

ENERGY AND WATER DEVELOPMENT APPROPRIATIONS FOR FISCAL YEAR 2009

U.S. SENATE,
SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,
Washington, DC.

NONDEPARTMENTAL WITNESSES

[CLERK'S NOTE.—At the direction of the subcommittee chairman, the following statements received by the subcommittee are made part of the hearing record on the Fiscal Year 2009 Energy and Water Development Appropriations Act.]

DEPARTMENT OF DEFENSE—CIVIL

DEPARTMENT OF THE ARMY

CORPS OF ENGINEERS—CIVIL

PREPARED STATEMENT OF THE NATIONAL CORN GROWERS ASSOCIATION (NCGA)

The National Corn Growers Association (NCGA) appreciates the opportunity to share with the subcommittee our Energy and Water Development Appropriations priorities for fiscal year 2009. In general, our appropriations priorities include an overall increase in U.S. Army Corps of Engineers' funding to address the needs of our failing inland waterways system; securing \$50 million in the Fiscal Year 2009 Energy and Water Development Appropriations bill for the Upper Mississippi River System (UMRS)—Navigation Ecosystem Sustainability Program (NESP) authorized by H.R. 1495, the Water Resources Development Act 2007, title VIII, secs. 8001–8005; and continued support for the Department of Energy's Biomass Technologies Program.

NCGA's mission is to create and increase opportunities for corn growers. NCGA represents more than 33,000 members and 48 affiliated State organizations and hundreds of thousands of growers who contribute to State checkoff programs.

U.S. ARMY CORPS OF ENGINEERS

Our country's inland navigation system plays a critical role in our Nation's economy, moving more than a billion tons of domestic commerce valued at more than \$300 billion. Each year, more than 1 billion bushels of grain (over 60 percent of all grain exports) move to export markets via the inland waterways system. Inland waterways relieve congestion on our already over-crowded highways and railways that run through cities. One jumbo barge has the same capacity as 58 trucks or 15 rail cars. A typical 15-barge tow on our Nation's rivers is equivalent to 870 trucks.

Additionally, navigation offers transportation with unparalleled environmental benefits. Barges operate at 10 percent of the cost of trucks and 40 percent of the cost of trains, while releasing 20 times less nitrous oxide, 9 times less carbon monoxide, 7 times less hydrocarbons, and burning 10 times less high-price fuel.

Unfortunately, investment in the inland waterways system has not kept pace with its needs and is deteriorating. In 2006, more than half of the 240 operational Corps-funded lock chambers in the United States—which handle over 625 million tons of freight each year—are over 50 years old and have exceeded their economic design lives. Many locks currently in use are too small for today's larger tows, susceptible to closures and long delays for repairs and unable to effectively deal with lines and

wait times that result from their obsolescence. In recent years, several high-profile closures have raised reliability concerns among shippers, carriers, the U.S. Army Corps of Engineers, and ultimately consumers who pay increased costs for expensive transportation delays.

Funding (in constant dollars) for Operations and Maintenance (O&M) on America's inland navigation system has remained flat for more than 2 decades. During this period, an increasing amount of routine maintenance on waterways infrastructure has been deferred. This deferred maintenance has become unfunded maintenance, and the aging waterways infrastructure, combined with the growing O&M backlog, has created today's average of 30 unscheduled lock shutdowns per year.

Tight O&M funding and the resultant "fix-as-fail" policy have led to a self-defeating cycle where routine maintenance dollars are now needed for emergency repairs. As critical maintenance needs grow, they become candidates for major rehabilitation—a trend that is not good for the waterways industry or for the Nation.

NCGA is appreciative of the successful efforts made by this subcommittee in recent years to increase the budget for the U.S. Army Corps of Engineers. NCGA strongly supports continuing this trend with a significant increase over last year's funding levels to address the critically needed repairs and delayed construction schedules facing the Corps. It's important to get our inland waterways infrastructure back on track so we can meet the ever-increasing demands of the global marketplace.

NAVIGATION ECOSYSTEM SUSTAINABILITY PROGRAM (NESP)

The Upper Mississippi River System (UMRS) includes the Upper Mississippi River and Illinois Waterway and tributary rivers, with 38 lock and dam sites stretching from Minneapolis, Minnesota, and Chicago, Illinois, to just south of St. Louis, Missouri. The Upper Mississippi has 29 locks and 858 miles of commercially navigable waterway, and the Illinois Waterway has 8 locks and is navigable for 291 miles. Also part of the UMRs is the Missouri River, which has no locks along its 735 navigable miles from Sioux City, Iowa, to St. Louis. There is one lock along the 26 navigable miles of the Kaskaskia River in southern Illinois.

In 1986, Congress declared the UMRs "a nationally significant ecosystem and a nationally significant commercial navigation system." The same waters that transport more than 60 percent of America's corn and soybeans are home to 25 percent of North America's fish species and are globally important as a flyway for 60 percent of North America's bird species. However, both the river transportation system and the river ecosystem are deteriorating. The locks that help tows to navigate the river are antiquated—increasing cost, safety risks and lost market opportunities. And from an ecological perspective, the floodplain is degraded, islands eroded, backwaters filled in and the river's natural flows disrupted.

With enactment of the Water Resources Development Act 2007, Congress created a historic opportunity for the UMRs. Congress recognized the economic and ecological importance of what truly is America's River by giving the U.S. Army Corps of Engineers a new, dual-purpose authority to integrate management of the river's habitats and navigation system in an unprecedented way. Corn growers are asking Congress to invest in the future of the UMRs by funding implementation of this new program.

We request your support in securing \$50 million in the Fiscal Year 2009 Energy and Water Development Appropriations bill for the Upper Mississippi River System (UMRS)—Navigation Ecosystem Sustainability Program (NESP). Now is the time to build on the promise of the new authority for NESP by including funding for the program in the Corps' fiscal year 2009 construction general account. Congress has authorized NESP at \$2.2 billion for navigation improvements; half of which is funded by the Inland Waterway Trust Fund, and \$1.72 billion for ecosystem restoration, with an additional \$10 million per year for monitoring. This will permit the Corps to begin implementing specific projects. NESP is a long-term vision, with the current authority providing for the first increment of that vision.

Over approximately the next 15 years, NESP will improve navigation efficiency by constructing new 1,200-foot locks at Locks & Dams 20, 21, 22, 24, and 25 on the Upper Mississippi River, and at LaGrange and Peoria on the Illinois Waterway. The plan also includes small-scale measures such as mooring facilities and switchboats and mitigation for the environmental effects of the lock construction and increased river traffic.

Concurrently, NESP will also work to restore and preserve more than 100,000 acres of habitat in a manner that is entirely compatible with current navigation practices. Restoration projects will range in size and complexity but will focus on restoring system-wide natural processes vital to the river's health. Examples include

mimicking natural flow regimes by drawing down pools in the summer and restoring floodplain habitat in cooperation with willing landowners. Because the UMRS is a vast and ecologically complex system, NESP includes an adaptive management strategy, in which sound science, learning and monitoring guide the most efficient and effective allocation of resources.

We appreciate this subcommittee's help in securing Pre-Construction Engineering and Design in years passed prior to authorization in the 2007 Water Resources Development Act. Congress has provided for \$13.5 million in fiscal year 2005, \$10 million in fiscal year 2006, \$10 million in fiscal year 2007 and \$8.85 million in fiscal year 2008. Capability levels for PED were identified as \$24 million for each fiscal year to achieve a 3–4 year pre-construction engineering and design phase.

For continued success, U.S. farmers need efficient transportation networks, which is why we have been long-time advocates for improvements to our inland waterway system. Meeting future international demand for corn, soybean, and other grains will be impossible without a modernized river infrastructure.

You have an opportunity to impact economic growth in our Nation. Your help in securing funds for NESP will allow the Nation to achieve the benefits of river infrastructure and ecosystem improvements as soon as possible.

BIOMASS TECHNOLOGIES PROGRAM

The United States needs to displace imported petroleum with domestically produced ethanol. Grain ethanol is the only economically viable solution today to reduce our reliance on foreign sources of energy. In order to achieve energy independence, the United States must capitalize on an abundance of domestic resources. Using starch from corn grain to produce ethanol is a proven, efficient way to reduce oil imports. Ethanol reduces green house gases, continues to spur economic development in rural communities, provides for a high-value co-product and stabilizes farm income. In 2007, strong commodity prices reduced Government spending by \$6 billion. Over the next decade, corn grain will continue to meet the growing demands from livestock feed, human food, export sectors, and ethanol fuel.

The current Federal biomass technologies program is focused on long-term cellulose research. Cellulose research will not have any meaningful economic impact for a decade or more. A successful research and development (R&D) portfolio always balances near-, mid- and long-term goals, and biomass research should use a similar strategy.

In the near term, R&D investments in corn grain ethanol production technology could have a strongly positive economic impact while immediately decreasing dependence on imported oil. Examples of R&D investment opportunities include improving production and utilization of animal feed (DDGS), co-production of biobased chemicals, utilization of corn kernel fiber, repowering ethanol facilities with biomass, water utilization, and decreasing natural gas use in ethanol plants. A sufficient supply of affordable ethanol will ensure the markets and infrastructure will be poised for the larger impacts coming in the mid to long-term.

NCGA recommends the subcommittee commit at least 25 percent of the fiscal year 2009 allocation for the biomass technologies program towards near-term research of corn grain. A strong corn ethanol industry is the foundation for an expanding renewable fuels market. Agricultural residues, cobs, and fiber will serve as the bridge technologies to a second generation of renewable fuels.

Thank you for the support and assistance you have provided to corn growers over the years.

PREPARED STATEMENT OF THE RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

PROJECT	REQUEST
MURRIETA CREEK FLOOD CONTROL PROJECT: Construction General	\$13,000,000
HEACOCK AND CACTUS CHANNELS: Special Authorization under WRDA	28,400,000
FUNDING FOR CERTIFICATION OF CORPS LEVEES: Inspection of Completed Works	3,000,000
SAN JACINTO & UPPER SANTA MARGARITA RIVER WATERSHEDS SPECIAL AREA MANAGEMENT PLAN (SAMP):	
General Investigations	355,000
SANTA ANA RIVER—MAINSTEM: Construction General	108,600,000

MURRIETA CREEK FLOOD CONTROL, ENVIRONMENTAL RESTORATION AND RECREATION
PROJECT

Murrieta Creek continues to pose a severe flood threat to the cities of Murrieta and Temecula. Overflow flooding from the undersized creek with a tributary watershed area of over 220 square miles continues to periodically wreak havoc on the communities. The winter storms in 1993 cost nearly \$20 million in damages to the public and private sectors. Almost on a yearly basis, small to moderate storms cause localized damages at numerous locations requiring ongoing repairs. As the area continues to develop, the potential for damages (direct and indirect) continues to increase.

In 1997 the U.S. Army Corps of Engineers initiated studies on the Creek. The final outcome of this endeavor was Congressional authorization in 2000 of the \$90 million, multi faceted project known as the Murrieta Creek Flood Control, Environmental Restoration and Recreation Project. This project is being designed and will be constructed in four distinct phases. Phases 1 and 2 include channel improvements through the city of Temecula. Phase 3 involves the construction of a 250-acre detention basin, including the establishment of about 160 acres of new environmental habitat and over 50 acres of recreational facilities. Phase 4 will include channel improvements through the city of Murrieta. Equestrian, bicycle and hiking trails, as well as a continuous vegetated habitat corridor for wildlife are components of the entire 7.5 mile long project.

The Omnibus Appropriations bill for fiscal year 2003 provided \$1 million for a new construction start for this critical public safety project and construction activities commenced in the Fall of 2003 on Phase 1. Appropriations for fiscal year 2004 and additional funds allocated allowed the Corps to continue construction on Phase 1, which was completed in December 2004. Phase 2 traverses Old Town Temecula, one of the hardest hit areas during the flooding of 1993. The Corps anticipates having a Phase 2 construction contract ready to award in the Winter of 2008. The District, therefore, respectfully requests the subcommittee's support of a \$13 million appropriation in fiscal year 2009 to allow the Corps to complete the Design Documentation Report, and initiate construction on Phase 2 of the long awaited Murrieta Creek Flood Control, Environmental Restoration and Recreation Project.

HEACOCK AND CACTUS CHANNELS PROTECTION OF MARCH AIR RESERVE BASE

Heacock and Cactus Channels are undersized, earthen channels that border the eastern and northern boundary of the March Air Reserve Base (MARB) located adjacent to the city of Moreno Valley, Riverside County, California. Substantial vegetation becomes established within both channels and impedes the conveyance of tributary storm flows to the existing ultimate outlet located downstream. Storm flows overtop Cactus Channel and traverse MARB causing major disruption of the Base's operation, including the fueling of airplanes and the transport of troops and supplies. The record rainfall of 2004/2005 also caused extensive erosion along Heacock Avenue jeopardizing existing utilities within the road right of way and cutting off access to about 700 residences within the city of Moreno Valley.

Under section 205 of the Continuing Authorities Program (CAP), the Corps received \$100,000 in fiscal year 2005 and completed an Initial Appraisal Report which determined the feasibility of proceeding with a project to provide flood protection to this sensitive area. With the \$546,000 received in fiscal year 2006 the Corps completed a Project Management Plan, executed a Feasibility Cost Sharing Agreement and is nearing completion of the Feasibility Study. However, this study found that MARB would receive approximately 75 percent of the benefits from constructing this project making the use of section 205 funds inappropriate. Therefore, the project will require Special Authorizing Language to approve and an appropriation of \$28.4 million to provide flood protection to MARB.

The District requests support from the subcommittee for Special Authorization approving the project and authorizing appropriations of \$28.4 million to complete the design and construct the project providing this critical military installation flood protection.

CERTIFICATION OF CORPS CONSTRUCTED LEVEES

As part of the Federal Emergency Management Agency's (FEMA) Map Modernization Program, the District, as well as all other agencies, cities and counties in the Nation are being required to provide certification of the reliability of all levee structures providing flood protection to our citizens. Many of these projects were constructed by the U.S. Army Corps of Engineers and in these cases, FEMA is requesting that the certification be provided by the Corps. Certification involves an exten-

sive amount of geotechnical analysis, including field and lab material testing, slope stability and seepage checks, hydrologic and hydraulic verification, and other costly and time consuming activities, as well as the review of operation and maintenance records. These projects have an established Federal interest. Therefore, a National Policy needs to be established addressing the need for these federally constructed projects to be certified by the Corps and authorizing the Corps to perform the required analysis. Furthermore, the Corps should also be authorized to provide Federal assistance for design and construction costs associated with any necessary rehabilitation, repair or reconstruction of projects that are found not to meet the CFR 65.10 FEMA and/or Risk and Uncertainty analysis criteria. Non-conforming levees put the public at risk and should be a Federal priority. Within our District, there are three Corps constructed levees requiring this Federal certification: Santa Ana River Levees constructed in 1958, Chino Canyon Levee constructed in 1972 and San Jacinto River Levee constructed in 1982.

The District requests support from the subcommittee for the establishment of a National Policy addressing this issue and the authorization and funding needed for the Corps to meet its obligations to the numerous local sponsors of federally constructed levees throughout the country. The Los Angeles District needs an appropriation of \$3.0 million for fiscal year 2009 under the Inspection of Completed Works—CA Operations and Maintenance Appropriation 3123 to accomplish the needed certification work.

SAN JACINTO AND UPPER SANTA MARGARITA RIVER WATERSHEDS SPECIAL AREA
MANAGEMENT PLAN

In 2001 the Corps began development of a Special Area Management Plan (SAMP) for both the San Jacinto and Upper Santa Margarita Watersheds to address regional conservation and develop plans that protect the environment while allowing for compatible economic development. The final product of the SAMP will be the establishment of an abbreviated or expedited regulatory permitting process by the Corps under section 404 of the Clean Water Act to assist Federal, State and local agencies with their decisionmaking and permitting authority to protect, restore and enhance aquatic resources, while accommodating various types of development activities. This process will increase regulatory efficiency and promote predictability to the regulated public. The plan will also build on the protection of high value resource areas, as envisioned in the MSHCP. The District requests support from the subcommittee for a fiscal year 2009 appropriation of \$355,000 to complete the work on the Nation's largest SAMP for the San Jacinto and Upper Santa Margarita Watersheds.

SANTA ANA RIVER—MAINSTEM

The Water Resources Development Act of 1986 (Public Law 99-662) authorized the Santa Ana River-All River project that includes improvements and various mitigation features as set forth in the Chief of Engineers Report to the Secretary of the Army. The Boards of Supervisors of Orange and San Bernardino Counties as well as the Board for the Riverside County Flood Control and Water Conservation District continue to support this critical project as stated in past resolutions to Congress.

For fiscal year 2009, an appropriation of \$108.6 million, is necessary to provide funding for Reach 9 of the Santa Ana River immediately downstream of Prado Dam, continue the construction of Prado Dam features and provide mitigation for the construction of Seven Oaks Dam. The District respectfully requests that the subcommittee support an overall \$108.6 million appropriation of Federal funding for fiscal year 2009 for the Santa Ana River Mainstem Project.

PREPARED STATEMENTS OF THE SANTA CLARA VALLEY WATER DISTRICT

STATEMENT OF SUPPORT—COYOTE CREEK WATERSHED STUDY

Background.—Coyote Creek drains Santa Clara County's largest watershed, an area of more than 320 square miles encompassing most of the eastern foothills, the city of Milpitas, and portions of the cities of San Jose and Morgan Hill. It flows northward from Anderson Reservoir through more than 40 miles of rural and heavily urbanized areas and empties into south San Francisco Bay.

Prior to construction of Coyote and Anderson Reservoirs, flooding occurred in 1903, 1906, 1909, 1911, 1917, 1922, 1923, 1926, 1927, 1930 and 1931. Since 1950, the operation of the reservoirs has reduced the magnitude of flooding, although flooding is still a threat and did cause damages in 1982, 1983, 1986, 1995, and 1997.

Significant areas of older homes in downtown San Jose and some major transportation corridors remain susceptible to extensive flooding. The federally-supported lower Coyote Creek Project (San Francisco Bay to Montague Expressway), which was completed in 1996, protected homes and businesses from storms which generated record runoff in the northern parts of San Jose and Milpitas.

The proposed Reconnaissance Study would evaluate the reaches upstream of the completed Federal flood protection works on lower Coyote Creek.

Objective of Study.—The objectives of the Reconnaissance Study are to investigate flood damages within the Coyote Creek Watershed; to identify potential alternatives for alleviating those damages which also minimize impacts on fishery and wildlife resources, provide opportunities for ecosystem restoration, provide for recreational opportunities; and to determine whether there is a Federal interest to proceed into the Feasibility Study Phase.

Study Authorization.—In May 2002, the House of Representatives Committee on Transportation and Infrastructure passed a resolution directing the Corps to “. . . review the report of the Chief of Engineers on Coyote and Berryessa Creeks . . . and other pertinent reports, to determine whether modifications of the recommendations contained therein are advisable in the interest of flood damage reduction, environmental restoration and protection, water conservation and supply, recreation, and other allied purposes . . .”.

Fiscal Year 2006 Administration Budget Request and Funding.—The Coyote Watershed Study was one of only three “new start” studies proposed for funding nationwide in the administration fiscal year 2006 budget request. Congress did not include funding for the study in the final fiscal year 2006 appropriations bill.

Fiscal Year 2008 Funding.—Congress did not appropriate any funding to the project in fiscal year 2008.

Fiscal Year 2009 Funding Recommendation.—It is requested that the congressional committee support an appropriation add-on of \$100,000 to initiate a multi-purpose Reconnaissance Study within the Coyote Creek Watershed.

STATEMENT OF SUPPORT—UPPER PENITENCIA CREEK FLOOD PROTECTION PROJECT

Background.—The Upper Penitencia Creek Watershed is located in northeast Santa Clara County, California, near the southern end of the San Francisco Bay. In the last two decades, the creek has flooded in 1980, 1982, 1983, 1986, 1995, and 1998. The January 1995 flood damaged a commercial nursery, a condominium complex, and a business park. The February 1998 flood also damaged many homes, businesses, and surface streets.

The proposed project on Upper Penitencia Creek, from the Coyote Creek confluence to Dorel Drive, will protect portions of the cities of San Jose and Milpitas. The floodplain is completely urbanized; undeveloped land is limited to a few scattered agricultural parcels and a corridor along Upper Penitencia Creek. Based on an August 2004 U.S. Army Corps of Engineers’ (Corps) Economics Analysis, over 5,000 homes and businesses in the cities of San Jose and Milpitas are located in the 1 percent or 100-year flood area. Flood damages were estimated at \$455 million. Benefit to cost ratios for the nine project alternatives range from 2:1 to 3.1:1.

Study Synopsis.—Under authority of the Watershed Protection and Flood Prevention Act (Public Law 83–566), the Natural Resources Conservation Service (formerly the Soil Conservation Service) completed an economic feasibility study (watershed plan) for constructing flood damage reduction facilities on Upper Penitencia Creek. Following the 1990 U.S. Department of Agriculture Farm bill, the Natural Resources Conservation Service watershed plan stalled due to the very high ratio of potential urban development flood damage compared to agricultural damage in the project area.

In January 1993, the Santa Clara Valley Water District (District) requested the Corps proceed with a reconnaissance study in the 1994 fiscal year while the Natural Resources Conservation Service plan was on hold. Funds were appropriated by Congress for fiscal year 1995 and the Corps started the reconnaissance study in October 1994. The reconnaissance report was completed in July 1995, with the recommendation to proceed with the feasibility study phase. The feasibility study, initiated in February 1998, is currently scheduled for completion in 2009.

Advance Construction.—To accelerate project implementation, the District submitted a section 104 application to the Corps for approval to construct a portion of the project. The application was approved in December 2000. The advance construction is for a 2,600-foot long section of bypass channel between Coyote Creek and King Road. However, due to funding constraints at the District and concerns raised by regulatory agencies, the design was stopped and turned over to the Corps to complete.

Fiscal Year 2008 Funding.—Congress appropriated \$229,000 to the project in fiscal year 2008.

Fiscal Year 2009 Funding Recommendation.—It is requested that the congressional committee support an appropriation add-on of \$171,000, in addition to the \$191,000 in the administration's fiscal year 2009 budget request, for a total of \$362,000 for the Upper Penitencia Creek Flood Protection Project to continue the Feasibility Study.

STATEMENT OF SUPPORT—SAN FRANCISQUITO CREEK FLOOD DAMAGE REDUCTION AND ECOSYSTEM RESTORATION PROJECT

Background.—The San Francisquito Creek watershed comprises 45 square miles and 70 miles of creek system. The creek mainstem flows through five cities and two counties, from Searsville Lake, belonging to Stanford University, to the San Francisco Bay at the boundary of East Palo Alto and Palo Alto. Here it forms the boundary between Santa Clara and San Mateo counties, California and separates the cities of Palo Alto from East Palo Alto and Menlo Park. The upper watershed tributaries are within the boundaries of Portola Valley and Woodside townships. The creek flows through residential and commercial properties, a biological preserve, and Stanford University campus. It interfaces with regional and State transportation systems by flowing under two freeways and the regional commuter rail system. San Francisquito Creek is one of the last natural continuous riparian corridors on the San Francisco Peninsula and home to one of the last remaining viable steelhead trout runs. The riparian habitat and urban setting offer unique opportunities for a multi objective flood protection and ecosystem restoration project.

Flooding History.—The creeks mainstem has a flooding frequency of approximately once in 11 years. It is estimated that over \$155 million in damages could occur in Santa Clara and San Mateo counties from a 1-percent flood, affecting 4,850 home and businesses. Significant areas of Palo Alto flooded in December 1955, inundating about 1,200 acres of commercial and residential property and about 70 acres of agricultural land. April 1958 storms caused a levee failure downstream of Highway 101, flooding Palo Alto Airport, the city landfill, and the golf course up to 4 feet deep. Overflow in 1982 caused extensive damage to private and public property. The flood of record occurred on February 3, 1998, when overflow from numerous locations caused severe, record consequences with more than \$28 million in damages. More than 1,100 homes were flooded in Palo Alto, 500 people were evacuated in East Palo Alto, and the major commute and transportation artery, Highway 101, was closed.

Status.—Active citizenry are anxious to avoid a repeat of February 1998 flood. Numerous watershed based studies have been conducted by the Corps, the Santa Clara Valley Water District, Stanford University, and the San Mateo County Flood Control District. A grassroots, consensus-based organization, called the San Francisquito Watershed Council, has united stakeholders including local and State agencies, citizens, flood victims, developers, and environmental activists for over 10 years. The San Francisquito Creek Joint Powers Authority was formed in 1999 to coordinate creek activities with five member agencies and two associate members. The Authority Board has agreed to be the local sponsor for a Corps project and received congressional authorization for a Corps reconnaissance study in May 2002. The Reconnaissance Study was completed in March 2005 and the Feasibility Study was initiated in November 2005.

Fiscal Year 2008 Funding.—Congress did not appropriate any funding to the project in fiscal year 2008.

Fiscal Year 2009 Funding Recommendation.—It is requested the congressional committee support an appropriation add-on of \$700,000 to continue the Feasibility Study.

STATEMENT OF SUPPORT—COYOTE/BERRYESSA CREEK PROJECT, BERRYESSA CREEK PROJECT ELEMENT

Background.—The Berryessa Creek Watershed is located in northeast Santa Clara County, California, near the southern end of the San Francisco Bay. A major tributary of Coyote Creek, Berryessa Creek drains 22 square miles in the city of Milpitas and a portion of San Jose.

On average, Berryessa Creek floods once every 4 years. The most recent flood in 1998 resulted in significant damage to homes and automobiles. The proposed project on Berryessa Creek, from Calaveras Boulevard to upstream of Old Piedmont Road, will protect portions of the cities of San Jose and Milpitas. The flood plain is largely urbanized with a mix of residential and commercial development. Based on the U.S. Army Corps of Engineers (Corps) 2005 report, a 1-percent or 100-year flood could

potentially result in damages exceeding \$179 million. Benefit-to-cost ratios for the six project alternatives being evaluated range from 2:1 to 7.3:1.

Study Synopsis.—In January 1981, the Santa Clara Valley Water District (District) applied for Federal assistance for flood protection projects under section 205 of the 1948 Flood Control Act. The Water Resources Development Act of 1990 authorized construction on the Berryessa Creek Flood Protection Project as part of a combined Coyote/Berryessa Creek Project to protect portions of the cities of Milpitas and San Jose.

The Coyote Creek element of the project was completed in 1996. The Berryessa Creek Project element proposed in the Corps' 1987 feasibility report consisted primarily of a trapezoidal concrete lining. This was not acceptable to the local community. The Corps and the District are currently preparing a General Reevaluation Report which involves reformulating a project which is more acceptable to the local community and more environmentally sensitive. Project features will include setback levees and floodwalls to preserve sensitive areas (minimizing the use of concrete), appropriate aquatic and riparian habitat restoration and fish passage, and sediment control structures to limit turbidity and protect water quality. The project will also accommodate the city of Milpitas' adopted trail master plan. Estimated total costs of the General Reevaluation Report work are \$6.5 million, and should be completed in 2009.

Fiscal Year 2008 Funding.—Congress appropriated \$1.147 million to the project in fiscal year 2008.

Fiscal Year 2009 Funding Recommendation.—Based on the continuing threat of significant flood damage from Berryessa Creek and the need to continue with the General Reevaluation Report, it is requested that the congressional committee support an appropriation add-on of \$650,000, in addition to the \$950,000 in the administration's fiscal year 2009 budget request, for a total of \$1.6 million for the Berryessa Creek Flood Protection Project element of the Coyote/Berryessa Creek Project.

STATEMENT OF SUPPORT—SOUTH SAN FRANCISCO BAY SHORELINE STUDY

Background.—Congressional passage of the Water Resources Development Act of 1976, originally authorized the San Francisco Bay Shoreline Study, and Santa Clara Valley Water District (District) was one of the project sponsors. In 1990, the U.S. Army Corps of Engineers (Corps) concluded that levee failure potential was low because the existing non-Federal, non-engineered levees, which were routinely maintained by Leslie Salt Company (subsequently Cargill Salt) to protect their industrial interests, had historically withstood overtopping without failure. As a result, the project was suspended until adequate economic benefits could be demonstrated.

Since the project's suspension in 1990, many changes have occurred in the South Bay. The State and Federal acquisition of approximately 15,000 acres of South Bay salt ponds was completed in early March 2003. The proposed restoration of these ponds to tidal marsh will significantly alter the hydrologic regime and levee maintenance activities, which were assumed to be constant in the Corps' 1990 study. In addition to the proposed restoration project, considerable development has occurred in the project area. Many major corporations are now located within Silicon Valley's Golden Triangle, lying within and adjacent to the tidal flood zone. Damages from a 1-percent high tide are anticipated to far exceed the \$34.5 million estimated in 1981, disrupting business operations, infrastructure, and residences. Also, historical land subsidence of up to 6 feet near Alviso, as well as the structural uncertainty of existing salt pond levees, increases the potential for tidal flooding in Santa Clara County.

In July 2002, Congress authorized a review of the Final 1992 Letter Report for the San Francisco Bay Shoreline Study. The final fiscal year 2004 appropriation for the Corps included funding for a new start Reconnaissance Study.

Project Synopsis.—At present, large areas of Santa Clara, Alameda and San Mateo Counties would be impacted by flooding during a 1-percent high tide. The proposed restoration of the South San Francisco Bay salt ponds will result in the largest restored wetland on the west coast of the United States, and also significantly alter the hydrologic regime adjacent to South Bay urban areas. The success of the proposed restoration is therefore dependent upon adequate tidal flood protection, and so this project provides an opportunity for multi-objective watershed planning in partnership with the California Coastal Conservancy, the lead agency on the restoration project. Project objectives include: restoration and enhancement of a diverse array of habitats, especially several special status species; tidal flood protection; and provision of wildlife-oriented public access. A Corps Reconnaissance Study

was completed in September 2004 and the Feasibility Study was initiated in September 2005.

Fiscal Year 2008 Funding.—Congress appropriated \$785,000 to the project in fiscal year 2008.

Fiscal Year 2009 Funding Request.—It is requested that the congressional committee support an appropriation add-on of \$2.8 million to continue the Feasibility Study to evaluate integrated flood protection and environmental restoration.

STATEMENT OF SUPPORT—LLAGAS CREEK PROJECT

Background.—The Llagas Creek Watershed is located in southern Santa Clara County, California, serving the communities of Gilroy, Morgan Hill and San Martin. Historically, Llagas Creek has flooded in 1937, 1955, 1958, 1962, 1963, 1969, 1982, 1986, 1996, 1997, 1998, 2002, and 2008. The 1997, 1998, and 2002 floods damaged many homes, businesses, and a recreational vehicle park located in areas of Morgan Hill and San Martin. These are areas where flood protection is proposed. Overall, the proposed project will protect the floodplain from a 1 percent flood affecting more than 1,100 residential buildings, 500 commercial buildings, and 1,300 acres of agricultural land.

Project Synopsis.—Under authority of the Watershed Protection and Flood Prevention Act (Public Law 566), the Natural Resources Conservation Service completed an economic feasibility study in 1982 for constructing flood damage reduction facilities on Llagas Creek. The Natural Resources Conservation Service completed construction of the last segment of the channel for Lower Llagas Creek in 1994, providing protection to the project area in Gilroy. The U.S. Army Corps of Engineers (Corps) is currently updating the 1982 environmental assessment work and the engineering design for the project areas in Morgan Hill and San Martin. The engineering design is being updated to protect and improve creek water quality and to preserve and enhance the creek's habitat, fish, and wildlife while satisfying current environmental and regulatory requirement. Significant issues include the presence of additional endangered species including red-legged frog and steelhead, listing of the area as probable critical habitat for steelhead, and more extensive riparian habitat than were considered in 1982.

Until 1996, the Llagas Creek Project was funded through the traditional Public Law 566 Federal project funding agreement with the Natural Resources Conservation Service paying for channel improvements and the District paying local costs including utility relocation, bridge construction, and right of way acquisition. Due to the steady decrease in annual appropriations for the Public Law 566 construction program since 1990, the Llagas Creek Project had not received adequate funding to complete the Public Law 566 project. To remedy this situation, the District worked with congressional representatives to transfer the construction authority from the Department of Agriculture to the Corps under the Water Resources Development Act of 1999 (section 501). Since the transfer of responsibility to the Corps, the District has been working with the Corps to complete the project. In November 2007, Congress passed the Water Resources Development Act of 2007 (Public Law 110-114, section 3022) revising the estimated total project cost for the remaining reaches of the project to \$105 million with a Federal share of \$65 million and a local share of \$40 million. The bill language also directs the Corps to complete the construction of the project.

Fiscal Year 2008 Funding.—Congress did not appropriate any funding to the project in fiscal year 2008.

Fiscal Year 2009 Funding Recommendation.—Based upon the high risk of flood damage from Llagas Creek, it is requested that the congressional committee support an appropriation add-on of \$1.8 million in fiscal year 2009 for planning, design, and environmental updates for the Llagas Creek Project.

STATEMENT OF SUPPORT—GUADALUPE RIVER PROJECT

Background.—The Guadalupe River is a major waterway flowing through a highly developed area of San Jose, in Santa Clara County, California. A major flood would damage homes and businesses in the heart of Silicon Valley. Historically, the river has flooded downtown San Jose and the community of Alviso. According to the U.S. Army Corps of Engineers (Corps) 2000 Final General Reevaluation & Environmental Report for Proposed Project Modifications, estimated damages from a 1 percent flood in the urban center of San Jose are over \$576 million. The Guadalupe River overflowed in February 1986, January 1995, and March 1995, damaging homes and businesses in the St. John and Pleasant Street areas of downtown San Jose. In March 1995, heavy rains resulted in breakouts along the river that flooded approximately 300 homes and business.

Project Synopsis.—In 1971, the local community requested that the Corps reactivate its earlier study. Since 1972, substantial technical and financial assistance have been provided by the local community through the Santa Clara Valley Water District in an effort to accelerate the project's completion. To date, more than \$85.8 million in local funds have been spent on planning, design, land purchases, and construction in the Corps' project reach.

The Guadalupe River Project received authorization for construction under the Water Resources Development Act of 1986; the General Design Memorandum was completed in 1992, the local cooperative agreement was executed in March 1992, the General Design Memorandum was revised in 1993, construction of the first phase of the project was completed in August 1994, construction of the second phase was completed in August 1996. Project construction was temporarily halted due to environmental concerns.

To achieve a successful, long-term resolution to the issues of flood protection, environmental mitigation, avoidance of environmental effects, and project monitoring and maintenance costs, a multi-agency "Guadalupe Flood Control Project Collaborative" was created in 1997. A key outcome of the collaborative process was the signing of the Dispute Resolution Memorandum in 1998, which modified the project to resolve major mitigation issues and allowed the project to proceed. The Energy and Water Development Appropriations Act of 2002 was signed into law on November 12, 2001. This authorized the modified Guadalupe River Project at a total cost of \$226.8 million. Subsequent to the authorization, the project cost has been raised to \$251 million. Construction of the last phase of flood protection was completed December 2004 and a completion celebration held in January 2005. The remaining construction consists of railroad bridge replacements and mitigation plantings. The overall construction of the project including the river park and the recreation elements is scheduled for completion in 2008.

Fiscal Year 2008 Funding.—Congress appropriated \$1.783 million for the project in fiscal year 2008.

Fiscal Year 2009 Funding Recommendation.—It is requested that the congressional committee support an appropriation add-on of \$10 million to continue construction of the final phase of the Guadalupe River Flood Protection Project.

STATEMENT OF SUPPORT—UPPER GUADALUPE RIVER PROJECT

Background.—The Guadalupe River is one of two major waterways flowing through a highly urbanized area of Santa Clara County, California, the heart of Silicon Valley. Historically, the river has flooded the central district and southern areas of San Jose. According to the U.S. Army Corps of Engineers (Corps) 1998 feasibility study, severe flooding would result from a 100-year flooding event and potentially cause \$280 million in damages.

The probability of a large flood occurring before implementation of flood prevention measures is high. The upper Guadalupe River overflowed in March 1982, January 1983, February 1986, January 1995, March 1995, and February 1998, causing damage to several residences and businesses in the Alma Avenue and Willow Street areas. The 1995 floods in January and March, as well as in February 1998, closed Highway 87 and the parallel light-rail line, a major commute artery.

Project Synopsis.—In 1971, the Santa Clara Valley Water District (District) requested the Corps reactivate an earlier study of the Guadalupe River. From 1971 to 1980, the Corps established the economic feasibility and Federal interest in the Guadalupe River only between Interstate 880 and Interstate 280. Following the 1982 and 1983 floods, the District requested that the Corps reopen its study of the upper Guadalupe River upstream of Interstate 280. The Corps completed a reconnaissance study in November 1989, which established an economically justifiable solution for flood protection in this reach. The report recommended proceeding to the feasibility study phase, which began in 1990 and was completed in 1998. Preconstruction Engineering and Design commenced in 1999 and currently several reaches are ready for construction.

The Upper Guadalupe River Flood Protection Project was first authorized for Federal construction in the Water Resources Development Act of 1999 (section 101). This authorization was for a project cost of \$140 million with an unfavorable cost-sharing formula. In November 2007, Congress passed the Water Resources Development Act of 2007 (Public Law 110-114, section 3037) for an estimated revised project cost of \$256 million with a Federal share of \$136.7 million and local share of \$119.3 million.

The project cooperation agreement was signed on July 21, 2007, and construction is planned to commence in July 2008.

Fiscal Year 2008 Funding.—Congress appropriated \$439,000 to the project in the fiscal year 2008.

Fiscal Year 2009 Funding Recommendation.—It is requested that the congressional committee support an appropriation add-on of \$12.5 million in fiscal year 2009 to continue construction on the Upper Guadalupe River Flood Protection Project.

PREPARED STATEMENT OF THE CITY OF LOS ANGELES BOARD OF HARBOR
COMMISSIONERS

Chairman Dorgan and members of the subcommittee, thank you for the opportunity to submit testimony in support of full funding of the Channel Deepening Project at the Port of Los Angeles/Los Angeles Harbor, the largest and busiest container seaport in the United States and tenth largest in the world. Our testimony speaks in support of an fiscal year 2009 appropriation of \$1.33 million for the final Federal share that will complete construction of the Channel Deepening Project. Proposed funding for the Channel Deepening Project was not included in the President's fiscal year 2009 budget. Construction of our Federal deep-draft navigation channels and ship berths is approximately 85 percent complete. Your full appropriation of the requested \$1.33 million will enable the Army Corps of Engineers to finish construction of the remainder of the Project; the Corps has stated that it has the capability to fully obligate and spend this amount in fiscal year 2009. Dredging for the project began in early 2003 with construction originally scheduled for completion in 2006.

