed results – indicating market barriers, discussing past and ongoing efforts to address the barriers, and recommending required mitigation activities – are presented in Appendix C. Figure 2 shows a summary of the market constraints, indicating immediate and secondary priorities for resolution. In the macroeconomic and policy arena, which may be regarded as market-conditioning factors, the priority constraints can be characterized as a weak economic climate and incomplete energy sector structural and pricing reforms. These constraints are widely recognized, of course, and the Government is active in addressing the constraints with the assistance of ongoing USAID initiatives.

Figure 2 also shows that retail market dynamics, including customer factors (economic, technical, and behavioral aspects), financing practices, and market delivery channel capabilities, are clearly most constrained by limited awareness of EEC technologies and practices. In these areas, very few if any initiatives are directly addressing market constraints. Table 2 further condenses the list of high-priority constraints and lists broad strategies that both possible and, in the project team’s analysis, feasible. Section 3.1 briefly describes the constraints and feasible mitigation strategies. Strategy recommendations are discussed more fully in Section 3.6 below.

Table 2
Priority EEC Market Constraints and Feasible Mitigation Strategies

Priority Constraints	Possible Strategies
Market conditions	Continue reforms
Limited managerial capacity	Training, human resources development
Limited EEC technology deployment	Monitoring and targeting equipment
Low levels of awareness	Information exchange mechanisms

3.1 Priority Constraints and Feasible Mitigation Strategies

Macroeconomic and General Business Conditions. The lack of growth in the economy and lack of an adequate financial and business infrastructure are major constraints affecting all participants in the market for EEC technologies. Local stakeholders report capricious enforcement of tax policy, low confidence in the legal system, and limited means of exchanging information (e.g., business strategies for energy management) with other enterprises. Rapid and numerous changes of policy have contributed to creating uncertainty among foreign investors.

The apparent success in attracting foreign capital in exchange for assets in oil, gas, and power sectors

“In the economic transformation, the destructive part has happened, but the substitution [of new systems and regulation] is not happening.”
R. Ghaffari: General Mgr. & CEO, Citibank

Figure 2: Priority EEC Market Constraints

Key Factors	Affected EE Stakeholders					Energy Suppliers	Equip Vendors	Service Suppliers	Gov't Inst'ns	Finance Inst'ns	Advocacy Groups
	End Users	Ind Com	Res	Inst	Trns						
Macroeconomic											
•Economic climate	●	●	●	●	●	●	●	●	●	●	●
•Weak biz infrastructure	●	●		○		○	○	○	○	○	○
Policy & Regulatory											
•Inefficient pricing	●	●	○	●		●	●	●	●	○	●
•Incomplete regulation	●	●	●	●	●	●	●	●	●	●	●
•Lack of codes & stds	●	●	●	●	○		●	○	●		○
Customer Factors											
•Limited awareness	●	●	●	●	●	●	●	●	●	●	●
•Ltd tech & mgt capacity	●	●		●		○	●	●	●	○	n/a
•Poor finances	●	●	●	○		●	●	●	●	●	n/a
Financing											
•Tight credit market	●	●	●	●	○		●	○		○	n/a
•Immature capital mkts	○	○		○	○	○	●	●	●	○	n/a
•Low awareness	●	●	●	●	●	●	●	●	●	●	●
Delivery Channels											
•Limited awareness	●	●	○	●	○	●	●	●	●	●	●
•Tech & mgt capacity	●	○		○		○	●	●			
•Ltd tech deployment	●	●	○	●		●	●	●	●		

● Immediate priorities ○ Secondary priorities

has not clearly led to levels of investment anticipated at the time the asset sales occurred. The Government has reneged on agreements with key foreign investors in the energy sector, exacerbating difficulties in attracting needed investments to upgrade power and heat generation and distribution facilities. The current situation does not stimulate investment in clean technologies.

Mitigation strategies: Continue support of privatization and structural reforms throughout the economy.

Policy and Regulatory Considerations. The greatest barriers are found in the ongoing, yet incomplete energy sector regulatory reforms. Energy pricing is still inefficient, with cross subsidies existing between customer classes and between energy forms (e.g., electricity pricing subsidizing heat). The agencies responsible for regulating energy pricing do not yet have sufficient capacity, and lingering price subsidies are severely eroding the financial position of the privatized energy suppliers, who in turn cannot make needed investments to upgrade service.

"Kazakhstan was over-ambitious in its restructuring. Too far, too fast."

V. Lee: Business Development Director, AES

Despite a declarative energy savings "law" enacted in 1997, Government agencies exhibit limited commitment to energy efficiency on the demand-side, apparently finding greater comfort in energy supply technologies than in market-oriented options. Codes and standards are not a major part of the overall strategy to promote energy efficiency. Government agency budgets often exclude energy costs, and the exemption from paying energy has resulted in procurement practices for Government facilities that ignore lifecycle costs of operation.

Despite a Government declaration that permits generation of autonomous heat and power, no regulations or tariffs exist to guarantee sale and pricing of excess energy generation. Environmental and site permitting regulations are not clear. As a result, few industries are investigating their potential for cogeneration, though many possible applications appear likely to be economic if macroeconomic conditions improved to the point where industries could operate at increased capacity.

Mitigation strategies: Continue regulatory reforms, with emphasis on energy pricing, which will provide multiple benefits, including: aiding the commercialization of retail energy suppliers thus stimulating needed investments in supply system stabilization and rehabilitation, and providing energy end-users with more accurate pricing, stimulating more rational choice of energy consuming equipment. Continue to develop capacity within public sector energy institutions to adapt to their changing role relative to the market(s) for energy services.

Develop procurement policies for government facilities that require consideration of lifecycle operating costs, and require that all government agencies be responsible for their energy costs. Consider tax incentives for local manufacture of EEC technologies. The project team determined that regulated efficiency codes for buildings and equipment would be premature at this time, due to the lack of enforcement capacity.

Customer Factors. A major constraint for most customers is the lack of adequate and accurate information regarding their own energy consumption. Residential consumers and small and medium commercial enterprises generally lack individual metering of heating and

hot water supply. Many industrial users lack accurate metering information because of the widespread use of induction meters in applications where readings can be in error by as much as 20 percent. Customer decision-making is further hampered by lingering pricing inefficiencies.

End users also lack information regarding EEC technologies and practices, and those who seek information have few available sources.

*"In the 1980s, electricity and heat were centrally supplied and consumed like air."
"Lack of information and awareness are our biggest problems"
A. Trofimov, President, Kazselenergoprojekt*

Management and procurement practices in industry suffer from the lack of accurate energy consumption information, inefficient pricing, and insufficient exposure to energy efficiency technologies and practices. Poor financial condition of many enterprises and annual capital budgeting practices lead to a heavy focus on first cost objectives.

Another effect of the prevailing economic circumstances is that existing equipment is often outdated, and maintenance is often deferred indefinitely. The combined effect is that equipment efficiencies for motors, pumps, and compressors are quite poor, as are thermal efficiencies of industrial processes.

Mitigation Strategies: Encourage replicable low-cost technology deployment, such as monitoring and metering equipment. Develop information exchange mechanisms such as industry associations. Conduct targeted training programs focused on energy management decision-making and human resource development.

Financing of Energy Efficiency Projects. Capital markets in Kazakhstan are poorly developed and retail credit is tight, even for credit-worthy customers. Total assets in the banking sector are only \$1.8 billion, of which customer deposits are approximately \$300 million, corporate around \$600 million. Retail financing totals about \$60 million annually. The Government officially projects an inflation rate of 16.8 percent. Further devaluation of the tenge is widely expected. Local commercial banks are weak and face consolidation.

