INVENTORY OF ENVIRONMENTAL AND ENERGY PROJECTS IN CHINA

U.S. Government Projects

DEPARTMENT OF AGRICULTURE/ FOREST SERVICE

http://www.fs.fed.us/global

Building Natural Resource Policy and Economic Analysis Capacity
Focus: Forestry Policy
Partners: Chinese Academy of Sciences, Center for Chinese Agricultural Policy, Chinese State Forestry Administration
Schedule: Initiated 2004, Ongoing

The USDA Forest Service is working with Chinese partners on a project that helps their staff and forestry managers in China perform sound economic and policy analysis that can be used by their decision-makers. As part of this effort, the partners are supporting topic specific seminars, supplemented by case studies. The Center for Chinese Agricultural Policy is focusing primarily the academic aspects of economic and policy analysis while the State Forestry Administration is focusing on application aspects, especially involving their own staff.

Carbon Storage and Accumulation in Forests of China
Focus: Climate Change
Schedule: Initiated 2004, Ongoing

China and Russia make up most of the Eurasian landmass yet little is known about the carbon budget, especially in China. Therefore, the USDA Forest Service has initiated a project, which is trying to estimate the total carbon stored in China's forests. The project is in the preliminary stages of identifying appropriate collaborators. The goal of the project is to apply the consistent methods used in the U.S. and Russia forest carbon studies to estimate carbon storage in China's forests.

Code for Forest Harvesting Practices
Focus: Forestry Management
Partners: Chinese State Forestry Administration, Food and Agriculture Organization, International Labor Organization
Schedule: Initiated 2003, Ongoing

The Chinese State Forestry Administration with some support from the USDA Forest Service has a project to develop and test codes for forest harvesting practices that can help lead to improved forest management in China. The International Labor Organization in cooperation with the Food and Agriculture Organization provided funding for the initial development phase. The USDA Forest Service supplied harvesting specialists to comment on the draft codes and provided some funding in the development phase and plans to continue to provide technical assistance. The State Forestry Administration is currently in the process of institutionalizing the codes and developing awareness and training in the implementation of the Codes of Forest Harvesting Practices. The Codes are important even though China has a logging ban in place because there are still many areas, such as tree plantations excluded from the ban. In China there the central government is discussing the possibility of allowing some timber harvesting in restricted areas, in which case the new code could provide the basis for better harvesting practices.

Determining Natural Enemies for Mile-a-Minute Weed
Focus: Invasive Species

Partners: Sino-American Lab, Kyoto University, Japan
Schedule: Initiated 2004, Targeted Completion 2006

This cooperative project—titled Determining the Potential for Using Natural Enemies Found in China to Control Mile-a-Minute in the United States—is conducting surveys for natural enemies, establishing colonies of promising natural enemies, and undertaking host range tests in China. Based upon initial host testing, potential natural enemies are being further tested in the United States.

Emerald Ash Borer Invasive Species
Focus: Invasive Species
Partners: Chinese State Forestry Administration and Chinese Academy of Forestry

This recently identified pest to the United States, *Agrilus planipennis*, is causing serious ash mortality in Michigan and surrounding States and Canada. Unfortunately, there is little known about this destructive pest. One of the first activities underway is to conduct a literature review and interviews of what is known about the species, especially the biology, life history, natural enemies and damage. At the same time, the USDA Forest Service is beginning to search for potential biological control agents.

Invasive Pests Collaboration
Focus: Invasive Species
Partners: Chinese State Forestry Administration
Schedule: Initiated 2004, Ongoing

The USDA Forest Service and Chinese State Forestry Administration are collaborating on a number of threatening pests. Examples of collaborative efforts have included providing information on specific pests, hosting information gathering trips, conducting pest risk assessments, and working together on solutions that control invasive species from each other's country. Recent introduced pests where some form of collaboration has occurred include: (1) red turpentine beetle (*Dendroctnus valens*), (2) pine mealybug (*Oracella acuta*), and (3) hemlock wooley adelgid (*Adelges*). The fist two pests are introductions from the United States into China and the third has invaded the United States from China.

Nature-Based Tourism Workshop
Focus: Ecotorism
Partners: Chinese State Forestry Administration, Sichaun Forestry Department, Conservation International, WWF-China,
Schedule: Initiated 2000, Ongoing

A workshop was held in Sichuan in the fall of 2000 to discuss the components of nature-based tourism, specifically ecotourism. The workshop was sponsored by the Sichuan Forestry Department with support from the USDA Forest Service. The USDA Forest Service, Conservation International and the WWF-China provided resource people for the workshop. Additionally, the workshop served as an opportunity for park and reserve managers to share experiences and develop a group to address issues of mutual interest. A general users manual to assist managers in developing nature based tourism enterprises is currently being developed.

Pest Publication
Focus: Invasive Species
Schedule: Initiated 2004, Targeted Completion 2004

This project revised, expanded, and translated two Chinese publications. The first is titled *Parasites and Predators of Forest Pests in China* and the second, *Diseases of Forest Pests in China and their Risk of Invasion into North America*. Both publications will be republished in both Chinese and English. The publications summarize the status of the effectiveness of biological controls for numerous forest pests in China, many of which have been identified as invasive and potential threats to North American forests.

Restoration/Forest Health
Focus: Forest Regeneration

Partners: Chinese State Forestry Administration and Memphis Zoo
Schedule: Initiated 2002, Ongoing

The State Forestry Administration in collaboration with the USDA Forest Service, the Memphis Zoo and others, are collaborating in a project looking at various strategies and practices that can be implemented to facilitate and restore healthy forests in China. This project first identified five forested areas in China with different conditions and needs. In each of the five demonstration areas the project is exploring various treatments to move the forest areas towards a healthier state, while taking into consideration the needs and livelihoods of the local villagers and farmers. Assuming the demonstrations are successful, the State Forestry Administration intends to expand this process to other areas throughout China. As a part of the project, a national-level workshop was held in August of 2002 to share the concept of the project and progress of the demonstration areas, as well as share broader strategies for creating healthier forests through restoration and other forest management practices. Currently, the project partners are refining their work plans and starting to implement activities in each of the five demonstration areas.

Tree-of-Heaven
Focus: Invasive Species
Schedule: Initiated 2004, Ongoing

The purpose of this project is to develop a biological control component and integrated weed management program for *Ailanthus altissima*—the tree-of heaven weed, which is an invasive species from China. This weed forms dense thickets and stands that displace native species. Tree-of-heaven is found throughout 42 states in the United States. The objectives of this effort are to: (1) complete literature searches, inspect museum collections, and talk to scientists concerning this pest, (2) survey and assess the relative effectiveness of native natural enemies in China and the United States, and (3) conduct preliminary host range tests of promising natural enemies.

Wildfire Management Studies
Focus: Forestry Protection
Partners: Chinese Academy of Forestry

The Use of Remote Sensing Technologies to Monitor Fires – The Chinese Academy of Forestry and the USDA Forest Service are collaborating to test remote sensing technologies that can help to promote more efficient monitoring of wildfires. Initial exchange visits have occurred and specific joint activities are now underway. Data collection has been completed for a study to measure and model the distribution of particulate matter from fires and other sources. Another activity validating imagery from Moderate Resolution Imaging Spectroradiometer (MODIS) and testing its utility in monitoring fires is underway.

DEPARTMENT OF ENERGY

www.doe.gov www.oit.doe.gov/international/china.shtml

U.S.-China Protocol for Cooperation in the Field of Fossil Energy Technology Development and Utilization

This protocol was signed in April 2000 and aims to: (1) identify the developing export and international business opportunities in partnership with U.S. private industry in China, (2) develop technical programs and implement policy that will enhance U.S. energy industry's competitiveness in the Chinese market, and (3) promote technologies and solutions that will improve the global environment and increase U.S. energy security. Projects under Annexes I and III-V are described below.

Annex I (Advanced Power Systems)

Power Plant Optimization Software Briefing
Focus: Utility Sector
Partners: Chinese power companies

Schedule: Initiated 2004, Ongoing

This project is to familiarize Chinese personnel with commercially available U.S. plant optimization software packages. Included will be a one-week technology briefing at a Chinese power plant that has a U.S. software package installed. This will be followed by suitability assessments of other plants.

Annex III (Oil and Gas)

Overview and Use of Publicly Available Department of Energy (DOE) Oil and Gas Software

Focus: Oil and Gas Sector

Partners: China Petroleum and Chemical Industries Association

Schedule: Initiated 2004, Ongoing

This project will consist of technology briefings for oil reservoir simulation software that has been developed by DOE.

