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**SUMMARIES AND BACKGROUND INFORMATION**

**ON THE**

**First Annual USAID/NIS Energy Sector  
Review Workshop**

Office of Energy, Environment and Technology  
Bureau for Europe and the New Independent States  
Agency for International Development

**January 10-12, 1994**

**SHERATON RESTON  
RESTON, VIRGINIA**

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# SECTION I

**ATTENDEES IN ORDER OF LAST NAME  
ENERGY REVIEW WORKSHOP  
JANUARY 10-12**

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<u>NAME</u>	<u>AFFILIATION</u>
AKHTAR, SALIM	USAID/ENI/NIS/EET
ALAVI, MARJAN	IIE
ALCOCK, FRANK	DEPARTMENT of ENERGY
ANDRIENKO, VLADIMIR	RCG/HBI
ARCHER, ROBERT	USAID/ENI/EUR
ARZOUMANIAN, RAZMIG	K & M ENGINEERING
AVERBECK, STEVE	ENTERTEK ASSOC./B&R
BANKS, JOHN	IRG
BARLEY, CAROLYN	U.S. EPA
BASSETT, ORMON	VERGA ASSOCIATES
BECKMAN, ROBERT	USAID/ENI/NIS/EET
BERLS, BOB	DEPARTMENT of ENERGY
BERY, RAJ	FOSTER WHEELER
BEVER, JIM	USAID/ENI/NIS/EET
BLISS, CHARLES	IDEA/NIS
BRADEN, PAM	ADVANCED SYSTEMS TECHNOLOGY
BROWN, CARL	BURNS AND ROE
CARTER, JAY	JAY B. CARTER & ASSOC.
CHANDLER, WILLIAM	BATTELLE
CHATTERJEE, ROMIR	IDEA, INC.
CHAUDHRY, IQBAL	USAID/G/EG/CAP
CHEN, HENRY	HARZA
CHERENSON, RUTH	USEA

COLEMAN, MARYRUTH	DEPARTMENT of STATE
CUMMAS, CYNTHIA	U.S. EPA
DE TERRA, NIELS	RCG/HBI
DECKER, GERALD	DECKER INT'L DEV.
DIACHOK, DARIAN	IDEA/NIS/PADCO
DOERNBERG, ANDRES	IDEA/NIS
DUTKIEWICZ, BRONEK	INTRATECH, INC.
EBBIN, STEVE	IIE
EBINGER, CHARLES	IRG
EKIMOFF, LANA	DEPARTMENT of ENERGY
FAFARD, CHARLES	RMA
FATOORECHIE, M.M	PRAGMA GROUP, THE
FEINTUCH, HOWARD M.	FOSTER WHEELER
FICK, GLEN	BURNS AND ROE
FITZGERALD, DONALD	BURNS AND ROE
FITZPATRICK, MIKE	U.S. EPA
FOELL, WESLEY	RMA
GEISING, DAN	DEPARTMENT of ENERGY
GERGES, SAM	BURNS AND ROE
GIVEY, ROBERT	FOSTER WHEELER/B&R
GODDARD, CATHRYN	COVERDALE/RCG/HBI
GOLDBRUNNER, PETER	BURNS AND ROE
GOODRICH, MALINDA	IDEA/NIS
GUERTIN, DONALD	ATLANTIC COUNCIL
GUNUSEN, TAYFUN	BURNS AND ROE
GUTHRIE, ELAINE	DEPARTMENT of ENERGY
HALE, SANDY	CH2M HILL
HAN, GAYL BARRETT	IDEA/NIS

HANLON, KATE	USAID/EPT
HANSON, MARK	RMA
HATTON, LORI	USAID/CTIS
HAUN, RICK	PURVIN AND GERTZ (RCG/HBI)
HEARN, PAUL	U.S. GEOLOGICAL SURVEY
HOFFMAN, STEVE	U.S. EPA
HUBER, DOUG	
HUWITT, BOB	PURVIN AND GERTZ (RCG/HBI)
ICHORD, ROBERT	USAID/ENI/EUR
IRVING, ALAN	PIER
JACKOWSKI, MIKE	K & M ENGINEERING
JACKSON, BARD	NRECA
JERMAIN, DAVID	RCG/HBI
JURISH, ROBERT	JOHN BROWN
KALLAUR, CAROLITA	MIN MGMT SERV
KAWAJJIAN, GREG	HILL INT'L, INC.
KEITH, DAVID	RCG/HBI
KERULIS, FREDERICK	PIER
KESSLER, CAROL	DEPARTMENT of STATE/PM/FC
KLEES, RITA	CH2M HILL
KRUGER, DINA	U.S. EPA
KRYWUSHA, LARYSSA	PIER
KUJAWA, JEROME	U.S. EPA
LANDIS, ED	U.S. GEOLOGICAL SURVEY
LEONHARDT, JOHN	BURNS AND ROE
LOEFFL, MICHAEL	JOHN BROWN
LONG, DENNIS	USAID/ENI/NIS/EET
LVOVSKY, GREGORY	E3A

MALIK, MASOOD	IDEA/NIS
MANFRED, ROLF	IDEA/NIS/ALMATY
MARKESSET, ED	USAID/ENI/NIS/EET
MARKS, SIGFRIED	JOHN BROWN
MARTIN, LISA	U.S. GEOLOGICAL SURVEY
McCARTHY, PATRICK	CIA/OSEA
McCOMBS, J. MURRAY	JMCA, INC./RCG/HBI
MEAGHER, WILLIAM	PIER
MEYERS, ROBIN	DEPARTMENT of STATE
MONTGOMERY, PHYLLIS LOVE	PADCO
MOSELEY, CHARLES	IDEA/NIS/MOSCOW
MUSTINE, DAVID	AMER ELECT PWR
O'BRIEN, ROBERT	BECHTEL - ETIP
O'ROURKE, MARVENE	MMS
OLIKER, ELIYAHU	JOSEPH TECH CORP.
OLIKER, ISHAI	JOSEPH TECH CORP.
PALANT, SIMKHA	BECHTEL - ETIP
PALMISANO, JOHN	E3A
PARSHAD, NANDITA	EBRD
PASAREW, LEE	U.S. EPA
PIERCE, BRENDA	U.S. GEOLOGICAL SURVEY
POLEN, WILLIAM	USEA
PRIMM, BARRY	USAID
PROVANZANA, JOHN	AMER ELECT PWR
RAHBANI, KAMI	PRICE WATERHOUSE
RAMSEY, JOHN E.	NRC
RASMUSSEN, JOHN	USEA
ROGERS, LEONARD	USAID/ENI/EUR/DR/EI

ROSSI, EDWARD	DEPARTMENT of ENERGY
SHERLOCK, BEN	BURNS AND ROE
SKEATH, AL	USEA
SMITH, SUZANNE	RCG/HBI
SMITH, CHARLES	ELECTROTEK
STERN, ROBERT	IDEA, INC.
STREICHER, ALAIN	RCG/HBI
TAUBMAN, FELIX	ECI INT'L
THOMPSON, KAY	DEPARTMENT of ENERGY
TOPSACALIAN, HAROUT	IDEA/NIS/YEREVAN
TRUJILLO, JOSE	K & M ENGINEERING
VITELLI, MARY LOUISE	PIER
WALINSKI, ARKY	JOHN BROWN
WANDER, JOHN	IDEA, INC.
WANG, FRANK	DECKER INT'L DEV.
WASILEWSKI, ROMAN	DEPARTMENT of STATE
WEESNER, JOHN	DECKER INT'L DEV.
WEYNAND, GORDON	USAID/ENI/NIS/EET
WILLIAMSON, JACK	CORE INTERNATIONAL
WORTHINGTON, BARRY	USEA
WORZALA, MARY	RMA

**ATTENDEES IN ORDER OF COMPANY AFFILIATION  
ENERGY REVIEW WORKSHOP  
JANUARY 10-12**

---

<u>AFFILIATION</u>	<u>NAME</u>
	HUBER, DOUG
ADVANCED SYSTEMS TECHNOLOGY	BRADEN, PAM
AMER ELECT PWR	MUSTINE, DAVID PROVANZANA, JOHN
ATLANTIC COUNCIL	GUERTIN, DONALD
BATTELLE	CHANDLER, WILLIAM
BECHTEL - ETIP	O'BRIEN, ROBERT PALANT, SIMKHA
BURNS AND ROE	BROWN, CARL FICK, GLEN GERGES, SAM FITZGERALD, DONALD GUNUSEN, TAYFUN GOLDBRUNNER, PETER LEONHARDT, JOHN SHERLOCK, BEN
CH2M HILL	HALE, SANDY KLEES, RITA
CIA/OSEA	McCARTHY, PATRICK
CORE INTERNATIONAL	WILLIAMSON, JACK
COVERDALE/RCG/HBI	GODDARD, CATHRYN
DECKER INT'L DEV.	DECKER, GERALD WANG, FRANK WEESNER, JOHN

DEPARTMENT of ENERGY

ALCOCK, FRANK  
BERLS, BOB  
EKIMOFF, LANA  
GEISING, DAN  
GUTHRIE, ELAINE  
THOMPSON, KAY  
ROSSI, EDWARD

DEPARTMENT of STATE

COLEMAN, MARYRUTH  
KESSLER, CAROL  
MEYERS, ROBIN  
WASILEWSKI, ROMAN

E3A

LVOVSKY, GREGORY  
PALMISANO, JOHN

EBRD

PARSHAD, NANDITA

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TAUBMAN, FELIX

ELECTROTEK

SMITH, CHARLES

ENTERTEK ASSOC./B&R

AVERBECK, STEVE

FOSTER WHEELER

BERY, RAJ  
FEINTUCH, HOWARD M.  
GIVEY, ROBERT

HARZA

CHEN, HENRY

HILL INT'L, INC.

KAWAJJIAN, GREG

IDEA, INC.

CHATTERJEE, ROMIR  
STERN, ROBERT  
WANDER, JOHN

IDEA/NIS

BLISS, CHARLES  
DOERNBERG, ANDRES  
GOODRICH, MALINDA  
HAN, GAYL BARRETT  
MALIK, MASOOD

IDEA (PADCO) /NIS/KIEV

DIACHOK, DARIAN

IDEA/NIS/ALMATY

MANFRED, ROLF

IDEA/NIS/MOSCOW	MOSELEY, CHARLES
IDEA/NIS/YEREVAN	TOPSACALIAN, HAROUT
IIE	ALAVI, MARJAN
	EBBIN, STEVE
INTRATECH, INC.	DUTKIEWICZ, BRONEK
IRG	BANKS, JOHN
	EBINGER, CHARLES
JAY B. CARTER & ASSOC.	CARTER, JAY
JMCA, INC./RCG/HBI	McCOMBS, J. MURRAY
JOHN BROWN	JURISH, ROBERT
	LOEFFL, MICHAEL
	MARKS, SIGFRIED
	WALINSKI, ARKY
JOSEPH TECH CORP.	OLIKER, ELIYAHU
	OLIKER, ISHAI
K & M ENGINEERING	ARZOUMANIAN, RAZMIG
	JACKOWSKI, MIKE
	TRUJILLO, JOSE
MMS	KALLAUR, CAROLITA
	O'ROURKE, MARVENE
NRC	RAMSEY, JOHN E.
NRECA	JACKSON, BARD
PADCO	MONTGOMERY, PHYLLIS LOVE
PIER	IRVING, ALAN
	KERULIS, FREDERICK
	KRYWUSHA, LARYSSA
	MEAGHER, WILLIAM
PIER-MOSCOW	VITELLI, MARY LOUISE
PRAGMA GROUP, THE	FATOORECHIE, M.M
PRICE WATERHOUSE	RAHBANI, KAMI

PURVIN AND GERTZ (RCG/HBI)

HAUN, RICK  
HUWITT, BOB

RCG/HAGLER BAILLY, INC.

ANDRIENKO, VLADIMIR  
DE TERRA, NIELS  
JERMAIN, DAVID  
KEITH, DAVID  
SMITH, SUZANNE  
STREICHER, ALAIN

RMA

FAFARD, CHARLES  
FOELL, WESLEY  
HANSON, MARK  
WORZALA, MARY

U.S. EPA

BARLEY, CAROLYN  
CUMMAS, CYNTHIA  
FITZPATRICK, MIKE  
HOFFMAN, STEVE  
KRUGER, DINA  
KUJAWA, JEROME  
PASAREW, LEE

U.S. GEOLOGICAL SURVEY

HEARN, PAUL  
LANDIS, ED  
MARTIN, LISA  
PIERCE, BRENDA

USAID

PRIMM, BARRY

USAID/CTIS

HATTON, LORI

USAID/ENI/EUR

ARCHER, ROBERT

USAID/ENI/EUR

ICHORD, ROBERT

USAID/ENI/EUR/DR/EI

ROGERS, LEONARD

USAID/ENI/NIS/EET

AKHTAR, SALIM

BECKMAN, ROBERT

BEVER, JIM

LONG, DENNIS

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USAID/ENI/NIS/EET (cont.)

MARKESSET, ED

WEYNAND, GORDON

USAID/EPT

HANLON, KATE

USAID/G/EG/CAP

CHAUDHRY, IQBAL

USEA

CHERENSON, RUTH

POLEN, WILLIAM

RASMUSSEN, JOHN

SKEATH, AL

WORTHINGTON, BARRY

VERGA ASSOCIATES

BASSETT, ORMON

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# SECTION II

# First Annual USAID/NIS Energy Sector Review Workshop

Office of Energy, Environment and Technology  
Bureau for Europe and the New Independent States  
Agency for International Development  
January 10-12, 1994

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## January 10th, Monday

7:30 - 9:00 a.m.	Registration
9:00 - 10:00 a.m.	Welcome, Introduction, and Background
10:15 - 10:30 a.m.	Session Objectives and Methodology
10:30 - 12:00 p.m.	Energy Efficiency
12:00 - 1:30 p.m.	Lunch
1:30 - 3:00 p.m.	Production and Conversion of Energy
3:15 - 4:30 p.m.	Institutional Policies and Reform
4:30 - 5:30 p.m.	Nuclear Power Plant Safety

## January 11th, Tuesday

9:00 - 12:00 p.m.	Session I, Russian Federation
12:00 - 1:30 p.m.	Lunch
1:30 - 5:00 p.m.	Concurrent Sessions: Session II A. Central Asian Republics Session II B. NIS West (Ukraine, Belarus, and Moldova)

## January 12th, Wednesday

9:00 - 12:00 p.m.	Session III, Caucasus (Armenia and Georgia)
12:30 - 2:00 p.m.	Observations and Conclusions

# SECTION III

# Monday, January 10th

## Session I -Overview and Objectives

- |    |  |  |
|----|--|--|
| A. | Energy Efficiency                        | RCG/Hagler Bailly<br>Department of Energy<br>Resource Management Association (RMA)                         |
| B. | Production and Conservation<br>of Energy | Bechtel<br>United States Geological Survey<br>Partners in Economic Reform<br>Harza Engineering             |
| C. | Institutional Policy and Reform          | Atlantic Council<br>Institute for International Education (IIE)<br>United States Energy Association (USEA) |
| D. | Nuclear Power Plant Safety               | Department of Energy<br>Nuclear Regulatory Commission  |

**A.I.D. - RUSSIA  
1992/93 ENERGY EFFICIENCY PROJECT  
RCG/Hagler, Bailly, Inc.**

**Objective**

The AID-Russia Heating Energy Efficiency Project was a first step, designed to serve as a catalyst to begin cooperation in the energy sector and promote energy efficiency in district heating systems.

The specific objectives were:

1. Improve energy efficiency in specific pilot sites (district heating enterprises and their customers), through provision of energy audits, energy management programs, and energy-saving equipment;
2. Foster the development and capability of Russian professional experts, NGOs, private firms, and energy enterprises to provide energy efficiency services;
3. Promote energy efficiency in Russia by disseminating information to a wider group of local experts;
4. Expand Russia's energy efficiency technical and commercial ties to the U.S.

**A.I.D. - RUSSIA  
1992/93 ENERGY EFFICIENCY PROJECT  
RCG/Hagler, Bailly, Inc.**

**Summary of major accomplishments**

1. First A.I.D. technical assistance project on the ground in Russia - March 1, 1992.
2. Energy efficiency cells established, and provided with training and state-of-the-art U.S. energy audit instruments, in combined heat and electric power companies in 5 cities (Yekaterinburg, Kostroma, St. Petersburg, Irkutsk, Murmansk) and one NGO (CENEf, Moscow). 40 Russian professionals attended energy auditing seminars.
3. Energy efficiency programs, with audits leading to \$450,000 in U.S. equipment (supplied by 20 different U.S. manufacturers) specified, procured, supplied, cleared customs duty-free, and installed. Clients included 3600 MW power plant, 3 combined heat and power stations, 2 city district heating systems, 2 industrial plants, school, hospital, residential buildings. Estimated \$1.5 million in annual energy savings at world market prices.
4. Produced series of four 2-day energy efficiency conferences, exhibitions, and public forums to U.S. level of commercial and professional standards. In Moscow, St. Petersburg, Yekaterinburg and Kostroma, 12 U.S. companies, 40 Russian speakers, and 600 Russian professionals participated.
5. Used Hollywood-experienced filmmakers to produce 10 minute promotional video for USAID, 25 minute documentary for project participants, and 40 hours of footage.

**A.I.D. - RUSSIA  
1992/93 ENERGY EFFICIENCY PROJECT  
RCG/Hagler, Bailly, Inc.**

**Recommendations for future NIS programs**

In addition to the 13 "lessons learned" we listed in the September meeting, we suggest:

1. Energy efficiency programs (whether implementation or training) need to focus on market-oriented and policy issues much more than energy technical issues. Russian energy experts are good engineers who already understand efficiency concepts and know their technology. They need to learn about business subjects (management, accounting, economics, finance, law), industrial quality, and process optimization.
2. Greatest problem is not that technology is obsolete but rather that it is poorly operated and maintained. Greatest barriers are not technical but motivational and managerial. Privatization will help by creating an "owner's mentality".
3. Program being implemented by AID/EUR in Bulgaria is best model for NIS:
  - Set up local applications, RFPs, and other competitive processes, not old boys.
  - Identify and target energy entrepreneurs for training and participation.
  - Train entrepreneurs in business subjects, marketing, management, quality, etc.
  - Create a market, with multiple local suppliers, and local clients paying them.
  - Give training programs with a tangible result - international certification.
  - Provide energy engineers membership in AEE, and set up local chapters.
  - Train local consultants to offer diverse services, not just energy audits.
  - Provide equipment to raise management interest and obtain tangible results.
  - Help develop local banks through competitive RFP processes to identify projects

**A.I.D. RUSSIA - 1992/93 ENERGY EFFICIENCY PROJECT  
LESSONS LEARNED**

**Prime Contractor: RCG/Hagler, Bailly**

- 1) Equipment and subcontracts to local professionals are especially valuable since they provide important tangible benefits and psychological hope for the future;
- 2) Local subcontractors may not perform according to scope of work, but rather their own ideas;
- 3) Energy efficiency has to be taken in the broader context of survival - it may not be the most important issue of the day;
- 4) Parallel channels of communications must be established, since most phone/fax systems are inadequate (E-mail can help);
- 5) Social and cultural functions are important to establish good working relationships and trust;
- 6) Russian professionals have a sense of loss and failure, and a mistrust of U.S. assistance, and need to be handled carefully;
- 7) Translations of all documents are necessary, if they are intended for the Russian audience;
- 8) In trade and investment, U.S. firms will move on a stepwise path of representative, distributorship, assembly, and finally manufacturing. This is not understood by Russians, who want instant factories.
- 9) Local contacts and agents are critical to success, and it is wise to have more than one, working in parallel, however be prepared for rivalries;
- 10) Expect that your local partners may try to use the project to achieve some greater advantage, such as a middleman;
- 11) Large institutes usually do not make good subcontractors, in comparison to individuals or emerging private enterprises, however good cooperation has been achieved with large operating enterprises;
- 12) Frequent visits from the U.S. side will be necessary;
- 13) Project success is dependent on good relations with key individuals, and can be seriously threatened if the individual leaves the job.

# ENERGY EFFICIENCY CENTERS STATUS, JANUARY 1994

- **POLISH FOUNDATION FOR ENERGY EFFICIENCY**
  - Warsaw, Katowice, Krakow
  - Founded 1991
- **SEVEN--THE CZECH ENERGY EFFICIENCY CENTER**
  - Prague
  - Founded 1990
- **ENEFFECT--THE BULGARIAN ENERGY EFFICIENCY FOUNDATION**
  - Sofia
  - Founded 1993
- **CENef--THE RUSSIAN ENERGY EFFICIENCY CENTER**
  - Moscow
  - Founded 1992

## ENERGY EFFICIENCY CENTERS PROGRAM OBJECTIVES

- **SUPPORT POLICY REFORM**
  - Local experts can address policy
  - Local expertise provides continuity
- **DEVELOP PRIVATE BUSINESS**
  - Local experts know the ropes
  - Local experts are cost-effective
  - Market development cuts investment costs
- **DEMONSTRATE COST-EFFECTIVE MEASURES**
  - Technology projects provide experience
  - Institutional projects provide solutions
- **PROVIDE INFORMATION**
  - To consumers
  - To investors
  - To policymakers

## ENERGY EFFICIENCY CENTERS LESSONS LEARNED, 1993

- **CENTERS ARE COST EFFECTIVE**
  - Cost is low, skill is high
  - U.S. business profits from using them
- **MARKET DEVELOPMENT REQUIRES LOCAL EXPERTISE**
  - Locating investment opportunities
  - Developing institutional solutions
- **SIGNIFICANT BARRIERS REMAIN**
  - Financial "Catch-22s"
  - Weak legal basis for transactions
- **INDEPENDENCE IS INVALUABLE**
  - Flexibility for hiring experts
  - Ability to "tell the truth"
- **AN NGO PARTNER IS ESSENTIAL**
  - WWF, ACEEE
  - Foundation grants
- **CAN BECOME SELF-SUPPORTING**
  - FEWE's budget is two-thirds self-generated
  - SEVEN's budget is half self-generated

SOURCE: Battelle, PNL



**RUSSIA**

**ENERGY EFFICIENCY IMPROVEMENTS**

**OBJECTIVES:**

- ASSESS THE POTENTIAL FOR IMPROVED EFFICIENCY OF  
ELECTRICAL END USE
- DEVELOP TIME PHASED PLAN FOR IMPROVING ENERGY  
EFFICIENCY
- PROVIDE INPUT TO JOINT ENERGY ALTERNATIVE STUDY



**FUTURE PROJECTS**

- INDUSTRIAL ENERGY EFFICIENCY
- RESIDENTIAL ENERGY EFFICIENCY
- WEATHERIZATION
- JOINT VENTURE DEVELOPMENT
- TRAINING
- CONVERSION TO METERING BASED ON CONSUMPTION

## GAS FLARING PROJECT

- OBJECTIVE:**
- To effectively utilize associated gas, increase natural exports and reduce gas flaring

**ACCOMPLISHMENTS:**

- Conducted Resources Reviews
- Performed Interim Feasibility Study to assess economic viability of constructing gas processing facilities for 4 and 6 BCM/yr

**LESSONS:**

- Challenge Assumptions
- Special emphasis on logistics, data, communications
- Narrow Project scope, get consensus of all parties
- It will take more time than you think it should

## NIS NATURAL GAS SYSTEM REHABILITATION

- OBJECTIVE:**
- Evaluate existing Gas Utilities conditions
  - Identify investment projects to improve Utilities performance and end-users gas utilization efficiency
  - Prepare specific projects for financing by the World Bank

**MAJOR ACCOMPLISHMENTS:**

- Identification Utilities performance improvement projects
- Identification District Heating Gas Conservation Projects
- Identification Industrial Energy Conservation Projects
- Utilities Financial Analysis

**LESSONS LEARNED:**

- Communicating Project objectives to the NIS
- Communication difficulties
- Quality & interpretation of technical & financial data

DEPARTMENT OF THE INTERIOR

U.S. GEOLOGICAL SURVEY

PETROLEUM RESOURCES IN THE FORMER SOVIET UNION

by

Gregory F. Ulmishek<sup>1</sup> and Charles D. Masters<sup>2</sup>

Open-File Report 93-316

This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards and stratigraphic nomenclature.

<sup>1</sup> Denver, CO

<sup>2</sup> Reston, VA

## ESTIMATED PETROLEUM RESOURCES IN THE FORMER SOVIET UNION

## INTRODUCTION

This Open-File report provides an assessment (Table I) of undiscovered oil and gas resources in countries of the Former Soviet Union (FSU) made by participants of the World Energy Resource Program of the U.S. Geological Survey utilizing a modified Delphi (subjective) method of assessment (Masters et al, 1991). The assessment is based on a multi-year study of the geology of FSU basins and exploration results. The assessment was made basin-by-basin and, for the first time, includes allocation of Reserves and Undiscovered Resources to the Newly Independent States (NIS) (figure 1). The amounts of Identified Reserves<sup>1</sup>, although no more deemed as a high state secret (except for West Siberia), have not been published and the corresponding numbers in the table present a "best guess" based on the count of reserves of the largest fields and/or basin production rates. The reserve estimation is complicated by the "heterogeneity" of the Russian C1 and C2 categories that are a part of the Identified Reserves. These categories include so-called "inactive reserves." These are difficult to produce reserves in low permeability (<50 md) rocks characterized by low well yields, high viscosity oils, and reserves in small fields remote from the infrastructure. A large part of these reserves is non-commercial by Western standards.

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<sup>1</sup>Identified Reserves include approximately economically recoverable Proved, Probable & Possible Reserves in an American sense and, hence, incorporate significantly more resources than commonly reported Proved Reserves. For Proved Reserves estimations, the reader might consider an R/P of 10-15 as applied to 1991 production (Table I).

Inclusion of these reserves (Probable and Possible components) results in a high reserves to production (R/P) ratio for many FSU basins relative to U.S. basins.

The present assessment covers all major productive basins of the FSU, but does not include poorly known frontier basins of the arctic shelf east of the Kara Sea, basins of the Bering Sea, Sea of Okhotsk (except for the North Sakhalin basin), Japan Sea, and Black Sea, the presently non-productive Moscow basin in the central European part of Russia, and a number of relatively small non-productive depressions located primarily in the Russian Far East and in Kazakhstan. Several of these basins have small discoveries (onshore portions of the Anadyr and Khatyrka basins in the Bering Sea, West Kamchatka area of the North Okhotsk basin, basins on the east and northwest of the Black Sea), some others may prove productive in the future.