Energy efficiency projects are generally self-financed. Typical borrowing rates for first-tier customers from first-tier banks are in the range of 22 to 27 percent, on terms no longer than one year. In the second tier, banks typically charge "loan origination fees" of an additional 10 to 15 percent, on terms of three to six months. As a result, enterprises require investment payback periods of about three months or less.

*"Local banks aren't interested in energy efficiency projects."
P. Smilkov, General
Director, Honeywell*

Financial institutions are not familiar with energy-efficiency projects, which results in perceptions of high risk. Financing practices strongly favor asset-based lending over project- or performance-based financing. Lease financing has been attempted "a few years ago," but is not utilized at present as it lacks a supporting legal framework. Local banking institutions tend to focus on large-scale projects, preferably with foreign investment partners.

Mitigation Strategies: Develop training programs to raise profile of EEC financing with local financial community. Develop information exchange programs to facilitate communication between banks, consumers, and potential project developers.

Market Delivery Channels. Energy-efficient products are almost all imported and are only inventoried in limited quantities: given current economic conditions, vendors are not willing to maintain inventory. When production line expansion and new building construction projects specify energy savings technologies, as is usually the case in projects with foreign investment, vendors capably import EEC technologies. Spare parts for EEC technologies are available only on special order. Energy-efficient technologies have not been widely demonstrated.

Local manufacture or co-manufacture of EEC equipment technologies is virtually nonexistent, though the capability exists. Meters are manufactured locally. Locally manufactured insulating products for piping and building applications have poor quality and are in short supply.

"If we sold only the parts, we might never find a buyer."

*G. Stoulnikov,
Director, Schneider
Electric*

Existing service companies are typically focused on turnkey engineering, procurement, and construction contracts, often in informal partnerships with equipment vendors. Few identify themselves as EEC service providers, and most lack capacity for energy efficiency activities. Most have not established links with the financial sector, though a few have self-financed projects, including one company which offered leasing terms on an energy-efficiency project. Familiarity with EEC technologies is modest at best, and with ESCO business models is poor.

The local engineering skill base is adequate, though is not generally organized in the form of service businesses due to the low levels of demand for design and installation services. Rather, energy engineers are typically employed in industrial enterprises, where they are often constrained by a combination of capital budgets and management practices to doing little more than maintenance.

Mitigation Strategies. Training and technical assistance to local service sector to raise awareness of EEC technologies and of energy service company business models. Information exchange mechanisms such as associations of service businesses and/or energy service professionals.

3.2 Economic Aspects of Energy Efficiency

Given the energy end-user requirements for rapid payback, the project team focused its economic analyses on EEC technologies known for extremely high cost-effectiveness. Table 3 presents representative payback periods for typical EEC technology applications. The complete lack of sectoral and end-use consumption data at the national level, however, makes it impossible to project meaningful estimates of the potential magnitude of savings for each EEC application.

Table 3
Simple Payback Periods of Selected EEC Technologies

Technology	Ind/Com	Res/Inst'l	Energy Supply
Monitoring/targeting	1-3 months	~ 8 months	~ 1 month
Combustion control	~ 1 year	N/a	1-3 years
Lighting (CFLs)	~ 10 months	~ 1.2 years	n/a
Autonomous heat	~ 1 year	> 1 year	n/a
District heat upgrade	> 12 months	> 12 months	> 3 years

Because operating conditions and usage patterns vary tremendously between users, the team opted to use customer-supplied accounts of successful applications in their own facilities rather than to attempt definitive characterization of “representative” economics when so many input variables lack precision. For example, estimates of baseline and EEC technology cost are not statistically significant given the lack of survey data, usage patterns are irregular and expected to continue changing as the national economy continues its transformation, prevalent subsidies in energy pricing make interpretation of results problematic, and consumer discount rates (which can dominate estimates of cost-effectiveness) are high and volatile.

3.3 Private Sector Demand for Energy Efficiency

The demand for EEC technologies is presently limited, primarily due to general economic constraints affecting all energy consumers. Information gaps and inefficient energy prices also depress private sector demand, yet consumers for whom energy consumption represents a high operating cost are actively seeking low-cost efficiency improvements. Industrial and large commercial consumers are cognizant of the benefits of energy efficiency and implement solutions within their financial constraints.

Industrial users are eager to exchange information with other enterprises on methods to save on energy costs. As energy supply pricing, billing, and collection practices improve, demand for EEC options in all sectors can be expected to increase. Until economic conditions improve, however, EEC demand will be limited to measures that satisfy users’ low-cost and rapid payback criteria.

3.4 Coordination with USAID/CAR Portfolio

The project team examined the USAID/CAR portfolio of energy and environmental initiatives in the context of stated objectives (see Section 2.2 above). The team also considered ongoing and planned initiatives of other institutions in the international development community to ensure that ensuing recommendations would complement, rather than duplicate, other activities.

The team found that critical constraints in the market conditioning arena (both macroeconomic and policy/regulatory issues) are being addressed in ongoing USAID initiatives (see Section 1.3 above). Within the energy sector, ongoing initiatives have a heavy emphasis on privatization, commercialization, and rehabilitation of the energy supply system. Policy and regulatory initiatives appropriately address both energy supply and environmental issues.

Figure 3 illustrates the team's analysis of the spectrum of energy and environmental initiatives in Kazakhstan, highlighting the areas of ongoing initiatives and the perceived gaps in the portfolio. The gaps are primarily those that directly affect the deployment of EEC technologies, including both policy and technology options.

Because final decisions regarding technology deployment in a sustainable market for energy services are made at the retail level, the implication is that prospective future initiatives should include a strong emphasis on retail market dynamics and active private sector counterparts. The team also found indications that a program focusing on stimulation of local demand for low-cost, fast payback EEC technologies and services would best complement the existing portfolio of USAID/OEEI and other donor-assisted initiatives:

- Ongoing activities focused on developing a pipeline of projects, although important for long-term market development, are likely to be slow in attracting investors in the immediate future: the existence of GOK policies favoring import substitution means that priority projects will have limited hard currency earnings and thus attract few foreign investors, and the tight credit market means that local investment in large-scale technologies will also be limited.
- Further, many large-scale technology applications are likely to be premature until macroeconomic recovery progresses: with most industries running at partial capacity, high-cost technology investments (e.g., cogeneration) would see already lengthy paybacks go even longer and would therefore not likely be sustainable on a commercial basis.