Annex IV (Energy and Environmental Control Technologies)

Study of CO_2 Capture Using Aqueous Ammonia

Focus: Carbon Sequestration

Partners: National Power Plant Combustion Engineering Technology Research Center (NPCC)

Schedule: Initiated 2004, Ongoing

This project features joint R&D on scrubbing of flue gas with aqueous ammonia to capture CO_2. NPCC has demonstrated CO_2 capture in the high 90-percent range in a new 3-stage spray tower erected in a pilot-scale combustion facility. NPCC has been developing their process to produce a mixed fertilizer product (ammonium bicarbonate/ammonium and nitrate/ammonium sulfate). The National Energy Technology Laboratory has developed and patented a thermal regeneration process for an ammonium bicarbonate product that generates a concentrated stream of CO_2, which could be sequestered, and a more valuable ammonium nitrate/ammonium sulfate fertilizer product.

Annex V (Climate Science)

Climate Change Studies and Models

Focus: Atmospheric Modeling

Partners: China Meteorological Administration, Chinese Academy of Sciences

Schedule: Ongoing

- *Analysis of Atmospheric Circulation Models:* This activity draws on 500 years of Chinese data on the climate of East Asia, and the ability of original climate models to reproduce that data set.
- *Climate Data Preparation and Analysis:* This project consists of the reconstruction of 2000 years of climate data over China that can be used to validate climate models.
- *Measurement of Atmospheric Greenhouse Gas Emissions other than CO_2* This project also draws on the long-term data set available in China. Recent activities have focused on methane emissions (a strong greenhouse gas) from rice paddy fields, including the effect of the change in soil management practices on emissions of methane and nitrous oxide.
- *The Impact of Climate Change on Human Systems* This project focuses on the interplay between climate and human activity in the agriculture in China.

U.S.-China Energy and Environmental Technology Center (EETC)

Focus: Clean Energy Technologies

Partners: Tsinghua University

Schedule: Ongoing

The EETC's mission is to promote the efficient, responsible production and utilization of clean energy and to encourage improved environmental performance, while improving the quality of life in China. The EETC acts as a liaison for the U.S. companies seeking effective entry into the Chinese market for energy and environmental goods and services.

DEPARTMENT OF THE INTERIOR/FISH AND WILDLIFE SERVICE (FWS)

http://www.fws.gov http://international.fws.gov

Cooperation Agreement: U.S.-P.R.C. Nature Conservation Protocol
Focus: Conservation Management, Conservation Training
Partners: Chinese State Forestry Administration, Ministry of Agriculture, Chinese Academy of Sciences
Schedule: Initiated 1986, Ongoing

The Fish and Wildlife Service (FWS) administers activities with China under the bilateral Nature Conservation Protocol, signed in 1986 and currently extended through 2006. Funding comes principally from appropriations to the FWS Division of International Conservation. Exchanges carried out in 2003 included: (1) visit to U.S. of a Chinese delegation headed by State Forestry Administration Leading Member Yang Jiping to review bilateral activities carried out in 1999-2002 and adopt a program of cooperation for 2003-2005; and (2) visit of American wetlands biologists to Yunnan and Zhejiang Provinces, P.R.C. for familiarization with wetlands management in high altitude areas and coastal lowlands. Exchanges scheduled for 2004 are: (1) visit of American wildlife refuge management specialists to P.R.C. for exchange of information on outreach and educational activities, law enforcement, habitat protection, data collection and visitor center displays; (2) visit of Chinese wetlands biologists to U.S. for familiarization with ecosystem-based conservation and restoration efforts in California, Arkansas and Tennessee; and (3) visit of American fishery biologists to Qinghai Lake, P.R.C. to advise on restoration of habitat for naked carp, based on U.S. programs for lake trout and walleye.

LAWRENCE BERKELEY NATIONAL LABORATORY, CHINA ENERGY GROUP

http://china.lbl.gov/china.html

Organizational Background: The China Energy Group at the Lawrence Berkeley National Laboratory is committed to understanding the opportunities for meeting China's growing energy needs through improved energy efficiency, and to exploring their implications for policy and business by collaboratively with energy researchers, suppliers, regulators, and consumers in China.

China Energy Databook
Funding: 115K (Energy Foundation)
Schedule: Initiated 2005, Targeted Completion 2006

This initiative will develop version 6 in electronic format of the comprehensive *China Energy Databook* for public distribution. The current version has only 110,000 data points covering all aspects of energy production, consumption, end-use, trade, environment, and international comparisons

China Energy Efficiency Procurement
Focus: Energy Efficiency
Partners: EPA, Chinese Ministry of Finance, National Development and Reform Commission
Funding: $200K (EPA and Energy Foundation)
Schedule: Initiated 2004, Targeted Completion 2006

This project aims to assist the Ministry of Finance and the National Development and Reform Commission to develop a national and regional program of mandatory government energy efficiency procurement, modeled after the US FEMP program and linked to China's efficiency labeling program.

China Tax and Fiscal Policy Study
Funding: US$145k (EPA)
Schedule: Initiated 2004, Targeted Completion 2005

Compile, review, and summarize tax and fiscal policies in the industrial and building sectors around the world used to promote energy efficiency, as input to China Ministry of Finance development of related policies for China.

China 2020
Funding: $150,000 (Department of Energy)
Schedule: Initiated 2005, Targeted Completion 2006

Assess China's long-term development plan through 2020 with a focus on energy supply, transport infrastructure, environmental impact, policy development and implementation, and international energy trade.

Energy Efficiency Labeling
Partners: EPA, and The Energy Foundation
Funding: US$150k/year
Schedule: Initiated 2000, Ongoing

This project assists the China Center for the Certification of Energy Conservation Products to develop efficiency specifications for consumer products, based on internationally harmonized testing and performance requirements. Recently launched labeled products include computers, monitors, fax machines, copiers, DVD players, and external power supplies. Specifications for Set-Top Boxes are under development.

Minimum Energy Efficiency Standards
Partners: EPA, China National Institute of Standardization
Funding: US$150k/year (EPA and Energy Foundation)
Schedule: Ongoing

Assist the China National Institute of Standardization in the development of minimum efficiency standards for consumer and commercial equipment though transfer of modeling, analysis, and impact assessment approaches. Recently enacted minimum efficiency standards include refrigerators, room air conditioners, central air conditioners, clothes washers, and linear fluorescent lamps. Standards for gas water heaters are currently being developed.

NATIONAL RENEWABLE ENERGY LABORATORY

http://www.nrel.gov/china

Technology Cooperation Agreements Pilot Project/Climate Technology Partnership
Focus: Climate technology transfer
Partners: National Development and Reform Commission (NDRC), U.S. EPA
Schedule: Initiated 1997, Completed 2004

The Technology Cooperation Agreements Pilot Project (TCAPP, www.nrel.gov/tcapp) was an initiative of the U.S. government that assisted developing countries in attracting clean energy investments to meet development needs and reduce greenhouse gas emissions. The National Renewable Energy Laboratory (NREL) and NDRC led the implementation of the TCAPP team activities in China in the areas of: (1) efficient motors, (2) grid-connected wind power, (3) industrial boilers, and (4) clean coal technology. In 2003, work in motors and clean coal technology work was concluded. During 2003, the partners began a new EPA program that focuses on deployment of grid-connected wind power and developing a long-term wind strategy for China to address key barriers in coordination with other wind programs. Main activities in the wind, motors, boilers, and clean coal technology sectors are outlined below:

(1) Wind resource assessment. *(See CES5 for description of activities)*
(2) Wind turbine testing for certification. *(See CES5 for description of activities)*

(3) Wind business partnerships. *(See CES5 for description of activities)*
(4) Boiler Technology Transfer. A pilot site for industrial boiler technologies, fuels, and new operation parameters was identified at the Hui Ro Chu District Heating Company outside of Beijing. An underlying goal of this action was to help facilitate business development activities. Information exchange was facilitated between small- and medium-sized companies, trade organizations, manufacturers, and project developers. The partners completed a review of worldwide advanced technology applicable for industrial boilers and an assessment of appropriate technologies for industrial boilers in China in 2002.
(5) Industrial Boiler Business Partnerships. A study tour in fall 2002 to the eastern United States educated Chinese experts on advanced U.S. and international boiler and boiler-related technologies. Nine delegates from China, including six heads of Chinese manufacturing companies, spent ten days investigating opportunities to transfer suitable technologies with greenhouse gas mitigation potential in China. The study tour included presentations on various technologies and visits to numerous industrial boiler plants. The visit resulted in promising discussions with companies and research centers such as GE, Foster Wheeler, ECR International, the Energy Center at Penn State University, and the Energy Research Center at Lehigh University.
(6) Boilers workshop. A boilers workshop to exchange information on technology and develop potential business partnerships was carried out in Beijing in June 2004. The workshop was the first of its kind and included over 130 participants.
(7) U.S. PFBC Workshop. The emphasis of this project is to lay the foundation for future Sino-U.S. collaboration in pressurized fluidized bed combustor (PFBC) technology. The main activity was a PFBC technology workshop in the United States in January 2003 with key participation from U.S. and Chinese private sector businesses. Major outcomes included information exchange, development of formal understandings such as licensing agreements, and initial project identification for U.S. Trade and Development Agency support. During the workshop, the Chinese team presented Chinese PFBC activities and future plans, including summaries of R&D activities, pilot demonstration activities, and results from completed technical/economic studies.
(8) High-efficiency Motors Systems. *(See CES 5 and 6 for description of activities*)

Wind Technology Partnership (WTP)
Focus: Wind Power
Partners: National Development and Reform Commission (NDRC), U.S. EPA, and DOE
Schedule: Initiated 2003, Ongoing

This project is a direct outgrowth from TCAPP. The project focuses on technology transfer, capacity development, and policy for wind power development in China. Activities in 2004 included a wind developers' training workshop in June 2004 and direct assistance to provincial stakeholders in developing wind concessions and other wind projects in one province.

