Workplan Task 3.2a

Kazakhstan and Climate Change Abatement: The Work Completed and the Path Ahead

January 1999

Task Order No. 813
USAID Contract No. PCE-I-00-96-00002-00

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By
Theresa Sabonis-Helf

January 1999

For
USAID/Washington DC Office

Environmental Policy and Institutional Strengthening Indefinite Quantity Contract (EPIQ)
Partners: International Resources Group, Winrock International, and Harvard Institute for International Development

Subcontractors: PADCO; Management Systems International; and Development Alternatives, Inc.

Collaborating Institutions: Center for Naval Analysis Corporation; Conservation International; KBN Engineering and Applied Sciences, Inc.; Keller-Bliesner Engineering; Resource Management International, Inc.; Tellus Institute; Urban Institute; and World Resources Institute

About the Author

Theresa Sabonis-Helf of the Harvard Institute for International Development is the EPIC Environment and Energy Policy Advisor. She received her Ph.D. from Emory University in Political Science, with the dissertation topic: “Power Politics: National Energy Strategies of the Nuclear Newly Independent States of Armenia, Lithuania and Ukraine.” She received her MPA from Princeton University in International Relations. She has lived and worked in seven of the Soviet Successor States, and has published on energy policy, environmental security, energy security, and on Post-Soviet culture.

Preface

This project was contracted by USAID as a component of the EPIC workplan. The author wishes to thank Randall Bluffstone, Harvard Institute for International Development; David McCauley, International Resources Group; and Alma Raissova, EPIC/HIID for their substantial contributions to this document. The author would also like to thank Ko Barrett, Pamela Baldwin, Alexandra Burke, and Ira Birnbaum of USAID for their technical advice and editorial assistance.

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Executive Summary

The US government has expressed its strong interest in assisting the Government of Kazakhstan's efforts to join Annex I/Annex B of the FCCC and the Kyoto Protocol. Both governments have agreed on a common goal of identifying a credible greenhouse gas (GHG) reduction commitment in time for the next Conference of the Parties in October 1999. Considerable work has already been undertaken by Kazakhstani organizations, often with US Government agency support, but much remains to be done. Critical aspects of past and future USAID-funded work in this field may be divided into four main categories:

1. Forecasting Emissions Paths

Work completed or underway:

1990 Baseline inventory was completed under USAID's Country Studies Program for CO_2, Methane, and Nitrous Oxide in all sectors.

1994 inventory underway (estimated completion, Spring 1999).

ENPEP model was used by Kazakh counterparts to provide preliminary forecasts of CO_2 emissions from the energy sector, specifically electricity.

Near-term work needed:

Expand inventory to include all gasses.

Support selected sectoral analyses, including deeper analysis of energy sector to identify interventions that would help the Kazakhs to meet growth targets lower than business as usual scenario.

Assist with creation of "business as usual" scenario: use better economic data as input (existing analysis uses government 30-year plan), which has serious shortcomings.

Assist with selection of GHG reduction target for 2008-2012.

2. Estimating Costs of GHG Reductions

Work completed or underway:

Using the ENPEP model, six possible approaches to power sector GHG reductions were examined. Small hydropower was found to be least cost (assuming new capacity is needed, which is unlikely in the near- and medium-term), followed by rehabilitation of existing thermal power.

It was estimated that significant emission reductions will accrue if reforms that lead to orderly privatization are made in the energy sector.

An estimate was made that there is a potential for end-use efficiency improvements in the manufacturing sector of between 25% and 40%.

Potential gains to efficiency in electricity production were estimated based on a study of four power plants.

Near-term work needed:

Additional analysis of least-cost GHG reduction options should be conducted prior to selection of a GHG reduction target for 2008-2012 (in cooperation with the World Bank).

Quantify emissions reductions associated with energy sector reforms as well as potential emission reductions in other sectors including industry and agriculture.

Longer-term work needed:

Assist with development of institutional capacity to conduct emissions trading and JI projects.

Assist with energy sector reforms that will encourage privatization and with it, investment in cleaner technologies (generation, T&D, end-use)

3. Benefits to Kazakhstan of GHG Reductions

Work completed or underway:

Estimate of value of health damages caused by key air pollutants was conducted (reduction of particulates is a common secondary benefit of GHG emissions abatement).

Near-term work needed:

Quantification of energy and dollar savings that can be derived through energy efficiency improvements in order to drive home the benefits of abatement of GHG emissions.

4. Developing Policy Instruments/institutional Capacity for Abatement

Work completed or underway:

Development of energy law and regulation, improvement in pricing, and move towards privatization has provided base for ability to reduce GHG emissions.

Pilot program in emissions trading between stationary sources (for particulates) took place in Almaty in October 1996.

USAID works closely with KazNIMOSK on GCC issues. The lead for climate change within GOK resides in the Ministry of Environment.

Near-term work needed:

In order to have the capacity to provide solid growth target estimates in time for COP5 in October, 1999, the Ministry of Environment needs the following near-term assistance in the policy arena:

Establish growth targets so that they can estimate costs associated.

Coordinate with World Bank which is also proposing to work on credible scenarios.

Assistance in developing and implementing enforcement mechanisms to ensure implementation of newly developed energy laws and regulations, which provide a base for ability to reduce GHG emissions.

Institutional capacity building: there are people who know how to do modeling, but no credible macroeconomic model currently exists for Central Asia. A model needs to be established and people in CAR need training on how to use it.

Medium- to long-term work needed:

Development of improved environmental policies, economic reforms, energy sector reforms and legislation to maximize private sector participation, with particular focus on policy incentives for private investors in power generation and distribution.

Development of energy legislation and policy to support more rational use of energy, including analysis/removal of subsidies, improved collections, metering.

Development of systems for recycling revenues from sales of emissions reduction credits, and of systems for management of excess reduction credit "assets."

Development of environmental finance structures.

Outreach/education needed to better inform the public, the private sector, and policy makers about risks of climate change and likely financial benefits from trade.

1. Introduction: The Lead-up to Buenos Aires

In November 1998 in Buenos Aires, the Government of Kazakhstan expressed its willingness to take on a commitment to reduce Greenhouse Gas (GHG) emissions and become a party to Annex I of the Framework Convention on Climate Change and Annex B of the Kyoto Protocol. Though some US government officials were favorably surprised with this position, in many ways it was a natural result of work which has been underway in Kazakhstan for some time, led by a number of US government contractors and grantees, together with their local counterparts.