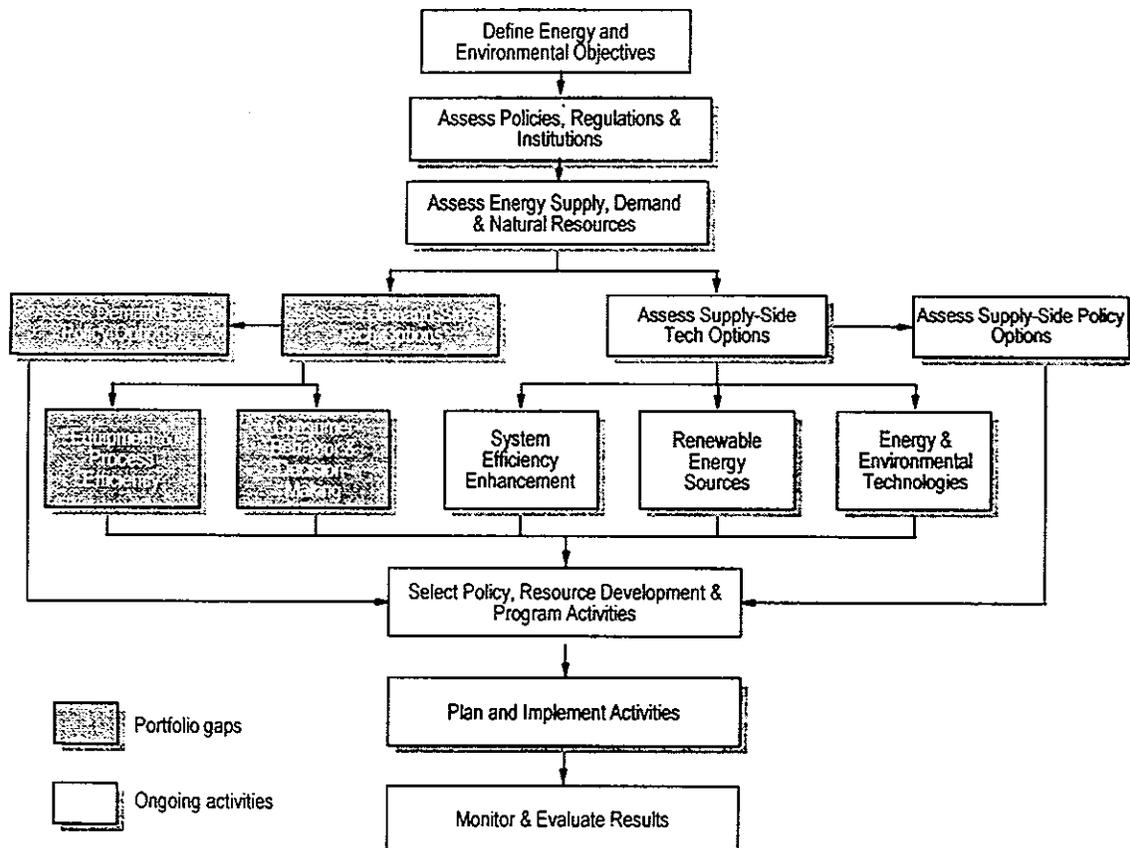


Figure 3 Analysis of USAID/OEEI Portfolio

On a sectoral basis, prospective EEC initiatives should be aligned with key energy-consuming market segments. As discussed throughout this report, the quality of consumption data is poor, but it appears clear that the energy-intensive industrial sector is an attractive target for an EEC activity as it is responsible for over 40 percent of the country's final energy consumption.² Further, EEC initiatives within the sector will tend to strengthen industrial performance and reinforce economic development initiatives. Segments such as transportation and agriculture, which combine for another third of final consumption, are potential targets for EEC activities after some successes are realized in industry. In the near term, the diffuse nature of transport and the lack of commercial orientation in agriculture make the sectors less attractive starting points for an EEC activity.

3.5 Institutional Capacity of GOK Agencies

The choice of appropriate counterparts for a prospective EEC activity depends, of course, on the specific objectives of the initiative. However, with the perception that an EEC activity should be market-oriented and focused on improving information exchanges and the replicable deployment of low-cost EEC technologies, the team evaluated several likely candidate counterparts.

Ministry of Energy, Industry, and Trade (MEIT). The Ministry is officially supportive of energy efficiency, and was instrumental in passage of the 1997 Energy Savings Law. It is, however, strongly oriented towards improving efficiency in the supply of power and heat, reflecting its roots and comfort in energy supply planning and production. MEIT officials responsible for energy matters are not well-grounded in market dynamics and have made little outreach to major energy consumers. The Ministry would be an enthusiastic counterpart, but would require assistance to define its role, organize a supporting unit, and sponsor badly needed end-use data collection efforts.

Kazselenergoprojekt. The organization, a government-owned research institute and joint stock company, has worked on power and heat system design and operations for more than fifty years. Kazselenergoprojekt is active in nontraditional energy issues, including renewable energy and, to a lesser extent, EEC technology options. The institute could be a strong counterpart in technology deployment, capacity building, and creation of information exchange mechanisms.

Kazakh Institute for Environment Monitoring & Climate (KazNIIMOSK). The institute is a capable counterpart for USAID's EPIC program, and has a small but well-trained staff who are knowledgeable in EEC market dynamics. They are organized in the Ministry of Environment and Natural Resources, however, and have little influence with MEIT. If appropriate linkages between the Ministries are made (which could have powerful benefits for OEEI's program objectives) then KazNIIMOSK could be useful in conducting and analyzing surveys that would not only provide end-use consumption data to guide energy sector policy but also establish better baseline information for use in climate change initiatives.

² The district heating systems are also responsible for enormous inefficiencies in energy consumption, and these inefficiencies are being addressed through USAID's Energy Efficiency and Market Reform Project at a policy/regulatory level and by a UNDP/GEF demonstration project at field level. Institutional sector energy efficiency is the object of the planned EU/Tacis "Bistro" Project.

Kazakhstan Electric Grid Operating Company (KEGOC). In addition to operational departments directly responsible for rehabilitation and operation of the national power transmission grid, the remnants of the state-owned power company reside in KEGOC. These remnant capabilities give them the apparent capacity to participate as a counterpart for a prospective EEC activity. For example, they retain selected energy planning functions, but the ongoing reorganization and commercialization of the company is likely to remove such functions from KEGOC as they are not aligned with the new business charter. As such, KEGOC is not an ideal counterpart.

Private Sector Institutions. The project team recommends involvement of private sector institutions in a future EEC activity. Potentially attractive counterparts include:

- Union of Industrialists and Manufacturers of Kazakhstan. The Union is headed by influential industry directors, and includes membership of nearly 2000 industrial enterprises nationally. The Union is enthusiastic about a potential role in establishing information exchange mechanisms.
- Kazakhstan Electricity Association. KEA members include both retail energy distributors (e.g., AES and Almaty Power Consolidated) and large energy consumers from industry and commerce. The Association was formed to improve communications between energy producers, consumers, policy makers, and regulators. KEA is also a willing and capable participant in an EEC activity
- Kazakhstan Power Engineering Institute (KazPEI). The institute is a joint stock company, with its ownership 53 percent and 47 percent state. Although its ownership and operation of the Northeast Boilerhouse (a district heat and power supply company serving a portion of Almaty) give them a potential conflict of interest with EEC activities, the research functions at the Institute are quite good, particularly in investigations of domestic production of EEC technologies such as insulation, metering, and controls. KazPEI could be an effective counterpart in a limited role.

Private sector participation in an information exchange mechanism would be a key factor in its success. A memorandum or protocol formalizing a public private partnership for information exchange and outreach could provide the foundation for an effective collaboration involving key stakeholder institutions, enterprises, and associations. Other elements of a comprehensive information exchange mechanisms would include traditional skill transfer activities such as training workshops and collateral material, best practices manuals, twinning relationships, staff exchanges, etc.

3.6 Recommendations

The project team recommends that USAID support a market-oriented strategy to promote accelerated use of EEC technologies and practices in local industry and commerce. The strategy should focus on key constraints to energy efficiency and feature activities to:

- Build technical and managerial capacity with regard to efficient energy utilization. Components might include management and procurement practices, technical assistance and training to enterprises, certification programs, etc.
- Accelerate deployment of metering technologies, coupled with training in monitoring and targeting (M&T) techniques, to enable better informed customer decision-making. The activity would also allow compilation of more accurate end-use

consumption data, enabling policy makers and service suppliers to focus more accurately on priority market segments and end uses.

- Establish information exchange mechanisms (e.g. business and professional associations, national EE advisory group, workshops, etc.) to increase the level of awareness and understanding of EEC technologies, and of economic and environmental benefits.