The largest portion of undiscovered petroleum resources of the FSU is located in basins of Russia. Very significant resources of oil and gas are located in Kazakhstan (primarily in the North Caspian basin), and Turkmenistan possesses large undiscovered resources of gas. Moderate amounts of oil and gas resources belong to Azerbaijan, Ukraine, and Uzbekistan. Other NIS have only limited oil and gas resources (Byelarus, Tajikistan, Kyrgyzstan, Lithuania, Georgia) or are completely devoid of them (Armenia, Moldova, Latvia, Estonia).

## PETROLEUM BASINS AND/OR PROVINCES

West Siberia. The West Siberian basin is the principal producer in Russia and possesses the largest undiscovered resources of both oil and gas. The main play that contains the dominant portion of identified oil reserves is in the Neocomian deltaic section in structural traps of central West Siberia (primarily the Middle Ob region). The play is significantly explored, and much of the remaining oil potential is expected to be found in stratigraphic traps in Neocomian rocks and in structural and stratigraphic traps in the pre-Neocomian (mainly Jurassic) section. The presence of significant oil resources in northern West Siberia and offshore in the South Kara Sea remains highly speculative (which is expressed by a large assessment at 5 percent probability). Much of the undiscovered resource is expected to be in reservoir rocks of poor to fair quality characterized by relatively low yields of wells.

Most of the discovered gas reserves is found in upper Albian-Cenomanian continental clastics in huge structural traps of northern West Siberia. Lesser gas reserves with moderate amounts of condensate are contained in deeper Neocomian-Aptian rocks. All the largest structures (except possibly in the northeastern area) have been drilled, and the reserve addition onshore is expected to be located in smaller structures and in deeper parts of the stratigraphic succession (Jurassic-Neocomian and possibly pre-Jurassic rocks). The main gas play clearly extends into the South Kara Sea where the dominant portion of undiscovered resources is

located. Two recent huge gas discoveries offshore in the western South Kara Sea support the very high resource assessment numbers.

Volga-Ural. The Volga-Ural province has been maturely explored. The main oil reserves are in Middle Devonian-lower Frasnian clastics in structural traps and in Upper Devonian reefs and drape structures over them. The gas reserves are in Carboniferous-Lower Permian carbonates and are almost entirely concentrated in the giant Orenburg field in the southeast part of the province. The undiscovered potential of the basin is limited. Remaining oil resources are expected to be contained in a large number of small fields (primarily in small Upper Devonian patch reefs) and in the somewhat less explored northern and northwestern parts of the province. The Buzuluk depression on the extreme south, just north of the North Caspian basin boundary, has a moderate potential for gas condensate and oil in the Devonian clastic section at great depths. A pinch-out zone of Devonian clastics on the northwest has some potential for oil in stratigraphic traps; however, proper sealing conditions have not been demonstrated and no discoveries have been made. The Ural thrust belt on the east is gas-prone. Although two gas fields have been found, we do not value this play highly because of significant faulting and the absence of a good-quality regional seal. Large amounts of oil that can be tapped by horizontal drilling are possibly contained in fractured source rocks of the Domanik Formation, but the available data are insufficient to make a quantitative assessment of these unconventional resources.

Timan-Pechora. Exploration has been successful during the last decade in the immaturely explored northern region of the Timan-Pechora basin. The main potential plays are carbonates below the pre-Middle Devonian unconformity in structural traps, Upper Devonian reefs and drape structures over them, and Lower Permian carbonates (including reefs) below the pre-Late Permian unconformity. Toward the Barents Sea shore, Devonian rocks dip to great depths and the main oil and gas condensate potential offshore is in Lower Permian carbonates and Triassic clastics. A pinch-out zone, hundreds of miles long, of Middle Devonian clastics may contain significant oil reserves in updip stratigraphic traps, but the lower seal may present a problem. The Ural thrust belt play is similar to that in the Volga-Ural province. The same is true for the unconventional play related to horizontal drilling into the Domanik source rocks which has not been assessed here. Our relatively conservative assessment for the basin is based on significant uncertainties of the thrust belt play and on our presumption that the principal Domanik source rocks have only limited distribution offshore. If correct, the petroleum productivity of the large western offshore portion of the basin is dependent on the long-distance lateral migration of hydrocarbons from Triassic(?) source rocks of the South Barents depression which increases the exploration risk.

Barents Sea. The principal potential of the Russian part of the Barents Sea shelf is connected with the large South Barents and North Barents depressions on the eastern side of the sea and with flanks of surrounding uplifts. Our assessment is based on

the presumption that the major source rocks occur in the Triassic section of the depressions and that the Upper Jurassic source rocks are immature over the shelf. This suggests a strongly gas-prone character of the depressions because of both the significantly coaly nature of the source rocks and their very deep occurrence. The presence of good clastic reservoir rocks and an excellent Upper Jurassic seal indicates that the potential for gas is high. The oil potential is probably moderate and is chiefly related to shallower parts of the depressions' slopes and to the Paleozoic-Triassic play north and northeast of the Kola Peninsula. The validity of this play has not yet been demonstrated by exploration results.

Lena-Tunguska. Our assessment of the Lena-Tunguska province is quite conservative considering its giant area. Until recently, the exploration has been concentrated in the southern half of the province and two plays have been proved to be productive. These are Vendian-lowermost Cambrian clastics and carbonates on the Nepa-Botuoba arch on the east, and Riphean carbonates beneath the pre-Vendian unconformity on the Baykit arch on the west. Source rocks, although not geochemically identified, occur in the Riphean section. The relatively moderate assessment of undiscovered resources resulted from poor quality of reservoir rocks, especially in the most promising Riphean section, and uncertainty in areal distribution of Riphean rocks that are supposedly largely limited to rift structures. The hydrocarbon potential of both plays is confined to the area covered by the Lower Cambrian salt seal.

The potential of the superposed middle Paleozoic-Triassic Tunguska basin is uncertain, but probably rather low. The main negative factor is the abundance of dolerite sills and dikes that compose up to 25-30 percent of the section and could adversely affect preservation of petroleum. Thick Triassic volcanics in the upper part of the section strongly hamper the efficiency of seismic surveys.

Anabar-Khatanga. The Anabar-Khatanga basin occupies the eastern part of the fore-Taimyr trough. (The western part of the trough, or the Yenisey-Khatanga basin, is basically characterized by the West Siberian geology and is assessed here together with West Siberia.) The Anabar-Khatanga basin is almost completely unexplored. A few non-commercial oil discoveries were made in the 50's in Permian continental clastics in structures related to Devonian(?) salt domes. The reservoir rocks are poor. The presence of source rocks is suggested by tar sands on the southern basin flank. The resource assessment is highly speculative.

Vilyuy. The late Paleozoic-Mesozoic Vilyuy basin is superposed on the margin of the early Paleozoic Siberian platform. The basin is underlain by a Devonian rift filled with volcanics and salt. On the east, the basin is bounded by the Verkhoyansk thrust belt. After several gas discoveries in the 60's, exploration has been rather unsuccessful. The source rocks are believed to be Permian coaly clastics, which results in a strongly gas-prone character for the basin. Middle Cambrian (Kuonam Formation) organic-rich black shales dip under the basin fill, but occur at great depths in the center. They may be within the oil

window in a narrow zone on the edge of the Devonian rift; however, the probability of a related oil play is low. Smaller structural traps and stratigraphic pinch-out traps on the basin margins are expected to contain the bulk of undiscovered gas. The narrow Verkhoyansk foredeep, north and east of the basin, has a very limited gas potential.

North Sakhalin. Almost all discovered oil and gas of the North Sakhalin basin are in structural traps in Miocene-Pliocene deltaic sediments of the paleo-Amur river. The onshore area of the Paleo-delta is maturely explored, the remaining potential is small and is related to stratigraphic traps. The offshore area north of the Sakhalin Island is gas-prone. The main potential is connected with the offshore area east of the island, where several significant discoveries were made in recent years. However, the potential area is rather small because eastward, the deltaic section thins and probably passes into prodeltaic shales. An almost unexplored play is lower Miocene fractured diatomaceous shales (principal source rock of the basin) similar to the Monterey shales of California. The Okruzhnoye field has been discovered in these shales on the south of the basin. The extent and potential of this play remain unknown.

North Caucasus-Mangyshlak (Azov-Kuban and Middle Caspian basins). The North Caucasus-Mangyshlak province includes the Azov-Kuban basin on the west and the Middle Caspian basin on the east. Most of the province occupies the foreland of the Great Caucasus and Crimean Mountains; the South Mangyshlak subbasin (a part of the Middle Caspian basin located east of the Caspian Sea)

is bounded by the Karabogaz arch on the south and by the Central Mangyshlak foldbelt (deformed and inverted Triassic rift) on the north. The small and minimally prospective western portion of the province occupying the eastern Crimean Peninsula is in Ukraine, the North Caucasus region is in Russia, and the South Mangyshlak subbasin is in Kazakhstan. The offshore boundaries between the states have not been established. Small areas in the central Caspian Sea appear to be in state waters of Turkmenistan and Azerbaijan.

The onshore areas of the province are maturely explored. Gas dominates in hydrocarbon reserves of the Azov-Kuban basin, whereas most of the Middle Caspian basin and the South Mangyshlak subbasin are more oil-prone. The remaining potential onshore is rather small and is chiefly related to subtle traps, to great depths in the foredeep (especially subsalt Jurassic rocks), and to Triassic carbonates in the pre-Jurassic rift system. The principal part of undiscovered resources is located offshore in the unexplored central Caspian Sea and, to a far lesser extent, in the Azov Bay of the Black Sea. Jurassic and Lower Cretaceous clastic rocks in structural traps are the prime exploration target in the Caspian Sea; in the Azov Bay, the main undiscovered potential is in rocks beneath the Maykop series shales (Oligocene-lower Miocene).

North Caspian. During the last 15 years, three supergiant oil and gas condensate fields and a number of smaller, but significant, fields were discovered in rocks beneath thick Lower Permian (Kungurian) salt of the North Caspian (Peri-Caspian) basin. The basin is still in the immature stage of exploration

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because of great depths, high overpressure, and high contents of sulfur in the hydrocarbons. The eastern, southeastern, and central parts of the basin are in Kazakhstan; the southwestern, western, and a narrow zone of the northern margins are in Russia. Although no very large discoveries were made in recent years, the potential of the basin is very high. Subsalt Paleozoic carbonate rocks and associated reefs have the most potential of the exploration plays. An extension of the Karaton-Tengiz carbonate platform (which contains the Tengiz supergiant) offshore into the northern Caspian Sea is especially attractive, but promising exploration targets may be found on all basin margins. Carboniferous and Lower Permian clastic fans are also widespread along the eastern and southern margins; however, the reservoir properties of the clastics are poorer than those of the carbonates. A shallow Mesozoic suprasalt salt-dome play has been explored for many years, but still possesses a significant petroleum potential. Oil and gas with a high content of condensate are expected to dominate in undiscovered resources of the basin. In the central areas of the basin the salt is probably underlain by thick piles of clastic turbidites interbedded with black-shale source rocks that occur at great depths. There is a high probability that turbidites contain very large in-place resources of gas, and possibly oil, in supposedly tight reservoir rocks. This speculative play was not assessed because of the complete lack of data.

Baltic. The FSU portion of the Baltic basin covers parts of the Kaliningrad Administrative Region (Russian enclave),

Lithuania, and Latvia. The onshore part of the basin has been thoroughly explored. The dominant portion of discovered reserves is found in the Russian enclave, and several small fields are located in Lithuania. A single play in Middle Cambrian sandstones contains all the reserves. The remaining potential onshore is negligible. The Baltic shelf is essentially undrilled although a few small discoveries have been made in Polish and Russian waters. The offshore extension of the Middle Cambrian play supposedly will contain the bulk of undiscovered resources.

Pripyat. The Pripyat basin is a Devonian rift filled by salt and carbonates and overlain by a Carboniferous and younger sag. The basin is located in Byelarus. The basin is oil-prone; only one small gas condensate field has been found. Production is from subsalt Frasnian and intersalt Lower Famennian carbonates in structural traps at crests of the tilted fault blocks. All discovered fields are concentrated in the northern zone of the basin; the central and southern zones are non-productive, apparently because of immaturity of source rocks. The remaining potential of the heavily explored northern zone is very small and is related to subtle structural and stratigraphic traps. The potential of the rest of the basin is dependent on the presence and quality of pockets of mature source rock in deep depressions on the southern flank.

Dnieper-Donets. The Dnieper-Donets basin of Ukraine is the southeastward continuation of the Devonian rift of the Pripyat basin; however, the sag sequence in the former is much thicker and contains almost all the discovered reserves. The Dnieper-Donets

basin is oil-productive in its northwestern part; southeastward, along the dip, gas becomes dominant because of both overmaturity of source rocks and increase of the amount of coaly material in shales and coal beds. The entire Carboniferous through Lower Permian section is productive, but major gas reserves are concentrated in Devonian salt dome-related traps below the Lower Permian salt seal. The basin is significantly explored to depths of 4 - 4.5 km. The remaining potential is mostly gas in stratigraphic and deeply buried traps (more than 4.5 km) in Lower Carboniferous clastics. Other exploration plays are Devonian clastics and carbonates on the basin margins and possibly Lower-Middle Carboniferous reefs, primarily on the northeastern margin; however, the potential of these plays is lower.

Carpathian. The Ukrainian part of the Carpathian basin occupies a Tertiary thrust foredeep of the Carpathian foldbelt and the adjacent foreland. From the Ukraine, the foredeep extends, on strike, northward to Poland and southward to Romania. Strongly folded thrust plates of the foredeep are dominantly oil-productive, whereas gas fields are mainly controlled by gentle uplifts on the foreland. Upper thrust plates are significantly explored to depths of 4 - 4.5 km. The remaining potential is largely related to complex structures of the lower thrust plates at great depths and to the underthrust of the Carpathian foldbelt. Some gas potential exists in the foreland where Jurassic reefs may present an unexplored play.

Chu-Sarysu. Several hydrocarbon fields have been discovered in the Chu-Sarysu intermontane basin in central Kazakhstan.

Suspected source rocks in the Devonian-Tournaisian section are strongly overmature and all the discoveries are gas. Most of hydrocarbon reserves are in Carboniferous rocks, less productive are Devonian clastics. Gas in the Lower Permian reservoirs, below a salt cap, is dominantly nitrogen with a high content of helium. The basin is lightly to moderately explored. The undiscovered potential of the basin is rather low and is significantly related to the less explored Devonian section below the Upper Devonian salt seal.

South Turgay. The South Turgay basin is located in central Kazakhstan, just northwest of the Chu-Sarysu basin. Exploration began in the early 80's and revealed that flat-lying Tertiary and Cretaceous rocks are underlain by a Lower-Middle Jurassic rift system. Several oil and gas fields have been discovered, but almost all reserves are concentrated in the large Kumkol field. Upper Jurassic and Neocomian clastics of the field are oil-productive in a structural trap over a horst. Reservoir properties of the clastics are very good and a high recovery efficiency is expected. The basin is lightly explored; however, drilling of many structures similar to the Kumkol field has not resulted in significant discoveries. Much of the remaining potential is probably in stratigraphic and structural traps in the Lower-Middle Jurassic sequence limited to grabens of the rift system.

North Ustyurt. The largest part of the North Ustyurt basin is in Kazakhstan and its eastern part is in Uzbekistan. The basin occupies a median massif (microcontinent) in the Hercynian

accreted terrane. The geology of the basin seems to have much similarity with the Tarim basin in China, although foredeeps along the boundary sutures are not as well developed. Jurassic through Tertiary-aged sediments, dominantly clastic basin fill, overlies a carbonate platform of the microcontinent. Most of discovered reserves are heavy oil in Jurassic-Neocomian rocks at shallow depths on the Buzachi Peninsula, on the extreme west of the basin. Source rocks for this oil are unknown and possibly the oil has migrated there from the North Caspian basin. Elsewhere in the basin, several rather small oil fields in Jurassic rocks and a few biogenic(?) gas fields in Eocene rocks have been discovered. The Jurassic-Tertiary sequence is moderately explored and its undiscovered potential is deemed to be low. The deep Paleozoic carbonate sequence has been drilled only in a few locations. The presence of reefs and basinal facies (possible source rocks) has been interpreted from seismic data in the eastern part of the basin. The assessment of undiscovered resources is conservative and highly uncertain.

South Caspian. The rich South Caspian basin is located in western Turkmenistan, the southern Caspian Sea, and Azerbaijan. On the extreme northwest, the basin extends into Georgia where several fields produce oil from Eocene fractured volcanic reservoirs. The dominant amount of discovered reserves is in the thick middle Pliocene clastic section. The largest and most productive fields are found in a narrow structural zone extending across the sea along the northern boundary of the basin from the Apsheron Peninsula in northeastern Azerbaijan into the Peri-

Balkhan region of western Turkmenistan. This zone is characterized by the presence of good reservoir sandstones deposited in the paleo-Volga river delta. Southward, the quality of reservoir rocks deteriorates significantly. Oil dominates in the discovered reserves, but gas accumulations become more common seaward. The western onshore area of the basin, parts of the Apsheron-Peri-Balkhan zone offshore, and the Peri-Balkhan region of Turkmenistan have been intensively explored and relatively limited potential remains (primarily at great depths). Offshore exploration has been largely limited to very shallow water depths on the west, and the extensive Turkmenian shelf on the east is essentially undrilled. A number of recent large discoveries onshore along this shelf suggest high potential of the adjacent area of the sea. Most of the yet undiscovered resources will be found in middle Pliocene clastics in structural traps; however, the potential of updip pinch-out stratigraphic traps is also high. A Mesozoic reef play on the basin margins is possible, but its petroleum potential is perhaps moderate at best.

Amu-Darya. Most of the Amu-Darya basin is located in eastern Turkmenistan and only its northeastern margin is in Uzbekistan; to the southeast, the basin extends into Afghanistan. The central area of the basin (Murgab depression) is filled with a thick sequence of Lower-Middle Jurassic coal-bearing clastics, Upper Jurassic carbonates and salt, and Cretaceous through Tertiary primarily clastic rocks. The basin is significantly gas-prone due to the abundance of coaly organic matter in the Lower-Middle Jurassic and to the deep occurrence and overmaturation of Upper

Jurassic marine source rocks. Significant oil reserves are present only on the northeastern basin flank in Uzbekistan, where the fields produce from structural traps and reefs in Upper Jurassic rocks. The rest of the basin contains dominantly gas and gas condensate fields. Production is mostly from Lower Cretaceous clastics above the Upper Jurassic salt. A number of discoveries have been made in the subsalt section, but the fields have not been developed because of a high sulfur content in the gas. However, the suprasalt section has been extensively explored and most of the remaining potential is connected with subsalt rocks. The presence of the essentially undeformed salt seal suggests that the potential is high.

South Takjik. The western part of the South Tadjik (Surkhan-Vakhsh) basin is in Uzbekistan, its larger eastern part is in Tajikistan, and the basin extends across the FSU boundary into Afghanistan. Geologically, the South Takjik basin actually represents an eastward continuation of the Amu-Darya basin which was deformed in the Late Tertiary by the Pamir protrusion. The basin consists of a set of north-to-south thrust structural ranges, expressed in the surface topography, and separating deep depressions filled with thick Neogene molasse clastics. The basin is moderately explored to depths of approximately 3 km. Deeper drilling has been limited by poor resolution of seismic records. Discovered hydrocarbon reserves are small. Paleogene carbonate reservoirs are oil-productive, whereas Cretaceous clastics and Upper Jurassic carbonates contain mostly gas. The undiscovered resources of the basin seem to be limited, chiefly owing to

intensive faulting and poor preservation conditions. However, much uncertainty exists in the assessment because of complex structure and inefficient previous exploration. A large part of the remaining potential is associated with rocks at great depths, especially Upper Jurassic carbonate rocks below the salt seal.

Fergana. The intermontane Fergana basin is a deep Neogene molasse depression overlying Paleogene and Mesozoic platform rocks of a median massif (microcontinent) in the Alpine foldbelt. The basin is divided between Uzbekistan, Kyrgyzstan, and Tajikistan. Previous exploration was dominantly targeted at shallow to moderately deep traps on basin margins, along the boundary thrusts. The principal portion of hydrocarbon reserves has been found in Paleogene clastic and carbonate reservoirs. The amounts of hydrocarbon reserves in Mesozoic and Neogene rock is much smaller. The marginal zones of the basin are thoroughly explored, but drilling in the deep, inner areas of the basin began only recently and a large oil field has been discovered (with a recent catastrophic blowout) in Paleogene rocks and in the lower part of the Neogene molasse section. The exploration potential of the central parts of the basin seems to be high, but drilling depths are great and exceed 6 and even 7 km in large areas. The potential of the unexplored subthrust play along the basin margins is uncertain.

### Acknowledgements

The text of this report derives largely from the Russian literature which is not herein referenced. The reader is referred, however, to the several reports on FSU petroleum basins by James Clarke, James Peterson, and Gregory Ulmishek of the USGS World Energy Resources Program (see Selected References). The authors are grateful for the many professional contributions to this understanding made by our program colleagues, including: James Clarke, James Peterson, Keith Robinson, Mahlon Ball, Jack Kingston, Benjamin Law, and Doug Klemme.

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CRUDE OIL<sup>1</sup>  
(Billions of Barrels)

NATURAL GAS  
(Trillions of Cu. Ft.)

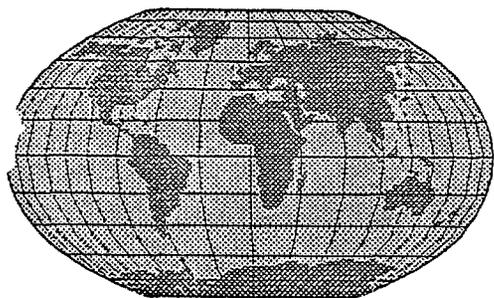
% Resources by country	Basin/Province/ Country Name	Cumulative Production	Identified Reserves	Undiscovered Resources				Cumulative Production	Identified Reserves	Undiscovered Resources			
				95%	Mode	5%	Mean			95%	Mode	5%	Mean
FSU (Aggregate)		109	129	68	115	278	151	411	1820	1140	1924	4703	2541
Russia (Aggregate)		90	100	40	68	171	91	252	1650	927	1587	4083	2153
100R	W. Siberia	39	60	20	40 (4)	100	52.4	190	1400 <sup>2</sup>	400	900	2000	1089.8
100R	Volga Urals	41	21	1	2.5 <sup>3</sup>	4	2.5	29	25	2	4	10	5.2
100R	Timan Pechora (incl.offsh.)	2.7	9	2	4 <sup>3</sup> (.5)	8	4.6	12	24	10	25	60	31.4
100R	Anabar Khatanga	0	0	.2	.5	4	1.4	0	0	2	5	10	5.7
100R	Lena-Tunguska	0	3	3	7	25	11.3	0.1	20	50	100	400	175.2
100R	Vilyuy	0	0	negl.	negl.	negl.	negl.	0	16	10	20	100	40.7
100R	N. Sakhalin	0.7	1.4	1	2.5	5	2.8	1	21	10	15	40	21.1
100R	Barents Sea <sup>4</sup>	0	.1	1	3	8	4.0	0	120	200	500	1500	716.9
Kazakhstan (Aggregate)		3	17	14	26	89	42	5	83	66	124	495	218
75R.25K	N. Caucasus-Mangyshlak	8.4	6.5	2	3.5	7	4.1	26	5	5	15	40	19.8
20R.80K	N. Caspian	1	16	10	30 (8)	100	45.4	100	70	150 <sup>5</sup>	600	261.2	
100K	Chu-Sarysu	0	0	0	0	0	0	0	2	1	2	4	2.3
100K	S. Turgay	0	.7	1.0	1.5	6	2.7	0	negl.	.2	.5	1	0.6
80K 20Uz	N. Usturt	.4	2.2	1	1.5	3	1.8	.8	.5	.5	1	2	1.2
75Tk.25Uz <sup>6</sup>	Amudarya <sup>7</sup>	.3	.7	.5	3 (2)	6	3.2	86	200	30	75	200	100.1
60Az 40Tk <sup>8</sup>	S. Caspian <sup>9</sup>	12.1	5	3	6 (.6)	15	7.9	10	30	20	30	70	39.3
70Uz.20Kg	Fergana	.4	1	2	3	8	4.2	1	.3	1	3	6	3.3
10Ti													
40Uz.60Tj	S. Tadjik <sup>7</sup>	negl.	<.1	.1	.3	1.5	0.6	.3	.2	.5	1	3	1.5
100B	Pripyat	0.6	.6	<.1	0.2	0.5	0.3	negl.	negl.	negl.	negl.	negl.	negl.
100U	Dneiper Donetz	1.2	.7	.2	0.7 (.3)	1.5	0.8	47	20	10	20	40	23.2
100U	Carpathian <sup>10</sup>	.7	.4	.2	.4	0.9	0.5	8	1.2	1	2	4	2.3
75R.20Lth. 5Lat	Baltic	0.2	0.2	0.1	0.3	0.7	0.4	0	0	negl.	negl.	negl.	negl.

1 Condensate portion of Undiscov. Rscs. in parentheses  
 2 Includes recent offshore discoveries in Kara Sea  
 3 Horiz. drilling in Domanik not assessed  
 4 Offshore Timan-Pechora not included  
 5 Central Basin turbidite play not considered  
 6 For gas rscs: 95Tk, 5Uz  
 7 FSU part only--basin extends into Afghanistan  
 8 Small quantity in Georgia  
 9 FSU part only--basin extends into Iran  
 10 Ukrainian part only--basin extends into Poland and Romania

Annual Production - oil (gas) 1991 and Country abbreviations:

Russia (R)	3.365	(22.505)	Lithuania (Lth)	
Kazakhstan (K)	.194	(.277)	Latvia (Lat)	
Azerbaijan (Az)	.085	(.301)	Tadjikistan (Tj)	(.004)
Turkmenistan (Tk)		(2.950)	Kyrgystan (Kg)	(.004)
Ukraine (U)	.036	(.854)	Uzbekistan (Uz)	.020 (.171)
Byelarus (B)	.015	(.010)		

BEST AVAILABLE DOCUMENT



# P.I.E.R.

## Coal Project Update

A Newsletter Published By  
Partners In Economic Reform, Inc.

Volume 1 Number 1

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### Yeltsin Decree Moves Coal To Market System

Russian President Boris Yeltsin signed a decree on June 21, 1993 freeing coal prices, allowing coal enterprises to retain hard currency and easing import of mine equipment.