In the months leading up to Buenos Aires, USAID assistance concentrated its efforts on improving the GOK's understanding of the possible advantages of Annex I/Annex B membership. These efforts focused on organizing a series of presentations in collaboration with the GOK's National Ecological Center. An inter-ministerial working group was convened, drawing its members from a variety of GOK institutions. This working group was provided with a background paper with recommendations for consideration. The Group considered this and conducted a review of the climate change-relevant documents that Kazakhstan was then preparing, especially its national communication to the UN Secretariat and its preliminary national strategy for greenhouse gas reductions (to which US government support had been given under the Country Studies Program). Based on these documents the working group assembled a set of recommendations which were presented to a larger seminar of 40 officials from all the relevant Ministries, plus several electricity companies, research institutes, and the international donor community. The USAID input was well received and was followed by an announcement of the GOK's intention to sign the Kyoto Protocol in advance of the Buenos Aires meeting. USAID continued to support the Kazakh delegation before and during the Buenos Aires meeting.

2. Groundwork in the Area of Climate Change[1]

The delegation's success in Buenos Aires was the result of prior as well as recent efforts. An appreciation of potential impacts of climate change on the country, and understanding of economic approaches to environmental problems, energy policy and energy efficiency issues were all necessary background that the GOK had obtained prior to Buenos Aires. A variety of USAID contractors and projects had collaborated with the GOK on these topics and thereby contributed to increased understanding in these key areas.

By announcing its intention to accede to Annex I of the FCCC and Annex B of the Kyoto Protocol, the GOK committed itself to a variety of challenging future tasks. These activities, which are discussed in detail by type of task, may be organized according to the following general categories:

1. Setting of Emission Growth Targets;
2. Policy Development and Implementation;
3. Institutional Development; and
4. Public Outreach.

Though the decision to accede to Annex I and Annex B was wholly GOK's, US support for preliminary analyses was critical to the result in Buenos Aires. The GOK's state-of-the-art approach to GHG reduction policy, detailed in the Kazakhstan National Climate Change Action Plan (adopted by the GOK in October 1997) was supported by the US Country Studies Program.
This document summarizes results from US government assistance programs in Kazakhstan which focus on key components of setting emission growth targets and developing policies to achieve those targets. Crucial activities requiring US Government support are discussed in the following section.

[1] Please see Appendix I for short summaries of US government-supported activities.

3. Forecasting a Business as Usual Emissions Path

3.1 Groundwork Completed

The first step in this process was completion of the 1990 emissions inventory, which was presented in Buenos Aires. The US Country Studies Program sponsored by USAID, USEPA and DOE, assisted the Kazakh Research Institute for Climate and Environmental Monitoring (KazNIMOSK) in its development of the first stages of Kazakhstan's national inventory of greenhouse gases in 1996. This inventory included only estimates of CO_2, methane and nitrous oxide emissions. CO_2, is by far the most important GHG, and during the period 1990-1996 CO_2, emissions are estimated to have declined by 25%. A second inventory covering 1994 is expected to be completed by spring 1999.

Various forecasts of CO_2 emissions have been conducted since 1995. The ENPEP energy-planning model developed in the US by the Argonne National Laboratories was the first internationally recognized model to be applied to the forecasting of Kazakh emissions. KazNIMOSK was the lead agency in Kazakhstan, and it prepared the analysis with US Country Studies support. The analytical methodologies underlying projections other than those derived from the ENPEP model are not fully understood. It appears that over time all the models have increased in sophistication, but still fall far short of what is required to support an Annex B commitment. The chief weaknesses are a tendency to assume linear relationships rather than complex interactions, and a poor understanding of the likely relationship in the future between GDP and energy consumption.

The following table presents several forecasts of CO_2 emissions. The last two estimates were partially supported by the US Country Studies Program. The third row of data was developed in support of the Initial Communication to the FCCC, but the 1990 and 1994 figures differ somewhat from those in that document. The last row contains data and projections in support of the preliminary National Climate Change Strategy prepared by the National Ecological Center for Sustainable Development. USAID provided partial support for this work.

Table 1: Forecasts of CO_2 Emissions (millions of tons)

Projection Source	1990	1995	2000	2005	2010	2015
1. Official Estimate (Expert Opinion)	191.0	145.0	160.0	-	-	-
2. Institute of Economic Research	193.9	165.5	185.3	196.1	202.3	-
3. ENREP Model-Based Estimate	205.6	141.3	164.5	195.1	234.7	272.1
4. Official Estimate Including Likely Reductions	205.6	141.3	159.6	189.4	219.8	258.8

Energy production is the largest of GHG. In the inventory presented in the Initial National Communication, the energy- producing sector made up almost half of all CO_2 emissions. As shown in Table 2 below, within this sector, electricity usage has dropped precipitously since 1990 due to severe economic decline, and it is expected to remain below the 1990 level at least until 2005. Under the "minimum" scenario, usage does not reach 1990 levels until after 2020.

Table 2: Electricity Demand Projections According to Different Energy Development Scenarios (TWh)

Scenario	1990	1995	1996	1997	1998	1999	2000	2005	2010	2015	2020
Maximum	104.7	74.4	66.2	57.1	60.0	65.0	80.0	95.0	110.0	120.0	130.0
Intermediate	104.7	74.4	66.2	57.1	56.0	57.0	60.0	80.0	95.0	105.0	115.0
Minimum	104.7	74.4	66.2	57.1	54.6	55.5	57.0	67.5	78.0	88.0	98.0

Information source: Table 1.3: Initial National Communication. Calculations from *Energy Development Strategy Unit 2030, as adopted June 1998.*

CO_2 emissions by the power sector were estimated using the ENPEP model. This set of estimates is part of CO_2 emission projection #3 discussed above, which was funded under the US Country Studies Program. As shown below, using this "bottom-up," technology driven model, CO_2 emissions were forecasted to reach 1990 levels by 2010 based on an assumption that the 1990 level of GDP would be regained in 2003.