Such an activity would strengthen USAID/CAR/OEEI's program portfolio by creating strong linkages with climate change and energy policy reform initiatives. It would also improve the relative competitiveness of local industrial and commercial enterprises by strengthening their financial standing as they control their energy costs more efficiently. Further, an activity would foster the development of market-based energy efficiency business activities in the local service sector as demand for EEC technologies increases, resulting in increased economic activity, job growth, and environmental benefits.

USAID should also continue its broad market conditioning activities, including support of energy sector restructuring and regulatory reform, with particular attention to the removal of subsidies and cross-subsidies in retail energy pricing. Progress toward more rational pricing will establish the foundation for commercial acceptance and deployment of EEC technologies, in addition to the fundamental benefits accruing through further movement toward privatization and competition in the energy supply system.

Timing issues. If it were not for the unmistakable evidence of commercial EEC activity, albeit on an extremely restricted scale, the project team would recommend only limited support of an EEC activity at this time. The fact that a nascent market for energy efficiency services does exist, however, suggests that now is an opportune time to complement the market conditioning activities of energy sector reforms with an EEC activity such that decision-making by energy end users and delivery channels for energy-efficiency services will improve in concert with improvements in energy supply systems and pricing.

The current lull in economic activity offers a window of opportunity for USAID to initiate an EEC activity with appropriate focus on program elements that are most likely to lead to demonstrable and replicable success. The project team found the prospective market participants to be receptive to EEC technology information, financing methods, and suggestions regarding potential information exchange mechanisms. Capitalizing on their present receptivity would minimize "lost opportunity" risks – i.e., that those same people and organizations might have significantly less time to consider EEC concepts in the future when their concentration will be increasingly absorbed in core business concerns as their activities pick up with the expected national economic recovery.

"The economic situation has not been all bad. It has given us some time and forced us to think."

*A. Zhussupaliev:
Director, Ayat*

In recommending that USAID support an EEC activity, the project team recognizes that energy sector reforms and reduction of inefficiencies in the generation, transmission, and distribution of both power and heat remain high priorities for the establishment of a more environmentally sustainable energy system. These activities that are reforming the energy supply industries should still feature prominently in the USAID portfolio.

An environmentally sustainable energy system also comprises efficient energy consumption, which strengthens economic performance of energy consumers and bolsters job growth in the EEC service sector, all stimulating further economic growth.

3.7 Next Steps

The project team recommends that USAID initiate a pilot program to support increased energy efficiency and conservation, targeting industry and large commercial enterprises and government facilities. The program objectives would be to strengthen the nascent market for energy efficiency services by:

- Increasing demand for EEC services through effective demonstration of highly cost-effective monitoring and targeting methods and energy management practices
- Increasing supply of EEC services through provision of training and technical assistance to local service sector to raise awareness of EEC technologies and of energy service company business models.
- Establishing information exchanges to disseminate information to prospective market participants. Business and professional associations, advisory groups, and workshops or other outreach forums can successfully increase awareness and understanding of EEC technologies and benefits.

The initial activities in a pilot program would seek to:

- Identify candidate enterprises for M&T implementation, obtain memoranda of understanding for participation
- Develop training programs/mechanisms for industrial and services enterprises
- Enlist commitments from public and private sector counterparts and begin M&T technology deployment
- Develop information exchange and outreach mechanisms
- Initiate market and statistical analyses to estimate the market potential for EEC goods and services

As the activities progress, the project would develop case studies of M&T applications and resulting end user actions to increase the efficiency of their energy utilization, and widely disseminate information through appropriate outreach mechanisms. Use of the information exchange mechanisms would promote successful energy management practices in both public and private sectors. For example, case studies of monitored EEC technologies could be used to justify and encourage government procurement policies based on lifecycle costs and, coupled with credible results of EEC market potential analyses, support increased local manufacture of EEC technologies by stimulating market demand. In each example, the information exchange and outreach mechanisms would play a central role.

The prospective project goal would be to support comprehensive development of a sustainable market for EEC goods and services, which the team expects would require at least three to five years. Given the present state of the Kazakh economy, the project should start on a modest basis, with of first year targets of M&T implementation in five or more local industries (e.g., food processing, metals processing, construction materials, etc.), commencement of training and technical assistance activities to local industries and

prospective EEC service providers, assessment of market potential of EEC goods and services, and establishment of formal protocol for information exchange and promotion.

Such an effort would require approximately thirty-six person-months' effort from technical specialists annually, plus local logistical support. Annual budget requirements for the recommended activities would be in the range of \$700,000. First year requirements would be approximately as follows:

- Technical lead: 12 months (overall technical leadership, selection and coordination with counterparts, analyze resource requirements and lead training activities, negotiate public/private protocol)
- Energy engineers: 14 months (identify and recruit sites and determine appropriate monitoring systems, determine site-specific monitoring objectives, schedule, and performance goals, assist procurement and implementation of equipment, investigate potential for developing codes and standards)
- Energy economists: 8 months (conduct market and end-use studies, coordinate program components with other environmental and market development initiatives, analyze economic benefits, assess government procurement practices)
- Information specialist: 2 months (formalize information exchange mechanisms and promotional outreach components, coordinate content of technical assistance activities)
- Local interpreter/administrative assistant: 12 months (arrange meetings, interpretation and translation, administrative assistance, etc.)

Table 4
First Phase Program Elements by Specialty

	Monitoring and targeting	Training Programs	Counterpart Commitments	Information Exchange	Codes and Standards	Market Study
Technical Lead	0	0	0	0	0	0
Energy Engineers	0	0			0	0
Energy Economists	0	0			0	0
Information Specialist		0		0		

Non-labor resource requirements would include:

- M&T equipment for participating facilities, estimated at about \$15,000 per enterprise
- Four to six portable gas analyzers for monitoring boiler operating efficiencies
- Direct costs for best practices manuals, support of workshops, and other information and skill transfer activities
- Other direct costs for travel and subsistence, and ordinary office supplies for project staff

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Development Agencies

USAID/CAR
US Embassy Commercial Attaché
World Bank
United Nations Development Programme
European Union/Tacis
European Bank for Reconstruction and Development
Islamic Development Bank

Government Organizations

Ministry of Energy, Industry and Trade, Republic of Kazakhstan
Kazselenergoprojekt, Republic of Kazakhstan
KazNIIMOSK
Kazakhstan Scientific & Research Institute of Power Engineering, JSC (KazPEI)
Kazakhstan Electric Grid Operating Company (KEGOC)

Energy Suppliers

AES Silk Road
Almaty Power Consolidated / Tractebel
KazPEI (NE Boiler House)

Industrial Energy Consumers

Coca-Cola
Bachus (wines and distilled beverages)
Rachat (confectioner)
Montazhnik (boilers)
Central Asia Cement
Byelkamit (pressure vessels)

Commercial Energy Consumers

Butya
Ram Store
Tsum Department Store
Hyatt Regency Hotel
Regent Ankara Hotel
Hotel Dostyk
Hotel Otrar
Kiosks

Financial Community

National Bank of Kazakhstan
Citibank

Service Companies

Ayat Energy Savings Technology
Ekos Limited

Eshel Engineering
Ecology and Environment, Kazakhstan
Bechtel International
PriceWaterhouseCoopers

Equipment Vendors

Honeywell
York International
Asea Brown Boveri
Emerson Electric
Fisher-Rosemount
Schneider Electric
Carrier
Johnson Controls
Philips

Associations

Kazakhstan Electricity Association
Union of Industrialists and Manufacturers of Kazakhstan
American Chamber of Commerce

Development Programs/Contractors

Energy Market Reform, Hagler Bailly
EcoLinks, Institute for International Education
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Harvard Institute for International Development
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Project Schedule of Activities, August – September, 1999

