Department of Energy

The Department of Energy has responsibility for providing for the long-term energy security of the United States. DOE's Arctic and sub-Arctic activities support the DOE mission through studies of energy production, relevant atmospheric/environmental measurements and modeling, and radioactivity.

The Arctic and sub-Arctic activities of the Department of Energy (DOE) include support for projects in three diverse areas:

- Energy production and power generation;
- Atmospheric/environmental measurements and modeling related to climate change; and
- Measurement, modeling, and mitigation of radioactivity.

Assessment of the recoverability and production of methane hydrates and related free-gas accumulations is an important part of these activities. DOE researchers also collaborate with other Federal and state agencies in the development of energy sources that provide affordable and reliable electric power for rural Alaskan villages. There are compelling scientific reasons to study climatic change at high latitudes, as well as elsewhere. Through its Atmospheric Radiation Measurement (ARM) Program, DOE investigates cloud and radiative processes at the North Slope of Alaska/Adjacent Arctic Ocean site (NSA/AAO), near Barrow. The resulting data are used to refine atmospheric models critical to the understanding of potential climate change. The DOE continues to have an interest in understanding radiological issues in the Arctic in general and Alaska in particular. Examples include projects that measure and model the transport of anthropogenic and natural radionuclides in the atmosphere, soil, and aquatic systems. The following is a list of projects and programs that are wholly or partly focused on the Arctic.

	Funding (thousands)	
	FY 02	FY 03
Amchitka Island Project	1,340	400
Arctic Energy Office	3,000	5,500
Arctic Methane Hydrates	3,250	3,720
Atmospheric Radiation Measurement Program	3,200	3,200
Geothermal Activities in Alaska	0	100
Global Meas of Radionuclides and JCCEM/Arctic Transport Studies	160	150
Nat Institute for Global Env Change	100	200
Neighborhood Environmental Watch	40	40
Wind/Renewable Activities in the Arctic	1,240	1,500
Total	12,330	14,810

Amchitka Island Project

Amchitka Island is located about 1,340 miles southwest of Anchorage, near the western end of the Aleutian Islands. The U.S. Atomic Energy Commission, the predecessor to DOE, conducted three underground nuclear tests on the island in the late 1960s and early 1970s. The first test was part of a program to differentiate between an earthquake and a nuclear detonation. The following two tests were part of the weapons effects program.

In 2002 the DOE's National Nuclear Security Administration's (NNSA) Nevada Site Office prepared and submitted a Closure Report to the Alaska Department of Environmental Conservation for the surface remediation work completed in 2001, which consisted of placing engineered covers on numerous drilling mud pits on the island. The report included a risk assessment for material existing on the surface from past spills.

In 2003 the DOE completed computer modeling of the subsurface environment for evaluating groundwater flow and associated contaminant transport from each underground test area. In addition, the potential for release of radionuclides into the marine environment from each test location was evaluated, and an associated human health risk assessment report was released.

Arctic Energy Office

The Arctic Energy Office (AEO) was established by PL 106-398 to support research that is appropriate for regions "where permafrost is

present or located nearby." Specifically the office is to sponsor research in two broad categories:

- Fossil energy, by promoting research, development, and deployment of enhanced oil recovery, drilling technologies, transportation systems, gas hydrates, conventional and unconventional gas, etc., and
- Remote power, by promoting research, development, and deployment of small hydroelectric facilities, wind, geothermal, fuel cells, and other alternative energy technologies.

To ensure that the most urgent research needs are being addressed, the AEO collaborates with state and Federal agencies, the energy industry (oil, natural gas, coal, and power generation), the environmental community, and the general public. The majority of AEO-funded projects are selected by two industry panels, one for each category listed above, and are coordinated through the University of Alaska Fairbanks under a five-year cooperative agreement that began in FY 2001.