U.S.-China Protocol for Cooperation in the Fields of Energy Efficiency and Renewable Energy Technology Development and Utilization
Focus: Energy Policy
Schedule: Initiated 1995, Ongoing

This protocol (signed by DOE and MOST) focuses on three sustainable energy goals to: (1) advance world energy security interests by helping China develop more diversified energy resources and reduce its future demand for oil, (2) mitigate environmental damage associated with rapid growth in energy demand through deployment of renewable energy and energy-efficiency measures, and (3) enhance U.S. industry competitiveness in China's energy market. Five of the six protocol annexes pertain to renewable energy, of which NREL implements annexes on rural energy development, wind energy development, business development, policy and planning, and geothermal production and use. A progress report for this bilateral protocol is available on NREL's Web site (www.nrel.gov/china/re_forum.html). Activities under NREL's implementation of the five annexes are outlined below.

Rural Energy Development Annex I

This annex focuses on the use of village-scale renewable energy technologies to provide energy or electricity to rural areas in China.

Ongoing Projects Under Rural Energy Annex I (See CES4 and CES5): *Gansu Solar Home System Project, Great Wall PV Demonstration Site; Inner Mongolia Hybrid Household Project; Rural Biomass Collaboration; Rural Renewable Energy Development Training Activities*

Asia Pacific Economic Cooperation (APEC) Tibet Solar Electrification Project

Two companies have installed 200 solar home systems (30-36 watt systems) in rural areas of Damschung and Phendrop counties within Lhasa prefecture. They also identified business development strategies for photovoltaic (PV) installations in Tibet. Lotus Energy and Wisdom Light Group have implemented this project with assistance from the Boulder-Lhasa Sister Cities Program. In 2003, this project, in collaboration with Greenstar, completed installation of a 1.6 kilowatt PV village power system. In 2004, the project will install an additional 400 watts. In addition, Internet communications and a payment mechanism will be set up to help villagers increase local incomes through export of digital art and music. Other APEC activities in China include work in four areas—renewable energy standards, distributed resources, and micro-business development—in which the United States is pursuing activities jointly with other APEC members.

Wind Energy Development Annex II

Activities under the wind energy development annex focus on accelerating sustainable large-scale development of wind power in both grid-connected and off-grid village power applications in China.

Ongoing Projects Under the Wind Energy Annex II (See CES4 and CES5): *Wind Energy Training, Xiao Qing Dao Village Power Project*

Hybrids Industry Working Group

Focus: Energy Training

Partners: UNDP, UN Department of Economic and Social Affairs (UNDESA)

Schedule: Initiated 2002, Ongoing

DOE/NREL is working with the UNDP to: (1) convene regular meetings of China's hybrid systems integrators, and (2) design and implement training programs for China's hybrid's industry working group.

Renewable Energy Business Development Annex IV

Under this annex, DOE/NREL has undertaken workshops and outreach activities that have been successful in helping U.S. companies facilitate business partnerships and develop markets for renewable energy technologies in China. Previous workshops are outlined in CES5 and recent outreach activities are described below.

Outreach. During 2002 and 2003, the China Renewable Energy Industries Association (CREIA) provided an in-country liaison service as business support for U.S. companies. In addition, CREIA and NREL published fact sheets in 2003 for businesses interested in large renewable energy projects in China. The fact sheets cover eight topics, and can found on the NREL Web site:

Renewable Energy in China: WB/GEF Renewable Energy Development Project.
http://www.nrel.gov/docs/fy04osti/33067.pdf
Renewable Energy in China: Renewable Energy Business Partnerships in China.
http://www.nrel.gov/docs/fy04osti/35785.pdf
Renewable Energy in China: Renewable Energy Policy in China: Overview.
http://www.nrel.gov/docs/fy04osti/35786.pdf
Renewable Energy in China: Renewable Energy Policy in China: Financial Incentives.

http://www.nrel.gov/docs/fy04osti/36045.pdf
Renewable Energy in China: China's Plan for Renewable Energy.
http://www.nrel.gov/docs/fy04osti/35787.pdf
Renewable Energy in China: Township Electrification Program.
http://www.nrel.gov/docs/fy04osti/35788.pdf
Renewable Energy in China: Grid Connected Wind Power in China.
http://www.nrel.gov/docs/fy04osti/35789.pdf
Renewable Energy in China: Brightness Rural Electrification Program.
http://www.nrel.gov/docs/fy04osti/35790.pdf

In 2004, NREL executed a study tour for U.S. renewable energy companies in China, in conjunction with a Village Power System Components Technology Transfer Workshop in Beijing.

Policy and Planning Annex V

This annex, which focuses on renewable energy policy and support of the Brightness Rural Electrification Program, was signed between DOE and SDRC in May 2000. The activities continue in China under NDRC leadership.

Energy Policy
Focus: Renewable Energy Policy
Partners: Center for Renewable Energy Development (CRED)
Schedule: Initiated 1998, Ongoing

Previous renewable policy research by the staff from Center for Renewable Energy Development (CRED), DOE, and NREL led China's National Development and Reform Commission (NDRC) to advocate renewable energy policy incentives to the State Council, including the creation of a Renewables Portfolio Standard, which became part of the Tenth Five-Year Plan (2001-2005). More recently, staff from CRED and provincial Development Planning Commissions were trained in MARKAL and are using the model results to develop renewable energy plans for Hunan province and Xinjiang autonomous region.

Geothermal Energy Production and Use Annex VI

This effort has focused on development of the geothermal heat pump markets and identification and implementation of investment projects.

Geothermal Market Development
Focus: Energy Research, Energy Development
Partners: U.S. Geothermal Heat Pump Consortium, Beijing Jike Energy New Technology Development Company
Schedule: Initiated 2000, Ongoing

DOE, U.S. Geothermal Heat Pump Consortium, and Beijing Jike Energy New Technology Development Company (Jike) identified twelve geothermal heat pump (GHP) projects, three of which—totaling $5.3 million—have been completed by Trane and Florida Heat Pump Environmental Equipment Company. The Beijing Concordia International Apartment Building, which features 501 GHP units, was commissioned in August 2001. The training and demonstration projects under this initiative have contributed to a rapidly growing Chinese market for GHP. In 2004, GHP activities included a market study and the development of a market development strategy for China, as well as an international conference.

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

www.noaa.gov http://www.lib.noaa.gov/china/

U.S.-China Science and Technology Agreement

On January 31, 1979, the United States and China signed the *U.S.-China Science and Technology Agreement* in Washington, D.C. Almost twenty-five years later this umbrella agreement contains over thirty individual protocols for science and technology cooperation based on mutual benefit. Two of these protocols—also signed in 1979—are administered on behalf of the U.S. government by the National Oceanic and Atmospheric Administration (NOAA): the *Protocol for Cooperation in Atmospheric Sciences* and the *Marine and Fishery Science and Technology Protocol.*

Protocol for Cooperation in Atmosphere Sciences

Protocol on Atmosphere Sciences is administered by the National Weather Service (NWS), National Oceanic and Atmospheric Administration (NOAA) for the United States, and the China Meteorological Administration (CMA) for China. The purpose of the Protocol on Atmospheric Sciences is to promote the advancement of meteorological science for the benefit of the public. The principal goal of the Protocol is to improve weather forecasting. Activities under the Protocol involve public domain information and deal with (1) climate and monsoons, (2) mesoscale meteorology, (3) satellite meteorology, (4) atmospheric chemistry, (5) meteorological modernization, (6) exploratory research and (7) a very active scientist exchange called the Training and Participation Program. A meeting to renew the *Protocol on Atmospheric Sciences* was held in Beijing July 2004. Some of the recent climate and monsoon and satellite activities under this protocol are outlined below.

