ENERGY AND WATER DEVELOPMENT APPROPRIATIONS FOR FISCAL YEAR 2022

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

NONDEPARTMENTAL WITNESSES

[CLERK'S NOTE.—The subcommittee was unable to hold hearings on nondepartmental witnesses. The statements and letters of those submitting written testimony are as follows:]

PREPARED STATEMENT OF ACLARA TECHNOLOGIES, LLC

As a leading technology provider to electric, gas and water utilities, Aclara Technologies, LLC—a wholly-owned subsidiary of Hubbell Incorporated [1]—respectfully urges you to prioritize modernization of the nation's electric distribution systems and funding to improve the performance, efficiency, and safety of our nation's energy and water distribution infrastructure in the Fiscal Year (FY) 2022 Energy and Water Appropriations bill. We thank you for this opportunity to express our support for this funding and appreciate your consideration.

Aclara Technologies, LLC ("Aclara") provides smart infrastructure technologies to electric, gas and water utilities, with offerings in advanced metering, utility automation, methane sensing, device networking and communications, data management, analytics, and customer service. Over 1,100 utilities in thirty-six countries rely on proven Aclara solutions. There are currently 1,000 Aclara clients located in all 50 states and Aclara employs over 1,500 staff in the United States and over 195 internationally. Companies like Aclara prove that smart technologies mean jobs, not just at Aclara, but also at utilities in the form of installation and monitoring jobs.

Aclara offers its strong support for the advancement of technologies that can improve our nation's energy and water distribution networks by providing enhanced monitoring, detection, and control capabilities. These technologies are an important and cost-effective way to increase reliability, efficiency, and safety of our ageing infrastructure. Supporting the advancement of these technologies will be crucial as the country's energy and water distribution networks continue to age and as the risks for utilities and network operators rise.

ELECTRICAL DISTRIBUTION INFRASTRUCTURE

The U.S. currently has over 500 million above-ground utility poles with over 5 million miles of overhead distribution conductors fed from greater than 62,000 distribution substations. Aclara understands that electric utilities must divide their collective attention between many priorities including maintaining the vast distribution infrastructure mentioned above and adapting the infrastructure to the deployment of distributed energy resources such as solar, wind, and storage. The technology to verify the health of the distribution assets such as the position and orientation of utility poles and the attached conductors is in development to enable utilities to sense, for example, a car has collided with a utility pole or an overhead

[1] Hubbell Incorporated is an international manufacturer of high quality, reliable electrical and utility solutions for a broad range of customer and end market applications. With 2020 revenues of $4.2 billion, Hubbell Incorporated operates 70 manufacturing facilities in the United States, employing over 9,550 Americans, and has additional facilities and employees around the world. The corporate headquarters is located in Shelton, CT. Hubbell Inc. acquired Aclara Technologies in 2018.

conductor has dropped from the utility pole. Other key analytics about clusters of these conditions, as when windstorms or ice buildups cause cascade failures of conductor support systems, enable utilities to respond in real time to failure events as well as better estimate resources required for large scale recoveries. The technology in development is also very cost-effective, as it can be installed on new distribution system construction and easily retrofitted to existing distribution infrastructure. In addition to ensuring funds are dedicated to the advancement of distribution infrastructure, we also urge you to support appropriations for technologies to make our electrical distribution asset monitoring systems "smarter," particularly when failure of these systems presents a safety risk to the public.

Specifically, for FY22, we urge support for two important demonstration projects to be carried out within the DOE Office of Electricity's Resilient Distribution Systems Grid Sensors and Sensor Analytics program. The first demonstration project should focus on utilizing data from advanced distribution sensors that are deployed on existing distribution lines to predict and/or detect vegetation contact in order to mitigate wildfires and wildfire impacts.The second demonstration project should focus on measuring the condition of utility poles in terms of their position, impacts, and presence of high temperatures. Data from the sensors should be utilized and visualized from these devices to provide useful and immediate analytics to improve the safety of the general public and improve electrical distribution network performance indices.

Also of importance in discussions about electric grid infrastructure is the need to reduce greenhouse gas emissions. For decades, sulfur hexafluoride (SF6) has been used as a dielectric insulator in gas insulated systems. One pound of SF6 has the same global warming potential as 22,800 pounds of CO_2. Additionally, since it is such a stable compound, it has a life of 3,200 years in the atmosphere vs 200 years for CO_2. The US Environmental Protection Agency (EPA) has established a voluntary program in which partner companies agree to reduce SF6 emissions through technically and economically feasible actions. Although SF6 designs have been commercially available and have functioned reliably for the past 30 years, new available technologies have emerged at comparable prices that offer superior performance and a greatly reduced carbon footprint. These alternatives should be strongly promoted in grid devices operating under 72kV. Unfortunately, there has not been a good alternative found for SF6 for grid equipment above 72kV. As such, we urge DOE to advance safe and effective capture and reuse technologies for SF6 in grid equipment above 72kV.

WATER INFRASTRUCTURE

Although many of our nation's water and wastewater systems have been around for more than a century, water infrastructure spending has received a significantly smaller and decreasing share of total infrastructure investment. the U.S. Environmental Protection Agency (EPA) estimates a needed investment of $750 billion over the next 20 years to maintain the nation's drinking water and wastewater infrastructure. Without the necessary federal funding to close the gap, communities across the country will continue to face rate increases that disproportionately impact our most vulnerable communities.

Water leaks cost many cities as much as 10 to 30 percent loss of their water, leaks that also waste a lot of energy. The EPA estimates that drinking water and wastewater systems account for 30 to 40 percent of total energy consumed by municipalities. As much as 8.4 billion kilowatts is wasted each year moving water nationwide. Due to ageing infrastructure, significant energy savings are possible through the use of leak detection and pressure monitoring technologies to improve operational efficiencies and reduce water loss.

Water system efficiency and smart water networks should be a clearly stated goal of any investments made in our nation's water infrastructure. Water distribution systems should be modernized in a way that increases water and energy efficiency and enables customers and utilities to interact with it as never before. This will require smart water networks that facilitate the collection of data via sensors along distribution networks, advanced analytics, and the incorporation of communications technologies to optimize performance, preempt problems, and allow for rapid response.

The utilization of infrastructure solutions such as distribution network leak detection, pressure monitoring, and sanitary and combined sewer monitoring technologies during upgrades to water and wastewater systems help optimize water delivery performance, reduce energy usage, limit water waste in distribution systems, and enhance modeling of sewer collection networks. This will help to improve operations,

maintenance, and capital expenditure in planning and budgeting, and increase spatial and temporal monitoring data available on U.S. water quality and quantity.

One key aspect of smart water networks is advanced metering infrastructure (AMI). AMI can offer communities multiple advantages to improve their management of water, reducing water and energy waste, and decrease costs for distributors, operators, and consumers. Detailed consumption data provided by AMI can help reduce water use in many ways, including:

—Detects system leaks—Non-revenue water costs utilities $4.9 billion per year. AMI can help drastically reduce water leaks and associated costs by creating a continuous flow of information from advanced meters, combined with advanced data analytics, that enables water suppliers to rapidly and precisely identify water losses and conservation opportunities.

—Helps consumers save water (and money)—AMI allows for hourly data to be made available to end consumers. Providing this kind of detailed water use information to consumers through an associated consumer engagement application or customer portal is proven to increase conservation, thereby saving consumers money on their monthly water bills.

—Provides resilience during and following natural disasters—for example, Aclara's system in New York City, which serves more than 9 million people, weathered Hurricane Sandy with minimal disruption. Aclara's water meter transmission units have a 20 year battery life and its data collectors offer a rugged, weather-proofed design that stores 28 days of data with a 14 day back up battery life. Deployments offer redundancy so that if an individual data collector is disabled, another collector can continue to obtain meter data for that area, offering resiliency critical after earthquakes, floods or other disasters.

NATURAL GAS INFRASTRUCTURE

The U.S. currently has 2.4 million miles of natural gas pipeline infrastructure and approximately 400 storage fields, which combined carry around 25% of the total energy consumed in the U.S. The low cost and relative abundance of natural gas is driving the aggressive expansion of new pipeline infrastructure. It is also causing increased use of existing infrastructure, putting pressure on an ageing system. As our reliance on natural gas continues to expand, so will the pressures on our natural gas infrastructure. As such, it is imperative that adequate funding be provided for both pressure management—which increases the efficiency of natural gas distribution networks—as well as methane detection technology, which can reduce the occurrence and severity of methane leaks which cost utilities money and can present a significant risk to public health.

Continuous gas pressure monitoring enhances early leak detection by recognizing and interpreting gas line pressure fluctuations. A sudden, unexplained drop in pressure could be a burst pipe or a gas leak. Utilizing an AMI supported gas pressure monitoring system will provide utilities with a constant stream of data to alert them to these potential issues. Smart pressure monitoring requires a wireless communications system including sensors that measure pressure at critical points, software that analyses the pressure status at such points and calculates responses to achieve a desired pressure, and a controller device to prompt smart valves whose use can save energy. Smart gas pressure management will allow utilities to better monitor and control system gas pressures according to demand. While reducing potential leaks, it can also reduce operating cost associated with site visits and "linepack".