Access to Federal and state lands is a critical factor for future exploration and development of oil and gas in Alaska. Ice roads are the preferred method for providing access to drilling sites on the North Slope. Water to build these roads is pumped from tundra ponds, which has resulted in controversy because there is little precipitation on the North Slope and little water flow except during the snowmelt in the spring. One project sponsored by the AEO examines the amount of water that can be safely pumped from tundra ponds and lakes. Similarly an AEO-sponsored research project being conducted by the Alaska Department of Natural Resources' Northern Region Land Section is investigating the potential for a new standard for tundra travel that will allow exploration activity, including seismic and exploration drilling activity, to be permissible for an increased period of time. The objective is to increase the exploration window to at least 130 days per season. In recent years the number of days in which the North Slope is "open" for exploration has been just over 100. Finally the office is collaborationg with the North Slope oil producers to identify novel gas treatment options that, if proven, could lead to significant reductions in the capital and operating costs associated with delivering North Slope natural gas to the lower-48 states.

In addition to addressing oil and gas research needs, the Arctic Energy Office sponsors research aimed at providing reliable and affordable power to remote villages. There are over 200 small Alaskan villages not serviced by an electric distribution grid system. While many villages are clustered along rivers or the coastline, they have very little infrastructure and no connection to the road system. Those located on rivers may be served by barges during the summer. Most are served by air transport year-round. The lack of transportation options complicates the economics of power generation. Most of these villages have diesel generators and small distribution systems. The cost of power in these villages runs from $0.20 up to as much as $0.80 per kilowatt-hour. The cost is heavily subsidized by the state government, but that subsidy is due to be reduced and phased out.

Many of the remote sites have potential for improving the efficiency of their diesel generators and for developing non-diesel energy resources. Villages located on or near the major rivers may benefit from run-of-the-river hydropower systems. Coastal locations have consistent and strong winds and strong tides that could be harnessed. Some locations have the potential for shallow natural gas, coal bed methane, or gas hydrates. Still others have identified coal beds in the region, but most of these are not defined or developed.

Following is a partial list of AEO-sponsored projects:

- Tundra travel model for the North Slope of Alaska;
- Physical, biological, and chemical implications of mid-winter pumping of tundra ponds (http://www.uaf.edu/water/projects/NorthSlope/lake_recharge/index.html);
- Injection of carbon dioxide for recovery of methane from gas hydrates;

Why Focus on Alaska?

- Alaska contains 22% of the total U.S. oil reserves (7.1 billion barrels) and 19% of the total U.S. natural gas reserves (36 trillion cubic feet—tcf).
- Alaska produces 19% of the total U.S. oil production (0.963 million barrels per day).

With regard to undiscovered resources:

- The USGS mean estimate for the National Petroleum Reserve–Alaska (NPRA) is 10.6 billion barrels of oil. The NPRA is partially open for exploration, and some discoveries have been announced.
- The USGS mean estimate for the Arctic National Wildlife Refuge (ANWR) is 10.4 billion barrels.
- The USGS and MMS estimates for undiscovered technically recoverable oil for onshore and offshore Alaska total almost 100 billion barrels of oil and natural gas liquids.
- The USGS estimate for technically recoverable natural gas for the entire North Slope region is 61.4 tcf.

Tracked vehicle of the type used for many years for tundra access in winter. Vehicles with very wide tires called rollagons are also used for this purpose.

- Rural Alaska coalbed methane: application of new technologies to explore and produce energy;
- South central Alaska natural gas supply study;
- Low-rank coal grinding performance vs. boiler performance;
- Characterization and alteration of wettability states of Alaskan reservoirs to improve oil recovery efficiency;
- Transportation issues in the delivery of gas-to-liquids products from Alaska North Slope to market;
- Solid oxide fuel cell system for remote power generation;
- Diesel-fueled solid oxide fuel cell system for remote power generation;
- Village power systems performance monitoring;
- Effects of village power quality on fuel consumption and operating expenses;
- Galena electric power situation options analysis; and
- Development of tilt-up, guyed, tower, and foundation system for wind turbines.