Table 3: CO_2 Emissions from the Energy-Producing Sector (millions of tons)

Actual Emissions				Projections		
1990	1994	2000	2005	2010	2015	2020
94	74	67	83	93	118	129

Information source: Table 3.4: Initial National Communication

In the case of all Kazakhstani models as well as the ENPEP model, it is likely that emissions projections are inflated. This is because all economic projections incorporated into the analysis are based on the official government "2030 Plan," which prescribes Kazakhstan's desired pattern of development up to the year 2030. This long-term plan for economic development is a matter of law, but the economic growth projections incorporated into the 2030 Plan are widely believed to be overly optimistic. Any forecasts must therefore be treated with caution.

The policy objective which the analysis to date was designed to support (fulfilling FCCC reporting obligations and exploring the possible benefits of Annex B membership) was much less ambitious than the new policy objective of taking on an appropriate Annex B emissions reduction commitment. Hence, it is not surprising that much more analytical work will be required in the future.

3.2 Next Steps: Analysis Needed to Set GHG Emissions Growth Targets

Kazakhstan's initial communication to the FCCC Secretariat makes clear that considerable monitoring capacity exists. The ability to project future emissions, however, is severely limited by a lack of credible macroeconomic models for Kazakhstan. Support in developing such models is a necessary precursor to Kazakhstan's adoption of a credible commitment.

- As was already noted, with USAID support the estimation of current GHG emissions has been done. The group led by KazNIMOSK has the capacity to prepare future inventories if continued support is available. This group requires some additional support for sectoral analysis.

- A credible estimation of future GHG emissions in the "business as usual" scenario has not been done. Completion of this task will require outside expertise, as existing macroeconomic models are insufficient and the linkage between the macroeconomy, energy usage and energy policy is relatively poorly understood.

- Because the business as usual scenario has not been done, selection of a GHG reduction target for 2008-2012 has also not been completed. This emissions reduction goal must include real reductions, but leave the opportunity for Kazakhstan to benefit financially from economic growth and trading. This requires completion of the above "business as usual" scenario, plus additional analyses on least-cost options facing Kazakhstan. The choice of this target is crucial, and the associated uncertainties are very large.[2]

[2] Witness, for example, the possibility that the Czech and Slovak Republics, Hungary and Poland may end up net buyers of tradable emissions reduction credits. For a discussion, please see "Study on Russian National Strategy for Greenhouse Gas Reduction," by A. Golub, A. Avertchenkov, V. Berdin, A. Kokorin and E,. Strukova prepared for the World Bank and the Government of the Russian Federation, Moscow, 1998.

4. Costs of Greenhouse Gases Reduction

4.1 Groundwork Completed

Several USAID-supported activities have also been focusing on the costs of GHG reductions. Again using the ENPEP model, six possible approaches to GHG reductions in the power sector were considered by the research team based at KazNIMOSK. These steps included rehabilitating thermal power plants, supplementing thermal power with small hydropower, solar, and wind energy, as well as supplanting thermal power with nuclear energy. The team found that nuclear power had the highest CO_2 emissions reduction potential, but it also had virtually the highest average cost per ton reduced. Only slightly higher in cost was supplementing thermal power with wind energy. As shown in the table below, the cheapest option was considered to be small hydro-power, which overall has lower costs than existing generation methods. However, small hydro has very limited potential for total contribution to emissions reduction, since it could replace only about 600MW of installed thermal capacity. Overall, rehabilitation of existing thermal plants appears to be the optimal strategy because of its high potential impact on emissions at relatively low cost.

Table 4: Costs of Reducing CO_2 in the Power Sector in Kazakhstan ($/ton)

	Small Hydro-Power	Rehabilitating Cogeneration	Solar	Nuclear	Wind
$/Ton	-19.96	15.26	22.35	49.05	50.33

Source: "Mitigation Assessment for Kazakhstan," in *Global Climate Change Mitigation Assessment: Results for 14 Transitioning and Developing Countries*, August, 1997.

Important precursors to this modeling exercise were detailed energy efficiency analyses conducted under the USAID-sponsored Kazakhstan National Energy Efficiency Program. Since Kazakhstan is the world's largest emitter of CO_2 per unit of GDP due to inefficient energy use, significant inefficiencies exist in the industrial sector, particularly among metal, chemical and refining plants. There is therefore large potential energy efficiency improvements in the industrial sector: fuel savings of 25% in the near term and 40% long term; and electricity savings of 10% in the near term and 20% long term, according to estimates prepared by USAID contractors.

The World Environment Center, with USAID support, achieved just such results through demonstration projects in two plants (one in Uzbekistan). During technical analyses that were conducted in 1995 and 1996, it was found that costs could be reduced while pollution emissions (including GHGs) declined if simple methods to conserve energy and materials were implemented. Though it is not really known how representative are such findings, drawing on the Central and Eastern European experience it seems reasonable to suppose that significant opportunities for so-called "win-win" measures exist in the Kazakh industrial sector.

These end-use energy efficiency improvements have significant GCC implications. More efficient use of energy requires less energy production, transmission, and distribution, directly reducing GHG emissions. USAID activity in this area has included preparation of a National Program

for Energy Savings that estimated savings and recommended an approach that included necessary policy reforms to help realize the savings. This formed the basis for the official GOK position on this topic and paves the way to better demand management in Kazakhstan.

While significant GHG emission reductions opportunities can be made in the industrial sector, the greatest proportion of GHG emission reductions opportunities are in the energy sector, which is responsible for about half of Kazakhstan's CO_2 emissions. Meaningful emissions reductions require a number of structural reforms in the energy sector, entailing energy sector restructuring and privatization, energy tariffs and bill collections, regional energy trade, power plant efficiency improvements, and end-use energy efficiency improvements.

Under the Energy Sector Reform Program, the technical efficiency in four major power plants was analyzed and it was concluded that major, no cost/low cost energy efficiency improvements of up to 10 - 20% could be made. Since approximately 80% of Kazakhstan's GHG emissions come from coal use, largely by power plants, there are a significant number of such opportunities. USAID-funded studies have also examined savings potential in roughly 30% of Kazakhstan's generating capacity and also in the Almaty district heating system. Such efforts were critical in convincing Kazakhstani officials that CO_2 emission reductions may not be prohibitively expensive and that taking on an Annex B commitment could be in the national interest.