The decree seeks to meet the financial demands of the coal industry without increasing budget deficits. It begins the transition to market prices for coal and coal products, providing the industry financing through price increases rather than government subsidies.

Prior to this mandate, coal enterprises could not deal directly with foreign companies for hard currency. Sales were conducted through a complex barter system involving one or more brokers. Hard currency bank accounts will result in more efficient transactions.

The Yeltsin decree eliminates import tariffs on mine equipment, spare parts, and other components not produced or produced in limited quantities in Russia.

According to a U.S. coal industry source, heavy import duties have been a deterrent to increased trade between western firms and Russian coal enterprises. By liberalizing tariffs, Yeltsin opened the Russian market to U.S. manufacturers.

According to a World Bank official, "this historic development" could determine the course and pace of reform in Russia's labor-intensive industries.

A June 23 Council of Ministers action establishing a fund to support coal industry reform with a three percent value added tax may reflect Government determination on reform. \*

### President Clinton's Letter to PIER Chairman

"A productive and prosperous Russia can add billions of dollars in new growth to the global economy."

So wrote President Bill Clinton in a July 1 letter to W.J. Usery, Jr., Chairman, Partners in Economic Reform, thanking him for his interest in the U.S. policy toward the independent states in the former Soviet Union.

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*"We are investing not only in the future of Russia, but also in the future of America."*

President Clinton

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Referring to agreements reached last spring at the summit meeting with Russian President Boris Yeltsin, President Clinton declared that the United States and the other major industrialized democracies are committed to helping ensure the continuation of Russia's reforms.

The President said that a sound Russian economy could mean new jobs and new investment opportunities for Americans and for our allies around the world. "We are investing not only in the future of Russia, but also in the future of America," he concluded. \*

### PIER To Assist Russian Coal Industry Reform

In response to a joint request for assistance from management, labor, and government officials in the Russian coal industry, PIER has invited a delegation of Russian coal experts to Washington.

The delegation will meet August 7-15 with representatives of the U.S. Government, labor and management, international financial institutions, and PIER Board Members to discuss the U.S. role in reforming the Russian coal industry.

The six-member delegation from Russia will consist of:

- A.E. Evtushenko, First Deputy Minister of Fuel and Energy;
- A.I. Skryl, Chief, Strategic Planning Division, Russian Coal Company;
- A.V. Druzinin, Director-General, "Cheliabinskugol" Mining Association;
- I.A. Simonov, Chief of the International External Department, Russian Coal Company;
- A.S. Sergeev, Chairman, Independent Trade Union of Miners (NGP), Russia;
- I.S. Kozhuhovskiy, President of the Russian Fund for Social Guarantees.

The formal request for PIER assistance came from Yuri Malyshev, President of "Rosugol", the Russian Coal Corporation, to create a team of U.S. and Russian experts to plan and implement the coal industry's

## News From The Field

Donetsk, Ukraine  
 Fredric Kerulis, Director  
 PIER Ukraine

The United Nations, Economic and Social Council, Economic Commission for Europe, Committee on Energy recently sponsored a workshop on the recovery of coal bed methane. Slav Slavov, UN Economic Commissioner, for Europe led the session, which was held June 14-16, 1993 in Donetsk, Ukraine.

Participants, totaling 350, represented Ukraine, Russia, Canada, Poland, Hungary, Germany, the United States, and Switzerland.

Six U.S. companies with interests in coal bed methane attended the U.N. workshop.

Their interest in developing coal bed methane in the Donbass was generated by meetings held at an earlier methane symposium in the U.S.

The Ukrainian American Center for Cooperative Development provided interpreters for the U.S. companies and facilitated negotiations for the Makeevka Coal Association and Ammonite Resources.

As a result of their negotiations several protocol agreements were signed. The resulting protocol agreement initiated a joint venture in methane degassing in Makeevka and Donetsk. The Donetsk Coal Association entered into similar agreements.

The Makeevka and Donetsk Coal Associations have agreed to have the Center work with the Bazhanov Mine in Makeevka and the Skachinsky Mine in Donetsk in developing mining standards similar to those in the U.S. ♦

## Assist, from page 1

transition to a market system.

In a recent memorandum to W. J. Usery, PIER Chairman, Malyshev said that, as a result of President Yeltsin's June 21 mandate, Russia now faces implementing many of the measures discussed at the PIER seminar convened last March in Moscow.

At that meeting, American and Russian experts discussed improving safety, efficiency, and performance in the Russian coal industry and protecting workers in the transition to a market economy.

In response to Malyshev's request, PIER is proposing the following new project initiatives:

- A pilot Safety Net/ Job Creation project to assist workers displaced by the restructuring of the coal industry.

- An accelerated program to demonstrate U.S. mining technology and equipment, along with management, engineering, production, and safety techniques.

- An expanded training program for the next generation of Russian miners, engineers, and managers, to be conducted in the U.S.

- An analysis of the current organizational structure of the Russian coal industry and alternative structures that would increase competition and improve efficiency and quality.

PIER is working with the U.S. Department of Commerce to establish business centers in Kemerovo, Vorkuta, and Irkutsk. These centers will serve to promote the interest and activity of U.S. manufacturers and suppliers in these coal regions, and assist them in taking advantage of the recent changes in Russian currency and export/import regulations. ♦

## PIER - Kazakhstan

PIER's Kazakhstan team, John Marunich, in Karaganda, and Alan Irving in Almaty, have had a full schedule since arriving in country six weeks ago. In addition to locating appropriate office and living space, hiring staff, installing equipment and completing the formalities of setting up shop overseas, both Directors have negotiated local agreements with labor, management and government.

Through mine surveys and other contacts, John Marunich has established his expertise and excellent working relations with labor, management, government and academic institutions in Karaganda. A working visit to the U.S. for top management and labor officials in coal is being planned. John also arranged the formal presentation of personal mine safety equipment donated by the U.S. The presentation ceremony was attended by AID Project Director Ed Birgells, Jim Bigus, representing Ambassador William Courtney, and PIER's labor and management Partners in Karaganda. The presentation, and the Project have been reported favorably in local and national media.

PIER Almaty Director Irving quickly established close working relations with top levels of labor, management and government there. Irving's work in the Capital gained broad access for PIER and the U.S., facilitating work in Karaganda, and resulting in an invitation to Alan to accompany Ambassador Courtney to Ekibastuz "the World's Largest Surface Mine". During the visit, Irving arranged a future exchange of expert visits between Ekibastuz and the U.S., and received a formal request from the General Directors of the coal and energy associations to establish a PIER Center in Ekibastuz. In a letter supporting the Ekibastuz Center, First Deputy Minister Bekbosinov praised Alan's "great work" in Kazakhstan. Irving is brokering an extension of an exchange program between University of Kentucky and Kazakh institutions, and a Kentucky-Kazakhstan "sister region" program. ♦

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USAID/NIS Energy Sector Review Workshop  
Jan 10-12, 1994

**PRODUCTION AND CONVERSION OF ENERGY**  
(based on Study of Kyrgyzstan Hydropower Program)

Objectives

- Assess Kyrgyzstan electric power situation.
- How hydropower meets the present demand and may supply future needs.
- Opportunity to export hydropower.
- Study specific hydropower projects.

Accomplishments - Technical

- Electric power supply adequate for current and near-term needs - adverse economic conditions.
- Hydropower supplies bulk of electricity - stable electricity prices.
- High imported fuel cost for district heating and other purposes.
- New hydroplants could meet heating needs and for export.

- 360 MW Kambarata 2 being considered by European Development Bank to provide construction financing.
- Recommend substitution of imported fuel with electric power or local coal.
- Problem of operating reservoirs for irrigation purposes.

#### Accomplishments - Nontechnical

- Excellent cooperation from Kyrgyzstan.
- Met objectives within budget and schedule.
- Provided technology transfer for counterparts.

#### Lessons Learned

- Logistics, language, culture, facilities.
- Addressing issues within one narrow topic with broader implications presents difficulties.
- Obtaining information outside of Kyrgyzstan more difficult.
- Issues extend beyond electric power or energy sector.

December 21, 1993

**Energy Policies**  
**for the Newly Independent States of the Former Soviet Union (NIS):**  
**A U.S.—Japan—NIS Cooperative Approach**

A Proposal of the Atlantic Council to  
the U.S. Agency for International Development  
for Additional Work in Year II (1994)

## BACKGROUND

AID is now supporting a work program on energy policies for the newly independent states of the former Soviet Union — in particular Russia and Ukraine. The program is scheduled to run until December 1994. A major paper recommending comprehensive energy policies for Russia and Ukraine has been released on December 2, 1993 and is being widely distributed.

The policy paper is providing an important background document for use by Dr. Alexei A. Makarov, the coordinator of energy policy work now underway in the Russian Federation. Dr. Vladimir Tonkal, the head of the Ukrainian Institute of Energy Saving Problems, is also using this paper as significant input to Ukrainian government officials to encourage market approaches in Ukraine.

Briefings on the comprehensive policy recommendations have been held in Washington and Tokyo for key government officials of both countries to inform them of the significance of this work in Russia and Ukraine, and to provide them with a series of policy recommendations which can be of use in formulating programs to cooperate with the Russian and Ukrainian governments towards the revitalization of their energy industries.

In the proposal submitted for AID support in January 1993 the work program included:

- ▶ Formation of a quadripartite Steering Committee and Advisory Group.
- ▶ Completion of background papers: twenty-eight have been prepared and circulated.
- ▶ Preparation of a book: this is to be done in the first half of 1994.
- ▶ Holding of briefings in the United States, Japan, Russia and Ukraine: the briefings in Japan and the US have been successfully completed; the briefings in Russia and Ukraine have been postponed until March 1994 because of political developments in Russia in the fall of 1993.
- ▶ Evaluation of recommendations: this is to be done in the fall of 1994.

Because of the success of this project and its timeliness as significant input in particular to the current Russian efforts on development of market-oriented energy policies and technology cooperation among the United States, Japan and other OECD countries and World Bank efforts to revitalize the energy industry of both Russia and Ukraine, the Working Group believes it would be timely to do additional in-depth work on prices, capital formation, and foreign investment during 1994.

## ADDITIONAL TASKS TO BE ACCOMPLISHED — JANUARY TO OCTOBER 1994

- Establishment of a US-Russian-Ukrainian-Japanese drafting group of twelve members, to focus on pricing, capital formation and foreign investment in Russia and to a lesser extent in Ukraine.
- Preparation of three major (background) papers on the following subjects:
  - Energy prices and taxation
  - Main ideas to guide the formation of investment legislation and institutions
  - Resources needed to finance energy development and sources of financing.
- Preparation of an overview (policy) paper on prices, taxes, capital formation and sources of finance, based on the above.
- Meeting in June 1994 of the Working Group to discuss above papers; this will include representatives from the United States, Japan, Russia and Ukraine.
- Completion of all papers on pricing/investment (September 1994).
- Publication of papers including recommendations to implement policies in these areas (October 1994).
- Briefings on these recommendations in Moscow, Kiev, Tokyo and Washington, DC (November-December 1994).

## SCHEDULE OF WORK (JANUARY-DECEMBER 1994)

January 1994	Finalize outline of work through correspondence. Work with US-AID on funding.
March 21-22	Briefings in Moscow on policy paper [ <i>funding available</i> ].
March 23-25	First meeting of drafting group to discuss work on pricing, taxes, and investment (in Moscow).

*Note: Recommend holding Kiev briefing on policy paper June 6-7, following the June 2-3 meeting of overall Working Group (Steering Committee plus National Advisory Groups) to discuss drafts of background papers prepared by drafting group. Alternate approach is to hold Kiev briefing on March 28-29, following above meetings in Moscow.*

April → May      Draft background papers on policies on prices, taxes and investment for Russia and Ukraine.  
 Draft overall paper.  
 Circulate draft papers to Working Group for discussion at June 2-3 meeting.

*Note: If above schedule is too tight, defer Working Group meeting to late June/early July.*

June 2-3      Working Group meeting to discuss draft background papers and draft overview paper on prices/taxes/investment [*funding available*].

June 6-7      Briefings on overall policy paper in Kiev.

June → August      Redraft background papers and overview paper.  
 Researchers meet in Washington (August).

September      Finalize papers at meeting of Working Group Rapporteurs [*funding available*].

October      Print overview and background papers.

November →      Briefings in Moscow, Kiev, Tokyo and Washington [*funding available*]  
 December

## RESOURCES REQUIRED TO MEET OBJECTIVES

The Atlantic Council will cooperate with the Japanese and NIS institutions described below to prepare a policy paper and background papers on energy pricing, taxation, capital formation, and investment for Russia and Ukraine. This work will build on the current Atlantic Council project on "Basic Concepts for the Development of Energy Policies for Russia and Ukraine.

The overall budget for this project in 1994 is about \$380,000, of which \$244,473 is now available. The funds requested (\$135,527) will be used primarily to support research work in Russia and Ukraine, and associated travel.

A supplemental budget for the research work is *attached*.

## TIME PERIOD

The research work described is to begin in February (or March) 1994 if the project is to be completed by December 1994.

## GROUPS AND INDIVIDUALS INVOLVED

A Steering Committee of senior experts from the United States, Japan, Russia and Ukraine was formed in the fall of 1992. The institutions with which the Atlantic Council is cooperating are: the Committee for Energy Policy Promotion (Japan); The Institute of Energy Economics (Japan); the Energy Research Institute, Russian Academy of Sciences; and the Institute of Energy Saving Problems, Ukrainian Academy of Sciences.

A list of members is *attached*. John E. Gray, a Vice Chairman of the Atlantic Council, and Chairman of the Council's Energy Policy Committee, chairs the Steering Committee. Members have selected national advisory groups to draft background papers and advise the Steering Committee members for their countries. A list of background papers and their authors is *attached*.

Key respected Russian researchers on pricing and investment during the 1994 phase of the work will be:

1. Mansur H. Gazeev, doctor of economic sciences; director, Association for the Development of the Russian Energy Sector.
2. Dimitriy V. Shapot, doctoral candidate of economic sciences; chief of laboratory, Energy Research Institute, Russian Academy of Sciences.
3. Natalya A. Volynskaya, doctoral candidate of economic sciences; director of Research Center, Association for the Development of the Russian Energy Sector.

The principal rapporteur for the project is Dr. Donald L. Guertin, Director and Senior Research Fellow of the Atlantic Council. He cooperates with Japanese, Russian and Ukrainian rapporteurs. The project coordinator is Mrs. Eliane Lomax, Associate Director, Energy and Environment Program, Atlantic Council.

## EVALUATION

In late 1994, one year after the publication of the policy paper, the Steering Committee will meet in Moscow to revisit the recommendations, evaluate progress, and, as appropriate, recommend additional policy action.

In preparing for this meeting, staff will:

1. Survey key policy officials in the United States, Japan, and the NIS who were briefed on policy recommendations to obtain their views on impact and possible future action.
2. Survey Steering Committee members and advisors in the same manner.
3. Draft a paper summarizing the findings of the surveys and recommending additional policy action, if appropriate.

## FINANCING PLAN

We are requesting that AID provide a supplementary grant of \$135,527 of the \$380,000 total project costs in 1994. The requested AID funds would be used to cover primarily Russian and Ukrainian research, together with associated travel, as shown on the attached budget. The outstanding 1994 portion of the AID existing grant is approximately \$80,000. The U.S.-Japan Foundation grant for the period November 93→October 94 is \$164,538.

## RATIONALE FOR PROJECTED ACTIVITIES

The Atlantic Council Working Group on NIS energy policy completed in the fall of 1993 a paper presenting a comprehensive set of energy policies for Russia and Ukraine in November 1993. Briefings on this paper have been held in Tokyo (October 21-22, 1993) and Washington (December 1-3, 1993). The paper is being widely distributed to policy makers.

Briefings in Moscow and Kiev originally scheduled for November 1993 have now been rescheduled for the spring of 1994, taking account of elections in Russia and Ukraine.

Through Dr. Alexei A. Makarov, a key member of the Atlantic Council Working Group, the paper has provided important input to current Russian national efforts to formulate comprehensive energy policies. Dr. Makarov is a member of the Executive Committee of the Russian Commission for Energy Strategy Development chaired by Energy Minister Shafranik. Dr. Makarov is also the key person responsible for staffing the Commission. The Commission plans on completing its work by the end of 1995.

The additional proposed work on energy pricing, taxation, capital formation and investment will provide useful input to further Russian work on these subjects. Ukrainian participation will provide valuable background for work in Ukraine on these same policy issues.

## USE OF EXPECTED RESULTS

The work resulting from this additional research will provide important input to:

1. Russian energy policy work now underway, as noted above.
2. Ukrainian energy policy work following Ukrainian elections.
3. US, Japanese, and other OECD governmental and private sector efforts.

## ASSUMPTIONS ADDRESSED

Experience in the past year in Russian, Ukrainian, Japanese and US cooperative efforts have demonstrated the benefits of this work in increased understanding of energy policies and implications of these policies for the economies and social structures of Russia and Ukraine. Work to date has proven timely and the future work on pricing/investment is being undertaken as critically needed input on these issues.

**Additional 1994 Budget Requirements  
for added in-depth research**

<b>1. Atlantic Council Labor</b>			
Senior staff time:			
Consultant, 30 days @ \$400	12,000		
Employee, 20 days @ \$180	3,600		
Support staff time:			
Employee, 20 days @ \$97	1,940		
Subtotal labor			17,540
<b>2. Research in Russia and Ukraine</b>			
Russia, 10.5 man-months @ \$3,000	31,500		
Ukraine, 3 man-months @ \$3,000	9,000		
Subtotal research			40,500
<b>3. Meetings and Travel*</b>			
<i>Meeting of Drafting Group, Moscow, March 1994</i>			
4 US to Moscow @ \$1,400	5,600**		
3 Kiev to Moscow @ \$200	600		
Hotel, 7 p. x 5 days @ \$195	6,825		
Perdiem, 7 p. x 5 days @ \$75	2,625		
Ground transport, 4 p. x \$80	320		
Subtotal Moscow mtg			15,970
<i>Meeting of Drafting Groups, Washington, August 94</i>			
3 Moscow to WDC @ \$3,500	10,500		
3 Kiev to WDC @ \$3,500	10,500		
4 US to WDC @ \$600	2,400		
Hotel, 10 p. x 5 days @ \$110	5,500		
Perdiem, 10 p. x 5 days @ \$38	1,900		
Ground transport, 10 p. x \$80	800		
Subtotal Washington mtg			31,600
<i>Additional Participants in June Working Group meeting in Moscow</i>			
3 Kiev to Moscow @ \$200	600		
Hotel, 3 p. x 4 days @ \$195	2,340		
Perdiem, 3 p. x 4 days @ \$75	900		
Subtotal additions to Moscow mtg			3,840
<b>4. Documents</b>			
Overview Policy Paper + 6 Papers:			
MS preparation	2,000		
Reproduction	1,000		
Publication	6,000		
Distribution	2,000		
Subtotal documents			11,000
<b>5. Other Direct Costs</b>			
Office supplies	500		
Telecommunications	1,000		
Postage, UPS, etc.	2,000		
Subtotal ODC			3,500
<b>6. Fringe and overhead</b>			
85% of employee labor	4,710		
33% of consultant labor	3,960		
<b>SUBTOTAL ADDITIONAL COSTS</b>			132,620
Government audit @ 2% of total	2,652		
<b>TOTAL</b>			135,272

\* US and NIS members only; Japanese members will not participate in meetings associated with this research work.

\*\* Half of travel expenses.

**Oil Futures and Energy Commodities Markets Training and Development or NYMEX Program completed in August 21, 1993.**

- \* Conducted all needs assessments, course promotion, selection, interviewing, and logistical arrangements in Russia in conformance with Handbook 10 specification.

Interviews of more than 120 candidates were conducted over two weeks.

- \* Designed, customized 5-week course in United States on Energy Futures and World Oil Market Pricing and 2-week in-country course on Economics of the Firm.
- \* Trained 85 Russian participants over two weeks in Moscow (selected class of 85 out of 120 applicants.)
- \* Trained 25 participants during 5-week period: in New York (at NYMEX) and Washington ( plus 2 at own expense.)
- \* Wrote two 300-page manuals and translated both of them into Russian.

**Lessons Learned from Past Experience:**

- \* Costs in NIS are higher than have been assumed in past budgeting.
- \* Scarcity of appropriate participants for training with adequate English skills makes it necessary to utilize simultaneous translation.
- \* Russian translation and interpretation costs are increasingly high in the United States and the availability of technically competent translators/interpreters is hard to come by and very costly.
- \* Well-translated training manuals and other materials are essential to a successful training program.
- \* Training has to be challenging and at a high level to satisfy Russians.
- \* It is obvious that this training is well-regarded by Russians and they are willing to work hard to equip themselves to deal in private sector energy industry.

**Lessons . . . cont'd**

- \* Performance in training is highly sensitive to palpable incentives.
- \* Essential to develop administrative mechanisms to facilitate training.
- \* Necessary to develop linkages with appropriate organizations, avoiding involvement with jealousies among local organizations.

# **NIS ENERGY TRAINING DEVELOPMENT**

**INSTITUTE OF INTERNATIONAL EDUCATION WILL:**

- **CONDUCT TRAINING NEEDS ASSESSMENTS**
- **DESIGN, PRESENT AND ADMINISTER SPECIALIZED ENERGY TRAINING COURSES**
  - ▶ **IN ALL ENERGY SUBSECTORS**
  - ▶ **IN RUSSIA, UKRAINE, KAZAKHASTAN**

**IIE**

# **NIS ENERGY TRAINING DEVELOPMENT**

**COURSES WILL FOCUS ON:**

- **COMMERCIAL AND MANAGERIAL TECHNIQUES USED BY FOR-PROFIT ENERGY COMPANIES**
- **MODERN TECHNOLOGIES AND EFFICIENT OPERATIONS**
- **FINANCE AND ECONOMICS PECULIAR TO ENERGY SECTORS**
- **MARKETS, MARKET PRICING, AND MARKETING**
- **ENERGY SECTOR REGULATIONS**

**IIE**

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## **NIS ENERGY TRAINING DEVELOPMENT**

### **IIE HAS 13 YEARS ENERGY TRAINING EXPERIENCE:**

- ETP CONTRACT WITH AID OFFICE OF  
ENERGY**
- MORE THAN 2000 TRAINEES**
- FROM MORE THAN 65 COUNTRIES**

IIE

## **NIS ENERGY TRAINING DEVELOPMENT**

### **IIE HAS LAUNCHED ITS RUSSIA PROGRAM**

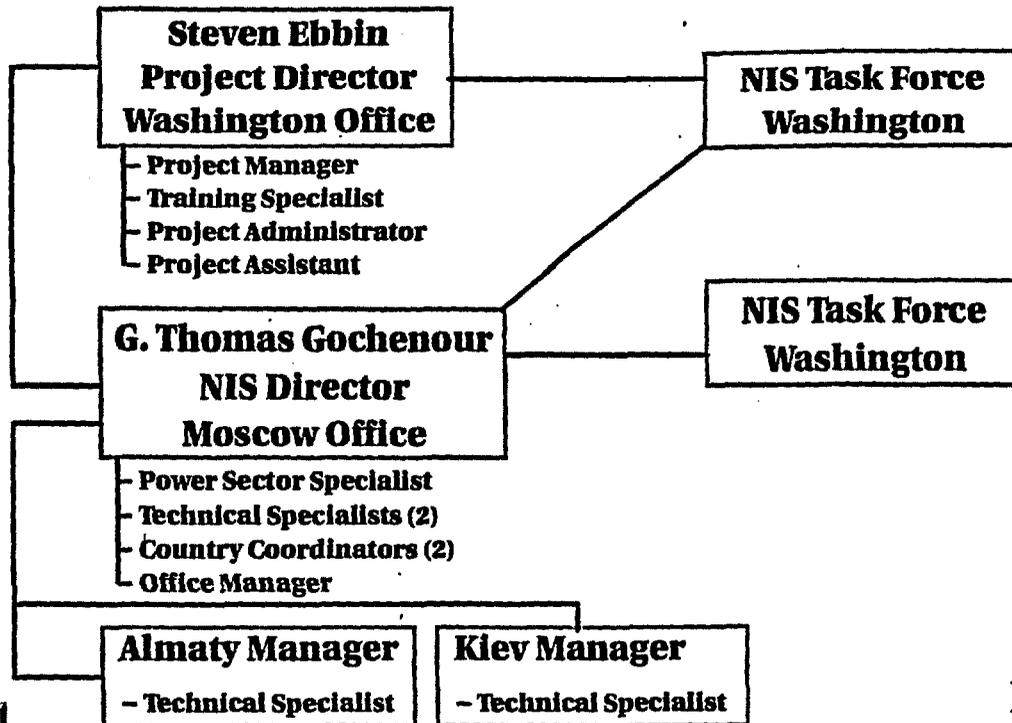
- TRAINING COURSE IN THE WORKS FOR  
RAO EES ROSSII**
- RESIDENT MANAGER IN MOSCOW**

**UKRAINE PROGRAM WILL BE  
LAUNCHED IN FEBRUARY.**

IIE

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# NIS PROJECT ORGANIZATION



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# USEA ENERGY INDUSTRY PARTNERSHIP PROGRAMS -- ESTABLISHED PARTNERSHIPS

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## Armenia

Ministry of Energy and Fuel - City of Anaheim Public Utilities

## Kazakhstan

Kazakhstanergo - Cincinnatti Gas and Electric

AlauGAZ - Cincinnatti Gas and Electric

USEA

## Kyrgyzstan

State Energy Company - National Hydropower Association

- Idaho power
- Washington Water Power

## Russia

RAO EES Rossi - Edison Electric Institute

GAZPROM - American Gas Association

ROSGAZ - American Gas Association

## Ukraine

Kievenergo - Pennsylvania Power and Light

# USEA ENERGY INDUSTRY PARTNERSHIP PROGRAMS --

## LESSONS LEARNED

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- Requirement for capital expenditures to rehabilitate and improve energy production, transmission and distribution systems surpass the ability of donors and NIS governments to finance.
- Private Sector financing will be required.
- Policy infrastructure is not established to facilitate private investment.
- This situation is imposed on NIS Energy Managers with no experience in general business administration.
- Moreover, senior management perceives little vested interest in reform.
- Mid-level management shows keen interest in increasing exposure to/understanding of market economics and business principles.