The Port of Los Angeles is America's busiest seaport with record volumes of cargo moving through the 7,500-acre harbor. Its strong performance is attributed to a solid U.S. economy and the recovering Asian economies with a renewed manufacturing demand for American exports. The Port itself is a major reason for the remarkable cargo volumes. Its world-class facilities and infrastructure maximize the "one-stop shopping" concept of cargo transportation and delivery favored by most shipping lines. Ocean carriers can send the majority of their west coast-bound cargo to Los Angeles with full confidence in the Port's modern cargo terminals and efficient train/truck intermodal network. The Channel Deepening Project is a critical Federal navigation improvement project, and is the underpinning of the ongoing confidence that shipping lines have in the Port of Los Angeles.

In the fiscal year 2006 Energy and Water Development Appropriations Act, Congress authorized an increase in the total project cost to \$222 million from \$194 million, representing a Federal share of \$60.7 million and a local share of \$161.3 million in accordance with the Army Corps of Engineers' revision. This revision accounts for credits for in-kind services provided by the Port and other required project modifications, including adjustments for construction contract changes, adjustments to the disposal costs for the dredged material, and project administration costs. The cost-share amounts for the Channel Deepening Project is currently under review, as well as a Supplemental EIS/EIR that will evaluate and determine the best alternative for increased disposal capacity. Under consideration for placement of the remaining dredge material are the formation of additional lands for future Port development and environmental enhancements through the creation of improved submerged marine habitats. Upon completion of both reviews, the new cost-sharing amounts and the additional costs for disposal at the recommended site(s) will be established. The need for a Supplemental EIS/EIR has moved project completion to fiscal year 2009.

PORT NAVIGATION DEMANDS

The evolving international shipping industry prompted a collaborative effort by the Port of Los Angeles and the Corps of Engineers to implement the Channel Deepening Project in the early 1980s. With this project, the Port will deepen its main Federal channel and tributary channels by 8 feet, from -45 to -53 feet Mean Lower Low Water (MLLW), to accommodate the industry's shift to larger container vessels. The first of these deeper-draft ships began calling at the Port of Los Angeles in August of 2004, carrying 8,000 20-foot equivalent units of containers (TEUs) and drafting at -50 feet. Carriers are continuing to order these larger, post-Panamax vessels that range in size from 7,500 TEUs to 10,000 TEUs. These vessels are now in service in the international shipping trade and will continue to be delivered to shipping lines at a steady pace for the foreseeable future, which means that ports unable to accommodate the bigger ships will be left out of the surge in trade if they are unable to accommodate these vessels.

As we have testified before, cargo throughput for the San Pedro Bay port complex, comprising the Ports of Los Angeles and Long Beach—and the Port of Los Angeles in particular—has a tremendous impact on the U.S. economy. We at the Port of Los Angeles cannot overemphasize this fact. The ability of the Port to meet the spiraling demands of the steady growth in international trade is dependent upon the speedy construction of sufficiently deep navigation channels to accommodate the new container ships. These new ships provide greater efficiencies in cargo transportation, carrying one-third more cargo than most of the current fleet, and making more product inventory of imported goods available to American consumers at lower prices. In addition, exports from the United States have become more competitive in foreign markets. However, for American seaports to keep up, they must immediately make the necessary infrastructure improvements that will enable them to participate in this rapidly changing global trading arena.

Mr. Chairman, as we have said before, these state-of-the-art container ships represent the new competitive requirements for international container shipping efficiencies in the 21st century, as evidenced by the increased volume of international commerce. As such, we ask your subcommittee to fully appropriate the \$1.33 million for fiscal year 2009 that will enable the Army Corps of Engineers to complete construction of the Channel Deepening Project in fiscal year 2009.

ECONOMIC BENEFITS

The Port of Los Angeles is one of the world's largest trade gateways, and the scope of its economic contributions to the Southern California regional economy—and to the U.S. economy—is critically important. Currently, nearly 45 percent of containerized cargo entering the United States is handled at the San Pedro Bay port complex with the Port of Los Angeles, alone, handling a record 8.5 million TEUs just last year. This represents significant continued growth for any American seaport. The national economics of trade through the Port of Los Angeles is significant, touching every Congressional district in the country. Some 190 million metric revenue tons of cargo, valued at more than \$238 billion, were handled at the Port in 2007, with \$223 billion in trade benefiting the national economy based on the \$5.1 billion it generated in State and local tax revenues.

Locally, the Port is connected, directly or indirectly, with tens of billions of dollars in industry sales each year in Southern California. Those sales translate into hundreds of thousands of local jobs representing billions in wages, salaries, and tax revenues. Regional benefits from Port of Los Angeles trade include:

- 1.1 million jobs in California;
- 3.3 million permanent, well-paying jobs in the United States;
- \$89.2 billion in California trade value;
- \$223 billion in U.S. trade value;
- \$5.1 billion in State tax revenue; and
- \$21.5 billion in Federal tax revenue.

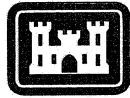
This economic impact is a direct result of international waterborne trade flowing through the Port of Los Angeles. Clearly, the Channel Deepening Project is a commercial, Federal navigation project of tremendous national economic significance, and one that will yield exponential economic and environmental returns to the United States annually. Furthermore, the U.S. Customs Service reports that more than \$12 million a day in customs duties are taken from the Port. The Los Angeles Customs District leads the Nation in total duties collected for maritime activities, collecting more than \$6 billion in 2005 alone. The return on the Federal investment at the Port of Los Angeles is real and quantifiable, and we expect it to continue to surpass the cost-benefit ratio—as determined by the Army Corps of Engineers' project Feasibility Study—many times over.

In closing, Federal investment in the Channel Deepening Project will ensure that the Port of Los Angeles, the Nation's busiest container seaport, remains at the forefront of the new international trade network well into this century. The Channel Deepening Project marks the second phase of the 2020 Infrastructure Development Plan that began with the Pier 400 Deep-Draft Navigation and Landfill Project. The Port of Los Angeles is moving forward with the 2020 Plan designed to meet the extraordinary infrastructure demands placed on it in the face of the continued high volume of international trade.

Chairman Dorgan, the Port of Los Angeles respectfully urges your subcommittee to appropriate the full \$1.33 million request for fiscal year 2009 that will enable the Army Corps of Engineers to complete construction of the Channel Deepening Project in fiscal year 2009.

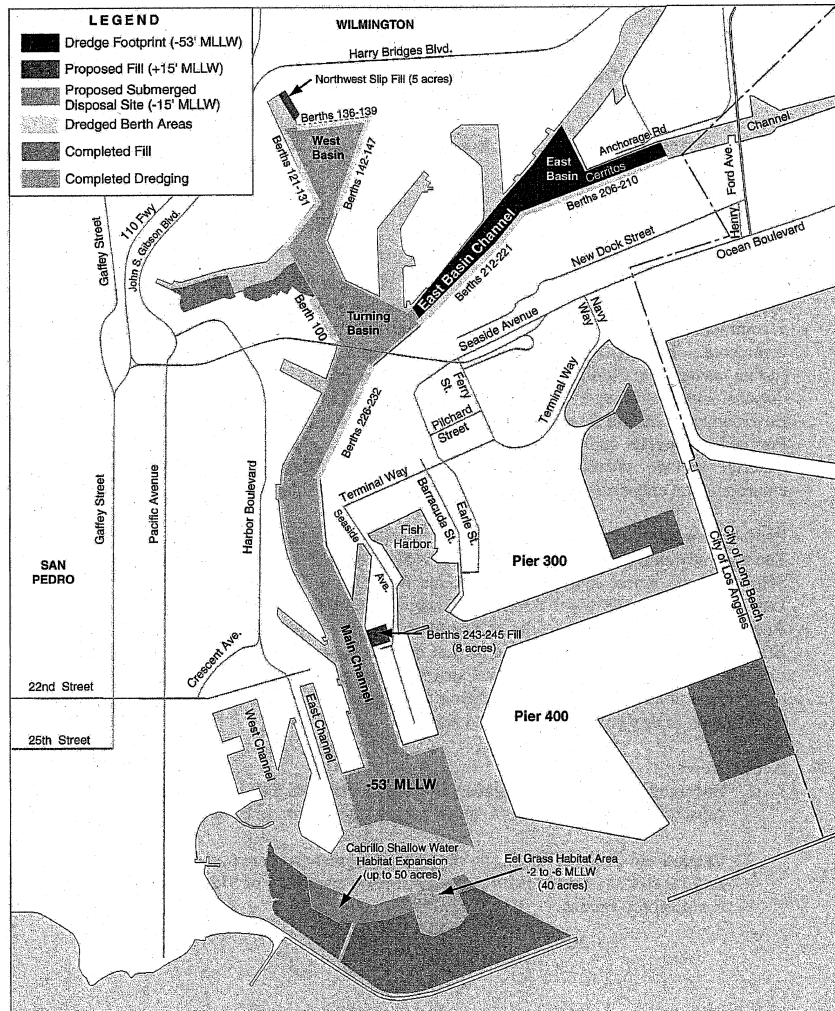
Thank you, Mr. Chairman, for the opportunity to submit this testimony for continued Congressional support of the Channel Deepening Project at the Port of Los An-

geles. The Port has long valued the support of your subcommittee and its appreciation of the role the Port of Los Angeles plays in this country's economic strength and vitality.



U.S. Army
Corps of Engineers

Port of Los Angeles Channel Deepening Project



DEPARTMENT OF THE INTERIOR

BUREAU OF RECLAMATION

PREPARED STATEMENT OF THE GARRISON DIVERSION CONSERVANCY DISTRICT

Mr. Chairman, members of the subcommittee, my name is Dave Koland; I serve as the general manager of the Garrison Diversion Conservancy District. This is a request for a \$102 million appropriation for the Pick-Sloan Missouri Basin Program/Garrison Diversion Unit, Bureau of Reclamation, Water and Related Resources, Department of the Interior. The mission of Garrison Diversion is to provide a reliable, high quality and affordable water supply to the areas of need in North Dakota. Over 77 percent of our State residents live within the boundaries of the district.

The President's fiscal year 2009 budget request was pitifully inadequate in meeting the commitments the Federal Government has made to North Dakota. In return for accepting a permanent flood on 500,000 acres of prime North Dakota river valley, the Federal Government promised the State and tribes that they would be compensated as the dams were built. The dams were completed over 50 years ago and still we wait for the promised compensation. At the rate of payment the President's budget proposes, the Federal Government will not even stay current with the indexing applied by law on their commitment to North Dakota.

The Municipal Rural & Industrial (MR&I) program was started in 1986 after the Garrison Diversion Unit (GDU) was reformulated from a million-acre irrigation project into a multipurpose project with emphasis on the development and delivery of municipal and rural water supplies. The statewide MR&I program has focused on providing grant funds for water systems that provide water service to previously unserved areas of the State. The State has followed a policy of developing a network of regional water systems throughout the State.

NORTH DAKOTA'S SUCCESS STORY

Rural water systems are being constructed using a unique blend of local expertise, State financing, rural development loans and MR&I grant funds to provide an affordable rate structure; and the expertise of the Bureau of Reclamation (BOR) to deal with design and environmental issues. The projects are successful because they are driven by a local need to solve a water quantity or quality problem. The solution to the local problem is devised by the community being affected by the problem. The early, local buy-in helps propel the project through the tortuous pre-construction stages.

The desperate need for clean, safe water is evidenced by the willingness of North Dakota's rural residents to pay water rates well above the rates EPA considers affordable. The EPA Economic Guidance Workbook states that rates greater than 1.5 percent of the median household income (MHI) are not only unaffordable, but also "may be unreasonable".

The average monthly bill on a rural water system for 6,000 gallons of water is currently \$59.21. The water rates in rural North Dakota would soar to astronomical levels without the 75 percent grant dollars provided by the MR&I program. For instance, current rates would have to average a truly unaffordable \$134.19/month or a whopping 3.8 percent of the MHI. Rates would have ranged as high as \$190.80/month or a prohibitive 5.3 percent of MHI without the assistance of the MR&I program.

BUDGET IMPACTS ON GARRISON DIVERSION UNIT

Let me begin by reviewing the various elements within the current budget request and then discuss the impacts that the current level of funding will have on the program.

The President's budget request for fiscal year 2009 is \$22.11 million. This year, Garrison Diversion Conservancy District is asking Congress to appropriate a total of \$102 million for the GDU. Attachment 1 is a breakdown of the elements in Garrison Diversion's request. To discuss this in more detail, I must first explain that the GDU budget consists of several different program items. For ease of discussion, I would like to simplify the breakdown into three major categories. The first I would call the base operations portion of the budget request. This amount is nominally \$18 million annually. However, as more Indian MR&I projects are completed, the operation and maintenance costs for these projects will increase and create a need that will need to be addressed.

The second category of the budget is the MR&I program. This consists of both Indian and non-Indian funding. The Dakota Water Resources Act of 2000 authorized

an additional \$200 million for each of these MR&I programs. It is our intent that each program reaches the conclusion of the funding authorization at the same time. We believe this is only fair and have worked with the tribes toward this goal.

The MR&I program consists of a number of projects that are independent of one another. They are generally in the \$20 million category. Some are, of course, smaller and others somewhat larger; one that is considerably larger at \$150 million is the Northwest Area Water Supply Project (NAWS). The first phase of that project is under construction. Several other projects have been approved for future funding and numerous projects on the reservations are ready to begin construction. These requests will all compete with one another for funding. It will be a delicate challenge to balance these projects. Nevertheless, we believe that once a project is started, it needs to be pursued vigorously to completion. If it is not, we simply run the cost up and increase the risk of incompatibility among the working parts.

The third category of the budget is the Red River Valley Water Supply Project (RRVWSP) construction phase. The Dakota Water Resources Act of 2000 authorized \$200 million for the construction of facilities to meet the water quality and quantity needs of the Red River Valley communities. Over 42 percent of North Dakota's citizens rely on the drought-prone Red River of the North as their primary or sole source of water. It is my belief that the final plans and authorizations could be expected in approximately 2 to 3 years. This will create a need for greater construction funding.

This major project, once started, should also be pursued vigorously to completion. The reasons are the same as for the NAWS project and relate to good engineering and construction management. Although difficult to predict at this time, it is reasonable to plan that the RRVWSP features, once started, should be completed in approximately 3 years. This creates the need for additional funding of \$30 million/year starting in fiscal year 2011.

Using these two projects as examples frames the argument for a steadily increasing budget. There is a need to accelerate the MR&I program now to assure the timely completion of the NAWS project and then to accommodate the need for additional construction funds when the RRVWSP construction is underway.

It is simply good management to blend these needs to avoid drastic hills and valleys in the budget requests. By accelerating the construction of NAWS and tribal projects which are ready for construction during the next few years, some of the pressure will be off when the RRVWSP construction funding is needed. A smoother, more efficient construction funding program over time will be the result.

It began with a \$67 million budget in fiscal year 2008 and needs to gradually build to about \$200 million when the RRVWSP construction could be in full swing (fiscal year 2011). Mr. Chairman, this is why we have supported a budget resolution that recognizes that a robust increase in the budget allocation is needed for the Bureau of Reclamation, Water and Related Resources Account in fiscal year 2009.

The Bureau of Reclamation, Rural Development, Garrison Diversion Conservancy District, North Dakota State Water Commission and local rural water districts have formed a formidable alliance to deal with the lack of a high quality, reliable water source throughout much of North Dakota. This cost-effective partnership of local control, state-wide guidance and Federal support has provided safe, clean, potable water to hundreds of communities and thousands of homes across North Dakota.

ATTACHMENT 1.—GARRISON DIVERSION UNIT (GDU)

Justification for \$102 million appropriation fiscal year 2009

North Dakota's Municipal, Rural and Industrial (MR&I) water supply program funds construction projects State-wide under the joint administration of the Garrison Diversion Conservancy District (GDGD) and the State Water Commission (SWC).

Northwest Area Water Supply Project (NAWS) is under construction after 18 years of study and diplomatic delay. Construction costs are estimated to be \$150 million.

Indian MR&I programs on four reservations are also under construction. Tribal and State leaders have agreed to split the MR&I allocation on a 50/50 basis.

The SWC has advanced the MR&I program \$21 million to allow construction to continue on several critical projects. One project is the \$85 million South Central Regional Water District system currently under construction.

[In millions of dollars]

	Amount
OPERATION AND MAINTENANCE OF INDIAN MR&I SYSTEMS AND JAMESTOWN DAM (Provides for the O&M of the Tribal water systems and the Jamestown Dam.)	5.61
BREAKDOWN OF \$96.39 MILLION CONSTRUCTION REQUEST:	
Operation and Maintenance of existing GDU system (Provides for the O&M of the Snake Creek Pumping Plant, McClusky and New Rockford Canals.)	5.24
Wildlife Mitigation & Natural Resources Trust (Provides for O&M of Arrowwood, Audubon, Kraft Slough, Lone-tree and Canalside Lands.)	3.96
Red River Valley Water Supply (Provides for the work on the RRVWSP.)	0.22
Indian and non-Indian MR&I (Provides funding for the State and tribal MR&I programs. Funding is split 50/50 between the two programs.)	84.00
Oakes Test Area and Miscellaneous (Provides for the O&M of the Oakes Test Area, Recreation Facilities, work for 28K unidentified acres.)	1.09
Standing Rock Irrigation (Provides for development on Standing Rock Reservation.)	1.88
Total for Construction	96.39
Grand Total	102.00

PREPARED STATEMENT OF THE IRRIGATION AND ELECTRICAL DISTRICTS ASSOCIATION
OF ARIZONA

The Irrigation and Electrical Districts Association of Arizona (IEDA) is pleased to present written testimony regarding the fiscal year 2009 proposed budgets for the Bureau of Reclamation (Reclamation) and the Western Area Power Administration (Western).

IEDA is an Arizona nonprofit association whose 25 members and associate members receive water from the Colorado River directly or through the facilities of the Central Arizona Project (CAP) and purchase hydropower from Federal facilities on the Colorado River either directly from Western or, in the case of the Boulder Canyon Project, from the Arizona Power Authority, the State agency that markets Arizona's share of power from Hoover Dam. IEDA was founded in 1962 and continues to represent water and power interests of Arizona political subdivisions and their consumers.

BUREAU OF RECLAMATION

IEDA has reviewed the testimony submitted by Susan Bitter Smith, the President of the Board of Directors of the Central Arizona Water Conservation District (CAWCD), the Arizona three-county special district charged with operation of the CAP. We support that testimony and urge the subcommittee to actively consider the suggestions made by President Smith. We are especially mindful that the Yuma Desalting Plant continues to remain underfunded and therefore not able to conduct the water conservation, water quality and water supply mission for which it was designed. The Yuma Desalting Plant is an integral element of the problem solving mechanisms being put in place for the Colorado River and especially the Lower Colorado River. Problem solving on the Lower Colorado River will be substantially impaired as long as the plant remains idle.

We also wish to call to the subcommittee's attention the issue concerning increased security costs at Reclamation facilities post-9/11. Legislation is pending before Congress addressing that issue and a budget approved for Reclamation for fiscal year 2009 should reflect the possibility that this legislation will become law and affect Reclamation operations in the next fiscal year.

WESTERN AREA POWER ADMINISTRATION

IEDA has reviewed the testimony submitted by Western's administrator, Tim Meeks. We note that both this subcommittee and the Senate Energy and Natural Resources Committee Water and Power Subcommittee have a concern, as did Administrator Meeks, over the \$74 million shortfall in construction funding proposed for fiscal year 2009. We believe this shortfall is irresponsible. Western has over 15,000 miles of transmission line for which it is responsible. It has on the order of 14,000 megawatts of generation being considered for construction that would depend on that Federal network. The existing transmission facilities cannot handle all of these proposals yet the region is projected, by all utilities operating in the region,

to be short of available generation in the 10-year planning window utilities, including Western, use.

Moreover, the \$1,881,000 proposed for appropriation in this category cannot come even close to keeping existing transmission construction going. Repairs and replacements will have to be postponed and, considerable hardships to local utilities that depend on the Federal network are bound to occur. In Western's Desert Southwest Region, our region, over \$20 million in work necessary just to maintain system reliability will have to be postponed.

We would be the first to support additional customer financing of Federal facilities and expenses through the Contributed Funds Act authority under Reclamation law that is available to Western. However, programs utilizing non-Federal capital formation require years to develop. One such program being proposed by the Arizona Power Authority in a partnership with Western has been stuck in bureaucratic red tape at the Department of Energy for over 2 years. There is no way that Western customers can develop contracts, have them reviewed, gain approval of these contracts from Western and their governing bodies, find financing on Wall Street and have monies available for the next fiscal year. It is just impossible.

There are impediments to using existing Federal laws in facilitating non-Federal financing of Federal facilities and repairs to Federal facilities and Congress should examine them. But dropping this bomb on us 9 months before the beginning of the fiscal year, when there just is not the time necessary to develop alternative capital formation, is bad public policy and should not be countenanced. We urge the subcommittee to restore a reasonable amount of construction funding to Western so it can continue to do its job in keeping its transmission systems functioning and completing the tasks that it has in the pipeline that are critical to its customers throughout the West.

CONCLUSION

Thank you for the opportunity to submit this written testimony. If we can provide any additional information or be of any other service to the subcommittee, please do not hesitate to get in touch with us.

PREPARED STATEMENT OF THE OGLALA SIOUX RURAL WATER SUPPLY SYSTEM, WEST RIVER/LYMAN JONES RURAL WATER SYSTEM, ROSEBUD RURAL WATER SYSTEM, AND THE LOWER BRULE RURAL WATER SYSTEM

MNI WICONI PROJECT

Fiscal Year 2009 Request

The Mni Wiconi Project beneficiaries respectfully request appropriations of \$38.378 million for construction (\$28.196 million) and operation and maintenance (OMR) activities (\$10.182 million) for fiscal year 2009:

[In millions of dollars]

	Fiscal Year 2009 Request
Construction	28.196
OMR	10.182
Total	38.378

Construction Funds

Construction funds would be utilized as follows:

Project Area	Amount
Oglala Sioux Rural Water Supply System:	
Core	\$1,115,000
Distribution	14,775,000
West River/Lyman-Jones RWS	5,133,000
Rosebud RWS	7,173,000
Total	28,196,000

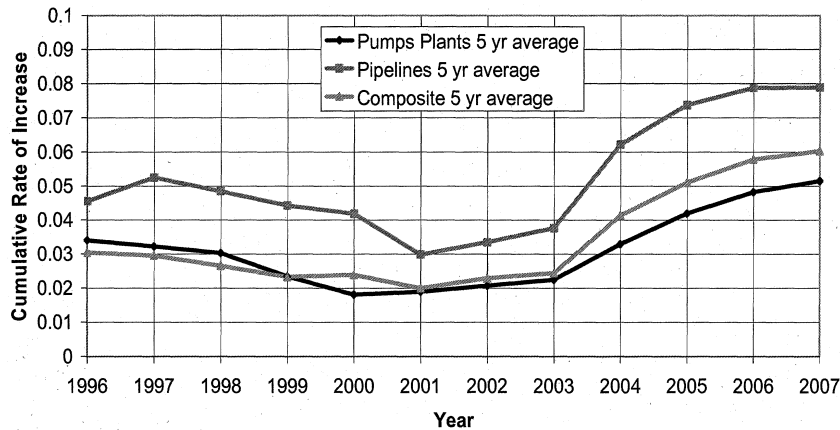
As shown in the table below, the project will be 81 percent complete at the end of fiscal year 2008. Construction funds remaining to be spent after fiscal year 2008

will total \$87.691 million within the current authorization (in October 2007 dollars). Extension of the project authorization from fiscal year 2008 through fiscal year 2013 was accomplished by Public Law 110-161. Additional administrative and overhead costs of extending the project, additional construction costs, and accelerated inflation over the next 5 years are expected to increase project costs to \$137.167 million after fiscal year 2008.

Total Federal Construction Funding (Oct. 2007 dollars)	\$451,707,000
Estimated Federal Spent Through Fiscal Year 2008	\$364,016,000
Percent Spent through Fiscal Year 2008	80.59
Amount Remaining After 2008:	
Total Authorized (Oct. 2007 dollars)	\$87,691,000
Overhead Adjustment for Extension to Fiscal Year 2013 and Other	\$109,851,000
Adjustment for Annual Inflation	\$137,167,000
Completion Fiscal Year (Statutory Fiscal Year 2013; Public Law 110-161)	2013
Years to Complete	5
Average Annual Required for Finish	\$27,433,000

Cost indexing over the last 5 years has averaged 7.89 percent for pipelines. Pipelines are the principal components yet to be completed (see chart below). Assuming an average 7.89 percent inflation in construction costs in the remaining 5 years to complete the project, average funding of \$27.433 million is required. The President's budget of \$16.24 million is grossly inadequate, departs significantly from recent budgets and threatens an undetermined delay in completing the project by 2013, the new date established by Congress in Public Law 110-161 last year.

**RATE OF CONSTRUCTION COST INCREASE
FOR ANNUAL AND 5-YEAR RUNNING AVERAGES SINCE 1992,
US BUREAU OF RECLAMATION**



*Oglala Sioux Rural Water Supply System (OSRWSS)
Core System*

The funding request will provide \$1,115,000 for the OSRWSS core system. These funds will complete the project's transmission system that serves all sub-projects managed by separate entities, including the Pine Ridge Indian Reservation, Rosebud Indian Reservation, Lower Brule Indian Reservation and the 8-county service area of West River/Lyman-Jones. Funds will be used to connect the northern portion with the southern portion of the transmission system and permit water delivery in either direction to accommodate a shutdown in the western part of the water transmission system.

The completion of the OSRWSS core system is an historic milestone and permits greater focus in the remaining years of the project authorization on completion of the distribution systems.

Distribution System

The Pine Ridge Indian Reservation has not received water from the OSRWSS core system prior to fiscal year 2008. Over 40 percent of the project's population resides on the Pine Ridge Indian Reservation. The Reservation public has awaited delivery of project water from the Missouri River since 1994. Project funds in fiscal year 2009 will permit the completion of the on-Reservation transmission system between the connection with the OSRWSS core system (see discussion above) and the community of Kyle in the central portion of the Pine Ridge Indian Reservation. Delivery of Missouri River water at this location will allow distribution to OSRWSS project pipelines built earlier that serve the communities of Kyle, Sharps Corner, Rocky Ford, Red Shirt, Manderson, Evergreen and Porcupine and the large number of rural homes between the communities along these pipelines.

The fiscal year 2009 request also funds additional on-Reservation transmission system that will advance the delivery of Missouri River water toward the largest community on the Reservation, Pine Ridge Village. Connection to Pine Ridge Village is scheduled in fiscal year 2010. The request will connect the transmission system from Porcupine Butte to the community of Wounded Knee and serve rural homes south of Manderson. The request will fund an additional transmission system beyond Pine Ridge Village toward the community of Oglala and will connect with OSRWSS pipelines built in the early years of the project.

As set forth above, the focus on the Pine Ridge Indian Reservation in fiscal year 2009 is to construct the transmission system that serves as the "backbone" of the project on the Reservation. This distribution system is now reliant upon groundwater exclusively. Groundwater will be retained where adequate and safe. Missouri River water will serve as a backup to groundwater supplies and as the sole supply in areas where groundwater is deficient.

The Oglala Sioux Tribe is supportive of the funding request of other sponsors.

West River/Lyman-Jones Rural Water System

Priority projects for the WR/LJ system include the Powell Area Project, service to new members within the system and distribution system storage. The Powell area, from Midland to Philip and from the Bad River to the Elbon service area, continues to be impacted by drought conditions that have persisted since 2001. Powell area users have patiently waited as the OSRWSS North Core pipeline was constructed through their area. With its completion their project area has a supply source from which distribution lines can be constructed.

Projects in the Reliance area and Eastern Mellette County were constructed with emphasis on pipeline. Needed storage structures were deferred until additional funds were made available. Water use has increased each year since completion of these projects. Providing storage within those service areas increases system capability to meet peak demands and improves system reliability.

The WR/LJ system receives new requests for service in completed project areas as stock ponds and wells go dry and as people move into those areas. Further additions are required as existing members request added connections to serve livestock in other locations. These additions are a demonstration of the need for this important project.

Rosebud Rural Water System (Sicangu Mni Wiconi)

In fiscal year 2009 the Rosebud Sioux Tribe will complete the necessary infrastructure to supply surface water to portions of Todd County, which will reduce the need for summertime water restrictions that have resulted from overextending the interim groundwater supply. Work began on this series of projects in the summer of 2007 and the primary pipeline and pump stations will be completed in the summer of 2008. The receiving reservoir at the end of this pipeline is partially funded with fiscal year 2008 funds as is the large diameter pipeline that will connect the town of Mission and eastern Todd County to the surface water supply. However, both of these projects require fiscal year 2009 funding for completion.

Two additional projects are also scheduled for 2009. Phase I of the Old Rosebud project will replace corroded iron pipelines in the older portion of the Rosebud community with modern plastic pipe. This project is designed and ready to bid; however, to reduce costs and improve effectiveness, it is being bid and managed in conjunction with a Bureau of Indian Affairs street replacement project and an Indian Health Service sewer replacement project. Rural Development is also assisting with funding for the sewer work. By completing water, sewer and street improvements at the same time, the cost of excavation and reclamation for the water portion of

the work is significantly reduced. Upgrading water and sewer lines concurrently with the paving project also prolongs the useful life of the new streets because the new pavement will not need to be disturbed (and then patched) to repair water main breaks.

The other major project scheduled for 2009 will serve the rapidly growing Sicangu Village area. The existing wells and aquifer in this area are not capable of supplying the growing demands. A pipeline will connect the community to the existing well field several miles south of the town of Mission. Adequate capacity will be available in that well field after the Mission area is connected to the surface water supply.

Other projects include a new well for the well field near St. Francis and the ongoing service line and connections installed by the tribal construction crew. The new well near St. Francis is needed because two of the existing wells currently run 24 hours a day during periods of peak demand in summer months. The third existing well does not have sufficient capacity to allow either of the two primary wells to recover. The St. Francis well field also supplies the Spring Creek and Grass Mountain areas.

Operation, Maintenance and Replacement Budget

The sponsors have and will continue to work with Reclamation to ensure that their budgets are adequate to properly operate, maintain and replace (OMR) respective portions of the core and distribution systems. The sponsors will also continue to manage OMR expenses in a manner ensuring that the limited funds can best be balanced between construction and OMR. The project has been treating and delivering more water each year from the OSRWSS Water Treatment Plant near Fort Pierre. Completion of significant core and distribution pipelines has resulted in more deliveries to more communities and rural users. The need for sufficient funds to properly operate and maintain the functioning system throughout the project has grown as the project has now reached 73 percent completion. The OMR budget must be adequate to keep pace with the system that is placed in operation. The administration's request for fiscal year 2009 is \$9.374 million less than the administration's fiscal year 2008 request of \$9.526 million despite the acknowledged increasing need for OMR funds.

The supporting documentation for the Great Plains Region budget request prioritizes the OMR of the Tribal features of Mni Wiconi. However, it should be noted that the tribal features of Mni Wiconi do not participate in Reclamation's Replacement, Additions and Extraordinary (RAX) program for which \$9.8 million has been requested by Reclamation for their non-tribal projects in the Great Plains Region. The tribal systems also have RAX needs.

The Mni Wiconi Project tribal beneficiaries (as listed below) respectfully request appropriations for OMR in fiscal year 2009 in the amount of \$10,182,000:

Project Area	OMR Amount
Oglala Sioux Rural Water Supply System:	
Core	\$2,376,000
Distribution	2,808,000
Lower Brule	1,485,000
Rosebud RWS	2,121,000
Reclamation	1,392,000
Total	10,182,000

DEPARTMENT OF ENERGY

PREPARED STATEMENT OF THE NATIONAL CONGRESS OF AMERICAN INDIANS

On behalf of the National Congress of American Indians, we are pleased to present testimony on the administration's fiscal year 2009 budget request for transportation energy and water development programs. We look forward to working with this subcommittee to ensure that the critical programs and initiatives are funded at levels that will ensure their long term effectiveness.

TRIBAL ENERGY ACCESS AND PRODUCTION

The lack of access to energy resources and to participation in the energy market is still a persistent problem among Indian communities. According to the U.S. Census Bureau, 14.2 percent of reservation homes lack access to electricity, compared

to the national average of less than 2 percent.¹ When provided with innovative energy solutions, tribes are embracing them. For example, 350 Navajo Nation members recently began renting renewable energy units, which provide them with energy for the first time. Using wind technologies, members can power their televisions and a few lights. These improvements, while humble, can drastically improve the quality of life for Indian people.

TRIBAL WATER ACCESS AND RIGHTS

Water resources are, perhaps, the single most important natural resource that is at risk for tribes. Climate change and population growth forecasts place a large burden on rivers and reservoirs, especially in the west, and tribes play a key role in future management of these bodies of water. Tribes usually have priority water rights, but typically have not exercised their full rights. As water demands grow, more tribes will need to exercise their rights and work on developing water infrastructure for their communities. The current posture of requiring offsets in other Department of Interior programs to fund water settlements and projects is potentially harmful to tribal programs, and other sources must be utilized.

Specific Tribal Appropriations Requests; Energy & Water—Department of Energy

Title V—Indian Tribal Energy Development and Self-Determination Act Grants.—The Energy Policy Act of 2005 (Public Law 109–058) included Title V—Indian Tribal Energy Development and Self-Determination Act of 2005, which authorized a competitive grant in the amount of \$20 million from fiscal year 2006 to 2016 to assist Indian tribes in energy education, research and development, planning and management needs; and to provide a loan guarantee program to any Indian tribes for energy development. These initiatives have yet to be funded and again are not included in the President’s request budget for the Department of Energy’s fiscal year 2009.

—NCAI recommends that the title V grants to Indian tribes be fully funded in the amount of \$20 million.

Weatherization Assistance Programs.—The President proposed a significant decrease in funding for Indian programs in the Department of Energy. The administration proposes the elimination of the Weatherization Assistance Programs that provides weatherization assistance grants to Indian tribes for low-income and rural homes, and the training and technical assistance.

—NCAI recommends that \$22.7 million be made available in fiscal year 2009 for the Weatherization Assistance Programs, the same amount appropriated for fiscal year 2008.

Office of Indian Energy Policy and Programs.—The President requested a substantial decrease for tribal energy activities for fiscal year 2009, which would be funded at \$1 million compared with \$5.9 million in fiscal year 2008. The President also proposes no resources for the Office of Indian Energy Policy and Programs, which was authorized under the Energy Policy Act of 2005 but has never been funded. The Energy Policy Act of 2005 authorized this office to implement tribal energy initiatives and funding opportunities for Indian energy development and tribes have been fighting for even the most basic funding each year.

—NCAI recommends that level funding of \$5.9 million be made available for fiscal year 2009 for the Office of Indian Energy Policy and Programs (OIEPP).

Renewable Energy Production Incentives.—Another program proposed for termination in the fiscal year 2009 President’s budget is the Renewable Energy Production Incentive (REPI), which provides financial incentive payments to publicly owned utilities, not-for-profit electric cooperatives, and tribal governments and native corporations that own and operate qualifying facilities generating renewable energy. The justification for the elimination of REPI by the administration is the importance of this program has diminished over time due to reduced cost and competitiveness of renewable energy technology.

—NCAI recommends that \$8.5 million be made available for the renewable energy and conservation programs and activities for fiscal year 2009.

Bureau of Reclamation (Department of Interior)

General—Tribal Water Projects and Settlements.—The Bureau of Reclamation (BOR) has a significant role in shaping the future of tribal water resources. Water rights settlements are often funded through BOR, as well as negotiated and implemented. However, the process is cumbersome and very tenuous as funding is often difficult to obtain. There are nearly 25 settlements nearing implementation that will

¹ Energy Information Administration, *Energy Use and Renewable Energy Development Potential on Indian Lands*, 2000.

need funding, and the current position of pushing it further down the timeline only increases the price. The budget committee needs to raise the ceiling.

—NCAI recommends that the Bureau of Reclamation prioritize funds for Indian water projects and water rights settlements.

Reclamation Fund.—Tribes passed a resolution at the 2007 Annual NCAI Conference (No. DEN 07–069) that identifies the Reclamation Fund (Fund) as an appropriate vehicle for funding tribal water rights settlements. The Fund could be utilized as the primary source for funding settlements, which is desperately needed. The Fund was established in 1902 to fund water projects in the 17 western States, including on tribal lands. The Fund continues to have a growing balance, over \$7 billion estimated in fiscal year 2007, with mineral development providing most of the increase.

—NCAI recommends that the BOR Reclamation Fund be utilized as a substantial source for tribal water projects and settlements.

Army Corps of Engineers (Department of Defense)

Army Corps of Engineer projects can provide substantial opportunities for water infrastructure development in Indian Country. Specifically, the Water Resources Development Act authorizes municipal water supply and wastewater treatment projects. These projects are crucial for tribes, and funding needs to be increased to tribal projects. In the earlier part of this century when Congress invested heavily in Corps projects and WPA projects, Indian Country was often overlooked. Therefore, our infrastructure, particularly water infrastructure has usually never had even the most basic investment.

—NCAI recommends a minimum of 10 percent of the civil works projects that provide environmental infrastructure be set aside for tribal specific projects.

PREPARED STATEMENT OF THE CONSORTIUM FOR FOSSIL FUEL SCIENCE (CFFS)
PRODUCTION OF TRANSPORTATION FUELS FROM COAL PLUS BIOMASS WITH REDUCED
CARBON DIOXIDE EMISSIONS

Chairman Dorgan and members of the subcommittee, we request \$2,000,000 in funding for a congressionally directed project in the budget of the Department of Energy in the Fuels Program of the Office of Fossil Energy, to continue a program of research to produce transportation fuels from coal plus biomass. This program, which was recently initiated with a \$750,000 contract from the U.S. Department of Energy in fiscal year 2008, will focus on the conversion of coal plus waste biomass into ultra-clean transportation fuels by gasification and Fischer-Tropsch synthesis. This approach has the potential to minimize the amount of carbon dioxide emitted by the fuel conversion process to less than that produced by the production of similar transportation fuels from petroleum. Additionally, combustion of the biomass component of the carbon during fuel utilization in vehicles or planes will be carbon dioxide neutral.

