OIT International Activities with China

Background

Since 1978 when economic reforms began, China's Gross Domestic Product (GDP) has expanded at an average rate of over 9 percent per year, increasing the demand for energy as well as causing a variety of environmental issues. China plans to increase annual electricity capacity by about 20 Gigawatts per year throughout the Ninth Five Year Plan (1996-2000); this is equivalent to adding a major electric power station every two weeks. There is also a need to modernize the energy infrastructure and promote energy efficiency within a context where coal is, and will probably remain, the primary energy source.

In terms of energy use per unit of GDP, China has one of the most energy intensive economies in the world. China achieved significant energy savings in the 1980s through a state-administered plan, which used state funds to import advanced technologies. During this time period, the Chinese economy grew by 126 percent whereas energy consumption grew by only 61 percent. According to studies conducted at China's Energy Research Institute, China has the technical potential to achieve a further 40-50% energy reduction by raising its industrial energy efficiency level to international levels.

China's Agenda 21 and Ninth Year Plan place a high priority on energy efficiency. The Ninth Five Year Plan, which took effect in January 1996, ranks energy efficiency equal to energy supply as a priority. China intends to promote the application of new technologies to increase efficiency and strengthen energy conservation legislation and enforcement.

In 1993, the Beijing Energy Efficiency Center (BECon) was established with funding from DOE, EPA, and the World Wildlife Fund. BECon is a Chinese institution, administratively affiliated with the Energy Research Institute, which in turn, is part of the State Planning Commission (SPC). BECon's director, Zhou Dadi, is also the Deputy Director of the Energy Research Institute. BECon promotes energy efficiency in China through policy research, business development, demonstration projects, training, and public education. The center has made significant progress in its four-years of existence, including designing a $100 million World Bank Energy Service Company (ESCO) grant and loan program.

China's industrial sector consumes more than two thirds of China's total commercial energy. The non-state share of industrial output has expanded considerably, but because the state's influence is pervasive over many industrial sectors of the economy, the state still accounts for a large share of energy use.

Industry is highly dependent on the direct use of coal, which accounts for almost 70 percent of industrial energy use; electricity accounts for about 10 percent. China's industrial boilers and industrial furnaces are large consumers of China's end-use energy. In 1991, China had 430,000 boilers, most of which burn coal; these boilers operate at an efficiency rate about 15 percent lower than advanced boilers.

In the energy intensive industries, such as steel, cement and glass, efficiencies are considerably less than their U.S. and Japanese counterparts, due, in part, to the processes not taking advantage of the economies of scale. Other opportunities in the industrial area include improved waste heat, gas, and waste steam recovery; expanded use of cogeneration; improved industrial furnaces and kilns; better monitoring and control systems; the use of improved insulation; and other renovations in thermal and steam systems. There is also an opportunity to install energy-efficient equipment such as boilers, electric motors, and associated electrical equipment.

Due to the construction boom, the market for insulation technologies and materials has the potential to grow rapidly. A substantial retrofit market is also developing. Appliance purchases are increasing, creating an opportunity for consumer education on return on investment of energy-efficient purchases and an opportunity for cooperation on energy- efficient codes and standards and their enforcement.

Other areas of opportunity include: training in integrated resource planning (IRP) and demand side management (DSM) programs with potential financial benefits for residential, industrial and commercial customers, particularly in areas that are being added to the grid and increasing the efficiency of electricity transmission and distribution.

The U.S. Department of Energy (DOE) and China have undertaken several cooperative initiatives addressing the challenges and opportunities associated with sustainable economic development. From February 15 to 24, 1995, former Secretary of Energy Hazel O'Leary led a Presidential Mission to China. The mission was designed to promote U.S.-China cooperation in energy, sustainable development, and free trade and to pursue cooperative ventures that would produce economic and environmental benefits to both countries.

The U.S. and China participants at the breakout session of the mission's Energy Summit agreed to form teams to address opportunities and barriers in ten energy efficiency areas: energy policy, information exchange and business outreach, district heating, cogeneration, energy efficient building demonstration, energy-efficient motors systems, industrial process controls, lighting, amorphous core transformers, and finance.

After the mission, the U.S. organized teams composed of representatives from industry, state agencies, energy associations, the DOE national laboratories, and other interested parties. The U.S. teams drafted action plans which were transmitted to China in Summer and Autumn of 1995. Subsequently in February 1996, similar teams were formed by China. The China teams have been reviewing the U.S. action plans and there is general agreement with the thrust of these plans. The teams' action plans are expected to be finalized in late Spring 1997 during the China-U.S. Energy Efficiency Meeting in Beijing. However, many cooperative team activities are already underway. The Office of Industrial Technologies (OIT) works in conjunction with other offices within DOE to coordinate the teams' work, which is outlined in the following chapters of this document.