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				8/12 Smith leaves US	13 Fry leaves US	14 Smith arrives Almaty
15	16 Fry arrives Almaty 9 USAID (Madland) 2 Hagler Bailly	17 9:30 Bechtel 2:30 team mtg	18 9 team mtg 3 EcoLinks 3 CAAEF 6:15 team mtg	19 10 Am Cham 10 Johnson Controls 2 Commerce Dept. 3 Honeywell	20 9 USAID (Madland) 10 York Int'l 2 Coca-Cola 3 Schneider Elec. 4 En & Env, Kazakh 6 USAID (Madland)	21 10 Regent Hotel 1 Team mtg
22	23 10 Almaty Power/KEA 11 Carrier 11 Eshel Engineering 3 ABB 3 World Bank 5 Bechtel	24 10 Islamic Dev Bank 10 AES/Silk Road 2 EU/Tacis 3 Bacchus 6:30 team mtg	25 10 UNDP/GEF 11 Emerson Electric 1 Hagler Bailly 3 EPIC/HIID	26 10 CitiBank 11 National Bank 3 MEIT/Kazselenergo... 4 Butya 6 Hyatt Hotel	27 10 EU/Tacis 10 Rachat 11 Central Asia Cement 2 UNDP 3 Ayat 4 Montazhnik 6:15 team mtg	28 9 Team mtg 4 USAID (Madland)
29	30 team mtg (all day)	31 10 Byelkamt 12 KazPEI 2 KazNIIMOSK 4 USAID (McNamara) 6 team mtg	9/1 2 USAID (presentation) 4 team mtg	2 Smith leaves write up	3 write up	4 write up
5	6 Labor Day	7 9 Mining & Metals convention 2 USAID (Madland)	8 9 HVAC convention 11 KEGOC	9 11 EPIC/HIID 3 Price Waterhouse	10 10 USAID (Starnes, Madland)	11 write up
12	13 Fry leaves	14	15	16	17	18
19	20 USAID/ENI (Ichord, Crooks, Birnbaum)	21				

Appendix C – APPLICATION OF MMEE FRAMEWORK TOOL TO KAZAKHSTAN

KEY FACTORS INFLUENCING SUCCESSFUL DELIVERY OF EE SERVICES	BARRIERS TO ENERGY EFFICIENCY	PAST EFFORTS TO ADDRESS BARRIERS	RESULTS AND LESSONS LEARNED	ACTIONS NEEDED
A. MACRO-ECONOMIC AND GENERAL BUSINESS CONDITIONS				
Stable Political Environment	Not a Barrier	President in office since 1991; has strong political power base. Expected to win next election in 1999	Spectacular progress in reforming and opening of markets. Privatization of much of the economy has already taken place and continues despite current economic downturn due to collapse of Russian economy - chief direct trading partner	Continued commitment to "free market" approach
Stable or Growing Economy	Major Constraint because of economic downturn in Russia the major trade partner with Kazakhstan and other CAR countries	GOK policy of market liberalization and privatization of state owned companies promoted growth in early nineties	Growth rates were positive till mid nineties. Collapse of Russian economy considerably hampered/impacted economy. Economic activity shrinking and not expected to improve in short term. Economy expected to contract in 1999/2000 approximately -2%. Growth expected over next 5 years in range 1 - 5%	Continued commitment to "free market" approach; Many initiatives to increase foreign investment and make business transactions more transparent but also some short term "reactive" measures to protect local industry
Adequate Financial and Business Infrastructure	Major Constraint while economy depressed because of Russian economic crisis	GOK policy of market liberalization has enhanced and developed business infrastructure to a large extent but current lack of liquidity severely constraints economic growth. Rapid and numerous changes of policy have contributed to creating uncertainty among foreign investors. The apparent renegeing on agreements with key foreign investors and not following through on deals has compounded and exacerbated the uncertainties of investing in the country.	Tenge fully free floating since April 1999; prior policy sort to maintain a stable Tenge/Dollar exchange rate resulting in high Tenge value with respect to local/main trading partners which in turn made Kazak goods and services uncompetitive; tight monetary policy making investors think only in very short term investments or avoid capital market as a way to generate growth.	A consistent approach to government policy is needed to permit business to make meaningful longer term investment decisions. The short to medium term impact of the current tight money supply policy is not clear. The government is committed to "free market" approach and continued privatization and well as focusing on promoting import substitution; cutting public expenditures but it is not clear if they can continue to attract all necessary foreign investment to help economy grow and whether the monies the government is received from the sale of assets is being appropriately redistributed within the economy to stimulate future growth and expansion.
Non Cumbersome and Enforceable Legal System	Constraint because of general lack of confidence in litigation process However, those with appropriate level of resources can get recourse under the law.	GOK reformed legal system to create greater equity	reform underway with mixed results. Anticipating due process under the law not yet an appropriate risk management strategy for small and medium scale business.	Avoid complex contracts, such as performance contracts, that rely on use of legal system to obviate risk elements.
Reasonable taxation Policy	Inequitable taxation policy: GOK taxation policy favors energy supply investments over demand control expenditures as well as manufacturing over service sector; little use of incentives such as accelerated depreciation to stimulate/attract investments in new technologies	GOK has offers tax breaks for foreign investment/ownership of local industries but has also showed an inconsistent approach to sustain foreign investor interests once the initial foreign capital investment has been attracted.	Country has been successful in attracting foreign capital in exchange for assets in key sectors - energy supply/ oil/gas It is not clear that the anticipated level of foreign investment expected as a consequence of the sale of assets has occurred. Current situation does not stimulate/promote investment in clean technologies	Further analyses is required to determine appropriate financial policy options to stimulate investment in EE Such options could include tax incentives for implementation of EE projects and manufacturing of EE products

Appendix C – APPLICATION OF MMEE FRAMEWORK TOOL TO KAZAKHSTAN

KEY FACTORS INFLUENCING SUCCESSFUL DELIVERY OF EE SERVICES	BARRIERS TO ENERGY EFFICIENCY	PAST EFFORTS TO ADDRESS BARRIERS	RESULTS AND LESSONS LEARNED	ACTIONS NEEDED
Stable Currency	Constraint given uncertainty of future exchange rates	GOK Tenge fully floating to bring more favorable exchange rates with local trading partners. Prior high Tenge exchange rates made Kazak commodities and services uncompetitive in regional/traditional trading arena	Tenge fully free floating since April 1999; prior policy sort to maintain a stable Tenge/Dollar exchange rate resulting in high Tenge value with respect to local/main trading partners which in turn made Kazak goods and services uncompetitive; tight monetary policy measures are being applied to control inflation.	Given current economic climate only very limited essential investments being made. The short term impact on exports not clear due to the political uncertainties surrounding country's chief trading partners and their respective economies. Impact on local based industry and commercial activity not clear.
Business Practices and Culture Promoting EE	Individual businesses beginning to accept energy efficiency as a way to counter increasing energy costs when they have access to information on their energy use but only limited awareness of EE as a business strategy.	Some sporadic and disjointed initiatives undertaken with mixed results. Little follow-through and implementation of EE practices and technologies due to other investment priorities an uncertainty in the economy. Some businesses seeking ways to promote awareness among end users. National Energy Savings Program and EU/TACIS energy efficiency center had only minor impacts on stimulating energy efficiency investments and inculcating EE approaches and methods.	Full reform and liberalization of market not always carried out simultaneously with changes in company status. For example, removals of price controls not always done - subsidies and tariff reform not a clear and transparent process. This made some companies not cost competitive - utility companies - heat supply/power generation companies versus autonomous heat supply/self generation for large consumers for example.	broader and more comprehensive policy analyses required prior to enacting changes needed. A better understanding of the linkage between development and energy sector is required. For example, to ensure appropriate policy initiatives relative to district heating/power generation and autonomous supply further evaluation - technical/soci-economic/environmental is needed before widespread promotion/application of the prime ministerial decree on autonomous heat supply begins.
National Commitment to GCC Concerns	Country very committed to GCC	i) GOK signature to UNFCCC; ii) willing to set target for emissions reduction	1) Strategic National Action Plan for meeting UNFCCC commitments developed. Cornerstone is use of clean technologies in the energy sector including energy efficient technologies; emphasis placed on energy supply ii) Global Climate Change consistently part of GOK/donor initiatives; iii) Environmental regulations consistently used by government and municipalities to "monitor" key industry and commercial sector activities - oil/gas; manufacturing	Strengthening the linkage and role of EE to Environmental Policy & give priority to the Strategic National Action Plan