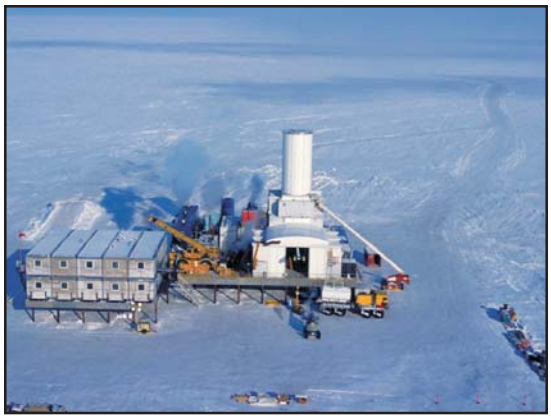
Arctic Methane Hydrates

The DOE is involved in several projects aimed at evaluating the methane hydrate resource on the North Slope of Alaska and in the Canadian Arctic. The primary objective of the effort is to characterize, quantify, and determine the resource potential of the gas hydrate and associated free gas in the region. The U.S. Geological Survey (USGS) estimates that roughly 45 tcf of methane is stored in the form of hydrate beneath the North Slope permafrost.

The USGS and DOE are working with industry partners to sample wells of opportunity and run well logs through the permafrost to the base of the gas hydrate stability zone. Wells have been sampled and logged in the Tarn and Milne Point units with Phillips (now ConocoPhillips) and BP Exploration–Alaska. Mud log and temperature data were correlated with gas sample analyses to identify the gas-hydrate-bearing formations at these locations. Observations from these wells provide data points for improving future hydrate resource estimates for the North Slope. Additional well sampling is anticipated in the NPRA, farther west.

BP is in the second year of a project to evaluate the hydrate potential of the Milne Point unit. The University of Alaska Fairbanks is developing a detailed reservoir model of the depositional environment and reservoir parameters from well logs. The reservoir model will be integrated with the geological structure model being developed from the shallow, 3,500-foot-depth, three-dimensional seismic data by the University of Arizona to identify fault control and seismic attributes related to permafrost, gas hydrate, and free gas distribution across the Milne Point study area. Results to date indicate there is a complex geometry of fault blocks that controls sediment and the distribution of gas in the shallow section. Discussions will be initiated in the third quarter of FY 2004 to develop the Phase 2 well plan.

Maurer Technology is in the second and final year of a project with Anadarko Petroleum Corporation to evaluate and test technologies for drilling, coring, seismic imaging, and sampling the hydrate stability zone in the area between the



Aerial view of Anadarko's Arctic Platform, set up and fully operational at Hot Ice #1.

Kuparuk River and Tarn units on the North Slope of Alaska. On February 7, 2004, the Hot Ice #1 well reached its total depth of 2,300 feet, approximately 300 feet below the hydrate stability zone. Although significant gas shows did occur in the hydrate stability zone, no confirmed hydrate was encountered. The project team is currently conducting a thorough post-drilling analysis of the core, log, and vertical seismic profile data to understand the drilling results. The project demonstrated a number of innovative technologies, including Anadarko's Arctic Drilling Platform, a mobile core analysis laboratory, and a new application of a continuous coring rig.

DOE was also involved in the Mallik Program, an international consortium that drilled a hydrate research well on Richard's Island, in the Mackenzie Delta, Northwest Territories, Canada, in the winter of 2001–2002. The other partners included the Geological Survey of Canada, Japan National Oil Company, Geoforschungs Zentrum Potsdam, USGS, India Ministry of Petroleum and Natural Gas, BP-ChevronTexaco-Burlington Joint Venture Group, and the International Scientific Drilling vProgram. In addition to numerous geological and geophysical analyses to map the concentration and extent of the hydrate, the program partners ran two production tests that both produced gas from hydrates.