**USAID/NIS ENERGY SECTOR  
REVIEW WORKSHOP**

**NUCLEAR SAFETY INITIATIVE**

**DEPARTMENT OF ENERGY  
JANUARY 9, 1994**

DOE

**NUCLEAR SAFETY INITIATIVE**

**OBJECTIVE**

**TO SIGNIFICANTLY REDUCE THE RISK FROM OPERATION OF THE OLDER, LEAST SAFE PLANTS UNTIL ECONOMIC CONDITIONS ALLOW THEM TO BE SHUTDOWN OR UNTIL ALTERNATE SOURCES OF POWER CAN BE PROVIDED.**

**PROGRAM ELEMENTS**

- o **OPERATIONAL SAFETY**
- o **TRAINING CENTERS**
- o **RISK REDUCTION MEASURES**
- o **FIRE SAFETY**

*bl*

## NUCLEAR SAFETY INITIATIVE

### OPERATIONAL SAFETY

- o THE PURPOSE OF THE OPERATIONAL SAFETY ELEMENT OF THE PROGRAM IS TO DEVELOP WESTERN-STYLE EMERGENCY OPERATING PROCEDURES FOR SOVIET-DESIGNED REACTORS
- o SYMPTOM-BASED EMERGENCY OPERATION INSTRUCTIONS (SBEI's) HAVE BEEN DEVELOPED OVER THE LAST THREE YEARS UNDER AN EARLIER DOE-USSR PROGRAM FOR THE VVER 440-230 DESIGNS. THEY ARE BEING IMPLEMENTED AT NOVovoronezh UNITS 3 AND 4 THIS SPRING
- o THESE VVER440-230 SBEI's ARE PROVIDING THE FOUNDATION FOR OTHER SOVIET-DESIGNS

<u>REACTOR TYPE</u>	<u>RUSSIAN TARGET NPP</u>	<u>UKRAINIAN TARGET NPP</u>
VVER 440-213	KOLA	ROVNO
VVER 1000	BALAKOVO	ZAPOROZHYE
RBMK	SMOLENSK	(CHERNOBYL)

- o 34 EXPERT WORKING GROUPS ESTABLISHED WITH AMERICAN, RUSSIAN AND UKRAINIAN CO-CHAIRS
- o INPO AND 7 US UTILITIES INVOLVED. THE US SIDE PROVIDES TECH TRANSFER ON WHAT WAS DONE IN THE US. THE SBEI's ARE DEVELOPED BY RUSSIA AND UKRAINE THEMSELVES
- o SBEI DEVELOPMENT PROCESS INVOLVES PREPARATION OF:
  - TECHNICAL BASIS DOCUMENTS
  - MORE THAN 40 SPECIFIC SETS OF INSTRUCTIONS
  - VERIFICATION AND VALIDATION OF SBEI's
  - TRAINING OF TRAINERS AND THEN OPERATORS
  - REGULATORY APPROVAL
- o WORK IS UNDERWAY AT EACH BASE PLANT AND IMPLEMENTATION IS SCHEDULED FOR 1995

## NUCLEAR SAFETY INITIATIVE TRAINING CENTERS

- o PURPOSE IS TO ASSIST IN THE DEVELOPMENT OF TWO TRAINING CENTERS. IN RUSSIA, AT THE BALAKOVO NPP. IN UKRAINE, AT THE KHMELNITSKY NPP
- o OBJECTIVE:
  - TO TEACH EACH COUNTRY THE SYSTEMATIC APPROACH TO TRAINING (SAT) BASED ON US EXPERIENCE
  - TO HELP THEM DEVELOP THE 12 STANDARD TRAINING PROGRAMS AS PRESCRIBED BY INPO
- o PROVIDE EACH CENTER WITH SUFFICIENT EQUIPMENT TO RUN A TRAINING CENTER
  - BASIC TRAINING EQUIPMENT
  - EQUIPMENT FOR SPECIFIC COURSES
- o COURSE ON SIMULATOR MAINTENANCE COMPLETED; WILL BE GIVEN IN FEBRUARY
- o COURSES FOR INSTRUMENTATION & CONTROL TECHNICIANS, REACTOR OPERATORS, TURBINE OPERATORS, AND MECHANICAL MAINTENANCE PERSONNEL ARE UNDERWAY
- o REMAINING COURSES WILL BEGIN ON A 3 TO 5 MONTH FREQUENCY AND WILL HAVE AN AVERAGE DURATION FOR COMPLETION OF 10 MONTHS
- o COURSES ARE ULTIMATELY BEING PREPARED BY RECIPIENT COUNTRIES WITH US ASSISTANCE RATHER THAN PRESENTING THEM WITH A COMPLETED COURSE
- o PACE OF PROGRAM IS MORE DEPENDENT ON RECIPIENT COUNTRIES ABILITY TO ABSORB AND PREPARE INFORMATION THAN THE ABILITY OF THE US SIDE TO DELIVER MATERIAL

### NUCLEAR SAFETY INITIATIVE SIMULATOR FOR UKRAINE

- o THE TRAINING CENTER PROGRAM INCLUDES THE SUPPLY OF A FULL-SCOPE, STATE-OF-THE-ART SIMULATOR FOR THE KHMELINTSKY NPP IN UKRAINE
- o A SPECIFICATION FOR THE SIMULATOR HAS BEEN DEVELOPED BETWEEN US AND UKRAINIAN AUTHORITIES. A REQUEST FOR PROPOSALS WAS ISSUED IN SEPTEMBER AND RESPONDED TO AT THE END OF NOVEMBER
- o EVALUATION OF PROPOSALS INCLUDING UKRAINIAN PARTICIPATION IS UNDERWAY
- o THE PROJECTED SCHEDULE FOR MANUFACTURING OF SIMULATOR IS SEPTEMBER, 1995 WITH SHIPMENT, INSTALLATION, AND CHECKOUT OF SIMULATOR AT KHMELNITSKY TO BE COMPLETED BY DECEMBER 1995

### NUCLEAR SAFETY INITIATIVE RISK REDUCTION MEASURES

- o THE PURPOSE OF THIS PROGRAM ELEMENT IS TO TAKE INTERIM MEASURES ON THE WORST PLANTS (RMBK AND VVER 440-230) TO SIGNIFICANTLY REDUCE THE RISK FROM OPERATION
- o BASIS FOR PROJECTS: FUNDAMENTAL DESIGN DEFICIENCIES ARE WELL KNOWN BASED ON US AND WESTERN ANALYSES BEGINNING WITH THE CHERNOBYL ACCIDENT
- o TWO WORKING GROUPS MADE UP OF RUSSIAN AND US EXPERTS HAVE BEEN ESTABLISHED, 19 PROJECTS HAVE BEEN DEFINED, AND WORK HAS BEEN INITIATED
- o US FIRMS WILL DO PRELIMINARY DESIGN WORK AND PURCHASE EQUIPMENT. RUSSIA NPPs (AND DESIGN INSTITUTES) WILL DO FINAL DESIGN AND INSTALLATION

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## RISK REDUCTION MEASURES

VVER 440- 230

PROJECTS	PLANT	COMPLETION DATE
DC Power Supply	KOLA #2	Oct. 1994
Safety Panel	Novovoronezh	Oct. 1995
Emergency Water Supply	Novovoronezh	Dec. 1995
Imp. Confinement Leaktightness	KOLA #2	Oct. 1994
Confinement Isolation Valves	KOLA #2	Oct. 1994
Post Accident Confinement Vent.	Novovoronezh	Sept. 1994
Leak Instrumentation	KOLA NPPs	June 1994
Post Accident Radiation Monitors	KOLA #2	Jan. 1994

## RISK REDUCTION MEASURES

RBMK

PROJECT	PLANT	COMPLETION DATE
Seismic Panels- DC Power Supply	KURSK #1	June 1995
Safety Panels	KURSK #1 or #2	Summer 1995
New PPS Trip- Pressure Drop	KURSK #1	June 1995
New PPS Trip- GDH Low Flow	KURSK #1	June 1995
Ultrasonic Test Equipment	KURSK NPPs	Summer 1994
High Temperature Suits	KURSK NPPs	January 1994
ECCS Fast Acting Valves	KURSK #1	June 1995
Improved Confinement Leaktightness	KURSK #3 or #4	spring 1995
Leak Instrumentation	KURSK NPPs	Summer 1994
Confinement Isolation Valves	KURSK #3 or #4	March 1995
Emergency Water Supply	KURSK #1 or #2	June 1995

## NUCLEAR SAFETY INITIATIVE

### FIRE SAFETY

- o THE PURPOSE OF THIS PROGRAM ELEMENT IS TO REDUCE THE FIRE RISK AT NPPs
- o TARGET PLANTS FOR THIS ACTIVITY ARE THE SMOLENSK NPP IN RUSSIA AND THE ZAPOROZHYE NPP IN UKRAINE
- o PLANT WALK DOWNS AND A FIRE HAZARDS ANALYSIS HAVE BEEN COMPLETED AND AGREEMENT REACHED ON IMPROVEMENTS
- o MAJOR AREAS OF FIRE SAFETY IMPROVEMENTS:
  - FIRE DETECTION E.G. SMOKE DETECTORS
  - FIRE SUPPRESSION E.G. NEW SPRINKLER HEADS
  - FIRE DOORS
  - ADJUSTABLE WATER CANNON NOZZLES
  - FIRE FIGHTING PROTECTIVE GEAR
  - COMMUNICATIONS EQUIPMENT
  - REPLACEMENT OF FLAMMABLE MATERIALS WITH FIRE RETARDANT MATERIALS

DOE

## NUCLEAR SAFETY INITIATIVE

### ISSUES/LESSONS/OBSERVATIONS

- o LIABILITY
- o NPP INVOLVEMENT
- o COMMUNICATION BETWEEN INVOLVED PARTIES WITHIN THE COUNTRY
- o ABILITY OF RECIPIENT COUNTRY TO PARTICIPATE - DUE TO FUNDING PROBLEMS FOR THEIR PEOPLE OR LACK OF APPROPRIATE PERSONNEL IN SOME CASES
- o ROBBERY ON TRAINS

# NRC'S AID-SUPPORTED NUCLEAR REGULATORY ASSISTANCE PROGRAMS FOR NIS



## USAID/NIS ENERGY SECTOR REVIEW WORKSHOP JANUARY 9-12, 1994

### NUCLEAR REGULATORY ASSISTANCE PROGRAMS FOR NIS INTRODUCTION

- DISCUSSIONS WITH SOVIET UNION BEGAN IN LATE 1970'S, BUT WERE DISCONTINUED DUE TO SOVIET INVASION OF AFGHANISTAN
- DISCUSSIONS RESUMED IN LATE 1984, CULMINATING IN FEBRUARY 1986 WITH INITIATIVES (UNDER AUSPICES OF PEACEFUL USES AGREEMENT) COVERING FUSION, BREEDER REACTORS, AND HIGH ENERGY PHYSICS.
- FOLLOWING CHERNOBYL ACCIDENT (APRIL 1986), CIVILIAN NUCLEAR REACTOR SAFETY INITIATIVE (ALSO UNDER PEACEFUL USES USES) WAS LAUNCHED, RESULTING IN CREATION OF JOINT COORDINATING COMMITTEE FOR CIVILIAN NUCLEAR REACTOR SAFETY (JCCCNRS) ON APRIL 26, 1988.
- INITIAL FOCUS OF JCCCNRS WAS ON TECHNICAL COOPERATION, IMPLEMENTED THROUGH TOPIC-SPECIFIC WORKING GROUPS.
- JCCCNRS WAS RESTRUCTURED IN JULY 1992, REFLECTING PRINCIPLES OF LISBON INITIATIVE (MAY 1992) AND DISSOLUTION OF SOVIET UNION.
- JCCCNRS ACTIVITIES CURRENTLY INCLUDE AID-FUNDED DIRECT REGULATORY ASSISTANCE FOR GAN OF RUSSIA (6 EXISTING PRIORITIES) AND SCNRS OF UKRAINE (14 EXISTING PRIORITIES), MC&A-RELATED ASSISTANCE, AND 4 REMAINING TOPIC-SPECIFIC WORKING GROUPS.

## EXISTING AID-SUPPORTED PRIORITIES FOR GAN OF RUSSIA

- LICENSING BASIS AND SAFETY ANALYSES
- INSPECTION PROGRAM ACTIVITIES
- CREATION OF AN INCIDENT RESPONSE CENTER
- ANALYTICAL SUPPORT ACTIVITIES
- ESTABLISHMENT OF REGULATORY TRAINING PROGRAM
- FIRE PROTECTION SUPPORT

NRC

## EXISTING AID-SUPPORTED PRIORITIES FOR SCNRS OF UKRAINE

- GENERAL PROGRAM ON THE DEVELOPMENT OF THE SCNRS
- TRAINING CENTER FOR NPP AND REGULATORY PERSONNEL AND DEVELOPMENT OF CORRESPONDING TRAINING PROGRAM
- LICENSING AND SAFETY ANALYSIS OF NPP
- PROGRAMS FOR DEVELOPMENT OF A SYSTEM FOR SAFETY ANALYSIS
- JOINT INSPECTION OF UKRAINIAN NPP FOR ASSESSMENT AND DEVELOPMENT OF INSPECTION PROCEDURES
- DEVELOPMENT OF UKRAINIAN NPP INSPECTION ACTIVITIES BASED ON RESULTS OF JOINT INSPECTIONS
- PROGRAM ON ENFORCEMENT REGULATIONS
- PROGRAM ON WASTE, SPENT FUEL AND NUCLEAR MATERIALS MANAGEMENT

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## EXISTING AID-SUPPORTED PRIORITIES FOR SCNRS OF UKRAINE (CONTINUED)

- FIRE PROTECTION REGULATIONS
- CREATION OF AN EMERGENCY RESPONSE FACILITY
- CREATION OF AN INCIDENT REPORTING SYSTEM
- PROGRAM ON CREATION OF A LEGAL FRAMEWORK
- PROGRAM FOR THE DEVELOPMENT OF RESEARCH SUPPORT FOR REGULATORY ACTIVITIES
- REGULATING RADIOACTIVE SOURCES UTILIZED IN INDUSTRY AND MEDICINE
- CREATION OF A COMPETENT ORGAN OF THE UKRAINE AND OF REGULATIONS GOVERNING THE TRANSPORTATION OF RADIOACTIVE MATERIALS

NRC

## ACCOMPLISHMENTS HIGHLIGHTS

- PILOT INCIDENT RESPONSE SYSTEM INSTALLED
- RISK WORK STATIONS TO PERFORM COMPUTER CODE SAFETY ANALYSES HAVE BEEN DELIVERED
- COMPLETED EMERGENCY OPERATING PROCEDURE REVIEW TRAINING
- RADIOACTIVE WASTE SURVEY IN PROGRESS
- TECHNICAL AND INSPECTION TRAINING YIELDING TANGIBLE RESULTS
- OVER 1300 PERSON-DAYS OF INSPECTION OR TECHNICAL TRAINING PROVIDED BY NRC

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## OBSERVATIONS

- JOINT PROGRAM - FULLY SUPPORTED
- PROFESSIONAL WORKING LEVEL RAPPORT ESTABLISHED
- NUMBER OF VARIABLES INFLUENCE PROJECT SCHEDULE AND POTENTIAL OVERALL SUCCESS
- TRAINING GENERATES ADDITIONAL REQUIREMENTS AND NEEDS
- ORGANIZATIONAL EXPANSION MAY BE NEEDED TO ACCOMODATE INCREASED RESPONSIBILITIES AS NUCLEAR SAFETY EXPERTISE IS ENHANCED
- COORDINATION AT EXPERT/IMPLEMENTATION ENGINEER LEVEL

# SECTION IV

## Tuesday, January 11th

### Session I - Russia

- A. Efficiency Improvement RCG/Hagler Bailly  
(Please refer to January 10th, Session I-A)
- B. Oil and Gas United States Geological Survey (USGS)  
(Please refer to January 10th, Session I-A)  
United States Energy Association (USEA)  
(Please refer to January 10th, Session I-A)  
Bechtel  
(Please refer to January 10th, Session I-B)
- C. Electricity United States Energy Association (USEA)
- D. Coal
- E. Strategy Charles Moseley (IDEA-NIS)

### Session II A - Central Asian Republics

- A. Energy Efficiency United States Energy Association (USEA)  
IRG
- B. Oil and Gas John Brown
- C. Electricity Harza Engineering
- D. Coal
- E. Institutional Reform Rolf Manfred (IDEA-NIS)

### Session II B - NIS West

- A. Introduction Darian Diachok (IDEA-NIS)
- B. Energy Efficiency Resource Management Associates (RMA)
- C. Petroleum John Brown
- D. Electricity United States Energy Association (USEA)
- E. Coal

**USGS**

(Please refer to Section II  
Session I-A)

**RCG/Hagler Bailly**

(Please refer to Section II  
Session I-A)

**USEA**

(Please refer to Section II  
Session I-A)

**Bechtel**

(Please refer to Section II  
Session I-B)

**FIRST ANNUAL USAID/NIS ENERGY SECTOR  
REVIEW WORKSHOP**

JANUARY 10 -12, 1994

**UNITED STATES ENERGY ASSOCIATION  
ENERGY INDUSTRY PARTNERSHIP PROGRAM**

**RUSSIA  
WILLIAM L. POLEN, PROGRAM MANAGER**

**USEA ENERGY INDUSTRY PARTNERSHIP PROGRAM  
IMPLEMENTATION**

1. Identify NIS energy companies with desire/need for information on technology applications and management practices in market economics.
2. Develop a company/country profile of the prospective NIS partner.
3. Conduct an informal solicitation of U.S. energy sector to identify a U.S. partner.
4. Match U.S./NIS companies according to technical and other characteristics of the companies.
5. Sponsor an initial exchange visit between the U.S./NIS partners and sign cooperation agreements.
6. Develop annual workplans of exchange visits, seminars, internships, and study tours.
7. Facilitate implementation of workplan activities.

## **RUSSIA ELECTRIC POWER CRITICAL ISSUES**

- Presidential Decrees establish RAO EES ROSSI and call for electric utility industry privatization.
- 71 vertically integrated regional utilities have been established.
- Industry structure remains unclear- how will regional utilities relate to RAO? What will be the role of the central transmission system? What level of retail access and competition, if any, will be permissible?
- Regulatory structure for pricing, licensing, property rights, private investment is lacking.
- These problems are imposed on RAO and regional utility managers with no experience in the general administration of utilities in a market economy -- technology applications, pricing, contracting, human resource development, finance.

## **RUSSIA ELECTRIC POWER SECTOR STRATEGY**

- Continue working with RAO EES ROSSI on industry restructuring issues in cooperation with the Edison Electric Institute.
- Establish partnerships between U.S. and Russian regional electric utilities to provide counsel on industry restructuring and general utility management.
- Conduct study tours to increase awareness of environmentally sound electric power generation options and non-generating options such as energy efficiency and DSM.

**RUSSIAN ELECTRIC POWER SECTOR ACTIVITIES****FY 1993**

- RAO EES ROSSI/Edison Electric Institute exchange visits- April, June, and November
- International Power Forum - April
- Clean Coal Study Tour - September

**RUSSIA ELECTRIC POWER SECTOR ACTIVITIES****FY 1994**

- Combined Cycle Study Tour - November
- Combined Cycle Study Tour, February 94
- RAO EES ROSSI/Edison Electric Institute exchange visits to be scheduled with RCG/Hagler, Bailly Technical Assistance, March-June 94
- Establish three utility partnerships with regional utilities possibly including MOSENERGO, LENENERGO, KHABOVSKENERGO, April 94

## **RUSSIA NATURAL GAS CRITICAL ISSUES**

- Natural gas production beginning to decline
- Substantial investments required to rehabilitate existing pipeline and distribution systems and develop new pipeline and distribution capacity
- GAZPROM and ROSGAZ management are unfamiliar with project finance and are not structured to attract international investment
- General lack of understanding of business administration in regional pipelines and distribution companies -- long-term gas contracts, marketing, pricing and transportation tariffs, etc.
- Seeks access to new drilling technologies cooperation in deep sea and arctic drilling technologies

## **RUSSIAN ENERGY INDUSTRY PARTNERSHIP PROGRAM RUSSIA NATURAL GAS STRATEGY**

- Continue existing partnerships between American Gas Association and GAZPROM and American Gas Association and ROSGAZ.
- Establish new company-to-company partnerships between U.S. companies and GAZPROM subsidiaries and regional distribution companies.
- Involve drilling service industry and equipment suppliers through technology study tours.

## RUSSIA NATURAL GAS SECTOR ACTIVITIES

### FY 1993

- AGA Annual Meeting and Study Tour October 93
- Natural Gas in a Market Economy November 93
- Initial Partnership Exchange July 93

### FY 1994

- Internship & Personnel Exchange March 94
- Project Development Seminar April 94
- Seminar on Gas Production (GAZPROM) June 94
- Scale Systems Workshop (ROSGAZ) August 94

## USEA ENERGY INDUSTRY PARTNERSHIP PROGRAM IMPLEMENTATION

1. Identify NIS energy companies with desire/need for information on technology applications and management practices in market economics.
2. Develop a company/country profile of the prospective NIS partner.
3. Conduct an informal solicitation of U.S. energy sector to identify a U.S. partner.
4. Match U.S./NIS companies according to technical and other characteristics of the companies.
5. Sponsor an initial exchange visit between the U.S./NIS partners and sign cooperation agreements.
6. Develop annual workplans of exchange visits, seminars, internships, and study tours.
7. Facilitate implementation of workplan activities.

Attachment to Rishoi to Moseley  
Letter of December 10, 1993

### RESPONSIBILITIES AND FUNCTIONS OF IDEA/MOSCOW

- A. International Development and Energy Associates, Inc. (IDEA, Inc. has been contracted by USAID to support the technical management of USAID funded energy and environmental activities in the NIS. A listing of present activities in Russia is provided in Attachment A.
- B. The contract which was awarded on August 3, 1993, requires IDEA, Inc. to establish small offices in Washington, Moscow, Kiev, Almaty and Yerevan. The division of responsibilities between IDEA, Inc.'s Washington office and four field offices reflects the division of responsibilities within USAID. Details of that division are provided in Attachment B. The office in Moscow (IDEA/Moscow) which was established in October, 1993 supports and operates under the technical and policy direction of USAID/Moscow's Regional Office of Energy and Technology (RET).
- C. Based on Article C.2 (b) of the contract and within the constraints of its authorized staffing level, the responsibilities and functions of IDEA/Moscow are as follows:
1. Assist in the monitoring of USAID funded Energy Program activities being implemented by contractors, grantees, and recipients (hereafter called "performing entities") under AID contracts, grants cooperative agreements, etc., (hereafter called "agreements") for purposes of determining and reporting upon progress, quality of work, compliance with performance objectives and timeframes as stated in the AID agreement, accomplishment of program objectives, and such other purposes as may be specified by RET or observed as noteworthy by the IDEA/Moscow.
  2. <sup>RET</sup> Help clarify and/or resolve technical concerns raised by ~~RET~~, the performing entities, and host country counterparts working in the NIS and in the U.S.
  3. Identify and analyze technical issues that arise during the course of performance under an AID agreement with performing entities, that are specifically identified by RET for consideration, or that are identified by the IDEA/Moscow and accepted by RET as noteworthy.
  4. Develop information memoranda in such technical areas as may, from time to time, be specified by RET.
  5. Provide analysis and technical advice in all of the sectors with which RET is concerned, e.g., oil, gas, coal, nuclear energy, environment, etc., as assigned by RET.

6. For the purposes of possibility linking USAID funded energy sector activities with those of other organizations and acquiring an understanding of on-going or planned activities similar to those of USAID, the contractor shall consult with the representatives, and access information, of other entities involved in Energy/Environment activities (e.g., Dept. of State, World Bank, International Energy Agency, European Economic Community, etc.).
  7. At the request of RET and in line with RET guidance, review and draft responses to correspondence, proposals, and such other items received from performing entities. Such draft responses shall, in all cases, be submitted to RET for review and disposition.
  8. In response to requests of RET, review a variety of Energy/Environmental activities proposed to be conducted in Russia and submit reports with supported recommendations concerning the efficacy, priority, and cost effectiveness of each activity.
  9. Propose, assist with preparations for and participate proactively in energy program meetings, seminars, conferences and field trips. At the request of USAID and/or U.S. implementing entities, serve as general coordinator and U.S. chairperson when such meetings involve more than one U.S. performing entity. Authority as organizer and/or Chairperson of such meetings shall be limited to that of a facilitator, source of general information, and proposer of courses of action. Each of the U.S. performing entities participating in such meetings shall be responsible to assure that any collective decisions made are consistent with the terms and conditions of their respective "agreement" with USAID".
  10. Draft performance statements for the conduct of activities identified by RET.
  11. Draft periodic work plans and reports as required by the Contract and special reports, as directed by RET, concerning on-going and prospective project activities, new interventions, technical reviews/analyses, etc.
  12. Provide expert advice to RET, USAID/Moscow and such others as requested by RET, on areas identified by RET.
  13. Provide support to other NIS Regional Offices as requested by them and approved by RET.
  14. Perform such other activities as may be identified by RET.
- D. CONFLICT OF INTEREST CLAUSE OF CONTRACT:

IDEA, Inc.'s contract has a Conflict of Interest clause which

is quoted as follows:

"As the contractor will have access to and will assist in the development of procurement information for NIS energy/ environmental activities, it is specifically understood and agreed that the contractor will not participate in any tender or bid for any of the on-going or new or prospectively new EET agreements if the contractor devoted any effort whatever under this contract to (such) agreements."

12/10/93

# U.S.- RUSSIA ENERGY PROGRAM

6. TO START AND FACILITATE COORDINATION WE HAVE PROVIDED SUMMARIES BELOW OF BOTH THE AREAS AND ACTIVITIES IDENTIFIED IN THE DOE-MFE AGREEMENT OF OCTOBER 2 (PARAGRAPH 7) AND KEY ACTIVITIES OF THE OVERALL USG ENERGY PROGRAM EXCEPT THOSE FUNDED THROUGH AGREEMENTS WITH DOE (PARAGRAPH 8). A VERY CURSORY REVIEW OF THE TWO SUMMARIES WILL YIELD NUMEROUS AREAS OF OVERLAP THAT REQUIRE CAREFUL, DETAILED, AND FREQUENT COORDINATION IN ORDER TO AVOID DUPLICATION AND WASTE. A MORE DETAILED DESCRIPTION OF THE OVERALL PROGRAM WILL BE AVAILABLE SHORTLY IN WASHINGTON THROUGH JAMES BEVER OF USAID'S OFFICE OF ENERGY, ENVIRONMENT AND TECHNOLOGY (TELEPHONES 736-4403 AND 736-4407).