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B. REGULATORY AND POLICY CONSIDERATIONS				
National Commitment to EE	Limited commitment to energy efficiency on demand-side. Greater emphasis placed on supply-side but since privatization government commitment to energy efficiency not a priority	Several donor-supported initiatives in energy efficiency undertaken since early 1990's but lacked overall strategic approach: 1993-95 USAID - supported energy audits; 1995/96 EU/TACIS energy efficiency center; ii) government established National Energy Savings program and passed Energy Efficiency law but was basically declaration only, no meaningful regulations enacted.	The 1997 energy sector development plan complements President's Strategy for Development of Kazakhstan to 2030 objectives. Although much is made of the need to rationalize energy use and the opportunities to improve the efficiency in the manufacturing sector (25% short term, 40% medium term) little priority is given to improve this. No support is given by government through either loans, grants or tax incentives, the approach being to rely on the private sector of investment. No real coordinated and integrated National Energy Efficiency Strategy involving both public and private sector entities who will be responsible for implementing energy efficiency exists to priorities or incentivize investment by the private sector.	Full and meaningful support to the development and implementation of a comprehensive National Energy Efficiency Strategy by all key players with a strong emphasis on the promotion and role of the private sector is needed
Privatization of Publicly-Owned Energy Organizations	Significant part of energy sector (80% of power generation) privatized. Oil/gas sector mainly private sector driven. Private generation plants and the public sector entities operating inefficiently due to lack of investment in new capacity and equipment upgrades.	Electricity sector reform/privatization underway with mixed results. Private owners of generation faced with difficulties to raise prices or even sell power at anticipated levels have shied away from substantive investment as expected by the government when selling assets. Recent agreement between government and AES has somewhat calmed foreign owners/investors fears but inability to raise prices to appropriate levels to cover commercial operations compounds uncertain future.	i) Commercial energy not always reliable for industry and commercial enterprises. Energy costs to consumer rising as subsidies are being removed but percentage of paying customers diminishing. Customers who are paying do not want to carry full burden of suppliers inefficiency and inability to increase numbers of paying customers ; iii) sector moving toward greater export opportunities through interconnection of electricity and oil and natural gas export opportunities but constrained by nearness to reliable buoyant markets.	Continued liberalization of the energy sector and creation of opportunity for private/public sector partnership
Regulatory Incentives for Energy Efficiency Activities of Energy Entities	Lack of economic and business incentives to manufacturing, procuring, and implementation of energy efficiency products and services	regulatory reform underway	Substantive progress but activity stalled and drifting due to economic climate and fairly frequent changes in government approaches and personnel in key policy making bodies. Changing mission of Ministry of Energy not complemented by reengineering/retraining of personnel. Regulatory board not yet operational, retail power market development hampered by prevailing economic situation, existing laws do not favor widespread use of EE options such as cogeneration among private sector companies	Continued review and reform where appropriate based upon continued monitoring and analyses of prevailing economic climate. Increase private sector participation involvement in policy making process through appropriate information exchange mechanisms

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Appropriate Energy Efficiency Codes/Standards	Lack of attention to Energy Codes and Standards	very limited meaningful activity	Codes and standards not major part of the overall strategy to promote energy efficiency. Law on Energy Savings, 199, more declaratory than regulatory.	Appropriate regulations, codes and standards need introducing supported by associated infrastructure and institutional development to support their use.
Market-Based Pricing	Have not reached full international energy pricing or long run marginal costs yet.	GOK looking to rationalize energy pricing but approach not always clear. The GOK has shown strong support to liberalization of the energy sector but doesn't always approach the issue in the same way. Sometimes appears to not want responsibility of creating an equitable pricing system. Prior prices did not encourage energy efficiency	current pricing more equitable among local industry and commercial sector and makes energy efficiency a more viable investment to create competitive edge	Continue movement toward equitable pricing structure
Absence of Subsidies and Cross-Subsidies	Existing and prior cross subsidy causes price and market distortion for energy efficiency services	USAID policy reform initiatives and the sale of key entities in the Energy Sector designed to promote investment in new technology as well as removing/minimizing inappropriate pricing	Distorted pricing gave local industry a minor competitive edge but promoted prolonged use of obsolete inefficient technologies. It also was coupled with limited incentive for bill paying. Current pricing more equitable among local industry and commercial sector and makes energy efficiency viable investment to create competitive edge. However it exacerbates commercial losses.	Continued removal, as appropriate, of cross subsidy and move toward equitable pricing.
Capability to Import EE Equipment without Extra Cost	transparency in customs duties application not always apparent - No policy direction to provide incentives to importing EE products	Duty/tariffs applications have been not fully transparent, often misapplied for energy efficient technologies and associated spare parts. Issue compounded by many changes.	i) misapplication of duty severely increases business risk for energy efficiency investment; ii) prior use of high tariffs on imported efficiency technologies limited availability of modern EE technology. Current economic situation compounds problem.	appropriate tariffs and duties to ensure sustained use of clean technologies

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C. CUSTOMER FACTORS				
Adequate Awareness of Benefits of Energy Efficiency among End-Users	Limited awareness of the long term economic and operational benefits of EE	Some donor initiatives including EU/TACIS center, USAID identification audits and support of the National Energy Savings program, support to the development of the framework for technology transfer (TCAPP), the country framework/plan for GCC mitigation	Awareness of energy efficiency technologies and issues limited to those who have been associated with prior government-led initiatives or those equipment vendors who market EE technologies. No appropriate information exchange mechanism in place - limited information dissemination across market players - little interaction among different market segments.	A comprehensive multi-year strategy awareness creation and outreach should be designed targeting key players. A key element should be the facilitation of appropriate information exchange mechanisms.
Widespread Information on EE Technologies, Products and Equipment	Lack of adequate information exchange mechanisms and a system to develop and disseminate information on EE technologies relevant to Kazakhstan	EU/TACIS center plus Ministry of Energy National Energy Savings Program supported seminars	EU/TACIS center role not clearly understood and it was unable to sustain much beyond the end of donor supported initiative.	Create an appropriate information exchange mechanism which will facilitate widespread exposure and awareness development among key players. Such a mechanism will promote synergy between other on-going and complementary activities such as ECOLINKS/GERI/Energy Sector reform/other donor energy efficiency programs.
Perceived Risk of EE Technologies	Business and financial communities not fully aware of benefits/risks of using EE equipment. Current economic climate makes companies very risk averse in use of collateral.	Limited dissemination of information on energy efficiency Technology deployment and very few practical demonstrations of EE technologies. Successful demonstration projects not widely known - most done by private organizations with limited attempts to promote.	Lack of meaningful demonstrations and information hampers replication of appropriate EE methodologies and technology deployment	Enlist those players where successful projects have been implemented as champions and use newly developed information exchange mechanisms to disseminate information across all key market segments and players
Acceptance of EE Service Providers by End-Users	Limited exposure to energy efficiency service organizations limits opportunities for services. Most companies have an energy engineer with some energy knowledge and expertise. However, expertise usually geared toward supply of energy in a facility not rational use.	Limited attempts by individual private sector service providers to promote concept. Most prefer to market their own products/services rather than the broad concept.	The limited attempts to build capacity were stymied by the lack of appropriate awareness creation The demise of the EU/TACIS center is a good example of what can happen when there is little integration of capacity development and outreach/promotion.	Greater capacity and depth needed in energy efficiency business sector thorough appropriate education and training coupled with an appropriate outreach/awareness strategy