ENERGY POLICY

Objective: 1) describe collaborations between the U.S. and China that are currently underway on energy policy; 2) identify opportunities for future collaborations based on the expressed interests of the U.S. members of the policy team.

Status:

The U.S. Energy Efficiency Policy team accomplished its first objective by summarizing ongoing collaborations on energy efficiency policy. The U.S. team's action plan describes 7 ongoing energy projects that involve collaboration between China and the U.S. They are:

1) Integrated Resource Planning and Demand-Side Management; 2) Appliance Efficiency Standards; 3) Standard for Industrial Products; 4) Cogeneration; 5) Market Assessments of Energy Efficiency Products; 6) Identification of Possible Joint Ventures for Renewable and Energy Efficiency; and 7) Transportation Energy Efficiency in China.

After documenting collaborative work already in progress, the U.S team proposed additional projects. China's Energy Efficiency Policy Subgroup met in March 1996 and made recommendations for 3 projects: Develop policy recommendations based on comparisons of Chinese and U.S. macro-level energy efficiency policies; demonstrate efficient lighting systems; and compare product energy intensities in the Chinese and U.S. sectors. Projects will be discussed at the proposed Spring 1997 meeting.

The Chinese have requested U.S. assistance with developing the Energy Conservation Law of China, which is held up in the People's Congress. The Chinese would like U.S. legislative experts to demonstrate how similar legislation is written in the U.S.

China also requested help in creating refrigerator energy efficiency standards and as a first step, Lawrence Berkeley National Laboratory will train three visiting Chinese technicians in the use of analysis tools.

Related Activities:

- The Beijing Energy Conservation Center (BECon), with Steve Nadel of the American Council for an Energy-Efficient Economy (ACEEE), produced an Integrated Resources Planning (IRP) and Demand Side Management (DSM) manual. The manual is available in English and in Chinese.

- BECon held two 3-day training courses in China. The courses focused on IRP and DSM and used the above-cited manual. BECon and the China Electricity Council agreed to continue similar training activities in the future.

- A Shenzhen Utility Regulation delegation conducted a study tour of the U.S. to learn about U.S. experiences with IRP and DSM. BECon is assisting the city government of Shenzhen to

formulate a local energy law which would require the use of IRP and DSM.

- BECon completed its study, "*Environmentally Sound Transportation Development in Beijing*"; which describes Beijing's current transportation situation and related environmental problems and offers policy recommendations.

- BECon, the National Energy Conservation Monitoring Center, and the Chinese Standardization Technology Committee co-sponsored two training courses providing general guidelines for monitoring energy efficiency. The courses were in Dalian. The approximately 100 engineers and administrative staff taking the training are expected to teach others in their localities using the materials provided in the course.

- Three agencies of the Chinese government are working with the U.S. Environmental Protection Agency (EPA) to develop a "golden carrot" program to encourage technology transfer of energy-efficient equipment. The program will be supported by the State Planning Commission (SPC), the State Economic and Trade Commission (SETC), and the Chinese National Environmental Protection Agency. BECon is developing a "golden carrot" proposal and implementation plan as part of its core activities.

- China has identified 20 projects that would reduce carbon dioxide emissions, are financially viable, and for which U.S. investment would be welcome. A collaborative effort between U.S. and Chinese researchers is underway to evaluate these projects.

U.S. Energy Policy Team Members:

Team Leader	**Organization**
Mark Levine	Lawrence Berkeley Laboratory (LBL)

Team Members	**Organization**
Marianne Bailey	EPA
Larry Hill	Oak Ridge National Laboratory (ORNL)
Frank Wang	Armstrong International
Steve Nadel	American Council for an Energy-Efficient Economy (ACEEE)
Chuck Guinn	Strategic Guidance Associates
Lewis Reade	U.S.-Asia Environment
Cheryl Dobbins	Basic Technologies
William Chandler	Battelle, Pacific Northwest Laboratory (PNL)
Tim Olson	California Energy Commission
Sy A. Ali	Allison Engine
David Behnke	J.P. Morgan
Larry Papay	BECHTEL
Jack Siegel	Energy Resources International
Frank Stewart	DOE - Golden Field Office
John Armstrong	Hagler Bailly
Lee Gebert	DOE, Office of Utility Technologies

Brent Lok	Allied Signal

China Energy Policy Team Members:

Team Leader	**Organization**
Wu Changlun	Department of Communications and Energy Industries, State Planning Commission (SPC)

Team Members	**Organization**
Yang Ziwei	Resource Department, State Economic and Trade Commission (SETC)
Feng Xianghua	State Planning Commission (SPC)
Xing Dingguo	Beijing Energy Conservation Center (BECon)
Zhang Guocheng	Industry Department, State Science and Technology Commission (SSTC)
Qiu Qingjun	Standardization Department, State Bureau of Technology (SBT)

INFORMATION EXCHANGE AND BUSINESS OUTREACH TEAM

Objective: 1) ascertain the information needs of U.S. energy efficiency companies 2) request information from China in two main areas: economic and energy statistics and energy efficiency market information; and 3) provide information to the U.S. and Chinese according to their requests 4) act as a focal point for information collection and dissemination for the U.S.-China teams.