Climate and Monsoons

In 2003 and 2004 Chinese and US scientists had numerous exchanges on issues of climate and monsoons. Some visits included: (1) Several CMA scientists visited NOAA's Climate Prediction Center working towards improving understanding and prediction of the U.S. and China climate. (2) CMA scientist Dr. Peiqun Zhang visited NOAA's Climate Prediction Center for six months to assess the performance of NOAA products including general circulation model simulations and apply these products to understand the impact of the Tibetan Plateau in regional and global climate. (3) CMA scientists participated at the NOAA 27th Annual Climate Diagnostics and Prediction Workshop and at the International Symposium on Climate Change presenting research results from collaboration with scientists from NOAA and other agencies on the long-term change of China climate. (3) A five-member delegation of the Chinese Meteorological Society visited NOAA and discussed with managers and scientists on various topics about climate research, monitoring, and prediction. (4) NOAA scientist Dr. Song Yang visited CMA Shanghai Observatory and presented a seminar on problems and opportunities in studies of the Asian monsoon.

Satellite Meteorology

NOAA and counterparts in China work together in a number of bilateral and multilateral earth observation avenues—the Committee on Earth Observing Satellites (CEOS), the informal Group on Earth Observations, and Argo (China supports several Argo floats for ocean observations). Additionally the two sides have maintained an active exchange of scientists, data, and software on satellite meteorology.

Marine & Fishery Science and Technology Protocol

The Marine and Fisheries Protocol activities span the following five scientific areas: (1) Data and Information Exchange, (2) Marine Environmental Services, (3) Understanding the Role of the Oceans in Climate Change, (4) Living Marine Resources, and (5) Marine and Coastal Management. In China, NOAA's counterpart organizations for this agreement are the State Oceanic Administration, the Ministry of Agriculture, and the Chinese Academy of Sciences.

Climate Change Dialogue

Climate change exchanges and dialogues take place through the U.S.-China Bilateral Dialogue on Climate and through the atmospheric and marine protocols. The United States and China have an

ongoing bilateral dialogue on climate change, managed by the U.S. Department of State, which provides a forum for exchange of climate specific research and endeavors. Since the U.S. and China experience similar climate patterns, both countries recognize the importance of cooperation to better understand the impact of climate on society. NOAA's cooperation with China on climate change focuses on joint research and applications, including expanding access to environmental data from China and encouraging China to be a partner in international climate observation programs. Cooperating with China in these areas is an important step towards improving global climate data coverage and, subsequently, climate forecasts.

Coastal Management
Focus: Integrated Coastal Management
Partners: China's State Oceanic Administration, Various Municipal and Provincial Governments Along China's Coasts
Schedule: Initiated 1998, Ongoing

NOAA is also quite active with China under a Joint Commission on Integrated Coastal Management, established in 1998 in response to recommendations of the U.S.-China Environment and Development Forum. This program supports exchange of expertise and sharing of technical advances in integrated coastal management, including management of marine protected areas, use of information technology to facilitate decision-making, and comparative case studies.

U.S. ENVIRONMENTAL PROTECTION AGENCY

www.epa.gov

Advanced Reburn System Pollution Control
Focus: Air Quality/Control Technology
Partners: Institute for Thermal Power Engineering (ITPE), Zhejiang University, DOE
Schedule: Initiated October 2002, Targeted Completion October 2005

This project provides technical assistance on cost-effective control of NOx, POPs, and other pollutants, such as mercury, from combustion sources. The project includes: (1) a feasibility study of the technology for a candidate boiler, (2) the conceptual design and detailed engineering drawings, (3) the manufacture and installation of the reburn component, and (4) system "shakedown" and testing. Under this project the Beilun Power Plant in Ningbo, Zhejiang province, is interested in applying reburn technology for NOx emissions control. With five 600 MW coal-fired boilers, the Beilun plant is the largest coal-fired power plant in China.

Air Quality Management Assessment
Focus: Air Quality
Partners: SEPA, Chinese Research Academy of Environmental Sciences (CRAES), Shanghai Environmental Protection Bureau, Shanghai Academy of Environmental Sciences (SAES), Shanghai Environmental Monitoring Center, National Monitoring Center
Schedule: Initiated October 1999, Completed October 2004

The Air Quality Management (AQM) Assessment project is assessing the feasibility of applying U.S. AQM methods and technologies to a large Chinese city. Shanghai is the demonstration city for this collaborative assessment. The assessment includes a broad range of air quality management elements, including: (1) development and use of an emissions inventory, (2) design and use of an ambient monitoring network, (3) local and regional air quality modeling, (4) development of control strategies and regulations, and (5) public participation and outreach at the national and local level. The project's principal activities include training, exchanges, and workshops with an emphasis on building capacity in monitoring, inventories, and modeling. AQM workshops were held in Beijing in April 2000 and AQM training took place in the U.S. in March 2002. The assessment report was completed in 2003. Chinese capacity has been strengthened in the areas of monitoring, emission inventories, and local and regional

modeling. Technical tools have been transferred to support economic and environmental assessment. The project will publish a final report on AQM at the national and Shanghai regional levels. EPA will continue assistance to the Shanghai Environmental Protection Bureau in developing a regional AQM plan for the Yangtze River Delta. Under the EPA-SEPA Clean Air Strategy, EPA plans to build upon this project to provide assistance and training to Beijing.

Air Quality Modeling Pilot Project
Focus: Air Quality
Partners: SEPA, Shanghai Academy of Environmental Sciences (SAES), Tsinghua University, Chinese Research Academy of Environmental Sciences (CRAES), Shanghai Environmental Protection Bureau, Beijing Environmental Protection Bureau, Beijing Environmental Monitoring Center
Schedule: Initiated November 2002, Targeted Completion 2008

This project is building capacity and transferring technology to Chinese scientists at the national and regional level to conduct a preliminary scientific assessment of the regional formation and transport of ozone, particulates, and acid rain. EPA will conduct pilot urban air quality modeling projects in Shanghai and Beijing using local developed emissions' inventories. EPA plans to develop an air quality management decision support system in cooperation with the World Bank. EPA plans to assist and train Beijing municipal authorities in conducting a modeling assessment for use in planning the 2008 Olympics.

Asian POPs from Combustion Workshop
Focus: Toxic Substances/Dioxin
Partners: State Environmental Protection Administration, Shanghai Environmental Protection Bureau, Zhejiang University, World Bank, Japan, Environment Canada
Schedule: Initiated January 2004, Targeted Completion October 2004

The Asian Persistent Organic Pollutants from Combustion Workshop took place October 2004 in Shanghai and aimed to support worldwide efforts to reduce POPs released to the global environment. The main objectives of the workshop were: (1) To strengthen the capacities of China for the preparation of NIP, especially the Action Plan for unintentional products under the Stockholm Convention; (2) To share information and experiences from other countries on POPs releases and reductions from combustion processes; (3) To provide an opportunity for government regulators, the regulated community and academic researchers in China to receive and share the information and experience on the management strategies, technological solutions to mitigate and monitor emissions of POPs release from combustion processes; (4) To provide information on strategies and practices to prevent emissions of POPs from incineration through environmentally-sound management and segregation of wastes; (5) To discuss the priority fields on unintentional products in China; and (6) To present and discuss alternatives to incineration for the disposal of wastes. The workshop will disseminate technical information in China and the Asian region for reducing unintentional POPs, one of the greatest environmental threats in the region. It is expected that the workshop will greatly facilitate information exchange with respect to unintentional POPs, including the establishment of a national focal point for this purpose, and the provision of information to the public, particularly decision-makers and affected groups; and encourage and undertake research, development and monitoring of unintentional POPs, and supporting international efforts. The workshop provided a good opportunity for networking and coordinating efforts within the technical community in China and the Asian region for reducing unintentional POPs. The workshop was followed by a conference on combustion and incineration at Zhejiang University in Hangzhou from October 21-23, 2004.

Assessment of Mercury Emissions and Use
Focus: Toxic Substances/Mercury
Partners: Ministry of Science and Technology (MOST), Zhejiang University, USDOE, and USGS
Schedule: Initiated October 2003, Ongoing

EPA is providing technical assistance to Chinese partners for the assessment of mercury emissions and use in China. The effort includes source characterization, emissions inventory, transport modeling,

monitoring, development of a situational assessment, and development of public information materials on mercury risks and management strategies. EPA's Office of Research and Development, in collaboration with US DOE/NETL, is assisting the Institute of Thermal Power Engineering to develop a field test program for characterizing mercury emissions from coal-fired boilers in China, the biggest source of mercury emissions in China.

Beijing Olympics Air Quality Subgroup

Focus: Air Quality/Air Quality Management
Partners: Beijing Environmental Protection Bureau, Beijing Environmental Monitoring Center, Beijing Organizing Committee for the Olympic Games, and State Environmental Protection Administration (SEPA)
Schedule: Initiated 2003, Ongoing

As part of a U.S. inter-agency effort, EPA is assisting the Beijing Organizing Committee for the Olympic Games address air quality management in the greater Beijing region, including monitoring, emissions inventory, modeling, and the development of control strategies.