Overview

Traditional petroleum-derived fuels will continue to dominate transportation by vehicles and planes for at least the next 20 years. The United States currently imports over 10 million barrels of oil per day at a cost exceeding \$470 billion/year, most of it from unstable regions of the world. Not only is this the biggest item in the U.S. trade deficit, it is also a serious threat to our national security. Increasing global demand, coupled with an expected peaking in the world oil supply, will undoubtedly cause shortages and markedly increased prices, possibly deepening the current economic recession and leading to more severe recessions in the future.

It is therefore essential that we begin to produce transportation fuels from our own national resources, particularly our most abundant energy resource, coal. It is equally essential, however, that we do so without harming the environment. The Consortium for Fossil Fuel Science (CFFS), a research center of the University of Kentucky, has formed an integrated team of fossil fuel scientists from five universities (University of Kentucky, West Virginia University, Auburn University, University of Utah, and University of Pittsburgh) to conduct a basic research program focused on producing Fischer-Tropsch fuels using mixtures of coal and biomass as the feedstock. We believe that costs can be reduced, a superior transportation fuel can be produced, and carbon dioxide emissions can be minimized through such research.

The CFFS has extensive experience and broad expertise in research on the conversion of coal into clean liquid transportation fuels and the conversion of coal into hydrogen. We have made significant breakthroughs in such areas as:

- Catalysis of coal conversion reactions.
- C1 chemistry processes, including Fischer-Tropsch (F-T) synthesis, to produce transportation fuels from coal-derived syngas.
- Conversion of coal and waste materials, including plastic, rubber, and cellulose (biomass) into high value oil products.
- Development of novel processes to produce hydrogen from fossil fuels.
- Environmental research focused on a number of pollutants derived from coal (fine particulate matter (PM), toxic trace metals (arsenic, chromium, mercury, etc.) and SO_x).

We are now focusing on a research program to develop processes that use biomass as a co-feed with coal for the production of clean transportation fuels with reduced carbon emissions. In this program, lignocellulosic waste materials will be used because they are not food feedstocks. Wood wastes and agricultural wastes (sawdust, bark, corn stover, etc.) will be emphasized because they reflect the lumber, paper, and farming industries in the CFFS States.

Goals

Some of the research goals of the CFFS coal + biomass program are summarized below.

- A pilot scale (3–30 lbs/hr) gasifier is under construction that will be used to gasify coal + biomass feeds. It will be coupled with a supercritical fluid (SCF) F-T synthesis reactor.
- Biomass feedstocks (lignin, cellulose, hemicellulose, etc.) will be reformed in supercritical water (SCW) to produce hydrogen for F-T synthesis and fuel upgrading with no net carbon dioxide emissions.
- Iron-alloy nanoparticle catalysts will be used to dehydrogenate gaseous alkanes produced by F-T synthesis, yielding pure hydrogen to recycle to the coal + biomass syngas stream, raising its hydrogen content to avoid carbon dioxide emissions from the water-gas shift reaction.
- A laboratory-scale fluid-bed gasifier will be designed and built to convert coal + biomass into syngas with an adjustable composition. Potassium and calcium will be tested as catalysts.
- Novel catalysts (dual function catalysts, metallic nanoparticles on carbon nanotube supports, xerogels, etc.) will be developed for F-T synthesis using syngas typical of coal + biomass.
- Systems engineering modeling will be used to optimize fuels production from coal + biomass with regard to both economics and carbon dioxide emissions.

Summary

We request your support for \$2,000,000 in funding for this program from the Fossil Energy budget for fiscal year 2009. This funding will be shared between the CFFS universities to support the second year of a 3-year research program for the production of liquid transportation fuels from coal and biomass. The CFFS will provide \$500,000 in cost-sharing to support this important research on a topic that is critical to both our States and our Nation.

PREPARED STATEMENT OF THE NATIONAL RESEARCH CENTER FOR COAL AND ENERGY,
WEST VIRGINIA UNIVERSITY

FOSSIL ENERGY RESEARCH AND DEVELOPMENT PROGRAMS

Summary

The National Research Center for Coal and Energy submits this testimony in support of the Fossil Energy program and recommends the following modifications to the administration's budget request:

- Carbon Capture and Storage (+\$6 million for the Focus Area for Carbon Sequestration Science)
- Fuels Program (+\$20 million for continuation of the coal, synthetic natural gas, and coal-biomass liquid fuels programs)
- Advanced Research (+\$10 million to initiate a Focus Area for Materials Science and +\$5 million for the Focus Area for Computational Energy Science)
- Innovations for Existing Plants (+\$10 million for criteria pollutants and water programs)
- Oil and Natural Gas Programs (+\$30 million to restore programs for small producers)

We recommend a dual program strategy to Congress which includes supporting fundamental research for developing new concepts and also supporting larger scale projects to prove out and hasten the deployment of advanced technologies. A robust

coal, oil, and natural gas research program is necessary if we are to meet our national energy needs.

Introduction

Coal will continue to play a leading role in electrical power generation in the United States well into the future. Transforming coal into liquid fuels, synthetic natural gas, and/or chemicals can help to reduce petroleum imports, bring associated positive effects on our international balance of payments, and preserve jobs in this country. Concerns about the effect of greenhouse gases on global climate will require reducing emissions of CO₂ from all fossil fuel use. The successful deployment of cost-effective carbon capture and storage (CCS) technologies will ensure that America can continue to use its abundant domestic fossil fuel resources into the future. Given the projected global use of coal and other fossil fuels, leadership by the United States to implement low carbon emission technologies will set a positive example for the rest of the world. Deployment of U.S. owned low-carbon technologies would be an economic stimulus for developing new products that can be sold in global markets.

Advanced low carbon fossil energy technologies will enable the world community to meet pressing environmental challenges driven by growing economies as both established and emerging nations are faced with diminishing resources. We recommend strong congressional support for fossil energy research, development, and technology deployment. We also call the subcommittee's attention to the critical shortage of energy technologists at all levels. We urge your support in particular for basic research in fossil energy that supports academic programs under which we can both develop breakthrough discoveries and also educate our future workforce of scientists and engineers to meet the challenges which face the energy sector.

Carbon Capture and Storage

We recommend strong support for carbon storage research for injecting CO₂ into geologic formations. Given the variety of potential sinks, multiple projects are needed to prove out technologies such as injection into saline aquifers, depleted oil and natural gas reservoirs, and coal seams. States like West Virginia offer possibilities for demonstrating and deploying capture and storage technologies while offering opportunities for our State's coal resources to help meet electrical demands of the East Coast. We recommend congressional support for a diverse portfolio of investments in the National Energy Technology Laboratory (NETL) as the national center for carbon management research. NETL should also expand its programs on developing pre- and post-combustion CO₂ capture technology. Continued support for the collaborative research program with NETL and the Zero Emissions Technology Center is also recommended. Another promising area of research is to explore ways to utilize CO₂ in processes which do not require storage but result in useful products. In addition to supporting the base administration request, we recommend restoring the Focus Area for Carbon Sequestration Science to its fiscal year 2007 level of \$13 million (+ \$6 million to administration request).

Fuels Program

The administration request for fuels research includes only \$10 million for the development of hydrogen from coal. This program contributes to developing a national hydrogen economy. However, the administration program should also support projects which address the deployment of hydrogen technologies and the associated critical infrastructure issues. We need to demonstrate to the general public that hydrogen (from coal) is both economically viable and safe.

We are also concerned that little attention is paid to developing transportation fuels, synthetic natural gas, and/or chemicals from alternative energy sources such as coal and coal-biomass blends. We recommend adding \$20 million for continuation of the fuels programs added by Congress in fiscal year 2008. These funds would permit investments in fuels research to support programs such as the Consortium for Fossil Fuel Science and the Center for Advanced Separation Technology. These fundamental research programs educate coal chemistry and coal materials technologists who will be needed in the energy industry of the future as our aging scientists and engineers from the Synfuels Corporation era complete their careers. Other worthwhile investments which should be supported from these funds include the program conducted by the United States and China under Annex II of the Fossil Energy Collaborative Research Protocol to study the development of large scale coal liquefaction/carbon sequestration plants in China. Of the increased funding recommended, \$1 million should be designated to continue the China program. Modest investments in the China program pay back big dividends in access to commercial-scale results at a fraction of the cost of building such plants in the United States.

We support the position that CCS must be integrated with the fuel production aspects of coal conversion technologies. Fundamental programs of research conducted with the additional funds recommended would develop new technologies that are cost effective with respect to both fuels production and CO₂ capture. Computational modeling, especially for polygeneration systems, should be an integral part of the work conducted under these programs.

Advanced Research

Materials Research.—Advanced materials are needed in a variety of applications such as ultra supercritical power plants, high temperature gas-fired and hydrogen-fired turbines, sensor technology, catalysts for fuel conversion, high temperature materials for fuel cells, and new processes for carbon capture. We recommend the addition of \$10 million to the Advanced Research account for the creation of a Focus Area for Materials Research at NETL to develop advanced materials for energy applications.

Focus Area for Computational Energy Sciences.—Advanced computing capability enabled by newer, high speed computers and developments in computing science permit modeling of energy systems in scale ranges from molecular interactions to integrated operation of complex power plants. Given the high cost of testing and building large scale energy systems, computational modeling offers inexpensive advantages to design energy systems which will/must be deployed in the future. We are disappointed that the administration has again neglected this important area of research and recommend additional funding of \$5 million for this account for fiscal year 2009.

Innovations for Existing Plants Program

We support the request of the administration to provide increased funding to the Innovations for Existing Plants (IEP) program for CCS technologies. We are concerned however, that the administration request neglects other important areas such as particulate control, air toxics, combustion byproduct utilization, and research in technologies which minimize the use of water in energy systems. Continued research is needed in these areas in view of the new CAMR ruling calling for more stringent studies on mercury emissions. National concerns have arisen about the scarcity of water in many regions where electric power demands are increasing. We recommend an additional \$10 million for the IEP program for these applications.

Oil and Natural Gas Programs

The administration request zeros out funding for both the Oil and Natural Gas programs again this year. The core oil and natural gas programs under Fossil Energy are specifically authorized in Public Law 109–58 (EPAct 2005). This authorization includes programs such as the Stripper Well Consortium, the Petroleum Technology Transfer Council, and the Enhanced Oil Recovery in Marginal Fields programs. All three of these programs are of major interest to areas such as Appalachia where small producers do not have sufficient funding or expertise to conduct research to recover the valuable resources remaining in the ground. These programs also support research which educates our geologists and petroleum engineers needed in the future to produce our existing resources and to manage our carbon storage programs for CO₂. We recommend restoration of the Oil and Natural Gas program at NETL to a level of \$30 million, which is considerably less than Congress provided in earlier times when we were not facing national economic challenges such as \$118 per barrel oil and \$4 dollar per gallon gasoline.

Thank you for considering our testimony.

NOTE.—Specific recommendations for the Consortium for Fossil Fuel Science (\$2 million) were made in testimony submitted by Gerald Huffman. Roe-Hoan Yoon submitted testimony requesting support for the Center for Advanced Separations Technology (\$3 million).

PREPARED STATEMENT OF THE AMERICAN COUNCIL FOR AN ENERGY-EFFICIENT ECONOMY (ACEEE)

The American Council for an Energy-Efficient Economy is an independent, non-profit organization dedicated to advancing energy efficiency to increase economic prosperity, enhance national security, and improve environmental quality. Founded in 1980, we are a leading source of unbiased information and policy analysis on energy efficiency.

DOE's fiscal year 2009 budget request reflects a continuing decline in support for important energy efficiency programs at a time when expanded support for energy efficiency is needed more than ever to protect national energy security, save Amer-

ican jobs, control rising consumer bills, and stem air pollution and greenhouse gas emissions. For fiscal year 2009, the administration proposes to cut \$204 million (29 percent) relative to the fiscal year 2008 appropriation. In order to better address many of America's energy needs, we recommend that the subcommittee increase funding for 11 especially high-priority programs for a total of \$302 million above the administration's request but only \$71 million above the fiscal year 2008 appropriation. These programs include several of DOE's most successful programs as well as a few new programs authorized in the Energy Independence and Security Act of 2007 (EISA). Specific recommendations are described in the sections below.

BUILDINGS TECHNOLOGIES

Commercial Building Initiative.—CBI is a major new initiative established in EISA. The goal of the initiative is for all new commercial buildings to use zero energy on net by 2030 (i.e. they produce as much energy as they use) and all existing buildings to meet the same goal by 2050. These are very large savings that can have many positive impacts on the U.S. economy and environment. CBI combines research, development, and deployment, and will be run by DOE with input from an industry consortium. We recommend that funding of at least \$20 million be appropriated for this important new program, an increase of \$7 million relative to the Commercial Buildings Integration budget in DOE's request.

Lighting and Appliance Standards.—DOE standards produce the greatest energy savings of any DOE program. DOE's analysis estimates that 12 standards to date have saved consumers about \$25 billion, from a Federal investment of less than \$10 million a year. DOE is under court order to complete many rulemakings that are years behind schedule, and also needs additional funding to address requirements added by EISA. The DOE request does not appear to address the new EISA requirements which include several new rulemakings, as well as new mandates to review and update existing test procedures and standards every 6 to 8 years. In order to address both old and new requirements, we recommend funding of \$24 million for the standards program, an increase of \$4 million relative to the fiscal year 2009 budget request but an increase of only \$2 million relative to the fiscal year 2008 appropriation. DOE should be permitted to spend a portion of this increase on staffing, as more DOE staff are needed to supervise increased contractor budgets made possible by the fiscal year 2008 budget.

Building Codes, Energy Star, and Residential Building Integration.—These are three of the most important programs at DOE and all three received significant funding increases in the fiscal year 2009 request. We support these increases.

—Many States are interested in revising their building codes as part of efforts to save energy and address climate change. The DOE codes program is an important source of funding for these efforts. DOE is also supporting efforts by ASHRAE to reduce permitted energy use in its model commercial building code by 30 percent.

—The Energy Star program is probably the administration's most effective climate change response program. Increased funding will allow DOE to update existing specifications, expand the program to several new products, and actively promote these specifications in regions without significant State or utility programs.

—The Residential Building Integration program is the home of the Building America program, a successful partnership with private firms that is developing and promoting cost-effective design approaches for reducing energy use of new homes by 40 percent or more.

INDUSTRIAL TECHNOLOGIES

The 2009 request would cut the Industrial Technologies Program by \$2.3 million, relative to fiscal year 2008, but much larger cuts in several very important programs are hidden in the budget details as is discussed below. The overall program activities are divided into two broad groupings: industry specific and cross cutting. We have identified several priorities in each of these areas.

Industrial Assessment Centers.—The IAC is part of the cross-cutting program budget. The IAC program helps small and medium industries identify and implement energy saving measures, while also helping to train the next generation of industrial energy engineers. The program operates centers at 31 universities nationwide and produces several hundred trained engineers annually while helping to reduce industrial energy use in small- and medium-sized facilities. This is one of DOE's most effective programs, and is presently saving more than \$1 billion per year (including measures implemented in earlier years). The program should be substantially expanded in order to meet future needs for trained energy engineers—

there is presently a shortage of skilled energy efficiency engineers. We recommend that the program be restored to fiscal year 2006 funding levels of \$6.435 million in fiscal year 2009.

Industries of the Future (Specific).—This program does cost-shared research with industry at major research institutions. The program focuses on key, energy-intensive manufacturing industries such as steel, aluminum, wood products, glass and metal casting. The most recent National Academy review found this to be among the most successful of Federal R&D efforts.¹ In spite of this success, the program has seen its budget drop from \$63 million in fiscal year 2002 to \$11 million in fiscal year 2008. DOE is proposing \$11.4 million in fiscal year 2009, which may appear to be level funding, but in reality represents a further cut since most of the research funding is multi-year, and funding from earlier years is now no longer being replaced and the pipeline is running dry. In EISA, Congress authorized an expanded Energy-Intensive Industries program (sec. 452), with an emphasis on industry-specific research in energy-intensive industries. This provision specifically authorized the successful industry-focused program format that has proven effective because it responds to the targeted needs of individual industries rather than to the more general and less focused topics covered under the cross-cutting program. To start implementing this new provision, we recommend fiscal year 2009 funding of at least \$24.2 million (which was the appropriation in fiscal year 2006), an increase of \$12.8 million relative to the budget request.

Distributed Energy (DE).—Over the past decade these efforts have played a key role in the development of high-efficiency clean technologies like combined heat and power (CHP) and technologies to recycle waste energy. Over the past few years these efforts have been shuffled between EERE and the Office of Electricity, and the program has received no funding for the past year. For fiscal year 2008, Congress provided \$14.5 million, but DOE's fiscal year 2009 request is for only \$1.5 million. The program is now part of the cross-cutting effort in the Industry program. We recommend the DE activities be funded at an overall level of no less than \$20 million, an increase of \$5.5 million relative to the fiscal year 2008 appropriation.

Industries of the Future (Cross-Cutting).—The remainder of the industrial program budget request falls within the category of cross-cutting programs. This includes the Industrial Assessment Centers and the Distributed Generation program discussed above. In addition, this program includes Best Practices and cross-cutting R&D, each of which we discuss below.

—*Best Practices.*—The OMB request proposes to increase the best practices area from \$8.8 to \$15.5 million, though this represents only a partial restoration of funding that was \$19.8 million in fiscal year 2007. This increased funding will allow the expansion of the successful Save Energy Now program, one of the most successful energy savings programs undertaken at the Federal level (e.g. savings underway of approximately \$288 million since program inception in 2006). We recommend that the program be funded at the requested level of \$15.5 million.

—*Cross Cutting RD&D.*—These activities are primarily for R&D on technologies that benefit many industrial sectors, such as work on sensors and controls. In addition, DOE is now proposing a number of new efforts in energy-intensive process R&D, feed stock flexibility and nanomanufacturing, and expanding the industry focus to include datacenters and food processing. While these are potentially worthy areas of efforts, DOE is essentially proposing to fund these efforts by further cuts to the successful industry-specific IOF efforts. In addition, EPA has already been running a datacenter program for several years, and a new DOE effort is potentially duplicative. If budgets are tight, funding for these cross-cutting RD&D can be reduced to fiscal year 2008 levels in order to free up funds for our higher priorities discussed above.

¹In 2005 the National Research Council reviewed DOE's Industrial Technology Program in their report *Decreasing Energy Intensity in Manufacturing*. The study characterized the program (at that point) as being "well-managed and effective." In particular they indicated that the program's scope and depth of analysis and reporting are impressive. The ITP significantly leverages its resources through a large and growing number of partnerships with industry, industry associations, and academic institutions." Unfortunately, funding has been dramatically reduced since this evaluation, and a subsequent National Research Council report on DOE R&D, *Prospective Evaluation of Applied Energy Research and Development at DOE (Phase Two)* (2007), noted with respect to Chemical Industry research activities "the budget decreased to \$9 million in fiscal year 2005 and \$7 million in fiscal year 2006. There is a clearly apparent contradiction between the ambitious goals of the program and the dwindling resources available to pursue them."

VEHICLE TECHNOLOGIES

Despite the nominal increase of \$8 million in the Vehicle Technologies Program budget, proposed funding for this work has actually declined because elements of the Hydrogen Technology budget have been moved into Vehicle Technologies. In fiscal year 2008, Vehicle and Hydrogen Technologies together received \$424.1 million. The fiscal year 2009 request cuts these combined budgets by \$56.7 million. The proposed transferal, elimination or postponement of certain activities in the Hydrogen Technology Program appears reasonable in many cases, and in particular begins to rectify disproportionate allocations in prior years to hydrogen and fuel cells relative to other vehicle and fuel technologies. However, given the great opportunities and needs at present in the area of vehicle efficiency and greenhouse gas reduction, it is imprudent to simply eliminate funds from this program, rather than transferring some of the funds to underfunded areas in Vehicle Technologies. In the fiscal year 2009, DOE proposes to cut a variety of important vehicle programs: Hybrid Electric Systems declines by \$5.8 million (6 percent, net of the Technology Validation activity transferred from the Hydrogen Technology Program), Technology Integration by \$2.2 million (13 percent), Advanced Combustion loses \$11 million (25 percent), Materials Technology loses \$2.7 million (7 percent), and Fuels Technology loses \$1.7 million (10 percent), relative to fiscal year 2008 appropriations. Also, funding for the 21st Century Truck Partnership declines in the budget proposal, for a total 40 percent reduction since fiscal year 2007. We recommend that some of these cuts be restored by adding \$37 million to the fiscal year 2009 request, which is still a cut of about \$20 million relative to the combined fiscal year 2008 Vehicle and Hydrogen budgets.

Hybrid Electric Systems.—The proposed reduction in the Vehicle and Systems Simulation and Testing activity relates in part to heavy vehicle systems optimization R&D, which warrants greater attention. We recommend that \$7.1 million be restored to Vehicle and Systems Simulation and Testing, bringing funding for this activity back to \$28.2 million. Furthermore, energy storage efforts need to be accelerated. We recommend that the Energy Storage R&D activity be funded at \$59.5 million, an increase of \$10 million above the proposed budget.

Advanced Combustion Engine R&D.—The explanation offered for the proposed cut, namely that resources should go to “R&D that has a higher potential for oil savings” is not persuasive given the considerable remaining opportunities in this area for both light- and heavy-duty engines. We recommend that Combustion and Emissions Control be funded at \$38.8 million, restoring \$10 million to this activity.

Materials Technology.—Reaching DOE’s stated goal of a 50 percent reduction in the weight of body and chassis for a passenger vehicle will require a sustained effort, including continued exploration of “high-risk concepts”, as referenced in DOE’s budget explanation. We recommend funding of \$30 million for Lightweight Materials Technology, which restores \$2.9 million cut in the budget and adds a further \$7.7 million.

OTHER PRIORITIES

Weatherization Assistance Program.—This program has steadily improved, and according to the last nationwide evaluation of the program, is reducing energy use in participating homes by about 20 percent. DOE has proposed to eliminate this program, in order to save money. With the economy heading into a recession, this is a particularly bad time to cut our country’s safety net. We recommend funding this program at least at the fiscal year 2008 level of \$227 million.

Energy Information Administration Energy Consumption Surveys.—EIA’s Energy Consumption surveys are an important resource for energy analysis and energy program planning. These three surveys (residential, commercial and manufacturing) are widely used and provide important information for accurate forecasting and planning. Unfortunately, due to declining funding, sample sizes are smaller (making regional data less precise) and the surveys are now every 4 years, instead of the every 3 years called for in the Energy Policy Act of 1992. In fiscal year 2008, the consumption surveys have a \$3.6 million budget. We recommend that \$2 million be added to the EIA request in order to return to the every 3 year schedule, increase sample sizes and speed up processing of surveys so they can be released more quickly.

PREPARED STATEMENT OF THE NEXT GENERATION NUCLEAR PLANT WORKING GROUP

The United States must successfully compete in today’s global marketplace to provide opportunities for all of its citizens and future generations. Two of the major

issues affecting our competitiveness are the lack of energy security and our major contributions to the global greenhouse gas (GHG) inventory. The first issue is economic and costs the U.S. taxpayers several billion USD daily. Additionally, innumerable jobs in industries that depend on reasonably priced and abundant fossil feedstock continue to move offshore. The second is more subtle. Our GHG emissions cost us in terms of international reputation and accelerate the adverse effects of global climate change. We must become much more efficient in our use of energy, but this step is not sufficient to address the critical issues to keep our economy strong. We must aggressively pursue technological solutions that provide energy for all sectors of our economy in an environmentally responsible manner. One of the technologies that can address both of these critical issues utilizes a proven energy source, nuclear fission, for a broad range of applications beyond its traditional role of generating electricity.

The Next Generation Nuclear Plant (NGNP) Project provides the basis for the commercialization of this technology in the form of a new generation of advanced, passively safe, modular nuclear plants that use High Temperature Gas-Cooled Reactor (HTGR) technology. This technology offers enhanced safety plus improved reliability, higher efficiency (requiring less fuel and cooling water), proliferation resistance, security and waste management capabilities. Further, at current and projected natural gas prices and costs for CO₂ management, the HTGR will be competitive for a broad range of applications, including:

- High efficiency electricity generation for small to medium markets, particularly if suitable for cogeneration with water desalination or dry cooling;
- High quality steam for use in heavy oil recovery, including tar sands, or the broad range of process steam/cogeneration based industries;
- High temperature process heat for industrial chemical and petrochemical facilities, preserving natural gas for feedstock; and
- High temperature process heat for hydrogen production and cogeneration for the petrochemical and refinery industries plus the clean conversion of coal to liquid and gaseous fuels or the direct use of hydrogen transportation fuel in the future.

Advanced HTGR plants can help improve U.S. industrial competitiveness, promote the utilization of indigenous coal and uranium, and eventually, our oil shale resources. Their use will extend domestic oil and gas resources and preserve them for feedstock for products that would otherwise be unattainable, thereby reducing costs and risks associated with imported oil and natural gas.

The NGNP Project is essential to demonstrate the commercial potential of the HTGR and support timely NRC Design Certification and commercialization. An industry based Consortium is being created to support the public/private partnership with the Department of Energy to focus the development and deployment of the NGNP and help provide the infrastructure for follow-on commercialization. A cost/risk sharing model between the U.S. Government and industry will assure a new commercialization phase for nuclear energy for production of process heat and cogeneration without carbon emissions—at the lowest costs and risks for the U.S. taxpayers.

With a balanced approach to risk management and timeliness to attract end-user support, the recommended NGNP Project schedule targets startup of the demonstration plant in the 2018–2019 timeframe. Near-term priorities in support of this date follow:

- Establish reference design and baseline costs
- Advance licensing strategy and pre-application program with the NRC
- Advance critical-path enabling technology development and testing
- Establish Public-Private Partnership and costs/risks sharing concept
- Establish Project plan, vendor team and international cooperation frameworks

During the past year significant technical progress and milestones have been achieved in the following key areas of the NGNP Project: preliminary design evaluations for the competing concepts, including trade-off studies to resolve critical issues and establish technology development needs; licensing strategy development, technology development including fuel manufacturing process development and testing; and, bounding cost estimates.

For fiscal year 2009, the NGNP Alliance recommends a NGNP Project budget of \$210 million (versus the DOE budget of \$59.5 million) plus a \$28 million budget for the related Nuclear Hydrogen Initiative (versus the DOE budget of \$16 million). The working group also recommends a budget of \$10 million for NRC licensing and required R&D activities related to the NGNP Project. A licensing framework and a process appropriate for the enhanced safety features of the HTGR is essential and is a critical path to the deployment of the NGNP Project.

PREPARED STATEMENT OF THE NEW YORK STATE ENERGY RESEARCH AND DEVELOPMENT AUTHORITY AND THE NEW YORK STATE DIVISION OF HOUSING AND COMMUNITY RENEWAL

The New York State Energy Research and Development Authority (NYSERDA) and the New York State Division of Housing and Community Renewal (NYSDHCR) welcome the opportunity to present this testimony to the Subcommittee on Energy and Water Development, and look forward to working with the subcommittee to ensure the most appropriate and effective Federal funding of essential programs and operations. This testimony will address proposed funding of two Department of Energy programs which are issues of concern to NYSEDA, namely funding for the West Valley Demonstration Project (West Valley, Project), identified for funding from the Non-Defense Environmental Cleanup Program at \$57 million, and the State Energy Program (SEP), identified for funding at \$59 million. In addition, this testimony addresses one program of particular importance to NYSDHCR, the Weatherization Assistance Program (WAP), funding for which was cut completely in the President's proposed fiscal year 2009 budget proposal. NYSDHCR asks that funding for this program be restored to at least fiscal year 2008 levels of \$243 million.

WEST VALLEY

The State of New York and NYSEDA are extremely concerned about the proposed cut in Federal funding to the West Valley Demonstration Project, a radioactive waste cleanup project located near Buffalo, New York. The President's budget for fiscal year 2009 would provide only \$57 million for activities of the Department of Energy at West Valley. The State strongly urges full funding of the West Valley Demonstration Project at the level of \$95 million.

Federal funding had been more than \$100 million as recently as 2004, but had been reduced to \$75 million in recent years. The proposed cuts will result in lengthening the term of the cleanup and ultimately only increase the total project costs. Moreover, as will be discussed below, important risk reduction work that has been agreed upon between the State and Federal governments will not be funded in 2009 and as many as 50 trained workers will have to be laid off.

The Federal funding responsibility for this project was established in 1980, when Congress passed the West Valley Demonstration Project Act, Public Law 96-368. The West Valley Demonstration Project Act directed the U.S. Department of Energy to carry out a high-level radioactive waste (HLW) management demonstration project at the Western New York Nuclear Service Center in West Valley, New York. The WVDP Act directs the Department of Energy to:

- Solidify the 600,000+ gallons of liquid high-level radioactive waste.
- Develop containers for permanent disposal of the solidified HLW.
- Transport the solidified HLW to a Federal repository for permanent disposal.
- Decontaminate and decommission:
 - the tanks and other facilities in which the HLW were stored,
 - the facilities used in carrying out solidification, and
 - the material and hardware used in connection with the Project.
- Dispose of the low-level radioactive waste and transuranic waste produced in conducting the Project.

The West Valley Demonstration Project Act requires the Secretary of Energy to enter into an agreement with New York State for carrying out the Project. Under the requirements of the act, New York State pays 10 percent of the Project costs and the Federal Government pays 90 percent, making New York the only State that has contributed to the cleanup of HLW. New York State has provided approximately \$242 million toward completion of the Project to date.

Decontamination and decommissioning of the West Valley site is necessary to protect public health and safety. The Department of Energy has solidified the bulk of the liquid high-level nuclear waste that was stored in underground tanks. A total of 275 HLW glass-filled canisters are in storage at West Valley awaiting disposal at the Federal repository. However, much cleanup work remains to be done on the site's contaminated facilities and property, including the decommissioning of the four underground HLW storage tanks, the Main Plant Process Building, an unlined lagoon system, a radioactive groundwater contamination plume, and a radioactive waste disposal area. The Department of Energy must also dispose of the low-level waste, the transuranic waste, and the vitrified High-Level Waste.

Until recently, progress on significant aspects of the West Valley cleanup had stalled. The Department of Energy ceased efforts to contain a radioactive groundwater plume and refused to take steps to halt the spread of liquids leaking from a radioactive waste disposal area under its control. The Environmental Impact

Statement that is essential for decisions on the future of the cleanup was also stalled. In the past year, there have been some substantial and encouraging changes at West Valley. Agreements have been reached on steps to control the groundwater plume and disposal area leaks, and the involved Federal and State agencies have agreed on an approach to complete the Environmental Impact Statement.

Unfortunately, this progress is threatened by the lack of adequate funding. For fiscal year 2009, Federal funding at about \$95 million is necessary to continue decontamination work on the highly radioactive Main Plant Process Building, remove liquid from the underground high-level radioactive waste tanks, mitigate radioactive groundwater contamination that is spreading toward the Project boundary, and ship waste for offsite disposal. In the absence of this level of funding, important work to reduce risk from radioactive materials at the site will not get done this year and up to 50 members of the highly trained workforce at the site will have to be laid off. For each year that work is delayed, the time until completion and the total cost of the Project are increased.

For the reasons stated above, New York State and NYSERDA request a restoration of funding for West Valley to \$95 million to permit the important work at the Project to continue at an optimal pace.

STATE ENERGY PROGRAM

The State of New York and NYSERDA are concerned about the proposed level of Federal funding for the State Energy Program, at \$59 million, and request that a funding level of \$75 million for fiscal year 2009 is provided to support this essential program. This funding level request is made in support of the request of the Coalition of Northeastern Governors (CONEG), which is also submitted to the subcommittee. The \$75 million level will help to restore a funding level for SEP which has experienced significant cuts in program budgets in the past. As noted in both the CONEG testimony, and by the Department of Energy itself, every Federal dollar invested by the SEP returns \$7.23 in energy cost savings. In addition, every Federal dollar invested by the SEP also leverages \$10.71 in State, local and private resources, providing significant additional economic benefit.

In New York, SEP program dollars are used by NYSERDA to support the deployment of various energy efficiency programs and services. NYSERDA leverages SEP funds with the State ratepayer-supported System Benefits Charge and other private sector funds. Most importantly, SEP provides essential funding for programs which reach across the spectrum of fuel sectors, helps to fill program gaps, and expands the reach of critical energy efficiency activities to customer sectors which may otherwise be limited from full program participation. In addition to reducing overall energy use in New York, the SEP supports activities that improve productivity, stimulate private investment, retain and create jobs, displace petroleum use, reduce electric peak load, and improve air quality, among other benefits.

Activities supported by SEP dollars include:

- NYSERDA's award-winning Flexible Technical Assistance Program, which provides onsite energy engineering services through competitively retained energy service providers.
- Multifamily Residential energy efficiency program which provides energy audits, evaluations and access to loan fund dollars which reduces the cost to building owners to implement energy efficient technologies.
- Agricultural Initiatives.
- Green Building Projects.
- Alternative Fuel Vehicles and Alternative Fuel Infrastructure.
- Industrial Improvements.
- Expansion of the Home Energy Assistance Program heating oil purchasing program, providing participating low-income energy consumers with discounts on heating oil purchases.

Obtaining an optimal level of SEP funding will help to ensure the continuation of these critical program activities.

For the reasons stated above, New York State and NYSERDA request a restoration of funding for SEP to \$75 million to permit the important energy efficiency programs in New York to continue and expand at a pace needed to meet energy consumer needs.

WEATHERIZATION ASSISTANCE PROGRAM

The Weatherization Assistance Program (WAP) improves the energy efficiency of low-income homes every year, helping to reduce the home energy bills of the Nation's most vulnerable citizens by 25 percent or more. The New York State Division of Housing and Community Renewal (NYS DHCR) is very concerned about President

Bush's decision to eliminate funding for the program for fiscal year 2009. If the President's cut is sustained, the State program will lose \$21.8 million. The State of New York relies on this funding to help assist its low-income families. With oil prices at record levels, and cuts to LIHEAP proposed, these cuts would be devastating to low-income families and seniors in New York. Currently, we have waiting lists for this assistance in excess of 18 months. NYSDHCR asks that Congress work toward funding this program at its fully authorized level.

In conclusion, and as stated herein, NYSERDA and NYSDHCR respectfully requests that the Senate provide, for fiscal year 2009, \$95 million for West Valley, \$75 million for SEP, and at least \$243 million for WAP. NYSERDA and NYSDHCR look forward to working with the subcommittee to ensure that these program funding levels are provided to ensure that essential energy projects are maintained.

PREPARED STATEMENT OF THE BIOMASS ENERGY RESEARCH ASSOCIATION

SUMMARY

This testimony pertains to the fiscal year 2009 appropriations for biomass energy research, development, and demonstration (RD&D) conducted by the Department of Energy's (DOE) Office of Energy Efficiency and Renewable Energy (EERE), Biomass Program. This RD&D is funded by the Energy and Water Development bill and performed under the heading of Energy Supply and Conservation, Energy Efficiency and Renewable Energy.

BERA recommends a total appropriation of \$275 million in fiscal year 2009 under Biomass and Biorefinery Systems R&D (Energy Supply and Energy Conservation), exclusive of earmarks. This is an increase of about \$50 million over the Department of Energy request for fiscal year 2009 for this programmatic area.

We feel this increase is necessary to meet goals for production of fuels from cellulosic biomass as stipulated under the Energy Independence and Security Act (EISA) of 2007. While the proposed DOE Bioenergy budget is an increase of \$27 million over the administration's fiscal year 2008 proposed budget, it reflects a decrease of \$49 million from the DOE Biomass Program's authorized level of (sec. 932) \$274 million, and reducing funds available for important Integrated Biorefinery Demonstration Projects (sec. 932(d)). Technology demonstrations reduce technical and economic risk and accelerate the potential for private investment. They are critical for reaching goals for biofuels production for 2022 and beyond.

Specific lines items for the DOE biomass RD&D budget are as follows:

- \$20 million for Feedstock Infrastructure development (regional partnerships, harvesting and storage technology)
- \$35 million for Biochemical Conversion Platform Technology (conversion of agricultural residues, wood, forest residues and perennial crops to various fuels)
- \$35 million for Thermochemical Conversion Platform Technology (conversion of plants, oil crops, energy crops, wood and forest resources to oils, long chain hydrocarbons, or other fuels/intermediates)
- \$175 million for Integrated Biorefinery Technologies demonstrations
- \$10 million for Utilization of Platform Outputs: Bioproducts (chemicals and materials as co-products)

BACKGROUND

On behalf of BERA's members, we would like to thank you, Mr. Chairman, for the opportunity to present the recommendations of BERA's Board of Directors for the high-priority programs that we strongly urge be continued or started. BERA is a non-profit association based in the Washington, DC area. It was founded in 1982 by researchers and private organizations conducting biomass research. Our objectives are to promote education and research on the economic production of energy and fuels from freshly harvested and waste biomass, and to serve as a source of information on biomass RD&D policies and programs. BERA does not solicit or accept Federal funding.

There is a growing realization in our country that we need to diversify our energy supply, develop technologies to utilize indigenous and renewable resources, reduce reliance on imported oil, and mitigate the impacts of energy on climate. Economic growth is fueling increasing energy demand worldwide and placing considerable pressure on already burdened energy supplies and the environment. The import of oil and other fuels into the United States is growing steadily and shows no sign of abating. Industry and consumers alike are faced with rapidly rising and volatile costs for fossil fuels, especially petroleum and natural gas. A diversified, sustainable

energy supply is critical to meeting our energy challenges and maintaining a healthy economy with a competitive edge in global markets.

Biomass is the single renewable resource with the ability to directly replace liquid transportation fuels. It can also be used as a feedstock to supplement the production of chemicals, plastics, and other materials that are now produced from crude oil. In addition, gasification of biomass produces a syngas that can be utilized to supplement the natural gas supply and electricity from fossil fuels. Production of power from biomass co-products for use in biorefinery processes greatly reduces the life cycle carbon footprint of biofuels. Fuels, chemicals, and power are already being produced from biomass, but on a small scale compared to the potential markets. While biomass will not solve all our energy challenges, it can certainly contribute to the diversity of our supply, and do so in a sustainable way, while minimizing impacts to the environment or climate.

The Energy Policy Act of 2005 created various incentives for diversifying our energy supply via the use of biofuels. In addition, the Energy Independence and Security Act (EISA) of 2007 put forth a mandate to increase use of alternative fuels for transportation, with a substantial portion to come from cellulosic biomass. To meet the ambitious goals of EISA will require aggressive support for RD&D to move technology forward and reduce technical and economic risk. Incentives are also needed to accelerate commercialization and deployment.