In the arena of energy sector restructuring and privatization, power sector decentralization is underway. Generation is approximately 80% privatized, but distribution is generally not privatized. Natural gas distribution is still wholly owned by state. Restructuring has direct implications on GCC. Restructuring facilitates privatization by breaking the energy enterprises into manageable pieces that enable investors to understand their value and prospects for improvement in the enterprises. In turn, privatization provides motivation for cost reduction in several ways:

- Privatization encourages more efficient operation, as the energy enterprises have to operate in a commercial manner.

- Privatization provides a framework for the owners to invest capital in the power plants to improve operations.

- The capital investments provide a means to use cleaner fuels and install cleaner, more efficient technologies, and to reduce transmission and distribution losses.

- To operate commercially, private owners will increase bill collections, which in turn motivates customers to reduce consumption.

The USAID-supported Energy Sector Reform Program, which has focused restructuring and oil and gas sector reform, has provided significant preliminary support in this area. The Program conducted extensive analyses of electricity pricing and energy regulatory reform. By introducing the notion of proper pricing of energy, the program has also paved the way for reforms that will be critical for meeting any proposed Annex B target. This important educational value should not be under-estimated.

Proper pricing of energy and removal of energy subsidies, while perhaps crossing into the policy instruments arena, is expected to be a very low-cost (even negative cost) method for reducing emissions of CO_2. Reducing and phasing out any significant energy subsidies will indeed probably be a very important step toward GHG reductions. Though it is believed that to-date little analysis or quantification of energy subsidies has been conducted, the experience of the European transition economies is very clear on this point. Allowing the prices of energy to rise to reflect the opportunity cost of those resources - even before trying to address the pollution externalities associated with combustion - is the single most important step that has been undertaken to reduce air pollution and improve energy efficiency in Central and Eastern Europe.[3]

Even without GHG or any other pollution reduction goal, we also know that energy subsidies are bad for the economy. They distort the economic structure, orienting the choice of technology and day-to-day practice towards wasting resources instead of saving them. The artificially low tariffs prompt increased energy use among customers due to undervaluing the true energy costs. The low collection levels deprive energy enterprises of funds needed for investments that would improve operations and efficiency, lead to installation of cleaner technologies, thereby cutting emissions. Collecting bills owed is also a precondition for customers to have incentive to reduce consumption. Kyoto mechanisms that offer incentives or GHG reductions just increase the costs of these fundamentally bad policies by valuing the currently valueless carbon reduction benefit. Trading opportunities provided by the Kyoto Protocol therefore increase the returns to fundamentally good policies.

4.2 next Steps: Targets and Least-cost Options

- As was discussed in the previous section, Kazakhstan needs to select a GHG reduction target for 2008-2012. Before this work can be completed, however, serious analysis of the least-cost GHG reduction options facing Kazakhstan will be necessary. Such possibilities must, of course, be included in any modeling framework employed.

- Of particular near-term interest is research into the level and opportunity for reducing energy subsidies. Though this activity will need to be part of the overall modeling exercise already described in Section III, because of the potentially political nature of this policy step it would be best to also consider it as a separate analytical exercise. Indeed, to support the public outreach program that will be crucial to the GOK's Annex I bid, an important part of the work will need to focus on quantifying the health and economic costs generated by those subsidies. This component therefore is closely linked to the benefits of GHG reduction (Section V. below)

- Demonstration projects that show consumers that better efficiency in the energy sector can lead to improved rather than less effective services, and illustrate for producers that increased energy efficiency reduces costs.

[3] For more details please see *Controlling Pollution in Transition Economies: Theories and Methods*, R. Bluffstone and B.A. Larson eds., Edward Elgar Publishing Co. 1997.

4.3 Next Steps: Longer-term Actions, Post COP-5 and the Setting of Targets

Energy Sector Restructuring and Privatization

- Further restructuring, demonopolization of electric distribution.
- Regulatory agency development and market rule formulation.
- Further restructuring, regulatory development, and privatization of the gas system.

Energy Tariffs and Bill Collections

- Increased metering
- Market-based tariff methodologies.
- Increased privatization of distribution to increase collections.

Regional Energy Trade

Regional energy trade provides opportunities for GHG reductions. Electricity has been traded regionally, and oil pipeline work has entailed regional cooperation. The regional trading has GCC implications due to the potential for regional hydro and natural gas resources through regional trading. USAID activity in this area includes development of a formal regional trading agreement; assistance in integrated grid operations; and environmental improvements in pipeline development.

Next Steps needed include:

- Resolving investment issues on electricity transmission and market development
- Improvements in the water/power management system.

Power Plant Efficiency Improvements

- Creation of an investment climate and institutional mechanisms favorable to emissions trading and joint implementation.

End-Use Energy Efficiency

- Developing private sector capabilities to deliver energy efficiency services
- Creating investment climate and institutional mechanisms favorable to emissions trading and joint implementation.

5. Benefits of Greenhouse Gases Reduction

5.1 Groundwork Completed

Significant local ancillary benefits are expected to result from GHG reductions. Perhaps the most important are improvements in human health due to declines in respiratory illness caused by non-GHG pollutants. Of particular importance are reductions in particulate, SO_2 and NOx emissions that are expected to occur as energy efficiency improves.

Relatively little analysis has been undertaken regarding these benefits, but one component of USAID's collaborative work with the Ministry of Environment and Natural Resources during 1994-98 was reform of the Kazakhstani system of pollution charges. This economic instrument will likely be a significant tool for GHG emission reductions, and therefore the effort may have its most important impacts in the area of policy reform. As part of this work, however, the monetary value of health damages caused by key air pollutants was estimated. The results of the project clearly pointed out the economic value of health costs generated by air pollution. Policy makers therefore became familiar with these relatively new methodologies, and developed an appreciation for the economic costs of pollution. Though not directly focused on GHG mitigation, as already mentioned in Section IV., the use of such methodologies will be critical if the GOK is to demonstrate that significant local environmental benefits will result from Kazakhstan's participation in the FCCC.

5.2 Next Steps: Enhancing Understanding by Policy Makers and the Public of Benefits

Kazakhstan has many environmental problems that appear to be more pressing than the potential problems posed by global climate change. In order for Kazakhstan to be a successful player in the international trading regime, building national support for its participation is essential. The following efforts are recommended:

- Targeted environmental valuation studies that quantify the non-marketed local environmental benefits of GHG reductions.