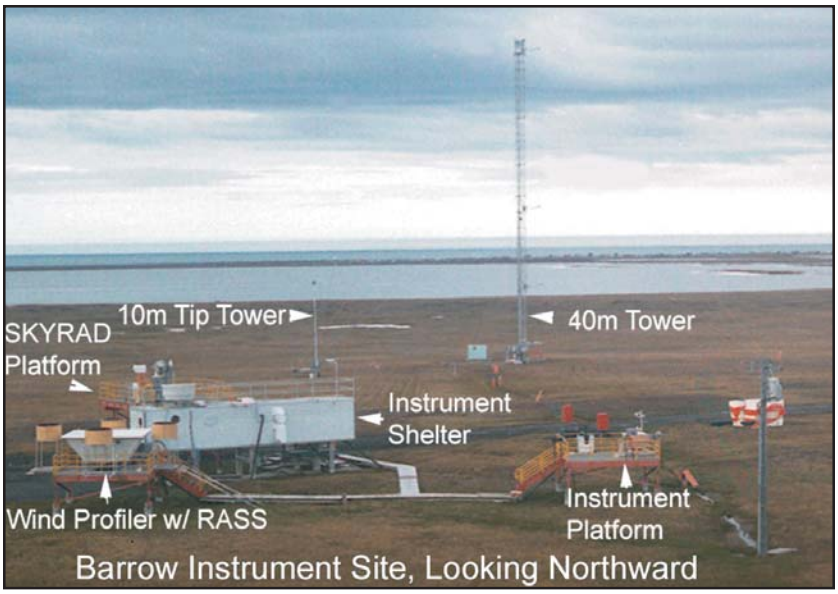
Atmospheric Radiation Measurement Program

The ARM Program, DOE's principal climate change research effort, seeks to resolve scientific uncertainties about global climate change with a specific focus on improving the performance of general circulation models (GCMs) used for climate research and prediction. The ARM program focuses on one critical feature of the GCMs: the transport of solar and thermal radiation (sunlight and radiant heat) through the earth's atmosphere to and from the earth's surface. Within this area the greatest uncertainties are associated with clouds: their formation, quantitative description, behavior, and optical characteristics as influenced by atmospheric and underlying surface conditions.

ARM created a number of long-term, highly instrumented climate research sites in carefully selected locations around the world. The site locations were selected primarily on the basis of what needs to be learned about clouds and radiation to improve the models, but secondarily on the basis of cost and logistics. Three Cloud and Radiation Testbed (CART) sites now exist, each with facilities at more than one location. The first site, in the southern Great Plains of the U.S. north of Oklahoma City, began operations during 1992. The Tropical Western Pacific (TWP) site began phased operations in 1996. The third CART site, the North Slope of Alaska and Adjacent Arctic Ocean (NSA/AAO), was dedicated in July 1997. The Barrow facility ramped up operations over the following year. Subsequently an outlying facility was established at Atqasuk, 100 km inland from Barrow. Routine data acquisition at the NSA/ AAO site offshore began in October 1997 as part of the Surface Heat Budget of the Arctic (SHEBA) experiment primarily sponsored by the National Science Foundation and the Office of Naval Research (ONR). SHEBA involved a research ice camp deployed around an icebreaker frozen in and drifting with the Arctic ice pack for a year. ARM provided radiometric and cloud characterization data using its instrumentation deployed aboard the icebreaker. SHEBA concluded in October 1998.

The CART sites originally had a planned life of ten years. The rationale for their long duration is that virtually all process-focused meteorological and climatological efforts to date have been based on short-term field efforts (a few weeks to a few months). During these brief periods the quantity of data that can be acquired is inadequate to provide the statistical accuracy and precision required. With all of its potential economic and other societal impacts, global climate change is nevertheless the result of small radiative effects—a difference of a few watts per square meter in the energy balance out of an average energy flow of several hundred. To improve our ability to predict climate change, the physical effects that must be measured and accurately modeled are small. This requires statistics drawn from large numbers of measured situations, not just a few.

Other agencies have been monitoring climate for decades. Why aren't these efforts adequate for ARM purposes? Monitoring efforts focus on measuring a few important climate-related parameters, not the full range of parameters needed for the process studies that will improve the GCMs. The ARM program fills the critical gap between field campaigns and other agency measurements. For the NSA/AAO CART site, the central facility is adjacent to NOAA's high-latitude climate monitoring facility near Barrow. The only National Weather Service station on the North Slope of Alaska is also located at Barrow, further enriching the data



Low-level aerial view of the ARM Climate Research Facility (ACRF) Barrow site. See http://www.arm.gov for a description of the instrumentation.

environment. ARM has taken advantage of existing facilities and has greatly augmented the instrumentation to provide the data needed for climate process research.