BERA RECOMMENDATIONS FOR U.S. DOE BIOMASS RD&D

BERA's recommendations support a balanced program of RD&D, including projects to develop and demonstrate advanced biochemical and thermochemical biomass conversion processes, a diverse slate of liquid transportation fuels, and co-production of fuels, chemicals, and power in integrated biorefineries. Our overarching recommendations are to:

- Invest in demonstration of technology (as progress is made) to reduce risk (e.g., through loan guarantees, cost-shared projects, other mechanisms) and encourage private sector investment and commercialization.
- Explore a variety of fuels beyond ethanol, including green diesel, green gasoline, jet fuels, algae diesel, pyrolysis oils, mixed alcohols, and others. Include fuels that can be easily integrated into existing infrastructure, and revolutionary fuels or feedstocks (algae). This will diversify options for different transport markets that depend heavily on petroleum.
- Fund a variety of conversion technologies, both biochemical and thermochemical.
- Integrate sustainability throughout RD&D to promote the use of biomass technologies that improve environmental performance and minimize impacts to land, water and air.

BERA's recommendations for funding for DOE biomass RD&D are shown in Table 1 and outlined below. Note that recommended budgets for demonstration projects do not include industry cost-share, which should be 50 percent or more.

TABLE 1.—BIOMASS/BIOREFINERY SYSTEMS R&D, ENERGY SUPPLY & CONSERVATION, EERE
[In millions of dollars]

Program Area	Description of RD&D	R&D	Demonstration	Total
Feedstock Infrastructure	Regional feedstock partnerships, joint development of storage and harvesting technology.	15.0	5.0	20.0
Biochemical Conversion Platform R&D.	Conversion of cellulosic biomass—agricultural residues, wood/forest residues, perennial grasses.	20.0	15.0	35.0
Thermochemical Conversion Platform R&D.	Conversion of wood/forest residues to pyrolysis oils or syngas.	20.0	15.0	35.0
Platform Outputs: Integrated Biorefineries.	Developing/validating biochemical and thermochemical conversion technologies in integrated biorefineries (e.g., 932 projects) and small scale biorefineries.	10.0	165.0	175.0
Platform Outputs: Bioproducts.	Co-production of chemicals and other products from biochemical and thermochemical output streams.	5.0	5.0	10.0
TOTAL	70.0	205.0	275.0

Feedstock Infrastructure.—Continue support for regional feedstock partnerships to ensure the optimal and sustainable production of feedstocks to meet demand on a regional basis. The Departments of Energy and Agriculture, in partnership with the Sun Grant Initiative universities and the members of the National Biomass State and Regional Partnership, established the Regional Biomass Energy Feedstock Partnership. Funding should be continued for these important partnerships, as they will help ensure that cost competitive biomass feedstocks are widely available in sufficient quantity and at an acceptable market cost. Increase funding for cost-shared activities with USDA on critical harvesting, storage and transport technologies to ensure a feedstock delivery infrastructure is available to meet the larger demand.

Platform Outputs: Support Development/Demonstration of Integrated Biorefineries.—Activities should address promising biochemical and thermochemical processes in integrated biorefineries producing fuels, high-value products where possible, and potentially heat and power to meet processing demands. A diversity of technologies and feedstocks should be considered, as well as new fuel options (green diesel, jet fuel, algae, etc.). The object is to improve process efficiency and reduce cost, taking into consideration design, financing, permitting, environmental controls, waste processing, and sustained operations; feedstock acquisition, transport, storage, and delivery; and storage and delivery of products to market.

Conversion: Fund Both Biochemical and Thermochemical Conversion Platforms as Foundations for Integrated Biorefineries.—The biochemical and thermochemical platforms are both important and could provide viable technologies for production of fuels and chemicals. BERA urges that both be funded to accelerate the development and demonstration of large-scale, synergistic integrated biorefinery systems. BERA urges that biochemical conversion research be funded at the amounts shown in Table 1, and that thermochemical conversion R&D for biomass gasification, pyrolysis, and synthesis of alternate liquid fuels be given equal priority. Both should focus on the use of cellulosic biomass, waste biomass, or novel concepts for feedstocks.

Platform Outputs: Invest in R&D to Develop Bioproducts That Enhance the Economic Viability of the Integrated Biorefinery.—BERA urges that funding be provided for R&D to enable economic production of commodity organic and high value chemicals as co-products in biorefineries. Biomass-derived fuels and chemicals combined would increase the product slate and provide greater opportunity for reducing fossil fuels consumption, while increasing the economic viability of the biorefinery. BERA urges that this effort include research on sugar intermediates, but that it be expanded to include direct conversion of other intermediates (such as those derived from gasification and pyrolysis) to fuels and commodity organic chemicals.

Reduce or Eliminate Earmarks.—The level of earmarks in the last few years has limited new initiatives and led to premature reductions of scheduled programs by EERE. BERA respectfully asks the subcommittee to carefully consider the impacts of all earmarks on EERE's biomass energy RD&D.

PREPARED STATEMENT OF THE CENTER FOR ADVANCED SEPARATION TECHNOLOGIES

Chairman Dorgan and Ranking Member Domenici, and members of the subcommittee, I represent the Center for Advanced Separation Technologies (CAST), which is a consortium of seven universities. I appreciate the opportunity to submit this testimony requesting that your subcommittee add \$3 million to the 2008 Fuels Program budget, Fossil Energy Research and Development, U.S. Department of Energy, for advanced separations research. Research in Advanced Separations Technology Development is authorized by the Energy Policy Act of 2005, title IX, subtitle F, sec. 962. I am joined in this statement by my colleagues from the consortium: Richard A. Bajura, West Virginia University; Peter H. Knudsen, Montana Tech of the University of Montana; Rick Q. Honaker, University of Kentucky; Jan D. Miller, University of Utah; Ibrahim H. Gundiler, New Mexico Tech; and Maurice C. Fuerstenau, University of Nevada-Reno.

FUNDING REQUEST FOR CENTER FOR ADVANCED SEPARATION TECHNOLOGIES

CAST was formed initially as a partnership between Virginia Tech and West Virginia University in 2001 to address the needs of the U.S. coal industry. In 2002, five other universities (University of Kentucky, Montana Tech, University of Utah, University of Nevada-Reno, and New Mexico Tech) joined to form a consortium, with Virginia Tech as the lead institution. The objective of the consortium is to develop Advanced Separation Technologies that can be used to produce cleaner fuels from domestic resources with minimal environmental impact.

PROPOSED WORK

The United States faces an energy crisis created by an imbalance between domestic supply and demand. While the United States makes up only 4.6 percent of the world's population, it consumes 24 percent of the world's energy resources, 25 percent of the oil, and 44 percent of the motor gasoline, while its domestic energy production lags behind. As a result, the United States imported 30 percent of its energy needs in 2006, a number expected to grow in the future. On the other hand, the United States is fortunate to have large amounts of untapped energy resources within its borders, which include 271 billion tons of recoverable coal, 2.6 trillion barrels of oil in the form of oil shale, and 20 billion barrels of oil in oil sands. In addition, the United States has 200,000 trillion cubic feet (Tcf) of methane deposited in the form of hydrates in ocean floors and permafrost. The amount of energy deposited as methane hydrates far exceeds the amounts of all fossil energy resources combined. The advanced separation technologies developed by CAST will be useful for developing these resources in an environmentally acceptable manner and help the United States achieve its energy independence.

A major concern in developing these domestic resources is the greenhouse gases (GHG) emitted from the utilization of fossil energies, which account for 85 percent of the total energy consumed in the United States. Therefore, the country is seeking to increase energy efficiencies and develop renewable energies. However, the renewable energies account for only 7 percent of the total, including hydroelectric power (2.9 percent), bio-fuels (0.8 percent) and others. Recognizing that the crux of the energy crisis lies in the shortages of transportation fuel liquids, the country is striving to increase the production of bio-fuels. In 2005, the United States produced about 4 billion gallons; however, the United States consumed 180 billion gallons of gasoline and diesel fuel combined in the same year. Thus, ethanol accounts for only a small percentage of the transportation fuel need. According to a publication by the National Academies, the energy from biomass will likely increase by 60 percent, and those from wind, solar and other renewable resources are likely to nearly triple by 2030. But the net effect of all these activities will probably raise the total renewables from 7 percent of the total energy consumed in the United States to about 8 percent in 2030. Thus, the United States will have to rely on fossil energy resources for the foreseeable future.

On the other hand, the scientific debate on global warming seems to be over, and the country is prepared to reduce CO₂ emissions by legislation. But Congress recognizes that the United States cannot stop global warming single-handedly. Developing countries, such as China and India, should also participate in limiting their own CO₂ emissions. If the United States reduced the emissions unilaterally, the cost of producing American goods would increase relative to those manufactured in countries without emission limits, resulting in the relocation of U.S. industry and manufacturing jobs.

It is projected that developing countries will account for more than three-quarters of the increase in global CO₂ emissions between 2005 and 2030, and these countries' overall shares in world emissions are expected to rise from 40 percent in 2005 to nearly 55 percent by 2030. In 2006, China and India alone produced 3.1 billion tons of coal, representing 46.2 percent of the world production, while the United States produced 1.16 billion tons of coal accounting for 19.3 percent of the world production. In the near term, the major focus of these countries is on economic development and reducing poverty. Therefore, it would be desirable for the United States to develop affordable clean coal technologies (CCT) that can be used in these countries.

A serious problem in China and India is that much of the coal is burned as mined without cleaning, causing low thermal efficiencies. The thermal efficiencies for power generation are 29 percent in these two countries as compared to 38 percent in the United States. By improving the quality of coal used for power generation, China can increase the efficiency to 33 percent and reduce CO₂ emissions by 20 percent. Currently, only 12 percent of the coal burned in China for electricity generation is cleaned coal. Thus, increased use of advanced coal cleaning technologies, representing the most affordable CCTs, should help China reduce CO₂ emissions substantially. According to a recent IEA report, India could reduce CO₂ emissions by 55 percent using state-of-the-art technologies relating to coal quality, boiler/generator design, instrumentation and control, and high voltage distribution systems. Unfortunately, much of the coals burned in India for power generation are of low quality, assaying 35–42 percent ash.

It is, therefore, an objective of CAST research to develop advanced technologies that can be used to separate various impurities such as ash, sulfur, and mercury from coal so that they can be burned more cleanly and efficiently. The Chinese Gov-

ernment considers pre-combustion coal cleaning an important element in their strategy to increase energy supply and improve energy transportation systems, as stressed in their plan to implement CCTs. Recently, India passed a law requiring coals to be cleaned if they are to be transported more than 1,000 km.

SUMMARY OF ACCOMPLISHMENT

Thanks to your support, CAST has become the world leader in developing advanced separation technologies for the coal industry. Many of the solid-solid and solid-liquid separation technologies developed by CAST are marketed commercially worldwide under license agreements. For example, the Microcel flotation technology is used to remove ash, sulfur, mercury, and other impurities from coal in the United States, Australia, and China. In addition, an advanced fine coal dewatering technology has been tested successfully in full-scale tests, and is marketed commercially. More recently, another fine coal dewatering technology has been tested successfully at pilot-scale and is expected to be commercialized before the end of this year. With the commercialization of these advanced separation technologies, the U.S. coal industry will no longer have to discard fine coal due to the lack of appropriate separation technologies. These new technologies will help coal companies produce cleaner solid fuels without causing environment damage.

The advanced separation technologies developed at CAST will soon be implemented in India. As part of the Asia-Pacific Partnership on Clean Development and Climate (APP) program, the U.S. Department of State (DoS) provided major funding for CAST through a competitive solicitation process to implement advanced separation technologies in India. Also, CAST has submitted a proposal to Coal India Limited (CIL), which produces 86 percent of the coal in the country, to implement the advanced fine coal beneficiation technologies developed by CAST in a demonstration plant.

Some of the advanced separation technologies developed for cleaning coal have cross-cutting applications. For example, the methods of separating fine particles are used for producing potash (KCl) from previously unminable resources in New Mexico. For another, methods of separating coarse particles are used for producing phosphate fertilizers in Florida.

NEW INITIATIVES

Coal is the most abundant energy resource the United States has, and it is difficult to displace it with renewable energy resources in a relatively short timeframe. Therefore, it is imperative to develop methods of utilizing coal with minimal CO₂ emissions. To meet this objective, it is proposed to develop advanced gas-gas separation methods which will have crosscutting applications for many ongoing programs such as Carbon Capture and Sequestration (CCS), Innovation of Existing Plants, Gasification, and Hydrogen from Coal.

During the course of studying the basic sciences involved in a solid-solid separation process (i.e., froth flotation), CAST has developed a new understanding of the behavior of hydrophobic species in water. Based on both experimental and theoretical studies, it has been found that hydrophobic surfaces attract each other via hydrophobic force, which originates from the tendency for water molecules to reorganize themselves around hydrophobic entities. These studies have lead to an improved understanding of how ice (or hydrate) is formed around hydrophobic molecules (e.g., methane on ocean floors), and why different gases (e.g., CO₂, nitrogen, and hydrogen) form hydrates under different conditions, which in turn provide a basis for separating one type of gas from another.

It is, therefore, proposed to separate different types of gases from each other by forming hydrates selectively. At present, cryogenic distillation is the only commercially viable method of separating oxygen and nitrogen, and this new method can potentially reduce the cost of producing oxygen substantially. The same method can also be used to separate other gases. For example, CO₂ and nitrogen present in combustion gases can be readily separated from each other as shown by thermodynamic calculations and in experiment. It is also found that the kinetics of hydrate formation and, hence, the separation process can be improved in the presence of appropriate additives. The gas-gas separation process based on selective hydrate formation can have higher capacity and lower cost than the methods of using membranes. The new gas-gas separation method can also be used for producing ultra-pure hydrogen for fuel cell applications, which is a major objective of the Fuels Program.

The proposed research can also lead to the development of efficient methods of extracting hydrates from permafrost and ocean floors, while, at the same time, allowing CO₂ to be sequestered in place. The Blake Ridge deposit off the Carolina shores alone has 1,300 Tcf of methane, which is about six-times larger than the

amount of the conventional natural gas resource in the United States. Thus, the proposed work offers a new approach for separating gases for CCS and for the production of clean fuels such as methane and hydrogen from coal.

FUNDING REQUEST

It is requested that \$3 million of research funding for CAST be added to the fiscal year 2009 Fuels Program budget, Fossil Energy R&D, the U.S. Department of Energy. Continued funding will allow CAST to develop advanced technologies that can be used to exploit domestic energy resources and help developing countries reduce their CO₂ emissions. In addition, the new gas-gas separations technologies to be developed at CAST will have crosscutting applications for a wide spectrum of the Fossil Energy R&D programs.

PREPARED STATEMENT OF THE NATIONAL MINING ASSOCIATION (NMA)

NMA RECOMMENDATIONS

Department of Energy (DOE)

\$156 million for the FutureGen project at Mattoon, Illinois; \$382.7 million for base coal research and development programs; \$200 million for the Clean Coal Power Initiative (CCPI); \$38.5 billion for the loan guarantee office to support deployment of advanced coal technologies; and \$7.5 million for DOE's participation in the Asia-Pacific Partnership on Clean Development and Climate.

U.S. Army Corps of Engineers

Civil Works Program.—\$180 million for the Regulatory Program. See the table below for NMA's list of priority lock and dam projects and recommendations for levels of funding required for their completion. NMA opposes the Corps' proposed concept of a new inland waterways "lockage fee/tax" to fund improvements to the Nation's inland waterways system.

BACKGROUND

Office of Fossil Energy

NMA strongly supports: \$156 million for the FutureGen project at Mattoon, Illinois and opposes the administration's proposal to cancel the project and use the funding for smaller carbon, capture and sequestration projects. In addition, NMA supports the \$382.7 million in the administration's budget request for base coal research and development programs. However, NMA recommends that CCPI be funded at a level of \$200 million, which would enable DOE to conduct a third solicitation targeting advanced technology systems that capture carbon dioxide for sequestration.

While the NMA applauds the administration's commitment to accelerating research, development and deployment of technologies that will allow the management of carbon emissions at coal-fueled power plants, the NMA questions the efficacy of DOE's proposal to cancel the FutureGen project as originally configured. Tremendous progress has been made since the FutureGen project was announced in 2003 and the NMA urges the subcommittee to reject the administration's proposal and to fund the FutureGen project as originally configured with the \$156 million requested.

Technological advancements achieved in the base coal research and demonstration programs such as gasification, advanced turbines, and carbon sequestration, provide the component technologies that will ultimately be integrated into the FutureGen project as currently configured. NMA believes these programs should be funded at a level of at least the President's request of \$382.7 million. In addition, the advanced turbine program should be funded at \$55 million instead of the requested level of \$28 million. The increase in funding for these and other programs will ensure the FutureGen project meets the intended goals outlined in the DOE's 2004 report to Congress, "FutureGen, Integrated Sequestration and Hydrogen Research Initiative—Energy Independence through Carbon Sequestration and Hydrogen from Coal."

The Coal Utilization Research Council and the Electric Power Research Institute estimate that by 2025, combustion and gasification-based power generation options can be available commercially—with the ability to capture and sequester CO₂—at a cost of electricity comparable to the cost of new power generation (with CO₂ capture) today. This includes the current work on FutureGen. In order to achieve this

goal, a Federal investment of \$10 billion through 2025 is necessary while the industry investment is expected to be \$7 billion over that same time.

In addition, NMA recommends \$3 million of funding for the Center for Advanced Separation Technologies (CAST), which is a consortium of seven universities lead by Virginia Tech. CAST has developed many advanced technologies that are used in industry to produce cleaner fuels in an environmentally acceptable manner, while some of them have crosscutting applications in the minerals industry. Further development of advanced separation technologies will help encourage developing countries, such as China and India, to deploy affordable clean coal technologies (ACCT) and reduce CO₂ emissions. Research in Advanced Separations is mandated by the 2005 Energy Policy Act, section 962.

Asia-Pacific Partnership on Clean Development and Climate (APP)

NMA supports the administration's total request of \$52 million for this partnership and specifically, the request of \$7.5 million to fund the DOE's participation.

The APP will spur development of cutting edge technologies and practices that support economic growth while reducing emissions, including greenhouse gas emissions. It will result in expansion of market opportunities for U.S. mining and equipment companies and other U.S. businesses.

The APP, involving the United States, Australia, Canada, China, India, Japan and South Korea, is important for a number of reasons:

—*It Will Result in Real Emissions Reductions.*—With the participation by China and India, APP is the only international agreement addressing rapid emissions growth in the developing world, which is forecast to surpass emissions of industrialized nations in 2010. APP is a voluntary, technology-based approach to emissions reduction geared towards future economic growth and energy security and will be more effective than unrealistic mandates or treaties.

—*It Builds on Methane-to-Markets and Other Successful Programs That Reduce Greenhouse Gas Emissions.*—The U.S. coal industry has captured and re-used 308 billion cubic feet of coal mine methane—the equivalent of removing 40 million automobiles per year from the roads. APP, working with the EPA's Methane-to-Markets program will use U.S. experience and expertise to accelerate large-scale capture and recycling of methane in China and India.

—*It Helps Preserve Coal as an Important Energy Source.*—The United States, China, India and Japan will be at the center of a significant rise in population, economic activity and energy use in the next 50 years. Coal is essential to sustaining America's competitiveness and vitality in a changing world, as it is in China and India. APP supports improvements in efficiency in both coal mining and use through the acceleration of clean coal technologies, industrial technology strategic planning and energy efficiency best practices.

—It creates new markets for U.S. companies in the emerging economies of China and India.

U.S. Army Corps of Engineers

Regulatory Program.—NMA supports the administration's request of \$180 million for administering the Corps' Clean Water Act (CWA), section 404 permit program and for implementing the Memorandum of Understanding (MOU).

The Corps' Regulatory Branch plays a key role in the U.S. economy since the Corps currently authorizes approximately \$200 billion of economic activity through its regulatory program annually. NMA recommends that a portion of the Corps' regulatory program funding be used for implementing the MOU issued on February 10, 2005, by the Corps, the U.S. Office of Surface Mining (OSM), EPA and the U.S. Fish and Wildlife Service. The MOU encourages a coordinated review and processing of surface coal mining applications requiring CWA section 404 permits.

The ability to plan and finance mining operations depends on the ability to obtain CWA section 404 permits issued by the Corps within a predictable timeframe. In this regard, the NMA appreciates the subcommittee including language in the fiscal year 2008 Omnibus appropriations bill directing the Corps to work with OSM to develop a more efficient process for expediting permit decisions associated with surface coal mining operations; in addition to directing the Corps to dedicate sufficient personnel and financial resources needed to support an efficient permit review process.

Civil Works Programs.—The NMA understands the Corps intends to provide Congress with a legislative proposal to replace the diesel fuel tax that has been in place since 1986, with a "lockage fee/tax" that would more than double the taxes paid by the towing industry. The coal industry ships approximately 185 million short tons of coal annually on the inland waterways systems. Therefore, the increase in this tax will ultimately be borne by the consumers of coal-fired electricity. NMA opposes such a tax increase and urges Congress to reject this proposal and instead maintain

the current diesel fuel tax and change the Inland Waterways Trust Fund cost-sharing formula from 50/50 to 75/25 (Federal/non-Federal) to ensure predictable, consistent, and adequate funding for key inland waterways infrastructure projects. Below is a table indicating NMA's fiscal year 2009 priority navigation projects.

NMA FISCAL YEAR 2009 PRIORITY NAVIGATION PROJECTS

Construction	Fiscal Year 2008 Enacted	Fiscal Year 2009 Request	NMA Recommendations
Robert C. Byrd Lock and Dams Ohio River, OH/WV	\$905,000	\$1,000,000	\$1,000,000
Kentucky River Lock Addition, Tennessee River, KY	51,168,000	22,330,000	34,500,000
Marmet Lock and Dam, Kanawha River, WV	29,520,000	9,000,000	9,000,000
McAlpine Locks and Dams, Ohio River, IN/KY	44,280,000	6,270,000	6,270,000
Locks and Dams 2, 3, 4, Monongahela River, PA	69,175,000	40,806,000	40,806,000
J.T. Myers Locks and Dams, Ohio River, IN/KY	984,000	14,624,000
Olmsted Locks and Dams, Ohio River, IL/KY	102,336,000	114,000,000	114,000,000
Emsworth Dam, Ohio River, PA	42,312,000	25,800,000	25,800,000
Greenup Lock and Dam, Ohio River, KY/OH	12,100,000

The National Mining Association (NMA) represents producers of over 80 percent of the coal mined in the United States. Coal continues to be the most reliable and affordable domestic fuel used to generate over 50 percent of the Nation's electricity. NMA members also include producers of uranium—the basis for 20 percent of U.S. electricity supply. NMA represents producers of metals and minerals that are critical to a modern economy and our national security. Finally, NMA includes manufacturers of processing equipment, mining machinery and supplies, transporters, and engineering, consulting, and financial institutions serving the mining industry.

PREPARED STATEMENT OF THE GAS TECHNOLOGY INSTITUTE

INCREASE THE COMBUSTION BUDGET TO \$4.2 MILLION IN THE FISCAL YEAR 2009 ENERGY AND WATER APPROPRIATIONS BILL FOR DOE, EERE

Dear Chairman Dorgan and Senator Domenici, we write today because we are concerned about the Department of Energy budget request for the Industrial Technologies Program within the Energy Efficiency and Renewable Energy budget. In particular, we are disappointed to see the essential elimination of the Combustion program within the Crosscutting Industries of the Future area.

The combustion focus at the Department has been on development of next generation boiler technology, applicable to a variety of industrial processes, that is both much more efficient and environmentally friendly than existing technology. The Gas Technology Institute, Cleaver Brooks, a boiler manufacturer, and a number of gas utilities have been working with the DOE, California Air Resources Board, California Energy Commission, South Coast Air Quality Management District, and others to develop next generation "Super Boiler" technology.

Developing a clean, efficient natural gas steam boiler will be a boon to the U.S. economy. Increasing energy costs and stringent local emissions standards are two reasons why America's industrial facilities are re-locating overseas. With 31 percent of industrial energy used for steam generation, widespread adoption of Super Boiler technology can significantly reduce costs and emissions.

The Super Boiler system is 94 percent efficient compared to current technologies which are around 80 percent efficient. This increase in efficiency will provide a 15–20 percent fuel savings, corresponding to a 15–20 percent reduction in greenhouse gas emissions, and a 90 percent reduction in NO_x emissions. Technological development efforts for the coming year include fuel flexibility and the use of alternative fuels for the boiler, scale up, extensive testing and improvements to the heat recovery system that will both further boost efficiency and reduce emissions.

We urge you to fund the DOE Combustion budget at \$4.2 million in the fiscal year 2009 Energy and Water Appropriations bill for the Department of Energy, Energy Efficiency and Renewable Energy (Industrial Technologies Program, Industries of the Future Crosscutting) for continued development and deployment on Super Boiler technology.

Thank you for considering this request.

PREPARED STATEMENT OF THE ALLIANCE FOR MATERIALS MANUFACTURING
EXCELLENCE (AMMEX)

The Alliance for Materials Manufacturing Excellence (AMMEX) welcomes this opportunity to provide its input to the subcommittee on the proposed budget for fiscal year 2009 for the Industrial Technologies Program (ITP) at the Department of Energy. AMMEX organizations include the basic materials manufacturing sector (aluminum, chemicals, forest products, glass, metal casting, steel) in the U.S. economy along with several stakeholders in materials manufacturing, such as the Northeast-Midwest Institute, the National Association of State Energy Officials and the American Council for an Energy-Efficient Economy. We are writing to urge Congress to restore funding to the ITP to the level of \$125 million and to restore the structure of the program to one that emphasizes new process development in all six materials industries as opposed to cross-cutting research.

This request would align the program with the authorized funding levels and intent of both section 452 (Energy Intensive Industries Program) of the Energy Independence and Security Act of 2007, which was signed into law on December 19, 2007, as well as the Energy Efficiency and Renewable Energy Act of 2007, which passed the House unanimously on October 22, 2007.

U.S. materials manufacturing continues to face challenges resulting from increased cost and decreased availability of traditional energy supply resources. These challenges have stimulated innovation in the materials manufacturing sector in order to create significant energy improvements and to diversify the energy supplies. While the innovations of the past have brought the materials manufacturing sector a long way, the sector cannot go further without new innovations. In order to do this, the materials manufacturing processes must be transformed, i.e. new processes and new innovations must be developed which will use much less energy and which will be able to utilize diverse forms of energy.

The member organizations of AMMEX have been partners with the Department of Energy's Industrial Technology Program since its inception. ITP is a true public-private partnership. DOE and materials manufacturers jointly fund cutting-edge research that addresses the needs of the Nation and materials manufacturers. All projects have the shared goals of reducing energy consumption, reducing environmental impact, increasing competitive advantage of U.S. materials manufacturers, and enhancing our national security. The program is unique because we select only projects with "dual benefits"—a public benefit such as reduced emissions or petroleum use, justifying the Federal funding; and an industry benefit such as a more efficient process, justifying the industrial funding. Substantial energy reductions have occurred as shown below.

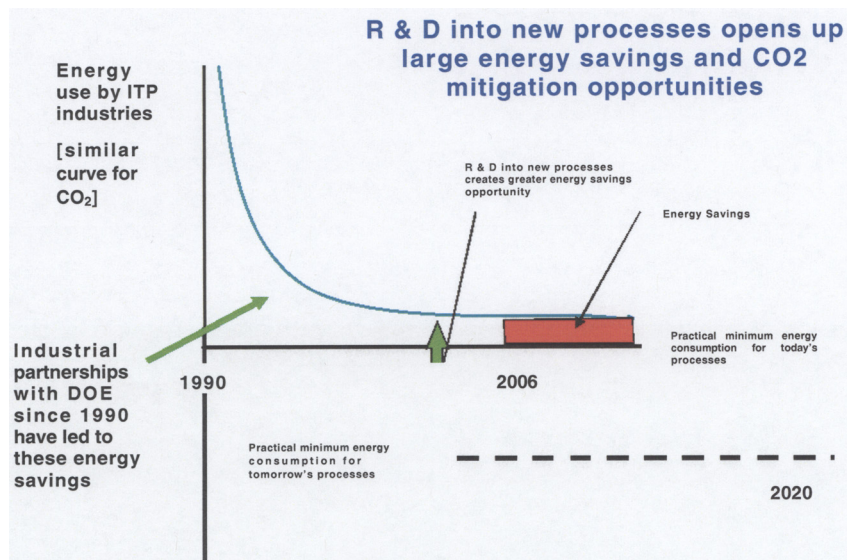


FIGURE 1.—*Materials Manufacturers have greatly reduced energy use since 1990 because of their co-investment with DOE*

To accomplish these goals, the Federal Government and industry will need to embark upon a co-funded effort to broaden and accelerate inherently high-risk research, development, and deployment of new materials manufacturing processes that utilize diverse energy sources. This effort will also allow the materials manufacturing sector to lessen dependence on natural gas and oil resources and conventional electricity sources—thus benefiting consumers through contribution to a stable energy market.

Furthermore, it is critical to recognize the important contributions of ITP to efforts to combat climate change. The development of new technology is an extremely important facet to dealing with climate change. Most, if not all AMMEX industries have voluntarily reduced energy intensity by 25 percent since 1990 in partnerships with DOE and only very small gains in energy use are still possible for today's processes [red area in above chart].

Most of the legislative options being considered to reduce CO₂ and other greenhouse gases employ a target of at least a 50 percent reduction in CO₂ emissions by 2050 over a 2000 baseline. It is important to acknowledge that achieving such a goal with today's manufacturing processes will be very challenging. Thus, we are confronted with the ideal opportunity for ITP and AMMEX industries—collaboration to accelerate the development and deployment of new, transformational technologies to help our country reach its CO₂ mitigation goals. We would argue there is not a more appropriate public-private partnership than one focused on our environment. It is the method of choice employed by our competitors in Europe and Asia.

The infrastructure already exists to create such a program—only a slight re-focusing of the ITP program and a return to historical budget levels is all that is needed for the Federal Government and materials industries to embark upon a co-funded effort to broaden and accelerate inherently high-risk research, development, and deployment of new materials manufacturing processes that utilize diverse energy sources.

Consequently, our request for funding in fiscal year 2009 for ITP entails two parts:

- A return to a total program level of \$125 million, bringing the funding amount closer to the level authorized in the Energy Independence and Security Act of 2007.
- A re-structuring of the program so as to return to the structure that was so successful from 1990–2003—a balanced portfolio of industry-specific research from the point of view of research impact, i.e., that 50 percent or more of the funding

go to industry specific new process development [where the energy savings potential in industry is highest].

AMMEX members have identified their top new process development concepts [not in priority order] which would be pursued at the funding levels and structure defined above:

Aluminum

- Improved, energy-efficient burners and furnaces for aluminum melting
- Improved energy efficiency and recovery rates for recycling technologies

Chemicals

- Development of alternative feedstocks for the chemical industry to reduce dependence on petroleum and natural gas derived feedstocks
- Nano-manufacturing scale-up methodologies for key unit operations: synthesis, separation, purification, stabilization, and assembly
- Development of low-energy, low-capital membrane or hybrid separations technology

Glass

- Complete development and deployment to multiple industries of Submerged Combustion Melter
- Waste Heat Recovery and Use as Electrical or Chemical Energy
- Low Residence Time Glass Refining Technologies

Forest Products

- Advanced water removal and high efficiency pulping
- Gasification of Spent Pulping Liquors and Biomass Residuals

Metal Casting

- Simulation of Dimensional Changes and Hot Tears
- Engineered Coatings for Aluminum Pressure Dies
- Developing a lightweight production cast aluminum metal matrix composite alloy

Steel

- Ironmaking by Molten Oxide Electrolysis
- Ironmaking by Flash Smelting using Hydrogen
- Demonstration of the Paired Straight Hearth Furnace Process

The United States also faces serious shortages in the science and engineering manpower that is needed to keep America's competitive edge in world markets through technology innovation and timely application. From the President's recent State of the Union Addresses to recent legislation passed by Congress, the Nation is awakening to the need for a re-energizing of our commitment to technology education. Our proposal to the subcommittee is an effort to both rebuild America's materials manufacturing industries and meet shared national energy and environmental goals.

On behalf of the AMMEX coalition, we thank you for the opportunity to submit this statement. We look forward to continuing to work with the subcommittee as you move forward on the fiscal year 2009 appropriations legislation for the Department of Energy.

PREPARED STATEMENT OF THE AMERICAN FOREST AND PAPER ASSOCIATION

AGENDA 2020 TECHNOLOGY ALLIANCE

The Agenda 2020 Technology Alliance, a Special Project of the American Forest & Paper Association (AF&PA) welcomes this opportunity to provide the subcommittee with our views on the industry's key public-private partnerships within the Office of Energy Efficiency and Renewable Energy (EERE) and to urge increased funding to adequately address industry's challenges in fiscal year 2009. The EERE Industrial Technologies Program (ITP) and Office of Biomass Programs (OBP) provide vital funding for research, development, and demonstration (RD&D) of technologies that dramatically reduce the forest products industry's energy intensity and transforms our industry into producers of carbon-neutral biofuels—thus addressing strategic national needs associated with energy efficiency, energy security, diversified energy supply, and environmental performance. We recommend increasing the industry specific funding for the forest products industry in ITP to \$6 million. We support the President's request for \$225 million for Biomass and Biorefinery Systems R&D in OBP and ask that the subcommittee work to maintain eligibility of

forest biorefineries in these programs and keep the appropriations unencumbered to allow for full funding of competitive biomass systems and biorefinery RD&D grants.

The Agenda 2020 Technology Alliance is an industry-led partnership with government and academia that holds the promise of reinventing the forest products industry through innovation in processes, materials and markets. The collaborative, pre-competitive research, development, and deployment supported through Agenda 2020 provide the foundation for new technology-driven business models that will enable our industry to address market demands for materials from renewable sources, while also contributing solutions to strategic national needs including energy reduction and sustainability. The technology approaches developed through Agenda 2020 are aligned to provide solutions to the competitive challenges faced by the U.S. forest products industry, which accounts for approximately 6 percent of the total U.S. manufacturing output, employs more than a million people, and ranks among the top 10 manufacturing employers in 42 states with an estimated payroll exceeding \$50 billion.

As is the case with many U.S. manufacturing industries, we face serious domestic and international challenges. Since early 1997, more than 145 pulp and paper mills have closed in the United States, contributing to a loss of 86,000 jobs, or 40 percent of our workforce. An additional 80,000 jobs have been lost in the wood products industry since 1997. New capacity growth is now taking place in other countries, where forestry, labor, and environmental practices may not be as responsible as those in the United States. Several drivers have heightened the need to develop new energy efficiency technologies: the recent volatility of energy markets, especially for natural gas; renewed national focus on climate change and environmental performance; and aging process infrastructure. Global competition, coupled with massive industry restructuring due to financial performance pressures from Wall Street, continue to hinder the ability of U.S. companies to make new investments. Each year without new investments, new technologies and new revenue streams, we lose ground to our overseas competitors.

Currently, energy is the third largest manufacturing cost for the forest and paper industry at 18 percent for pulp and paper mills—up from 12 percent just several years ago. For some of our mills, the cost of energy is about to eclipse employee compensation.

Since 1994, the forest products industry has been one of DOE's "Industries of the Future," partnering with ITP through the Agenda 2020 Technology Alliance in RD&D that has yielded successful advances towards our national energy and environmental goals. Agenda 2020 stands as an example of successful industry-government collaboration to develop technologies that hold the promise of reinventing industry, while providing real solutions for strategic national energy needs. Every Federal \$1 spent on ITP saves \$7.06 in annual energy costs and 1.3 million in annual source BTUs (2004 estimates). As recently as 2003, the ITP/Agenda 2020 portfolio included a total shared DOE and industry investment of almost \$48 million, with nearly 55 percent coming from direct project cost shares by industry.

Today, after several years of continuous and substantial cuts, the ITP/Agenda 2020 budget has been reduced by over 80 percent since fiscal year 2002. This undermines our progress in achieving crucial energy efficiencies at a time when energy and response to climate change are major factors in the survival of the U.S. forest products industry. Projects rescoped or cut in recent years due to budget shortfalls resulted in a lost energy savings potential of 5 trillion BTUs/yr. Recent reductions make us unable to pursue projects in key priority areas such as advanced water removal and high efficiency pulping, which represents a lost savings potential of 100–200 trillion BTUs/yr. In fiscal year 2009, a further funding reduction is proposed and emphasis shifted from industry specific funding. Unfortunately, the types of technologies that cross all industries are not those from which we can achieve the maximum savings for energy and environmental emissions. Furthermore, the proposed funding of \$1.448 million is barely sufficient to fund ongoing projects, let alone address the high priority R&D needs specific to the forest products industry that have been jointly identified by industry with the DOE.

This comes at a crucial time when the forest products industry, like many energy-intensive industries, is facing unprecedented pressures due to the rising costs of energy and potential climate change mandates. Although we are nearly 60 percent self-sufficient (using biomass), it is imperative that we seek solutions as diverse as fuel switching, finding new energy sources, and options for reducing energy consumption. Thus we are in greater need than ever for the technology-based energy efficiency solutions that could be provided through our Agenda 2020 partnership with ITP. AF&PA's recommended ITP funding for forest products research (\$6 million) would help our industry partially recover its capacity to develop and deploy vital energy efficiency technologies. Restoring Agenda 2020 funding to pre-fiscal

year 2005 levels will not only help the competitive position of American industry, but will also serve national strategic goals for reduced dependence on foreign oil.

Second, the Integrated Forest Products Biorefinery (IFPB) is a key Agenda 2020 technology platform and a top technical and economic priority for our industry. The objective is to develop and deploy core technologies that can be integrated into existing processing infrastructure, which would be transformed into geographically distributed production centers of renewable “green” bioenergy and bioproducts. This can be done while co-producing existing product lines, creating higher skilled and better paying jobs, strengthening rural communities, and opening new domestic and international markets for U.S. forest products companies.

The IFPB technology has the potential to integrate agricultural wastes, agricultural producers, forest landowners, agricultural landowners, forest product producers, and the petrochemical industry to produce clean renewable bio-fuels to support our local economies and the Nation. Widespread application of this technology would not only reduce the environmental impact of burning fossil fuels, it would also increase the viability of agricultural, forest products, and other industries that use waste heat. It will create new high paying jobs, both direct and indirect, increasing tax revenue. From an energy perspective, the IFPB has the benefit of making the forest products industry even more energy self-sufficient, serving the DOE strategic goal of reduced energy intensity in industry by reducing fossil energy consumption. In addition, the IFPB would permit the industry to become a producer of renewable, carbon-positive bioenergy and biofuels, contributing to DOE strategic goals to dramatically reduce dependence on foreign oil and to create a new domestic bio-industry.