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<p>Awareness of GCC Benefits of EE Implementation</p>	<p>GCC benefits not widely known at individual plant level. Well known among technocrats within government circles but limited experience in establishing national/sectoral energy management/efficiency programs with multi-disciplinary approaches</p>	<p>GOK in conjunction with others has done some promotion and outreach activity - ECOLINKS project accepted energy efficiency applications in first round of program - about 12% of applications ee-related. GGERT is expected to lead to JI investments.</p>	<p>The 1998 Framework for Climate Change Cooperation in Kazakhstan highlights energy efficiency opportunities on the supply-side but gives limited emphasis to demand-side options. A more comprehensive integrated energy sector approach could capture both elements of the equation. Not clear how investments will materialize for the supply-side options given the current uncertainty surrounding future tariff increases, the role of the regulatory agency and the anticipated power pool. The impact on district heating system providers from the prime minister's directive on autonomous heat supply is unclear. The UNDP/GEF project and the newly planned EU/TACIS BISTRO project when operational can contribute to facilitating the required integration.</p>	<p>Further efforts to integrate demand-side options should be encouraged and promoted as part of the overall outreach strategy. More in depth analyses are needed to fully understand and determine appropriate demand-side options and approaches. A holistic approach making use of applicable regulatory and policy initiatives, capacity building and promotion and awareness creation needs to be undertaken to fill existing "information and resource gaps".</p>
<p>High Credibility of EE Service Providers</p>	<p>The is a small pool of service providers which does not equate to a critical mass. Therefore the energy efficiency service industry has very limited exposure and credibility, making it difficult to market services.</p>	<p>Little or no activity to build capacity - technical assistance focused on specific technical issues</p>	<p>Very few entities able to provide energy services to the market on full cost recovery basis in current economic climate as market does not appreciate benefits. A critical mass unlikely to develop in the short term even if the economy were to expand very soon as few entities are now willing to invest in developing the necessary HR capabilities associated with energy services business operations.</p>	<p>Capacity building initiatives needed to create and sustain a critical mass of qualified energy services sector personnel and professionals through appropriate education/training/certification and tech transfer</p>
<p>Hassle-free Installation</p>	<p>Perceived problems associated with retrofit projects may create false ideas concerning energy efficiency projects</p>	<p>No significant EE technology demonstrations. Some research activity</p>	<p>There are a limited number of concrete examples of local EE demonstrations but they are not widely promoted or known outside of the direct beneficiaries.</p>	<p>Successful demonstrations valid under current economic conditions are needed to facilitate awareness creation. The planned EU/TACIS BISTRO and the UNDP/GEF projects should when operational help if complementary activities to put in place Information Exchange mechanisms are undertaken. Given both projects limited budgets for outreach, there is an inherent risk that little sustainable activity may occur beyond the time frame of the individual projects.</p>

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Efficient End-User Decision Process	Internal decision-making procedures do not always reflect competitive market place. Often reflect financial status of individual organization. Multinational groups better able to tolerate current economic environment.	Limited donor-supported initiatives to train technical professionals/technocrats in market based decision making/management approaches. Some management training but technical assistance in energy efficiency focused on specific technical issues and identifying technical solutions. Frequent changes in management within key GOK organizations and limited experience of operation of companies in a market-based economy poses major challenge for most local organizations.	Where existing management comes from centrally planned entities, there is little knowledge and appreciation of managing a company during periods of economic decline and strong market competition. The "new generation" has responsibility but little capacity within the system to supplement their capabilities. Good young managers of both public sector-based institutions as well as private sector entities are often overburdened by responsibility and demands for their time and also lack experience to manage in current situation.	Focused training on energy management and awareness development about the relationship of energy use and specific businesses can overcome barrier
Presence of Champions/Promoters of Energy Efficiency Ethic	Few champions for energy efficiency exist. EU/TACIS center unable to sustain due to lack of interest/market for services. There is a lack of appropriate information exchange mechanisms to make maximum use of any champions where they exist.	Little or no activity to identify and encourage would-be champions to participate in broader outreach initiatives.	The champions that exist are in discrete and isolated "pockets" and the lack of an appropriate information exchange mechanism means few leading private industrialists have successful energy efficiency demonstration projects and have participated in national program outreach activities	Creation of an information exchange mechanism that enables key players to "come together" and work on developing indigenous approaches and solutions to awareness creation through use of appropriate marketing techniques can stimulate the interest of other end users and /or designated energy managers and workers
Successful "business models" of EE Service Delivery	Lack of awareness of business approaches/practices particularly on the financing end among users may lead to non-consideration of ESCOs and other energy efficiency implementation initiatives	Very few home grown examples exist to promote and no information exchange mechanism to facilitate outreach.	Little knowledge of innovative approaches such as ESCOs/performance contracting known or used in country. The EE business sector very minor player and often only paid lip service by policy makers.	An appropriate outreach strategy is needed to increase awareness in management and decision makers of possible innovative business transactions.
Attractive Payback Periods	Not all companies aware of benefits	EU/TACIS center plus Ministry of Energy National Energy Savings Program supported seminars	In the current economic climate most companies undertaking very limited investments, many only investing in necessary production-related expenditures. Some tangible energy efficiency investments such as metering (when coupled to monitoring and targeting program) can have paybacks within a very short period and makes them attractive even in the current investment climate.	Additional tangible demonstrations, over and above those planned/anticipated through UNDP/GEF support and the EU/TACIS BISTRO initiative are necessary. They need to be linked to a carefully developed outreach strategy and capacity building to show the benefits of economically feasible projects.
Availability of Internal Capital for EE Projects	Majority of industries facing severe liquidity problems due to declining demand for goods and services. EE is low on priority list for scarce capital.	Prior investments focused on production-related improvements. Now economic situation and market decline means whatever cash available is spent very carefully. However, focus is once again production oriented.	Given the limited awareness generated and the economic climate means that cost effective projects are not being given full consideration in the current financial situation. The widely regarded unsuccessful introduction of leasing and the relative lack of liquidity compounds the narrow perspective applied to any investments currently being made.	Appropriate targeted awareness activities should aim at both business owners and financial institutions to mobilize private investment into EE projects