A generic, fully developed CART site includes facilities spread over a large area. The central facility at Barrow has the largest concentration of instrumentation. It relies heavily on upward-looking remote sensors (radars, lidars, and radiometers of several kinds) to determine the characteristics of the clouds, winds, and atmosphere as a whole above the site on a continuous basis. The inland facility at Atqasuk has a subset of the instrumentation deployed at Barrow. A temporary facility at Oliktok Point to the east of Barrow is planned for field campaigns that use instrumented tethered balloons, which cannot be accommodated at Barrow because of FAA constraints. In addition to ground-based instrumentation for characterizing the atmosphere and the earth's surface, it is necessary to depend heavily on data from polar-orbiting satellites and to make occasional instrumented aircraft flights to measure conditions aloft.

The NSA/AAO site provides data about cloud and radiative processes at high latitudes and, by extension, about cold and dry regions of the atmosphere in general. These data will be used to refine models and parameterizations for high-latitude regions and for the upper atmosphere. More specifically the issues of principal interest as they apply to cold regions are as follows:

- Atmospheric radiative transfer;
- Ice and mixed-phase cloud formation, evolution, and dissipation;
- Behavior of surface radiative characteristics;
- Direct and indirect aerosol radiative effects; and
- Development and testing of satellite remote sensing algorithms.

For more information, visit the ARM NSA/AAO web page at http://www.arm.gov/sites/nsa.stm.

Since the ARM/CART sites were first established, they have hosted many projects and researchers from other DOE programs and from other agency programs that find the data-rich environment of the CART sites convenient and cost effective for conducting their own related research. Consequently in June 2003 the three ARM/CART sites taken together were declared to be a DOE National User Facility known as the ARM Climate Research Facility (ACRF). ACRF is not limited to a predetermined life. It is planned that ACRF will continue as long as it is needed. What has now become ACRF NSA/AAO conducted the following Intensive Operating Periods (IOPs) in recent years (IOPs are the mechanism through which additional site activities are authorized):

- FIRE (First ISCCP [International Satellite Cloud Climatology Program] Regional Experiment, in collaboration with NASA, 1998);
- Single Column Model (in collaboration with Aerosonde Inc. and the Australian Bureau of Meteorology, 1999);
- MM Wave Arctic Winter Radiometric Measurements (in collaboration with NOAA and NASA, 1999);
- Second International Pyrgeometer and Absolute Sky Scanning Radiometer Comparison (in collaboration with the World Radiation Center, 2000);
- Russian Ice Station Comparison (in collaboration with the International Arctic Research Center, since 2001);
- Digicora Radiosonde Installation and Testing (an internal ARM program, 2002);
- Radiosonde Intercomparison (in collaboration with the National Weather Service, since 2002);
- ADEOS (Advanced Earth Observing System) Validation (in collaboration with the Japanese Space Agency, 2003);
- Aerosonde Robotic Aircraft Development (in collaboration with the National Science Foundation, with more than a half dozen deployments since 2000);
- AIRS (Atmospheric Infrared Sounder) satellite remote sensor validation (in collaboration with NASA, with annual several-month intercomparisons since 2002); and

- Boundary Layer Cloud Experiment (an internal ARM program, 2003).

In addition, another five IOPs are either ongoing or planned at the NSA/AAO.

Geothermal Energy Activities in Alaska

The Geothermal Technologies Program has initiated a Geopowering the West program in Alaska. Activities are underway to develop a Geothermal Working Group there. DOE funded the Alaska Division of Energy to support this effort and to sponsor a mission for approximately 15 Alaskans to travel to Nevada, tour producing geothermal sites, and talk to developers, regulators, and others about geothermal development. This is a kick-off activity.

Global Measurements of Radionuclides in the Atmosphere and Precipitation

The objectives of this program are to characterize, quantify, and model the environmental pathways of natural and anthropogenic radionuclides deposited on the earth's surface and to evaluate their environmental and human health impacts on regional and global scales. A component of this program is the operation of a high-quality global radioactivity sampling network by what had been DOE's Environmental Measurements Laboratory (now part of the Department of Homeland Security), which includes stations in the Arctic and sub-Arctic (Alaska, Canada, Greenland, and Norway). Through the global network, DOE continues to be poised to react quickly to any new introduction of atmospheric radioactivity.