In light of these realities, AF&PA and Agenda 2020 also support the administration’s announced \$225 million budget initiative in fiscal year 2009 for biorefinery research and demonstration in OBP. This initiative provides much needed funding to advance core enabling IFPB technologies, as well as providing major capital cost-share for commercial scale biorefinery demonstration. The forest products industry is an ideal partner to develop and commercialize integrated biorefineries. We have much of the infrastructure and expertise—wood harvesting, transportation and storage, manufacturing and conversion infrastructure, waste handling and recovery—needed to achieve the goals of integrated biorefineries. By and large, they are located in rural communities where they can help realize important synergies between agricultural and forest-based feedstocks.

Recent estimates from Princeton University show significant potential for net environmental benefits of IFPBs, inclusive of offsetting other fossil fuel consumption in the mill. The industrywide potential is to reduce nearly 100 million tons of carbon emissions annually from IFPBs. The study also estimates the cumulative value of savings due to reduced CO₂, SO₂, and NO_x emissions is \$6 million to \$40 billion. A core enabling technology for part of the IFPB is black liquor gasification (BLG), which converts the by-product of the chemical pulping process into a synthetic gas. The synthetic gas can subsequently be burned to directly produce clean, efficient energy, or converted to other fuels such as hydrogen, renewable transportation fuels, and/or other high value chemicals. If fully developed and commercialized, a biorefinery based on BLG can produce up to 10 billion gallons of other renewable transportation fuels, and as much as 20,000 MW of biomass power.

However, private/public investments in RD&D are critical to bring IFPB technologies into full commercial use. Co-investment for RD&D can help mitigate the technical risks (especially integration with capital-intensive, legacy infrastructure) of early adopters of emerging IFPB technologies. Risk mitigation is an important factor in achieving the benefits of IFPBs, especially for integrating biorefinery technologies with existing manufacturing infrastructure. Federal support through research funding and other investments, such as loan guarantees and tax credits, is critical.

In order to achieve the promise of IFPB technologies for the industry and for the Nation, we need greater stability and availability of funds provided through the OBP budget. We urge the subcommittee to preserve the proposed \$225 million funding of the Biomass and Biorefinery Systems R&D program, so that there will be sufficient appropriations to fund biorefinery demonstration and commercialization projects. We also urge the subcommittee to ensure that forest-based materials are eligible for this and future biorefinery research and demonstration funding. Forest-based materials can sustainably produce enough biofuels to displace up to 10 percent of the country’s petroleum production. They are a vital feedstock for achieving reduced dependence on foreign oil and facilitating bioindustries domestically and should be included in programs for biomass and biorefinery RD&D.

The Agenda 2020 Technology Alliance appreciate the subcommittee's interest in ensuring sustained and adequate funding for RD&D partnerships and look forward to working with you to advance industry and national interests.

PREPARED STATEMENT OF THE VISION2020 TECHNOLOGY PARTNERSHIP, GLASS MANUFACTURING INDUSTRIAL COUNCIL, COPPER DEVELOPMENT ASSOCIATION, INTERNATIONAL COPPER ASSOCIATION, HYDRAULIC INSTITUTE, PUMP SYSTEMS MATTER, AND THE VANADIUM PRODUCERS & RECLAIMERS ASSOCIATION

Mr. Chairman, we respectfully request that the subcommittee grant restoration of appropriations funding in the fiscal year 2009 Department of Energy Appropriations bill to match the \$190 million authorized for the Industrial Technology Program (ITP) within the Energy Efficiency and Renewable Energy Act of 2007.

The submitting coalition represents a broad range of energy intensive sectors including chemical and chemical allied industries, the copper industry including mining, producer and fabricating companies, organizations focused on hydraulic and pump system technology, the domestic glass industry sectors including flat, container, fiber and specialty glass and the domestic vanadium producers and reclaiming companies. We believe that the Industrial Technologies Program is critical to boost Federal and corporate R&D investments into novel applications that will help move our industries towards higher energy efficiency.

Environmental quality, economic vitality and national security are all at risk due to the inability of the United States to effectively conserve energy as the country continues to grow and expand the national standard of living. Energy conservation is now a national goal. While renewable energy processes are one part of the solution, undertaking energy efficiency is as necessary as ever before. Both President Bush and the Congress have recognized that technology is the key to both energy efficiency and renewable energy.

In the United States, industry accounts for over one-third of all energy consumption. Of that, the majority is consumed by several heavy industries including chemical, glass and metals production, aluminum, mining, petroleum refining, forest and paper products, and supporting industries. These groups all consume high amounts of energy per unit of production, making them a prime target for energy efficiency efforts. In addition, the rising cost of energy has the potential to put these industries at a competitive disadvantage with other nations.

While the President and Congress have continually supported industrial energy efficiency efforts, the funding provided has not matched the problem. Funding has dropped from \$175 million in fiscal year 2000 to \$57 million in fiscal year 2007. The House Committee on Science and Technology noted on September 25, 2007 that "these funding levels reflect a dramatic shift in priorities away from industrial efficiency R&D." Fortunately, Congress recognizes the need to increase funding levels through its own authorization of \$190 million in fiscal year 2008 for the Industrial Technology Program.

The Industrial Technology Program (ITP) is a competitive, public-private partnership program which works to utilize research and development in cutting edge, high-value cost sharing methods to improve the energy efficiency of America's industrial sector. The ITP operates through coordinated research and development, validation, and dissemination of energy-efficiency technologies and operating practices. ITP projects have already won dozens of "R&D 100 Awards" and have generated over 150 patents on exciting new technologies. Dual use benefits for both public and industrial uses are required by the ITP. Nearly 200 technologies have reached the commercial market assisting over 13,000 U.S. manufacturing plants and leading to \$23 billion worth of energy savings.

All programs which are awarded competitive funding must meet the shared goal of reducing energy consumption, reducing environmental impacts and increasing the competitive advantage of U.S. material manufacturers. In addition, while cross-cutting technologies are valuable, the application of ITP technologies to individual industries is critical and needs to be strengthened with additional funding. It is in this application at the factory level where the vast majority of the actual energy savings and environmental protection will be recognized.

In order to fully recognize the potential benefits of the ITP, it is imperative that Congress fully fund the ITP at the level of \$190 million. This is the level seen as necessary by the authorizing committees with jurisdiction and rightly so, given the environmental benefits, national security needs for energy independence, and economic productivity gains which can be realized in energy efficiency efforts aimed at the U.S. industrial sector. A national imperative focused on the ITP will help get us there.

PREPARED STATEMENT OF THE AMERICAN GEOLOGICAL INSTITUTE

To the chairman and members of the subcommittee, thank you for this opportunity to provide the American Geological Institute's perspective on fiscal year 2009 appropriations for geoscience programs within the subcommittee's jurisdiction. The President's budget request for Department of Energy (DOE) research programs provides no funding for oil and gas research and development (R&D), eliminates mandated direct spending of \$50 million for unconventional onshore and ultra deep water offshore natural gas R&D, includes a decimating cut to hydropower R&D and does not fulfill some of the geothermal and carbon sequestration R&D funding authorized in the Energy Independence and Security Act of 2007.

Given the interest of the administration and Congress to reduce the Nation's foreign oil dependence, reduce prices on fossil fuels and mitigate carbon emissions from fossil fuels, it seems like an inopportune time to eliminate or under fund programs that could help with these objectives. We hope that Congress will support wise investments for all energy resource programs and carbon sequestration R&D. AGI applauds the requested 18 percent increase for the largest supporter of physical science research in the United States, DOE's Office of Science, and encourages the subcommittee's full support for this increase. We applaud the request of \$30 million for geothermal R&D and an increase of about \$35 million for carbon sequestration R&D, both of which partially fulfill the Energy Act of 2007. We ask for the subcommittee's continued support for oil and gas, unconventional natural gas, geothermal, hydropower and carbon sequestration R&D so the Nation can develop a diverse portfolio of energy resources while enhancing carbon mitigation strategies to secure clean, affordable and secure energy supplies for now and the future.

AGI is a nonprofit federation of 44 geoscientific and professional associations that represent more than 100,000 geologists, geophysicists, and other earth scientists. The institute serves as a voice for shared interests in our profession, plays a major role in strengthening geoscience education, and strives to increase public awareness of the vital role that the geosciences play in society's use of resources and interaction with the environment.

DOE OFFICE OF SCIENCE

The DOE Office of Science is the single largest supporter of basic research in the physical sciences in the United States, providing more than 40 percent of total funding for this vital area of national importance. The Office of Science manages fundamental research programs in basic energy sciences, biological and environmental sciences, and computational science and, under the President's budget request, would grow by about 15 percent from about \$3.9 billion last year to \$4.7 billion. AGI asks that you support this much needed increase.

Within the Office of Science, the Basic Energy Sciences (BES) program supports fundamental research in focused areas of the natural sciences in order to expand the scientific foundations for new and improved energy technologies and for understanding and mitigating the environmental impacts of energy use. BES also discovers knowledge and develops tools to strengthen national security.

The Basic Energy Sciences (BES) would remain the largest program in the office with an increase of 24 percent from \$1.27 billion in fiscal year 2008 to \$1.57 billion in fiscal year 2009 in the President's request. Within the BES, Chemical Sciences, Geosciences and Biosciences would receive a \$75 million increase over their fiscal year 2008 budget for a total of \$297 million. The Geoscience program provides peer-reviewed grants to universities and DOE national laboratories for fundamental Earth science research in geochemistry, hydrology, rock mechanics, and geophysical imaging. The \$7.5 million increase specifically for the Geoscience research program is focused on solid earth geophysics and geochemistry to understand the stability and transformation of deep carbon sequestration, nanoscale geochemistry, chemical imaging, experimental and theoretical studies of complex subsurface fluids and mid-scale instrumentation.

The President's request for the Office of Science only partially fulfills the carbon sequestration R&D and large-scale demonstration project, which was authorized to receive \$240 million in fiscal year 2009 and the carbon sequestration university-based R&D which was authorized to receive \$10 million in fiscal year 2009. An additional \$30 million is requested for carbon sequestration R&D and demonstration within the Office of Fossil Energy to partially satisfy the wise investments called for in the Energy Act of 2007. AGI requests that funding for carbon sequestration R&D in the Office of Science and the Office of Fossil Energy be increased to fulfill the intent of the Energy Act of 2007.

DOE ENERGY EFFICIENCY AND RENEWABLE ENERGY

Within DOE Energy Efficiency and Renewable Energy, the President's fiscal year 2009 budget request would cut funding by 27 percent or \$467 million. We are concerned about the cuts to alternative energy R&D programs, in particular the reduction of more than 70 percent (a cut of almost \$7 million) for hydropower R&D which would decimate the program. A balanced portfolio of R&D across many promising energy resources should be maintained with steady funding to help ensure energy supplies in a changing world.

AGI applauds the \$30 million requested for geothermal R&D and greatly appreciates previous support from Congress for this key alternative energy resource. The geothermal research program within the Renewable Energy account, which funds Earth science research in materials, geofluids, geochemistry, geophysics, rock properties, reservoir modeling, and seismic mapping, would receive an increase of 51 percent from fiscal year 2008 enacted levels only one year after the administration slated the program for termination. The new funds for geothermal satisfy in part an authorization in the Energy Independence and Security Act of 2007, which calls for \$90 million for geothermal R&D in fiscal year 2009.

DOE FOSSIL ENERGY RESEARCH AND DEVELOPMENT

AGI urges you to take a critical look at the Department of Energy's Fossil Energy Research and Development (R&D) portfolio as you prepare to craft the fiscal year 2009 Energy and Water Development Appropriations bill. Over the past 8 years, Members of Congress have strongly emphasized the need for a responsible, diversified and comprehensive energy policy for the Nation. The growing global competition for fossil fuels has led to a repeated and concerted request by Congress to ensure the Nation's energy security. On February 28, 2007 this subcommittee held a hearing on the "10-Year Energy Research and Development Outlook" in which the Energy Information Administrator Guy Caruso noted the Nation's need for fossil fuels over the next 30 years and the other expert witnesses noted the critical need to continue R&D on fossil fuels and all other energy resources. The President's proposal, which provides no funding for oil and gas R&D, is short sighted and inconsistent with congressional concerns and expert testimony presented to your subcommittee. No funding for oil and gas R&D will hinder our ability to achieve energy stability and security.

The research dollars spent by Fossil Energy R&D go primarily to universities, State geological surveys and research consortia to address critical issues like enhanced recovery from known fields and unconventional sources that are the future of our natural gas supply. This money does not go into corporate coffers, but it helps American businesses remain competitive by giving them a technological edge over foreign companies. All major advances in oil and gas production can be tied to research and technology. AGI strongly encourages the subcommittee to ensure a balanced and diversified energy research portfolio that does not ignore the Nation's primary sources of energy, fossil fuels, for at least the next 30 years.

Today's domestic industry has independent producers at its core. With fewer and fewer major producing companies and their concentration on adding more expensive reserves from outside of the contiguous United States, it is the smaller independent producers developing new technologies concentrated on our domestic resources. However, without Federal contributions to basic research that drives innovation, small producers cannot develop new technologies as fast, or as well, as they do today. The program has produced many key successes among the typical short-term (1 to 5 years) projects usually chosen by the DOE. And even failed projects have proven beneficial, because they've often resulted in redirection of effort toward more practical exploration and production solutions.

In 2003, at the request of the Interior Appropriations Subcommittee, the National Academies released a report entitled Energy Research at DOE: Was It Worth It? Energy Efficiency and Fossil Energy Research 1978 to 2000. This report found that Fossil Energy R&D was beneficial because the industry snapped up the new technologies created by the R&D program, developed other technologies that were waiting for market forces to bring about conditions favorable to commercializing them and otherwise made new discoveries. In real dollars from 1986-2000 the Government invested \$4.5 billion into Fossil Energy R&D. During that time, realized economic benefits totaled \$7.4 billion. This program is not only paying for itself, it has brought in \$2.9 billion in revenue.

Unfortunately, despite this success, the President's fiscal year 2009 budget request continues the alarming reduction of energy R&D funding by eliminating all funding for our primary energy resources, oil and gas. Federal funding for renewable, fossil and nuclear R&D has decreased dramatically from \$5.5 billion in 1978

to \$793 million in 2005 according to a Government Accountability Office (GAO) report entitled Key Challenges Remain for Developing and Deploying Advanced Energy Technologies to Meet Future Needs. Such significant under-investment in energy R&D over many decades hinders progress on cost-effective and environmentally-sound exploration and extraction of raw energy resources and clean and efficient development, production and use of energy products.

The Federal investment in energy R&D is particularly important when it comes to longer-range research with diversified benefits. In today's competitive markets, the private sector focuses dwindling research dollars on shorter-term results in highly applied areas such as technical services. In this context, DOE's support of fossil energy research, where the focus is truly on research, is very significant in magnitude and impact compared to that done in the private sector, where the focus is mainly on development. Without more emphasis on research, we risk losing our technological edge in the highly competitive global market place.

Perhaps one of the most promising areas of R&D for domestic oil supplies are in the ultra deep waters where drilling is allowed in the Gulf of Mexico. The Energy Policy Act of 2005, set aside \$50 million annually from collected offshore royalties for ultra deep water and other unconventional oil and gas R&D to support clean and efficient exploration and extraction in the Gulf. The President's budget request would repeal this program and provide no funding for ultra deep water and other unconventional oil and gas R&D. AGI asks that you consider R&D spending or other incentives to encourage the private sector to invest in clean and efficient technological advances to enhance our unconventional fossil fuel supply in offshore regions where drilling is allowed and significant infrastructure already exists.

The research funded by DOE leads to new technologies that improve the efficiency and productivity of the domestic energy industry. Continued research on fossil energy is critical to America's future and should be a key component of any national energy strategy. The societal benefits of fossil energy R&D extend to such areas as economic and national security, job creation, capital investment, and reduction of the trade deficit. The Nation will remain dependent on petroleum as its principal transportation fuel for the foreseeable future and natural gas is growing in importance. It is critical that domestic production not be allowed to prematurely decline at a time when tremendous advances are being made in improving the technology with which these resources are extracted. The recent spike in oil and natural gas prices is a reminder of the need to retain a vibrant domestic industry in the face of uncertain sources overseas. Technological advances are necessary to maintaining our resource base and ensuring this country's future energy security.

Thank you for the opportunity to present this testimony to the subcommittee.

PREPARED STATEMENT OF THE AMERICAN SOCIETY OF AGRONOMY, CROP SCIENCE SOCIETY OF AMERICA, AND THE SOIL SCIENCE SOCIETY OF AMERICA

Dear Chairman Dorgan, Ranking Member Domenici and members of the subcommittee, the American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America (ASA-CSSA-SSSA) are pleased to submit the following funding recommendations for the Department of Energy for fiscal year 2009. For the Office of Science, ASA-CSSA-SSSA recommend a funding level of \$4.722 billion, an 18 percent increase over fiscal year 2008 (\$3.973 billion). For the Office of Energy Efficiency and Renewable Energy, we recommend a funding level of \$1.843 billion, a 7 percent increase over fiscal year 2008. We recommend a funding level of \$6.094 billion, a 7 percent increase, for the Office of Environmental Management. Specifics for each of these and other budget areas follow below.

With more than 25,000 members and practicing professionals, ASA-CSSA-SSSA are the largest life science professional societies in the United States dedicated to the agronomic, crop and soil sciences. ASA-CSSA-SSSA play a major role in promoting progress in these sciences through the publication of quality journals and books, convening meetings and workshops, developing educational, training, and public information programs, providing scientific advice to inform public policy, and promoting ethical conduct among practitioners of agronomy and crop and soil sciences.

DEPARTMENT OF ENERGY OFFICE OF SCIENCE

The American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America (ASA-CSSA-SSSA) understand the challenges the House Energy and Water Appropriations Subcommittee faces with the tight budget for fiscal year 2009. We also recognize that the Energy and Water Appropriations bill has many valuable and necessary components, and we applaud the subcommittee for

funding the DOE Office of Science in the fiscal year 2008 Omnibus Appropriations bill at \$3.973 billion. Under the Energy Policy Act of 2005 (Public Law 109-58), the Office of Science is authorized to receive \$5.2 billion in fiscal year 2009. Congress approved the America COMPETES Act of 2007 (Public Law 110-69), recognizing that an investment in basic (discovery) scientific research is essential to providing America the brainpower necessary to maintain a competitive advantage in the global economy and keep U.S. jobs from being shipped overseas. The President's request of \$4.722 billion is consistent with the America COMPETES Act, which authorizes the doubling of the Office of Science's budget over a 7-year period. Such an investment is needed to keep U.S. science and engineering at the forefront of global research and development in the biological sciences and geosciences, computing and many other critical scientific fields. The Office of Science supports graduate students and postdoctoral researchers early in their careers. Nearly one-third of its research funding goes to support research at more than 300 colleges and universities nationwide. Moreover, approximately half the users at Office of Science user facilities are from colleges and universities, providing further support to their researchers. The Office of Science also reaches out to America's youth in grades K-12 and their teachers to help improve students' knowledge of science and mathematics and their understanding of global energy and environmental challenges. This recommended funding level of \$4.722 billion is critical to ensuring our future energy self-sufficiency and as a means to address major environmental challenges including global climate change. Finally, a funding level of \$4.722 billion will allow the Office of Science to: maintain and strengthen DOE's core research programs at both the DOE national laboratories and at universities; provide support for 1,000 of PhD's, postdoctoral associates, and graduate students in fiscal year 2009; ensure maximum utilization of DOE research facilities; allow the Office of Science to develop and construct the next-generation facilities necessary to maintain U.S. preeminence in scientific research; and enable DOE to continue to pursue the tremendous scientific opportunities outlined in the Office of Science Strategic Plan and in its 20 Year Scientific Facilities Plan.

BASIC ENERGY SCIENCES

Within the Office of Science, the Basic Energy Sciences (BES) Program is a multi-purpose, scientific research effort that fosters and supports fundamental research to expand the scientific foundations for new and improved energy technologies and for understanding and mitigating the environmental impacts of energy use. ASA-CSSA-SSSA support the President's fiscal year 2009 request of \$1.568 billion, a 23 percent increase over fiscal year 2008, for BES. The portfolio of programs at BES supports research in the natural sciences by focusing basic (discovery) research on, among other disciplines, biosciences, chemistry and geosciences. Practically every element of energy resources, production, conversion and waste mitigation is addressed in basic research supported by BES programs. Research in chemistry has led to the development of new solar photoconversion processes and new tools for environmental remediation and waste management. Research in geosciences leads to advanced monitoring and measurement techniques for reservoir definition. Research in the molecular and biochemical nature of photosynthesis aids the development of solar photo-energy conversion.

Within the Basic Energy Sciences Program, the Chemical Sciences, Geosciences, and Energy Biosciences subprogram supports fundamental research in geochemistry, geophysics and biosciences. The Geosciences Research Program supports research focused at developing an understanding of fundamental Earth processes that can be used as a foundation for efficient, effective, and environmentally sound use of energy resources, and provide an improved scientific basis for advanced energy and environmental technologies. The Biosciences Research Program supports basic research in molecular-level studies on solar energy capture through natural photosynthesis; the mechanisms and regulation of carbon fixation and carbon energy storage; the synthesis, degradation, and molecular interconversions of complex hydrocarbons and carbohydrates; and the study of novel biosystems and their potential for materials synthesis, chemical catalysis, and materials synthesized at the nanoscale.

BIOLOGICAL AND ENVIRONMENTAL RESEARCH

Within the Office of Science, the Biological and Environmental Research (BER) Program, for more than five decades, has advanced environmental and biological knowledge that supports national security through improved energy production, development, and use; international scientific leadership that underpins our Nation's technological advances; and research that improves the quality of life for all Ameri-

cans. BER supports these vital national missions through competitive and peer-reviewed research at national laboratories, universities, and private institutions. In addition, BER develops and delivers the knowledge needed to support the President's National Energy Plan. ASA-CSSA-SSSA support a 7 percent increase for BER which would bring the funding level to \$582,504,790 for fiscal year 2009. ASA-CSSA-SSSA support a variety of programs within BER including the Life Sciences subprogram which supports Carbon Sequestration Research (we recommend a 7 percent increase, bringing the funding level to \$7,625,890), and the Genomes to Life (GTL) program (we also recommend a 7 percent increase to bring funding to \$163,422,170). Within Genomes to Life (GTL) are programs supportive of bioenergy development including GTL Foundation Research, GTL Sequencing, GTL Bioethanol Research, and GTL Bioenergy Research Centers, all playing an important role in achieving energy independence for America. Also within BER is the Environmental Remediation subprogram and its Environmental Remediation Sciences Research program, both critical programs to advancing tools needed to clean up contaminated sites. ASA-CSSA-SSSA support the President's budget request for the Climate Change Research subprogram in BER which calls for a 13 percent increase bringing the funding level to \$154,927,000. This subprogram supports many important areas of climate change research including: Climate Forcing which supports the Terrestrial Carbon Processes program and supports the Ameriflux network of research sites (which should receive a 7 percent increase, bringing funding to \$14,379,730), as understanding the role that terrestrial ecosystems play in capturing and storing carbon is essential to developing strategies to mitigate global climate change. An additional program of high importance within the Climate Change Research subprogram is the Climate Change Response and its associated programs—Ecosystem Function and Response, and Education. Finally, also under the Climate Change Research subprogram is the Climate Change Mitigation program, part of BER's support to the Climate Change Technology Program, which will continue to focus only on terrestrial carbon sequestration.

DEPARTMENT OF ENERGY OFFICE OF ENERGY EFFICIENCY AND RENEWABLE ENERGY

Biomass is currently the only clean, renewable energy source that can help to significantly diversify transportation fuels in the U.S. DOE's Energy Efficiency and Renewable Energy Biomass Program is helping transform the Nation's renewable and abundant biomass resources into cost competitive, high performance biofuels, bioproducts, and biopower. The Office of Energy Efficiency and Renewable Energy (EERE) manages America's investment in the research and development (RD&D) of DOE's diverse energy efficiency and renewable energy applied science portfolio. For the Office of Energy Efficiency and Renewable Energy, we recommend a funding level of \$1.843 billion, a 7 percent increase over fiscal year 2008. The fiscal year 2009 EERE budget maintains focus on key components of the AEI and Twenty in Ten including the Biofuels Initiative to develop affordable, bio-based transportation fuels from a wider variety of feedstocks and agricultural waste products.

Note: ASA-CSSA-SSSA strongly oppose the use by the Department of the term "agricultural wastes". Crop residues, e.g., corn stover, play a very important role in nutrient cycling, erosion control and organic matter development. Recent studies have shown that excessive removal of crop residues from agricultural lands can lead to a decline in soil quality. By no means should they ever be referred to as "wastes".

BIOMASS AND BIOREFINERY SYSTEMS

Within EERE, the Biomass and Biorefinery Systems plays an important role providing support for Regional Biomass Feedstock Development Partnerships and Infrastructure Core R&D programs, both within Feedstock Infrastructure. Activities included within this program are resource assessment, education, sustainable agronomic systems development, and biomass crop development. The mission of the Biomass Program is to develop and transform our domestic, renewable, and abundant biomass resources into cost-competitive, high performance biofuels, bioproducts and biopower through targeted RD&D leveraged by public and private partnerships. ASA-CSSA-SSSA support the President's request for a 25 percent increase for the Feedstock Infrastructure program which would bring the funding level to \$15,500,000.

DEPARTMENT OF ENERGY OFFICE OF ENVIRONMENTAL MANAGEMENT

ASA-CSSA-SSSA urge the subcommittee to provide the Office of Environmental Management (EM) a 7 percent increase for fiscal year 2009 which would bring total funding for EM to \$6.094 billion. EM supports high-priority soil and ground water remediation and excess D&D at Portsmouth, Paducah, Los Alamos, Savannah River,

Oak Ridge, Idaho, Hanford, and other sites. Technology Development and Deployment supports tank waste, soil and groundwater, and facility D&D.

CLIMATE CHANGE RESEARCH

ASA–CSSA–SSSA urge the subcommittee to continue to provide strong support for Climate Change Research to the following programs as follows: Climate Change Science Program (CCSP), \$145,940,000; Climate Change Research Initiative (CCRI), \$23,672,000; and Climate Change Technology Program (CCTP), \$833,301,000. These three programs together will increase our understanding of the impacts of global climate change and also develop tools and technologies to mitigate these impacts.

BASIC AND APPLIED R&D COORDINATION

The Office of Science continues to coordinate basic research efforts in many areas with the Department's applied technology offices. Within this area is Carbon Dioxide Capture and Storage R&D (we recommend a 7 percent increase, bringing total funding to \$18,055,000). The BER research includes understanding, modeling, and predicting the processes that control the fate of carbon dioxide injected into geologic formations, subsurface carbon storage, and the role of microbes and plants in carbon sequestration in both marine and terrestrial environments.

NATIONAL LABORATORIES

The Office of Science manages 10 world-class laboratories, which often are called the "crown jewels" of our national research infrastructure. The national laboratory system, created over a half-century ago, is the most comprehensive research system of its kind in the world. Five are multi-program facilities including the Oak Ridge National Laboratory. In the 2007 fiscal year, these facilities were used by more than 21,000 researchers from universities, national laboratories, private industry, and other Federal science agencies.

NATIONAL ENERGY TECHNOLOGY LABORATORY (NETL)

NETL's Carbon Sequestration Program is helping to develop technologies to capture, purify, and store carbon dioxide (CO₂) in order to reduce greenhouse gas emissions without adversely influencing energy use or hindering economic growth. Terrestrial sequestration requires the development of technologies to quantify with a high degree of precision and reliability the amount of carbon stored in a given ecosystem. Program efforts in this area are focused on increasing carbon uptake on mined lands and evaluation of no-till agriculture, reforestation, rangeland improvement, wetlands recovery, and riparian restoration. ASA–CSSA–SSSA urge the subcommittee to direct the Department to increase funding for its terrestrial carbon sequestration program, specifically The Regional Carbon Sequestration Partnerships, which are collaborations between Government, industry, universities, and international organizations funded by DOE to determine the most suitable technologies, regulations, and infrastructure needs for carbon capture and sequestration.

OAK RIDGE NATIONAL LABORATORY (ORNL)

ORNL is one of the world's premier centers for R&D on energy production, distribution, and use and on the effects of energy technologies and decisions on society. Clean, efficient, safe production and use of energy have long been our goals in research and development. At ORNL, unique facilities for energy-related R&D are used both for technology development and for fundamental investigations in the basic energy sciences that underpin the technology work.

Thank you for your thoughtful consideration of our requests.

PREPARED STATEMENT OF THE FRIENDS COMMITTEE ON NATIONAL LEGISLATION (QUAKERS)

The Friends Committee on National Legislation (Quakers) makes the following recommendations on budget request of the National Nuclear Security Administration for fiscal year 2009 (fiscal year 2009):

—*Reliable Replacement Warhead*.—Under the Weapons Activities/Directed Stockpile Work program, delete all funding from the \$10 million requested. Include in the committee report the same language that was in the Consolidated Appropriations Act, 2008: "No funding is provided for the Reliable Replacement Warhead."

—*International Nuclear Materials Protection and Cooperation.*—Under the Defense Nuclear Nonproliferation program, increase funding by \$195 million, from the requested \$430 million to \$625 million for fiscal year 2009. This would be the same amount as was appropriated for fiscal year 2008.

—*Nonproliferation and Verification R&D.*—Under the Defense Nuclear Nonproliferation program, we oppose the administration's proposed budget cut of \$112 million and support a funding level closer to the fiscal year 2008 level of \$387 million, but make no specific suggestion.

—*Global Threat Reduction Initiative.*—Under the Defense Nuclear Nonproliferation program, we strongly support the administration's proposed increase of \$26 million for fiscal year 2009, to \$220 million.

Reliable Replacement Warhead.—Congress wisely rejected the administration's request for the Reliable Replacement Warhead for fiscal year 2008. The arguments have not changed since last year.

The Joint Explanatory Statement to the Consolidated Appropriations Act for fiscal year 2008 explains:

“As stated in both the House and Senate reports, Congress believes a new strategic nuclear deterrent mission assessment for the 21st century is required to define the associated stockpile requirements and determine the scope of the weapons complex modernization plans. The NNSA is directed to develop a long-term scientific capability roadmap for the national laboratories to be submitted to the Committee on Appropriations.”

FCNL agrees. The United States still has no 21st century nuclear weapons policy in place. Until the reports mandated by the fiscal year 2008 defense authorization bill are completed, there is no framework to base long-term nuclear stockpile decisions on.

The nuclear stockpile continues to be annually certified as safe and reliable by the Secretaries of Defense and Energy. There remains no need to rush to replace the plutonium pits in warheads, which have been found to have lifetimes of a century or more.

Additionally, further development of RRW could have serious adverse international security consequences. Proceeding with RRW would send the wrong message to would-be proliferators, and undermine ongoing efforts to curb the nuclear programs of Iran and North Korea. Development of a new U.S. warhead would also provide nuclear weapons advocates in Russia with effective material to lobby for more aggressive Russian nuclear weapons modernization programs. Senator Sam Nunn's 2007 testimony before your House Subcommittee counterpart remains as relevant today:

“[I]f Congress gives a green light to this [RRW] program in our current world environment, I believe that this will be: misunderstood by our allies; exploited by our adversaries; and complicate our work to prevent the spread and use of nuclear weapons.”

Finally, FCNL rejects the Energy Department (DOE) assertion that pursuing the RRW program is the only way to elicit the data needed to address stockpile certification concerns raised by the September 7, 2007 review of RRW by the JASON Defense Advisory Group.

We believe DOE can address the stockpile certification concerns raised by the JASONs review without developing RRW. The Joint Explanatory Statement to the Consolidated Appropriations Act for fiscal year 2008 also reaches this conclusion. By creating the Advanced Certification campaign to address these certification issues and simultaneously zeroing out the RRW program, the subcommittee (in conjunction with your House counterpart) determined that these issues could be pursued without advancement of the RRW program.

Nuclear Nonproliferation Programs.—Hundreds of tons of nuclear weapons materials are stored at inadequately secured facilities in Russia and perhaps 20 other countries. One hundred and ten pounds of highly enriched uranium could be fashioned into a crude nuclear weapon by a committed group of violent extremists. Such a weapon would destroy downtown New York, killing more than half-a-million people from the immediate effects of the explosion. The cost would be well over \$1 trillion from the staggering economic disruption. A nuclear detonation in any U.S. city would cause devastation that would make the 9/11 attack and the Katrina hurricane pale in comparison.

These programs continue to enjoy strong support across the political spectrum, as evidenced by these statements from the past few months (emphasis added):

“ . . . the Department of Defense’s Cooperative Threat Reduction program and the Department of Energy’s nuclear nonproliferation programs . . . address perhaps the *single biggest threat* to the U.S. homeland, the threat of nuclear terrorism and other weapons of mass destruction.” Rep. Ike Skelton, Chairman, House Armed Service Committee, press release, December 7, 2007.

“Nuclear nonproliferation programs such as the NNSA’s Global Threat Reduction Initiative, GTRI, are some of the *most important tools* we have to curb the threat of nuclear material being acquired by those who wish to do us harm.” Sen. Pete V. Domenici, Ranking Member, Senate Appropriations Subcommittee on Energy and Water Development, Congressional Record, December 12, 2007, p. S15228.

“The proliferation of weapons of mass destruction remains the *number one national security threat* facing the United States and the international community.” Sen. Richard G. Lugar, Ranking Member, Senate Foreign Relations Committee, “Remarks at the Defense in Depth against WMD CPC Conference,” Chantilly, VA, January 30, 2008.

The House Budget Resolution for fiscal year 2009 also reaches the same conclusions:

“It is the policy of this resolution that . . . implementing the recommendation of the National Commission on Terrorist Attacks Upon the United States (commonly referred to as the 9/11 Commission) to adequately fund cooperative threat reduction and nuclear nonproliferation programs (securing ‘loose nukes’) is a *high priority and should receive far greater emphasis* than the President’s budget provides;” H. Con. Res. 312, sec. 502, March 7, 2008 (emphasis added).

Even the administration’s budget request agrees:

“The convergence of heightened terrorist activities and the ease of moving materials, technology and information across borders have made the potential for terrorism involving weapons of mass destruction (WMD) the *most serious threat* facing the Nation. Preventing WMD from falling into the hands of terrorists is the *top national security priority* of this administration.” Department of Energy, Fiscal Year 2009 Congressional Budget Request, vol. 1, p. 453, February 2009 (emphasis added).

However, the administration’s budget request does not match its rhetoric. We ask the subcommittee to increase the nuclear nonproliferation programs to at least last year’s levels.

We greatly appreciate the termination of the Reliable Replacement Warhead program in the Consolidated Appropriations Act for Fiscal Year 2008. We also appreciate the additional funds the subcommittee provided for nuclear nonproliferation programs in the Continuing Resolution, the Supplemental Appropriations Act, and the Consolidated Appropriations Act. We believe the country is more secure because of your actions. We urge you again to apply those priorities to your fiscal year 2009 bill.

Thank you for your consideration.

PREPARED STATEMENT OF THE US FUEL CELL COUNCIL

Chairman Dorgan, Ranking Member Domenici, and distinguished members of the subcommittee, on behalf of the 110 organizations of the US Fuel Cell Council (USFCC), I want to thank this subcommittee for supporting fuel cell funding over the years. We are writing to urge strong support for fuel cell and hydrogen programs managed by the Department of Energy. Specifically, we request the subcommittee to consider the following:

- Provide \$20 million to establish a Market Transformation program.
- Restore \$39 million to continue Hydrogen Production and Delivery R&D.
- Add \$15 million to Technology Validation (managed by Vehicle Technologies—Hybrid Electric Systems).
- Add \$5 million to restore EERE Manufacturing R&D.
- Add \$10 million to Fossil Energy’s SECA program.
- Add \$4 million to Safety Codes and Standards, and maintain current jurisdiction.
- Maintain Education jurisdiction under the Hydrogen Technology Program and fund at \$4 million.
- Restore \$2 million to continue Fuel Processor R&D.

Fuel cells are a family of technologies that are being developed for portable, stationary and transportation applications.

These technologies offer a unique combination of benefits. And while our industry has invested billions to develop fuel cells for portable, stationary and transportation applications, we view our partnership with the Federal Government as vital. Funding for other worthwhile technologies must not come at the expense of the hydrogen program, as we feel this would impede efforts to become more energy independent.

Establishing a Market Transformation program is a top priority for industry. Last year the Senate Energy and Water Appropriations Subcommittee provided funding for this endeavor; however, the measure was not included in the final appropriations bill. The program, when funded, will fulfill congressional intent as outlined in sections 782 and 783 of the Energy Policy Act of 2005.

The Market Transformation program will allow the Department of Energy to assist other agencies to purchase portable, stationary and transportation fuel cell systems. The program, which is voluntary, is seen by industry as a key component to commercialization as it would also help fuel cell manufacturers increase output, thereby reducing costs and creating economies of scale. It would also allow more Federal agencies to comply with new energy efficiency guidelines as directed by Executive Order.

Unfortunately, the President's fiscal year 2009 request cuts or changes a number of critical path programs, including Hydrogen Production and Delivery R&D; Fuel Processor R&D; and Manufacturing R&D. These programs are designed to maximize availability of fuel cells and hydrogen at an affordable price.

With regard to Hydrogen Production R&D and Delivery, the administration justifies the elimination of the program by stating that the "core technology readiness goals established for 2015 can be met with the technologies for producing hydrogen from natural gas that were developed in prior years, so . . . near-term hydrogen production is no longer a critical-path barrier." We disagree. Cost-effective and environmentally benign methods of reforming hydrocarbons are still not commercially feasible. Several technical challenges remain, including low cost desulfurization methods. Current refining methods often produce flammable and/or hazardous waste. While alternative desulfurization materials can avoid these problems, they are prohibitively expensive—as much as 10 times the current cost. If reinstated by Congress, the Department should be instructed to fund improvements in removing sulfur-containing odorants from natural gas and liquefied petroleum gas. In addition, a coordinated, nationwide (or even international) effort to replace sulfur-containing odorants with non-sulfur-containing odorants should be initiated.