Advanced leak detection technologies are crucial to curbing methane emissions from natural gas pipelines and storage fields and decreasing the risk of major gas leaks and accidents. Take, for example, the Aliso Canyon methane leak in California, which lasted over four months and released approximately 97,100 metric tons of methane into the atmosphere (more than the estimated total annual emissions from the entire U.S. pipeline infrastructure). Leaks like the one in Aliso Canyon demonstrate that the magnitude of risk faced by the natural gas industry is great, and that even more substantial risks exist for citizens living in the surrounding area and the environment. The key to reducing methane leakage—and associated environmental, safety, and economic impacts—from natural gas distribution networks is being able to locate and close leaks quickly and effectively. While traditional infrastructure replacements, upgrades, and periodic monitoring technologies do not allow utilities to do this, innovative technology is being developed that does.

Some of this new technology is already on the market. For example, Aclara offers several technology-based solutions and pipeline safety enhancements for natural gas transmission, storage, and distribution companies. Aclara's technologies enable continuous remote monitoring via infrared point sensing with automatic reads and near real-time alarms, which allow utilities to proactively identify potential issue areas

in their network and significantly reduces the chances of a small leak and/or disturbance turning into a catastrophic burn hole. The key to this technology is a focus on early detection, which is the most essential aspect of effective, proactive risk management and safety practices. The technology is also very cost-effective, as it can be easily fitted to existing AMI networks and the data it generates can be transmitted by existing utility communications networks, thus eliminating the high operational costs of data communication charges with cellular modems or other cost intensive communication technologies.

We urge Congress to encourage increased coordination with industry and U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration on methane leak detection technology—particularly in regards to deployment—and to support investment in smart pipeline sensors and controls, internal pipeline inspection and repair, and composite and advanced material science technologies. We support the expanded use of gas pressure monitoring, both real time and hourly, in distribution systems to improve system integrity and safety, as further deployments of methane detection sensors closer to the consumer would add to overall safety. We also urge Congress to consider mandatory use of gas pressure monitoring, both real time and hourly, in distribution systems to improve system integrity and safety.

We urge you to ensure that FY2022 appropriations, as well as any potential infrastructure package put together during this congress, includes funds for the advancement of technologies that will make our electric, water and natural gas distribution networks smarter, safer, and more efficient. Again, thank you for providing this opportunity to submit testimony.

[This statement was submitted by Kumi Premathilake, Senior Vice President, Division Vice President, AMI and Services at Hubbell Utility Solutions.]

PREPARED STATEMENT OF THE AMERICAN GEOPHYSICAL UNION

The American Geophysical Union (AGU), a non-profit, non-partisan scientific society, appreciates the opportunity to submit testimony regarding the Fiscal Year (FY) 2022 appropriations request for the Department of Energy (DOE). AGU, on behalf of its community of 130,000 in the Earth and space sciences, respectfully requests that the 117th Congress appropriate the following:

—$7.7 billion for DOE Office of Science

—$500 million for DOE Advanced Research Project Agency—Energy

DEPARTMENT OF ENERGY

AGU requests that Congress appropriate $7.7 billion for DOE's Office of Science, which represents a 9.6% increase over FY2021 spending levels. Additionally, we request $500 million for DOE's Advanced Research Project Agency—Energy (ARPA–E), which is in line with the bipartisan Energy Act of 2020. These funding levels will ensure that DOE is able to continue its work to preserve U.S. leadership in scientific discovery by developing new cutting-edge technology, fostering innovation, and training the nation's future scientific workforce.

OFFICE OF SCIENCE

As the primary funder of basic research in the physical sciences, DOE's Office of Science is at the forefront of scientific discovery, innovation, and the shaping of our nation's energy future. The Office of Science oversees a breadth of programs and technical infrastructure essential to the nation's economic growth, energy and national security, future scientific and engineering talent, and the development of innovative technologies.

The Office of Science is playing a crucial role in our nation's fight against the COVID–19 pandemic. Not only has it previously funded mRNA research used to develop the vaccine, but it is harnessing its supercomputing capabilities to advance our understanding of the coronavirus and its spread and creating and distributing better personal protective equipment for healthcare workers.

Through competitive grants awarded to national laboratories, more than 300 universities and colleges, and other organizations in all 50 states and the District of Columbia, the Office of Science fosters collaboration between sectors that helps contribute to our nation's strategic priorities.

DOE's Office of Science also supports more than 34,000 researchers-including Ph.D. scientists, engineers, graduate students, undergraduates, and technical and support personnel—who collaboratively work on high-risk, high-reward research

projects that foster cutting-edge energy technologies. The Office of Science provides essential resources and opportunities, including access to sophisticated scientific capabilities, beyond those offered by industry and academic institutions. The Office of Science has also been critical in the creation of industrial breakthroughs and annually partners with about fifty Fortune 500 companies as well as small businesses.

In addition, DOE's Office of Science supports exploration of both the frontiers of science such as quantum science and technology, artificial intelligence, and genomics and advances energy research such as solar energy, bioenergy, and batteries that will be the bedrock of the country's move to clean energy. With a 92% rate of timely completion of projects within budget, researchers supported by the Office of Science are making key advances in energy and safeguarding our nation's security by leading us towards energy independence.

Sustained and robust federal investment in scientific research is essential if the U.S. hope to remain globally competitive, especially as other countries like China aggressively increase their investments in scientific research. Moreover, as our nation recovers from the pandemic, the opportunities provided by the Office of Science to students, researchers and businesses are critical to help our country regain our economic strength and advance our energy security. Overall, the DOE Office of Science has been proven to be a smart investment now and for the future.

ADVANCED RESEARCH PROJECT AGENCY-ENERGY

The Advanced Research Project Agency-Energy (ARPA–E) was established to surmount the barriers posed to high-risk, long-term energy technology development. In its short ten-year history, ARPA–E has supported more than 1,000 projects, 177 of which have attracted over $4.9 billion in private-sector follow-on funding, and 88 of which have gone on to form new companies. Additionally, ARPA–E is making significant contributions to advancing U.S. leadership in cutting edge energy science and technology. ARPA–E projects have submitted more than 4,614 peer-reviewed journal articles and been issued 716 patents by the U.S. Patent and Trademark Office. ARPA–E has also shown itself to be a responsible steward of taxpayer resources by ceasing funding for projects that fail to meet milestones.

We are at a moment when other nations, especially China, Korea, and Russia, are making significant investments into advanced energy technologies and are poised to seize the economic and geopolitical advantages afforded by technological supremacy in this field. With global demand for energy projected to increase by almost 30% by 2040—combined with the often decade long development cycles for energy technologies—those nations making commitments to dominate this economic opportunity today will be the ones to reap the rewards in the years to come. The U.S. is exceptionally well positioned to capitalize on key advantages, including the work of cutting-edge agencies such as ARPA–E, but only if they are adequately funded.

Significantly, the transformative clean energy research and development funded by ARPA–E is critical to our nation's efforts to combat climate change. Additionally, ARPA–E 's investment in scaling up transformative solar, geothermal, battery, biofuels and advanced surface coating technologies has the potential to drastically alter our clean energy landscape.

Overall, ARPA–E projects create jobs and innovation, enhance our national energy security, and boost economic activity in communities across the country. Continued and stable investment into this transformative program is necessary to ensure its success and bolster our nation's science and technology leadership.

[This statement was submitted by Brittany Webster, Program Manager, Science Policy & Government Relations.]

PREPARED STATEMENT OF THE AMERICAN INDIAN HIGHER EDUCATION CONSORTIUM

REQUEST SUMMARY

On behalf of the nation's Tribal Colleges and Universities (TCUs) that collectively are the American Indian Higher Education Consortium (AIHEC), we thank you for this opportunity to share our recommendations regarding the Department of Energy (DOE), National Nuclear Security Administration's (NNSA) Minority Serving Institutions Partnership Program (MSIPP).

Department of Energy (DOE): National Nuclear Security Administration—Minority Serving Institutions' Partnership Program—Tribal Education Partnership Program (NNSA–MSIPP–TEPP): TCUs urge the Subcommittee to continue funding for the newly established Tribal Education Partnership Program, a TCU-specific sub-program within the NNSA–MSIP, at $5,000,000 for FY2022. With funding from NNSA–MSIPP, the TCU Advanced Manufacturing Network Initiative (TCU AMNI) was cre-

ated with a pilot cohort of five TCUs in collaboration with AIHEC. Since 2015, each of the participating TCUs has established a basic advanced manufacturing facility that offers training and education programs with support from NNSA National Laboratory partners. TCUs are uniquely positioned to catalyze economic transformation in Indian Country, because they have the capacity to train a specialized workforce and develop critical research and development partnerships with NNSA National Laboratories as well as major national companies such as Boeing Company and Ford Motor Company.