U.S.–Russia Contaminant–Transport Studies

The nuclear waste storage facilities in Russia, where plutonium was produced in large quantities during the Cold War, now pose threats to the environment. Nuclear wastes were often stored in shallow soils and surface water impoundments at these facilities. One of these sites is at the Mayak Production Facility, Ozersk, in the Chelyabinsk region of the southern Urals, Russia, where from 1949 to 1951, medium- and high-level radioactive waste was discharged directly into the Techa River system, which flows via the Ob River into the Kara Sea. When this discharging ceased in 1951, the medium- and high-level waste from Mayak was then discharged into Lake Karachay, inside the complex. This area in Russia, which lies near the edge of the West Siberian Plain and Basin, is now one of the most severely contaminated environments in the world. Furthermore, it is possible that the surface water and groundwater in that region are hydraulically connected to an extensive system of rivers, lakes, and swamps that might discharge to the western Siberian oil and gas fields and eventually to the Arctic Ocean.

DOE's Office of Environmental Management International Collaboration Projects, through Florida State University's Institute for International Cooperative Environmental Research, sponsored subsurface contaminant transport studies at the Mayak, Krasnoyarsk, and Tomsk sites in Russia. This work was performed under the auspices of the former Joint Coordinating Committee for Environmental Restoration and Waste Management (JCCEM) between the Office of Environmental Management (DOE-EM) and the Ministry of Atomic Energy (MINATOM) for the Russian Federation. The main types of investigations conducted in 2002–2003 and their results are reported below.

Investigations at the Mayak site included hydrogeological, geochemical, geophysical, and radiometric characterization, as well as three-dimensional modeling of the migration of the groundwater plume containing radionuclides (^{90}Sr, ^{137}Cs, ^{238}U, and ^{239}Pu) and a nitrate. These investigations also included the evaluation of sorption effects on contaminant transport. Based on the results of geological and hydrological field investigations at Mayak, an extensive computer model of the Mayak site was developed that included the surrounding land areas, the surface water bodies, and the geological formations underlying the site. This numerical model has been adapted to the Hanford site. Although the geologic and hydrologic conditions at the Hanford site are somewhat different, the application of this model at Hanford will be used in the development of a comprehensive plan for addressing the potential environmental threats to the Columbia River Basin region. The development of a transient modeling scheme will permit improved characterization of the horizontal and vertical migration of radioactive plumes at the Mayak and Hanford sites.

Russian scientists have developed a local three-dimensional hydrodynamic and contaminant transport model for radioactive contamination in Lake Karachay groundwater. Using inverse modeling, these scientists determined the migration

The point of contact for the Amchitka Island, Alaska, Project is Monica Sanchez, U.S. Department of Energy, Environmental Restoration Division, Nevada Operations Office, Las Vegas, NV; 702-295-0160.

The point of contact for the Arctic Energy Office is Brent Sheets, National Energy Technology Laboratory, P.O. Box 750172, 539 Duckering Building/ UAF Campus, Fairbanks, AK 99775-0172, 907-452-2559; brent.sheets@netl.doe.gov.

The point of contact for DOE's Methane Hydrate Program is Brad Tomer, U.S. Department of Energy, National Energy Technology Laboratory, Morgantown, WV 26507; 304 285-4692.

The point of contact for the ARM program is Dr. Wanda R. Ferrell, Atmospheric Radiation Measurement Program Manager, Climate Change Research Division, SC-74, U.S. Department of Energy, 1000 Independence Ave., SW, Washington, DC 20585; 301-903-0043, wanda.ferrell@science.doe.gov.

The point of contact for the NIGEC program is Dr. Jeff Amthor, NIGEC Program Manager, Climate Change Research Division, SC-74, U.S. Department of Energy, 1000 Independence Ave., SW, Washington, DC 20585; 301-903-2507, jeff.amthor@science.doe.gov.