Status: Components of the U.S. Information Exchange and Business Outreach Team met in Beijing in 1995 to incorporate Chinese goals and needs into the U.S. draft action plan. The revised plan has since been forwarded to the China team for their review. The teams plan to finalize the action plan at the Energy Efficiency meetings in Spring 1997.

Former U.S. Team Leader Jessica Hamburger surveyed her team members to identify high priority topics for information exchange. Members indicated interest in obtaining information about energy pricing and macroeconomic indicators. In a July 1995 meeting with Hamburger, the China Energy Conservation Investment Corporation (CECIC) agreed to assist the Beijing Energy Conservation Center (BECon) in obtaining energy price data to include in the China Energy Bulletin, a quarterly publication sponsored by the U.S. government.

The U.S. Information Exchange and Business Outreach Team has also initiated a monthly electronic bulletin designed to keep project managers and researchers in the field of energy efficiency in China informed about relevant events, projects, deals, publications, and policies. China energy efficiency updates will be posted on Pacific Northwest Laboratory's homepage at www.pnl.gov/china/

Other projects conducted by the team include an updated version of the China Energy Data Book, market surveys of the top ten energy efficiency technologies for the industrial and buildings sectors, and an assessment of a potential energy efficiency joint investment project. These activities are being collaboratively conducted by BECON, the American Council for an Energy-Efficient Economy, Lawrence Berkeley National Laboratory, Pacific Northwest National Laboratory, and the Energy Research Institute of the State Planning Commission of China.

Other possible activities considered by team members include translating and exchanging publications, exchanging news on upcoming energy conferences and workshops, obtaining listings of investment and demonstration projects seeking foreign participation, exchanging market data on energy efficiency technologies, and obtaining translations of studies related to energy and energy efficiency being carried out by major institutions in China. Future plans include posting more documents on the Internet and helping Chinese organizations improve their connection to the Internet. The U.S. team would like to ensure that interested Chinese agencies have access to energy efficiency data bases such as CADDET. The U.S. team intends to coordinate these efforts with the Center for Renewable Energy and Sustainable Technology (CREST), which is also using the Internet to facilitate energy efficiency information exchange between professionals in developing and industrialized countries.

U.S. Information Exchange and Business Outreach Team Members:

Team Leader	**Organization**
Jeff Logan	Battelle, Pacific Northwest Laboratory (PNL)

Team Members	**Organization**
Larry Hill	Oak Ridge National Laboratory (ORNL)
Mark Levine	Lawrence Berkeley Laboratory (LBL)
Chuck Guinn	Strategic Guidance Associates
Lewis Reade	U.S.-Asia Environment
Cheryl Dobbins	Basic Technologies
Tim Olson	California Energy Commission
John Armstrong	Hagler Bailly
Carl Hocevar	Hagler Bailly
Lee Gebert	DOE, Office of Utility Technologies
Daniel Rosen	International Economics

China Information Exchange Team Members:

Team Members	**Organization**
Shui Bin (liaison)	Beijing Energy Conservation Center (BECon)
Hu Ziaoqiang	Energy Research Institute (ERI)
Cui Lifang	State Statistic Bureau (SSB)
Feng Xianghua	State Planning Commission (SPC)
Feng Yan	State Economic and Trade Commission (SETC)
Yang Daming	State Center of Energy Conservation Supervising
Hu Xiaohong	Information Center of Light Industry Association
Bao Yunqiao	World Energy Newspaper

ENERGY-EFFICIENT MOTOR SYSTEMS

Objective: To facilitate the development, commercialization, and use in China of high-efficiency motors, motor speed controls, and other technologies and practices to improve motor system efficiency.

Status:

The U.S. Energy-Efficient Motor Systems Team proposed an action plan which includes four action items: 1) Prepare a market study on the Chinese motor market; and compile information on efficient U.S. motor products so as to better educate Chinese motor product manufacturers and purchasers and others about advanced motor products; 2) Introduce Chinese and U.S. manufacturers that may be interested in pursuing joint ventures; 3) Exchange information on policies to promote motor efficiency; and 4) Conduct a Chinese Motor Challenge Program. The teams plan to finalize an action plan at the Energy Efficiency meetings in Spring 1997. The teams are also working with International Institute of Energy Conservation (IIEC) on the U.S. DOE Motor Challenge Program.