In the transportation arena, there is growing support for ethanol and other biofuels, and for hybrid vehicles as responses to our energy challenge. These programs would not, by themselves, solve our problem. They would, however buy us time to make the transition to hydrogen. Automakers still view hydrogen as the ultimate transportation fuel as it allows long range driving, short fueling time with little to zero-emissions. The public/private partnership in fuel cells is working, and more development and demonstration is needed.

Work performed by the Technology Validation program is designed to demonstrate the performance of hydrogen infrastructure and fuel cell systems under real world operating conditions. If development work were to stop due to lack of funding it could take years or even decades to revive the effort. By restoring funding to fiscal year 2008 levels, the Department and private industry will continue to collect necessary data to continue development of fuel cells for vehicles

Manufacturing R&D was also eliminated in the fiscal year 2009 request. Last year, the administration put significant focus on this program as it was critical to "cultivate a robust domestic manufacturing capability in evolving hydrogen infrastructure and fuel cell technologies, vital to establishing U.S. economic leadership in emerging hydrogen and fuel cell industries." After 1 year and a single round of solicitations awarded, the administration now feels the program is not a critical-path barrier to achieving the programs core technology readiness goals for 2015.

Once again, we disagree with the President's plan. The Department, in cooperation with private industry, has made great strides in reducing the high-volume cost of fuel cells. Eliminating this program in its infancy will only delay efforts to bring the cost of fuel cells down.

With regard to the Fossil Energy (FE) activities, we request \$70 million for fuel cell activities, which includes funding for the Solid State Energy Conversion Alliance (SECA). The SECA program is designed to develop high-efficiency fuel cells that are capable of utilizing a variety of domestically available fuel, including coal gas, ethanol and other biofuels.

Proposed program cuts aside, we feel that most of the program reorganizations suggested are unnecessary. For example, a proposal to move hydrogen Education and Codes and Standards staff from the hydrogen program to the vehicle tech-

nologies program, in the name of consolidation, is misguided. Department leadership describes these as “complementary” activities, however we strongly disagree.

If altered, we fear the Department will not be able to accomplish its stated mission to educate the public, code and safety officials, and support DOE Market Transformation activities. Given the transformational nature of hydrogen, we believe these positions properly should remain within the hydrogen program for maximum effectiveness, and in any event reorganization ought to be left to the next administration.

Supporting the remainder of the Presidents fiscal year 2009 plan—Hydrogen Storage R&D, Fuel Cell Stack Component R&D, and Distributed Energy Fuel Cells Systems—will maintain the integrity of the competitively awarded projects administered by the Department of Energy and continue our public/private partnership designed to fully commercialize fuel cell and hydrogen technologies.

Over the past 4 years, shortfalls in fuel cell and hydrogen core program funds have slowed and in some cases stopped high-priority research and development. Full funding can restore program momentum, and give the country some hope that we can break the cycle of energy dependence. Competition for energy supply and security of supply are both urgent concerns, and the Nation’s investment, we believe, ought to match that urgency.

Thank you for considering our requests.

PREPARED STATEMENT OF THE NATIONAL ASSOCIATION OF STATE ENERGY OFFICIALS

Mr. Chairman and members of the subcommittee, I am Dub Taylor of Texas and chair of the National Association of State Energy Officials (NASEO). NASEO is submitting this testimony in support of funding for a variety of U.S. Department of Energy programs. Specifically, we are testifying in support of no less than \$75 million for the State Energy Program (SEP). SEP is the most successful program operated by DOE in this area. Within a \$75 million funding level for SEP we would support the administration’s proposed \$10 million competitive program, but we do not support such an effort at the proposed funding level of \$25 million for the core SEP activities and \$25 million for the competitive program. SEP is focused on direct energy project development, where most of the resources are expended. SEP has set a standard for State-Federal cooperation and matching funds to achieve critical Federal and State energy goals. We also support \$300 million for the Weatherization Assistance Program (WAP). These programs are successful and have a strong record of delivering savings to low-income Americans, homeowners, businesses, and industry. We also support an increase in the budget for the Energy Information Administration (EIA) to \$120 million, including an increase of \$600,000 for EIA’s State Heating Oil and Propane Program, in order to cover the added costs of increasing the frequency of information collection (to weekly), the addition of natural gas, and increasing the number of State participants. EIA’s new State-by-State data is very helpful. EIA funding is a critical piece of energy emergency preparedness and response. NASEO continues to support funding for a variety of critical deployment programs, including Building Codes Training and Assistance (\$10 million), Rebuild America (\$5 million), Energy Star (\$10 million) and Clean Cities (Vehicle Technologies Deployment) (\$12.5 million). NASEO supports funding for the Office of Electricity Delivery and Energy Reliability, at least at the fiscal year 2006 request of \$161.9 million, with specific funding for the Division of Infrastructure Security and Energy Restoration of \$18 million, which funds critical energy assurance activities. We also strongly support the R&D function and Operations and Analysis function. The industries program should be funded at a \$74.8 million level, equal to the fiscal year 2005 levels, to promote efficiency efforts and to maintain U.S. manufacturing jobs, especially in light of the loss of millions of these jobs in recent years. Proposed cuts in these programs are counter-productive and are detrimental to a balanced national energy policy. The Energy Independence and Security Act of 2007 (EISA) also has a number of exemplary provisions which should also receive funding, including the new commercial buildings initiative. EISA also reauthorized SEP (section 531) and Weatherization (section 411) through fiscal year 2012. We remain concerned that a number of programs authorized in the Energy Policy Act of 2005 (EPACT 2005) have received no direct funding. Of special interest are sections 124, 125, 126, 128 and 140 of EPACT 2005.

Over the past 7 years, both oil and natural gas prices have been rising in response to expanded Chinese and Indian use, other international events, increased domestic use, the falling dollar and the result of the 2005 hurricanes. We expect \$100+ oil to continue for an extended period of time, with an expanded problem as summer approaches. Gasoline prices may spike to \$4/gallon. Diesel prices are al-

ready over \$4/gallon. In addition, we now have quantifiable evidence of the success of the SEP program, which demonstrates the unparalleled savings and return on investment to the Federal taxpayer of SEP. Every State gets an SEP grant and all States, the District of Columbia and territories support the program.

In January 2003, Oak Ridge National Laboratory (ORNL) completed a study and concluded, "The impressive savings and emissions reductions numbers, ratios of savings to funding, and payback periods . . . indicate that the State Energy Program is operating effectively and is having a substantial positive impact on the Nation's energy situation." ORNL updated that study and found that \$1 in SEP funding yields: (1) \$7.22 in annual energy cost savings; (2) \$10.71 in leveraged funding from the States and private sector in 18 types of project areas; (3) annual energy savings of 47,593,409 million source BTUs; and (4) annual cost savings of \$333,623,619. The annual cost-effective emissions reductions associated with the energy savings are equally significant: (1) Carbon—826,049 metric tons; (2) VOCs—135.8 metric tons; (3) NO_x—6,211 metric tons; (4) fine particulate matter (PM10)—160 metric tons; (5) SO₂—8,491 metric tons; and (6) CO—1,000 metric tons. The energy cost savings is much higher today, in light of higher prices. State monitoring and verification has confirmed SEP's effectiveness.

State Energy Program Special Projects and Other Deployment Programs.—Through fiscal year 2005, SEP Special Projects provided matching grants to States to conduct innovative project development. It had been operated for 10 years and has produced significant results in every State in the United States. We support funding of DOE's new, proposed SEP competitive program, but only above a minimum \$55 million SEP appropriation for the base SEP program. The States with lower populations are disadvantaged by this program.

EISA authorized a new Energy Efficiency and Conservation Block Grants program (section 541–548). We look forward to working with Congress and the administration to make this program a reality. We hope start-up funding can be provided in fiscal year 2009. However, we remain concerned that a structure that requires DOE to review and process thousands of local government grant applications each year will be unworkable. With the elimination of the DOE/EERE Regional Offices, DOE contracting processes have become slower. There is now a more attenuated connection between State and local governments with DOE. We look forward to working with Congress, local governments and DOE to correct this situation. Joint planning needs to occur immediately. State energy offices have partnered with local governments for decades. This program should allow us to supplement and enhance those activities.

Industrial Energy Program.—A funding increase to a level of \$74.8 million for the Industrial Technologies Program (ITP) is warranted. This is a public-private partnership in which industry and the States work with DOE to jointly fund cutting-edge research in the energy area. The results have been reduced energy consumption, reduced environmental impacts and increased competitive advantage of manufacturers (which is more than one-third of U.S. energy use). The States play a major role working with industry and DOE in the program to ensure economic development in our States and to try to ensure that domestic jobs are preserved. State energy offices are working effectively with DOE on the "Save Energy Now" campaign. Funding for distributed generation should be included above these amounts.

Examples of Successful State Energy Program Activities.—The States have implemented thousands of projects. Here are a few representative examples.

California.—The California Energy Commission has operated energy programs in virtually every sector of the economy. The State has upgraded residential and non-residential building codes (including major 2008 upgrades), developed a school energy efficiency financing program (including \$100 million for high performance schools), and instituted a new replacement program for school buses utilizing the newest natural gas, advanced diesel and hybrid technologies. The buildings program has reduced consumption by enormous amounts over the past few years, through alternative financing programs and outreach. California's greenhouse gas mitigation plans and a new solar initiative are moving forward.

Colorado.—The State is conducting training to implement the new statewide energy code. The energy office is pushing hard to promote the use of biofuels and create infrastructure for the dispensing of the fuel. The Colorado Carbon Fund has been developed to help individuals and businesses develop and purchase offsets. In addition, the State is working promoting community-based small wind projects, geothermal energy, commercial buildings energy efficiency and a variety of solar energy programs.

Hawaii.—After enacting significant legislation ("Energy for Tomorrow"), the State is focused on implementing a plan to diversify the energy sources utilized in the State. Distributed generation and utility scale solar projects are being installed. An

aggressive hydrogen promotion program is ongoing. The State has a variety of energy performance contracting projects. They have upgraded their tropical energy building code. Extensive utilization of bioenergy and biofuels is a priority and has been expanded.

Kentucky.—The energy office has been working on Energy Star promotion activities and high performance energy programs for schools. They are working to promote energy efficiency programs in the agricultural sector as well, including the Kentucky Rural Energy Consortium activities. They have been executing energy performance contracts for a variety of State facilities.

Louisiana.—The State recently upgraded building energy codes. Now they are embarked on an extensive training program to ensure that the code will be followed and understood. In the alternative fuels area the State has instituted projects including CNG fueling, hybrid electric buses and bio-diesel promotions. Significant attention has been paid to energy efficient reconstruction after Hurricane Katrina.

Mississippi.—The energy office has been working on an extensive energy education program, ranging from school children to higher education initiatives. The State has also been active in promoting alternative motor fuels, rural business opportunities with the agricultural sector, energy efficiency in State buildings and Energy Star product promotions.

Missouri.—The energy office in Missouri has been operating a low-interest energy efficiency loan program for school districts, colleges, universities and local governments. Thus far, public entities have saved more than \$93 million, with more than 400 projects. The State energy office has also worked with the Public Utility Commission and the utilities within the State to get \$20 million invested in residential and commercial energy efficiency programs, with a significant incremental increase to \$20 million in investments in 2008 alone. A new revolving loan for biodiesel has also been initiated. The energy office and the air agency have developed a program to set-aside NO_x allowances for energy efficiency and renewable energy.

New Jersey.—The State's Clean Energy Program expended approximately \$171 million in 2006 alone, with the expected electricity and natural gas bill reductions for the life of these projects expected to be over \$2.3 billion. New Jersey has an extremely aggressive solar energy program. Recent innovative projects have included a pilot photovoltaics power systems program in Phillipsburg, a wireless energy management demonstration project, an alternative fuel vehicle and a bio-diesel vehicle rebate program, etc.

New Mexico.—After adoption of new energy legislation in 2007, the State is pushing for new renewable energy transmission projects, the implementation of the Renewable Portfolio Standard, expanded promotion of the sustainable buildings tax credits, use of energy bonds, promotion of "solar roofs," and encouraging manufacturers to utilize the alternative energy product tax credit. They have been training green building professionals and promoting clean fuels and efficient transportation options.

North Dakota.—The energy office in North Dakota has focused on promotion of alternative fuels, wind energy projects (including a wind-to-hydrogen demonstration), biomass gasification (with the EERC Center for Renewable Energy in Grand Forks), energy efficiency for schools and local governments and deployment of renewable technology.

South Dakota.—The energy office has instituted a energy efficient grants program for higher education projects, including a 50 percent match. Recent projects have included lighting, energy recovery and heating and controls upgrades. The energy conservation loan program is focused on State agencies and recent projects have included a biomass boiler conversion. These projects have been instituted throughout the State.

Texas.—The Texas Energy Office's Loan Star program has long produced great success by reducing building energy consumption and taxpayers' energy costs through efficient operation of public buildings. This saved taxpayers more than \$224 million through energy efficiency projects. In another example, the State promoted the use of "sleep" software for computers, which is now used on 136,000 school computers, saving 42 million kWh and reducing energy costs by \$3 million annually. This is part of a broader energy efficiency program that has helped 3,500 schools and local governments thus far. The State has initiated the Texas Emissions Reduction Plan/Texas Energy Partnership in 41 urban counties to reduce emissions through cost-effective energy efficiency projects.

Utah.—The State has recently upgraded their building codes and they have been pushing to train builders, local code officials, architects and engineers. They also developed a zero-interest loan program for school districts. A State renewable energy tax credit has been utilized for large projects. The Governor has instituted a new renewable energy initiative.

Washington.—The energy agency has been working on promoting energy efficiency and renewable energy tax incentives, net metering and biofuels development. The State is also working on promoting Energy Star products and they are working regionally on building energy efficiency activities. They have also instituted a regional energy planning process.

West Virginia.—The Energy Division is focused on promotion of energy efficiency in the industries of West Virginia, including work in the steel, aluminum, chemical/polymer, glass, metal-casting, wood products and mining industries. They are also promoting Energy Star products, especially in the residential sector. The recently developed State energy plan is being utilized to promote a diverse energy future for the State.

PREPARED STATEMENT OF THE AMERICAN SOCIETY OF PLANT BIOLOGISTS

The American Society of Plant Biologists (ASPB) urges the subcommittee to approve the Department of Energy (DOE) fiscal year 2009 budget request for the Office of Science of \$4.7 billion. Please support the Office of Basic Energy Sciences request for \$1.568 billion. Included with the Department's budget request for Basic Energy Sciences is \$297,113,000 for leading research in the Chemical Sciences, Geosciences and Energy Biosciences Division. We urge you to support the Department's budget request for the division, including \$35.6 million for Energy Biosciences research. ASPB supports the DOE budget request of \$568.5 million for the Office of Biological and Environmental Research.

Research the subcommittee supported within the Energy Biosciences program has led to many breakthroughs including increased understanding of the composition of the cell wall. These findings help allow scientists and the Department to project further research advances leading to cost-competitive production of cellulosic ethanol. Many years of basic research supported in Energy Biosciences led to these cell wall findings. The highly regarded Energy Biosciences program also funded basic research leading to the landmark discovery of an enzyme that can convert cellulose into sugar for facile ethanol production.

Sunlight is the ultimate energy source for the earth. Harnessing even a fraction of this sunlight would provide us sufficient energy for years to come. Plants do this naturally through photosynthesis, also an area of research that has garnered continuous support from the DOE Energy Biosciences program. The burning of fossil fuels releases stored carbon dioxide into the atmosphere, contributing to global warming. Photosynthesis has the ability to recapture carbon dioxide, making plants a carbon neutral contribution to our energy needs.

We credit the subcommittee, the Office of Basic Energy Sciences Director and Under Secretary for the Office of Science for maintaining each year standards for peer-review selection based on the highest merit of science proposals submitted to the Energy Biosciences program and other programs within the Office.

These findings on the cell wall and enzymes are being built upon in a mission-related basic research effort by the Office of Biological and Environmental Research aimed at achieving advances that make possible cost-competitive production of cellulosic ethanol and other biofuels. The three Bioenergy Research Centers awarded by BER will increase understanding of cell wall and enzyme modifications needed to more cost-effectively capture sugars in the cellulose and hemicellulose in plant cell walls. We urge continued support for the three Bioenergy Research Centers. The Centers will also make possible advances in converting sugars to ethanol, biobutanol and other biofuels for the Nation's motorists. Cellulose is the most abundant biological material on earth. What was once only a dream of capturing and converting this abundant, renewable and sustainable resource into transportation fuels will become a reality thanks to continuing advances in plant and microbial science that the subcommittee is making possible. Advances in the fundamental understanding of oil crops such as soybean will contribute to increased biodiesel fuel production.

We urge support for the \$100 million initiative in Energy Frontier Research Centers (EFRCS). Under this initiative, universities, national laboratories, nonprofit organizations, and for-profit firms will be invited to compete, singly or in partnerships, to establish an EFRCS. Centers will be selected by scientific peer review and funded at \$2–5 million per year over a 5-year period. These integrated, multi-investigator Centers will conduct fundamental research focusing on one of more of several "grand challenges" recently identified in major strategic planning efforts by the scientific community. The purpose of these centers will be to integrate the talents and expertise of leading scientists in a setting designed to accelerate research toward meeting our critical energy challenges.

One of our most pressing energy challenges is in transportation fuels. I wrote a letter to the editor on the exciting next generation of biofuels that was published in *The Washington Times* on March 6, 2008. Following is the commentary:

[From *The Washington Times*, Mar. 6, 2008]

THE NEXT GENERATION OF BIOFUELS

Oil closed at \$100 a barrel February 19, for the first time. The *Washington Times* reported on February 20, ("Oil tops \$100 on refinery, OPEC," Business) that fears that the Organization of the Petroleum Exporting Countries may cut production contributed to the price increase.

Some analysts see this \$100 mark as just a stop on the way to \$200-per-barrel oil, possibly by the end of this decade. The reason cited is similar to newspaper reports on the bump to \$100 per barrel—OPEC's control of supply.

In addition to the economic and political challenges imposed by our reliance on foreign oil, we also need to be concerned that greenhouse gas (GHG) emissions associated with the use of fossil fuel contribute significantly to global warming, evident from observed increases in global air and ocean temperatures, widespread melting of snow and ice and a rising global average sea level. Is there a large-volume alternative to the use of increasingly costly oil with its high GHG emissions? There will be.

We are at the early stages of research on the next generation of biofuels using plant cellulose. Plant stems, stalks and leaves will become low-cost feedstocks for biofuels. A 2005 report from the U.S. Department of Agriculture and the U.S. Department of Energy projects that there will be enough biomass (cellulose) to meet more than one-third of the current U.S. demand in transportation fuels.

At the same time, next-generation biofuels will greatly lower emissions of stored carbon compared to gasoline. Biofuels will be better for Americans' pocketbooks and the environment.

The President and Congress are to be commended for initiating needed investments in new-generation biofuels research. Additional investment is needed in all phases of plant research. This will help hasten the day when biofuels make up 33 percent instead of 3 percent of the transportation fuels used in the United States.

C. ROBERTSON MCCLUNG,

President, American Society of Plant Biologists, Professor, Dartmouth College.

Understanding plant growth and development at a systems level feeds into increasing biomass, as does understanding basic mechanisms of abiotic and biotic stress tolerance. Understanding how cell walls are synthesized and their composition determined is not only fundamental to our knowledge of basic plant biology, but also is a central issue in biomass production and conversion. The same can be said of understanding how plants synthesize and regulate the production of lipids and oils as well as many other plant constituents and processes.

Please support increases in fiscal year 2009 for the Office of Biological and Environmental Research Program for Ecosystem Research (PER). PER sponsors experimental research to develop a better scientific understanding of potential effects of climatic change on U.S. terrestrial ecosystems and their component organisms. Field or laboratory studies are directed at understanding cause-and-effect relationships between temperature change and the abundance or geographic distribution of terrestrial vascular plants or animals in the United States. During the last decade there have been significant advances in the mechanistic understanding of how the component elements of terrestrial ecosystems are responding to elements of global change. These include changes in: atmospheric carbon dioxide levels, precipitation amount and seasonal distribution, and in daily and seasonal temperature cycles. As the primary producers of terrestrial ecosystems, the response of plants to multiple and interactive effects of global change drive the overall ecosystem response. This mechanistic research involving state-of-the-art physiological, biochemical, molecular, and genomic approaches has been almost exclusively conducted on individual plants exposed to global change scenarios under controlled environment conditions. Over the same period of time there have been tremendous strides made in the phenomenological characterization of the response of terrestrial ecosystems to interactive effects of global change. Again this research effort has centered on plants as the drivers of the central ecosystem processes of carbon, nitrogen, and water cycling. Plants also support the major biotic and trophic interactions within ecosystems and there has been intense interest to characterize the response of these interactions to global change.

The emergent research frontier where breakthroughs are most needed is in bridging mechanism and phenomenology to understand the systems biology of a functioning ecosystem under realistic global change treatments.

ASPB is a non-profit society of 5,000 scientists based primarily at universities. ASPB publishes the most frequently cited plant science journal in the world, *Plant Physiology* and the plant science journal with the highest impact factor, *The Plant Cell*. Thank you again for the opportunity to submit these comments to the subcommittee. Please let us know if we could provide any additional information.

PREPARED STATEMENT OF THE ELECTRIC DRIVE TRANSPORTATION ASSOCIATION

In the Nation's two newest comprehensive energy laws, the Energy Independence and Security Act of 2007 (EISA), and the Energy Policy Act of 2005 (EPA05), Congress recognized the need to invest in technologies and policies that will result in greater energy independence. Those bills authorize research and development, demonstration and deployment and manufacturing innovation programs to promote electric drive technologies, which use electricity to displace oil.

The Electric Drive Transportation Association (EDTA) applauds the Senate's support for electric drive technologies, which reduce petroleum consumption and decrease emissions of greenhouse gases and of air pollutants. Using electricity, by itself or in conjunction with another fuel, electric drive technologies power the wheels of vehicles in use today and numerous others in development. These vehicles can be passenger vehicles, trucks, tractors, locomotives or ground support equipment. Electric drive also powers transportation infrastructure, such as truck auxiliary power units and truck stop electrification facilities, which allow idled trucks to power with clean, alternative electricity.

Multiple fuel and vehicle technologies, including hybrids, battery electric vehicles, fuel cell vehicles, and plug-in versions of these electric drive vehicles, will be needed to end our unsustainable dependence on oil. The Department of Energy's Office of Energy Efficiency and Renewable Energy programs to accelerate development of electric drive vehicle technologies are pivotal to the effort to reduce oil consumption.

The Senate's budget resolution provides \$2 billion over the President's request for these programs. As you allocate fiscal year 2009 funding for the important programs in the Office of Renewable Energy and Energy Efficiency, we respectfully request that you provide the resources necessary to realize the electric drive advances outlined in EISA and EPA05.

ENERGY STORAGE RESEARCH AND DEVELOPMENT

Specifically, we support expanded funding for energy storage research and development at the Department of Energy's Office of Energy Efficiency and Renewable Energy (EERE), in particular, in the Vehicle Technologies program.

Advanced batteries and other energy storage innovations are the key to commercialization of plug-in electric drive and will accelerate advances in all electric drive vehicles. The administration's request for the existing DOE program is essentially level with fiscal year 2008 funding and does not reflect the intent of Congress as detailed in EISA.

Fiscal year 2009 funding in the Hybrid Electric Systems account should be expanded to include resources for the EISA section 641 energy storage competitiveness program. This program, which is authorized at \$295 million, includes basic and applied research, development and demonstration programs to support U.S. competitiveness in energy storage for electric drive vehicles and stationary applications.

FUEL CELL TECHNOLOGIES

We also urge you to ensure that the national effort to develop hydrogen fuel cell options is able to advance toward its goals. The fiscal year 2009 request for the Hydrogen and Fuel Cell Technologies program is \$33 million, a reduction from fiscal year 2008 levels. The Department's proposed program realignment should not undermine the ongoing work that is yielding technology breakthroughs and will ultimately yield necessary longer term transportation options.

For instance, the request for the Technology Validation program cuts funding to \$15 million, half of the fiscal year 2008 level. In this program, hydrogen infrastructure and fuel cell systems are certified under real world conditions. This work guides research agendas and helps establish the "real world" data collection necessary to develop fuel cell vehicles. Consequently, we believe this program should be funded at least at the fiscal year 2008 level of \$30 million.

Other programs necessary to the push toward commercialization are also cut or unfunded entirely, including a \$3.5 million reduction in Safety Codes and Standards and a complete elimination of funding for Manufacturing R&D (which received \$5 million in fiscal year 2008).

Section 782 of EAct05 authorizes Federal and State Procurement program funding to help government fleets acquire fuel cells vehicles. The program is designed to reduce the initial market barriers for advanced technology vehicles by covering the cost premium of the early Federal and State fleets of fuel cell vehicles. Congress should provide the \$25 million authorized by EAct05.

The Department of Energy should not abandon its hydrogen production and delivery activities, as the administration requests, and funding for the Transportation Fuel Cell Systems Account should be restored to at least the fiscal year 2008 level of \$8 million.

DEPLOYMENT AND DEMONSTRATION

Other new and existing demonstration and deployment programs have the potential to accelerate commercial deployment of electric drive technologies, with the appropriate resources.

Specifically, the EISA section 131 Transportation Electrification (b) Plug in Electric Drive Vehicle Program and (c) Near Term Transportation Electrification Program can help industry partners to work together to put on-road and non-road electric drive vehicles in use, enabling manufacturers and consumers to identify real world performance and establish initial market opportunities. The programs are authorized at a total of \$185 million. We ask that you provide substantial funding to allow rapid ramp-up of these programs in their initial year.

The Clean Cities program is another example of a successful, ongoing effort to deploy advanced vehicle technologies. The Clean Cities program consists of voluntary local and regional coalitions working to build clean and efficient private and municipal fleets, with advanced technology and alternative fuel vehicles. We appreciate the Congress' history of support for the program and request that you provide the technology- and fuel-neutral fund at the fiscal year 2008 enacted level, \$12.5 million.

Another important activity at DOE in fiscal year 2009 will be the rulemaking that will be required to implement new EAct fleet requirements. EISA's section 508 amends the existing fleet requirements to finally, explicitly include electric drive (fuel cell, hybrid, plug-in hybrid, medium and heavy duty hybrid electric vehicles and neighborhood electric vehicles) and investments in alternative fuel infrastructure. The \$1.8 million in the request is insufficient to ensure an expeditious and effective rule making process, and will delay the ability of covered fleets to comply with hybrid and other electric drive vehicles.

MANUFACTURING INNOVATION

We also support building domestic capacity for advanced batteries and vehicles as envisioned by EISA 2007. The Senate Budget resolution also endorses the effort, explicitly providing an additional \$2.7 billion for green jobs initiatives, including "loan guarantee and grant programs" for ". . . production of fuel efficient vehicles."

We respectfully ask that you direct the maximum available funds toward programs authorized in the EISA that will help new and existing manufacturers to produce advanced batteries and vehicles in the United States and expand employment in these fields.

Specifically, we are referring to the section 136 Advanced Technology Vehicle Manufacturing Incentive Program, which provides grants for up to 30 percent of the cost of re-equipping or establishing advanced vehicle and component manufacturing facilities, equipment investment and engineering integration, and section 132: Domestic Manufacturing Conversion, which authorizes grants to manufacturers of fuel efficient vehicles and component suppliers to modernize production facilities.

In addition, we recommend that additional funds be allocated to the existing Loan Guarantee Program to include the battery and component manufacturing guarantees activities authorized in EISA's section 134 Loan Guarantees for Fuel Efficient Automobile Parts Manufacturers and section 135 Advanced Battery Loan Guarantee Programs. The administration request includes \$10 billion of \$38.5 billion for advanced and innovative energy; that amount should be increased with funds directed to the EISA-authorized manufacturing activities.

EDTA appreciates the subcommittee's support for electric drive and for EERE's Vehicle and Hydrogen and Fuel Cell Technology programs. We respectfully ask that the subcommittee use the funds available in the fiscal year 2009 budget resolution to build on that support and establish the electric drive programs authorized in en-

ergy legislation and to ensure the continuing advancement of electric drive technology.

PREPARED STATEMENT OF GE ENERGY

The following testimony is submitted on behalf of GE Energy (GE) for the consideration of the subcommittee during its deliberations regarding the fiscal year 2009 budget requests for the Department of Energy (DOE). Among GE's key recommendations are: (1) support for the \$241.6 million funding request for the Nuclear Power 2010 program to develop new U.S. nuclear generation; (2) \$40 million in added funding for the GNEP program, for total funding of \$341 million, to start the necessary activities for technology demonstration and to help industry provide DOE with the information necessary to support the 2008 Secretarial Record of Decision; and (3) \$27 million additional for the Advanced Turbines program, DOE's major research effort focusing on gas turbines for electricity production which also addresses key needs for hydrogen turbines. Investments in these and the other important programs discussed below will help to meet the challenges of assuring a diverse portfolio of domestic power generation resources for the future.

NUCLEAR ENERGY

Nuclear Power 2010.—The NP2010 Program provides vital funding in three areas that are essential to the development of new nuclear generation capacity in this country. The program provides support for: (1) certification of new reactor designs, such as GE's advanced light water reactor technology (ESBWR); (2) advancement of detailed design and deployment planning to support new nuclear plant construction; and (3) preparation, submittal and NRC approval of two Combined Construction and Operating Licenses (COL). These activities are currently advancing with co-funding support from GE-Hitachi Nuclear Energy (GEH) and Westinghouse. Adequate DOE funding in fiscal year 2009 is necessary to maintain the schedules supporting certification, COL license approval and construction initiation.

The administration has requested \$241.6 million for fiscal year 2009 to support the NP2010 Program. GEH supports this funding level, which reflects the additional funding needed above initial estimates to facilitate continued ESBWR detailed design and deployment activities at levels that support industry expectations.

Among other things, funding is needed to support critical detailed design activities including piping and instrumentation diagrams development, process flow diagrams, system design spec development, 3D pipe routing and pipe stress calculations and the development of procurement specifications for long lead and highly engineered equipment. These detailed design activities are required for advanced module design, simulation assisted engineering, and critical path construction activities. Moreover, these detailed engineering activities are critical to the refinement of the ESBWR capital cost estimate. Deployment planning activities include the development of site utilization plans, crane lift plans, construction execution plans, procurement strategies, warehousing strategies and craft labor planning. These are required to allow the ESBWR to be successfully deployed in the desired timeframe well within the next decade.

The costs to complete these activities have escalated due to a number of contributing factors that have changed versus baseline assumptions made in 2005. These factors include, but are not limited to, NRC rate increases, large volume of additional NRC RAI's (Request for Additional Information), recent changes in regulatory position related to aircraft impact and Human Factors Engineering design process, customer expectations of increased design and COL standardization, and performance of COL compliance reviews. Additionally, higher resource demands from increased industry activity as well as the FOAKE nature of the effort have placed a substantial cost burden on the project. These and other factors have led to significant additional program cost above baseline assumptions. The fiscal year 2009 funding requested by the administration will help offset some of these cost escalations.

The Advanced Fuel Cycle Initiative and the Global Nuclear Energy Partnership (GNEP).—The Global Nuclear Energy Partnership (GNEP), initiated in early 2006, benefits from DOE's research and development work currently conducted under the Advanced Fuel Cycle Initiative (AFCI) and previously conducted in the Advanced Liquid Metal Reactor program (circa 1985 to 1995). GNEP seeks to expand the use of nuclear power in a proliferation-resistant manner, and to use nuclear waste by reducing the long-term radiotoxicity of spent nuclear fuel. The key emphases are on solutions for proliferation resistant fuel separations and long-term nuclear waste reduction.

In support of the broad GNEP goals and to help the DOE prepare for the 2008 Secretarial Record of Decision, DOE in October 2007 issued awards to four commercial teams, including the team led by GEH, for technical and conceptual design studies to provide information on commercial methods that are available to close the fuel cycle. The GEH team has explored the technical and business parameters that could support a viable system in a four-part submittal. The submittal included drafts of a Business Plan, a Technology Development Roadmap, a Conceptual Design and a Communication Plan. The Business Plan explored the current market, examined the financial viability of the Advanced Recycling Center and proposed policy direction for solutions to spent nuclear fuel. The cost and schedule report, a part of the Conceptual Design, served as the bridge between the technical details from the conceptual design and provided key financial input to the Business Plan. The Conceptual Design submittal (approximately 4,000 pages long) demonstrated in-depth knowledge developed during the Advanced Liquid Metal Reactor program, GE-funded programs and our current experience. The Technology Development Roadmap recommended direction on a future research and development program that could be started in fiscal year 2009 to engage U.S. universities and national laboratories that would allow the United States to lead within the GNEP policy framework as well as have better collaborations with foreign governments. Finally, the Communication Plan provided guidance on how the DOE may communicate scientific, technical and practical information related to closing the nuclear fuel cycle.

For fiscal year 2009, an additional \$40 million above the administration's budget request, for total GNEP funding of \$341 million, is needed. The recommended additional funding should be used to help industry conduct technology demonstration projects, such as the manufacture and demonstration of: (1) key reactor components (e.g., reactor vessel); (2) electrometallurgical based fuel separation; and (3) a reactor and fuel separation simulator. GEH further recommends that adequate funding through the GNEP program be provided to both the U.S. industry and the laboratories for electrometallurgical separations and the PRISM reactor in support of the GNEP policy goals.

FOSSIL ENERGY

Coal is facing a challenging landscape. In anticipation of carbon constraints, coal will require carbon capture and sequestration (CCS) if it is to continue serving as a major national energy resource. It is therefore necessary that the viability and efficacy of CCS be proven at large scale, for multiple projects and over a range of geologic settings. Only a major initiative and investment will provide the necessary confidence for the commercial and public acceptance of CCS. Meeting this challenge will require the combined resources of industry and government at all levels working in partnership.

Financial incentives alone will not be sufficient to achieve the goal of validated and commercially robust CCS. Reducing the risk and time required to identify and characterize potential storage sites, to obtain Federal, State and local government commitments related to long-term liability issues, to conduct the necessary reviews and to complete permitting will also require a substantial effort by all levels of government. The DOE must acknowledge this challenge in all programs related to CCS and provide specific assistance in addressing these issues. For this reason, the commitment of government to assume long-term liability for monitoring and safety of the stored CO₂ should be sought in forthcoming solicitations for CCS development. Without such assurances it is not likely that industry participation will be forthcoming.

FutureGen.—DOE's decision to restructure the FutureGen program correctly targets the deployment of CCS technology at a commercial scale. The proposed restructuring recognizes that carbon capture ready IGCC can be commercially supplied today; GE's commercial 630 MW IGCC plant already is carbon capture ready. To be successful, FutureGen's restructuring must address two overarching needs: (1) validation of CO₂ sequestration at a large scale; (2) in multiple geological settings and (3) demonstration that utility powerplants with carbon capture can be successfully integrated with sequestration. DOE's proposed restructuring can provide the platform to satisfy these needs and thus be a major step forward toward assuring a strong future for coal-based power generation. As the Department further develops the restructured FutureGen program, care must be taken, however, to avoid burdening large-scale CCS projects with unneeded additional complexity and cost. Nothing in the program's new structure should be allowed to divert attention from the central objective of proving that the most challenging goal can be met: that large-scale sequestration is viable and safe.

Clean Coal Power Initiative.—GE supports CCPI and its role in validating and testing advanced technology. With the potential refocusing of FutureGen, that program's function as a platform for introduction and validation of advanced IGCC carbon capture technologies will not be available. CCPI must be ready to serve a larger role in the validation and deployment of those technology advancements that are needed to meet DOE's goal of no more than 10 percent additional cost for CCS. However, mounting multiple projects within the overall anticipated funding of \$250 million for Round 3 of CCPI will be challenging. Front-end-engineering and detailed site characterization for a CCS project alone could account for \$40–\$50 million. After capital expenses for carbon capture equipment and sequestration pipeline and site development, there will be little if any funding remaining for the additional costs of CCS operation needed to validate sequestration capacity. For example, for a single 300 MW IGCC train equipped with carbon capture, the minimum 50 percent capture requirement of CCPI will result in over 1 million tons/year of captured CO₂ with potential annual incremental operating costs as high as \$40–\$50 million. In recognition of these cost challenges, the expectation for multiple project awards within the available CCPI funding needs to be reassessed.

IGCC.—With its pre-combustion carbon capture, IGCC provides a significant advantage over combustion technology. Despite its current 20 percent cost premium over pulverized coal combustion, IGCC can provide a lower cost of electricity with carbon capture. However, it should be recognized that IGCC is still in an early phase of commercial deployment and at the very beginning of a steep cost learning curve. Investment in technology development promises to have a high return.

DOE's goal of a maximum 10 percent premium in cost of electricity for IGCC with carbon capture will not be met with current technology. It will require technology advancements. Key technology areas that can significantly lower cost and improve performance are advanced carbon shift, CO₂ capture and separations, overall process efficiency plus advancing IGCC's capability for subbituminous coals. Therefore we strongly endorse the administration's request to increase fiscal year 2009 funding for IGCC by \$15.5 million over the fiscal year 2008 level to \$69 million.

In addition, cost reduction must be pursued vigorously for IGCC to realize its potential in maintaining coal competitiveness in a carbon-constrained environment. From this perspective, the clearest and quickest path to reducing the cost of carbon capture is the accelerated deployment of IGCC and elimination of its cost premium. In order to achieve this, we recommend a continuation and broadening of the investment tax credits under the Energy Policy Act of 2005 from 6 to 12 IGCC projects and covering a scope that helps to offset both the cost premium of IGCC as well as the incremental cost of carbon capture.

Carbon Sequestration.—GE also endorses the administration's requested technology funding increase of \$30 million from fiscal year 2008 levels to \$149 million for carbon sequestration. Research in sequestration needs to move forward as rapidly as possible. A primary focus needs to be the development of science-based requirements for site characterization, monitoring and CO₂ quality. Advancements in these areas are necessary to guide commercial-scale sequestration. The DOE also needs to quickly move forward with the demonstration programs authorized under section 702 of the Energy Independence and Security Act of 2007 in order to apply and gain experience with modeling, monitoring and rapid sequestration site characterization.

Advanced Turbines.—GE recommends that funding be increased by \$27 million to a total of \$55 million for the Advanced Turbines Program. This program represents the Department's high priority research effort focusing on the development of enabling technologies for high efficiency hydrogen turbines for advanced gasification systems. Gas turbine R&D is focused on advanced combustion and high temperature turbine technology for syngas/hydrogen fuels that will result from IGCC and carbon capture type power plants. The program addresses those gas turbine elements where the technology required for the use of syngas/hydrogen fuels differs from the requirements for natural gas fueled gas turbines. Development of these technologies will help offset some of the efficiency and output penalties associated with CO₂ capture. Unless the fiscal year 2009 budget for the Advanced Turbines program is increased, funding will be inadequate for this promising high priority work, and the progress and benefits of this research will be delayed accordingly.