The point of contact for the Geothermal Program is Roy Mink, Office of Energy Efficiency and Renewable Energy (EE-14), U.S. Department of Energy, Washington, DC 20585; 202-586-5340; Roy.Mink@ee.doe.gov.

parameters for ^{90}Sr and ^{137}Cs in groundwater. The study of the historical evolution of contamination in water-bearing rocks (the solid phase of the Lake Karachay plume) included an evaluation of groundwater contamination by radionuclides leaching from the solid phase. The results of extensive modeling studies allowed the scientists to better understand the field-scale migration of radionuclides in ground water from a former surface nuclear waste repository at Lake Karachay towards the Mishelyak River.

Based on geologic, hydrogeologic, and hydrologic characterization data, these Russian scientists developed a transient, three-dimensional regional hydrodynamic model, containing the deep-well injection areas and the recharge and discharge areas for subsurface water at the Siberian Chemical Combine near Tomsk. The study also included an evaluation of the effectiveness of monitoring and remediating deep ground water near deep injection wells.

U.S. researchers involved in the program are from the Pacific Northwest National Laboratory, the Savannah River Laboratory, the Environmental Measurements Laboratory, and the Lawrence Berkeley National Laboratory. Russian scientists are from Hydrospetzgeologiya, the Mayak Production Association, the Siberian Chemical Combine, the Institute of Industrial Technologies, and the Institute of Physics and Power Engineering.

The results of these projects can be used to support the remediation programs at Hanford, Savannah River, Rocky Flats, and other DOE sites and to calibrate and validate conceptual and numerical models developed by DOE scientists.

National Institute for Global Environmental Change

Through the DOE National Institute for Global Environmental Change, headquartered at the Davis campus of the University of California, university scientists can apply for research support to study ecological effects of climatic change in Alaska (and other states). In FY 2003, two university projects were funded in Alaska. One, conducted by Columbia University, is examining the response of Pacific Northwest and Alaskan forests to recent multiple environmental changes, including climatic changes. The question to be answered is whether environmental changes, which have been relatively large and rapid in sub-Arctic regions, is having a discernable effect on the growth and health of forest trees. The second, conducted by the University of Oregon and the University of Alaska, is examining potential effects of warming on plant parasites in the understory of boreal forests. Any changes in plant parasites caused by global warming could have effects, negative as well as positive, on basic plant growth and the goods and services supplied to humans by Alaskan forests.

Neighborhood Environmental Watch Network: NEWNET

NEWNET is a network of environmental monitoring stations and data storage and data processing systems, with public access to the data through the Internet. This allows interested members of the public to have constant access to the stations so they can observe the results at any time.

NEWNET was started in 1993 with stations in Nevada, California, Utah, and New Mexico. It is based on concepts developed by DOE for the Community Monitoring Program at the Nevada Test Site Nuclear Testing Facility. These concepts date back to the Three Mile Island Nuclear Power Reactor accident in the late 1970s. Five stations are located in Alaska: in Barrow, Fairbanks, Kotzebue, Nome, and Seward. A station manager from each community is trained in station maintenance and has access to researchers and support organizations that can provide technical assistance if needed. Station managers serve as liaisons to their communities and can help citizens understand measurements.

Stations can vary in configuration. Most NEWNET stations have sensors for monitoring wind speed and direction, ambient air temperature, barometric pressure, relative humidity, and ionizing gamma radiation. Some stations have tipping bucket rain gauges, and others have additional radiation sensors. Other types of sensors are being investigated for air quality measurements.

The Alaska stations are being set up in collaboration with the Alaska Department of Environmental Conservation (ADEC) and the University of Alaska Fairbanks. The project is funded by DOE. This effort will strengthen collaborations between Los Alamos National Laboratory (LANL), ADEC, and DOE in studying the environment in Alaska. It will promote an understanding of radiological issues in Alaska and provide continuous monitoring of radiation levels. More information on NEWNET, including readings from NEWNET stations, can be found on the web at http:/newnet.lanl.gov/.