A market study, funded by OIT/DOE, is being conducted by the American Council for an Energy-Efficient Economy (ACEEE) in conjunction with the Beijing Energy Conservation institute (BECon) and Shanghai Electric Apparatus Institute. A draft of the study has been completed and is expected to be finalized in Spring 1997. ACEEE is working closely with the U.S. team and will use this information to assist companies that are considering entering the China market. The U.S. team plans to compile information on efficient U.S. motor products so as to inform interested Chinese parties about available U.S. products. In addition, BECon and the Shanghai Electric Apparatus Research Institute will provide technical assistance to U.S. companies wishing to obtain additional information on the Chinese motor market.

Related Activities:

- The China Energy Conservation Investment Corporation conducted a study tour of the U.S. in the Autumn of 1995 to learn more about U.S. variable speed drive technologies and innovative financing strategies that can be used to help promote the use of these drives.

U.S. Energy-Efficient Motor Systems Team Members:

Team Leader	**Organization**
Steve Nadel	American Council for an Energy-Efficient Economy

Team Members	**Organization**
Larry Hill	Oak Ridge National Laboratory (ORNL)
Mark Levine	Lawrence Berkeley Laboratory (LBL)
Chuck Guinn	Strategic Guidance Associates
Lewis Reade	U.S.-Asia Environment
Paul Scheihing	DOE, Office of Industrial Technologies
Mark Oven	Hagler Bailly
Rob Boteler	U.S. Electric Motors

China Energy-Efficient Motor Systems Team Members:

Team Leader	**Organization**
Huai Litian	China Energy Conservation Investment Corporation (CECIC)

Team Members	**Organization**
Dai Yande	Beijing Energy Conservation Center (BECon)
Zeng Guandan	Ministry of Chemistry
Li Guitian	Ministry of Metallurgy
Song Shanming	Non-ferrous Metal General Corporation
Zhang Juda	State Bureau of Building Materials
Wang Zhankui	Huaneng Electronic Co. Ltd. of Shenzhen
Zhou Xiaotao	Shenzhen Huaneng Controlling System Co. Ltd.
Li Weike	Jiangmen Liteng Electronic Co. Ltd.
Jia Ruiliang	Shanghai Electric Science Inst, Ministry of Machinery
Yuan Zhijun, liaison	China Energy Conservation Investment Corporation (CECIC)

LIGHTING

Objective: 1) understand the current lighting industry in China including barriers existing in developing energy efficient lighting systems and disseminate this information to both countries; 2) identify the most effective approaches or opportunities, beneficial to both countries, for cooperative activities to promote high efficiency lighting in China.

Status:

The U.S. Lighting Team developed a draft action plan which contains the following activities: 1) make assessments of existing lighting stock based on efficiency ratings, marketing systems, and consumer behavior; 2) evaluate and test existing Chinese manufactured lamps, ballasts, and lighting auxiliary component parts; 3) access Chinese capability to fulfill the internal market; 4) select target areas for demonstrations; 5) implement demonstrations and monitor "before and after" efficiencies of equipment components and systems; 6) publicize results of demonstrations; 7) establish Chinese standards for equipment efficiency; 8) conduct numerous technical and business exchange missions between China and U.S.; and 9) establish a campaign within China to publicize the costs and benefits of efficient lighting for representative sites in the residential, commercial, and industrial sectors.

The Chinese team has submitted their action plan response to the U.S. team. The teams hope to finalize an action plan at the Energy Efficiency meetings in Spring 1997.

Related Activities:

- China has recently completed development of a "Green Lights" program, one of the major energy conservation programs in the ninth five-year plan, which covers the 1996-2000 period. As part of this program, China will work to increase the quantity and quality of high-efficiency lighting products produced in China and will promote high efficiency products and system designs to consumers. This initiative affords potential opportunities for U.S. companies interested in establishing lighting joint ventures in China or interested in providing technologies, equipment, or technical assistance to Chinese manufacturers.

  Jonathan Sinton and Fuqiang Yang from Lawrence Berkeley Laboratory (LBL) visited China to attend a conference on the program on October 10 and 11, 1996. A Chinese Green Lighting delegation traveled to the U.S. in December 1996, visiting energy equipment manufacturers and LBL. The China Green Lighting program is funded through the Beijing Energy Conservation institute (BECon) with a $1 million grant from the United Nations Development Program. In October 1996, BECon opened the China Green Lights Center in Beijing, which exhibits products from 60 manufacturers. BECon is developing standards for lighting products and plans to organize demonstrations and guide major investments being made by the Chinese government. BECon will make recommendations for the use of 250 million RMB (approx. $31 million) in loans to enterprises from the State Economic and Trade Commission. The loans are intended to help improve the technical quality of lighting manufacturing.

- A General Electric - Jiabao joint venture in Shanghai began marketing new products in July of 1995.

- The American Council for an Energy-Efficient Economy (ACEEE) and BECon completed a report on the Chinese lighting market.