- Demonstration projects that show a link between reduction of GHG emissions and improvement of local environmental conditions.

- Outreach in the form of public forums, brochures, skill upgrading and training to better inform the public and policy makers about the dangers of climate change, and the likely financial benefits from trading.

- Capture the costs of energy emissions abatement measures in energy tariffs.

6. Policy Instruments for Reducing Greenhouse Gas

6.1 Groundwork Completed

The development of energy law and regulation is a critical foundation on which Kazakhstan's ability to reduce GHG emissions rests. Privatization of the sector has created stronger incentives for appropriate pricing and effective collection. USAID has been involved in extensive analysis of electricity restructuring and pricing and has played a critical role in development of the electricity law. At the end of 1998, some 80% of Kazakhstan's electricity generation was privatized, creating opportunities for investments in more efficient, less polluting equipment.

As was already noted, the USAID has worked with the GOK to reform its environmental policy system, including economic instruments such as pollution charges. This activity builds on and parallels similar efforts in other transition economies that were undertaken by USAID. Throughout Central and Eastern Europe, as well as Russia and Central Asia, a variety of environmental policy reforms were successfully investigated, evaluated and implemented with USAID support. As part of these activities, the book noted in Footnote 6 was produced. An enormous body of experience on environmental policy reforms and implementation of economic instruments in transition economies has therefore been built up by USAID.

As part of its work with the GOK to develop better and more cost-effective environmental laws and regulations, USAID also proposed new economic instruments for consideration. One important part of that effort was the development of a pilot program for trading in air pollution emission credits (particulates). Although it remained only a pilot effort, a trade that took place between two Almaty industries in October 1996 was the first inter-firm pollution trade in the former Soviet Union. This pilot activity was actively supported by the Almaty City Department for Ecology and Bioresources (ACDEB) Under the Ministry of Environment and Natural Resources, and it was through this support that the two firms were able to realize the reduced compliance costs that motivate pollution trading. The pilot trade also raised the general awareness of the possible benefits of emissions trading, and gave rise to the Kazakhstan Carbon Initiative (KCI). The KCI was an inter-agency coordinating group, supported by USAID, which promoted a progressive position for Kazakhstan at Kyoto.

By educating key policy makers regarding emissions trading, the activity almost certainly contributed to Kazakhstan's position in Buenos Aires. With the support that USAID has provided on the subject of pollution charges, certain key Kazakh policy makers can also be expected to have a sophisticated understanding of economic instruments that will undoubtedly prove useful in developing GHG reduction policies.

6.2 Next Steps in Policy Development

A Kazakhstan GHG reduction target would constitute only the beginning. Implementation of policy measures will be needed to reduce emissions to the committed level. In order for Kazakhstan

to continue participating in a trading regime in the longer term, its policies must also be designed to take full advantage of possibilities for economic gain offered by emissions trading, joint implementation or the clean development mechanism. This will require at least the following:

- Development of improved environmental policies, energy sector reforms and legislation to create a framework for investments in GHG reductions in Kazakhstan.

- Development of energy legislation and policy that supports a more rational usage of energy. As already noted, this area must include the analysis and subsequent removal of energy subsidies, improved collections, metering, and other commercial operating factors.

6.3 Next Steps in Institutional Development

As part of efforts to create administrative capacity, it is essential to develop transparent, simple and easily administered systems, bearing in mind that idealized policy structures are unlikely to work in Kazakhstan. Three requisite institutions are the following:

- Systems for recycling revenues from sales of emission reduction credits.

- Improved environmental finance in a climate in which capital is scarce and borrowing difficult.

- Systems for management of excess emission reduction credit "assets." These structures must ensure that Kazakhstan can not only continue to participate in trading regimes credibly over the long term, but will also benefit from that participation.

7. Newly Emerging Efforts in the Area of Climate Change

Kazakhstan's decision to become party to Annex I and Annex B prompted an invitation from the Umbrella Group to join as an observer, which Kazakhstan has accepted. The GOK position has sparked considerable interest from the United States and other international parties as well.
A few proposed projects, which are expected to develop in the first quarter of 1999, are examined briefly below. This list is not presumed to be all-inclusive, but it is indicative of the variety of activities that will soon be underway.

World Bank-Funded National GHG Reduction Strategy Study: With support from Austria, the World Bank will begin in January a Kazakhstan National GHG Reduction Strategy Study. This analysis is likely to attempt to quantify CERs (Certified Emissions Reductions); estimate the cost of GHG reductions; develop a portfolio of possible AIJ/CDM projects; identify regulatory, institutional and capacity building requirements for AIJ/CDM; and "analyze the choices Kazakhstan is facing in addressing climate change... in the context of the national development goals of Kazakhstan."[4] It is anticipated that the World Bank will attempt to develop some economic projections that are more credible than those currently available. The study is not, however, expected to be conclusive and is unlikely to examine trading issues. (Principal: Helmut Schreiber). USAID frequently works in conjunction with the World Bank by undertaking complementary activities. In this case, work (particularly on economic projections) should be closely coordinated between the US government and the World Bank, to avoid duplication of efforts or discrepancies in underlying assumptions, policy recommendations and results.

Coal-Bed Methane Outreach Program: This USEPA-sponsored program has initial funding to explore the possibility of coal mine methane projects in Kazakhstan. The Program will be sending a delegation to Kazakhstan in February to begin examining the prospects for GHG emissions reductions in this area. USEPA is proposing to make initial contacts with the GOK and possibly develop a detailed coal mine methane emissions inventory and resource guide for potential investors. The GOK is likely to look very favorably on efforts in this area, as mine methane capture has long been at the top of the government's priority environmental project (NEAP) list (Principal: Roger Fernandez).

NREL-TCAPP: The National Renewable Energy Laboratories has developed a workplan (the Technology Cooperation Agreements Pilot Project) together with counterparts in Kazakhstan which identifies priority clean energy technologies and defines barriers to their deployment in Kazakhstan. The next phase of this plan proposes to facilitate near-term private investment in high priority technologies and to secure donor and domestic support for longer-term actions to remove market barriers. It is not clear from available materials if full funding has been secured (Principal: Collin Green). If this work goes forward, it should be coordinated with other US government work arising from the GCC effort, and should target the technologies and industries identified in the emissions reduction analysis.

[4] From the draft terms of reference for the Kazakhstan National Strategy Study.