The TCU AMNI program provides an important partnership model for the Department of Energy and the nation's TCUs. The program creates a career pipeline for American Indian and Alaska Native (AI/AN) students, beginning with the development of technical skills required to operate advanced manufacturing systems, which are coming to dominate the global manufacturing sector. Students completing technical training at TCUs are also prepared to pursue engineering programs, which are in demand at all stages of manufacturing. The TCU AMNI program contributes to the growth of a well-trained Native workforce: technicians, engineers, designers, and entrepreneurs. Through this initiative, TCUs are in a strong position to help tribes develop advanced manufacturing enterprises, which, in turn, generate significant economic activity and create high-skilled jobs for their young people. These efforts will contribute to breaking the cycle of poverty that has plagued tribal communities for generations.

TCU efforts in advanced manufacturing have direct economic impacts on tribes and have even proven impactful in the field of public health. During the current coronavirus pandemic, the Bay Mills Indian Community Chairman asked Bay Mills Community College (BMCC) to produce personal protective equipment (PPE) for the tribally operated Bay Mills Health Center and nearby War Memorial Hospital in the Upper Peninsula of Michigan. BMCC collaborated with Lake Superior State University and the local school district to 3–D print face mask headgear using a design developed by BMCC. BMCC also 3–D printed venturi valves, a component of medical ventilators, which were also in short supply, for War Memorial Hospital. BMCC worked with the other four ANMI TCUs to produce 3–D printed PPEs and other needed medical equipment for their local tribal health services providers and the Indian Health Service.

MSIPP TCU Report Language Needed for Funding

TCU AMNI represents a model for a partnership between the DOE and the nation's 37 TCUs that can help address the need for a more diverse STEM workforce within the NNSA National Laboratory system while promoting economic growth in Tribal communities. Historically, the competitive MSIPP grant program lacked distinct support for TCUs and Tribal communities. In the FY2020 DOE budget, $5 million was explicitly provided for a separate TCU program; however, a program was not initially established. Instead, the funds were added to the competitively awarded MSIPP grant program broadly available to Historically Black College and Universities and other Minority Serving Institutions. In conducting the FY2020 MSIPP grant competition, NNSA did not include provisions specifically for TCUs, nor was an outreach strategy implemented to solicit TCU grant applications to ensure that TCUs would receive the $5 million in Congressionally directed funding. Due to the lack of outreach by NNSA, few TCUs submitted proposals. After extensive feedback from AIHEC, NNSA released a new TCU-specific sub-grant program under MSIPP entitled: Tribal Education Partnership Program. While NNSA eventually took steps to administer Congressionally directed TCU funding, we respectfully request that report language and funding be included to ensure continuity in the newly established Tribal Education Partnership Program.

Success of the TCU Advanced Manufacturing Network Initiative

The TCU AMPI is creating very promising and exciting projects on five TCU campuses. Below are summaries from the five participating TCUs.

Navajo Technical University—Crownpoint, NM

The Center for Digital Technology at Navajo Technical University (NTU) in Crownpoint, NM has established an advanced manufacturing program with a state-of-the-art facility including metal 3–D printers, computer numerical control (CNC) machines and high-tech inspection, and validation instrumentation. Students at NTU are developing knowledge and skills in design engineering, manufacturing processes, and performance analysis. The Navajo Nation is making a significant investment in this program and has recruited major industry partners for manufacturing contracts resulting in employment for NTU graduates. This program provides a model for how TCUs and Tribes can join the global manufacturing supply chain

ecosystem, generate significant economic activity, and train students to join the technology and engineering workforce.

Bay Mills Community College—Brimley, MI

Bay Mills Community College (BMCC), located in the Upper Peninsula of Michigan, operates the Great Lakes Composites Institute, a wholly owned subsidiary of the college that functions as a Tier II/Tier III manufacturing supplier. It has established a technical leadership position as a supplier of composite materials and products focusing on thermoplastic fiber reinforced polymeric innovations and next-generation thermoplastic fiber-reinforced products. Industry partners include the Army Tank Research, Development, and Engineering Center (TARDEC), Ford Motor Company, and the Chrysler Corporation.

Cankdeska Cikana Community College—Fort Totten, ND

Cankdeska Cikana Community College (CCCC), located in rural North Dakota, has developed an advanced manufacturing certificate program that builds on an existing engineering program partnership with North Dakota State University. CCCC is partnering with the University Centers for Atmospheric Research (UCAR) on the design of environmental monitoring systems specifically to support local Tribal resource management requirements.

Salish Kootenai College—Pablo, MT

Salish Kootenai College (SKC) has established an Advanced Manufacturing Prototyping Lab (AMPL) used for both lab courses and open hours for students interested in exploring additive manufacturing projects, following the FabLab model. SKC faculty are implementing an underwater drone project, similar to that at CCCC, focusing on drones capable of carrying instrumentation needed to monitor hydrology, biology, and lake sedimentology of Flathead Lake, the largest freshwater lake west of the Mississippi River.

Turtle Mountain Community College—Belcourt, ND

Turtle Mountain Community College (TMCC), located 10 miles from the Canada-U.S. border, is expanding their partnership with North Dakota State University. The partnership was developed through a collaborative engineering program in which students complete their first two years of engineering at TMCC and continue on to complete their degree at NDSU. The engineering program integrates the college's advanced manufacturing program, providing students the opportunity to carry out engineering design projects and research using the college's advanced manufacturing facility.

CONCLUSION

Struggling economies are endemic in Indian Country. We ask that Congress join us in bringing Tribal nations into the evolving global manufacturing community; transforming Tribal economies while addressing national energy technology challenges. TCUs provide quality higher education opportunities to thousands of AI/ANs and other rural residents, as well as essential community programs and services to those who might otherwise not have access to such possibilities. The modest federal investment in TCUs have paid great dividends in terms of employment, education, and economic development. We greatly appreciate your previous and your continued support of the nation's Tribal Colleges and Universities and your careful consideration of our FY2022 appropriations requests.

PREPARED STATEMENT OF THE AMERICAN SOCIETY FOR MICROBIOLOGY

The Department of Energy (DOE) Office of Science is a leader in advancing critical industries of the future, including quantum information science, artificial intelligence, high performance computing, advanced communications networks, future energy technologies, and engineering biology. As we rise to meet the challenges of the 21st Century, microbial science funded by the

DOE Office of Science remains vitally important. ASM urges Congress to fund the DOE Office of Science at $7.7 billion in fiscal year (FY) 2022, an increase of 9.6% over FY2021. ASM also encourages Congress to continue to fully fund the Bioenergy Research Centers at $100 million, and the National Microbiome Database Collaborative (NMDC) at $10 million in FY2022.

The American Society for Microbiology (ASM) appreciates the opportunity to submit outside witness testimony for the Fiscal Year 2022 Energy and Water Development, and Related Agencies appropriations bill in support of increased funding for the Department of Energy Office of Science. The American Society for Microbiology

(ASM) is one of the largest professional societies dedicated to the life sciences and is composed of 30,000 scientists and health practitioners. ASM's mission is to promote and advance the microbial sciences.

Funding from the DOE Office of Science through the National Laboratories, universities, and other programs has generated some of our most economically important innovations and is the primary driver of basic research in the physical sciences, as well as critical areas of genome scale, quantitative analysis of microbial research. This support has enabled researchers to use microbes to solve energy and environmental problems, and to bring those solutions to scale by developing empirical, computational, and mechanistic modeling tools. Office of Science funding led to the creation of the Bioenergy Research Centers, which support research into viable and sustainable domestic biofuel and bioproducts industries. Each of the four Centers is led by a DOE national laboratory or university, and each take an innovative approach to improving and scaling up advanced biofuel and bioproduct production processes. Recent investments in the National Microbiome Data Collaborative, an open-source database, will lead to more effective analysis of microbiome data and better coordination of multidisciplinary microbiome research across the federal government. In addition, DOE National Laboratories were effectively deployed in the fight against COVID–19, using their supercomputing and modeling capabilities to both understand components of the virus and to find drug compounds to treat it.

MICROBIAL RESEARCH IS NEEDED TO FACE 21ST CENTURY CHALLENGES

Our society faces several large, complex, and interconnected challenges, many of which can be addressed through microbial research. Inexpensive renewable sources of energy, fuels, and chemicals are essential for continued economic growth, but the environmental tradeoffs of increased energy production must also be considered. Microbial science funded by DOE Office of Science can lead the way in developing sustainable strategies to feed an ever-growing population by increasing plant and agricultural productivity and quality; by providing strategies to ensure that future US citizens enjoy clean air, water, and a high standard of living; in transforming human health by providing everything from new pharmaceuticals, reagents for precision medicine, and next generation antibiotics; and by producing cost-competitive fuels, chemicals, and materials from abundant renewable resources. These and other advances in decarbonization, the production of biomaterials or bio-based polymers, and others based on new microbial catalysts will only happen with strong, stable investments in the Office of Science.