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Recognition of Importance of Energy Costs	Recent energy price hikes have encouraged those whose energy costs are a high operating cost component to look for efficiency improvements. However, information gaps/limited awareness of options can lead to inappropriate decisions.	Limited activity to determine importance of energy costs relative to operating costs. Very limited spending to develop appropriate Management Information Systems to provide relevant information. Some companies are beginning to respond but many continue to operate in ignorance.	With practically no mechanism to promote EE to a widespread audience there is little opportunity to disseminate meaningful information to key end users.	Additional management training needed to help develop management skills to operate businesses in competitive environment. The creation of an appropriate information exchange mechanism is also necessary to ensure all end users are aware of the potential gains.
Low Transactions costs	Costs of transaction not well understood or transparent.	Market reforms did not adequately address this issue. Economic downturn means only limited interchange between investors and project developers.	Further work is needed to develop the banking system. However, the relative size of typical EE investments may mean such opportunities do not receive adequate recognition and priority attention.	All parties involved need to examine initiatives to reduce transaction costs. By engaging all key players through an appropriate information exchange mechanism this key area can be addressed. The activities of the EBRD and USAID in the small/micro enterprise projects could play important roles.
D. FINANCING OF ENERGY EFFICIENCY PROJECTS				
Availability of Funds for EE Project Financing	Very small capital market. Limited liquidity in system.	Reform targeted to creation of a banking sector and development of a capital market	i) Limited/almost non-existent capital market; retail financial market approximately \$60 million. Total assets in banking sector \$1.8 billion; consumer deposits \$300 million, corporate around \$600 million ii) supporting legal framework not fully developed; iii) economy currently contracting 40% in last few years; money supply shrinking (approximately 30% in 1998)	Capital market needed - policy reforms must be continued to create appropriately strong financial sector. Greater awareness of the benefits of energy efficiency activities must be developed in the banking community
Willingness of Financial Institutions to Consider EE Projects	i)lack of awareness results in a perceived undesirable risk, ii) Financing practice is short term and asset-based; iii) Competing with perceived higher return from other sectors, iv) Lack of confidence in existing market players - government and energy service sector; v) perceived lack of any investment projects currently of sufficient size/order of magnitude. Focus of financial institutions on large scale projects.	Limited funds available. Banking sector not always robust - several banks not able to sustain activity. Funding for energy efficiency not readily available due to the general lack of understanding / knowledge of energy efficiency benefits. Leasing introduced without success. Efforts stalled/hindered by inadequate supporting legal framework.	very limited use of the funds due to very limited promotion and awareness. Financial institutions need to see the business community demonstrating the viability of this unknown business.	Greater awareness of the benefits must be developed i) more dialogue between private sector service providers and financial institutions and emerging funds, ii) possible pilot transactions to demonstrate the concept, iii) Government incentives to banks to finance EE projects
Ability to Finance Small EE Projects	Banking sector not fully developed. Investment mechanisms not set up for financing of small projects	Limited funds available for small investments.	Programs only used in limited fashion. Investors prefer to make money from financial transaction rather than developing business which hampers creation of vibrant small business activities such as energy efficiency	Awareness and recognition of energy efficiency as a small business activity needed. Efforts should focus on commodity-based and leasing initiatives to support funding small projects

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Low pre-development and transaction costs to prepare bankable projects	high transaction costs may render EE project unviable	no simplified assessment process developed for energy efficiency investments	not applicable	clear and transparent programmatic procedures need to be developed
Enhancing the Creditworthiness of Some End-Use Customers	Creditworthiness major factor but companies not looking to make major investment decisions currently due to prevailing economic conditions.	no initiatives known	not applicable	options need to be evaluated
E. MARKET DELIVERY CHANNELS				
Availability of EE Technologies, Products, & Equipment	Limited availability due to economic conditions, where import by vendors limited to actual orders from genuine clients.	Policy reforms and incentives for foreign investment dominated by energy supply considerations.	Energy efficiency technologies only available in limited supply. Little attempt to stimulate business activity initiated by government and availability, use and application occurring in an ad-hoc way. New production lines or new building construction with foreign investment usually incorporates energy savings technology. Retrofit market almost non-existent. Virtually no local or co-manufacturing of energy efficient technologies. Lack of market activity compounded by limited awareness of energy efficient technologies and the lack of financial liquidity. Engineering technology base predominantly former Soviet equipment which tends to be robust and highly durable. Little comprehension and use of 'life cycle costing' among decision makers and limited appreciation for quality products over cheaper/inferior quality. Government procurement sometimes limited to least first cost. Equipment purchases in both public and private sector driven by capital cost considerations only.	Initiatives to demonstrate tangible and valid examples of energy efficient technologies must be coupled with appropriate awareness and outreach activities which together with capacity development in key players within the sector should go a long way to ensure sustainability and long term deployment of energy efficient technology. Technical support in the relevance of appropriate procurement practice vis-a-vie specifications and standards should complement capacity building initiatives to enhance familiarity with operating and maintenance practices associated with EE technologies. Policy measures should examine options for easy import/availability of spare parts and co- and local manufacture of energy efficient technologies.
Presence and Capability of Energy Service Companies (ESCOs)	Local energy service sector lacking capacity for energy efficiency activities. Focus on turnkey engineering, procurement, construction contracts.	Very few actions to create service capability.	National Energy Savings Program not chartered to develop a sustainable market nor create critical mass of qualified personnel. Government policy not particularly supportive of ESCO activity and the apparent uncertainty around foreign investments in the energy supply sector adds additional risk considerations to the ESCO transaction process. Little attempt to engage financial community in the development of the service sector. Development agencies often forced into reactive mode because of frequent changes in government counterpart entities and sudden changes in policy.	Further development needed to create a critical mass of energy service personnel and professionals fully familiar with the legal, financial, technical, marketing, and risk management aspects of the energy service business. This should be undertaken only after validation of the ESCO concept as an appropriate business transaction in the country

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<p>Supporting Infrastructure to assist Energy Service Companies (ESCOs)</p>	<p>No clear infrastructure to support the emergence of ESCOs to provide services and other business initiatives in favor of adoption of EE practice. Limited awareness of the ESCO model as a successful business transaction.</p>	<p>Little or no initiatives to validate the concept of ESCOs. Initiatives in the energy sector designed to stimulate investment to increase energy supply and export.</p>	<p>Limited work on the use of alternate financing mechanisms has been done and very few examples specific to the energy efficiency business sector. Honeywell has proposed looking as part of a broader NIS initiative which they are part of. Limited use of leasing by one energy service/vendor organization. No real understanding of performance contracting and third party financing among larger end users.</p>	<p>Evaluation of the framework to support the ESCO concept as a valid and relevant business transaction mechanism in the country is needed. Given the limited appreciation for the ESCO concept, development of the approach needs i) increased exposure among potential customers, the government, finance community and equipment suppliers and vendors who are potential local ESCOs ii) capacity building, as appropriate, to supplement the limited personnel with energy service capability, including possible partnership and linkage to international ESCO organizations.</p>
<p>Transfer of successful EE Technologies</p>	<p>Limited technology transfer due to: i) prevailing economic conditions ii) limited awareness of EE technologies and iii) very limited prior demonstration of relevant EE technologies; iv) lack of critical mass of appropriately qualified technical staff throughout different market segments</p>	<p>i) EU/TACIS project 1995/96 created a center; ii) USAID 1993-95 focused on identification; iii) TCAPP technology framework 1997/98; iv) government supported national energy savings program; v) law on energy efficiency passed in 1996</p>	<p>i) EU/TACIS created center closed by government due to lack of activity and support; ii) USAID's efforts focused on identification with little emphasis on demonstration, awareness creation and capacity building; iii) TCAPP initiative had limited momentum and activity now stalled; iv) government's efforts focused on restructuring of energy sector; changing role of Ministry of Energy not clearly recognized by all policy makers, the agency itself, and public at large. Little effort to reengineer Ministry to adapt to new role; v) priority for regulatory reform on energy supply with only limited consideration for role of energy efficiency in strategic planning for the energy sector</p>	<p>Further development of the technology transfer process is needed. Given current economic situation, particular emphasis should be given to tangible/concrete demonstrations of appropriate technologies that can facilitate awareness creation as well as replication. Associated capacity building is also needed together with development of realistic and pragmatic policy initiatives.</p>