Clean Production Working Group: (Seeking US counterpart) The Ministry of Ecology and Natural Resources has requested US Government support for establishment of a "Cleaner Production Working Group" to be based in Pavlodar. This Group would build on work originally done by the World Environment Center with USAID funding. The Ministry is especially interested in establishing advisory capacity for cleaner production of raw materials, including mining, metallurgy, energy, oil and coal extraction, and uranium extraction and processing. Improved energy efficiency is a major objective and byproduct. Support from UNEP is currently being sought, but is by no means assured. The Ministry of Ecology and Natural Resources has approached the EPIC Program to inquire what US agencies might be able to provide technical and limited financial support. This working group could provide a very effective mechanism for distribution of information on available technologies and has founding members who come highly recommended.

Climate Change Mitigation Fund: USEA in conjunction with Edison Electric Institute has funding to carry out feasibility studies of potential Joint-Implementation projects between U.S. and foreign utilities. Kazakhstan is one of several countries included in this effort.

USAID-Sponsored Greenhouse Gas Emissions Reduction Initiative (GGERI): Although still in the planning stages, this pilot project would build the infrastructure to track emissions reduction activities on behalf of the Kazakh government in conformance with internationally accepted guidelines. An electronic emissions Registry would be created as an accounting device to measure progress against emissions reduction targets. By measuring the impacts of domestic actions, emissions trades, JI projects and CDM, the Kazakh government could make informed decisions to develop and modify its climate strategy as necessary. Policy decisions affected might include the allocation of credits for trading or the extent of participation in Joint Implementation and CDM projects. GGERI also seeks to work with government institutions which would certify JI credits, lending credibility to potential investments.

8. Concluding Remarks

It is in the interest of the United States that Kazakhstan make a credible commitment toward meaningful participation in the Framework Convention on Climate Change (FCCC) as soon as possible. It is also desirable that the Government of Kazakhstan use economic instruments to meet those obligations. Success in this area is clearly contingent on donor support and coordination.

At this time the Ministry of Environment and Natural Resources (MENR) closely coordinates GOK efforts in the area of climate change. To support this structure, donor-sponsored climate change activities should establish contacts with the MENR. While other agencies must increasingly become more involved, MENR makes an ideal lead partner for early development. Highly placed members of the MENR are fully committed to the development of tradable emissions, and other ministries have expressed their appreciation and support for the MENR's leadership role.[5]

The question of international assistance priorities requires early resolution if the US is to provide donor leadership as well as the prompt and effective assistance promised in Buenos Aires. It would appear that the most promising opportunities for US assistance lie in the aforementioned areas, some of which need to be completed by October, when COP 5 will take place, and some which will require longer implementation periods.[6]

It is evident that there is a need for a wide variety of assistance and expertise. The US Government would do well to build on its existing leadership and successes to ensure that the level of inter-agency and donor coordination remains high. The absorptive capacity of Kazakh organizations remains weak, and a great deal of institutional development and capacity strengthening will be required to ensure Kazakhstan's meaningful participation in the FCCC and the Kyoto Protocol—especially with respect to a tradable emissions regime. This participation, however, will provide substantial benefits for all cooperating parties.

[5] Post-Buenos Aires interviews indicated that the Ministry of Energy, Industry and Trade as well as the Ministry of International Affairs expect MENR to continue to provide leadership.

[6] For more details regarding these recommendations, please see EPIQ publications by Bluffstone (1998) and Dudek and Golub (1998).

Appendix I

Summary of Previous US Government Support in the Area of Climate Change

The following brief summaries outline earlier US government-sponsored efforts that laid the groundwork for Kazakhstan's decision to participate as fully as possible in emissions trading regimes laid out in the Kyoto Protocol. These important contributors are listed roughly in chronological order.

Environmental Policy and Technology Project (USAID): The EPT-Central Asia project operated in Central Asia from 1994-1998 and was implemented by CH2MHILL together with IRG and local counterparts. In Kazakhstan - and in all of Central Asia - the EPT project contributed substantially to mitigation of climate change impacts by promoting the rational use and allocation of limited water resources. EPT efforts included seminars on water pricing, technical assistance on water distribution, research on valuation of water uses, modeling of water supply and demand, assistance in developing interstate agreements on water sharing through the Interstate Council (ICKKTU). The project also supported efforts to make more explicit the links between water and energy pricing in a region where hydro-electricity (especially in winter) and water (especially in summer) are essential and limited resources.

Harvard Institute for International Development (HIID) Program: This USAID-supported environmental policy assistance program operated in Central Asia from 1994 - 1998. As part of this effort, in June 1995 consultants conducted an initial feasibility study for the establishment of a pilot air pollution emissions trading program in Almaty. Their report outlined the technical, economic and institutional constraints to introduction of emissions trading and concluded that a pilot program was feasible. Following this feasibility study, USAID and HIID initiated the Almaty Emissions Trading Program. Although it remained only a pilot effort, a trade that took place in October 1996 was the first inter-firm pollution trade in the former Soviet Union. This pilot trade raised awareness of the possible benefits of emissions trading, and gave rise to the Kazakhstan Carbon Initiative (KCI). The KCI was an inter-agency coordinating group, supported by USAID, which promoted a progressive position for Kazakhstan at Kyoto. HIID also developed a Health Damages Assessment working group to estimate the damages caused by air pollution in an effort to improve the process of setting pollution charges. The group focused its analysis on Almaty and Tashkent (in Uzbekistan), and the basic issues of methodology in measurement, monitoring and enforcement provided the members with experience that will certainly be applicable to further GHG work. HIID continues its efforts in Central Asia as a partner in the EPIC program.