Discoveries in targeted areas such as quantum science and technology, genomics, microelectronics, and machine learning have potential far-reaching impacts that spawn the creation of new industries. For example, DOE has also taken the lead on bio-based energy, fuel and chemicals innovation. The Office of Science currently funds four Bioenergy Research Centers (BRC), which support research into viable and sustainable domestic biofuel and bioproducts industries. These four Centers are developing viable and sustainable domestic biofuels and bioproducts derived from non-food plant biomass, such as poplar, switchgrass, and sorghum. This research will lead to lower greenhouse gas emissions, bring jobs to rural areas, and boost our energy security, and we strongly encourage Congress to continue fully funding the BRCs at $100 million in FY2022.

DOE-FUNDED MICROBIOME RESEARCH SPAWNS INNOVATION

In its stewardship of innovation at DOE's National Laboratories, universities, and other programs, the Office of Science is a critical partner in advancing areas of national need, supporting research in key emerging areas including artificial intelligence and microbiome research. Thousands of projects funded by NIH and NSF utilize DOE facilities each year, and more than fifty Fortune 500 companies and many small businesses use these facilities to conduct the underlying research required to develop new technologies and products that drive the economy, including the growing bioeconomy.

Microbiome science aims to advance understanding of microbial communities (microbiomes) for applications in areas such as health care, food production, and environmental restoration to benefit individuals, communities, and the environment. Understanding of the microbiome has evolved significantly since the concept of the human microbiome emerged roughly two decades ago. Today it is understood that microbial communities exist on, in, and around people, plants, animals, soil, oceans, and the atmosphere, making the microbiome relevant to all living things. The rapid pace of discovery has led to greater technology needs and data sharing infrastructure.

The Interagency Strategic Plan for Microbiome Research, FY2018–2022, developed by the Microbiome Interagency Working Group (MIWG), provides recommendations for improving coordination of microbiome research among Federal agencies and between agencies and nonFederal domestic and international microbiome research efforts. The five-year Strategic Plan coordinates microbiome research activities across 21 government agencies, describing the interagency objectives, structure and operating principles, and research focus areas and provided three recommended areas to transform microbiome discoveries to solutions:

1. Supporting interdisciplinary and collaborative research to enable a predictive understanding of the function of microbiomes in diverse ecosystems to enhance public health, food, and environmental security and grow new bioeconomy product areas.
2. Developing platform technologies to generate critical insights and to improve access to and sharing of microbiome data across ecosystems.
3. Expanding the microbiome workforce through educational opportunities, citizen science, and public engagement.

Recent advances in DNA sequencing technologies have increased our awareness of the complexity and diversity in networks of microorganisms. Yet there remains much to discover regarding how microbiomes function as communities, interact with their hosts and environment, and how they can be leveraged to improve health and ecosystems. As noted in the Interagency

Strategic Plan for Microbiome Research, microbiome data is "Big Data", which requires consistent and reliable database and resource coordination to facilitate data collection, analysis, interoperability, and data sharing. The NMDC is aimed at empowering this type of microbiome research. Spearheaded by Lawrence Berkeley National Laboratory, in partnership with Los Alamos, Oak Ridge, and Pacific Northwest national laboratories, the NMDC is leveraging DOE's existing data-science resources and high-performance computing systems to develop a framework that facilitates more efficient use of microbiome data for applications in energy, environment, health, and agriculture. In support of these ongoing efforts, ASM requests continued funding of $10 million for the National Microbiome Database Collaborative (NMDC) for FY2022.

Our nation's ability to make significant advances in solving energy and environmental problems depends on advances in the microbial sciences. This will only be possible if Congress continues its commitment to robust and sustained funding increases for the Department of Energy's Office of Science.

[This statement was submitted by Allen Segal, Director of Public Policy and Advocacy, American Society for Microbiology.]

PREPARED STATEMENT OF THE AMERICAN SOCIETY OF PLANT BIOLOGISTS

On behalf of the American Society of Plant Biologists (ASPB), we submit this written testimony to support $7.7 billion for the Department of Energy's (DOE) Office of Science in fiscal year (FY) 2022. Within this amount, ASPB supports proportional increases in funding for the Office of Basic Energy Sciences and the Office of Biological and Environmental Research. ASPB also supports at least $500 million for the Advanced Research Projects Agency-Energy (ARPA–E) in FY 2022. ARPA–E has proven to be an innovative and valuable program that advances high-impact energy technologies, including biotechnology, imaging, carbon capture, and sustainable crop systems that are important to the plant science community and to the nation.

The following testimony highlights the importance of biology-particularly plant biology, which is a necessary backbone of efforts to enhance bioenergy production-as the nation seeks to address energy security and other vital issues. We thank the Subcommittee for its consideration of this testimony and for its support for the basic research mission of the DOE Office of Science. ASPB recognizes the difficult fiscal environment our nation faces but believes investments in scientific research will be a critical step toward economic recovery.

ASPB, founded in 1924 as the American Society of Plant Physiologists, was established to promote the growth and development of plant biology, to encourage and publish research in plant biology, and to promote the interests and professional advancement of plant scientists in general. ASPB members educate, mentor, advise, and nurture future generations of plant biologists; they work to increase understanding of plant biology, as well as science in general, in K–16 schools and among the general public; they advocate in support of plant biology research; they work to convey the relevance and importance of plant biology; and they provide expertise in policy decisions world-wide. Overall, ASPB members, as representatives of the soci-

ety, work to disseminate information and excitement about plant sciences, especially through ASPB's advocacy, outreach activities, conferences, and publications.

FUEL, FOOD, ENVIRONMENT, AND HEALTH: PLANT BIOLOGY RESEARCH AND AMERICA'S FUTURE

Plants are vital to our very existence. They harvest sunlight, converting it to chemical energy for food and feed; they take up carbon dioxide and produce oxygen; and they are essential to life on Earth. Indeed, plant biology research is making many fundamental contributions in the areas of domestic fuel security and environmental stewardship; the continued and sustainable development of better fuels, foods, fabrics, pharmaceuticals, and building materials; and in the understanding of basic biological principles that underpin improvements in plant growth and homegrown energy sources for all Americans.

In particular, plant biology is at the center of numerous scientific breakthroughs in the increasingly interdisciplinary world of alternative energy research. For example, researchers at National Renewable Energy Laboratory (NREL) just published research that demonstrates the ability to convert wet waste carbon (food waste derived from fatty acids) to sustainable aviation fuels-highlighting the potential to simultaneously and synergistically address aviation needs and environmental challenges. Similarly, with the increase in plant genome sequencing and functional genomics, the interface of plant biology and computer science has become essential to our understanding of complex biological systems, ranging from single cells to entire ecosystems. This research is critical for our future bioenergy production.

Despite the fact that foundational and mission-oriented plant biology research-the kind of research DOE funds-underpins vital advances in practical applications in energy, health, and the environment, plant scientists have had to maximize and leverage modest federal funding to understand the basic function and mechanisms of plants. Sustained strong investments in plant biology research are important considering the significant positive impact crop plants have on the nation's economy and in addressing some of our most urgent challenges, like energy and food security. For example, continued basic and applied research in fields like synthetic biology will enable the creation and production of more energy dense, carbon neutral fuels and expand the production of energy-efficient biomass.[1]

Nearly 10 years ago, ASPB organized a two-phase Plant Science Research Summit with support and funding from DOE, the National Science Foundation, the U.S. Department of Agriculture, and the Howard Hughes Medical Institute. The Summit brought together representatives from across the full spectrum of plant science research to develop a research agenda and resulted in a report-Unleashing a Decade of Innovation in Plant Science: A Vision for 2015–2025.[2] This vision has helped guide our community towards significant gains in foundational and applied plant science. Importantly, novel crop varieties and precision agriculture technologies are producing more food per acre with less exogenous inputs. However, as climate change continues to threaten our agriculture systems, the work of the plant science research community is more pressing than ever. Additional significant progress is possible, but will require a bold commitment of resources from the federal government. As a research community, our continued vision is to create plant systems that are flexible and adaptable to both new and existing challenges by increasing the predictive and synthetic abilities of plant biology. In achieving these goals, the plant science research community will make significant contributions to:

—Exploring, conserving, and utilizing our natural resources;
—Protecting, maintaining, and improving energy crop productivity;
—Creating new plant-inspired bioproducts, companies, and industries; and
—Reducing the environmental impact and energy footprint of agriculture.

SECURING THE PLANT SCIENCE TALENT PIPELINE

As discussed above, many of the challenges that come with our changing world must be addressed specifically by plant scientists. A significant—but sustainable—increase in crop productivity will be needed to match the demand for food expected from the rate of population growth. At the same time, climate change will present new trials for crops and other plant ecosystems. These challenges will require efforts to increase productivity beyond current practices, including improvement in crop water use efficiency and enhanced crop photosynthesis efficiency and performance, to name just a few approaches. More knowledge and innovation will be needed to replace chemicals from non-renewable sources (from fuels to biomedical applica-

[1] https://roadmap.ebrc.org/energy/.
[2] plantsummit.files.wordpress.com/2013/07/plantsciencedecadalvision10-18-13.pdf.

tions) with plant-derived metabolites. These types of innovations will require contributions from basic and applied plant science fields and collaboration with other sciences, computation, and engineering.