- BECon, General Electric, and the Shenzhen Energy Corporation initiated a lighting compact florescent lighting / shared savings demonstration project. The agreement was signed in Spring of 1995 and the lamps were delivered to China in the Autumn of 1995.

U.S. Lighting Team Members:

Team Leader	**Organization**
Tim Olson	California Energy Commission

Team Members	**Organization**
Marianne Bailey	Environmental Protection Agency
Frank Wang	Armstrong International
Mark Levine	Lawrence Berkeley Laboratory (LBL)
Steve Nadel	American Council for an Energy Efficienct Economy (ECEEE)
Lewis Reade	U.S.-Asia Environment
Mike Crosetti	Hagler Bailly

China Lighting Team Members:

Team Leader	**Organization**
Feng Yan	Resource Department, State Economic and Trade Commission

Team Members	**Organization**
Su Jin	China Light Industry Association
Han Aixing	Technology Department, Construction Ministry
Gan Ziguang	Lighting Society
Chen Yansheng	Lighting Association
Li Wuyi	Electron Ministry
Li Jingming	Agriculture Ministry
Yu Cong	Beijing Energy Efficient Center (BECon)

INDUSTRIAL PROCESS CONTROLS

Objective: Within 18 months, begin the implementation of process improvements in at least 9 different industrial firms in China and document the experience after installations are complete.

Status: The Industrial Process Controls Team has developed a five-step action plan which includes: 1) have the Chinese team identify at least 3 plant facilities within 3 process industries (e.g. pulp & paper, chemicals, etc.) which could be candidates for process improvements; 2) to have the Chinese team fill out a questionnaire developed by the U.S. team about the sites; 3) have a two-day meeting in China to discuss and understand the needs and requirements of industrial process control; 4) offer the representatives from the Chinese firms the opportunity to visit plants outside of China where process improvements had been made; 5) negotiate contracts to do process improvements. The Chinese team has submitted their action plan response to the U.S. team; the Chinese agree with each action item, with some modifications. The teams expect to finalize their action plans at the Energy Efficiency meetings in Spring 1997.

Related Activities:

- After visiting China in December 1996, Bill Chandler of Pacific Northwest Laboratory, reported that the Science and Technology Commission of Chongqing has a special office to promote the use of controls for furnaces and boilers and other industrial controls. He stated that Chongqing is willing to buy imported industrial and energy control equipment.

- During the Presidential Mission on Sustainable Energy and Trade to China, led by former Secretary of Energy Hazel R. O'Leary, Honeywell, Inc. and Yangzi Petrochemical Company (subsidiary of Sinopec) signed a commercial contract for a Yangzi PTA Plant Distributed Control System Upgrade. Under the contract, Honeywell is to supply computer-based, distributed control systems, safety management systems, and related services to replace a panel-mounted instrumentation for the PTA plant. The system should produce significant energy and environmental benefits for Sinopec, the Chinese refining and petrochemical conglomerate.

- Honeywell and Sinopec signed a five-year strategic alliance agreement in August 1995 which builds on their previous cooperative joint venture. It calls for Honeywell, a global controls company, to apply advanced process control technology to help Sinopec achieve its vision of becoming a world-class refining and petrochemical corporation by the year 2000. Honeywell moved beyond the hardware it typically provided Sinopec to also deliver software-and services-based advanced control solutions.

- On February 14, 1995, Armstrong International established a U.S.-China joint venture, Kangsen-Armstrong Company, Ltd., to produce high-efficiency steam traps in Beijing. The plant plans to expand annual production capacity beyond 100,000 steam traps per year. Also, the joint venture company has built a sophisticated Steam Energy Training Center.

U.S. Industrial Process Controls Team Members:

Team Leader	**Organization**
Susan Rochford	Honeywell

Team Members	**Organization**
Marianne Bailey	Environmental Protection Agency (EPA)
Frank Wang	Armstrong International
Mark Levine	Lawrence Berkeley Laboratory (LBL)
Chuck Guinn	Strategic Guidance Associates
Lewis Reade	U.S.-Asia Environment
David Keith	Hagler Bailly

China Industrial Process Controls Team Members:

Team Leader	**Organization**
Li Baoshan	Industrial Department, State Science and Technology Commission
Wang Qingtian	China Chemical Industry Information Center

Team Members	**Organization**
representative	Yanshan Petrochemical Corp
"	Huinan Chemical Plant
"	Qingdao Petrochemical Plant
"	Luzhou Natural Gas Chemical Plant
"	Guizhou Chitianhua Co Ltd
Jiang Manxia	Hunan Xiangjiang Fertilizer Plant
representative	China Paper Industry Development Corporation
"	Jiamusi Paper Plant
"	Yueyang Paper Plant
"	Guangzhou Paper Plant

FINANCE

Objective: 1) Identify issues constraining energy efficiency finance in China and advise the U.S. and Chinese government on the findings; 2) Recommend explicit options to create lines of credit for energy efficiency financing.