Kazakhstan National Energy Efficiency Program (USAID): Several analyses implemented by Burns and Rowe together with IRG and local counterparts in 1995 looked at the inefficiencies in the Kazakh energy sector. Following their experience with broad policy issues, the USAID-supported analysts then conducted technical investigations into the efficiency improvement potential of heat and

power systems at four major plants, Ermakovskaya , Ekibastuz, Karaganda, and Ust-Kamenogorsk. Privatization of these power plants has complicated the issue of implementation, but the Ministry of Energy, Industry and Trade still remains interested in creating the necessary incentives to implement the recommendations made in 1995. IRG also conducted energy efficiency audits on components of the Almaty district heating system. IRG has also provided analysis on energy pricing and taxation in Kazakhstan. IRG continues its efforts in Central Asia as a partner in the EPIC program

World Environment Center (WEC) Program: The World Environment Center worked in Kazakhstan with USAID support from October 1995-July 1996. WEC developed waste minimization demonstration projects at a chemical plant in Pavlodar, Kazakhstan and a cement factory in Fergana, Uzbekistan. The WEC team's purpose was to disseminate cleaner production techniques and promote efficiency in production. The demonstration projects in Pavlodar enabled improvements in process efficiency, savings in energy and materials, and reduced pollution. The nascent cleaner production working group in Pavlodar credits WEC with its establishment.

Country Studies Program (USAID, USEPA, DOE): The US Country Studies Program assisted the Kazakh Research Institute for Climate and Environmental Monitoring (KazNIMOSK) in its development of the first stages of Kazakhstan's national inventory of greenhouse gasses in 1996. Their support included the vital task of training the KazNIMOSK staff in the use of the ENPEP energy sector model (developed at Argonne National Laboratory) to estimate the cost of reducing emissions in Kazakhstan. The Country Studies Program also provided technical and financial support to the KazNIMOSK in preparing the National Climate Change Action Plan and the Kazakhstan Climate Change Vulnerability Assessment. In addition, the Country Studies Program assisted in preparing the initial assessments of mitigation options in the energy sector and the non-energy sector.

US Energy Sector Reform Program (USAID): The national component of this regional effort, implemented by USAID contractor Hagler-Bailly, has played a critical role in development of the electricity law of the Republic of Kazakhstan. The Program has also conducted extensive analyses of electricity pricing and energy regulatory reform and restructuring (including privatization). The regional program has also promoted development of a Central Asian power pool, under which USAID-supported advisors worked with a regional electricity working group and the ICKKTU to develop regional agreements on management of the Central Asian electricity transmission grid. Analysts have also worked in oil and gas sector reform under the program, including developing regulatory legislation, consulting with the government on appropriate tariffs, and advising on privatization of gas distribution. Hagler Bailly continues to implement related work under a new USAID/CAR contract in cooperation with the USAID Global Environment Center.

ISAR-Central Asia Program: ISAR has worked with local counterparts throughout Central Asia to develop small scale alternative energy sources and to provide public education on climate change and alternative energy. With USAID support, ISAR produced the first Russian-Kazakh language introductory manual on climate change, and distributes it as a teaching tool to schools and NGOs. ISAR also participated in a cooperative effort with UNDP/GEF and the NGO "Anu-Umiti" in Aralsk to install a small wind energy facility (6 kW). This wind system, which came on-line in Summer 1998, provides electricity to a women's hospital in Aralsk. ISAR and Anu-Umiti have also cooperated on several seminars focusing on climate change and alternative energy use.

Environmental Policies in Central Asia (EPIC) Program Under the USAID EPIQ Contract: Since the activity began work in February 1998, EPIC has worked closely with the GOK on the topics of Annex I and Annex B commitments. The Program provided consulting assistance prior to COP-4 in Buenos Aires and also supplied a consulting economist who advised the delegation during the meeting. The Program's work in the area of regional water and energy management also assists the GOK in its efforts to adapt to global climate change. Water shortage is expected to be the major negative effect of greenhouse warming. Efforts to improve the use of water and efficiency of the power pool are therefore viewed as critical elements of the Kazakh climate change action plan.

Appendix II

Selected USAID-Supported Publications and Reports Relevant to Climate Change in Kazakhstan and Central Asia

Burns & Rowe/ International Resources Group, *Kazakhstan National Program for Energy Savings: Final Report*, by Browning, Banks, et al. July 1995.

Burns & Rowe, Technical Report: *Kazakhstan Expanded Energy Program- Heat and Power System Efficiency Improvements in Ermakovskaya and Ekibastuz Plants, Final Reports*, December 1995.

Burns & Rowe, *Technical Report: Kazakhstan Expanded Energy Program- Heat and Power System Efficiency Improvements in Karaganda and Ust-Kamenogorsk Plants, Final Reports*, January 1996.

Canara Corp., *Action Plan for Pilot Projects on Demonopolization and Restructuring of the Distribution Sector in Kazakhstan*, 24 January 1994.

Canara Corp., *Post-Privatization Support for Distribution Systems in Kazakhstan*, May 1997.

CH2M Hill, *Regional Water Pricing Committee Meeting Conference Proceedings, June 23-July 3, 1996*. Medeo, Kazakhstan.

EPIC Program, *Kazakhstan and Climate Change, by Theresa Sabonis-Helf*, August 1998.

EPIC Program, *Kazakhstan in the World of the Kyoto Protocol: Preparation for the Buenos Aires Meeting*, by Svetlana Ten, October 1998 (Russian Language).

EPIC Program, *The Kyoto Protocol's Options for Countries Not Included in Annex B - an Analysis for Kazakhstan and Uzbekistan*, by Daniel Dudek and Alexander Golub, October 1998.

EPIC Program, *What Next? Assisting Kazakhstan to Meet its Commitments Under the Framework Convention on Climate Change*, by Randall Bluffstone, December 1998.

EPT, *Summary of the Seminar on Water Pricing in Central Asia, by Barbara Britton, (Available in English or Russian)*, February 1996. Available from USAID or the EPIC library, locator number EPT/ R-6.

EPT, Issue Paper #2: *Valuation of Water Uses as a Tool for Resolving Water Sharing Issues in Central Asia*, by Robert C. Anderson, (Available in English or Russian), January 1997. Available from USAID or the EPIC library, locator number EPT/ R-17.

EPT, Issue Paper #6: *Analysis of Water Laws in the Republics of Central Asia*, by Saule Bakenova, (Available in English or Russian), July 1997. Available from USAID or the EPIC library, locator number EPT/ R-29.

EPT, *Working Meeting of Energy/Water Uses Round Table, Lake Issyk-Kul, Kyrgyzstan*, by Barbara Britton, (Available in English or Russian), August 1997. Available from USAID or the EPIC library, locator number EPT/ R-34.

EPT, *Final Report from the International Seminar on the Rational Use of Water and Energy Resources in the Central Asian Region*, by Anderson, Barnes, Britton, Hutchins, Mann and McCauley, (English Language), September 1998. Available from USAID or the EPIC library, locator number EPT/ R-36.