For the Global Measurements of Radionuclides in the Atmosphere and Precipitation projects, the points of contact are Matthew Monetti and Fabien Raccah, U.S. Department of Homeland Security, Environmental Measurements Laboratory (EML), Environmental Sciences Division, 201 Varick Street, NY, NY 10014; 212-620-3525 and 212-620-3379. The point of contact for the Joint Coordinating Committee for Environmental Management: Contaminant Transport Studies Project is Kurt Gerdes, DOE, Office of Environmental Management, International Programs Manager, 301-903-7289, Kurt.Gerdes@em.doe.gov. The point of contact for the NEWNET Program is Mike McNaughton, M.S. J978, Los Alamos National Laboratory, Los Alamos, NM 87545; 505-667-6130. The points of contact for the Department of Energy Wind Activities in Alaska are Dennis Lin, Office of Wind and Hydropower Technologies (EE-2B), Office of Energy Efficiency and Renewable Energy, U.S. Department of Energy, Washington, DC 20585; 202-586-7285; and Thomas Sacco, Office of Weatherization and Intergovernmental programs (EE-2K), Office of Energy Efficiency and Renewable Energy, U.S. Department of Energy, Washington, DC 20585; 202-586-0759.

Wind and Renewable Activities in the Arctic

The Department of Energy has been supporting wind power projects in Alaska for several years through various local and state organizations. These projects are aimed at providing lower-cost energy alternatives to rural Alaskan communities. These include projects through the DOE's Tribal Energy and Wind Programs. In addition, other renewable energy studies are underway. National Wind Technology Center personnel provide expert technical support to these projects by supplying anemometers, evaluating the wind resources, conducting wind workshops, and sponsoring local representatives to attend technical workshops. A list of the ongoing relevant Arctic/sub-Arctic projects is given below.

Kotzebue Electric Association

The objectives of this project for the Kotzebue Electric Association (KEA) are:

- To test and verify wind generation technology applications in wind/diesel hybrid systems and to provide system performance/cost data;
- To maximize the reduction in consumption of diesel fuel by KEA through the use of wind power generation;
- To develop a cold-weather wind turbine test site that will be available to DOE and the U.S. wind industry to develop advanced turbine designs;
- To provide educational outreach activities for the general public in Alaska and for operators who will be trained to operate the hybrid wind/diesel power plants; and
- To provide a basis for the evaluation of wind power system applications in the numerous diesel power plants serving remote, non-grid-connected Alaska villages.

City of Unalaska

The City of Unalaska is utilizing the DOE funds to evaluate future wind power installations and other combinations of wind plus diesel, biogas, hydro, or other cogeneration fuel sources. The city is conducting studies to determine wind resources; evaluate and characterize sites; gather data on physical installation of turbines; and develop a better understanding of other design considerations. This project is part of a larger effort by the city to obtain additional energy sources and to reduce dependencies on fossil fuels. Projections for the electrical demands of the city demonstrate that Unalaska will be unable to meet its energy demand in approximately five years.

TDX Corporation (St. Paul Island)

TDX is using its DOE grant funds to proceed with detailed engineering analysis and to purchase and install measurement equipment needed to evaluate the expansion of the TDX-owned wind/diesel cogeneration power station on Saint Paul Island, Alaska. In addition, TDX will begin acquisition of specific plant equipment in preparation for expansion, including expansion of the existing hot water loop, cooling system modifications, and acquisition of a second wind turbine gear box. This expansion will enable TDX to become Alaska's largest wind–diesel power plant. The goal of this study is to develop a master plan for interconnection with the City of St. Paul diesel generation plant and to provide electricity for the entire island.

Yukon–Kuskokwim Health Corporation

The Yukon–Kuskokwim Health Corporation (YKHC) is conducting a feasibility study for installation of small-scale wind turbines to serve YKHC facilities. Energy cost savings resulting from this project will allow the YKHC to direct more money toward its core mission of providing quality health care to the Alaska Native communities in the Yukon–Kuskokwim Delta region.

Native Village of Venetie

The Native Village of Venetie Tribal Government is conducting a feasibility study for powering an entire village during the season of the midnight sun using renewable solar energy. The system will allow the diesel generators to be turned off for most of the summer, yielding great economic, environmental, and social benefits. The system would operate year round. While there would be no solar energy input during the long night of December and January when the sun does not rise above the horizon, the system's energy storage component would continue to provide benefits by saving fuel by allowing more steady generator operation and by providing back-up power during generator outages.