Status:

The U.S. Finance Team's proposed activities include: 1) assess selected institutional arrangements for creating energy efficiency lines of credit; 2) explore the possibility of creating an on-lending program for energy efficiency through the Chinese Energy Conservation Investment Corporation; 3) evaluate a Chinese proposal to create an energy efficiency "foundation" that would provide a line of credit for energy efficiency. In this approach, a non-profit institution would be created with donations of multiple sponsors.

The team is exploring the possibility of creating an on-going lending program for energy efficiency through the Chinese Energy Conservation Investment Corporation (CECIC). Julie Belaga, Director of the Export-Import Bank of the U.S., has written a letter to Huai Litian, President of CECIC, suggesting that EX-Im Bank and CECIC work to establish a Memorandum of Understanding to cooperate in financing the export of U.S. energy efficiency technology.

U.S. Team Leader, Bill Chandler (Pacific Northwest Laboratory) visited China on November 1, 1995 and met with Huai Litian, President and General Manager of the CECIC in Beijing and the leader of the China Finance Team. CECIC currently controls about $240 million per year in energy efficiency investments; these funds are provided by the State Planning Commission. Mr. Huai said that China welcomes U.S. investors in energy efficiency projects in China and that CECIC will assist with technology transfer and information exchange.

Related Activities:

- A Global Environmental Facility (GEF) grant for $35 million will create 3 demonstration energy service companies (ESCOs) in Beijing, Liaoning, and Shandong to show how ESCOs can deliver efficiency services through market-oriented mechanisms. The funding will also support analysis to be conducted through an information dissemination center; technical assistance to develop institutional capacity in the government and project office; and ESCO promotion. Initial funding of $4.5 million from a European Union grant in April 1997 will maintain the project until the GEF funds are available in 1998. An additional component is a World Bank loan for $65 million to be available in FY 1998. The loan will provide customer finance for the ESCOs. Projects will be co-funded by the Chinese government.

- Three Chinese government agencies are working with U.S. EPA to develop a "golden carrot" program to promote technology transfer of energy-efficient equipment. BECon is developing a "golden carrot" proposal and implementation plan.

U.S. Finance Team Members:

Team Leader	Organization
William Chandler	Battelle, Pacific Northwest Laboratory (PNL)

Team Member	Organization
Linda Silverman	DOE, Office of Policy
Ron Colgan	Caterpillar
Flynn Bucy	EarthKind
Tim Olson	California Energy Commission
Larry Hill	Oak Ridge National Laboratory
Jim Sullivan	World Energy Efficiency
Jim Wolf	Honeywell
Frank Stewart	DOE - Golden Field Office
Mark Levine	Lawrence Berkeley Laboratory (LBL)
Steve Nadel	American Council for an Energy- Efficient Economy (ACEEE)
Matthew Buresch	Hagler Bailly
Art Simonetti	Allied Signal
Suzanne Smith	Hagler Bailly

China Finance Team Members:

Team Leader	Organization
Huai Litian	China Energy Conservation and Investment Commission (CECIC)

Team Members	Organization
Qu Guijin, liaison	China Energy Conservation and Investment Commission (CECIC)
Zhou Dadi	Energy Research Institute, State Planning Commission (SPC)
Feng Xianghua	State Planning Commission (SPC)
Feng Yan	Resource Department, State Economic and Trade Commission
Zhang Guocheng	Industry Department, State Science and Technology Commission
Zhen Yujin	Finance Department, Construction Bank

DISTRICT HEATING

Objective: Within 2 years, begin the implementation of retrofits in 5 district heating sites in China.

Status: The U.S. District Heating Team developed a five-step action plan which proposes: 1) to identify 5 high priority sites, from the perspective of the China team members, to do district heating retrofits; 2) to have the Chinese team members fill out a questionnaire developed by the U.S. team detailing information about each of the sites; 3) to have a day-long session in China attended by representatives of the 5 sites with presentations from U.S. companies and others about district heating projects and financial lenders; 4) to offer interested Chinese officials to visit 2 or 3 district heating retrofits that have been done in Russia or Eastern Europe and meet with company representatives and local executives and officials to learn their experiences; 5) to have each of the 5 sites in China negotiate contracts or issue requests for proposals (RFPs) for actual work to do the district heating retrofit.

Proposals were discussed in meetings with the Chinese who have agreed to provide details to the U.S. team on five high-priority sites and to have a seminar, attended by representatives from the sites, with presentations from U.S. companies and others about district heating projects. The seminar is tentatively planned for Beijing in the Summer of 1997.

Related Activities:

- Honeywell has a contract to retrofit a district heating system in Beijing.