To tackle these challenges, a strong and diverse community of plant scientists, with increased involvement from women and marginalized scientists, will be needed. However, the current training pipeline does not appear prepared to ensure the availability of this workforce. Overall, the number of Ph.D. degrees awarded in the US in biomedical sciences in the last two decades has increased at an unsustainable rate, even triggering warnings from members of the National Academy of Sciences; however, this trend has not been paralleled by increases in plant-related Ph.D. degrees. In fact, plant science doctoral degrees, both basic and agronomy-related, have remained stagnant during this time period. Clearly, a strong investment in plant science research, both basic and applied, renewed efforts to transform public perceptions of plant biology and plant biologists, and a push to increase the number of students entering the pipeline leading to plant science degrees are necessary to change these trends. Developing the workforce that will contribute the solutions to future challenges is urgent.

With this need in mind, ASPB applauds the awards DOE has made in training the next generation of scientists. Most recently, DOE has invested $20 million at the Oak Ridge Institute with the goal of training 150 Ph.D.s in energy related fields in the next five years. More investments like this, including outreach to women and individuals in marginalized groups, is vital for the US to maintain its energy leadership.

DOE RECOMMENDATIONS

Because the ASPB membership has extensive expertise and participation in the academic, industry, and government research sectors, ASPB is in an excellent position to articulate the nation's plant science priorities as they relate to fundamental plant biology and, specifically, with regard to recommendations for bioenergy research funding through DOE's Office of Science.

Within the Office of Science, the programs in Biological and Environmental Research (BER) and Basic Energy Sciences (BES) are crucial to understanding how basic biological processes operate. Sustained funding for these programs is vital, because the discoveries made in these areas will ultimately be the foundation for the next fuels and technologies we use in our daily lives.

Support from ARPA–E is critical to advancing plant synthetic biology technologies, and ASPB implores the committee to include sustained, targeted funding for synthetic biology research in the program.

In addition:

—We commend the DOE Office of Science, through its programs in BES and BER, for having funded the Bioenergy Research Centers and the Energy Frontier Research Centers. These centers provide a model for collective science innovation that complements DOE's essential investment in individual investigator and small group science. ASPB strongly encourages additional funding for the DOE Office of Science that would specifically target funding at individual and small-group grants for bioenergy and plant growth research.

—Considerable research interest is now focused on the processing of plant biomass for energy production. Fundamental discoveries of the genes that control plant growth and enable plant growth in response to stresses, including drought, are needed to secure our energy future. If biomass crops, including woody plants, are to be used to their full potential, extensive effort must be expended to improve our understanding of their basic biology and development, as well as their agronomic performance and conversion efficiency in processing to fuels and high-value co-products. Therefore, ASPB calls for DOE to support research targeted at efforts to increase the utility and agronomic performance of bioenergy feedstocks, both in the field and for their end users in the bioeconomy.

Thank you for your consideration of our testimony on behalf of the American Society of Plant Biologists. For more information about the American Society of Plant Biologists, please see www.aspb.org.

PREPARED STATEMENT OF THE ASSINIBOINE AND SIOUX RURAL WATER SUPPLY SYSTEM AND DRY PRAIRIE RURAL WATER SYSTEM

FISCAL YEAR 2022 BUDGET REQUEST

The Assiniboine and Sioux Rural Water Supply System and Dry Prairie Rural Water System respectfully request FY 2022 appropriations of $17.760 million, part of the Bureau of Reclamation Rural Water Program (Table 1).

The FY 2022 federal funding request is $7.021 million for the Assiniboine and Sioux Rural Water Supply System (ASRWSS) and $10.739 million for the Dry Prairie Rural Water System (DPRWS) to fully complete project construction. The combined request leaves a projected appropriation of $548,000 in FY 2023 to account for final indexing and any adjustments for non-federal cost shares or other.

TABLE 1

FY 2022 FUNDING REQUEST		
FORT PECK RESERVATION RURAL WATER SYSTEM (PL 106-382)		
Sponsor	Project Feature	Federal
Assiniboine and Sioux Rural Water Supply Syatem		
	Project Improvements	725,521
	Service Connections	1,535,668
	Pasture Taps	2,884,341
	FP SCADA, Electrical, Meters	1,875,839
	Subtotal	$7,021,369
Dry Prairie Rural Water System		
	Opheim Branches Phase 1	3,941,443
	Opheim Branches Phase 2	5,039,665
	System Expansion	110,503
	DP OM Buildings/Shop	842,665
	DP Electrical, SCADA, Meters, Easements	804,139
	Subtotal	$10,738,415
Total		$17,759,785

The project expresses the greatest appreciation to the Chairman and Subcommittee for its unwavering support during the construction of this vital infrastructure in a vast area of Montana.

FY 2022 funds will be used to construct all remaining important elements of the Fort Peck Reservation Rural Water System, Montana, (PL 106–382, October 27, 2000). The request is within the capability to spend funds in FY 2022. Design, cultural resource surveys, wetland surveys, and easements related to all proposed project features will be completed by the ASRWSS and Dry Prairie and approved by Reclamation in advance of the use of FY 2022 funds. Those activities are already underway on most FY 2022 projects.

PROJECT STATUS AND FUNDING NEEDS

As shown in Table 2, the overall project will be 94% complete at the end of FY 2021. ASRWSS will be 97% complete, and DPRWS will be 89% complete. ASRWSS has built the regional intake, water treatment plant and all main transmission interconnections that serve both ASRWSS and Dry Prairie.

Construction funds remaining to be spent after FY 2021 total $17.759 million within the current authorization, including a projected federal overrun on Dry Prairie of $4.285 million (in October 2020 dollars). FY 2022 appropriations at the level requested will leave a projected need for $548,000 in FY 2023 to adjust for inflation at the rate experienced over the last 5 years (3.72%), for final adjustment of non-federal cost shares and for other adjustments necessary to complete the project.

TABLE 2

STATUS OF FEDERAL FUNDS

Funding Status	ASRWS	DPRWS	Project
Total Federal Funding Authority (October 2020$)	$217,643,000	$98,059,000	$315,702,000
Federal Funds Appropriated Through FY 2021	210,621,878	87,320,906	297,942,784
% Complete after FY 2020	96.77%	89.05%	94.37%
Amount Remaining After FY 2020			
Total Authorized (October 2020$)	$7,021,122	$10,738,094	$17,759,216
Adjusted for Inflation to FY 2022 at 3.72% Annually	$7,282,095	$11,025,408	$18,307,503
FY 2021 Amount Requested	$7,021,369	$10,738,415	$17,759,785
FY 2023 Amount Needed to Complete	$260,725	$286,993	$547,718
FY 2021 Employment, Full Time Equivalents	21	32	53

The ASRWSS project features to complete its Reservation portion of project are currently under budget by $726,000. The ASRWSS portion of the project can be completed if appropriations cited above are available in FY 2022. The funds currently under budget will be spent on beneficial and federally approvable projects within the authorized construction ceiling.

Congress has authorized three amendments of PL 106–382 to extend the project completion most recently to December 31, 2026. The project funding will be completed in FY 2022 unless there are significant reductions in appropriations for the rural water program in FY 2022.

PROJECT HISTORY

The project has reached 94% completion over a period of 20 years (averaging about 4.7% completion annually). Continued Congressional support is needed for the Reclamation Rural Water Program to complete our currently authorized project funding in FY 2022. Fixed annual overhead costs have reduced funding that can be allocation to construction of project features because the project was required to build over twice the number of years anticipated at authorization. Despite the additional overhead costs, the project will be completed within budget, subject to a current federal project cost overrun on Dry Prairie of $4.285 million that resulted unexpectedly due to lower indexing in FY 2020 due to the COVID 19 pandemic. The expected indexing based on historic trends was not enough to cover actual increases in unit prices for construction. Dry Prairie is working with Reclamation to reduce the overrun.

ASRWSS and DPRWS have worked extremely well and closely with the Bureau of Reclamation since the authorization of the project in FY 2000. The Commissioner, Regional, and Area Offices of the Bureau of Reclamation have been consistently in agreement with the need, scope, total costs, and the ability to pay analysis that supported the federal and non-federal cost shares. There have been no areas of disagreement or controversy in the formulation or implementation of the project.

PREPARED STATEMENT OF AURORA WATER

I am requesting your support for appropriations in the President's recommended budget for FY 2022 to the Bureau of Reclamation, Upper Colorado Region for the Upper Colorado River Endangered Fish Recovery Program and the San Juan River Basin Recovery Implementation Program. The budget items and amounts requested in the President's budget for these programs are described below.