China-U.S. Partnership in Industrial Pollution Prevention and Energy Efficiency

Focus: Climate Change/Energy Efficiency
Partners: State Environmental Protection Administration
Schedule: Initiated July 2000, Completed October 2004

EPA assisted SEPA in developing voluntary industry-government partnership programs to promote industrial pollution prevention (P2) and energy efficiency (E2) based on pilot programs in Shandong, Liaoning, Guangdong, and Shanxi provinces. An in-depth pilot technical assistance program was conducted in Xinjiang Uyghur Autonomous Region to (1) build capacity for county-level EPBs to provide P2E2 technical assistance to industrial facilities; (2) provide sector-specific training and tools to implement P2E2 practices in food processing and cement industries; and (4) identify policies and incentives to promote P2E2 and water conservation in Xinjiang and Western China. A study tour for SEPA and Xinjiang EPB officials, "Pollution Prevention and Energy Efficiency Policies and Best Practices in US Cement & Food Processing Sectors" was held April-May 2004. In 2003, SEPA launched the nationwide the "China Environmentally Friendly Enterprise" (CEFE) recognition program, modeled on EPA's National Environmental Performance Track. CEFE companies must have an outstanding compliance record, have a certified EMS, undergo a Cleaner Production audit, and commit to quantitative "beyond compliance" pollution reductions. As of September 2003, 135 companies had applied. Thirty CEFE companies were announced in summer 2004. EPA and SEPA conducted training workshops in Xinjiang and Zhejiang Provinces in October 2003, to introduce EPB officials and candidate facilities to the principles of P2, E2 and cleaner production. Over 90 participants were trained. EPA will assist SEPA in developing, piloting and evaluating voluntary industrial pollution prevention and energy efficiency partnership programs through partnerships with trade associations, similar to EPA's Sector Strategies program. The role of industry associations in promoting improved environmental performance is a key subject because China recently dissolved its governmental industrial bureaus (e.g., Bureau of Mines) and is reforming them as non-governmental trade associations. SEPA is interested in learning how EPA works with sustainable industry associations like US BCSD. U.S. participants included US trade associations and their members that are partners in EPA's Sector Strategies program.

Clean Water for Sustainable Cities

Focus: Water Quality/Source Water Protection
Partners: Tianjin Environmental Protection Bureau, SEPA, Ministry of Water Resources, Hai River Conservation Commission, World Bank/GEF, Asian Development Bank
Schedule: Initiated July 2003, Targeted Completion June 2006

The Clean Water for Sustainable Cities project aims to increase public access to safe drinking water and sanitation, and to promote watershed management in the Hai River basin near Tianjin. The project is focusing on protecting the quality of source water at the Yuqiao Reservoir, through improved

management of waste and runoff from villages, hotels and restaurants, fishponds, and agriculture surrounding the reservoir. The project is transferring environmental management tools to the Tainjin Environmental Protection Bureau for sampling storm water runoff and for monitoring and modeling water quality in the reservoir. The project will advance the development of a watershed management plan in collaboration with the GEF Hai Basin Integrated Water and Environment Management Project.

Cleaner Air & Cleaner Energy Technology Cooperation (CACETC)
Focus: Climate Change/Renewable Energy
Partners: National Development & Reform Commission-CCO, Tsinghua University, DOE
Schedule: Initiated October 1998, Completed December 2004

The CACETC is a component of the global, interagency Technology Cooperation Agreements Pilot Project (TCAPP) to transfer clean technologies to developing countries. TCAPP identified technology priorities, formed in-country technology teams, and conducted pilot technology transfer projects in grid connected wind power, efficient motors, clean coal, and efficient boilers. EPA will conduct an Efficient Industrial Boiler workshop in Beijing in June 2004 and will collaborate with DOE in implementing a pilot project on boiler efficiency.

Clearing the Air from Tobacco Smoke: Creating Healthy & Safe Environments for Children
Focus: Air Quality/Indoor Air
Partners: SEPA, World Health Organization
Schedule: Initiated January 2003, Targeted Completion September 2005

EPA and the World Health Organization (WHO) entered into a cooperative agreement in 2000 to develop pilot programs to reduce childhood exposure to environmental tobacco smoke (ETS). ETS was identified as a children's environmental health priority by the G-8 Environment Ministers in 1997, and in 1999 WHO confirmed the significant health risks to children from second hand tobacco smoke. The WHO-EPA project used a social marketing module to train local leaders and to develop community-level action plans. China is one of four countries (including Poland, Latvia, and Viet Nam) participating in this environmental health prevention program. There are five cities (Zhuhai in Guangdong Province, Xiamen in Fujian Province, Qingdao in Shandong Province, Cangzhou in Hebei Province, and Hailin in Heilongjiang Province) in China that were involved in the project. Three of the action plans were funded by EPA and two by China's Ministry of Health. In October 2003, two USPEA experts in environmental tobacco smoke and the social marketing module conducted training workshop for local officials in China.

Comprehensive Management of Unintentional Releases of Dioxins and Furans from Cement Kilns
Focus: Toxic Substances/Dioxin
Partners: State Environmental Protection Administration, DOE/Lawrence Berkeley National Laboratories
Schedule: Initiated April 2004, Targeted Completion March 2007

China produces almost 40% of all cement in the world, and cement kilns (particularly those co-firing hazardous waste) can be a significant source of non-intentional releases of POPs, if not properly controlled and operated. SEPA is equipping a new dioxin laboratory, and in Phase 1 of this project, EPA will provide training and technical assistance to strengthen SEPA's capacity to monitor, analyze and manage unintentional POPs emissions, using cement kilns as a case study. SEPA and EPA will select two provinces as pilots and characterize emissions of dioxins and furans (PCDD/PCDF) from different types of cement kilns. A GIS-based inventory of cement kilns will be created to evaluate the scope of potential releases from the cement sector. SEPA and EPA will develop a training program for permitting cement kilns, which would incorporate ISO 14001 environmental management system standards, as well as performance and operating standards. EPA and SEPA also will build an international partnership for a larger project, using the initial funding as leverage. Subsequent phases depend on availability of resources and ability to recruit other partners. Phase two will build capacity for China to develop strategies to control unintentional releases of PCDD/PCDF from cement kilns used in cement production, and those that are hazardous waste combustors; and Phase three will implement

strategies for retrofitted cement kilns and for state-of-the-art kilns.

Developing Emissions Trading Infrastructure & Institutions
Focus: Air Quality/Market Mechanisms
Partners: Chinese Research Academy of Environmental Sciences, SEPA
Schedule: Initiated April 2004, Completed April 2005

China has a severe SO_2 and acid rain problem. To address this problem, the government has created several policies, including the Total Emissions Control (TEC) policy. The policy limits, or caps, total SO_2 emissions from all sectors of the economy. EPA's Office of Air Policy (OAP) has been working with SEPA since 1999 to help them look at the opportunities and obstacles to implementing market-based programs to control SO_2 emissions. OAP started to work with SEPA to build the capacity for better air quality management and we're focused on five key areas: (1) recommending source-level emission measurement methods, including standards and guidelines for continuous emission monitors and alternative measurement methodologies; (2) assessing different approaches to allocate the TEC quota (and tradable allowances); (3) providing data systems to collect, review and manage emission data, and manage TEC quota (and tradable allowance) information; (4) educating stakeholders about emission trading programs and general environmental policy design, implementation, and enforcement; and (5) providing suggestions for legislative and regulatory language to create credible and effective market-based programs. EPA/OAP transferred a series of tools to SEPA (and is making them available to other governments as well). These tools include training materials, computer simulations to illustrate concepts of emission trading program design and operation, allocation models, emission and allowance registries, and guidebooks on program design and operation. In 2002, EPA completed an assessment of the feasibility of emissions trading in China.

Economy-Environmental-Health Modeling
Focus: Air Quality/Modeling
Partners: Development Research Center, National Bureau of Statistics, Tsinghua University
Schedule: Initiated 2004, Ongoing

The Economy-Environmental-Health Modeling project has constructed and regularly updates a dynamic computable general equilibrium (CGE) model of the Chinese economy. The model has been used to look at the economic, environmental, and health effects of policies to reduce GHG emissions in China. A joint effort by Harvard and Tsinghua Universities collected data on industrial emissions from a number of sources in five Chinese cities. These data have been used to improve the model's parameters for PM and SO_2 emissions. In collaboration with the Chinese National Bureau of Statistics, work is underway to construct a time-series data set to be used to estimate a number of parameters of the economic model.

Economic and Environmental Modeling Workshops
Focus: Climate Change/Modeling
Partners: Energy Research Institute (ERI) of the National Development and Reform Commission (NDRC)
Schedule: Initiated January 1999, Targeted Completion December 2008

The Economic and Environmental Modeling Workshops enhance technical capacity in developing countries to model and run alternative scenarios of measures to address climate change and other environmental concerns. The technical exchange between U.S. and developing country modelers is mutually beneficial, and improves the likelihood that developing countries will evaluate a fuller range of climate policy options within their internal processes. Six workshops were held in China. The most recent workshop took place in May 2004 in Beijing. Workshop proceedings are published on the web: www.pnl.gov/aisu/pubs/#model. EPA is planning a 7th workshop in China. In the meantime, EPA and the ERI are continuing their collaborative modeling efforts.