7. SUMMARY OF DOE-MFE PROGRAM: THE SECRETARY AND MINISTER ESTABLISHED THREE JOINT WORKING GROUPS FOR THE PURPOSES OF DEVELOPING: (A) A COMMERCIAL AND LEGISLATIVE FRAMEWORK THAT WILL ENCOURAGE PRIVATE INVESTMENT IN THE ENERGY SECTOR; (B) OIL, GAS AND

COAL COOPERATION ON THE DEVELOPMENT OF ENVIRONMENTALLY ACCEPTABLE AND ECONOMIC USE OF FOSSIL FUELS AND TECHNOLOGIES; AND (C) ENERGY EFFICIENCY INITIATIVES PROMOTING GOVERNMENTAL AND PRIVATE SECTOR COOPERATION ON END-USE EFFICIENCY AND REDUCING ENERGY DEMAND. THE RECOMMENDATIONS OF THE WORKING GROUPS THAT WERE INCLUDED AS ATTACHMENTS IN THE RECORD OF MEETING SIGNED BY THE SECRETARY AND MINISTER ARE AS FOLLOWS:

ATTACHMENT 3; COMMERCIAL AND LEGISLATIVE FRAMEWORK DEVELOPMENT: IMMEDIATE ADOPTION OF AN OIL AND GAS LAW, THE DEVELOPMENT OF PROPOSED REGULATIONS TO IMPLEMENT THE OIL AND GAS LAW, THE DEVELOPMENT OF CORPORATE AND COMMERCIAL LAW BASED ON A CASE STUDY, THE DEVELOPMENT OF MODEL CONTRACTS AND PROCEDURES, THE ESTABLISHMENT OF UNIVERSITY-LEVEL TRAINING AND PROFESSIONAL EXCHANGES TO TRAIN RUSSIANS IN LEGISLATIVE AND ADMINISTRATIVE LAW PRINCIPLES AND CLOSER U.S. AND RUSSIA POSITIONS AT THE EUROPEAN ENERGY CHARTER CONFERENCE IN VIENNA.

ATTACHMENT 4; OIL, GAS, AND COAL DEVELOPMENT: THE PURSUIT OF ELEVEN PROJECTS TO ADVANCE THE FOSSIL ENERGY INTERESTS OF RUSSIA AND THE U.S. AND THEIR PRIVATE SECTORS (OIL AND GAS TECHNOLOGY CENTER; ADVANCED COAL-FIRED POWERPLANTS; OIL AND GAS TECHNOLOGY/INFORMATION EXCHANGE; OIL, GAS AND COAL PRODUCTION LOSSES, OIL TOOL MANUFACTURING, AMERICAN PETROLEUM INSTITUTE (API) CERTIFICATION; RETAIL GASOLINE DISTRIBUTION; JOINT VENTURE PROJECTS IN COAL MINING; CLEAN COAL TECHNOLOGY; OIL REFINING INDUSTRY DEVELOPMENT; AND TRAINING IN EFFECTIVE MANAGEMENT PRACTICES).

ATTACHMENT 5; ENERGY EFFICIENCY DEVELOPMENT: (ENERGY EFFICIENCY POLICY; LEGAL AND ECONOMIC INFRASTRUCTURE; DEVELOPMENT OF PROJECTS CONSISTENT WITH THE UNITED NATIONS ECE PROJECT "ENERGY EFFICIENCY 2000"; PROMOTION OF THE JOINT PRODUCTION AND TRADE OF ENERGY EFFICIENCY EQUIPMENT; DEVELOPMENT OF FINANCING MECHANISMS FOR ENERGY EFFICIENCY AND RENEWABLE ENERGY PROJECTS; SUPPORT OF RUSSIAN ENERGY EFFICIENCY FUND; AND TRAINING OF PERSONNEL.

8. SUMMARY OF ACTIVITIES OF THE OVERALL USG FUNDED ENERGY PROGRAM (EXCEPT THOSE FUNDED THROUGH USAID AGREEMENTS WITH DOE):

- ALREADY COMPLETED AND NEW ENERGY EFFICIENCY ACTIVITIES OF RCG/HAGLER BAILLY.

- ON-GOING DESIGN BY BECHTEL OF A \$1.2 BILLION FLARED GAS RECOVERY PROJECT BY BECHTEL ENGINEERING
- ON-GOING DESIGN BY BECHTEL OF A PILOT \$300 MILLION GAS DISTRIBUTION SYSTEM REHABILITATION PROJECT. THE PROJECT IS TO HAVE SUBSTANTIAL ENERGY EFFICIENCY IMPROVEMENT AND INSTITUTIONAL RESTRUCTURING COMPONENTS.
- ENERGY SECTOR (OIL, GAS, COAL AND ELECTRICITY) RESTRUCTURING, PRIVATIZATION, LEGAL AND REGULATORY REFORM, COMMERCIALIZATION, PRICING, INVESTMENT PLANNING, INVESTMENT PROMOTION AND OTHER NON-ENGINEERING TYPE ACTIVITIES OF THE WORLD BANK, RCG/HAGLER BAILLY, UNITED STATES ENERGY ASSOCIATION, AMERICAN GAS ASSOCIATION, AMERICAN PETROLEUM INSTITUTE AND OTHERS.
- FEASIBILITY AND OTHER TECHNICAL STUDIES IN SUCH AREAS AS OIL AND GAS PRODUCTION, PROCESSING, AND DISTRIBUTION; COAL MINING, BENEFICIATION AND USE; AND ELECTRIC POWER GENERATION, TRANSMISSION AND DISTRIBUTION AND USE. THE FIRST WORK THAT WILL GET UNDERWAY IN NOVEMBER WILL COVER THE UP-GRADING/REPLACEMENT OF AGING THERMAL POWER PLANTS, ELECTRIC ENERGY WHEELING, AND TRANSMISSION SYSTEM AND DISPATCH STRENGTHENING. IT IS EXPECTED SET THE STAGE FOR THE FAST TRACK DEVELOPMENT OF THE SEVEN-YEAR PLANS MENTIONED IN REF (C) TO UP-GRADE/REPLACE AGING THERMAL POWER PLANTS AND IMPROVE THE EFFICIENCY OF ELECTRICITY PRODUCTION, DISTRIBUTION AND END-USE.
- COAL SECTOR RESTRUCTURING INCLUDING MANAGEMENT AND SAFETY IMPROVEMENT WORK OF PARTNERS IN ECONOMIC REFORM AND THE WORLD BANK THAT INCLUDE THE RETRAINING OF WORKERS THAT WILL BE AFFECTED BY THE CLOSE DOWN OF INEFFICIENT MINES. THIS LATTER WORK IS BEING LED BY THE WORLD BANK.
- UNITED STATES ENERGY ASSOCIATION MANAGED INDUSTRY EXCHANGE PARTNERSHIPS BETWEEN THE ENERGY SECTOR ENTITIES OF THE UNITED STATES AND RUSSIA. UNDER THE PARTNERSHIPS; THE INDUSTRIES EXCHANGE LEGAL, INSTITUTIONAL AND TECHNICAL INFORMATION AND PROVIDE STUDY TOURS AND INTERNSHIPS TO EACH OTHER'S MANAGERS AND SPECIALIST. THREE EXCHANGE PARTNERSHIPS HAVE ALREADY BEEN ESTABLISHED ( IN THE ELECTRICITY GAS SUBSECTORS) AND TWO OTHERS (OIL AND ENERGY SECTOR SUPPORT INDUSTRY) ARE UNDER DISCUSSION.
- THE DESIGN AND IMPLEMENTATION BY THE INSTITUTE

FOR INTERNATIONAL EDUCATION OF A COMPREHENSIVE ENERGY SECTOR TRAINING PROGRAM THAT WILL FOCUS ON NEEDS GENERATED BY ECONOMIC REFORM AND RUSSIAN INTEGRATION INTO THE WORLD ECONOMY.

- AN ATLANTIC COUNCIL MANAGED RUSSIAN-JAPANESE-U.S. MACRO ECONOMICS ENERGY PLANNING PROJECT.

- ENERGY TECHNOLOGY FOCUSED ACTIVITIES OF THE USEPA: REBURN AIR POLLUTION CONTROL TECHNOLOGY FOR THERMAL POWER GENERATION PLANTS; E-SOX RETROFIT TECHNOLOGY FOR ELECTROSTATIC PRECIPITATORS OF THERMAL POWER GENERATION PLANTS; METHANE GAS EMISSION REDUCTION IN SUCH SOURCES AS COAL MINES, GAS PIPELINES, AND LANDFILLS; AND INTEGRATED RESOURCE PLANNING IN ELECTRIC UTILITIES.

- A U.S. GEOLOGICAL SURVEY ACTIVITY TO SUPPORT OIL AND GAS INVESTMENTS THROUGH THE ESTABLISHMENT OF OIL FOCUSED GEOLOGICAL INFORMATION, SEISMIC AND GEOCHEMICAL CENTERS IN MOSCOW AND TYUMEN.

- A U.S. MINERAL MANAGEMENT SERVICE ASSISTANCE IN CONCESSION LEASING/CONVEYING EXPLORATION AND DEVELOPMENT RIGHTS. ASSISTANCE TO COVER THE PREPARATION OF TENDERS, ASSESSING ENVIRONMENTAL CONTAMINATION AND REMEDIATION, AND OPERATIONAL AND ENVIRONMENTAL SAFETY DURING EXPLORATION.

- A COOPERATIVE AGREEMENT WITH THE WORLD BANK UNDER WHICH U.S TECHNICAL ASSISTANCE WILL BE PROVIDED FOR PETROLEUM LEGISLATION AND TAXATION, OIL ENTERPRISE CORPORATIZATION/COMMERCIALIZATION, PETROLEUM SECTOR REFORM, AND PETROLEUM PROJECT TENDERING.

- A COOPERATIVE AGREEMENT WITH THE EBRD UNDER WHICH U.S TECHNICAL ASSISTANCE WILL BE PROVIDED FOR THE U.S. SHARE OF A SIX COUNTRY SUPPORTED STUDY OF THE COST OF UP-GRADING THE ECONOMIC AND ENVIRONMENTAL PERFORMANCE OF GAZPROM'S VAST NATURAL GAS COLLECTION, PROCESSING AND DISTRIBUTION SYSTEM TO PRESENT DAY STANDARDS.

- AN ENERGY AND ENVIRONMENTAL COMMODITY (EQUIPMENT) IMPORT PROGRAM UNDER WHICH URGENTLY NEEDED EQUIPMENT AND MATERIALS WILL BE PROVIDED TO RUSSIA'S ENERGY AND ENVIRONMENTAL SECTORS. THE BASIC CRITERIA FOR THE SELECTION OF EQUIPMENT AND MATERIALS TO BE FINANCED UNDER THE PROGRAM IS THAT THEY IMPROVE THE ECONOMIC AND ENVIRONMENTAL PERFORMANCE OF RUSSIA'S ENERGY SECTOR. THE PROGRAM IS SCHEDULED TO BE AUTHORIZED BY NOVEMBER 30, 1993 WITH AN INITIAL

FUNDING LEVEL OF \$125 MILLION.

9. COORDINATION CHANNELS AND MECHANISMS:

EXCELLENT CHANNELS AND MECHANISMS ALREADY EXIST FOR U.S.- RUSSIA ENERGY PROGRAM COORDINATION. THESE INCLUDE:

- AN INTER-AGENCY COMMITTEE CHAIRED BY S/NIS,
- THE PROJECT COMMITTEE OF THE ENERGY EFFICIENCY AND MARKET REFORM PROJECT
- PERIOD IMPLEMENTING AGENCY, CONTRACTOR AND COOPERANT MEETINGS CALLED BY USAID/NIS/TF/EET,
- THE ENERGY SECTOR COORDINATING GROUP OF THE EMBASSY
- THE JOINT WORKING GROUPS ESTABLISHED BY THE SECRETARY AND MINISTER DURING THEIR RECENT MEETINGS AND OTHER JOINT COORDINATING COMMITTEES AND GROUPS ESTABLISHED BY USAID AND RUSSIAN COUNTERPARTS.
- ACTIVITY IMPLEMENTATION PLANS (AIPS) REQUIRED BY ALL PARTICIPATING AGENCY SERVICE AGREEMENTS (PASA). THE CONVENTIONAL ENERGY PASA THAT WAS SIGNED BY USAID AND DOE IN AUGUST REQUIRES THAT AIPS BE JOINTLY DEVELOPED AND APPROVED BY USAID BEFORE ACTIVITY IMPLEMENTATION IS STARTED. THIS IS PERHAPS THE MOST IMPORTANT OF ALL THE COORDINATING MECHANISMS IN TERMS OF MAXIMIZING SYNERGISM AND MINIMIZING DUPLICATION AND WASTE.

- 5 -

10. ACTION REQUESTED: (1) THE VARIOUS OFFICES OF DOE SHOULD TAKE THE LEAD IN PREPARING FIRST DRAFTS OF THE VARIOUS ACTIVITY IMPLEMENTATION PLANS IN LINE WITH THE DOE-USAID PASA. THE MOST URGENT OF THESE APPEAR TO BE THOSE FOR THE OIL AND GAS TECHNOLOGY CENTERS AND SUPPORT OF THE MOSCOW ENERGY EFFICIENCY CENTER. (2) CONTACT JOE YANCIK OF DOC TO COORDINATE IDEAS AND PLANS OF THE DOE OIL AND GAS TECHNOLOGY CENTERS AND GENERAL BUSINESS CENTERS BEING ESTABLISHED BY DOC. (3) AGREE TO THE INCLUSION OF USAID REPRESENTATIVES IN THE THREE WORKING GROUPS ESTABLISHED DURING THE SECRETARY'S VISIT. COLLINS##

**BRIEFING NOTES FOR AMBASSADOR - NOV. 29, 1993**

**ENERGY/POWER SECTOR**

**- STRATEGIC OBJECTIVES:**

**1. STRENGTHEN RUSSIA'S ABILITY TO PAY THE COST OF REFORM THROUGH INCREASED OIL AND GAS PRODUCTION AND EXPORTS.**

**2. INCREASED PRIVATE INVESTMENTS IN THE RUSSIAN ENERGY SECTOR THROUGH THE ESTABLISHMENT OF A COMPETITIVE INVESTMENT ENVIRONMENT AND RUSSIAN ACCESS TO INTERNATIONAL FINANCIAL MARKETS.**

**3. DEVELOPMENT OF MUTUALLY BENEFICIAL COMMERCIAL RELATIONSHIPS BETWEEN RUSSIA AND THE UNITED STATES.**

**4. REDUCTION OF RISK OF NUCLEAR POWER PLANT ACCIDENTS.**

**5. IMPROVEMENT OF ENVIRONMENTAL PERFORMANCE OF SECTOR.**

**- BACKGROUND/JUSTIFICATION:**

**1. Secretary of State's Speech at Princeton University in December, 1991 - identified energy as being critical to the success of democratic and market reform.**

**2. The Department of State's January, 1992 announcement - inclusion of energy as element of assistance program, authorization of Energy Efficiency and Market Reform Project.**

**3. Lisbon Initiative on Nuclear Power Plant Safety - announced by Secretary of State in May, 1992.**

**4. Meetings with Ministry of Fuel and Energy and five**

**Memoranda of Discussions of August, 1992.**

**5. VANCOUVER SUMMIT OF APRIL, 1993 -  
ESTABLISHMENT OF GORE-CHERNOMYRDIN  
COMMISSION OF ENERGY AND SPACE.**

**6. G-7 MEETING OF FINANCE MINISTERS IN TOKYO**

**7. DECISION TO HAVE ENERGY AND ENVIRONMENT  
COMMODITY (EQUIPMENT) IMPORT PROGRAM**

**8. VISIT OF SECRETARY OF ENERGY IN SEPT/OCT. 1993**

**- FUNDS BUDGETED THROUGH FY-96 - \$530 MILLION**

**KEY ACTIVITIES:**

**A. COMPLETED/ON-GOING:**

**1. ENERGY EFFICIENCY AUDITS AND IMPROVEMENTS  
IN KOSTRAMA AND YEKATERINBERG COMPLETED IN  
JUNE, 1993.**

**2. COAL MINE MANAGEMENT AND SAFETY  
IMPROVEMENT PROGRAM OF U.S. COAL INDUSTRY IN  
KUZBASS AND VORKUTA REGIONS.**

**3. NUCLEAR POWER PLANT SAFETY AND REGULATION  
IMPROVEMENT PROGRAMS OF DOE AND NRC.**

**4. DESIGN OF \$1.2 MILLION FLARED GAS REDUCTION  
PROJECT FOR WORLD BANK, EX-IM BANK, AND OTHER  
FINANCING. DESIGN WILL BE COMPLETED IN  
JANUARY, 1994.**

**5. PRIVATE SECTOR ENERGY INDUSTRY PARTNERSHIP  
EXCHANGE PROGRAM. GAS AND ELECTRICITY  
PROGRAMS FUNCTIONING; OIL PROGRAM PROPOSAL  
BEING REVIEWED.**

**B. NEW/SOON TO START INITIATIVES:**

**1. JOINT ENERGY ALTERNATIVES STUDY AND ACTION**

PLANS DEVELOPMENT UNDER CHERNOMYRDIN COMMISSION - FIVE JOINT WORKING GROUPS (ENERGY EFFICIENCY, THERMAL POWER PLANTS, NUCLEAR ALTERNATIVES, POWER TRANSMISSION AND ENERGY STRATEGY) WILL IDENTIFY ALTERNATIVES TO CONTINUED OPERATION OF LEAST SAFE NUCLEAR POWER PLANTS (RBMKS AND VVER-440/230S) AND PROPOSE ACTIONS PLANS FOR G-7 CONSIDERATION IN JULY 1994. GORE-CHERNOMYRDIN TO ENDORSE/APPROVE TERMS OF REFERENCE IN DECEMBER.

2. ENERGY AND ENVIRONMENT COMMODITY (EQUIPMENT) IMPORT PROGRAM - \$125 MILLION IN FY-94. OBJECTIVE: IMPROVE ENVIRONMENTAL AND ECONOMIC PERFORMANCE OF RUSSAIN ENERGY SECTOR AND INTRODUCE U.S. PRODUCTS. PROGRAM THAT IS 95% DESIGNED WILL BE AUTHORIZED IN WASHINGTON IN TIME FOR BILATERAL AGREEMENT TO BE SIGNED BY/DURING GORE-CHERNOMYRDIN MEETING IN DECEMBER.

3. RESTRUCTURING AND PRIVATIZATION OF ELECTRIC POWER SECTOR. FIVE JOINT WORKING GROUPS ESTABLISHED IN NOV. 1993:

- ...PRIVATIZATION PLAN
- ...LEGISLATION/REGULATION
- ...FINANCIAL (EQUITY) MARKETS
- ...INVESTMENT PROMOTION
- ...MARKET ECONOMY TRAINING

4. DOE SPONSORED OIL AND GAS TECHNOLOGY CENTER. ...U.S. DELEGATION LED BY DAS R. SPILLER  
 ...RUSSIAN CO-SIGNEE OF AGREEMENT FIRST DEPUTY MINISTER OF MFE, FOMIN  
 ...CENTER TO BE LOCATED IN TYUMEN CITY  
 ...RUSSIAN DELEGATION TO U.S. FROM 12/9 THRU 12/21  
 ...GORE-CHERNOMYRDIN TO ANNOUNCE.

#### CONTRACTORS/COOPERANTS

1. INTERNATIONAL DEVELOPMENT AND ENERGY

ASSOCIATES, INC. (IDEA). OPENED OFFICE IN MOSCOW ON OCTOBER 1, 1993; HAS ONE AMERICAN PROFESSION ON-BOARD; PROVIDES GENERAL ADMINISTRATIVE AND MANAGEMENT SUPPORT TO THE USAID'S ENERGY AND ENVIRONMENT PORTFOLIO THROUGH AN OFFICE IN MOSCOW AND BACK-UP STAFF IN WASHINGTON.

2. RCG/HAGLER BAILLY, INC. (HAGLER BAILLY) WILL OPEN OFFICE IN JANUARY; THROUGH TASK ORDERS, WILL DRAW ON ITS OWN RESOURCES AND THOSE OF OVER 40 RUSSIAN AND AMERICAN SUB-CONTRACTORS TO SUPPORT ENERGY SECTOR RESTRUCTURING AND PRIVATIZATION, PRICING, INVESTMENT PLANNING AND OTHER NON-ENGINEERING TYPE ACTIVITIES. WILL HAVE KEY ROLES IN BOTH ENERGY ALTERNATIVES STUDY AND POWER SECTOR PRIVATIZATION SUPPORT.

3. BURNS AND ROE ENTERPRISES, INC. WILL OPEN AND OFFICE IN JANUARY; THROUGH TASK ORDERS, WILL DRAW ON OWN RESOURCES AND THOSE OF OVER 25 RUSSIAN AND AMERICAN SUBCONTRACTORS TO PROVIDE TECHNOLOGY BASED TECHNICAL ASSISTANCE IN SUCH AREAS OIL AND GAS PRODUCTION, PROCESSING, DISTRIBUTION AND USE; COAL MINING, BENEFICIATION AND USE; AND ELECTRIC POWER GENERATION, DISTRIBUTION AND USE. WILL HAVE A KEY ROLE IN THE ENERGY ALTERNATIVES STUDY. ALL WORK WILL BE CAREFULLY COORDINATED WITH THE WORLD BANK, EUROPEAN BANK AND THE U.S. PRIVATE SECTOR AS POTENTIAL PROJECT FINANCERS.

4. UNITED STATES ENERGY ASSOCIATION (USEA), A PVO, WILL OPEN AND OFFICE IN JANUARY SFAFFED BY RUSSIAN EMPLOYEES TO MANAGE ITS USAID FUNDED ENERGY INDUSTRY PARTNERSHIP EXCHANGE PROGRAM.

5. INSTITUTE FOR INTERNATIONAL EDUCATION (IIE), A PVO, WILL OPEN AN OFFICE IN JANUARY SFAFFED BY ONE OR TWO AMERICANS AND SEVERAL RUSSIAN

**TO MANAGE USAID FUNDED ENERGY SECTOR  
TRAINING ACTIVITIES.**

**6. PARTNERS IN ECONOMIC REFORM (PIER), A PVO,  
HAS HAD OFFICES IN MOSCOW SINCE JUNE, 1992 TO  
MANAGE ITS USAID FUNDED COAL SECTOR  
ACTIVITIES.**

**FIRST ANNUAL USAID/NIS ENERGY SECTOR  
REVIEW WORKSHOP**

**JANUARY 10 -12, 1994**

**UNITED STATES ENERGY ASSOCIATION  
ENERGY INDUSTRY PARTNERSHIP PROGRAM**

**KAZAKHSTAN AND KYRGYZSTAN  
RUTH CHERENSON, PROGRAM COORDINATOR**

USEA

**KAZAKHSTAN ELECTRIC POWER CRITICAL ISSUES**

- Utility management skills are lacking to implement the country's privatization plans
- Lack of simple technologies and effective rate structures hinders efficiency
- Lack of regulatory system limits the extent of foreign investment
- Pollution exists from coal burned without environmental controls

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## **USEA ENERGY INDUSTRY PARTNERSHIP PROGRAM IMPLEMENTATION**

1. Identify NIS energy companies with desire/need for information on technology applications and management practices in market economics.
2. Develop a company/country profile of the prospective NIS partner.
3. Conduct an informal solicitation of U.S. energy sector to identify a U.S. partner.
4. Match U.S./NIS companies according to technical and other characteristics of the companies.
5. Sponsor an initial exchange visit between the U.S./NIS partners and sign cooperation agreements.
6. Develop annual workplans of exchange visits, seminars, internships, and study tours.
7. Facilitate implementation of workplan activities.