U.S. District Heating Team Members:

Team Leader	**Organization**
Susan Rochford	Honeywell

Team Members	**Organization**
Larry Hill	Oak Ridge National Laboratory (ORNL)
Frank Wang	Armstrong International
William Chandler	Battelle, Pacific Northwest Laboratory (PNL)
Sy A. Ali	Allison Engine
John Pietruszkiewicz	BECHTEL
Pat Cronin	Johnson Controls
El Oliker	Joseph Technology

China District Heating and Cogeneration Team Members: (Note combination of teams)

Team Leader	**Organization**
Huai Litian	China Energy Conservation Investment Corporation (CECIC)

Team Members	Organization
Liu Jie	Urban Construction Dept, Ministry of Construction
Chen Heping	State Planning Commission (SPC)
Zeng Xianglin	Beijing Public Utility Bureau
Xing Dingguo	Beijing Energy Conservation Center (BECon)
Wang Zhenming	China Motor Engineering Association
We Yuhuan	China Urban Heat Supply Association
Guo Jiang	China Energy Conservation Investment Corporation (CECIC)
Chen Wenqi, liaison	China Energy Conservation Investment Corporation (CECIC

COGENERATION

Objective: 1) define a program that would lead to the implementation of cogeneration projects involving the U.S. private sector in partnership with the Chinese at several commercial or industrial sites in China, within two years and 2) within one year after the completion of the above projects, to document the experience and recommend actions that would foster foreign participation in cogeneration in China.

Status: The U.S. Cogeneration Team developed a draft action plan designed to increase the use of cogeneration in China and enhance U.S. participation in Chinese cogeneration projects. The teams hope to finalize the action plan during the Energy Efficiency Meetings in Spring 1997.

The elements of the action plan include: 1) Priority Site Designation; 2) Distributing a questionnaire to obtain site data; 3) Expert Exchange; 4) Information Exchange; 5) Chinese Workshop and Site Visits; 6) Timetable and Status Report; 7) Experience Report. As a component of action item three, a U.S.-China Cogeneration Experts' Seminar, organized by Energy Resources International and Lawrence Berkeley Laboratory, was held in Washington, D.C. in the early summer of June 1996. Participants included Chinese and U.S. government officials, national laboratory personnel, and cogeneration experts from private industry. Participants discussed proposed cogeneration sites and agreed to five action items: prepare a guidebook identifying steps taken in developing cogeneration projects; summarize the policies and practices for implementing cogeneration in China; summarize the cogeneration approval process in China; standardize bidding and contract documents; and collaborate on one or more cogeneration projects.

Related Activities:

- Mr. Xin Dingguo, Chief Engineer of BECon, has published a paper, "*Market Survey and Policy Research on Cogeneration Development in China*." The paper, which provides cost/benefit analysis, information on market barriers, and policy recommendations, can be used as a reference for investment decisions.

U.S. Cogeneration Team Members

Team Leader	**Organization**
John Pietruszkiewicz	BECHTEL

Team Members	**Organization**
Larry Hill	Oak Ridge National Laboratory
Chuck Guinn	Strategic Guidance
Lewis Reade	U.S.-Asia Environment
Sy A. Ali	Allison Engine
Jack S. Siegel	Energy Resource
Mark Levine	Lawrence Berkeley Laboratory

Tim Olson	California Energy Commission
Brooks Howell	Hagler Bailly

China Cogeneration Team Members

Team Leader	**Organization**
Huai Litian	China Energy Conservation and Investment Corporation (CECIC)

Team Members	**Organization**
Liu Jie	Urban Construction Dept, Ministry of Construction
Chen Heping	State Planning Commission (SPC)
Zeng Xianglin	Beijing Public Utility Bureau
Xing Dingguo	Beijing Energy Conservation Center (BECon)
Wang Zhenming	China Motor Engineering Association
We Yuhuan	China Urban Heat Supply Association
Guo Jiang	China Energy Conservation and Investment Corporation (CECIC)
Chen Wenqi, liaison	China Energy Conservation and Investment Corporation (CECIC)

ENERGY-EFFICIENT BUILDING DEMONSTRATION

Status:

The Energy-Efficient Building Demonstration team has not completed a draft action plan. However, team leader Joe Huang of Lawrence Berkeley National Laboratory is working with OIT as well as DOE's Policy Office and Office of Building Technologies to develop an energy-efficient building demonstration. The teams plan to discuss potential activities at the Energy Efficiency meetings in Spring 1997.