PREPARED STATEMENT OF THE ENERGY COMMITTEE OF ASME'S TECHNICAL COMMUNITIES

Mr. Chairman and members of the subcommittee, the ASME Energy Committee is pleased to provide this testimony on the fiscal year 2009 budget request for research and development programs in the Department of Energy (DOE).

INTRODUCTION TO ASME AND THE ASME ENERGY COMMITTEE

The 127,000-member ASME is a nonprofit, worldwide professional, educational and technical Society. The Energy Committee of ASME's Technical Communities comprises 30 members from 17 divisions of ASME, representing approximately 40,000 of ASME's members.

ASME has long advocated a balanced energy supply mix to meet the Nation's energy needs, including advanced coal, petroleum, nuclear, natural gas, biomass, solar, wind, hydroelectric power, and energy efficient building and transportation technologies. Sustained growth will also require stability in licensing and permitting processes not only for power stations but also for transmission and transportation systems.

Over the past few years, concerns have been growing among policymakers and the general public about adverse security and environmental impacts resulting from America's dependence on foreign sources of oil and gas. As a result, the current administration and Members of Congress have made calls to diversify our energy supply and increase R&D on advanced energy technologies. The Energy Committee fully supports their efforts.

A forward-looking energy policy will require enhanced, sustained levels of funding for R&D as well as Government policies that encourage deployment and commercialization. The Energy Committee supports much of the fiscal year 2009 budget request, especially the increases in funds for fundamental scientific research. We wish to emphasize that increased funding in all areas is essential to meeting our national energy needs.

CRITICAL ISSUES

The Energy Committee would like to point out some critical energy issues:

- There is a critical worldwide shortage of trained persons in the work force at all levels. This includes persons in the building trades, persons in the manufacturing industry, persons who will be available to operate and maintain the energy systems, and engineers and scientists at all levels who will perform the R&D and design functions for all energy systems.
- International programs in energy are growing and will continue to do so in order to make use of shared resources. The International Thermonuclear Experimental Reactor (ITER) and the Global Nuclear Energy Partnership (GNEP) programs are examples of this. The ITER program includes seven international partners and the GNEP program now includes 21 countries. Consistent and sustained funding is required to demonstrate that the United States is a reliable partner in these efforts.
- Investment guarantees for construction of new renewable and nuclear facilities were enacted in previous energy legislation. These guarantees will enable lower financing costs for a variety of energy technologies leading to lower energy costs for the American public. Extending these programs further into the future will allow a reasoned rate of increase in construction and application of these technologies for electric generation.

FOSSIL ENERGY

The fiscal year 2009 budget request of \$754 million for fossil energy represents an increase of \$11 million over the fiscal year 2008 appropriation. The Energy Committee supports the increase in coal research programs to \$624 million. The effective use of coal in today's environment demands an increase in efficiency and a decrease in release of environmentally harmful emissions. The Energy Committee agrees with the DOE in its efforts to build IGCC plants by providing funding for the addition of CCS technology to multiple plants that will be operational by 2015. This approach builds on technological R&D advancements in IGCC and CCS technology achieved over the past 5 years.

The use of advanced integrated gasification combined cycle technology and carbon sequestration may allow the United States to utilize its coal resources in a more environmentally sound and cost effective manner. We encourage strong and consistent funding for these programs now and in future years.

ADVANCED FUELS RESEARCH

The Energy Committee agrees that the advanced fuels research should be aimed at fuels used in the transportation system. We believe that the development of transportation fuel systems that are not petroleum based is a critical part of our future national energy policy. The fiscal year 2009 budget for biomass and bio-refinery systems R&D is increased by \$27 million to \$225 million. The Energy Committee encourages Congress to ensure that these research programs continue to receive adequate funding. We are also pleased to see the increase to \$221 million in the effort related to vehicle technologies with a program emphasis on plug-in hybrid electric vehicles.

NUCLEAR ENERGY

The Energy Committee is encouraged to see the increase in the DOE Nuclear Energy budget to \$1.4 billion in fiscal year 2009. Nuclear power, as a non-greenhouse gas-emitting resource, is a critical component of a diverse U.S. power generation mix and should play a larger role in the Nation's base power supply.

Proposed increases in the Nuclear Energy Budget are most evident in the Nuclear Power 2010 program with an increase of \$108 million and the Advanced Fuel Cycle Initiative with an increase of \$122 million over the fiscal year 2008 Appropriation. The Energy Committee believes that nuclear generated electricity is important to the Nation, especially in a more carbon conscious environment. Therefore continued R&D looking at advanced nuclear systems is critical.

The GNEP program is vital to the international future of nuclear energy. Agreements are already in place to establish cooperative efforts. The U.S. based R&D elements of this program are now part of the Advanced Fuel Cycle Initiative. The Energy Committee concurs with the DOE goal to establish a full scale demonstration of the required facilities, including a burner reactor and fuel recycle plant that will not produce a pure plutonium product stream. The successful implementation of the GNEP initiative will lead to a minimization of high level nuclear waste, enhance the safeguarding of nuclear materials by keeping them in the reactor fuel cycle, lead to an effective and efficient use of all the potential energy contained in uranium and allow cost effective generation of electricity.

The university reactor assistance and education assistance program has been successfully integrated into other programs within the Nuclear Energy budget. The Energy Committee supports the continuation of this change.

ENERGY EFFICIENCY AND RENEWABLE ENERGY

The Office of Energy Efficiency and Renewable Energy (EERE) manages America's investment in research, development and deployment of the Department of Energy's (DOE) diverse energy efficiency and renewable energy applied science portfolio. The fiscal year 2009 request of \$1.25 billion provides a balanced and diverse portfolio of solutions to address the urgent energy and environmental challenges currently facing our Nation. Most of the key EERE programs, including Biomass, Building Technologies, Geothermal Energy, Vehicle Technologies, and Wind Energy, have received increases in funding to support the growth of renewable energy that the United States needs. The potential to meet the growing need for domestically produced energy justifies sustained and increased support for these programs.

The Hydrogen Program is reduced \$65 million; however, \$32 million has been added to hydrogen related activities and funding in the Vehicle Technologies Program. The Energy Committee encourages fully funding the Hydrogen Program as requested and recommends restoring a minimum level of \$2 million in funding to the Hydrogen Production and Delivery R&D activity to coordinate efforts with other Hydrogen Production R&D activities in other DOE offices.

The funding to the Water Power Program reflects increasing interest in ocean energy resource characterizations but it neglects the need for sustained support for conventional hydropower R&D. Hydropower is our Nation's largest renewable energy source. This includes pumped storage hydro and repowering existing hydropower facilities with advanced, environmentally benign equipment. The Energy Committee recommends increasing the fiscal year 2009 funding level of the Water Power Program to \$10 million to continue supporting development and deployment of advanced conventional hydropower and ocean energy technologies.

The integration of renewable electric generating systems into the operation of the electricity distribution system is critical to economic operation of these systems. The Energy Committee believes that R&D related to the integration of the electric grid and its control as a national system is imperative to the growth of renewable energy generating technologies and we encourage full funding for such research.

SCIENCE AND ADVANCED ENERGY RESEARCH PROGRAMS

The Energy Committee is pleased by the increased request for the Office of Science (OS), \$4.72 billion or \$749 million over the fiscal year 2008 appropriated amount, which attempts to restore the funding trajectory mandated in the America Competes Act of 2007 (Public Law 110-69). OS programs in high energy physics, nuclear physics, biological and environmental research, basic energy sciences, and advanced scientific computing, serves every student in the country. These funds support research at the DOE Laboratories and at a large number of universities and colleges. We believe that basic energy research will also improve U.S. energy security over the long term, through its support for R&D on cellulosic ethanol, advanced battery systems, and fusion.

Of the fiscal year 2009 requested increase, \$214 million is for the ITER fusion energy international agreement taking place in Cadarache, France. This program did not receive funding in fiscal year 2008. The Energy Committee is encouraged by this cooperative agreement and the enormous potential it holds.

The Energy Committee would like to impress upon the members of this subcommittee and their colleagues that high energy physics and nuclear physics programs are very important to all branches of engineering. The information gathered allows the development of data related to material formation and failure which guides the selection of materials for many day to day applications.

OTHER DOE PROGRAMS

DOE is also very active in areas outside of R&D. The environmental remediation program that funds the decommissioning and decontamination of old DOE facilities is one such program. The Energy Committee questions the advisability of the budget decreases in this program. Congress should appropriate the budget to ensure that this work is accomplished in an expeditious manner.

CONCLUSION

Members of the Energy Committee consider the issues related to energy to be one of the most important issues facing our Nation. The need for a strong and coherent energy policy is apparent. We applaud the administration and Congress for their understanding of the important role that scientific and engineering breakthroughs will play in meeting our energy challenges. In order to promote such innovation, strong support for energy research will be necessary across a broad portfolio of technology options. DOE research can play a critical role in allowing the United States to use our current resources more effectively and to create more advanced energy technologies.

Thank you for the opportunity to offer testimony regarding both the R&D and other parts of the proposed budget for the DOE. The ASME Energy Committee is pleased to respond to additional requests for additional information or perspectives on other aspects of our Nation's energy programs.

 PREPARED STATEMENT OF THE STATE OF ALASKA DEPARTMENT OF NATURAL RESOURCES

Dear Chairman Dorgan and Subcommittee on Energy and Water Development, I appreciate this opportunity to provide testimony outlining the urgent need for energy-related research and resource assessment in Alaska. Specifically, scientific work performed and funded in Alaska through the U.S. Department of Energy provides an invaluable service to the Nation by helping address energy security and development of technologies for the challenges unique to the Arctic. Alaska is one of the few places in the United States where the scientific unknowns are so ubiquitous, and the task so daunting, that Federal and State agencies seldom compete for the most high profile projects; there are too many to go around. In fact, we compliment each other's efforts in an attempt to tackle the many challenges that face us all. The Office of Fossil Energy, National Energy Technology Laboratory (NETL) Arctic Energy Office, plays a critical role in this collaborative effort.

Federal land-management responsibility in Alaska is significant. Although final conveyances are not complete, the current Federal land allotment stands at 243 million acres, or about 64 percent of the total Alaska land surface. The State of Alaska manages about 24 percent, or 90 million acres, and the Native corporations about 10 percent. Additionally, the energy potential in offshore Alaska Federal waters dwarfs nearly all other areas in North America. Those regions are now becoming the next global exploration frontiers of major international oil and gas companies. For example, the most recent lease sale, in the Chukchi Sea, astounded even the

most optimistic of explorationists by the bonus bids that were recorded (\$2.6 billion). Many of the geologic attributes that were targeted by the bidding extend onshore to the east into the National Petroleum Reserve Alaska (NPR). Additionally, the formidable challenges that will be faced to safely bring any discovered commodities to market will require the collaboration of many entities.

Arguably, Alaska has the greatest potential for undiscovered conventional resources of any area in the United States. Current mean-case technically recoverable resource estimates (calculated by the U.S. Geological Survey for on-shore basins and Minerals Management Service for offshore Alaska basins) stand at 200 trillion cubic feet of natural gas potential, and 46 billion barrels of oil. These probabilistic estimates are for undiscovered conventional resources only, and do not include the vast amount of natural gas in unconventional reservoirs such as gas hydrates, coalbed methane, shale-bed gas, and low permeability reservoirs. Additionally, Alaska contains the largest reserves of coal in all of the United States. Given that fossil energy will realistically play a key role in the energy portfolio of America for the foreseeable future, it is imperative that “all hands remain on deck” and agencies like the NETL Arctic Energy Office remain in full functional operation. The alternative will only put us farther behind and even more dependent on the volatilities of the global energy market.

The many important projects being managed from the NETL Arctic Energy Office attest to the critical role they play. Programs that collaborate with other agencies and address key aspects of national energy supply, Arctic engineering, environmentally sensitive exploration and development technologies, and rural energy supply will not be fully realized without committed and long-term participation by the Federal Government. The State of Alaska is rightfully spending hundreds of millions of dollars on these efforts, but we cannot do it alone.

Many changes are needed in the national energy policy, including a focus on and facilitation of dramatic conservation efforts, development of non-fossil energy sources that make environmental and economic sense, technological development for better use of fossil fuels, and continued pursuit of new conventional and unconventional reserves. Nevertheless, whether or not we stand ready, energy demand in the United States is forecast to increase by 19 percent by the year 2030. Even more alarming, global demand for energy is forecast to increase by 57 percent in that same time period. We shall either prepare for the inevitability of dwindling resources, shrinking supply and shortfall, and increasing dependence on foreign energy resources, or pray this calamity is not upon us and continue to cut budgets and hope that a miracle is “just around the corner.” I believe we should spend the capital to prepare now.

Thank you for your consideration of this important issue.

PREPARED STATEMENT OF THE ASSOCIATION OF STATE ENERGY RESEARCH AND TECHNOLOGY TRANSFER INSTITUTIONS (ASERTTI)

Mr. Chairman and members of the subcommittee, I am David Terry, Executive Director of the Association of State Energy Research and Technology Transfer Institutions (ASERTTI). ASERTTI is submitting this testimony in support of funding for a variety of U.S. Department of Energy programs. State and local governments host a wide range of public interest energy organizations, including State research and technology transfer institutions, municipal energy organizations, land grant colleges, universities, and others. The members of ASERTTI focus on State- and local-level public interest, applied clean energy research and technology transfer. Our work aims to develop and improve clean energy technologies, rapidly transfer those technologies to the private sector, and aid in the transformation of markets. ASERTTI promotes and facilitates communication and collaboration in the above-mentioned areas among its State and local members, as well as with other organizations, such as the U.S. Department of Energy (DOE) National Laboratories. Each year, our members invest hundreds of millions of dollars in State and local energy funds. We believe improved collaboration with our Federal partners would significantly leverage our efforts and State funds—improving our Nation’s energy future. In this regard, ASERTTI wishes to highlight a number of funding priorities, as follow, within DOE’s Office of Energy Efficiency and Renewable Energy (EERE) programs for the Industrial, Building, and Vehicle Efficiency Technologies, as well as for the Biomass, Solar, and Weatherization Assistance Programs.

INDUSTRIAL TECHNOLOGIES

The administration’s fiscal year 2009 budget request would cut the Industrial Technologies Program by \$2.3 million, compared with fiscal year 2008, and contains

cuts in several very important programs. Following are ASERTTI's priorities within the Industrial Technologies Program.

Industrial Assessment Centers (IAC).—The IACs are part of the industrial program's crosscutting budget. The IAC program is unique in that it trains university engineering students in conducting energy audits of small- and medium-sized facilities and, in so doing, helps the facilities identify and implement energy saving measures. We recommend that the program be restored to fiscal year 2006 funding levels of \$6.4 million in fiscal year 2009, with additional increases in funding and in the number of centers in future years. This is \$2.4 million above the fiscal year 2008 funding level.

Distributed Generation (DG/Distributed Energy).—Over the past decade, this program area has played a key role in the development of high-efficiency clean technologies like combined heat and power (CHP). These activities were moved around within DOE between EERE and the Office of Electricity. For fiscal year 2008, Congress appropriated \$14.5 million for these activities. However, the administration's fiscal year 2009 request is only \$1.5 million. The program is now part of the cross-cutting piece of the Industrial Technologies Program. ASERTTI recommends a robust funding increase over the fiscal year 2008 appropriated level for Industrial DG.

Within this DG (or DE) program, it is especially important to restore critical Centers that have become the cornerstone for regional DG activities, providing technical assistance and becoming involved in State and local interconnection and emissions issues—greatly leveraging Federal, State, and private resources. Section 451 of the recently enacted Energy Independence and Security Act of 2007 expands these Clean Energy Application Centers (formerly Regional Application Centers) and authorizes \$10 million for fiscal year 2009. ASERTTI strongly supports this authorization level. These Centers also would support market transformation activities to facilitate deployment and help reduce regulatory and institutional barriers. The Centers also would encourage public private partnerships to achieve these goals. Efficiency can be as high as 85 percent in CHP applications when compared to central station power generation efficiencies of 30–55 percent. These activities are estimated to contribute as much as 11 trillion BTUs of displaced energy and 0.2 MMTCE in carbon savings in 2020.

Industrial Best Practices.—This is one of DOE's most effective industrial energy programs. ASERTTI urges strong support for this program and recommends funding it at the administration's fiscal year 2009 request level of \$15.5 million.

Industries of the Future (specific).—This valued program enables cost-shared research with industry at major State and local research institutions. The program focuses on energy-intensive industries such as steel, aluminum, glass and metal casting. This program was reduced from \$63 million in fiscal year 2002 to \$11 million in fiscal year 2008. The administration's fiscal year 2009 request of \$11.4 million represents a cut over the previous year, since most research funding is multi-year, and funding from earlier years is not being replaced. Moreover the glass portion of the program has been eliminated. Congress authorized an expanded Energy-Intensive Industries program under the Energy Independence and Security Act focused on industry-specific research. This program authorized a focused approach that responds to the needs of individual industries and requires their long-term commitment. To begin implementing this approach, ASERTTI recommends fiscal year 2009 funding of \$24.2 million—\$12.8 million above the administration's \$11.4 million request.

BUILDING TECHNOLOGIES

Zero Energy Commercial Buildings Initiative.—The buildings sector in the U.S. accounts for about 40 percent of total energy consumption and 40 percent of carbon dioxide emissions, and nearly half of those emissions and of that consumption comes from commercial buildings. A large multi-year initiative is critical to achieve deep savings throughout the commercial buildings sector. This public-private collaboration will combine RDD&D, as well as better tracking of real energy performance, strategic research, and a market transformation plan. This newly-authorized program will be run by DOE with input from an industry consortium and is a priority for ASERTTI. Thus, ASERTTI recommends \$20 million in fiscal year 2009 to fund this new Initiative, in addition to the administration's request of \$13 million for the existing Commercial Buildings Integration program, for a total of \$33 million for these activities.

Building Application Centers.—It is critical to ensure that technologies developed under various building research programs make it into the marketplace. This important initiative within Building Technologies consists of a regional approach to transferring technologies to the marketplace by providing hands-on, cost-shared technical

assistance to builders, communities, and others. This approach has substantial State, local, and private support and is delivering results. To date, only two regions have been provided funding to move emerging technologies from the laboratory into the marketplace. ASERTTI urges the subcommittee to encourage DOE to expand and support these Centers in each region of the Nation.

VEHICLE TECHNOLOGIES

In the fiscal year 2009 budget request, the administration has proposed a variety of cuts to important vehicle programs—relative to fiscal year 2008 levels for the combined Vehicle and Hydrogen budgets—that would help save energy at a time of record-high gasoline prices and would help reduce greenhouse gas emissions. ASERTTI's priorities are as follows:

Hybrid Electric Systems.—The Vehicle and Systems Simulation and Testing activity relates in part to heavy vehicle systems optimization R&D, which warrants greater attention. The administration's proposed reduction in funding for this activity is a concern. ASERTTI recommends that \$7.1 million be restored to Vehicle and Systems Simulation and Testing, which would restore funding for this effort to \$28.2 million. Furthermore—and quite critically—energy storage efforts must be accelerated. ASERTTI therefore recommends that the Energy Storage R&D activity be funded at \$59.5 million, an increase of \$10 million above the administration's request for R&D efforts focused on electric, hybrid, and plug-in hybrid vehicle battery storage capabilities.

Following on from these activities, State and local energy institutions together with DOE created the Nation's first demonstration fleet of plug-in hybrid electric school buses. More than one dozen of these buses are now transporting students to and from schools around the Nation. ASERTTI urges the subcommittee to provide plug-in hybrid deployment funds for heavy duty vehicles to both expand the early adoption of these breakthrough vehicles and to support ongoing incremental improvements that will create a self-sustaining market for these "lead by example" buses. The market for plug-in hybrid school buses offers a means to reduce harmful air and greenhouse gas emissions, and the opportunity to create niche markets in the public sector that can grow into commercial opportunities that transform the market. These heavy duty plug-in hybrid applications are critical to meeting the Nation's energy and climate goals.

BIOMASS PROGRAM

ASERTTI Supports the Administration's Fiscal Year 2009 Request of \$225 Million.—To this end, ASERTTI urges the subcommittee to support funding that targets regional coordination of biomass research, demonstration, and technology transfer programs that emphasize the alignment of State and Federal resources. Currently, little attention or funding is provided to achieve joint State-Federal coordination in this critical research area. We believe the Nation could reach the goal of cost-competitive cellulosic-derived biofuels more rapidly if State and Federal research and demonstration resources were better aligned. ASERTTI also encourages Congress to fund analysis and communication activities that better inform the public about the value of biofuels. ASERTTI urges DOE to substantially increase the RDD&D under this program area for stationary applications, including the development of bio-based products and renewable, pipeline-quality biogas. Energy innovations resulting from ongoing cellulosic RD&D should be leveraged to address stationary application challenges, such as the need to increase yield from anaerobic digesters, improve thermochemical gasifiers, refine renewable gas cleanup for use in both power generation and direct use applications. These stationary applications also have the ability to improve the economics, and further reduce the carbon footprint, of biofuels production.

SOLAR ENERGY PROGRAM

The solar thermal research program is dominated by water-intensive technologies for cooling. It is critical, particularly as water resources are already scarce in some areas, and becoming more so throughout the United States, to focus additional RDD&D efforts on dry cooling systems. ASERTTI urges Congress to restore the Solar Energy Program to at least the fiscal year 2008 appropriated level of \$168.5 million, which is \$12.4 million above the administration's fiscal year 2009 request of \$156.1 million. ASERTTI also strongly recommends that there be a particular emphasis going forward on dry cooling systems.

WEATHERIZATION ASSISTANCE PROGRAM

ASERTTI supports the Weatherization Assistance Program (WAP), as it helps low-income households, the elderly, and the disabled by improving the energy efficiency of low-income housing. Each year the program has exceeded its target and has weatherized approximately 100,000 homes. The program also is reducing energy consumption in participating homes by about 20 percent. Increased funding would allow WAP to expand quickly to reduce energy usage by approximately 25 percent in each assisted home. This represents savings that families can use to pay for other critical needs, while reducing the Nation's energy demand by the equivalent of 18 million barrels of oil every year. The administration's request to eliminate funding for the program should be rejected, and ASERTTI urges the subcommittee to fund WAP at no less than \$300 million.

 PREPARED STATEMENT OF THE UNIVERSITY CORPORATION FOR ATMOSPHERIC RESEARCH (UCAR)

On behalf of the University Corporation for Atmospheric Research (UCAR) and the university community involved in weather and climate research and related education, training and support activities, I submit this written testimony for the record of the Senate Committee on Appropriations, Subcommittee on Energy and Water Development. We urge you to fund the DOE Office of Science at the requested level of \$4.7 billion or higher as authorized by the America COMPETES Act.

UCAR is a 71-university member consortium that manages and operates the National Center for Atmospheric Research (NCAR) and additional programs that support and extend the country's scientific research and education capabilities. In addition to its member research universities, UCAR has formal relationships with approximately 100 additional undergraduate and graduate schools including several historically black and minority-serving institutions, and over 50 international universities and laboratories. UCAR's principal support is from the National Science Foundation with additional support from other Federal agencies including the Department of Energy (DOE).

DOE OFFICE OF SCIENCE

The atmospheric and related sciences community is concerned about the final outcome for basic research in many areas of the fiscal year 2008 Consolidated Appropriations Act, including the DOE Office of Science. We do understand that appropriators were faced with extremely difficult funding choices, but the negative consequences of not investing now in science that contributes to our economy, standard of living, and safety and security, will only multiply in the future as this country's global competitors invest on a broader scale than ever before. We appreciate your support for last year's America COMPETES Act and urge you to reinstate the doubling track for the Office of Science with the fiscal year 2009 budget, and/or with a supplement to the fiscal year 2008 budget.

There will surely be immense budget pressures facing you again in your deliberations this year, but we ask that you focus on science as a national priority. We urge you to fund the DOE Office of Science at the requested level of \$4.7 billion or higher as authorized by the America COMPETES Act, ask that you make the Office a national priority when difficult choices have to be made at the end of the budget process, and that you enable the agency to apply the entire appropriation toward planned agency research priorities.

Biological and Environmental Research (BER)

Within the Office of Science, the Biological and Environmental Research (BER) program has as a key goal, the development of knowledge necessary to identify, understand, and anticipate the potential health and environmental consequences of energy production and use. These are goals that are essential to our country's well being and security. Peer-reviewed research programs at universities, national laboratories, and private institutions play a critical role in the BER program by involving the best researchers the Nation has to offer, and by developing the next generation of researchers. All BER research projects, other than those that have been in the "extra projects" category, undergo regular peer review and evaluation.

I urge the subcommittee to fund Biological and Environmental Research at the level of the fiscal year 2009 budget request, \$568.9, a 4 percent increase over the fiscal year 2008 level, and to enable BER to apply that entire amount toward planned agency research priorities that are peer-reviewed and that involve the best

researchers to be found within the Nation's university research community as well as the DOE labs.

BER's Climate Change Research Program

Within BER, the Climate Change Research subprogram addresses some of the most critical research priorities facing the world today including developing the ability to predict climate change and its impacts on global and regional scales, exploring the impacts of high levels of CO₂ on the Earth system, and providing the scientific foundation necessary to help mitigate those impacts.

One example of the compelling work being done is a BER contribution to the International Polar Year (IPY) utilizing the Community Climate System Model to simulate eight future emission scenarios. The results projected a decline in sea ice, with one scenario showing the Arctic becoming ice-free in summer at the end of this century—an occurrence that could change sea level, economies, world trade, and political stability. Such advanced modeling activities supported by the BER Climate Change Research are obviously critical to our understanding of the current global climate and areas that are being transformed by rapid change, but they are also critical to our understanding of what a changed world may look like in the very near future.

In 2009, Climate Change Research funded work will continue to focus on resolving the role of clouds and aerosols in climate change and their interaction with solar radiation. While great progress has been made in recent years, this remains one of the greatest scientific uncertainties in climate change prediction. As we learn more about climate change and the anthropogenic influences that are forcing change at an unnatural rate, those results must be made accessible to researchers working to understand the regional and local impacts that climate change will produce. A new Climate Change Research effort is strengthening the connections between the climate modeling research communities and those that address integrated assessment of impacts in addition to exploring adaptation methods. To be of use at regional scales (where details make tremendous differences at local ecosystem levels where we all live), models must be resolved at ever higher resolutions to project local impacts with any reasonable certainty. Running models at these resolutions presents complex problems of data retrieval, archiving, analysis, and dissemination for which BER is developing the tools and capabilities necessary.

The Climate Change Research goal to deliver improved regional climate data and models is critical to the ability of policy makers and stakeholders to provide stewardship resulting in a healthy planet—and it is particularly important as signs of increasingly dramatic change in our climate and environment continue to appear.

The Climate Change Research Request of \$154.9 million for fiscal year 2009 is a 13.2 percent increase over fiscal year 2008 which will make up some of the ground lost in previous years. Within this amount, Climate Change Modeling receives \$45.4 million—a critical 46 percent increase over fiscal year 2008. These additional resources are absolutely necessary for the work that must be accelerated at the regional level. I urge the subcommittee to fund Climate Change Research at the fiscal year 2009 requested level of \$154.9 million, and to enable DOE to apply the entire amount toward planned national research priorities.

Advanced Scientific Computing Research (ASCR)

Within DOE's Office of Science, Advanced Scientific Computing Research (ASCR) delivers leading edge computational and networking capabilities to scientists nationwide, enabling advances in computer science and the development of specialized software tools that are necessary to research the major scientific questions being addressed by the Office of Science. Development of this capacity is a key component of DOE's strategy to succeed in its science, energy, environmental quality, and national security missions.

ASCR's continued progress is of particular importance to atmospheric scientists involved with complex climate model development, research that takes enormous amounts of computing power to address the interaction of the earth's systems and global climate change. ASCR is one of the most important resources supporting climate work in this country.

Within ASCR, several programs are of particular importance to climate change computer modeling work, particularly through the development of complex software. The Leadership Computing Facility (LCF) at Oak Ridge National Laboratory (ORNL) provides a high performance computing resource and, in 2009, will continue the development of its world class facility with over 80 percent of its resources being made available to unclassified scientific research. In addition, the National Energy Research Scientific Computing Center (NERSC) operated by Lawrence Berkeley National Laboratory, and the Energy Sciences Network (ESnet) are also important

enablers for climate research, as is Argonne National Laboratory (ALCF) which is strengthening its infrastructure to prepare for future computing capacity. These computational and networking resources play a vital role in the progress of U.S. climate research.

The high performance computing facilities for the Office of Science serve thousands of scientists throughout the country at laboratories, universities, and other Federal agencies. Computing time is awarded to research groups based on peer review of submitted proposals. Basic research accomplished at these facilities covers a wide range of disciplines including climate modeling. ESnet enables researchers at laboratories, universities and other institutions to communicate with each other using collaborative capabilities that are unparalleled. This high-speed network enables geographically distributed research teams to collaborate effectively on some of the world's most complex problems. Researchers from industry, academia and national labs, through this program, share access to unique DOE research facilities, support the frequent interactions needed to address complex problems, and speed up discovery and innovation.

LCF, NERSC, and ESnet play complementary roles in advancing the complex and challenging science of climate change and other scientific areas of extreme importance to the security and quality of life of our citizens. I urge the subcommittee to support the President's fiscal year 2009 request of \$368.82 million for DOE Advanced Scientific Computing Research, a 5 percent increase over fiscal year 2008, and to enable DOE to apply the entire amount toward planned national priorities.

Scientific Discovery Through Advanced Computing (SciDAC)

BER and ASCR (through its Computational Partnerships program) partner to support Scientific Discovery Through Advanced Computing (SciDAC), a progressive program that provides the innovations in computational research and development for petascale computational and data management endeavors, including climate research. Along with very broad scientific applications, a current SciDAC goal is to break through the uncertainty still challenging researchers concerning the role of clouds and aerosols in climate change. Additional SciDAC investments address the role of land-ice in the climate system, improved representation of ice sheets in global circulation models, and understanding of climate extremes in a changing climate. Much of the research is designed to provide global community access to the data for impact studies as well as national and international assessments (e.g., the Intergovernmental Panel on Climate Change) concerning the consequences of global warming. This work is becoming increasingly critical as evidence mounts that regions of Earth are warming at an alarming rate. SciDAC research activities are competed through a merit review process and carried out via a synthesis of talent drawn from universities, national laboratories, and private institutions.

BER funding for SciDAC is requested at \$7.7 million for fiscal year 2009 with ACSR supporting SciDAC Computational Partnerships at \$52.0 million. I urge the subcommittee to support the President's fiscal year 2008 requests within BER and ASCR for overall SciDAC funding.

PREPARED STATEMENT OF RTI INTERNATIONAL

I am writing in support of the following subprogram in the fiscal year 2009 Energy and Water appropriations measure: Department of Energy—Fossil Energy Research and Development: Coal, Fuels and Power Systems, Advanced Integrated Gasification Combined Cycle.

I respectfully request that the President's \$69 million request for the Advanced Integrated Gasification Combined Cycle subprogram be fully funded.

Congress and the administration have highlighted energy as critical to America's economic future and national security. It is all too clear that the United States requires cost-effective technologies for clean use of coal to generate electricity and fuel vehicles, to save jobs, and enable domestic growth in critical industries such as chemicals, fertilizer, pulp and paper, metals, and glass.

Funded by Congress, the Advanced Integrated Gasification Combined Cycle subprogram has a historic opportunity to enable such benefits to be achieved in a manner that is environmentally responsible.

DOE's plans for 2009 include scaling up a new technology that greatly reduces the cost and improves the performance of a crucial step in any clean use of coal: cleaning the synthetic gas—"syngas"—that is made from coal. In every opportunity for clean use of coal, the first steps are to make and then clean the syngas. The new technology, called "warm-gas clean-up," has lower capital and operating costs than existing technologies, and does a better job of removing pollutants. This tech-

nology meets or exceeds requirements in the Energy Policy Act of 2005 for reduced sulfur and mercury emissions, contributes to meeting the EPACT's requirements for efficiency, and enhances the opportunity for carbon capture. Furthermore, this technology provides 10 percent greater efficiency compared with current technologies for generating electricity from coal, which causes a 10 percent reduction in carbon dioxide emissions without additional costs or equipment.

The administration has included sufficient funds for DOE's plans to scale up this syngas-cleaning technology. DOE's plans are well-timed, because there is substantial industry interest in scaling up the technology.

Time is of the essence to lower the costs of gasification. Worldwide, electric utilities, chemical companies, and other industries are making decisions today about how they will use coal in the near future. Better technology at lower costs will enable expanded use of gasification, with all of its environmental benefits, instead of conventional approaches. For example, gasification for generating electricity emits less carbon dioxide than conventional power plants. Warm-gas clean-up prevents acid-forming pollutants without the solid waste and carbon dioxide problems that come with scrubbing sulfur from power plants' emissions. Further, warm-gas clean-up enables a cleaner syngas, which means cleaner exhaust gas from the electric generating turbine at greater thermal efficiency. That in turn yields benefits such as significantly reduced cost to capture carbon (and the EPA already notes that carbon capture will be much less costly with gasification than with conventional power plants).

To realize the environmental and economic benefits of gasification, DOE must have sufficient funds to implement the bipartisan intent of Congress expressed in the Energy Policy Act of 2005.

I recognize the constraints by which the subcommittee is bound. I appreciate your consideration of my request that the Advanced Integrated Gasification Combined Cycle subprogram in DOE's Fossil Energy Research and Development be funded at or above the President's \$69 million request for fiscal year 2009.

If you have any questions or require additional information, please feel free to contact me. I look forward to working with you as the fiscal year 2009 Energy and Water appropriations bill takes shape.

PREPARED STATEMENT OF FLORIDA STATE UNIVERSITY

Florida State University is seeking \$4,000,000 from the U.S. Department of Energy (Electricity Transmission and Distribution) for our Electric Power Infrastructure, Security R&D Program.

Mr. Chairman, I would like to thank you and the members of the subcommittee for this opportunity to present testimony before this subcommittee. I would like to take a moment to briefly acquaint you with Florida State University.

Located in Tallahassee, Florida's capitol, FSU is a comprehensive Research university with a rapidly growing research base. The University serves as a center for advanced graduate and professional studies, exemplary research, and top-quality undergraduate programs. Faculty members at FSU maintain a strong commitment to quality in teaching, to performance of research and creative activities, and have a strong commitment to public service. Among the current or former faculty are numerous recipients of national and international honors including Nobel laureates, Pulitzer Prize winners, and several members of the National Academy of Science. Our scientists and engineers do excellent research, have strong interdisciplinary interests, and often work closely with industrial partners in the commercialization of the results of their research. Florida State University had over \$190 million this past year in sponsored research awards.

Florida State University attracts students from every State in the Nation and more than 100 foreign countries. The University is committed to high admission standards that ensure quality in its student body, which currently includes National Merit and National Achievement Scholars, as well as students with superior creative talent. Since 2005, FSU students have won more than 30 nationally competitive scholarships and fellowships including 2 Rhodes Scholarships, 2 Truman Scholarships, Goldwater, Jack Kent Cooke and 18 Fulbright Fellowships.

At Florida State University, we are very proud of our successes as well as our emerging reputation as one of the Nation's top public research universities.

Mr. Chairman, let me summarize our primary interest today.

The electric power system is critical as a fundamental enabling infrastructure for every aspect of the economy, national security, and defense. Large-scale failures in the electrical grid systems of North America and Europe have made us aware of the critical nature of our dependence on the availability of electrical power. A contrib-

uting factor to these failures was a lack of detailed understanding of the system response to an initial minor disturbance. Lack of investment in power systems grids over the last 20–30 years has eroded the redundancy traditionally built into the system. Over time, this lack of investment in R&D resulted in the loss of many power engineering educational programs. The Nation is now facing an acute shortage of power engineers.

This multi-university project will build on existing expertise at FSU, other Florida universities, and several of DOE's National Laboratories. The research conducted will focus on critical issues associated with modernizing the U.S. electric grid to improve reliability, security, and efficiency and to support new technologies. Much of the research will include industrial partners, thereby ensuring rapid technology transfer from research-to-practice. These activities include:

- Employing the real time digital simulator capability at FSU to simulate real-time behavior of regional and local power systems and interconnections and to examine areas of vulnerability to major outages and cascading failures. We plan that this will become a national user facility with remote access capability over high-speed connections.
 - Use of the real-time digital simulator through comparisons of concurrent real time modeling and an actual system to assess new technologies.
 - Investigation into technology needs for enabling wide area measurement, communications, and control advances for improved coordination over large areas.
 - Advanced materials R&D for superconductivity applications in power systems.
- Through coordinated efforts across multiple universities, FSU will lead the initiative to address future needs to assure reliable energy. We are seeking \$4,000,000 in fiscal year 2009 for this important project.

PREPARED STATEMENT OF THE GROUND WATER PROTECTION COUNCIL

Honorable Chairman Dorgan and members of the subcommittee, the following request by the Ground Water Protection Council (GWPC) is for continued funding in fiscal year 2009, of the U.S. Dept of Energy's Oil Technologies-Effective Environmental Protection: Risked Based Data Management (RBDMS) and Cost Effective Regulatory Approaches (CERA) programs. The request for fiscal year 2009 is at the fiscal year 2008 enacted level of \$1.2 million (RBDMS) and \$500,000 (Energy Efficiency).

—*RBDMS ACCOMPLISHMENTS.*—Data utilities from the Risk Based Data Management System are installed and under use in 25 States and 1 Indian Nation. The use of RBDMS streamlines State oil and gas permit and response times, enhances ground water protection, provides improved public and industry joint access to data and records, saves money for State and Federal agencies, reduces paper reporting, increases production for small independent domestic operators, and creates real time efficiencies in State and Federal domestic oil and gas programs. Over the life of this successful program, the States have matched Federal funding with their own funds at a 3:1 ratio. If state in-kind contributions are added, the State-to-Federal participation ratio increases substantially. This has been, and continues to be, a sound investment of Federal funds.

Fiscal year 2009 funding would provide:

—*E-Commerce.*—The development of new RBDMS e-commerce applications in fiscal year 2009 will increase environmental monitoring and compliance and at the same time decrease both cost and time allocation for small oil and gas producers. The result is money saved by State governments, Federal agencies and increased domestic oil and gas production.