## **KAZAKHSTAN ELECTRIC POWER SECTOR STRATEGY**

- Supplement successful partnership program with Cincinnati Gas & Electric Company with study tours aimed at specific technologies to encourage efficiency
- Continue to focus on utility management issues such as procurement, while including management tools such as IRP
- Focus on rate structure and design in addition to efficiency technologies to achieve savings and cover production costs

**KAZAKHSTAN ELECTRIC POWER SECTOR ACTIVITIES****FY 1993**

- Partnership Agreement April 93
- International Power Forum April 93
- Utility Management Seminar July 93
- Clean Coal Study Tour September 93

**FY 1994**

- Utility Finance Seminar October 93
- Energy Efficiency Study Tour October 93
- Combined Cycle Study Tour/  
Power Gen '93 November 93
- Procurement Seminar December 93
- International Energy Forum April 94
- Rate Structure and Design  
Seminar May 94
- Load Forecasting and IRP August 94

## KAZAKHSTAN NATURAL GAS STRATEGIES

- Continue development of new partnership
- Provide access to information regarding obtaining international finance
- Provide exposure to market-based organization and management principles

## KAZAKHSTAN NATURAL GAS ACTIVITIES

### FY 1994

American Gas Association Annual Convention/Initial Partnership Exchange	October 93
Natural Gas Management in A Market Economy Seminar	March 94
Natural Gas Industry Finance Seminar	June 94
Procurement and Finance Internships	September 94

## **KYRGYZSTAN ELECTRIC POWER CRITICAL ISSUES**

- Parliament recently passed legislation enabling the state energy company to become a holding company, but no reorganization plan exists
- Foreign investment is desired, but no legal and regulatory frameworks are in place
- Over fifty percent of customers do not/can not pay their electric bills, consequently, there are no funds to pay workers or fossil fuel debts
- Fuel shortages, particularly for heat in the capital city, are possible

USEA

## **KYRGYZSTAN ELECTRIC POWER SECTOR STRATEGIES**

- Continue to cultivate long-term, on-going partnerships with a few key utilities to assist in the restructuring
- Supplement partnerships with study tours which focus on finance, regulation, and efficiency
- Organize internships which focus on management issues in partnership utilities

**KYRGYZSTAN ELECTRIC POWER ACTIVITIES**FY 1993

- Partnership Agreement April 93
- International Power Forum April 93
- Utility Management Study Tour May 93
- Privatization Seminar June 93
- Waterpower 93 Conference and Study Tour August 93

USEA

**KYRGYZSTAN ELECTRIC POWER ACTIVITIES**FY 1994

- Regulation and Finance Seminar December 93
- Capital Financing Study Tour March 94
- Utility Pricing Seminar May 94
- Regulatory Study Tour July 94
- Utility Management and Finance Internships September 94

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# KAZAKHSTAN AND KYRGYZSTAN ENERGY EFFICIENCY AND MARKET REFORM PROJECT ENERGY PRICING AND TAXATION COMPONENT

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## Activities Performed

- Met with many key host country officials & technicians
- Conducted site visits to field operations, when possible
- Compiled extensive data & decrees on prices (wellhead to end-users), costs, taxes, & volumes
- Delivered seminars presenting key findings & recommendations

## Significant Accomplishments

- Made progress in rationalizing energy prices
- Transferred data base "know-how"

## Lessons Learned

- Ensure top level host country sponsorship
- Ensure continuity of all key personnel involved, especially technicians/staff & interpreters, leads to steeper learning curve
- Avoid duplication of repeated requests for same information/data
- Extend length of trips vs more short trips
- Strive for regional cooperation

# KEY FINDINGS/RECOMMENDATIONS

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## Major problems/issues

- Payment/arrears
- Enforcement & collection of taxes
- Labor displacement, relocation, training

## Policy

- Oil & gas exports lead reform during transition to "world equivalent" prices
- Coal tied to more regional conditions
- Domestic grid (heat, electricity, & natural gas) determined by regional production costs
- Domestic price guidelines incorporate income constraints
- Taxes: focus on wellhead (rent) taxes & end-use excise taxes

## Future TA Activities

- Hands on / on-the-job training in databases/information systems, energy pricing models, market assessments
- Analysis of potential export PL capacity & costs of transport systems
- Develop model for estimating potential tax revenues from oil and gas production

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QUALITY WORLDWIDE



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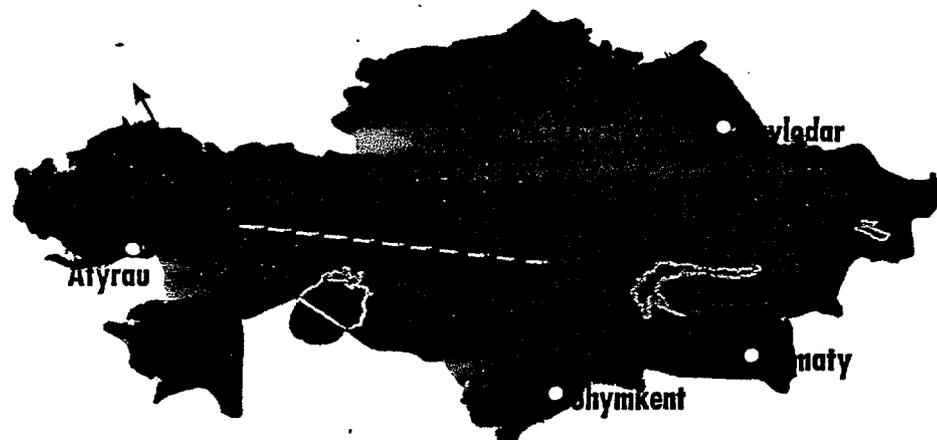


**Program Objectives**

- Focus Supporting Capital Lending Benefits of World Bank/EBRD
- Improved Production from Existing Facilities
- Development of Additional Capacity
- Conservation & Efficiency Driven Reductions in Demand
- Improvements in Environmental Practices to Reduce Pollution



**NIS Petroleum Refinery Program**



JOHN BROWN**Kazakhstan**

## Methodology

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- **Recon. & Questionnaire Dissemination**
- **Field Team Evaluation**
  - ✦ **Refinery Processing**
  - ✦ **Instrumentations**
  - ✦ **Mechanical**
  - ✦ **Electrical**
  - ✦ **Environmental**
  - ✦ **Economics**

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## Methodology

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- **Interview Staff**
  - ✦ **Gather Data**
  - ✦ **Review Questionnaire**
  - ✦ **Inspect Refinery Units & Systems**
- **Share Ideas Addressing Issues Relating to Program Objectives**
- **Interact with World Bank**
- **Analyze Data, Develop Recommendations**

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## NIS Petroleum Refinery Program

- **Scope of Work**
  - + **Evaluate Process Units**
    - Mechanical/Electrical/Instrument Systems
    - Environmental Issues
    - Economic Review - National & Local Refinery
  - + **Develop Short, Medium & Long Term Recommendations**
  - + **Organize Technical & Financial Data**
  - + **Organize/Conduct Seminar to Disseminate Results & Encourage Emulation in Other Energy Intensive Industries**

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## Operational Flexibility & Modernization Opportunities

- **Plan & Implement Gasoline Reformulation Projects**
- **Plan & Implement Projects for Bottom of the Barrel Processing**
- **Increase Capacity for Feedstock Storage**
- **Obtain & Utilize LP Model & Process Simulators**
- **Implement Advanced Control**
- **Install Digital Product Blenders**

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### Energy Efficiency Improvement Opportunities

- Upgrade Process Fired Heaters & Steam Boilers
- Utilize Extraction Steam Turbine where Applicable
- Optimize Steam Balance
- Upgrade Cooling Towers & Associated Equipment
- Install Secondary Sealing in Hydrocarbon Storage Tanks
- Optimize Fuel Balance
- Consider Power Recovery where Applicable

Kazakhstan



### Pollution Control Opportunities

- Add Tail Gas Treatment on Sulfur Recovery
- Implement Projects for Oily Sludge Treatment & Disposal
- Evaluate & if Necessary Control the Ground Water Pollution
- Improve Wastewater Treatment Plant
- Modify or Replace Furnace Burners for NO<sub>x</sub> Control
- Install Flue Gas Desulfurization where Required

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## **Recommended Courses & Seminars**

- **Furnace Burner Maintenance & Operation**
- **Steam Trap Maintenance & Operation**
- **Computerized Accounting & Maintenance Software**
- **Western Process Technology Seminars**
- **NPRA & API Annual Meeting**
- **Training in Capital Budget Practices**

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## **Summary**

- **Observations & Recommendations**
  - ‡ **Improve Fired Furnace Efficiencies**
    - Potential to Save Millions of Dollars/Year
  - ‡ **Improve Insulation Practices**
    - Less than One Year Payback
  - ‡ **Install Steam Traps**
    - Fast Payback
  - ‡ **Apply Methodology for Energy Savings to all Industry - Entire Country**
  - ‡ **Advance Controls**

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## Long Term Objectives

- **Oil Gas Sector**
  - + **Clarify Countries Objectives**
    - Domestic & International
  - + **Define Institutional Parameters for Privatization**
  - + **Control / De-control Prices**
  - + **Change Cost Plus Philosophy of Business Management**
  - + **Liberalize Markets**
    - Better Define Markets
    - Interfuel Substitution
    - Integrated Resource Planning
  - + **Pipeline for Crude From West Kazakhstan to Eastern Refineries**
  - + **Modernize Atyrau Refinery**
  - + **Complete Combined Unit at Pavlodar**
  - + **Complete & Modernize FCC Unit at Shymkent**
  - + **Gasoline Reformulation**
  - + **Implement Recommendations**
  - + **Reduce SO<sub>2</sub> & VOC Emissions**
  - + **Improve Operations of WWTP**
  - + **Bottom of the Barrel Processing**

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## Need for New Activities

- **Implement Country Wide Energy Savings Program - All Industries**
- **Evaluate E/W Crude Oil Pipeline**
- **Implement Recommendations**

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## **Lessons Learned**

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- **Recon Trip Contact with Affected Refineries is Essential**
- **Contact with High Level of Ministry Assures Higher Probability of Program Success & Acceptance**
- **Good Translators Essential for Success**
- **Communications Extremely Difficult**
  - **Establish In-country Link**
- **Personality Profiles - Proper Selection of Staff**
- **Survey Local Cost Structure**
  - **So as not to Overpay for Local Services**
- **Use of of Local In-country Contractors, Staff & Resources**
- **USAID Continue Initial Briefing Regarding Local Conditions**
- **Send Advance Copies to Host Countries that Require their Approval**

REGIONAL STRATEGIES-CENTRAL ASIAN REPUBLICS  
(long-term objectives for the electricity sector)

Current Situation for Kyrgyzstan

- Hydropower meets the bulk of electricity needs. Seasonal exchange with Kazakstan and Usbekistan.
- Reservoir releases in summer for irrigation purposes, contrary to power demand pattern.
- High cost of import fuel.
- Limitation in T/D system.
- Hydropower problem subject to water issue.

Long-term Objectives for Kyrgyzstan

- Energy independence with renewable resources.
- Strengthening transmission/distribution.
- District heating with indigenous fuel.
- Export with development of low-cost hydropower.
- Export hydropower regulation capability.

HARZA

Implication for Central Asian Republics

- Each country develop its own resources to meet its own needs.
- Energy exchange for economy only.
- Each country to own, operate, and maintain its own resources.
- Energy management center for economy and emergency exchange among republics.

# AGENDA

## Perspective

- Energy
- Fuels
- Environment

## Review of On-going Projects

- Energy Efficiency            IRG
- Oil and Gas                    JOHN BROWN
- Coal                             PIER
- Electricity                     HARZA
- Institutional Reform         —

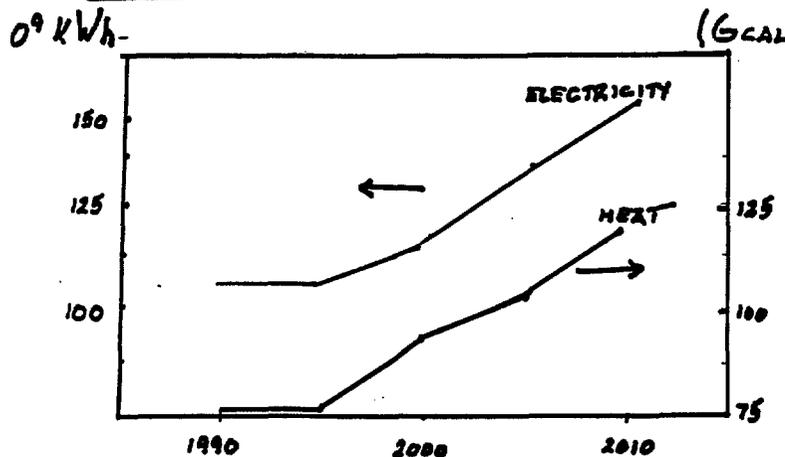
## Preview of Potential Projects



# POWER (KAZAKHSTAN)

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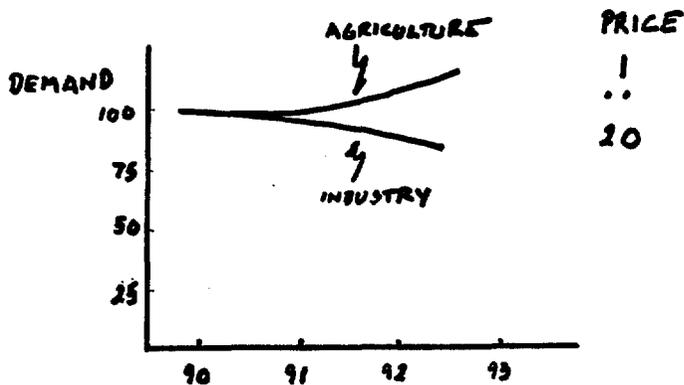
## CONSUMPTION



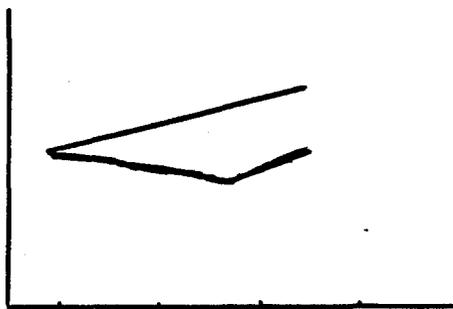
## PRODUCTION (1993)

13,000 MW THERMAL  
 2,000 MW HYDRO  
 ~ 2,000 MW OTHER

## EFFECT OF HISTORICAL CHANGES ON DEMAND (QUALITATIVE)



## PLANNED DEMAND GROWTH



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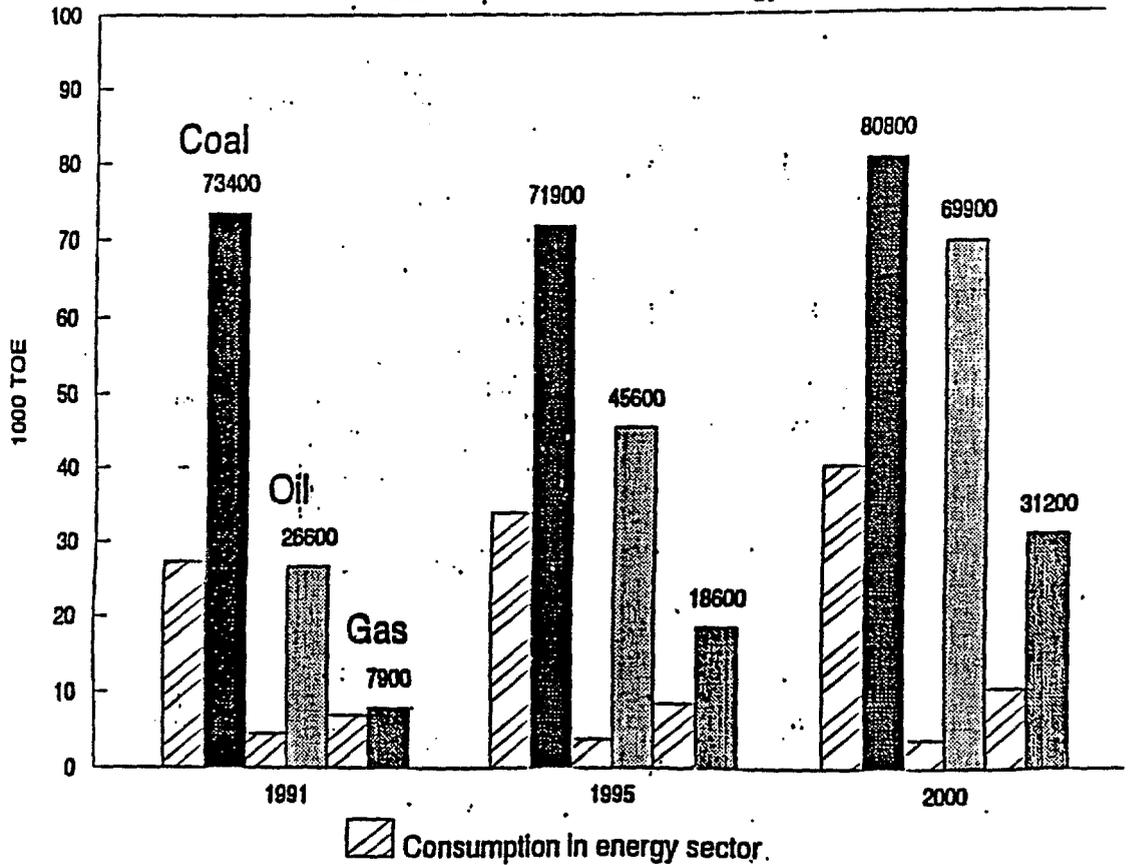


# Limitations / Needs

## Power

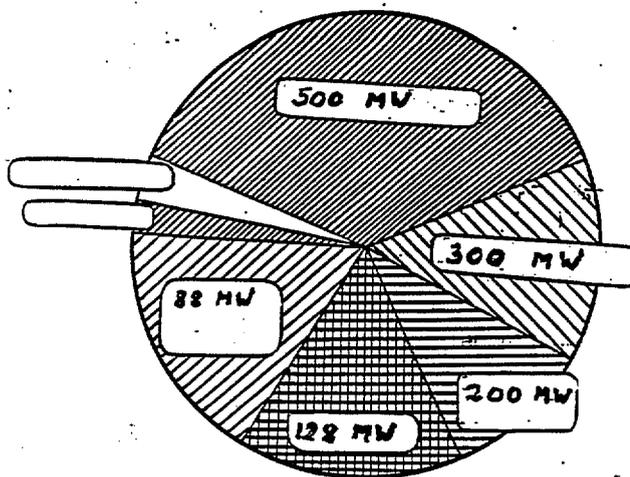
- Coal Quality
  - Coal Cleaning
  - Mining Efficiency
- Plant Age
  - Modernization
- New Installations
- Financing
- Transmission

Fuel extraction  
Consumption share of the energy sector



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Структура установленной мощности  
тепловых электростанций,  
МВт/%



Всего -  $\frac{13908}{100}$

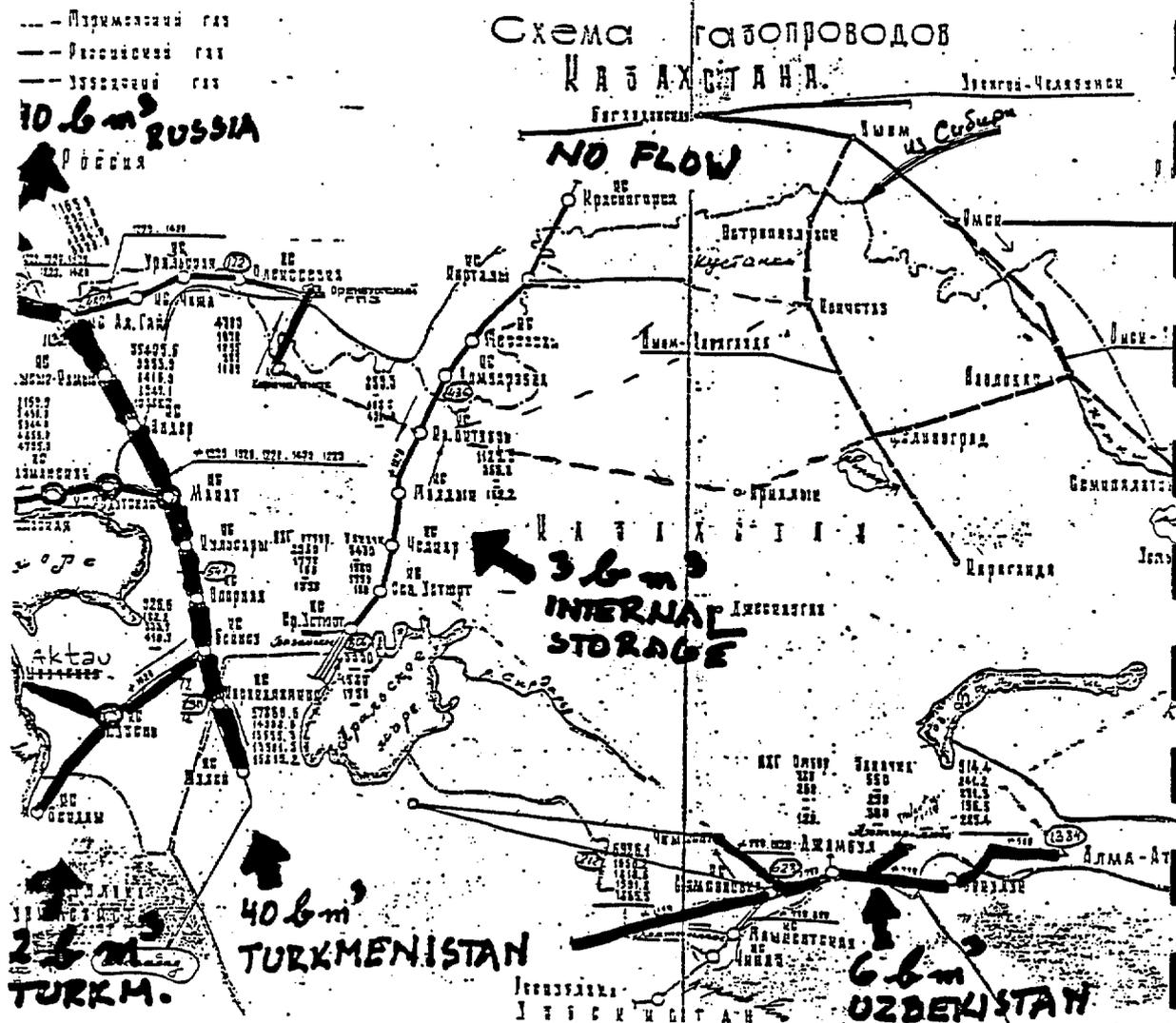
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Transport and distribution of energy

Transmission lines 0.4 - 1150 kV

Voltage, kV	Length of lines, 1000 km
0.4	117.1
6 - 10	220.5
35	62.0
110	44.2
220	19.5
500	4.6
1150	1.4
overall	449.2

Transmission lines of very-high voltage (500 kV, 1150 kV) are of high efficiency regarding to connections with neighbouring countries, but also for internal connections between northern and southern regions of Kazakhstan.



**Overall and specific emissions by power plants (Kazakhstanenergo, 1991)**

		NO <sub>x</sub>	SO <sub>2</sub>	solid substances
overall emission	1000 t/a			
boilers > 420 t/h		124.4	418.7	379.6
boilers < 420 t/h		95.5	237.5	266.9
overall		219.9	656.2	646.6
specific emissions	g/kWh			
boilers > 420 t/h		1.62	5.43	4.9
boilers < 420 t/h		1.34	3.38	3.8
overall		1.5	4.5	4.4
permitted values	g/kWh			
boilers > 420 t/h		0.31	0.63	0.22
boilers < 420 t/h		0.61	0.9	0.22

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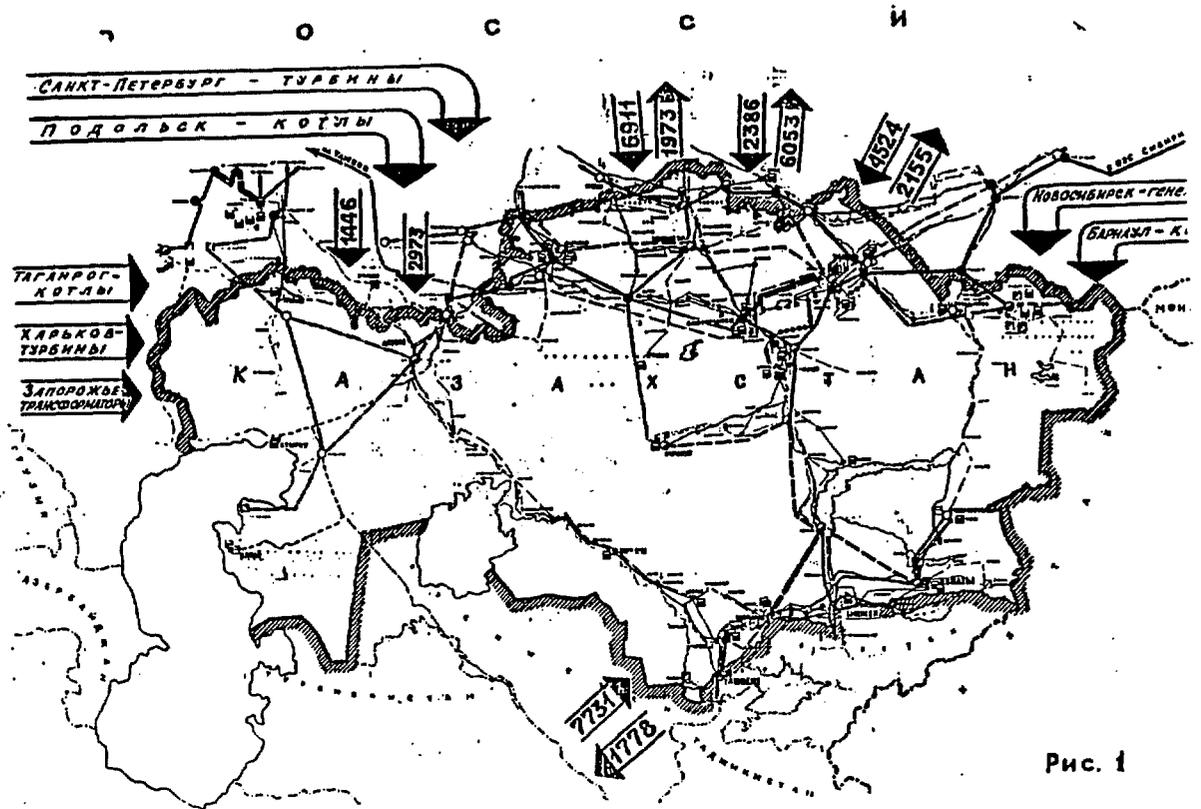


Рис. 1

## Kyrgyzstan Notes

### Production

- . Electricity 3,000 MW
- . Oil 7,000 bbl/day
- . NG 0
- . Coal 4 mt/yr

### Energy Exporter

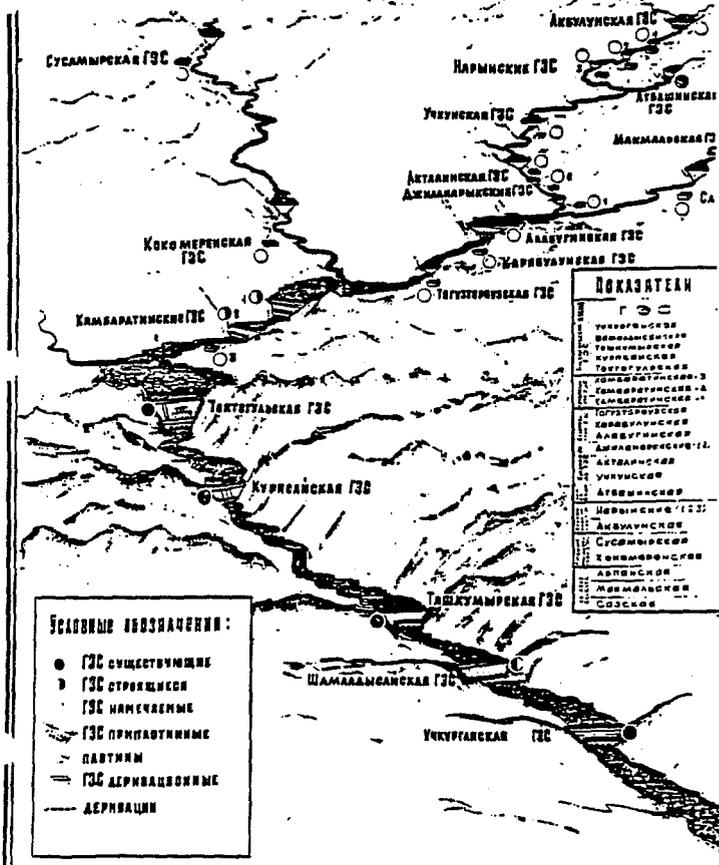
High Hydroelectric Generation

Underused Coal Reserves

Short on Transmission / Distribution

Power / Heating Plants Need Modernization

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Kazakhstan Chart 1

# KAZAKHSTAN

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Project Title	Notes
Program for Energy Savings	This may be a quick-start (Jan. 94)
Power Plant Improvement	Equip one model power plant with automation, controls and management changes.
Improvement of DH System	Use model station
Coal Cleaning Technology	The economic and technical feasibility of cleaning Kaz. coals needs to be established. Training and analytical equipment needed.
Power Plants Wastes Control	Invite US hardware/system companies to participate.