Energy Efficiency Policy
Focus: Energy Efficiency

Partners: China Center for Certification of Energy Conservation Products, Ministry of Construction Center for Energy Efficiency in Buildings, Association of Shanghai Property Managers
Funding: U.S. EPA
Schedule: Initiated in 2002, Ongoing

EPA works with Chinese partners in the commercial buildings sector to build capacity to achieve reductions in emissions of greenhouse gasses (GHG) and other air pollutants through the adoption of voluntary, profitable measures to reduce building energy consumption. The eeBuildings program assists property owners and managers in Shanghai to implement low- and no-cost actions which can reduce building energy use by 10 to 30 percent while maintaining comfortable lighting levels, temperature and air quality. eeBuildings provides technical assistance through seminars offered with the Association of Shanghai Property Managers, an e-mail newsletter, and www.epa.gov/eeBuildings. The program has trained 100 building owners and managers, responsible for 120 million square feet of space in 135 buildings. eeBuildings plans to expand its efforts to other major Chinese cities.

China Energy Efficiency Voluntary Endorsement Labeling
Focus: Energy Efficiency Standards, Energy Policy
Partners: China Center for Certification of Energy Conservation Products (CECP), Lawrence Berkeley National Laboratory, Energy Foundation, UN Foundation
Schedule: Initiated 2000, Ongoing

EPA works with CECP to strengthen China's voluntary energy-efficiency endorsement label (similar to ENERGY STAR®). Cooperation focuses on: (1) developing label performance specifications for new products which achieves direct emissions reductions and builds capacity to develop future performance levels, and (2) training in ENERGY STAR program management and promotional techniques. EPA shares the expertise of the Energy Star program, which is considered to be the world's most successful voluntary energy-efficiency endorsement-labeling program. This project and other energy-efficient equipment technology work in China builds on more than a decade of successful EPA cooperation with SEPA and other Chinese partners, which began in 1990 with the *U.S.-China CFC-free, Super-Efficient Refrigerator Project.* Working with EPA, CECP has established or revised performance specifications for televisions, clothes washers, room air conditioners, refrigerators, DVD players and printers, which will enable manufacturers to label qualifying products and save over three million metric tons of carbon equivalent (MMTCE) annually by 2010. Specifications are being developed for monitors, computers, copiers, fax machines, and external power supplies.

Integrated Environmental Strategies
Focus: Air Quality/Policy
Partners: SEPA, Shanghai Acaademy of Environmental Sciences (SAES), Tsinghua University, Beijing University, Shanghai Environmental Protection Bureau, Beijing Environmental Protection Bureau, Beijing Environmental Monitoring Center
Schedule: Initiated October 1998, Completed December 2004

The Integrated Environmental Strategies (IES) initiative is building capacity in China to develop, analyze, promote and implement policies that reduce GHGs, improve air quality and protect public health. The IES methodology enables developing countries to assess, quantify and compare clean energy and transport technologies, policies and measures, in terms of the local air quality and public health benefits, GHG reductions and other economic impacts. The methodology is being applied at both the local (Shanghai and Beijing) and national level. The project completed a comprehensive health and economic benefits analysis in Shanghai, conducted national and local policy maker workshops to discuss results, published several papers in Chinese journals and presented results in several international meetings. Substantial local capacity was built to conduct health benefits analysis of energy/environmental policies. The Beijing report was completed in spring 2004 and disseminated. The national study was completed in early 2005. In late 2004, cost analysis work was conducted in Shanghai and there was a national workshop on IES methodology for provincial policy makers and air quality experts.

Management of Lindane
Focus: Toxic Substances/Pesticides
Partners: State Environmental Protection Administration
Schedule: Initiated April 2004, Targeted Completion April 2007

The goal of this three-year project is to reduce global risks from lindane stemming from the production and use of lindane in China. Lindane, also known as gamma-HCH, and its alpha- and beta-HCH isomers, are the most frequently detected organochlorine pesticides in the environment and are globally re-distributed through mechanisms involving oceanic and atmospheric transport. Lindane and its isomers are found in high levels in air, seawater, seabirds, fish, and mammals in the Arctic food web. Phase 1 of the project will develop a detailed situation report on lindane and other HCH isomers in China. This report will include existing information on the following subjects: current and past production of lindane and other HCH isomers from the government, manufacturers, and formulators, including production volumes to track trends, current manufacturing practices with special emphasis on the management of waste isomers; current and historical registered uses for lindane; current practices in the agriculture, veterinary and pharmaceutical sectors with respect to lindane use; availability of registered alternatives; stockpiles; import/export data; and lindane/HCH monitoring data, including levels and trends in air, water, sediment, soils, and biota. Phase 2 will validate the results of the draft situation report by supporting a public meeting in China to solicit comments on the report by all relevant stakeholders. The report will be finalized after this public consultation to reflect public input. The final report will be used as a baseline to quantify the environmental benefits of the project. The AMAP 2002 chapter on POPs will be used as the baseline to quantify reductions in levels of lindane and other HCH isomers in the Arctic over the life of the project. Phase 3 will promote the exchange of scientific and technical information on lindane alternatives by supporting China's participation in a study tour to the USA.

Management of PCBs
Focus: Toxic Substances/PCBs
Partners: State Environmental Protection Administration
Schedule: Initiated 2004, Ongoing

China's State Environmental Protection Administration (SEPA) is implementing a demonstration project in cooperation with the Global Environment Facility (GEF) and other countries to address the lack of complete PCB pollution data, the lack of effective policy, law, regulatory and management systems and the lack of advanced disposal technology. EPA allocated $70,000 in FY2004 funds to design and begin implementation of a cooperative project to complement the GEF demonstration. One area of cooperation under consideration is studying the feasibility of adapting U.S. and other available disposal technologies for application in China and assessing how U.S. technologies may be employed at the GEF demonstration destruction facility in Zhejiang Province and at a centralized disposal facility in Liaoning province. An EPA PCB expert took part in the June 2004 World Bank mission to China to determine the scope of work for the EPA activity.

Measurements to Characterize Mercury Source-Receptor Relationships
Focus: Toxic Substances/Mercury
Partners: State Environmental Protection Administration, CNR Institute of Atmospheric Research, DOE
Schedule: Initiated April 2004, Ongoing

EPA, in collaboration with the Italian CNR Institute of Atmospheric Research, is collecting data at several sites in China along with meteorological and source emission data to determine, via source/receptor models, the form of the species being emitted and emission rates. The project also will determine, using ambient measurements, the form of Hg being emitted from coal fired power plants. In 2004, the project developed a data report on air quality measurements, a monitoring plan, and progress reports on the first scoping measurements.

Mercury Assessment
Focus: Toxic Substances/Mercury

Partners: State Environmental Protection Administration
Schedule: Initiated April 2004, Ongoing

EPA is providing technical assistance to Chinese partners for the assessment of mercury emissions and use in China. The effort includes source characterization, emissions inventory, transport modeling, monitoring, development of a situational assessment, and development of public information materials on mercury risks and management strategies. EPA's Office of International Affairs is working with SEPA to develop a mercury situational assessment.

Mercury Awareness Program
Focus: Toxic Substances/Mercury
Partners: Global Village Beijing
Schedule: Initiated October 2003, Ongoing

EPA awarded Global Village of Beijing a $25,000 to develop a TV program to: promote environmental awareness in China to the dangers of mercury; to encourage public involvement in environmental protection; and to provide guidance to environmental officials. Among other things, the TV program will provide Chinese audiences with information about how mercury is regulated and managed in the U.S. Air Quality

Mercury Emission Monitoring and Transport Modeling
Focus: Toxic Substances/Mercury
Partners: Tsinghua University, US DOE/Argonne National Lab
Schedule: Initiated 2004, Ongoing

EPA is providing technical assistance to Chinese partners for the assessment of mercury emissions and use in China. The effort includes source characterization, emissions inventory, transport modeling, monitoring, development of a situational assessment, and development of public information materials on mercury risks and management strategies. EPA's Office of Air Quality, Planning and Standards, in collaboration with US DOE/Argonne National Lab, is assisting China on its mercury emission inventory and transport modeling.