Endangered Species Programs: The Endangered Species Program also provides $5.7 million for the Upper Colorado and San Juan River Endangered Fish Recovery programs for construction of facilities need to recover endangered fish species: $2,500,000 for construction of a fish barrier at the Farmer's Mutual Ditch diversion structure on the San Juan River in northwest New Mexico, $500,000 for floodplain habitat development in northwest New Mexico on the San Juan River, $2,550,000 for rehabilitation of the fish screen and passage at the Grand Valley Irrigation Company diversion on the Colorado River near Grand Junction Colorado, and $150,000 for Upper Colorado Program Management for contracting, budgeting, reporting, con-

tract administration, tracking expenditures, and addressing issues and concerns associated with capital project construction.

Colorado River Compliance Activities: The President's budget requests $21,400,000 for Colorado River Compliance Activities that includes:

—$8,640,000 for the Upper Colorado and San Juan Endangered Fish Recovery Programs to restore critical habitat, enhance stream flows, maintain fish ladders and screens, augment and conservation of genetic integrity through hatcheries and stocking efforts, manage non-native and sport fish, and research and monitoring to provide the scientific basis to guide decision making.

—$11,360,000 for the Glen Canyon Adaptive Management Program for scientific investigations, experimentation using Glen Canyon Dam releases and other tasks required to increase understanding of how to operate Glen Canyon Dam to meet statutory requirements, and experimental flow research.

—$1,400,000 for water quality and consumptive use studies to provide data required to meet legal agreements that regulate the flow and quality of the river and support consumptive use studies of water for municipal, industrial, agricultural uses.

This funding for the recovery programs is authorized by P.L. 106–392, as amended.

These highly successful, cooperative programs are ongoing partnerships among the states of New Mexico, Colorado, Utah and Wyoming, Indian tribes, federal agencies and water, power and environmental interests. The programs' objectives are to recover endangered fish species while water use and development proceeds in compliance with the Endangered Species Act. The programs provide ESA compliance for approximately 2,500 water projects in the Upper Colorado River Basin, including every Reclamation project upstream of Lake Powell.

I appreciate the Subcommittee's past support and request the Subcommittee's assistance for fiscal year 2022 funding to ensure the Bureau of Reclamation's continuing financial participation in and provision of federal cost sharing for these vitally important programs.

Sincerely.

[This statement was submitted by Marshall Brown, General Manager, Aurora Water.]

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PREPARED STATEMENT OF THE BUILDING PERFORMANCE ASSOCIATION, E4THEFUTURE, AND THE BUILDING PERFORMANCE INSTITUTE

As leaders in the residential energy efficiency industry, the Building Performance Association, E4TheFuture, and the Building Performance Institute respectfully urge your support, through the Fiscal Year (FY) 2022 Energy and Water Development Appropriations bill, to provide robust funding to advance programs at the Department of Energy (DOE) that invest in residential energy efficiency and whole-house initiatives. The President's FY 2022 budget request makes significant investments in the Weatherization Assistance Program, State Energy Program, and Building Technologies Office. For the many reasons detailed below, we urge Congress to continue support for these programs and work to ensure that sub accounts within the DOE Office of Energy Efficiency and Renewable Energy are robustly funded so that their important work may continue and expand. On behalf of our stakeholders and members, we thank you for this opportunity to express our support for these important programs and initiatives that pay for themselves many times over and are a wise and modest investment that help Americans save money, improve energy security, and live and work in safe and comfortable buildings.

The Building Performance Association (BPA) is a membership-driven 501(c)6 industry association dedicated to advancing the home and building performance industry by delivering improved energy efficiency, health, safety, and environmental performance of buildings through our key stakeholders. With over 9,500 member companies operating in every state, BPA supports home performance contractors, weatherization agencies and training centers, product manufacturers and distributors, program sponsors and implementers, building scientists, and non-profits focused on residential and commercial energy efficiency.

E4TheFuture is non-profit 501c(3) organization which collaborates with industry stakeholders to provide expert policy solutions, education, and advocacy to advance residential clean energy and energy efficiency solutions on the federal, state and local level.

The Building Performance Institute (BPI) is the nation's premier building performance credentialing, quality assurance, and standards setting organization. Approved by the American National Standards Institute, Inc. (ANSI) as an accredited developer of American National Standards and as a certifying body for personnel credentials, BPI develops technical standards and professional certifications that help raise the bar in home performance contracting.

BPA, E4TheFuture, and BPI offer their strong support for DOE's residential efficiency programs and initiatives, as they are critical to the continued growth of the energy efficiency industry across the country. Public programs that support the energy efficiency industry are vital as it continues to develop and, as evidenced by a grassroots letter from U.S. taxpayers [1] to House and Senate Energy and Water Appropriations subcommittee leadership, there is tremendous public support for these programs. The grassroots letter includes signatures from over 1,160 U.S. taxpayers from 48 states plus the District of Columbia.

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[1] https://e4thefuture.org/wp-content/uploads/2021/05/FY22-Appropriations-Sign-On.pdf.

Energy efficiency equals jobs—it is the largest employer and fastest growing sector in the energy industry. The 2020 "Energy Efficiency Jobs in America"[2] report from E4TheFuture found that the energy efficiency industry employs nearly 2.4 million Americans and, prior to the pandemic, was adding more jobs than any other energy sector. Through 2019, the energy efficiency industry featured twice as many workers as the entire U.S. fossil fuel industry and led the nation's energy economy in new job creation. The industry was expected to see another 3% growth in 2020. Instead, over 18% of the energy efficiency workforce (430,000 workers) lost their jobs in the initial months of the COVID–19 pandemic.[3] While other sectors experienced robust recoveries in the second half of 2020, energy efficiency did not: In December 2020, over half of energy efficiency workers laid off in the spring (230,000) were still out of work. A significant portion of the energy efficiency jobs in the U.S. are in the residential sector, and approximately 56 percent of energy efficiency jobs involve construction and repairs. These are the contractors—the "boots on the ground"—installing energy efficiency products and technologies and working to reduce energy waste in homes and buildings across the country. These local, family-sustaining jobs exist all across the country. In fact, 99.9% of U.S. counties have energy efficiency jobs and nearly 400,000 of these jobs are in rural areas.[4] Residential energy efficiency jobs were hit particularly hard by the pandemic and statewide lockdown orders. Supporting these jobs as part of our nation's recovery will be critical.

Dollar for dollar, investments in energy efficiency create more jobs than investment in the utility sector or fossil-fuels,[5] and investments in DOE programs that support energy efficiency—like the Building Technologies Office, Weatherization Assistance Program, and State Energy Program—lead to job creation and economic growth. For example, investment in weatherization creates direct jobs in sales and installation and indirect jobs in equipment manufacturing and distribution.

In addition to economic and jobs benefits, residential energy efficiency also plays a key role in public health. A DOE report on the Weatherization Assistance Program[6] found that home improvements focused on energy efficiency can improve indoor air quality, which reduces respiratory illness and sick days, and improves mental alertness and productivity for both children and adults. Two additional reports from 2016—E4TheFuture's "Occupant Health Benefits of Residential Energy Efficiency"[7] and the U.S. Department of Energy's "HomeRx: The Health Benefits of Home Performance"[8]—also found that residential energy efficiency upgrades can help to address asthma triggers and other chronic obstructive pulmonary diseases (COPD), leading to reduced healthcare costs. Under the pandemic, these health cobenefits from residential energy efficiency have grown even more vital.

Promoting building efficiency is also vital to achieving carbon reduction goals. Buildings are responsible for 31% of all U.S. greenhouse gas emissions,[9] and are therefore critical to any emissions reduction strategy. A recent report from ACEEE found that energy efficiency alone can cut energy use and U.S. greenhouse gas emissions in half by 2050, and buildings deliver 33% of the total emissions reductions in the report's model.[10] The residential buildings sector in particular remains largely untapped. Residential buildings account for 21% of total U.S. energy consumption,[11] use more electricity than any other sector,[12] and are the largest contributor to peak demand.[13] Addressing this sector is essential from a carbon emissions reduction standpoint.

The below programs at the Department of Energy deserve the support of the American taxpayer as these programs are proven to provide a significant return on investment. When funded they will continue to provide energy cost relief to house-

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[2] https://e4thefuture.org/wp-content/uploads/2020/11/EE__Jobs__America__2020.pdf.

[3] https://e2.org/wp-content/uploads/2020/12/Clean-Energy-Jobs-December-COVID-19-Memo-Final-Revised.pdf.

[4] https://e2.org/wp-content/uploads/2021/04/E2-2021-Clean-Jobs-America-Report-04-19-2021.pdf.

[5] ACEEE. N.d. Energy Efficiency and Economic Opportunity. Retrieved from http://aceee.org/files/pdf/fact-sheet/ee-economic-opportunity.pdf.

[6] https://energy.gov/eere/wipo/downloads/weatherization-assistance-program-national-evaluation.

[7] https://e4thefuture.org/occupant-health-benefits-of-residential-energy-efficiency/.

[8] https://energy.gov/eere/buildings/downloads/home-rx-health-benefits-home-performance-review-current-evidence.

[9] Total combined emissions from the residential and commercial sectors with electricity-related emissions distributed. https://www.epa.gov/sites/production/files/2019-04/documents/us-ghg-inventory-2019-main-text.pdf.