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Project Title	Notes
Power Planning	Add to USEA seminar
Assistance in Formation of Privatized Equipment producers.	Invite participation by US industry.
Power Sector Legislation	Support ABA work
Exchanges	New USEA work
Gas Pipelines Study	Survey, feasibility and economics
Pavlodar Oblast Development	Extensive social, economic and environmental scope

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KYRGYZSTAN  
~~KAZAKHISTAN~~

Project Title	Notes
Planning Subsequent DH and Distribution Projects	Subsequent projects to support World Bank projects
Assistance for loan application for Kamarata Unit	Subsequent projects to support World Bank projects
Improve DH System	Support World Bank
Improve Distribution System	Support World Bank
Power Market Study	
Exchanges	USEA, etc.
Assistance for Drafting Laws	ABA



**8. MONEY TRANSFERS**

- BANKS SLOW, NOT ALWAYS POSSIBLE
- RUNAWAY INFLATION
- VAGUE PRICE QUOTES
- IF MONEY IS AMERICAN, THE PRICE IS HIGHER
- SUBSTANTIAL DOWN PAYMENT REQUIRED

**9. SHIPPING**

- THEFT
- UNRELIABLE, HARD TO TRACK

**10. LOCAL PERSONNEL WANT KICKBACKS/BRIBES**

**11. HIGHLY DESIRABLE FOR IN-COUNTRY STAFF**

**12. PROGRAMS SHOULD BE HIGHLY VISIBLE**

R



**MONITORING ACTIVITIES**

- RMA HAS BEGUN MONITORING OF CURRENT ENERGY EFFICIENCY ACTIVITIES
- USAID SHOULD REQUIRE MONITORING FOR ALL APPLICABLE PROJECTS
- BENEFITS USAID IN VERIFYING SAVINGS/IDENTIFYING MOST BENEFICIAL PROJECTS
- HELPS TO IDENTIFY REASONS WHY SAVINGS WERE, WERE/NOT ACHIEVED
- MOST IMPORTANT, CAN POSITIVELY DEMONSTRATE ACTUAL SAVINGS TO COUNTERPARTS
- HELPS TO INCORPORATE ENERGY MANAGEMENT TECHNIQUES

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**MAJOR ACCOMPLISHMENTS**



RMA

**- DISTRICT HEATING**

- EQUIPMENT INSTALLED
- JOINT VENTURES ESTABLISHED
- MONITORING BEGUN
- HELPED TO COORDINATE WORLD BANK FUNDING FOR  
FUTURE PROJECTS
- STRONG BUSINESS RELATIONSHIP ESTABLISHED

**PERCEPTIONS OF PROGRAMS**

- ACTUALLY IMPLEMENTING EQUIPMENT, NOT JUST STUDYING  
THE "PROBLEM"
- SINCERE DESIRE TO HELP
- TOO MUCH "RED TAPE", TIME DELAYS



**LESSONS LEARNED:**

1. EQUIPMENT - DETAILED SPECIFICATIONS
2. OPTIONS - APPROVED BY ALL PARTIES
3. CUSTOMS - NEVER WORKS LIKE ITS SUPPOSED TO
4. TIME DELAYS - ALWAYS (WORKS) HAPPENS
5. UNANTICIPATED COSTS
  - A. TRANSPORTATION FROM AIRPORT TO SITE
  - B. INSTALLATION
    - MECHANICAL AND ELECTRICAL
    - EXTRA MATERIALS (CONTROL WIRING, POWER WIRING)
6. COMMUNICATION PROBLEMS
7. NEED FOR:
  - PERSONNEL TO RECEIVE SHIPMENT
  - PERSONNEL TO OVERSEE INSTALLATION
  - COMMISSIONING

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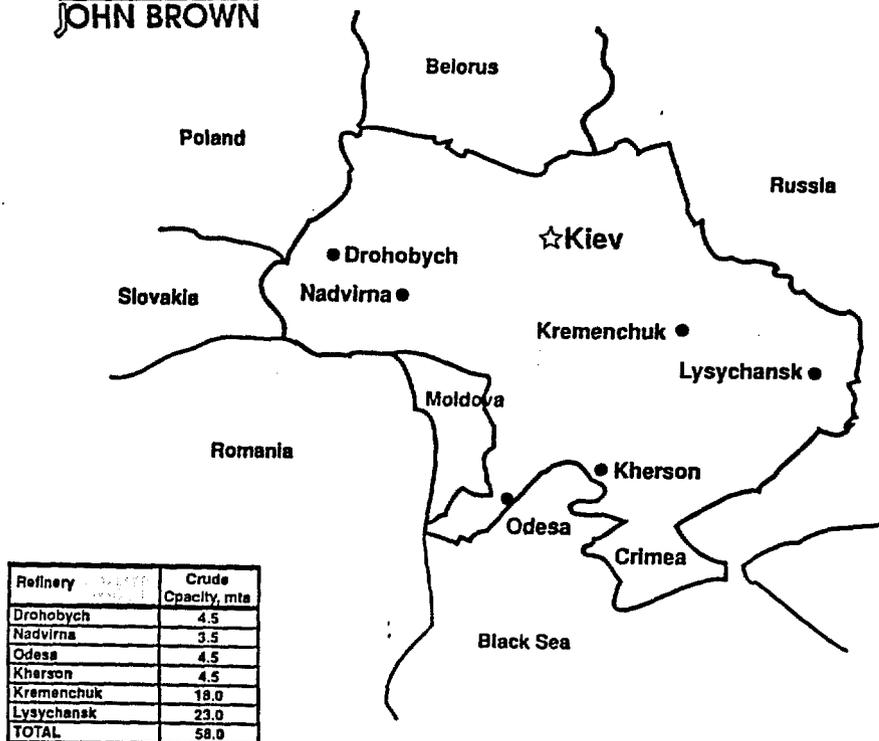


**FUTURE PROJECTS**

- INDUSTRIAL ENERGY EFFICIENCY
- RESIDENTIAL ENERGY EFFICIENCY
- WEATHERIZATION
- JOINT VENTURE DEVELOPMENT
- TRAINING
- CONVERSION TO METERING BASED ON CONSUMPTION

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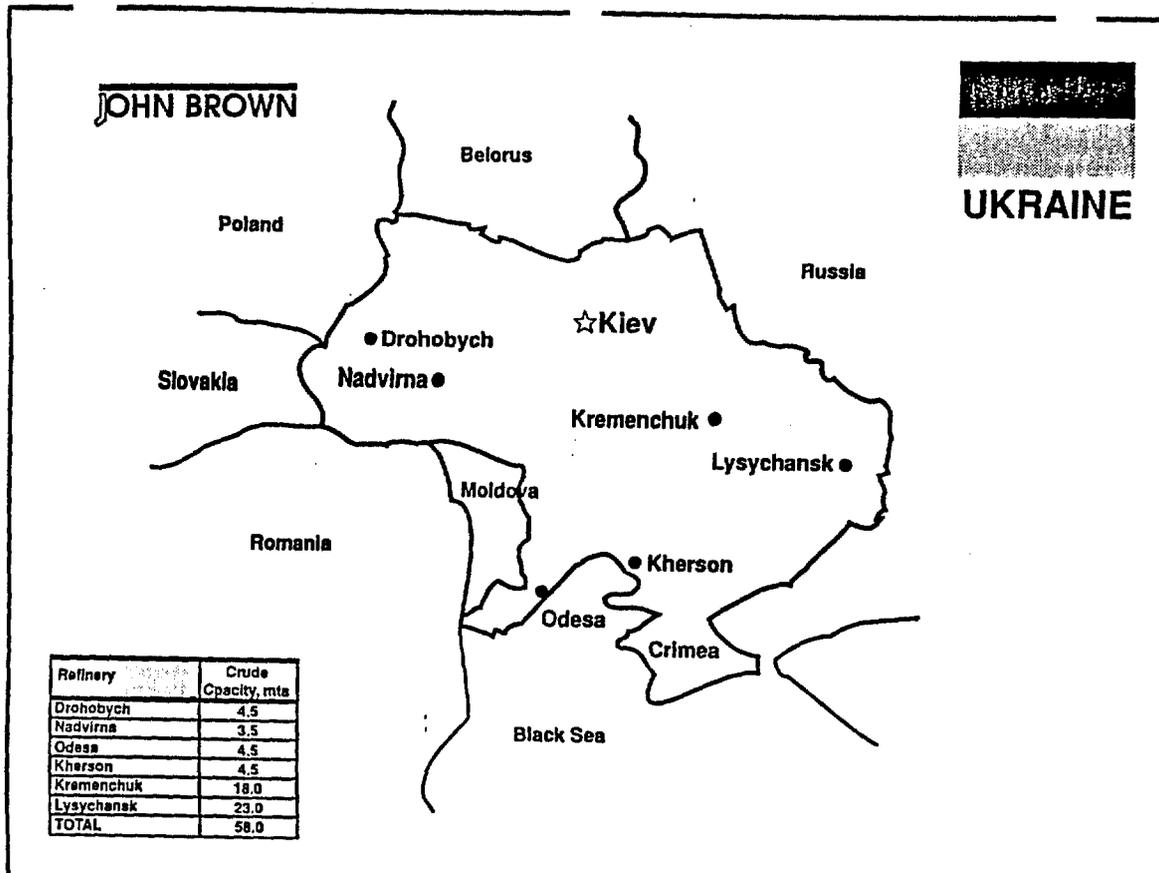
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**Ukraine**



## Program Objectives

- Improved Production from Existing Facilities
- Development of Additional Capacity
- Conservation & Efficiency Driven Reductions in Demand
- Improving Environmental Practices to Reduce Pollution
- Assist in the Privatization of the Petroleum Sector



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Ukraine



## Program Objectives

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## **Scope of Work**

- **Organize Technical & Financial Data**
- **Evaluate Selected Refineries**
  - ✦ **Process Units, Mechanical, Electrical, Instrument Systems, Environmental Issues & Economic Review**
- **Provide Information for Privatization Opportunities in the Petroleum Sector**
- **Develop Immediate, Medium & Long Term Improvement Opportunities for Energy Consumption & Environmental Impact Remedies**

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## **Methodology**

- **Recon Trip & Questionnaire Dissemination**
- **Field Team of Refining Industry Specialists**
- **Interview Staff**
  - ✦ **Administrative, Engineering & Operations**
  - ✦ **Collect Data**
  - ✦ **Inspect Refinery Units & Facilities**
- **Interview with Financial & Investment Institutes**
  - ✦ **Plans for Petroleum Industry**
- **Analyze Data**
- **Develop Recommendations**

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**Operational Flexibility & Modernization Opportunities**

- Obtain & Utilize LP Model & Process Simulators
- Implement Advanced Control
- Install Digital Product Blenders
- Optimize/Revamp Crude & Vacuum Units
- Plan & Implement Gasoline Reformulation Projects

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**Operational Flexibility & Modernization Opportunities**

- Plan & Implement Projects for Diesel & Fuel Oil Sulfur Reduction
- Plan & Implement Projects for Bottom of the Barrel Processing
- Increase Capacity for Feedstock Storage
- Projects to Improve Product Quality for Export

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**Energy Efficiency Improvement  
Opportunities**

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- Upgrade Process Fired Heaters & Steam Boilers
- Utilize Extraction Steam Turbine where Applicable
- Optimize Steam Balance
- Upgrade Cooling Towers & Associated Equipment
- Install Secondary Sealing in Hydrocarbon Storage Tanks
- Optimize Fuel Balance
- Consider Power Recovery where Applicable

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**Pollution Control Opportunities**

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- Minimize Oil Spill into Wastewaters
- Improve Wastewater Treatment Plant
- Modify or Replace Furnace Burners for NO<sub>x</sub> Control
- Install Flue Gas Desulfurization where Required
- Consider Adding Tail Gas Treatment on Sulfur Recovery
- Implement Projects for Oily Sludge Treatment & Disposal

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## Long Term Objectives

- **Odesa, Kremenchuk & Lyssychansk Refineries**
  - + Installation of Bottom-of-the-Barrel Conversion Units
  - + FCC, Hydrocracking, Visbreaking &/or Delayed Coker Units Should be Considered
  - + Improve Products to Meet World Standards
    - Merox Treating of LPG, Gasoline & Jet Fuel
    - Higher Octane Requirements of the Gasoline Pool
    - Future Reduction or Removal of Lead from the Gasoline Pool
    - Lower Sulfur Requirements of Heavy Fractions
  
- **Drohobych Refinery**
  - + The Refinery is Planning to Shutdown One Plant & Install the Following New Units:
    - 4,000,000 mta Atmospheric/Vacuum Distillation Crude Unit
    - 600,000 mta Continuous Catalyst Regeneration Refining Unit
    - Isomerization Unit
    - Amine Scrubbing/Regeneration System & Claus Sulfur Unit
    - Bitumen Unit
  
- **New Oil Terminal in Odesa**
  - + A contract has been signed to design & construct by end of 1994 an unloading facility for 4,000,000 mta of crude.
  - + Future plans call for expansion of up to 12,000,000 mta
  - + On shore facilities, storage tanks & pipelines from the new terminals must be built in the near future
  - + Pipelines from new terminal to refineries

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### Recommended Courses & Seminars

- Furnace Burner Maintenance & Operation
- Steam Trap Maintenance & Operation
- Computerized Maintenance & Accounting Software
- Western Process Technology Seminars
- NPRA & API Annual Meeting
- Review & Training in Capital Budget Practices

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### Major Problems in the Oil Industry

- Supply Insecurity
- Foreign Exchange Shortage
- Obsolescences
- Excess Capacity
- Subsidized Pricing
- Excessive Regulations

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### Lessons Learned

- Recon Trip Contact with Affected Refineries is Essential
- Contact with High Level of Ministry Assures Higher Probability of Program Success & Acceptance
- Good Translators Essential for Success
- Communications Extremely Difficult
  - Establish In-country Link
- Personality Profiles - Proper Selection of Staff
- Survey Local Cost Structure
  - So as not to Overpay for Local Services
- Use of Local In-country Contractors, Staff & Resources
- USAID Continue Initial Briefing Regarding Local Conditions
- Send Advance Copies to Host Countries that Require their Approval

**BEST AVAILABLE DOCUMENT**

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JANUARY 10 -12, 1994

UNITED STATES ENERGY ASSOCIATION  
ENERGY INDUSTRY PARTNERSHIP PROGRAM

UKRAINE  
ALBERT H. SKEATH, PROGRAM COORDINATOR

**USEA**

**USEA ENERGY INDUSTRY PARTNERSHIP PROGRAM GOALS**

1. Develop non-commercial partnerships between U.S. electrical power, petroleum, and natural gas companies energy companies and their counterparts in the NIS republics to promote technology transfer and improve management practices in the NIS.
2. Assist NIS energy companies improve their managerial performance through access to U.S. energy industry experience, facilities, and personnel.
3. Introduce market economy concepts through personnel exchanges, seminars, computer software programming, and dissemination of information on energy issues.
4. Identify technology needs of NIS energy companies and disseminate U.S. technology information through seminars, study tours, and exchange visits.
5. Assist U.S. energy companies gain an understanding of NIS business opportunities, practices and customs, and establish U.S.-NIS contacts for professional business relationships.
6. Enable U.S. NIS partnerships to be sustainable on a long-term basis without U.S. Government financial support.

**USEA**

**UKRAINE ENERGY SECTOR CRITICAL ISSUES**

- Ukraine is highly dependent on Russia for the supply of oil, gas, and spare parts.
- The price of electricity charged to the customers does not cover the cost of production.
- Inefficient industrial processes and residential energy systems result in overall energy inefficiency.
- There are substantial environmental wastes which are impacting on the air and water resources.
- The thermal power plants are old and are in need of retrofitting to improve efficiency and reduce environmental impact.

**BEST AVAILABLE DOCUMENT**

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## UKRAINE ENERGY SECTOR STRATEGIES

- Establish a regulatory framework for the energy sector to promote private investment, and energy efficiency and conservation.
- Develop an energy pricing strategy which will cover the costs of production, allow for long-term expansion, and promote energy efficiency and conservation.
- Introduce energy efficiency and conservation techniques and programs.
- Introduce information on clean combustion of coal.
- Develop a program of life extension, retrofitting and rehabilitation of existing thermal power plants.

## UKRAINE ENERGY SECTOR STRATEGY

1. Transfer of U.S. energy industry management experience and techniques.
2. Visits and internships at U.S. energy-related facilities to learn about life extension programs, environmental controls, efficiency programs, coal cleaning technology, nuclear safety, financial systems, organizational structures, and utility regulations.

**UKRAINE ENERGY SECTOR ACTIVITIES**FY 1993

- Clean Coal Study Tour September 93

FY 1994

- Energy Efficiency Study Tour October 93
- Electric Utility Partnership October 93
- PowerGen '93 and Combined Cycle Study Tour November 93

**UKRAINE ENERGY SECTOR ACTIVITIES**

- Exchange Visit December 93
- Exchange Visit March 94
- Utility Management Seminar May 94
- Utility Finance Internship September 94

# SECTION V

## Wednesday, January 12th

### Session III - Caucasus

- |    |   |   |
|----|---|---|
| A. | Opening Remarks                         | Suzanne Olds, Caucasus USAID Director   |
| B. | Introductions/ Summary                  | Harout Topsacalian, IDEA-NIS            |
| C. | Strategy Statement and Review           | Gordon Weynand, USAID Program Officer   |
| D. | Coal                                    | US Geological Survey                    |
| E. | Hydro Power/ Alternative<br>Energy Fund | K&M Engineering                         |
| F. | April '94 Armenia Energy<br>Conference  | United States Energy Association (USEA) |

### Closing Session - Observations & Conclusions

- |    |                               |                              |
|----|-------------------------------|------------------------------|
| A. | Conclusions                   | Jim Bever, Deputy Director   |
| B. | Central Asian Session Summary | Charles Bliss, Rapporteur    |
| C. | West NIS Session Summary      | Andres Doernberg, Rapporteur |
| D. | Caucasus Session Summary      | Malinda Goodrich, Rapporteur |
| E. | Russian Session Summary       | Masood Malik, Rapporteur     |

# ***THE CAUCASUS***

**(Armenia and Georgia)**

**Wednesday, January 12**

**9:00 am**

## **HIGHLIGHTS**

**USAID**

**BURNS & ROE**

**RMA**

**USEA**

**US GEOLOGICAL SURVEY**

***Coal Sector Development***

**PAINE WEBER**

***Nuclear Power Update***

***Oil/Gas Exploration***

***Privatization***

**WORLD BANK**

***Institutional Reform***

***Loan Update***

**ARMENIAN ASSEMBLY**

***Political Update***

**K&M ENGINEERING & CONSULTING**

***Hydro Power Update***

***Armenian Energy Fund***

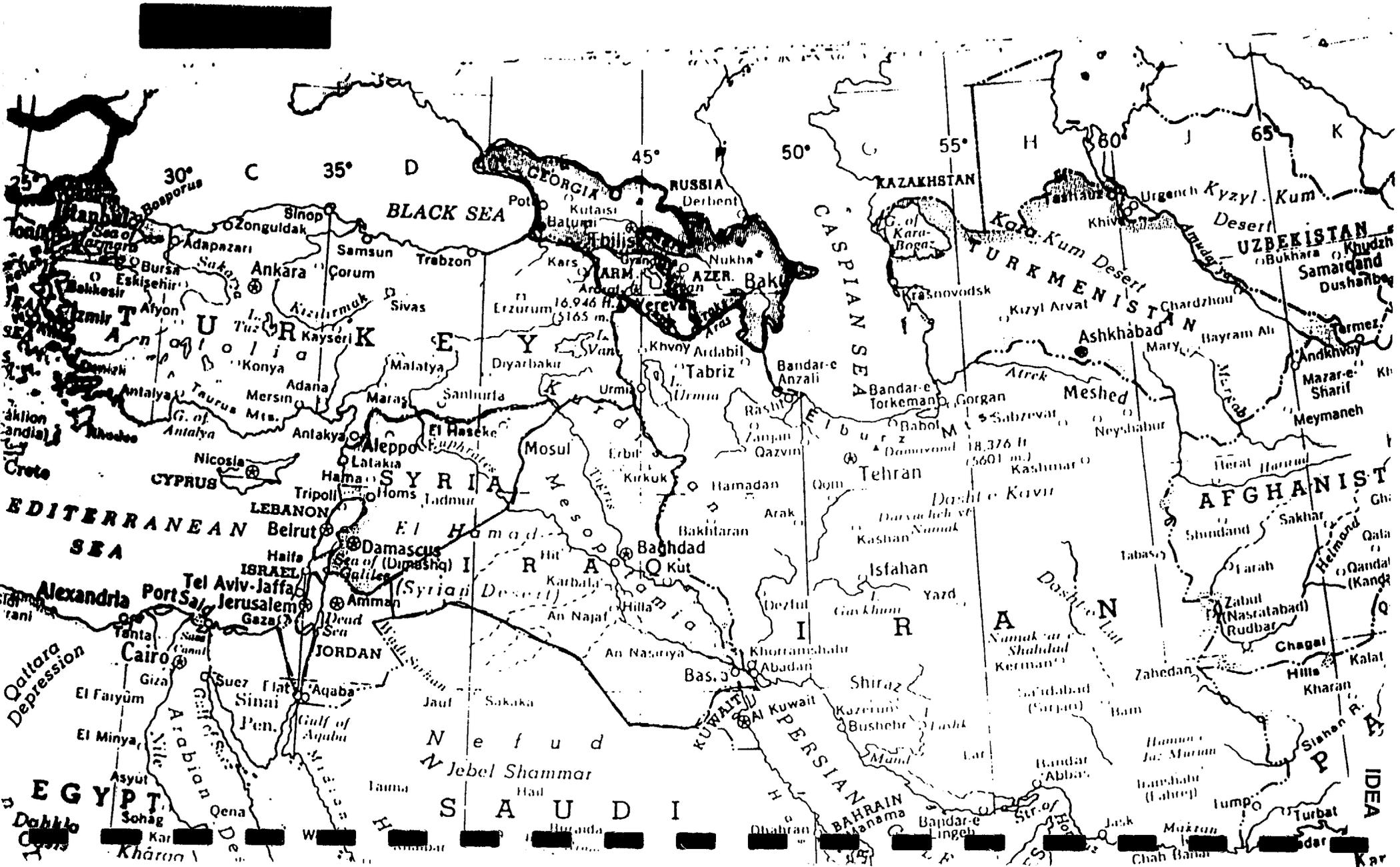
# THE CAUCASUS PANEL AGENDA

Wednesday, January 12  
9:00 am

<u>NAME</u>	<u>ORGANIZATION</u>	<u>TOPIC</u>	<u>TIME</u>
Suzanne Olds	USAID/Caucasus; Mission Representative	OPENING REMARKS	9:00 to 9:05
Harout Topsacalian	USAID/NIS/EET (IDEA, Inc.); Caucasus Energy Advisor	INTRODUCTIONS; CAUCASUS SUMMARY	9:05 to 9:10
Gordon Weynand	USAID/Washington	USAID/CAUCASUS STRATEGY STATEMENT AND REVIEW	9:10 to 9:20
Ross Vartian	Armenian Assembly of America	OVERVIEW OF THE POLITICS IN THE CAUCASUS	9:20 to 9:30
Charles Fafard	R M A	ENERGY EFFICIENCY AND DISTRICT HEATING REVIEW; GEORGIA SUMMARY	9:30 to 9:40
Ed Landis	US Geological Survey	ARMENIA COAL SECTOR REVIEW (SHORT TERM AND LONG TERM PLANS)	9:40 to 9:50
Mark Chenian	Paine Webber	MEDZAMOR NUCLEAR POWER PLANT; OIL/GAS EXPLORATION; PRIVATIZATION	9:50 to 10:00
Ben Sherlock	Burns and Roe	ARMENIA ELECTRICAL SYSTEM OVERVIEW; GEORGIA SUMMARY	10:00 to 10:10
Salman Zaheer	World Bank	REVIEW ON STATUS OF W.B. LOAN; INSTITUTIONAL REFORMS	10:10 to 10:20
Razmig Arzoumanian	K&M Engineering and Consulting, Inc.	HYDRO POWER PROJECTS IN ARMENIA; ALTERNATIVE ENERGY FUND	10:20 to 10:30
Al Skeath	USEA	APRIL '94 ARMENIA ENERGY CONFERENCE; PARTNERSHIP AGREEMENTS	10:30 to 10:40

SCHEDULE & ORDER SUBJECT  
TO CHANGE .