Hagler-Bailly, *Energy Regulatory Reform and Restructuring, Republic of Kazakhstan*, November 11, 1994.

Hagler-Bailly, *Restructuring Kazakhstan's Electric Power Industry*, March 16, 1995.

Hagler-Bailly, *Status Report: The Electric Power Sector of Kazakhstan*, April 27, 1998.

Hagler-Bailly, *1998 Comparison of NIS Electric Power Restructuring and Reform*, June 1998.

Hagler-Bailly, *Report of Wholesale Market Approach, Procedures, and Implementation Plan*, September 1998.

HIID, *Feasibility Assessment for an Area-wide Emissions Trading Bubble in the City of Almaty*, by S. Farrow. In cooperation with the Almaty City Department of Ecology and Bioresources and the Ministry of Ecology and Bioresources of the Republic of Kazakhstan, (Available in English and Russian), July 1995.

HIID, *Kazakhstan Investment Fund Considerations*, by Theodore Smith. HIID Environment Discussion Paper No. 28, 1997.

HIID, *Project Report: The Almaty Emissions Permits Trading Pilot Program*, by Richard Berger, February 1998.

HIID, *Project Report: Assessment Models for Health Damage from Air Pollution in the Cities of Almaty, Kazakhstan and Tashkent, Uzbekistan*, by Richard Berger, March 1998.

HIID, *Newly Independent States Environmental Economics and Policy Project: Final Report for Kazakhstan and the Central Asian Republics*, November 1994-March 1998, July 1998.

ICCMA, (International City/County Management Association), *Building A Regulatory System for Kazakhstan: Building Codes and Standards in A Market Economy*, by D. Harris, February 1993.

IRG, *Energy Efficiency Audit Report: Almaty Heating Systems Enterprise*, June 1993.

IRG, *Kazakhstan - Energy Efficiency in the District Heating System of Almaty: Policy and Institutional Analysis*, June 1993.

IRG, *Kazakhstan Energy Pricing and Taxation Study: Petroleum, Gas and Coal Pricing and Taxation*, by Browning and Poats, June 1993.

NOAA, *Final Report: Estimation of Seasonal Dynamics of Arid Zone Pasture and Crop Productivity Using NOAA/ AVHRR Data*, by Gitelson, Kogan, et al. 1995. In cooperation with Ben Gurion University and Jacob Blaustein Institute for Desert Research.

PER (Partners in Economic Reform), *Coal Project in Kazakhstan May 1993-January 1994*, by Irving and Marunich, January 1994.

USCSP (US Country Studies Program), *Climate Change Vulnerability Assessment in Kazakhstan*, jointly written by USCSP and the Kazakh Scientific and Research Institute for Environment and Climate Monitoring (KazNIMOSK), 1996.

USCSP, *Support for National Action Plan (SNAP) for the Republic of Kazakhstan, First Progress Report*, jointly written by USCSP and KazNIMOSK, March 1997.

WEC (World Environment Center), *Waste Minimization Training Manual for Central Asia Republics Industries*, (Russian and English), 1996.

WEC, *Waste Minimization Demonstration Project, Joint Stock Company Chimprom*, Pavlodar Kazakhstan, March 1996.

WEC *Waste Minimization Demonstration Project, Joint Stock Company Chimprom*, Pavlodar Kazakhstan, Visit #2, June 1996.

Appendix III

Key Local Counterparts for Work in Kazakhstan Relevant to Climate Change

Kazakh Scientific Research Institute for Environment and Climate Monitoring (KazNIMOSK), Under the Ministry of Environment and Natural Resources

Involved in the National Communication, US Country Studies Counterparts, Participants in Annex B working group.

Olga Pilofosova
Irina Eserkepova
Svetlana Mizina

Kazakhstan Institute of Economic Research (Under the Ministry of Energy, Industry and Trade)

Involved in projections of energy demand, Health Damage Assessment Models Program, EPIC Program working group on Accession to Annex I.

Kanat Barentaev
Nadezhda Fedorova, (retired)

Almaty City Department for Ecology and Bioresources (ACDEB) Under the Ministry of Environment and Natural Resources

Involved in the Almaty Emissions Permits Trading Pilot System covering particulates.

Bulat Esekin, (formerly.)
Khadzhimukan Aryonov, Head of Almaty City Department for Ecology and Bioresources (ACDEB)
Beibut Dyusekov, Deputy Head ACDEB
Galina Telekova, Chief, Department of Ecological Expertise and Audit, ACDEB
Mironyuk, Chief, Department of Automobile Transport, ACDEB
Sergey Belov, Chief, Department of Information and Analysis, ACDEB

National Ecological Center for the Sustainable Development of Kazakhstan (NEC) Under the Ministry of Environment and Natural Resources

Responsible for project identification and development, Implementation of the National Environmental Action Plan, Involved in EPIC Program Working Group on Accession to Annex I, Involved in proposed cleaner production working group.

Bulat Esekin, Director, formerly of ACDEB
Sergey Yelkin, Manager of NEC Climate Change division
Ajar Baisekalova, Project Appraisal, NEC
Baurzhan Duisebaev, Clean Production Manager

Proposed Working Group on Cleaner Production

Most of the group originated with the WEC Waste Minimization Project in Pavlodar.

V.P. Trojanov, Technical Director Joint Stock Company Chimprom
Irina Darkambaeva, WEC Country Coordinator
A.G. Siryk, Chimprom Production and Development Director, Chimprom
Baurzhan Duisebaev, National Ecological Center

Delegation to COP-4 (Buenos Aires) Supported by USAID Through EPIC

** Designates those who have worked with USAID climate change-relevant projects in the past.*

Irina Eserkepova,* KazNIMOSK (travel supported by USAID)
Bulat Esekin,* Director of the National Ecological Center for Sustainable Development (travel supported by USAID)
Minister Serikbek Daukeev,* Ministry of Ecology and Natural Resources
Deputy Asylzhan Akhmetov,* Chair of the Ecological Committee of the Mazhilis (lower house of Parliament)
Suinshlik Tiesov, Director of the Electricity Dept., Ministry of Energy, Industry & Trade
Erbulat Sembayev, First Secretary of the First Department, Ministry of Foreign Affair