[10] https://aceee.org/sites/default/files/publications/researchreports/u1907.pdf.

[11] https://www.eia.gov/totalenergy/data/monthly/pdf/mer.pdf.

[12] https://www.eia.gov/electricity/annual/html/epa__01__02.html.

[13] https://www.energy.gov/sites/prod/files/2019/04/f61/bto-geb__overview-4.15.19.pdf.

holds, support American-based industry and American jobs, ameliorate issues with the aging electrical grid, and support national security goals. We also urge additional funding either through regular appropriations or supplemental funding in the event an energy/infrastructure package is considered. In the event that opportunity presents itself, we would urge:

1. Title VI of the House-passed, FY21 House Energy and Water Development Appropriations Bill as a starting point to fund the State Energy Program (SEP) ($730 million—$3.8 billion if adjusted for inflation from the American Recovery and Reinvestment Act [ARRA]) (for base, formula funds), Weatherization Assistance Program (WAP) ($3.25 billion—$6.2 billion if adjusted for inflation from ARRA) ; and

2. the HOPE for HOMES program to advance workforce training and residential retrofit rebates supported by the President's Budget Request ($2 billion in FY22).

REGULAR FY22 APPROPRIATIONS REQUESTS

$80 M for Residential Buildings Integration program within the Building Technologies Office (BTO), which has the capacity to fundamentally transform the performance of homes and greatly improve the energy efficiency in the 115 million existing residential buildings throughout this country. As mentioned above, residential buildings account for 21% of total U.S. energy consumption, use more electricity than any other sector, and are therefore an essential (albeit often overlooked) part of the carbon reduction equation. RBI can significantly improve the energy efficiency in the residential sector through its partnerships with the thousands of small businesses in this sector, the construction trades, equipment, smart grid technology and systems suppliers, integrators and state and local governments. To date, approximately 950,000 energy efficiency improvement projects have been completed on existing homes through the Home Performance with ENERGY STAR program. We recommend that this program receive a line item in the budget for at least $80 million and that the funding be focused on facilitating later-stage research, demonstration, and widespread deployment of technology solutions in new and existing homes, with an emphasis on whole-house energy efficiency retrofits (including outreach, engagement and training to private sector contractors) and continuing efforts to advance grid-interactive residential buildings and smart home technology. We encourage the direct engagement with residential contractors and businesses, which are crucial to the success of buildings programs. The President's FY22 budget supports increasing funding for this program to $72 million, but we respectfully urge Congress to fund Residential Buildings Integration at no less than $80 million.

$90 M for State Energy Program (SEP). We urge the Committee to provide funding of at least $90 million for SEP, which provides funding and technical assistance to states, territories, and the District of Columbia to enhance energy security, advance state-led energy initiatives, and maximize the benefits of decreasing energy waste. The President's FY22 budget supports increasing funding for this program, but we request that at least $90M of funding be used for direct formula grants to the states. Over the past 30 years, SEP has proven to be the critical link in helping states improve efficiency in hospitals and schools, establish business incubators and job training programs, and establish relationships with energy service companies and small businesses to implement cost-effective energy efficiency programs across their state. The Oak Ridge National Laboratory (ORNL) found that every dollar invested in SEP by the federal government yields over $10 leveraged for energy-related economic development and realizes $7.22 in energy cost savings for U.S. citizens and businesses—a tremendous economic value. SEP provides extraordinary value and flexibility, which is why governors across the country strongly support continued funding. It is important to note that SEP defers to the governors all decisions on allocating resources provided by DOE to meet their states' priorities such as energy emergency planning and response and energy related economic development.

$360 M for Weatherization Assistance Program (WAP). We ask the Committee to provide funding of at least $360 million for WAP, which helps low-income and rural families, seniors, and individuals with disabilities make lasting energy efficiency improvements to their homes. WAP has a proven track record of creating new jobs and contributing to the economy through the program's large supply chain of vendors, suppliers, and manufacturers. Since 1976, WAP has helped make more than 8 million homes more efficient, saving the average recipient about $4,200 over the lifetime of their home. A peer-reviewed study from ORNL found that the program is cost-effective at even conservative levels of evaluation. Each dollar that goes toward weatherization assistance yields at least $2.30 in benefits, and by some estimates as much as $4.10 to the home and society. The President's FY22 budget request proposes a significant increase to WAP, funding the program at $390M. We respectfully

ask the Committee to continue support for the program in Fiscal Year 2022 in order to assist America's low- and moderate-income citizens.

Aside from the very important programs noted above, BPA, E4TheFuture, and BPI would like to request the Committee support the U.S. Energy and Employment Report (USEER) within the Department of Energy. The annual USEER is an invaluable resource for both employers and policymakers and, in this moment of economic turmoil, supporting the report is particularly critical. Funding from DOE makes USEER possible every year. Without future reports, the economic fallout from the pandemic and its impacts on the energy sector nationwide will not be fully recorded, depriving decisionmakers of crucial employment information.

In addition, we respectfully ask the Committee to support existing training programs that fund clean energy and energy efficiency jobs within the Office of Energy Efficiency and Renewable Energy (EERE). These EERE workforce development programs assist and support workers in trades and activities required for the continued growth of the U.S. energy efficiency and clean energy sectors. Seismic shifts in the energy workforce caused by COVID–19 have underlined the continuing need for these programs. We urge the Committee to support the USEER, funded at $2 million in FY22, as well as these workforce development programs within EERE.

In conclusion, BPA, E4TheFuture, and BPI offer their strong support for DOE's residential efficiency programs and initiatives, as they are critical to the continued advancement of the energy efficiency industry, which contributes to the country's overall economic growth, energy independence, and international competitiveness, and also represents a significant and largely untapped resource for carbon reduction. Public programs that support the energy efficiency industry are vital as it continues to develop and there is tremendous public support for these programs. The very small investments in the programs discussed above pay for themselves many times over and are a wise and modest investment that help Americans save money, improve energy security, and live and work in safe and comfortable buildings. Again, thank you for providing this opportunity to submit testimony. We look forward to working with you.

[This statement was submitted by Steve Skodak, President & CEO, Building Performance Association,Stephen Cowell, President, E4TheFuture, and Larry Zarker, CEO, Building Performance Institute.]

PREPARED STATEMENT OF THE BUSINESS COUNCIL FOR SUSTAINABLE ENERGY

The Business Council for Sustainable Energy (BCSE) urges Congress to make clean energy and demand-side energy efficiency central to infrastructure improvement measures enacted in the 117th Congress, with a focus on resilience and improved public health and safety. A key aspect of rebuilding our nation's infrastructure will be to enact robust funding for clean energy programs managed by federal agencies, in particular the Department of Energy, in the FY2022 Energy and Water Development Appropriations bill. A document containing clean energy industry funding requests for BCSE members in the renewable energy, energy efficiency and natural gas sectors for the FY2022 Energy and Water Appropriations Bill can be found here for your reference.

Federal investment in clean energy innovation has received bipartisan support because Congress recognizes the United States of America must lead the world in sustainable energy technologies to meet the need for grid reliability and safety, while boosting economic growth and reducing environmental impacts.

For these reasons, the Business Council for Sustainable Energy urges Congress to continue to adequately fund Department of Energy (DOE) clean energy programs for the offices of Energy Efficiency and Renewable Energy (EERE), Fossil Energy and Carbon Management (FE), Electricity Delivery and Energy Reliability (EDER), Advanced Research Projects Agency-Energy (ARPA–E) and other essential DOE clean energy programs. These federal research development and deployment funds can be used to leverage business investment to accelerate deployment and emissions reductions in all sectors of the economy.

The BCSE is a coalition of companies and trade associations from the energy efficiency, energy storage, natural gas, renewable energy, sustainable transportation and emerging decarbonization technology sectors. It includes independent electric power producers, investor-owned utilities, public utilities, equipment manufacturers, commercial end users and service providers in energy and environmental markets. Founded in 1992, the coalition's diverse business membership is united around the revitalization of the U.S. economy and the creation of a clean, secure and reliable energy future in America.

The BCSE is pleased to have an independent small- and medium-size businesses initiative under its banner, the Clean Energy Business Network (CEBN). Together, the BCSE and CEBN represent a broad range of the clean energy economy, from Fortune 100 companies to small businesses working in all 50 states and over 350 Congressional districts. On a national basis, these industries support over 3 million U.S. jobs.

The 2021 Sustainable Energy in America Factbook recently released by the BCSE and BloombergNEF shows that despite major headwinds brought about due to the COVID–19 pandemic, the transformation of how the U.S. produces, delivers, and consumes hydrocarbons, electrons and heat marched onward.

Congress has the opportunity to build on market conditions by funding research, development and deployment across a broad portfolio of technologies and industries, including energy efficiency and CHP, hydropower and marine energy, geothermal energy, wind, solar, energy storage, microgrids, carbon management and utilization, hydrogen, critical minerals, sustainable transportation and others to meet the need for grid reliability and safety, while boosting economic growth and reducing environmental damage.