# THE CAUCASUS





# THE CAUCASUS

## Armenia, Georgia, and Azerbaijan

DESCRIPTION	ARMENIA	GEORGIA
<b>CAPITAL</b>	Yerevan (1.2M)	Tbilisi (1.3M)
<b>POPULATION</b>	3,750,000	5,650,000
<b>AREA (Sq. Mi.)</b>	11,500	26,900
<b>PRESIDENT</b>	Levon Ter-Petrossian	Eduard Schevardnadze
<b>OFFICIAL LANGUAGE &amp; ALPHABET</b>	Armenian	Georgian
<b>ETHNIC MIX</b>	Armenian 95% Russian; 5% Kurdish; & Other:	Georgian: 70% Armenian: 9% Russian: 8% Azeri: 5% Other (Ossetian, 8% Abkhazian, Adjarian, etc.)
<b>RELIGION</b>	Orthodox Christian	Predominantly Orthodox Christian with Muslim minorities.
<b>NATURAL RESOURCES</b>	Copper, zinc, aluminum, molybdenum, precious metals, gold, industrial diamonds, and marble	Copper, manganese, zinc, aluminum, molybdenum, precious metals, gold, silk
<b>ENERGY RESOURCES</b>	Hydro potential; Coal deposits (full assessment needed); Oil & Gas (currently under active exploration);	Hydro potential; Coal Mines (surface & underground); Oil & Gas (some existing wells, further exploration needed);
<b>MANUFACTURING</b>	Electrical equipment; chemicals; electronics; textiles; cognac	Machine Tools; steel; trains; wines; cement; meat packing

# THE CAUCASUS

## OVERVIEW OF THE ENERGY SITUATION IN ARMENIA

### REASONS FOR FUEL AND POWER SHORTAGES

- COLLAPSE OF SOVIET UNION
- 1988 EARTHQUAKE WHICH KILLED 50,000 AND SEVERELY DAMAGED INFRASTRUCTURE IN 2ND LARGEST CITY - GIUMRY
- SHUTDOWN OF MEDZAMOR NUCLEAR POWER PLANT (816 MW) AND CURTAILMENT HYDRO CASCADE (550 MW) OF SEVAN-HRAZDAN CHAIN
- BLOCKADE IMPOSED BY AZERBAIJAN AFFECTING THE MAIN GAS LINES AND RAILWAYS INTO ARMENIA
- DISRUPTION OF TRANSPORTATION ROUTES THROUGH GEORGIA
- SABOTAGE OF REMAINING GAS THROUGH GEORGIA

### EFFECTS ON ARMENIA

- 60% OF FUEL SUPPLIES HAVE BEEN CUT OFF AND 38% OF ELECTRIC GENERATION CAPACITY HAS BEEN SHUT DOWN
- > PRE-1988; 3500 MW CAPACITY AND EXPORTED ELECTRICITY

GENERATING CAPACITY	
Oil or Gas Thermal Units	49%
Hydroelectric	28%
Nuclear	23%

- > 1994; 2200 MW --> POLITICS -->
- > 1993 TO PRESENT: AVG. ELECTRIC GENERATING CAPACITY: 800 - 900 MW
- > NEEDS AT LEAST 2000 MW IN SUMMER; 2400 MW IN WINTER

- SIEGE MENTALITY; THREE WINTERS WITHOUT HEAT AND 1 - 2 HOURS OF ELECTRICITY
- INDUSTRY SEVERELY IMPACTED

## WHAT ARMENIA IS DOING TO SOLVE ITS ENERGY PROBLEMS

- OBTAINED \$57 MILLION FROM EBRD TO COMPLETE 300 MW OIL/GAS BURNING UNIT 5 AT HRAZDAN
- INITIATED OIL AND GAS EXPLORATION ON PREVIOUSLY IDENTIFIED OIL AND GAS DEPOSITS
- INITIATED COAL EXPLORATION AND BRIQUETTING OPERATIONS
- RENEWABLE ENERGY SOURCES ARE BEING PURSUED, NOTABLY WIND AND SOLAR HOT WATER HEATING
- GRANTED RIGHTS TO OVER A DOZEN ENTERPRISES TO BUILD MINI-HYDROS
- COMPLETED LAND PRIVATIZATION AND IS COMMITTED TO PRIVATIZATION
- ENTERED INTO SEVERAL AGREEMENTS WITH IRAN REGARDING OIL & GAS SUPPLIES AND POTENTIAL FOR BUILDING GAS PIPELINE TO IRAN
- ENERGY PRICES ARE BEING REFORMED
- ENERGY EFFICIENCY PROGRAMS FUNDED BY USAID ARE BEING IMPLEMENTED

## POTENTIAL PROJECTS IN ARMENIA

- OIL/GAS EXPLORATION; OIL REFINERY STUDY; COAL SECTOR DEVELOPMENT; HYDRO DEVELOPMENT; FUEL (DIESEL & GASOLINE TO DO THE WORK); RENEWABLE ENERGY (WIND; SOLAR HEATING; WASTE TO ENERGY, ETC.); DEVELOP ARMENIAN NUCLEAR REGULATORY COMMISSION; TRAINING OFFICE IN YEREVAN
- LEGAL STRUCTURE AND A REGULATORY STRUCTURE TO PROVIDE INCENTIVE AND GUARANTEES TO PRIVATE INVESTORS
- A FINANCIAL FRAMEWORK TO TAKE ADVANTAGE OF ARMENIAN DIASPORA EAGER AND WILLING TO INVEST IN ARMENIA
- "HONEYMOON MONEY": START-UP ASSISTANCE TO THOSE WILLING TO DEVELOP PRIVATE PROJECTS
- STRATEGIC PLANNING AND DECISION ANALYSIS GROUP TO PERFORM LEAST COST ANALYSIS
- WORK IN GEORGIA & ARMENIA ON PROJECTS WHICH IMPACT BOTH REPUBLICS

**THE POSITIVE**

- **NOTHING IS INSURMOUNTABLE**
- **POLITICAL STABILITY AND WESTERN/DEMOCRATIC OUTLOOK**  
> Democratically Elected President Since 1991
- **COOPERATIVE GOVERNMENT COMMITTED TO REFORM AND PRIVATIZATION**
- **WELL EDUCATED AND ENTREPRENEURIAL WORK FORCE**
- **OPPORTUNITIES IN SOFTWARE; ELECTRONICS; CHEMICALS; TEXTILES; LABOR INTENSIVE R&D**
- **LINKS TO ARMENIAN DIASPORA (Western and NIS)**
- **USAID/NIS/EET (IDEA, Inc.) & STAFF IS LOCATED IN USAID BUILDING AT:**  
AIGEDZOR 10  
- YEREVAN (NEAR AMERICAN UNIVERSITY OF ARMENIA)  
TEL. (From U.S.) - 011 78852 151 389 (AT&T) or  
011 78852 226 621

**HAROUT TOPSACALIAN**

## COMMON PROBLEMS IN THE CAUCASUS

- o Lack of legal framework for the energy sector
  - > policy objectives:
    - > future relation of energy enterprises to the state
    - > role of the private sector
  - > contract law and investment codes
  
- o Lack of market-based prices
  - > subsidization of enterprises
  - > non-payment of energy bills
  
- o All energy sectors run by the state
  - > the same ministry has both policy and operational control
  - > no commercial business orientation
  
- o Inefficient and deteriorating energy infrastructure
  
- o Large capital investment requirements for rehabilitation of existing facilities and construction of new ones
  
- o Extremely energy-intensive economies
  
- o Energy sector is a major cause of environmental damage
  
- o All three nations suffer from conditions of "civil unrest"

## USAID INTEGRATED STRATEGIC OBJECTIVES FOR THE CAUCASUS

- o Aimed mostly at Armenia and Georgia.
- o Government to government assistance to Azerbaijan currently prohibited by the U.S. Congress.
- o **Country Goals:** To embark on a path of strong and sustainable economic growth in a market environment, while moving to restore and surpass 1991 GNP and per-capita income levels by the end of the decade.
- o **Strategic Objectives for 1994-96:**
  - > To provide emergency assistance to each country's most vulnerable groups and simultaneously develop selected components of a social safety net that will endure beyond the immediate crisis.
  - > To establish a climate and enabling institutions for efficient, competitive private-sector markets while stabilizing the economy.
  - > To provide adequate energy for sustainable economic growth and improved quality of life by expanding domestic non-nuclear energy supplies and improving the efficiency of energy consumption.

## USAID ENERGY PROGRAM PRIORITIES

- o Strengthening the capacity of the public and private sector in the areas of energy planning, policy formulation and implementation, investment analysis, and regulatory reform.
  - > energy and investment promotion legislation
  - > pricing reform
  - > creation of regulatory bodies (including nuclear)
  - > institutional restructuring action plans
  - > incorporation of the "informal" economy
  - > training in utility management, project evaluation, etc.
  
- o Assistance with energy demand management.
  - > implement revenue collection systems in parallel with price reform
  - > demonstration of energy conservation potential along with the creation of new norms and standards (e.g., RMA weatherization program)
  - > industrial energy audits
  - > improve efficiency of energy delivery systems
  - > private sector stimulation through enterprise funds
  
- o Limited assistance with the assessment and development of indigenous fossil fuels.
  - > coal production
  - > oil and gas exploration/production
  
- o Exploration and demonstration of the potential contribution of alternative energy sources and promotion of private investment in the development and operation of such sources.
  - > hydro resources evaluation
  - > solar, wind, waste-to-energy, biomass
  - > revolving loan fund
  - > USAID/DOE private sector investment conference
  
- o Mitigation of the environmental impacts of energy production and consumption.
  - > energy sector environmental assessment
  - > critical remedial measures to protect public health

PRELIMINARY ASSESSMENT  
COAL AND OTHER SOLID FOSSIL FUEL  
ARMENIA

ACTIVITIES: Completed preliminary assessment.  
Report in review, transmittal imminent

CONCLUSIONS: Coal and other solid fossil fuel deposits could comprise a much larger portion of the energy budget of Armenia.

All of the solid fuel deposits require exploration and development studies to determine their full extent, complete quality characteristics, and potential for recovery.

In order to mount a modern exploration and development program the responsible Armenian agencies require scientific and technical cooperative assistance and training, and help in the form of equipment and supplies.

COMMENT: The Armenians have initiated exploration of their solid fuels and are producing coal, coaly material, and peat from exploration trenches and shallow surface diggings.

Amount of solid fuels produced in 1993 exceeded 9,600 tonnes of coal and coaly material, plus about 100,000 cubic meters of peat.

About 6,000 tonnes of the coal plus an equal volume of peat have been, or will be, used to produce briquettes.

The other 3,600 tonnes are for direct combustion in small household stoves and in central heating facilities.

More solid fuels can be produced with more fuel and equipment. Greatly increased quantities could be produced if exploration and development allows rational planning for recovery and utilization.



■ Hard coal    ▲ Brown coal    ◆ Oil shale    ⬡ Peat

Fig. 1.

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First Annual USAID/NIS Energy Sector Review  
Workshop

January 10-12, 1994

***An Innovative Approach to Energy  
Development in Armenia***

by

K&M Engineering And Consulting

Razmig Arzoumanian

K&M

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USAID/NIS Energy Sector Review Workshop

**Introduction**

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***What is "Alternative Energy"?***

- Energy Sources That Replace Reliance on Nuclear Power and Imported Oil and Gas, Including:
  - Hydro Power
  - Geothermal Energy
  - Wind Power
  - Solar Energy
  - Domestic Oil and Gas

## **Promising Opportunities**

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### ***Significant Hydro Project Development Opportunities Exist in Armenia...***

- Armenia's Topography and Weather Are Suitable for Significant Hydro Capacity Development
- Over 400 Small and Large Hydroelectric Projects Have Been Identified and Pre-Designed in Armenia, Many of These Are Viable Projects
- Hydroelectric Development Is a Top Government Priority
- Armenia's Government and Legislative Framework Are Highly Reformist and Conducive to Foreign Investment
- Energy Scarcity Has Placed a Premium on Predictable and Reliable Power, Thereby Enhancing Revenue-Side Alternatives for Developers.

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*K&M Engineering And Consulting Corp.*

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## **Constraints to Development**

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### ***But the Current Institutional Environment Presents Significant Risks for Private Investors...***

- The Armenian Public Sector is Unable to Co-Finance Further Expansion - the National Utility Is Financially Unreliable
- Political Instability and Armed Conflicts Continue in Neighboring Republics
- The Legislative and Regulatory Environment Poses Fundamental Uncertainties that Need to be Addressed
- The Overall Economic Environment is Not as Attractive as Some of the Other NIS Countries.

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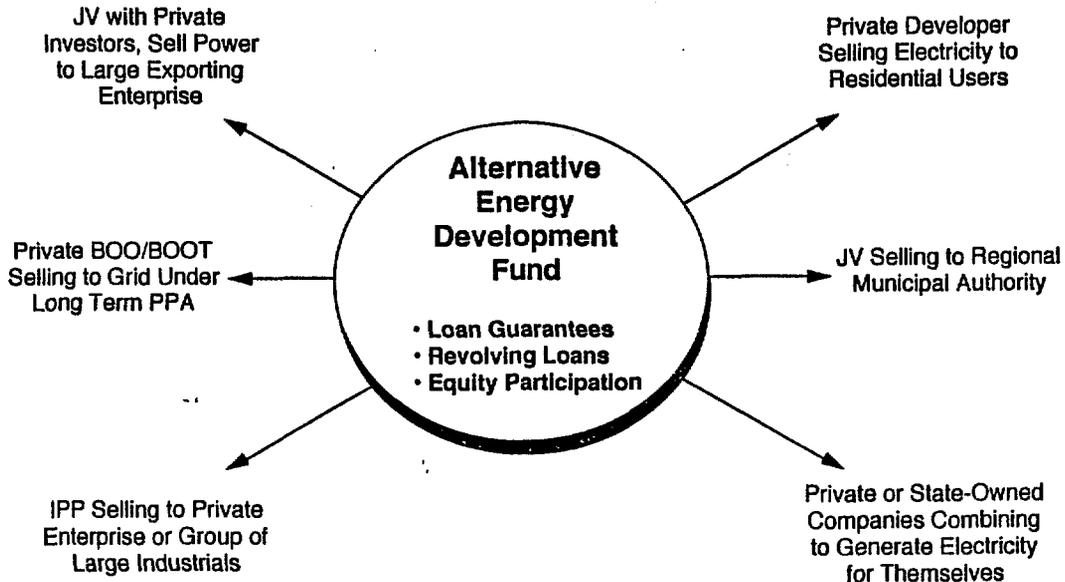
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USAID NIS Energy Sector Review Workshop

## The Alternative Energy Development Fund

*However, International Aid and Lending Institutions Can Act as Catalysts to Attract Private Participation*



K&amp;M Engineering And Consulting Corp.

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USAID NIS Energy Sector Review Workshop

## Objectives of the Fund

*The Alternative Energy Development Fund Would Meet Primary US Interests in the NIS*

- Reduce Need to Reopen Nuclear Power Plant in Armenia
- Provide Catalyst for Privatization and Institutional Reform
- Promote Foreign Investment
- Address Armenia's Priority Needs with Tangible, Long-Term Results.

K&amp;M Engineering And Consulting Corp.

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**Lessons Learned: Armenia & Belarus**

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- Local Counterparts Know Their Problems
- Host Country Counterparts are Much More Proficient in Technical Issues than in Commercial, Institutional and Financial Issues
- Continuity is Necessary in NIS Technical Assistance Relationships
- Dealing with the Highest Levels of Government to Obtain Information and Sponsorship is Critical - But Developing Personal Counterpart Relationships at the Operational Level is Also Crucial
- Translation Should Be Standardized

W/10.01.94  
(

**FIRST ANNUAL USAID/NIS ENERGY SECTOR  
REVIEW WORKSHOP**

JANUARY 10 -12, 1994

**UNITED STATES ENERGY ASSOCIATION  
ENERGY INDUSTRY PARTNERSHIP PROGRAM**

**ARMENIA  
ALBERT H. SKEATH, PROGRAM COORDINATOR**

USEA

**USEA ENERGY INDUSTRY PARTNERSHIP PROGRAM GOALS**

1. To develop non-commercial partnerships between U.S. electrical power, petroleum, and natural gas companies energy companies and their counterparts in the NIS republics to promote technology transfer and improve management practices in the NIS.
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3. To introduce market economy concepts through personnel exchanges, seminars, computer software programming, and dissemination of information on energy issues.
4. To identify technology needs of NIS energy companies and disseminate U.S. technology information through seminars, study tours, and exchange visits.
5. To assist U.S. energy companies gain an understanding of NIS business opportunities, practices and customs, and establish U.S.-NIS contacts for professional business relationships.
6. To enable U.S. NIS partnerships to be sustainable on a long-term basis without U.S. Government financial support.

## ARMENIA ENERGY SECTOR CRITICAL ISSUES

- The Medzamor nuclear plant was shut down in 1989 for safety reasons.
- The operation of the Sevan/Hrazdan system of hydro generating stations has been curtailed for ecological reasons.
- Interruptions and blockades of oil and gas supplies have significantly reduced output at the steam generating facilities.
- Armenian energy personnel lack an understanding of market-based economics and management.
- Armenia lacks an energy legal and regulatory superstructure to encourage and promote investment.

## ARMENIA ENERGY SECTOR STRATEGIES

- Energy Efficiency and Conservation Programs.
- Increased Development of Indigenous fuels.
- Alternate energy sources.

**ARMENIA ENERGY SECTOR ACTIVITIES****FY 1993**

- Senior Manager Internship Programs
- Renewable Energy Study Tour
- Petroleum Finance Seminar

**FY 1994**

- Energy Efficient Buildings Study Tour
- Transfer of U.S. Natural Gas Systems Procedures
- National Energy Plan Implementation Workshop
- Utility Management Seminar

**ARMENIA ENERGY SECTOR WORKPLAN FOCUS**

1. Transfer of U.S. energy industry management experience and technology.
2. Visits and internships at U.S. energy-related facilities to learn about energy efficiency, energy conservation, financial systems, organizational structures, alternate energy sources, and utility regulations.

## CROSS-CUTTING ISSUES

- o Efficiency improvement audits show 15 to 30% improvements can result in fuel/energy production with modest investments
- o Levering international funding institutions brings maximum impact
  - Domestic budgets still uncertain
- o Communications need improvement
  - Among Donors
  - Among All Players
  - Document Center is Needed
  - Reports to be Translated
- o NIS/TF in a short time achieved critical mass
  - Field Offices Operational
  - First Wave of Projects Completing
  - Results Significant to Client
- o Client countries and USAID projects directed at practical results.
- o Balance and diversion of projects addresses critical needs.
- o High priority U.S. Government programs requiring fast USAID response.
  - Gore-Chernomyrdin commission process

## CROSS-CUTTING ISSUES

- o Requirements of Russia and each NIS are different
- o Support provided to U.S. and client government and private sector
- o NIS/TF efforts supports U.S. commercial sector
- o Privatization/ institutional efforts are slow to develop but critically important for success
  - Exposure to Financial and Business Principles
  - Pricing Reform and Follow-through

## CHALLENGES

- Fit new energy activities into strategy(ies) with defined goals
- Relate new energy activities to considerations of market pricing and private sector ownership and operation
- Assure resulting program is void of gaps and overlaps both internally and with activities of other donor organizations
- Assure full comprehension and integration of results by host government agencies
- Attempt identification and avoidance of institutional obstacles during earliest stages of work

## PROGRESS

- Initial Activities
  - Petroleum Refinery Characterization, Audit, and Evaluation to be completed in February 1994
  - Results to be disseminated to Industrial Community
  - Energy Efficiency Conference in Kyrgyzstan (May 1994)
  - Other Scheduled Energy Oriented Conferences Scheduled
  - Definitive Coal Sector Work to begin (Kyrgyzstan) in February
  - Promotion of Coal Miner Health and Safety
- Prospective New Activities
  - Support of World Bank Loan Appraisals (Kyrgyzstan)
  - Various Activities: (Kazakhstan)

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## SUCSESSES

- Initial Activities
  - Energy Efficiency Program in both Cities Completed
  - Independent Evaluation highly Favorable
  - Numerous person-to-person contacts survive
  - First visits of key officials to the United States
  - Activities identified are largely implemented
  - Electric Utility Partnerships are established
  - Clean Coal Study Tour (September 1993)
  - Combined-cycle study tour (November 1993)
- Remaining Activities are currently being addressed

## CENTRAL ASIAN REPUBLICS

(Activities so far only in Kazakhstan and Kyrgyzstan)

- Initial activities based on 1992 visits
- Prospective new activities in process of identification
  - Through collaborative efforts with the World Bank
  - Through late 1993 reconnaissance

## WEST NIS - UKRAINE, BELARUS, MOLDOVA

## CHALLENGES

- Unique Situation of Ukraine and Moldova after Breakup of FSU Has Political Repercussions:
  - Among the Least Reformed Political and Economic Systems
  - In Ukraine Inflation and Erosion of Purchasing Power Are Extreme High
  - All West NIS Countries Are Dependent on Imports of Oil and Gas from Russia and Have Large Arrears in Newly Imposed Hard Currency Payments
  - A Fuel Emergency Has Been Raised as a Possibility in the Ukraine
- Ukraine Is Considered the Most Energy Intensive NIS Economy and Has Effected Few If Any Steps at Making its Use less Wasteful and Harmful to the Environment
- Institutionally Ukraine Has Lagged Other NIS Nations in Reorganizing its Energy Sector, Resulting in Lack of Coordination among Oil, Gas, Coal and Electric Sector Ministries - a Bright Spot Being a Progressive Electric Sector Serious about Restructuring
- Belarus and Moldova Import Practically All Their Energy from Russia and Are Now Exploring Other Arrangements; Ukraine and Belarus Are Strategically Located to Earn Hard Currency Transit Fees from Gas and Electricity Exports from Russia to the Rest of Europe
- In Ukraine, 750,000 Politically Powerful Coal Miners Work in Unsafe Conditions in an Industry That Will Require Subsidies for a Long Time

## ACCOMPLISHMENTS

- In Ukraine and Belarus, Energy Savings with Paybacks of less than One Heating Season Have Been Achieved in Combined Heat and Power Plants and District Heating Plants; Monitoring of Performance of USAID Installed Equipment Is Ongoing
- Institutional Support in Coal Mine Safety and Labor-Management Relations in Ukraine:
  - Has Had Major Impact in Dialogue Between Unions and Mine Managers Through Exposure to US Experience
- Assignments by USAID Funded Technical Teams Have Established the Long Term Relations Prized by Government and Industry Management, Relations Deemed Essential in the Region for the Establishment of Long Term Commercial Relations
- Utility to Utility Partnerships Have Been Established; These and Formal Exchanges with Dozens of Senior Ukrainian Energy Company Officials Have Provided First Hand Exposure to US Management and Technical Practices
- Nuclear Power Plant Risk Reduction Is Being Achieved with the Installation of US-provided Equipment and Operator Training

## PROGRESS

- USAID/KIEV is Ready to Launch an Expanded Energy Program in All Three West NIS Countries, Most Importantly the Ukraine Where Counterpart Receptivity Is High
- USAID/DC is Providing Support to the Mission with Field Resident Contractors; Special Attention Is Being Given to the Needs of the Mission and the Embassy Regarding Possible Fuel Emergencies in the Ukraine
- Strengthening the Competitive Position of Ukraine's Major Manufacturing Export Earner by Undertaking Energy Productivity Improvements in the Steel Sector; Also Establishing a Technical Basis for a Dialogue on Upgrading More Efficient Refineries and Shutting down Least Economic Ones, and Promoting the Restructuring of this Sector
- Improving Coal Sector Economic Performance and Coal Miner Health and Safety By:
  - Demonstrating the Payoffs in Capturing and Commercializing Coal-bed Methane Hazardous to Miner Safety and to the Global Environment, in Cooperation with EPA and the World Bank Global Environment Fund Grant Funds
  - Continuing Contribution of US Coal Sector Unions and Management in Key Coal Mining Regions
- Energy Savings Programs in Housing and District Heating Are Programmed for Kiev, Leading to Very Significant Follow-on Grant Funding by the World Bank GEF Fund

## USAID INTEGRATED STRATEGIC OBJECTIVES FOR THE CAUCASUS

- o Aimed mostly at Armenia and Georgia.
- o Government to government assistance to Azerbaijan currently prohibited by the U.S. Congress.
- o Country Goals: To embark on a path of strong and sustainable economic growth in a market environment, while moving to restore and surpass 1991 GNP and per-capita income levels by the end of the decade.
- o Strategic Objectives for 1994-96:
  - > To provide emergency assistance to each country's most vulnerable groups and simultaneously develop selected components of a social safety net that will endure beyond the immediate crisis.
  - > To establish a climate and enabling institutions for efficient, competitive private-sector markets while stabilizing the economy.
  - > To provide adequate energy for sustainable economic growth and improved quality of life by expanding domestic non-nuclear energy supplies and improving the efficiency of energy consumption.

## USAID ENERGY PROGRAM PRIORITIES

- o Strengthening the capacity of the public and private sector in the areas of energy planning, policy formulation and implementation, investment analysis, and regulatory reform.
- o Assistance with energy demand management.
- o Limited assistance with the assessment and development of indigenous fossil fuels.
- o Exploration and demonstration of the potential contribution of alternative energy sources and promotion of private investment in the development and operation of such sources.

## MAJOR ACCOMPLISHMENTS IN ARMENIA

- o Provided significant quantities of emergency food and fuel supplies to protect vulnerable groups.
- o Demonstrated energy conservation potential in industrial, health, and residential facilities and trained a cadre of technical specialists.
- o Worked with the EBRD to provide a loan to complete the 300 MW clean-burning Hrazdan #5 power plant.
- o Worked with the World Bank to develop an emergency energy loan to rehabilitate the electric distribution system and the thermal power stations.

## CHALLENGES

- o Reforming energy policy and institutions through appropriate legislation.
- o Restructuring energy institutions to provide services on a commercial basis to all consumers.
- o Stimulating the development of the private sector and encouraging private sector investment in a market economy.
- o Reducing energy demand and the energy intensity of the economy in real terms.
- o Coordinating USAID efforts with those of the World Bank, EBRD, EC, and other donors to achieve maximum impact.

## POLICY

- o Pioneering work in power sector restructuring /privatization launched. This will be an extensive effort -- in collaboration with the Russians over next 12 months.
- o Agreement to work collaboratively with a number of key Russian government entities to develop alternate future Russian energy sector development scenarios including option of phasing out unsafe/least safe Russian nuclear plants.
- o Nuclear power plant safety and regulatory improvement work underway (liability issues resolved which had impeded work in a number of areas)
- o Coal mine management, safety and worker management relations improvement program (in a strategically important subsector)
  - Program being implemented through a unique partnership of U.S. coal industry management and labor
  - Field offices in the Kuzbass and Vorkuta in addition to presence in the Rosugol (space provided by them)
- o Large energy efficiency improvement potential (30% in many cases) identified through actual field work in two cities

## STRATEGIC OBJECTIVES

1. Strengthen Russia's ability to pay the cost of reform through increased oil and gas production and exports.
2. Assist restructuring/rationalization of energy <sup>sector</sup> to improve
  - o Operations
  - o Establish competitive environment
  - o Access to international financial markets
3. Development of mutually beneficial commercial relationships between Russia and the United States.
4. Reduction of risk of nuclear power plant accidents.
5. Improvement of environmental performance of sector.

## CHALLENGES

- o Russia a large country and a large energy sector, second only to U.S. energy sector in the world
- o Sector has large needs -- capital input estimated to be about \$40-45 billion per year before economic downturn and even now needs are estimated to be \$10-15 billion per year
- o The country not underdeveloped, misdeveloped -- with advanced technological and manpower base
- o USAID assistance has to be well targeted to deliver meaningful results
- o High priority foreign policy/national security arena -- thus assistance has to immediately respond to high level policy directives
- o Large number of U.S. government and nongovernment entities involved -- hence coordination and orchestration necessary to maximize benefits and minimize confusion amongst Russians
- o Insufficient/limited staffing in the field relative to size of program and importance

# SUCCESSSES/PROGRESS

- Program has achieved critical mass in short time -- recognized by Russian energy sector entities, donors, private sector and donors as playing a key role.
- Program increasingly implemented/developed in full collaboration with counterparts
- A diverse and balanced set of activities responding to critical needs in light of US/USAID comparative advantages and constraints in following areas
- As elsewhere, emphasis on meaningful/practical results