Related Activities:

- The China Council for International Cooperation on Environment and Development (CCICED) and the United Nations Development Program (UNDP) sponsored a Workshop on Energy-Efficient Commercial Buildings in Beijing on November 7th-8th, 1995. The workshop's objective was to assemble international experts on energy-efficient building design and operations and bring them together with their Chinese counterparts in the building industry to discuss constructing a demonstration energy-efficient commercial building in China. Mr. Huang and Dale Sartor of Lawrence Berkeley National Laboratory (LBL) and other U.S. participants offered their perspectives on energy efficiency strategies. More than 20 Chinese participants attended the two-day workshop, including representatives from the State Planning Commission (SPC), the State Economic and Trade Commission (SETC), the research and construction branches of the Ministry of Construction, Tsinghua University, the Beijing Energy Conservation Center (BECon), as well as real estate, finance, and development companies, and companies involved in energy efficiency technologies. Several Chinese participants expressed high interest in the concept of a demonstration building and in participating in such a project.

- During a visit by Abe Haspell from DOE to China in late November 1995, the State Science and Technology Commission proposed an energy-efficient building demonstration to be located at Tsinghua University in Beijing. Upon his return, Mr. Haspell met with members of the U.S. Energy-Efficient Building Demonstration Team to discuss the proposed project. The project is being developed.

U.S. Energy-Efficient Building Demonstration Team Members:

Team Leader	**Organization**
Joe Huang	Lawrence Berkeley Laboratory

Team Members	**Organization**
Marianne Bailey	Environmental Protection Agency (EPA)
Larry Hill	Oak Ridge National Laboratory (ORNL)
Mark Levine	Lawrence Berkeley Laboratory (LBL)
Jim Wolf	Honeywell
Lewis Reade	U.S.-Asia Environment

Cheryl Dobbins	Basic Technologies
Tim Olson	California Energy Commission
Pat Cronin	Johnson Controls
William Chandler	Battelle, Pacific Northwest Laboratory (PNL)
Frank Stewart	DOE - Golden Field Office
Mark Lemmond	Owens-Corning
Mike Ellis	Hagler Bailly

China Energy-Efficient Building Demonstration Team Members:

Team Leader	**Organization**
Huai Litian	China Energy Conservation and Investment Corporation (CECIC)

Team Members	**Organization**
Chen Guangfu	State Office of Wall Materials Improvement
Tao Yousheng	State Building Materials Academy
Tian Zhemin	China New Building Material Technology Association
Shi Jinan	Nanjing Glass Fiber Inst, SBBM
Shang Naiwei	Wall Materials Research Inst of Xian, SBBM
Tu Fengxiang	Building Energy Conservation Technology Commission
Gu Tonzeng	Building Sector Association
Xu Jiufa	Beijing Construction Design Institute
Liu Jiangping	Harbin Construction Engineering Institute
representative	China Energy Conservation and Investment Corporation (CECIC)

AMORPHOUS CORE TRANSFORMERS

Objective: To evaluate the use in China of Total Owning Cost (TOC) purchasing of distribution transformers based on accurate valuation of energy losses. To accomplish this the team will need to: 1) determine accurate values for the energy losses from the core and coil of distribution transformers using internationally accepted methods of calculation; 2) encourage the use of these values by power supply bureaus and other customers to determine the total lifetime owning cost of transformers; 3) promote the use of TOC in making purchase decisions; 4) assess the potential impact of amorphous core transformers on the environment in China and include this in the value energy losses, if possible.

Status: The U.S. Amorphous Core Transformers Team developed a seven-step action plan which is comprised of the following actions: 1) priority site designation; 2) questionnaire; 3) visit by team members to each priority region; 4) visits to utilities practicing TOC; 5) report; 6) verification conference; 7) use TOC purchasing in China. The team expects to discuss the action plan during the Spring 1997 Energy Efficiency meetings.

Related Activities:

- In Pudong, AlliedSignal is manufacturing amorphous cores for transformers using ribbon from their South Carolina plant. The plant has 12 customers in addition to exporting to Taiwan and Korea. As a result of AlliedSignal's manufacturing commitment to the Pudong area, the Pudong administration has agreed to promote AlliedSignal's products to companies in Pudong by coordinating a seminar on efficient transformers and inviting the companies in the Pudong industrial parks to attend.

U.S. Amorphous Core Transformers Team Members:

Team Leader	**Organization**
Jeff Lilly	AlliedSignal

Team Members	**Organization**
Steve Nadel	American Council for an Energy-Efficient Economy (ACEEE)
Bill Higgins	AlliedSignal

China Amorphous Core Transformers Team Members:

Team Leader	**Organization**
Yang Ziwei	Resource Dept, State Economic and Trade Commission (SETC)

Team Members	**Organization**
Wu Changlun	State Planning Commission (SPC)
Zhang Guocheng	Industry Department, State Science & Technology Commission (SSTC)

Yue Luqun	Ministry of Electricity Industry
Zhang Lichao	Key Equipment Department, Machinery Ministry
Wei Dong	Technology Department, Metallic Ministry
Chen Xu	CITIC
Feng Yan, liaison	Resource Department, State Economic & Trade Commission (SETC)