Minimum Energy Efficiency Standards and Labeling
Focus: Climate Change/Energy Efficiency
Partners: China National Institute for Standardization (CNIS), CECP, LBL, Collaborative Labeling and Appliance Standards Program (CLASP—a collaboration that includes LBL, the Alliance to Save Energy, and the International Institute for Energy Conservation), DOE, UN Foundation, UN/DESA, and Energy Foundation
Schedule: October 2001, Ongoing

The Minimum Energy-Efficiency Standards project is a cost-effective effort that both achieves substantial energy and GHG reductions and builds capacity to achieve reductions in the future. EPA technical assistance to the China National Institute for Standardization (CNIS) and other institutions support implementation of minimum energy efficiency standards and information labels for appliances and other equipment. This activity builds on EPA's energy-efficient CFC-free refrigerator project and high-efficiency room air conditioning project, as well as the China-Lawrence Berkeley National Laboratory (LBL/CLASP) partnership. This activity is coordinated with and complements EPAs voluntary energy efficiency labeling cooperation with CECP. GHG emissions are projected to be reduced by 11.3 MMTCE annually (in 2010) through mandatory minimum EE standards and informational labels. Technical assistance in 2003 supported development of standards for commercial and room air conditioners. In 2004, EPA supported government procurement of energy efficient equipment in Beijing, study issues related to integrating endorsement and comparison labels for the same products, and support the development of a minimum standard for gas water heaters.

Partnership for Clean Indoor Air
Focus: Air Quality/Indoor Air
Partners: All-China Youth Federation, Italian Ministry of Territory and the Environment, World Health

Organization, Shell Foundation

Schedule: Initiated April 2004, Ongoing

The Partnership for Clean Indoor Air (PCIA) is addressing the increased environmental health risk faced by more than 2.5 billion people in the developing world who burn traditional biomass and coal indoors for cooking and heating. EPA is in the process of awarding two grants for pilot projects in China to increase the use of affordable, reliable, clean, efficient, and safe home cooking and heating practices, and reduce people's exposure to indoor air pollution from home cooking and heating practices. In the implementation of the pilots, the grantees will address the following four priority areas: (1) social/behavioral change, (2) market development; (3) technology design, and (4) exposure/health effects monitoring. The Partnership plans to bring together government agencies, industry, nongovernmental organizations (NGOs), community and public health leaders, and other stakeholders to organize workshops whose purpose will be to: (1) address social/behavioral barriers and generate private and public sector commitment/action to implementing improved cooking and heating practices; (2) improve market development of improved cooking and heating technologies; (3) disseminate design and performance guidance for improved cooking and heating technologies; (4) provide capacity building training on technology design and performance testing; (5) disseminate harmonized exposure and health effects protocols; and (6) provide training to increase the capacity of pilot project organizations to conduct exposure assessment and health outcomes monitoring.

Partnership for Clean Fuels and Vehicles – Sulfur Reduction Technology Demonstration

Focus: Air Quality/Transport

Partners: SEPA, Ministry of Science and Technology (MOST), Clean Air Initiative (CAI)-Asia, Italian government, China Automotive Technology & Research Center (CATARC)

Schedule: Initiated April 2004, Targeted Completion December 2006

The Partnership for Clean Fuels and Vehicles Sulfur Reduction Technology Demonstration project will demonstrate mobile source technologies, such as diesel particulate traps, for use with low sulfur fuel. The project will: (1) develop quantitative information on costs, emissions reductions, and health benefits of emission control retrofit technologies on existing vehicles, coupled with appropriate sulfur levels in the fuel; (2) promote the introduction of innovative diesel emission reduction technology as quickly and cost effectively as possible, while providing confidence in the emission reduction performance of the technology; (3) demonstrate retrofit technologies for older diesel vehicles; and develop a program that can be replicated with other fleets.

Real-Time Watershed Management

Focus: Water Quality/Technology

Partners: Shandong Environmental Protection Bureau, Henan Environmental Protection Bureau, Ministry of Water Resources (MWR), SEPA, and U.S. Department of Agriculture (USDA)

Schedule: Initiated June 2001, Targeted Completion December 2005

EPA and the U.S. Department of Agriculture (USDA) are conducting a joint demonstration/research project at two sites in China. This project involves the installation and operation of (a) an innovative membrane system to treat industrial wastewater for reuse at a brewery factory located in Jinan, Shandong Province, and (b) a solar powered buoy water quality monitoring system on the Yellow River, at Huayuankou, 20 miles north of Zhengzhou, the capital of Henan Province. These two sites will be linked through remote telemetry. EPA and USDA will transfer lessons learned from these demonstrations to the Haihe River source water protection project. The solar powered surface water monitoring system has been installed and successfully operated. The wastewater membrane treatment system was installed in 2003.

Studies on Health Effects of Arsenic in Drinking Water in Inner Mongolia

Focus: Toxic Substances/Arsenic

Partners: Inner Mongolia Center for Endemic Disease Control and Research

Schedule: Initiated January 1999, Completed January 2005

The EPA Office of Research and Development (ORD) supported research on the health risks associated with arsenic in drinking water in western Inner Mongolia. The groundwater in this region is naturally contaminated with arsenic, which provided a unique opportunity for assessing health risk. The cooperative research had two objectives: to conduct epidemiological studies to assess the health effects of arsenic in humans; and to conduct toxicological studies to assess dose-response relationships of arsenic exposure in humans, especially at low doses, and to identify biomarkers and neurological/cardiovascular function tests for assessing arsenic exposure and health effects. These collaborative efforts have led to four scientific publications on effects of arsenic and eight papers were presented in an international conference on arsenic exposure and health effects.

Ventilation Air Methane (VAM)/Coal Mine Methane (CMM) Recovery and Utilization in China
Focus: Climate Change/Methane
Partners: State Administration for Worker Safety and China Coal Information Institute
Schedule: Initiated October 2001, Targeted Completion December 2006

Cooperative project with the China Coal Information Institute to fund the China Coalbed Methane Clearinghouse to conduct important outreach efforts to promote the recovery and use of coal mine methane to: (1) reduce greenhouse gas emissions from China's coal sector; (2) make use of an otherwise wasted energy resource, and (3) improve local and regional air quality by substituting methane for coal. Outreach efforts include technical workshops and symposia, operation of a bilingual website and newsletter, publication of a technical journal and preparation of study reports and a feasibility analysis.

Voluntary Energy Efficiency Improvements in Commercial Buildings (EE Buildings)
Focus: Climate Change/Energy Efficiency
Partners: Center for Certification of Energy Conservation Products (CECP), Association of Chinese Property Managers (ASPM), Ministry of Construction (MOC)
Schedule: Initiated October 1999; Targeted Completion December 2006

EPA is working with Chinese partners to build capacity to achieve reductions in emissions of GHG and other air pollutants through adoption of voluntary, profitable measures to reduce energy consumption in commercial buildings. Currently focused in Shanghai, the project promotes voluntary low-cost/no-cost measures by owners and managers of commercial buildings to improve EE, provides EE technical resources through training seminars, website (www.epa.gov/eeBuildings), and newsletters. Project research is helping CECP to develop possible a future building EE label.

Wind Technology Partnership
Focus: Climate Change/Renewable Energy
Partners: Energy Research Institute (ERI), National Development & Reform Commission-Energy Bureau (NDRC), DOE
Schedule: Initiated February 2003, Targeted Completion December 2005

The EPA/DOE Wind Technology Partnership builds upon the CACETC/TCAPP under the UNFCCC. EPA and DOE are assisting NRDC to implement programs, policies, demonstration projects, and investments to expand wind power generation in China over the next decade. This project is under the auspices of DOE's Policy & Planning Annex with NRDC. In 2004, EPA plans to help China to draft the National Renewable Energy Law, to host a training workshop on developing wind projects, and will provide technical assistance in collaboration with UNDP in developing provincial wind projects and building government and stakeholder capacity.

U.S. TRADE AND DEVELOPMENT AGENCY

http://www.tda.gov

Feasibility Studies in China
Focus: Energy and Environment Trade Studies

Schedule: Initiated 2001, Ongoing

The U.S. Trade and Development Agency (USTDA) advances economic development and U.S. commercial interests in developing and middle-income countries. The agency funds various forms of technical assistance, feasibility studies, training, orientation visits, and business workshops that support the development of a modern infrastructure and a fair and open trading environment. USTDA's strategic use of foreign assistance funds to support sound investment policy and decision-making in host countries creates an enabling environment for trade, investment, and sustainable economic development. Operating at the nexus of foreign policy and commerce, USTDA is uniquely positioned to work with U.S. firms and host countries in achieving the agency's trade and development goals. In carrying out its mission, USTDA gives emphasis to economic sectors that may benefit from U.S. exports of goods and services. Clean energy and the environment are two sectors in which USTDA concentrates in China. Recent activities in China addressing air and water pollution, as well as energy include:

Environment (Air and Water Pollution)