—*Cost Effective Regulatory Approaches.*—The GWPC will focus on three cost effective priorities: (1) reducing the costs of information exchange between the oil and gas and mining industries and regulatory agencies, (2) eliminating duplicative reporting requirements across State and Federal jurisdictions, while (3) providing the reference data needed to make informed decisions about environmental protection and resource development.

—*Energy-Water Sustainability.*—The USDOE has a goal of minimizing water consumption by energy producing industries. The GWPC will develop applications that will aid State agencies in tracking water quality and quantity data related to oil and gas production. This will assist States in the analysis of related water consumption. Public education efforts through our Ground Water Report to the Nation series will emphasize ground water availability facts and realistic short and long term conservation efforts that can be made locally.

—*CO₂ Geo-Sequestration.*—Capture of CO₂ from power plants is one potential tool for decreasing the release of this gas to the atmosphere. However, storage or sequestration of its liquid form in geologic formations must be done with protection of underground sources of drinking water in mind. The GWPC will continue to work in cooperation with State and Federal agencies to apply sound science in the development of effective regulations, policy and technical guidance, with a focus on protecting the Nation's invaluable ground water resources. With additional funds we would be able to develop a geo-sequestration volume information tracking system.

THE GWPC.—GWPC is a respected national organization of State ground water, UIC, and oil and gas regulatory agencies with a successful track record of providing solutions to ground water protection related issues that are environmentally protective, scientifically based, cost effective and publicly accepted. We are the proud recipient of the Secretary of Energy's "Energy 100 Award"—given to the top 100 successful and publicly beneficial projects (RBDMS) in the last 30 years of USDOE. We hope the subcommittee will continue to support these efforts in fiscal year 2009 at the fiscal year 2008 level of \$1.2 million (RBDMS) and \$500,000 (Energy Efficiency).

We are grateful for your past support and would like to also request that the subcommittee continue to support the USDOE Office of Fossil Energy, and the National Energy Technology Lab (NETL). Without their national presence not only our successes, but those of many others would not have been accomplished. The programs they administer serve a valuable purpose and are important to the long term efficiency of the front line State and Federal agencies and the small domestic operators who would not otherwise have been able to extend the life of domestic reservoirs and increase environmental and ground water protection at the same time.

PREPARED STATEMENT OF THE NATIONAL HYDROPOWER ASSOCIATION

The National Hydropower Association (NHA)¹ appreciates the opportunity to submit this statement regarding hydropower funding priorities for the fiscal year 2009 appropriations budget cycle. NHA requests \$54 million in fiscal year 2009 Energy & Water Appropriations for the Department of Energy's Waterpower Program.

HYDROPOWER'S CURRENT AND FUTURE POTENTIAL AS THE NATION'S MOST ROBUST, RENEWABLE ENERGY RESOURCE

Congress is currently examining the implications of climate change on the environment, economy, and energy security of the United States. Crucial to the climate debate is the need for policymakers to work together to promote the development, deployment and expanded use of existing renewable resources, as well as innovative new technologies, that can play a significant role in addressing climate issues while maintaining a reliable and affordable electricity supply system. Hydropower of today and new water power technologies of tomorrow can provide significant benefits to these national energy and environmental goals.

Currently, hydropower provides sizeable benefits. As the leading renewable energy resource in the country, it accounts for 7 percent of all of the Nation's electricity in terms of actual generation and approximately 9 percent in terms of actual capacity. Overall, hydropower accounts for 77 percent of actual renewable electricity generation and 83 percent of the Nation's renewable energy capacity.

As an important source of electricity, hydropower offers advantages over other generation options. Importantly, hydroelectric units are able to start, stop, and change output quickly, which provides important grid stability and reliability benefits. As such, hydro has the ability to firm intermittent resources such as wind and solar, a benefit which becomes all the more important as the Nation moves to incorporate more renewables in its energy portfolio. Finally, hydropower's non-power benefits include water supply, flood control, irrigation, navigation and recreation.

Hydropower's potential contribution is notable—from efficiency improvements and capacity upgrades at existing projects, to new development at existing non-powered dams, to significant new capacity gains from emerging waterpower technologies, such as ocean, tidal and instream hydrokinetic projects. According to a March 2007 Electric Power Research Institute (EPRI) report titled, "Assessment of Waterpower Potential and Development Needs," the potential for increases in capacity, mostly without the need to build dams, is conservatively estimated at 23,000 MW by 2025,

¹NHA is a non-profit, national trade association dedicated to promoting the Nation's largest renewable resource and advancing the interests of the hydropower and new ocean, tidal and instream hydrokinetic industries and the consumers they serve.

with an overall estimate of 85,000 to 95,000 MWs with appropriate public policy support. This includes:

- 2,300 MW capacity gains at existing conventional hydropower facilities;
- 5,000 MW of new conventional hydropower at existing non-powered dams;
- 2,700 MW of new small and low head power conventional hydropower (<30 MW installed capacity);
- 10,000 MW from ocean wave energy technologies; and
- 3,000 MW from hydrokinetic technologies (river-based).

Realization of these capacity gains will require continued and increased research, development, demonstration and deployment (RDD&D) support and other economic incentives as well as planning, testing and impact evaluation assistance. As stipulated in EAct 2005, the Secretary of Energy is required to conduct R&D for conventional and new waterpower technologies.²

NHA'S STATEMENT REQUESTS FULL FUNDING OF THE SUITE OF INITIATIVES IDENTIFIED IN THE EPRI REPORT UNDER THE DEPARTMENT OF ENERGY'S NEW WATERPOWER R&D PROGRAM AT A LEVEL OF \$54 MILLION PER FISCAL YEAR

Waterpower Technology Development Needs

Through direct contact with NHA members, which include hydropower owners and operators, ocean, tidal and instream hydrokinetic technology developers, and the analysts and experts cited in the EPRI report, NHA analyzed the report's suite of development recommendations and concluded that the EPRI report provides a useful model, a roadmap from which to guide activities under the DOE Waterpower R&D program. As such, this statement highlights and summarizes the various R&D initiatives outlined in the report. These directives are intended to address the needs left unfunded by the previous RDD&D program for hydropower and would expand the Department's efforts.

Waterpower Realization Committee.—To provide the initial guidance and future oversight to benchmark results of the RDD&D program in terms of real waterpower capacity and generation gains. This committee, made up of representatives from industry, government resource agencies and non-governmental organizations would guide RDD&D efforts and monitor progress to ensure the realization of the capacity gains. The committee would measure on an annual basis the capacity gains from the various initiatives and make recommendations for refinement of the program, as necessary.

Waterpower Performance Initiatives.—The suite of activities and programs available to meet the goals of the program are outlined below.

Advanced Water Energy Science

Statement of Need.—The industry has identified the need for advanced scientific techniques to support the following activities:

—Advance Water Energy Science

- Work that would support the industry's need to better predict flow measurement. Accurate flow values are needed for a variety of operation and environmental performance topics.
- Modeling work to improve hydraulic modeling techniques.
- Turbine research in order to develop better materials resistant to cavitation and erosion damage.
- Generator research in order to discover materials suitable for use as stator core; build one prototype stator core; and study it over a period of time.

—Meteorological Forecasting and Optimal Dispatch of Energy/Water Systems.—Work in this area will examine and determine the benefits of integrating wind and other intermittent renewable energy resources with hydropower and pumped storage resources. Specific work could include:

- Near-term forecasting of meteorological conditions will help identify needs for improving meteorological data and instrumentation.
- Long-term projections of global climate change and effects of other cycles and other factors on regional meteorological conditions and future regional electricity and water demand, energy and electricity supply mix, and fuel costs.

²EAct 2005, title IX, sec. 931—"Conduct a program of research, development, demonstration and commercial application for cost competitive technologies that enable the development of new and incremental hydropower capacity, adding diversity of the energy supply of the United States, including: (i) Fish-friendly large turbines. (ii) Advanced technologies to enhance environmental performance and yield greater energy efficiencies. (. . .) The Secretary shall conduct research, development, demonstration, and commercial application programs for—(i) ocean energy, including wave energy (. . .) and (iv) kinetic hydro turbines."

- Research into the integration of meteorological information and load, energy price, and other forecasts with energy and water system operations.
- Integration and Control of Renewable Energy Technologies.*—Greater opportunities to adopt renewable energy technologies and their integration with water resources can be realized if research is provided to develop advanced integration and control mechanisms. Funding could be directed to the development and demonstration of hybrid control systems to include real time pricing, resource optimization and optimal economic value methodologies.

Hydropower Environmental Performance

- Statement of Need.*—The following objectives will improve hydropower performance by maximizing hydroelectric generation and protecting fisheries resources.
- Complete RDD&D for Fish-Friendly Turbines.*—Continued work on fish-friendly turbine development offers the opportunity to address energy and environmental impacts and needs. Activities under this category include:
 - Continue prototype Alden/Concepts NREC turbine development in preparation for commercialization. Additional fish survival testing.
 - Continue testing of the advanced turbines at Wanapum dam.
 - Perform power efficiency testing, and
 - Deploy and evaluate the Alden/Concepts NREC design at School Street Project, NY or other location.
 - Bioengineering for Fish Passage and Entrainment Mitigation.*—Technologies are needed to solve the problem of fish mortality involving hydropower structures. Continued work activities include:
 - Basic research on the effect of hydraulic process on fish movement.
 - Utilize biocriteria in the development of new turbine and fish passage designs.
 - Conduct demonstrations of new technology to determine effectiveness in real-world applications.
 - Water Quality Mitigation Technology.*—New and more cost-effective and less water intensive solutions are needed to address dissolved oxygen and water temperature issues involving water quality. Research is needed to:
 - Review state of the art techniques for addressing these issues.
 - Develop new technologies and target test sites for testing.
 - Conduct cost-shared demonstrations of new technologies.
 - Advanced Weirs for Flow Re-regulation and Aeration.*—More work is needed to optimize the design of weirs and demonstrate how they can be used to improve the efficiency of existing projects. Research activities could include hydraulic design studies, coupled with model tests and prototype demonstrations.

Hydropower Operational Performance

- Statement of Need.*—Improved forecast models and the implementation of advanced technologies can play a crucial role in enhancing the operational performance of hydropower facilities. The following objectives will improve operations at facilities.
- Hydropower Operation Decision Support Analysis.*—Need to understand various hydropower generation sensitivities to various processes. Research activities could include:
 - Determination of sources of hydropower generating variability across spatial and temporal scales.
 - Develop improved climate/meteorological stream flow forecast models.
 - Incorporate understanding and forecast models into optimization and decision support models.
 - Demonstrate benefits of using improved decisions support models.
 - Demonstration Testing of the Advanced Hydropower Turbine System (AHTS) to Increase Use of Efficient Designs.*—Demonstration activities will help potential users understand and overcome potential risks of using new technologies.
 - Advanced Electrical Equipment for Renewable Integration.*—More research into these technologies would increase efficiency and reliability by providing ancillary services to the electric grid.
 - Waterpower Technology Development.*—This part of the program would use funds to advance hydrokinetic and ocean energy technology in four program areas:

Hydrokinetic Resource Assessment

- Statement of Need.*—New generation technologies are on the threshold of implementation, but require additional site assessment and a mapping program to outline the criteria for development. A complete resource assessment and criteria protocol for hydrokinetic sites in the United States is required and should be available to

potential developers, similar to the resource assessment for small hydropower completed by DOE.

Hydrokinetic Environmental Profiling

Statement of Need.—Advanced technologies on the threshold of implementation often are stalled because prospective users cannot justify implementation risks and lack of knowledge among developers regarding the environmental and institutional barriers. Research to develop minimum time environmental data collection and analysis techniques for use in site evaluation of hydrokinetic machines is needed. This research would standardize monitoring techniques for evaluating the environmental impacts of hydrokinetic technologies and help expedite the deployment of these technologies.

Hydrokinetic Technology Improvement

Statement of Need.—Instream kinetic, tidal/wave energy and kinetic hydropower and pressure systems for manmade conduit systems all require test support and demonstration funding to support development, deployment and realization of their potential. Research is needed to determine proof of concepts with single prototype units and demonstrate operational viability and environmental effects with pre-commercial multiple unit projects. Support is also needed to identify universities, labs, and other entities where proof of concepts and operational tests can be conducted and environmental effects assessed.

Advanced Ocean Energy

Statement of Need.—Federal funding of ocean energy RDD&D and required regulatory activities would enable the United States to develop new domestic energy supplies, create jobs and capture an emerging global export market. Research is needed to develop an ocean wave energy technology industry to commercial deployment level including research into marine resources and converters; energy conversion, delivery and storage; environmental and cost monitoring; and field deployment.

CONCLUSION

Hydropower is already a major source of energy for the Nation. The nascent ocean, tidal and instream hydrokinetic technologies are at the beginning stages of commercial deployment. Yet both technologies have a tremendous growth potential that could be realized through sustained Federal RDD&D support. These renewable resources are clean, climate-friendly technologies that can provide significant base load power to the United States at a time when our demand for electricity continues to increase dramatically. By expanding the funding for the DOE Waterpower R&D program, the Nation could soon realize the tremendous energy and environmental benefits of maximizing existing hydropower projects and infrastructure as well as the suite of emerging waterpower technologies.

PREPARED STATEMENT OF THE HEALTH PHYSICS SOCIETY

This written testimony for the record for fiscal year 2009 requests reinstatement of funding for the Nuclear Education program appropriated to the Nuclear Regulatory Commission (NRC) in fiscal year 2008 to include at least \$1.5 million for support of health physics programs, students, and faculty. This support is necessary to address the shortage of health physicists, which is an issue of extreme importance to the safety of our Nation's workers, members of the public, and our environment. As explained below, justification by the Office of Management and Budget (OMB) to rescind the NRC Nuclear Education program is not applicable to the health physics academic programs.

Health Physics is the profession that specializes in radiation safety, which is necessary for the safe and successful operation of the Nation's energy, healthcare, homeland security, defense, and environmental protection programs. Although radiation safety is fundamental to each of these vital national programs, there is no single Federal agency that serves as a home and champion for the health physics profession as this profession cuts across all these sectors. However, health physics is necessary for all these sectors to exist as it supports the principle disciplines in these programs that are championed by multiple Federal agencies, such as engineers, medical professionals, law enforcement professionals, military personnel, and environmental scientists.

As the Nation's development and use of radioactive materials grew following the end of World War II, the Nation's demand for health physicists increased in the areas of energy, defense, public health, and environmental protection. This need was mainly supported by student fellowships and scholarships from the Atomic Energy

Agency (energy and defense) and Public Health Service (public health and environmental protection). However, over the years agencies and their missions changed, the nuclear power industry faltered and the Department of Energy (DOE) nuclear weapons complex downsized following the end of the cold war. This resulted in the academic program support from Federal agencies dwindling until the last remaining support from DOE was terminated in fiscal year 1999. With this dwindling support, the supply of new health physicists declined and the age of the existing health physics workforce increased despite the continued need for health physicists in energy, defense, public health, and environmental protection programs as well as an exponential growth in the medical and academic community. Due to these circumstances a human capital crisis was created in health physics.

As the health physics human capital crisis grew and loomed in the early years of the 21st century, Congress and the DOE took action to add support to the nuclear engineering academic programs through DOE programs in the Office of Nuclear Energy (NE) and eventually agreed that this was an appropriate support mechanism for the health physics academic program. In fiscal year 2005, just 4 years ago, Congress appropriated money to DOE-NE for a health physics fellowship and scholarship program as part of the University Reactor Fuel Assistance and Support budget item. Shortly thereafter, Congress reinforced its position that DOE needed to support the health physics academic programs in provisions of section 954 of the Energy Policy Act of 2005. Despite the fact that the need for an increased supply of health physics professionals continued to exist, the DOE ceased funding the Congressionally authorized DOE-NE health physics fellowship and scholarship program after only 2 fiscal years of funding the programs at minimal levels.

In fiscal year 2008, Congress transferred appropriations for a Nuclear Education program, including health physics programs, to the NRC. The Health Physics Society (HPS) applauds this insightful action. The NRC does have a vested interest in the radiation safety associated with most of the sectors covered by the health physics profession. Although the NRC quickly addressed the demands of starting a new education support program by opening two grant opportunities for student and faculty support, the administration has not included continuation of the program in their budget for fiscal year 2009.

The OMB has provided a justification for rescission of the Nuclear Education program. This OMB assessment is patently wrong with regards to health physics programs.

The OMB states “. . . target levels for the undergraduate enrollment have been met . . .” and “Since the 1990s, enrollment levels in nuclear education programs have tripled . . .”

Specific to “target levels,” since DOE has only funded health physics programs for 2 years, they have never established “target levels” for health physics program enrollments nor has there been time to assess the effect of those 2 years of funding on health physics program enrollments. The DOE-NE HP fellowship and scholarship program thus far has provided three graduate fellowships in fiscal year 2006 and zero undergraduate scholarships. In 2004, the HPPDO developed a plan for revitalizing the academic programs to a level that could meet the projected shortfall of health physicists. The Health Physics Program Directors Organization (HPPDO) plan calls for an initial target of 20 graduate fellowships and 20 undergraduate scholarships, i.e., target levels well above the actual performance of the Nuclear Education Programs.

In addition, the HPS does not feel that undergraduate levels are an appropriate metric to measure the success of an academic program. Undergraduate levels are not viewed significant by university Deans looking to justify graduate programs at the Masters and Doctorate level. Furthermore, university administrators will not commit to replacing an increasingly large number of retiring health physics faculty unless the Federal Government demonstrates its commitment to investing in the research and academic health physics infrastructure necessary to support new faculty hires in this vital profession.

The OMB justification also states “. . . and the number of universities offering nuclear-related programs also has increased.” Actually, the number of health physics programs graduating at least 5 students annually decreased from 20 programs in 1995 to less than half that number in 2005, which belies the OMB statement.

We find the OMB justification ignores the value of Federal long-term investment in academic infrastructure and ignores the value of professional radiation safety professionals to the successful protection of workers, members of the public, and the environment while benefiting from the use of nuclear technologies.

We consider it would take approximately \$1,000,000 to get to the HPPDO plan of 20 fellowships and 20 scholarships in health physics. In addition, funding of \$500,000 should allow for up to two young faculty members in health physics aca-

demic programs to receive grant support at the level offered by the NRC fiscal year 2008 grant opportunities. Considering the DOE budgets for the HP Fellowship and Scholarship programs for fiscal year 2005 and fiscal year 2006 combined have totaled \$500,000 and only produced 3 fellowships, we feel this request is very modest while we recognize it will not begin to provide the long term support that will eventually be required if we are to have enough safety professionals for our energy, healthcare, homeland security, defense, and environmental protection programs. However, it will go a long way to help building the student and faculty infrastructure needed to reach this goal.

The subcommittee's favorable consideration of this request will help meet our Nation's radiation safety needs of the future.

PREPARED STATEMENT OF THE GAS TURBINE ASSOCIATION

The Gas Turbine Association (GTA) appreciates the opportunity to provide the United States Senate Committee on Appropriations Subcommittee on Energy and Water Development with our industry's statement regarding fiscal year 2009 Department of Energy (DOE) Office of Fossil Energy (FE) Advanced Turbines R&D at \$55 million and Energy Efficiency and Renewable Energy (EERE) Industrial Technologies Program (ITP) Distributed Energy at \$60 million funding levels.

From Connecticut to California, States are working to put in place regulations to dramatically reduce greenhouse gas emissions. At the same time, our economy will be demanding more electric power to maintain its growth. Without new technology, the power generation industry will be hard pressed to produce additional electric capacity, while at the same time meet the strict greenhouse gas emissions standards being set by States and the Federal Government.

Federal investment in research and technology development for advanced gas turbines that are more versatile, cleaner, and have the ability to burn hydrogen-bearing reduced carbon synthetic fuels and carbon-neutral alternative fuels is needed to ensure the reliable supply of electricity in the next several decades. Domestic coal based Integrated Gasification Combined Cycle (IGCC) with carbon capture and sequestration is one such approach that would significantly supplement available supplies of domestic natural gas to guarantee an adequate supply of clean and affordable electric power. Alternative fuel choices range from imported LNG, coal bed methane, and coal-derived synthetic or process gas to biogas, waste-derived gases and hydrogen. Research is needed to improve the efficiency, reduce capital and operating costs, and reduce emissions.

\$55 MILLION FOR DOE FE ADVANCED TURBINES

\$60 MILLION FOR DOE EERE ITP DISTRIBUTED ENERGY

Supporting these programs provides the following benefits:

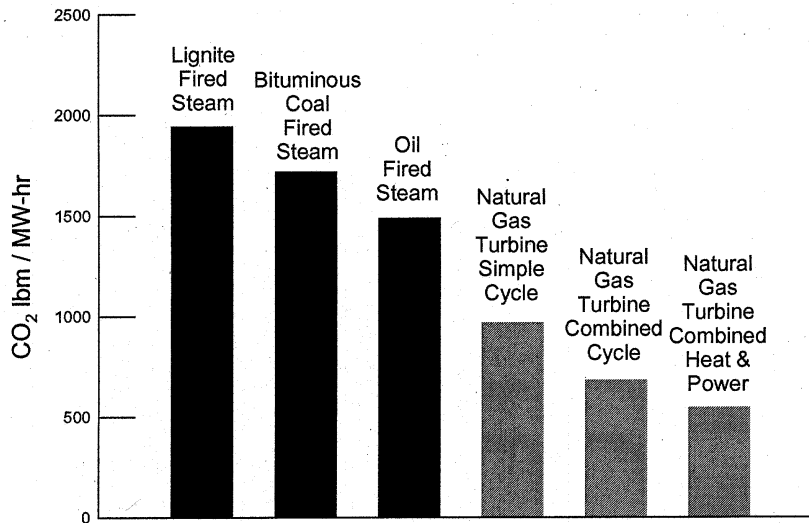
- Efficient and reliable turbine technologies for alternative fuel, near-zero-emission power plants
- Energy security by utilizing domestic energy sources to reduce the demand for foreign energy imports
- Globally competitive electricity prices for U.S. industries, businesses and homes, with reduced greenhouse gas emissions from power plants

Because policy makers have begun implementing rigid CO₂ regulatory mandates, failure to invest now will translate into stifled economic growth and the loss of our global competitiveness later. The Advanced Turbines program needs \$55 million and the Distributed Energy budget needs to be restored to \$60 million in fiscal year 2009 to ensure a smooth transition into a low-carbon economy.

GAS TURBINES REDUCE GREENHOUSE GAS EMISSIONS

The gas turbine industry's R&D partnership with the Federal Government has steadily increased power plant efficiency to the point where natural gas fired turbines can reach combined cycle efficiencies of 60 percent, and quick-start simple cycle peaking units can reach 46 percent. The gas turbine's clean exhaust can be used to create hot water, steam, or even chilled water. In such combined heat and power applications, overall system efficiency levels can reach 60 to 85 percent LHV. This compares to 40–45 percent for even the most advanced thermal steam cycles (most of which are coal fired).

CO₂ Emissions



Gas turbines already play a very significant role in minimizing greenhouse gas emissions worldwide. Gas turbines are both more efficient and typically burn lower carbon fuels compared to other types of combustion-based power generation and mechanical drive applications. The Nation needs to reinvigorate the gas turbine/government partnership in order to develop new, low carbon power plant solutions without increasing our reliance on natural gas. This can be done by funding research to make gas turbines more capable to utilize hydrogen and synthetic fuels as well as increasing the efficiency, durability and emissions capability of natural gas fired turbines. If Congress provides adequate funding to DOE's turbine R&D efforts, technology development and deployment will be accelerated to a pace that will allow the United States to achieve its emissions and energy security goals.

TECHNOLOGIES FOR ADVANCED IGCC/H₂ GAS TURBINE—REDUCING THE PENALTY FOR CO₂ CAPTURE

The turbines and related technologies being developed under the DOE FE Advanced Turbines program will directly advance the performance and capabilities of future power generation with CO₂ capture and sequestration. Advances are needed to offset part of the power plant efficiency and output reductions associated with CO₂ capture. Program funding is required to cost-share in the technology development of advanced hydrogen/syngas combustors and other components to realize the DOE goals.

Several GTA member companies are working cost-share programs with the DOE to develop technologies for advanced gas turbine power plants with carbon capture. These technologies will: (1) increase plant efficiency; (2) increase outputs; and (3) allow further reductions in combustion emissions of hydrogen rich fuels associated with CO₂ capture and sequestration. This will help offset some of the efficiency and output penalties associated with CO₂ capture. These programs are funding technology advancement at a much more rapid rate than industry can do on their own.

The need for increased levels of Federal cost-share funding is immediate. The fiscal year 2009 funding request for the Advanced Turbines program is inadequate to meet DOE's 2010 Advanced Power System goal of an IGCC power system with high efficiency (45–50 percent HHV), near-zero emissions and competitive capital cost. To meet this 2010 goal, the researchers must demonstrate a 2 to 3 percentage point improvement in combined cycle efficiency above current state-of-the-art Combined Cycle turbines in IGCC applications.

The plan for the IGCC-based FutureGen-type application is to develop the flexibility in this same machine with modifications to operate on pure hydrogen as the primary energy source while maintaining the same levels of performance in terms of efficiency and emissions. The goal is to develop the fundamental technologies needed for advanced hydrogen turbines and to integrate this technology with CO₂ separation, capture, and sequestration into a near-zero emission configuration that can provide electricity with less than a 10 percent increase in cost over conventional plants by 2012.

The Advanced Turbines program is also developing oxygen-fired (oxy-fuel) turbines and combustors that are expected to achieve efficiencies in the 44–46 percent range, with near-100 percent CO₂ capture and near-zero NO_x emissions. The development and integrated testing of a new combustor, turbine components, advanced cooling technology, and materials in oxy-fuel combustors and turbines is needed to make these systems commercially viable.

The knowledge and confidence that generating equipment will operate reliably and efficiently on varying fuels is essential for the deployment of new technology. Years of continued under funding of the Advanced Turbines program has already delayed the completion dates for turbine R&D necessary for advanced IGCC, as well as timing for a FutureGen-type plant validation.

MEGA-WATT SCALE TURBINE R&D

In the 2005 Enabling Turbine Technologies for High-Hydrogen Fuels solicitation, the Office of Fossil Energy included a topic area entitled “Development of Highly Efficient Zero Emission Hydrogen Combustion Technology for Mega-Watt Scale Turbines”. Turbine manufacturers and combustion system developers responded favorably to this topic, but DOE funding constraints did not allow any contract awards. The turbine industry recommends a follow-up to this solicitation topic that would allow the developed combustion technology to be tested in machines at full scale conditions and allow for additional combustion technology and combustor development for high-hydrogen fuels.

The turbine industry believes that this technology is highly relevant to industrial coal gasification applications: (1) site-hardened black-start capability for integrated gasification combined cycle applications (the ability to restart an IGCC power plant when the electric grid has collapsed); (2) supplying plant electric load fueled on syngas or hydrogen; (3) increasing plant steam cycle capacity on hot days when large amounts of additional power are needed; and (4) in gas turbines for compression of high-hydrogen fuels for pipeline transportation. The development of MW-scale turbines (1–100 MW) fueled with high-hydrogen fuels will promote the sustainable use of coal. In addition, highly efficient aeroderivative megawatt scale engines operate under different conditions than their larger counterparts and are installed for peaking or distributed generation applications. LNG, syngas and hydrogen combustion are issues for new sites and the legacy fleet. Funding is required to design efficient and low emissions combustors that accommodate the new fuels.

HIGH-EFFICIENCY, ALTERNATIVE-FUELED DISTRIBUTED ENERGY

The administration’s budget request recognizes the need for the development of alternate and dual fueled combined heat and power gas turbines systems. The budget document states “ITP would also pursue the growth opportunity in traditional industry CHP applications below 20 MW, including medium-sized plants that require both power and process heat. Specific activities would include the development of alternative/dual fuel capability for turbines that meet the most stringent NO_x and CO regulations (e.g., those in southern California)”.

However, there are insufficient funds allocated in the request to do any work in this area. The administration’s justification contends “full consideration of the new DG/CHP activity within the context of the fiscal year 2009 request was not possible”. If the United States is serious about transitioning to a low-carbon economy, we must restore the Distributed Energy budget to \$60 million in fiscal year 2009 to allow DOE to fund partnerships to develop ultra-high efficiency alternative and dual fuel CHP systems.

UNIVERSITY TURBINE SYSTEMS RESEARCH (UTSR) PROGRAM

Under the UTSR program, a consortium of 111 U.S. universities located across 42 States conducts fundamental and applied research to resolve critical knowledge gaps identified by the 17 industrial partners that sit on the UTSR program’s Industrial Review Board and by the DOE in support of the IGCC/FutureGen program. The UTSR program has been described as a model for university/government/indus-

try collaboration that is tightly focused on the research needed to support widespread use of syngas and hydrogen fueled gas turbines for power production.

This DOE/industry/university partnership is needed to help power producers cleanly and efficiently produce electric power from gasified coal, biomass and hydrogen, as well as natural gas. The UTSR program is the only federally-funded university-based program in the gas turbine area. The UTSR program's critical research efforts is needed to meet the Advanced Turbine program goals of preparing low-cost, high-efficiency, high-reliability, low-emission gas turbines for electricity production using IGCC-derived fuels. The UTSR program provides critical gas turbine research expertise in the United States and graduates with knowledge and training. Without adequate DOE funding, universities will de-emphasize this area in their own research investments and curriculums and the United States will lose its competitive advantage in this critical industry.

The Advanced Turbines program needs \$55 million and the Distributed Energy budget needs to be restored to \$60 Million in fiscal year 2009 to keep pace with the rapidly approaching Climate Change emissions mandates.

PREPARED STATEMENT OF SNM—ADVANCING MOLECULAR IMAGING AND THERAPY

SNM, formerly known as the Society of Nuclear Medicine, appreciates the opportunity to submit written comments for the record regarding funding in fiscal year 2009 at the Department of Energy (DOE). SNM is an international scientific and professional organization of over 16,000 members dedicated to promoting the science, technology, and practical applications of molecular imaging and therapy.

In fiscal year 2008, Congress restored funding for nuclear medicine research, after the Federal Government abandoned its over 50-year commitment to funding vital nuclear medicine research by eliminating funding in fiscal year 2006 for the research at the Department of Energy (DOE) and making no accommodation to transition nuclear medicine programs to other Government organizations. In past years, nuclear researchers have used Federal funding within DOE to make major accomplishments benefiting millions of patients with heart, cancer, and brain diseases. The loss of Federal funding for nuclear research adversely impacted future innovation in the field. With the restoration of funding last year and the continuation of funding in fiscal year 2009 we will be able to get this research back on track. For that reason, SNM advocates the continuation of funding for fiscal year 2009 at the level of \$17.5 million for the nuclear medicine research program now housed under the Office of Science's Biological Research Life Science Radiochemistry and Instrumentation program¹ in the fiscal year 2009 Energy and Water Appropriations bill.

WHAT IS NUCLEAR MEDICINE?

Nuclear medicine is an established specialty that performs non-invasive molecular imaging procedures to diagnose and treat diseases and to determine the effectiveness of therapeutic treatments—whether surgical, chemical, or radiation. It contributes extensively to the management of patients with cancers of the brain, breast, blood, bone, bone marrow, liver, lungs, pancreas, thyroid, ovaries, and prostate, and serious disorders of the heart, brain, and kidneys, to name a few. In fact, recent advances in the diagnosis of Alzheimer's disease can be attributed to nuclear medicine imaging procedures.

Annually, more than 20 million men, women, and children need noninvasive molecular/nuclear medicine procedures. These safe, cost-effective procedures include positron emission tomography (PET) scans to diagnose and monitor treatment in cancer, cardiac stress tests to analyze heart function, bone scans for orthopedic injuries, and lung scans for blood clots. Patients undergo procedures to diagnose liver and gall bladder functional abnormalities and to diagnose and treat hyperthyroidism and thyroid cancer.

LACK OF FEDERAL FUNDING THREATENS FUTURE INNOVATIONS

The goal of the DOE's nuclear medicine research program is to deliver relevant scientific knowledge that will lead to innovative diagnostic and treatment technologies for human health. The modern era of nuclear medicine is an outgrowth of

¹Previously nuclear medicine research was funded under the DOE's Office of Science, Biological and Environmental Research (BER) program's Medical Applications and Measurement Science. The BER program has been restructured, as directed by Congress, into two separate sub programs—Biological Research and Climate Change Research. Biological Research included activities in Life Sciences which is where this research is now housed. They also renamed it to Radiochemistry and Instrumentation.

the original charge of the Atomic Energy Commission (AEC) to exploit nuclear energy to promote human health. This program supports directed nuclear medicine research through radiopharmaceutical development and molecular nuclear medicine activities to study uses of radionuclides for non-invasive diagnosis and targeted, internal molecular radiotherapy.

Over the years, the DOE nuclear medicine research program has generated advances in the field of molecular/nuclear medicine. For example, DOE funding provided the resources necessary for molecular/nuclear medicine professionals to develop PET scanners to diagnose and monitor treatment in cancer. PET scans offer significant advantages over CT and MRI scans in diagnosing disease and are more effective in identifying whether cancer is present or not, if it has spread, if it is responding to treatment, and if a person is cancer free after treatment. In fact, the DOE has stated that this program supports “research in universities and in the National Laboratories, occupies a critical and unique niche in the field of radiopharmaceutical research. The NIH relies on our basic research to enable them to initiate clinical trials.”

The majority of the advances in molecular/nuclear medicine have been sponsored by the DOE, including:

- Smaller, More Versatile PET Scanners.*—Brookhaven National Laboratory (BNL) has completed a prototype mobile PET scanner, which will record images in the awake animal. The mobile PET will be able to acquire positron-generated images in the absence of anesthesia-induced coma and correct for motion of the animal. The long-term goal is to develop PET instrumentation able to diagnose neuro-psychiatric disorders in children.
- Highest Resolution PET Scanner Developed.*—Scientists at the Lawrence Berkeley National Laboratory (LBNL) have developed the world’s most sensitive PET scanner. The instrument is 10-times more sensitive than a conventional PET scanner and became operational in 2005.
- Imaging Gene Expression in Cancer Cells.*—Images of tumors in whole animals that detect the expression of three cancer genes were accomplished for the first time by investigators at Thomas Jefferson University and the University of Massachusetts Medical Center. This advanced imaging technology will lead to the detection of cancer in humans using cancer cell genetic profiling.
- Modeling Radiation Damage to the Lung.*—Treatment of thyroid disease and lymphomas using radioisotopes can cause disabling lung disease. Investigators at Johns Hopkins University have developed a Monte Carlo model that can be used to determine the probability of lung toxicity and be incorporated into a therapeutic regimen. This model will optimize the dose of radioactivity delivered to cancer cells and avoid untoward effects on the lung.
- New Radiopharmaceuticals with Important Clinical Applications.*—The DOE radiopharmaceutical science program has developed a number of innovative radiotracers at the University of California at Irvine for the early diagnosis of neuro-psychiatric illnesses, including Alzheimer’s disease, schizophrenia, depression, and anxiety disorders.
- Rapid Preparation of Radiopharmaceuticals for Clinical Use.*—The DOE-sponsored program at the University of Tennessee has developed a new method for preparing radiopharmaceuticals by placing a boron-based salt at the position that will be occupied by the radiohalogen. The method has been used to prepare a variety of cancer-imaging agents.

With continued DOE funding, essential molecular/nuclear medicine research will continue at universities, research institutions, national laboratories, and small businesses. Moreover, research with radiochemistry, genomic sciences, and structural biology will be able to usher in a new era of mapping the human brain and using specific radiotracers and instruments, to more precisely diagnose neuro-psychiatric illnesses and cancer.

In addition, to gain the full benefits of nuclear medicine, it is important to ensure that nuclear medicine researchers have a steady supply of radionuclides. One way to accomplish this goal would be to create a National Radionuclide Enhancement Production program at the DOE that would meet the Nation’s medical and homeland security needs.

NAS STUDY RECOMMENDS ENHANCED FEDERAL COMMITMENT TO NUCLEAR MEDICINE
RESEARCH

On September 20, 2007, the National Academy of Sciences (NAS) released a report sponsored by the Department of Energy (DOE) and National Institutes of Health (NIH), entitled *Advancing Nuclear Medicine Through Innovation*. The charge

of the NAS study was to provide findings and recommendations on the state of the science in nuclear medicine.

As one of the important findings, the report highlighted the detrimental loss of Federal commitment to nuclear medicine research, as evidenced by the large cuts in funding for the basic sciences related to nuclear medicine in the DOE Office of Science Office of Biological and Environmental Research (OBER) Medical Applications and Measurement Science (MAMS) program in fiscal years 2006 and 2007.

As a result, says the report, "there is now no short- or long-term programmatic commitment by any agency to funding chemistry, physics, engineering research and associated high-technology infrastructure (accelerators, instrumentation, and imaging physics), which are at the heart of nuclear medicine technology research and development."

There are countless new innovations on the horizon in this area that promise to improve patient care through new therapeutic isotopes to cure disease, earlier diagnosis of Alzheimer's disease and cancer, detection of the effectiveness of cancer therapies, development of the next generation of imaging technologies, and more. However, without ongoing funding for basic nuclear medicine research at DOE Office of Science, these breakthroughs may never materialize.

To enhance Federal commitment, the NAS report recommended that "reinstating support for the DOE-OBER nuclear medicine research program should be considered." Additionally, the report recommends "a national nuclear medicine research program should be coordinated by the DOE and the National Institutes of Health with the former emphasizing the general development of technology and the latter disease-specific applications."

The report also states, "Although the scientific opportunities have never been greater or more exciting, the infrastructure on which future innovations in nuclear medicine depend hangs in the balance. If the promise of the field is to be fulfilled, a federally supported infrastructure for basic and translational research in nuclear medicine should be considered."

We are at a critical juncture in nuclear medicine. In order to capitalize on groundbreaking research that will improve and save lives, Federal support for basic nuclear medicine research at DOE Office of Science must continue. Therefore, SNM calls on Congress to support the DOE Office of Science's Radiochemistry and Instrumentations programs with \$17.5 million in funding for nuclear medicine research for fiscal year 2009.

CONCLUSION

By continuing funding for the DOE's Radiochemistry and Instrumentation nuclear medicine research program at the DOE, policy makers will keep our Nation at the forefront of nuclear medicine research and innovation. We thank you for the opportunity to present our views on funding for these initiatives at the DOE and would be pleased to answer any questions you may have.