- **Shanghai Centralized Medical Waste Treatment Facility Project:** USTDA approved funding for a feasibility study to construct a centralized medical waste treatment facility in Shanghai to modernize and expand medical waste treatment services and management. The grantee for the project is the Shanghai Environmental Protection Bureau. Tetra Tech, Inc. has been selected to perform the study.
- **Composting/Bioconversion Project:** USTDA provided a grant for a feasibility study to assist the Beijing Municipal Administration Commission in developing municipal solid waste composting sites throughout the Beijing metro area in preparation for the Beijing 2008 Olympics. The grant was signed in July 2003. Ericsons Inc. has been selected as the contractor. The study is ongoing.
- **Shanghai Infrastructure Finance Advisory Services:** USTDA offered a grant to provide technical assistance for utilizing corporate bonds to raise revenue for environmental projects in the Shanghai area. Shanghai Water Services Assets Operation and Development Company, Limited is the grantee. The grant was signed in September 2002. The opportunity was competitively bid.
- **Desertification Prevention Project:** USTDA, the National Bureau to Combat Desertification, and China's State Forestry Administration signed a grant to examine irrigation practices and grazing methods to help combat desertification in western and central China. Valmont Industries, Inc. is the contractor for the project. The grant agreement was signed in September 2002 and the study is ongoing.
- **Jiangsu Environmental Monitoring:** This project involves working with the Jiangsu Environmental Protection Bureau (EPB) in establishing automatic air and water quality monitoring stations in Jiangsu Province. The grant agreement was signed in September 2002.
- **Changzhou Wastewater Treatment Project:** USTDA approved a feasibility study grant to the city of Changzhou for the construction of two wastewater treatment plants. The wastewater treatment plants will enhance the city's ability to mitigate severe water pollution problems and will improve downstream water quality by reducing the discharge of untreated water. Montgomery Watson Harza is performing the feasibility study. The grant was signed in late September 2001. The study has been completed and a final report is being drafted.
- **Shanghai Environmental Monitoring Project:** USTDA approved a feasibility study grant for the Shanghai EPB to monitor air and water quality and expand laboratory capabilities. Upgrading the city's monitoring systems yields more efficient ways of screening air and water quality. Tetra Tech, Inc. was selected to carry out the feasibility study. The grant was signed in late July 2001. The study has been completed and a final report has been submitted to USTDA.
- **Shandong Environmental Monitoring Project:** USTDA approved a feasibility study grant to assist the Shandong EPB with an air and water pollution monitoring plan for Shandong Province. The project will upgrade the province's environmental monitoring systems and laboratories to better monitor and address growing environmental problems. Montgomery Watson Harza was selected to carry out the feasibility study. The grant was signed in late July 2001. The study has been completed and a final report has been submitted to USTDA.
- **PetroChina On-line Automatic Monitoring System Project:** USTDA approved a feasibility study grant to partially fund a project that will allow PetroChina to improve its environmental standards by

utilizing on-line automatic monitoring technology. C.H. Guernsey & Co. is performing the feasibility study. The grant was signed in late July 2001. The study is ongoing.

- **Chongqing Wastewater Treatment Plant:** USTDA has approved funding for a feasibility study of a 300,000 m^3/d wastewater treatment plant along the Yangtze River in Chongqing. Liberty Pacific Direct Investments and Montgomery Watson Harza are performing the feasibility study. The grant was signed in March 2002. The study is nearing completion.
- **Automatic Water Monitoring Technologies Orientation Visit:** USTDA funded a visit to familiarize key Chinese central and local government officials in charge of water quality monitoring projects with U.S. technology and expertise in real-time, automatic water quality monitoring technology. The event took place in January 2002.
- **Shanghai Municipal Solid Waste Technical Assistance:** USTDA approved funding for technical assistance for the Shanghai City Appearance and Environmental Sanitation Administration Bureau as it prepares its application to the World Bank for a loan to assist with the Shanghai Urban Environmental Project. The assistance will mainly focus on municipal solid waste. The grant was signed in late April 2002 and Ecology & Environment is performing the study. The study is ongoing.
- **Tianjin Waste Project:** USTDA approved funds to support the Municipality of Tianjin as it establishes a system for the collection, storage, transportation, and disposal of medical and radioactive waste. The establishment of a chemical/hazardous material related emergency response system is also under development. The grant agreement was signed in July 2002 and contractor selection is ongoing.
- **Suzhou Central Hazardous Waste Management Facility:** USTDA approved funds to support the China State Environmental Protection Administration (SEPA)—working in cooperation with the Suzhou Environmental Engineering Company and Suzhou EPB—on a public sector led development of hazardous waste management facilities in the Suzhou region. The grant agreement has not yet been signed.
- **Hangzhou Hazardous Waste Management Facility:** USTDA approved funds to support SEPA—working in cooperation with Hangzhou Dadi Environmental Technology Company and the Hangzhou EPB—on a private sector led development of hazardous waste management facilities in the Hangzhou region. The grant agreement has not yet been signed.
- **Urban Water Supply in Hebei Province:** USTDA has provided funds for a feasibility study grant to assist the governments of several large cities in Hebei province with the commercial assessment and construction of urban water supply systems. The study will focus on diverting large quantities of fresh water from the Yangtze River into Hebei under the guise of the South-North Water Diversion Project. The grant agreement has been concluded and GCW Consulting is performing the study.
- **Sludge Management in Beijing:** USTDA has approved funds for a feasibility study to examine sludge management techniques for wastewater treatment facilities in Beijing. Beijing Drainage owns the facilities and is the grantee for this competed project. The grant agreement was signed in September 2003 and contractor selection is ongoing.
- **Water and Wastewater Treatment in Beijing:** USTDA has approved funds for a feasibility study to examine water and wastewater treatment facilities in Beijing for expansion and upgrade of those facilities. The facilities are owned by the Grantee, Beijing Capital. The study will look at the Ma An Shan water treatment facility and the Yongfen wastewater treatment facility. The grant agreement has been concluded and Black & Veatch is performing the study.

Energy

- **Ningxia Di-Methyl Ether Plant Project:** USTDA provided funding for a feasibility study on the construction of a Di-Methyl Ether Plant in Ningxia, in Western China. The plant will allow Ningxia to develop alternative fuels to alleviate environmental degradation. The grantee for the project is the Ningxia Petrochemical Industry Lingzhou Group Company, Ltd. Contractor selection is ongoing.
- **US-China Natural Gas Institute:** USTDA provided a grant to help establish a natural gas training institute in China. The institute will cover all aspects of natural gas use and will work to promote greater usage throughout China. The Grant was signed in September 2002 with the Gas Technology Institute

(GTI) as the Grantee. GTI and the Chinese State Development Planning Commission are currently conducting the training courses.

- **Shanghai Municipal Electric Power Reliability:** USTDA provided a grant to the Shanghai Municipal Electric Power Company for a feasibility study to assist with upgrading the power network to increase power reliability and quality in the Shanghai area. The grant was signed in August 2003 and EPRI PEAC Corporation is the Contractor for the project. The study has begun.
- **PetroChina Underground Gas Storage Project:** USTDA signed a feasibility study grant with PetroChina to evaluate the technical and economic feasibility of using the Jintan salt deposits for underground gas storage. The grant agreement was signed in September 2002. Parsons Brinckerhoff is conducting the study.
- **Shenhua Direct Coal Liquefaction Project:** USTDA is supporting Hydrocarbon Technologies, Inc. in developing the conversion of coal into clean transportation fuels and chemical feedstock. Shenhua Group is the Chinese project sponsor for this activity. The grant was signed in late July 2001. The study has been completed.
- **West-East Gas Pipeline Project:** USTDA supported Houston-based Universal Ensco's project management bid with a de minimus training grant offer to PetroChina. The grant agreement was signed in mid-September 2001. Construction of this 4,000-kilometer pipeline began in 2001, with completion expected by June 2004. The training has been completed.
- **Geothermal Heat Pump (GHP) Project:** USTDA approved funding for Beijing Jike Energy New Technology Development Company to establish four geothermal heat pump projects in northern China. These projects will demonstrate the ability of GHP technology to heat structures, by using renewable energy. Jacwill Services, Inc. is performing the feasibility study. The grant was signed in late April 2002. The study is ongoing.
- **PetroChina Enhanced Oil Recovery Project:** USTDA approved funding to aid in a feasibility study for an enhanced oil recovery project in Liaoning province. Tradewinds Oil and Gas International Ltd. entered into an agreement with PetroChina to increase the production of oil from the Shuangliu Well Area of China's Liaohe oil field. The grant agreement was signed in July 2002. The study is ongoing.
- **Shanghai Electric Power Orientation Visit:** The Shanghai Municipal Electric Power Bureau is developing a plan to increase energy reliability and quality and expand its power network. The orientation visit occurred June 2-11, 2002 and included discussions with manufacturers and visits to operating power networks.
- **Coal Bed Methane:** USTDA conducted an orientation visit for officials of PetroChina to visit U.S. coal bed methane (CBM) fields and meet with U.S. companies involved in the drilling and recovery of CBM. PetroChina plans to expand its CBM operations in the Qinshui Field and the orientation visit aimed to assist PetroChina to examine different equipment suppliers, including horizontal drilling technologies that could help develop the field.