The Council welcomes the opportunity to share information from the Factbook with you and we look forward to working with you throughout the FY2022 budget cycle.

[This statement was submitted by Lisa Jacobson, President, Business Council for Sustainable Energy.]

PREPARED STATEMENT OF THE CARBON UTILIZATION RESEARCH COUNCIL

Summary of CURC FY 2022 Recommendation: The Carbon Utilization Research Council ("CURC") is an industry coalition focused on technology solutions for the responsible use of our fossil energy resources in a balanced, low carbon generation portfolio.[1] CURC recommends $1,388,250,000 for the CCUS & Power Systems Program, funded by the Fossil Energy Research and Development (FE R&D) budget.

Benefits of Investment in Carbon Management Technologies: Deployment of carbon management technologies including carbon capture, utilization, and storage (CCUS) will have emissions reductions benefits, contribute to a growing economy, and play a critical role in the ongoing energy transition. In addition to providing low-carbon, dispatchable electricity to load follow intermittent renewables on the electric grid, CCUS provides a mean to reduce emissions from hard-to-decarbonize industrial processes including cement production and steelmaking and can help to create low- and zero- carbon fuels including hydrogen that have a wide variety of applications to decarbonize transportation, hard-to-abate industries, and provide long term, seasonal storage for the grid. International climate authorities like the International Energy Agency have determined that reaching economywide net-zero emissions in any scenario is "virtually impossible" without CCUS.

Federal investment in CCUS RD&D will also substantially benefit U.S. economic competitiveness, as the technology will allow us to maintain existing jobs and expertise in incumbent industries in addition to creating new, high-wage jobs in the energy and manufacturing sectors.

CURC–EPRI Roadmap:

CURC and the Electric Power Research Institute (EPRI) continuously evaluate technology needs that reflect changing markets and policies that impact fossil fuel use in the electric sector, which are communicated through an Advanced Technology Roadmap. The Roadmap identifies a suite of CCUS technologies that, if implemented, can deliver low carbon emission, fossil-fueled power plants between 2025–2035 that are cost-competitive with other sources of electricity. Several technologies identified in the Roadmap are readying for large-scale pilot testing while others are preparing for commercial demonstration. It is critical that a program is implemented to successfully commercialize these technologies to successfully meet any proposed net-zero objectives. This means annual federal budgets must increase to support the scale-up effort.

Federal Support of RD&D:

The U.S. has been a leader in the development of fossil energy technology with the support of the DOE's world class CCUS RD&D programs. In 2020, Congress recognized the need for expedited development and deployment of these technologies through the enactment of P.L. 116–260, which authorized approximately $6.7 billion

[1] For more information, please visit www.curc.net.

over five years for carbon management RD&D. These authorizations are in alignment with the recommendations of the CURC–EPRI Roadmap and will allow DOE to continue to make substantial progress in the development and commercialization of CCUS technologies for applications across sectors, including electric power.

CCUS & POWER SYSTEMS PROGRAM FISCAL YEAR 2022 SPECIFIC BUDGET RECOMMENDATIONS

CURC recommends full funding of the authorization levels for Carbon Management activities included in P.L. 116–260. However, CURC has several overarching comments regarding FY 2022 funding for the CCUS and Power Systems Program:

1. Any additional funding provided by Committee for new program activities should not come at the expense of existing initiatives, for which the Department has already made substantial progress to commercialize technologies.
2. Funding for selected projects under the Coal FIRST Initiative should be provided to construct project facilities, as each project is intended to demonstrate technologies that will result in net-zero carbon electricity and hydrogen production and are in line with the objectives of this Administration.
3. Continued funding should be directed to the Department to retrofit existing coal- and natural gas-fired electric power facilities, which will be critical to achieve the Administration's electric sector decarbonization objectives.
4. Substantial investment is needed to enable large-scale carbon storage, which underpins the entire value proposition of electric power and industrial sector carbon capture as well as negative emissions carbon capture technologies.

Carbon Capture Commercialization:

CURC recommends $500M. CURC recommends funding for the Department to initiate a Carbon Capture Commercialization Program consistent with commercial demonstration objectives authorized in PL 116–260 and recommends that expanded funding for the Department be used to fund commercial-scale applications of carbon capture technologies for coal, natural gas, and industrial applications.

Carbon Capture:

CURC recommends $205M. Consistent with the objectives of P.L. 116–260, CURC's recommendation includes funding to support research, development, large-scale pilot projects, and carbon capture test centers for a variety of transformational carbon capture technologies to improve the efficiency and lower the cost of carbon capture in both power and industrial sector applications. Funding for carbon capture should also be applied to new transformational technologies that are part of the DOE's Advanced Energy Systems program (addressed below), as intended by the carbon capture program authorization in the Energy Act of 2020, as those technologies inherently include carbon capture as part of the overall process. CURC supports efforts to evaluate industrial carbon capture and negative emissions technologies, but not at the expense of critical existing R&D for post- and pre-combustion capture technologies. CURC recommends full funding for the National Carbon Capture Center (NCCC), which is a critical path for testing and scaling up new technologies.

Front-End Engineering and Design:

CURC recommends $50M for a front-end engineering and design (FEED) program on coal, natural gas, and industrial applications of carbon capture technologies, consistent with objectives authorized in P.L. 116–260, which will provide technical and economic data necessary to accelerate CCUS project deployment. Funds within this appropriation should also be utilized to conduct FEED studies of carbon dioxide storage complexes that may be part of the carbon capture projects selected for a DOE award.

Carbon Storage:

CURC recommends $200M. CURC supports the authorized funding levels for Carbon Storage activities included in P.L. 116–260. CURC notes that direct air capture and other negative emissions technologies will also be dependent on a robust carbon storage industry and recommends a more robust program as follows:

—*Storage Infrastructure:* CURC—$180M.

—*Regional Initiatives:* CURC—$30M to diversify the Regional Initiatives' efforts, which were spun out of the Regional Carbon Sequestration Partnerships (RCSPs). The Regional Initiatives develop the geologic framework and infrastructure necessary to validate and deploy carbon storage, including the assessment of locations for CarbonSAFE or other commercial-scale carbon storage projects.

—*CarbonSAFE:* CURC—$150M to fully fund CarbonSAFE Phase III projects selected in fiscal year 2020 through to Phase IV and, with remaining funds, solicit proposals for additional CarbonSAFE projects. CarbonSAFE Phase III effort will seek permits, continue to integrate efforts with regional sources of CO_2, demonstrate technical viability of storage sites and support development of the qualification processes necessary for a site to begin to commercially accept CO_2.

—*CCUS Storage R&D:* CURC—$20M. CURC recommends continued focus on R&D at all TRL levels to address technical gaps to improve reliability of CCUS storage, including continued characterization of potential storage opportunities, monitoring and modeling technologies, risk assessment and mitigation tools should be supported.

Carbon Utilization:

CURC recommends $55.25M. CURC recommends funding for Carbon Utilization RD&D activities consistent with P.L. 116–260.

Advanced Energy Systems:

CURC recommends $273M. P.L. 116–260 includes authorizing language for R&D and large-scale pilot projects for a variety of transformational carbon management technologies, including those covered by the Advanced Energy Systems program that inherently include carbon capture as part of their system process. CURC recommends funding for specific subprograms as follows:

—*Advanced Gasification Systems:* $20M. CURC recommends continued focus on research for low cost, modular gasification technologies that will increase efficiency and lower capital costs for coal and biomass to hydrogen or power applications, as well as research to support a broad range of R&D.

—*Advanced Turbines:* $50M. CURC recommends funding to undertake R&D to improve the efficiency of gas turbines, to utilize 100% hydrogen as well as hydrogen-natural gas blends as well as ammonia and ammonia-hydrogen blends, and to test and validate components and their performance as an integrated system.

—*Fuel Cells:* $40M. CURC recommends funding for the development of next generation fuel cell technologies to produce both power and hydrogen from fossil fuels.

—*Advanced Combustion Systems:* $68M. CURC recommends funding to advance novel energy conversion technologies, including chemical looping ($11M), pressurized oxycombustion ($29M), and supercritical CO2 systems ($38M) for bench-scale work as well as to advance promising technologies to pilot-scale testing.

Supercritical CO_2 Technology (STEP):

CURC recommends $20M. CURC recommends efforts, consistent with the original scope of work, to complete the necessary design and construction of the 10–MW pilot and to conduct the necessary testing for the facility. CURC also recommends funds for competitively awarded research and development activities, coordinated with the Offices of Nuclear Energy (NE) and Energy Efficiency and Renewable Energy (EERE), to advance the use of supercritical power cycles.

Transformational Coal Pilot Plant Program:

CURC recommends $10M, consistent with FY 2021 appropriations, to continue funding Phase III projects selected in FY 2021.

Cross Cutting R&D Program:

CURC recommends $75M. CURC's recommendations for Cross Cutting R&D include:

—*Sensors and Controls:* $8M to improve monitoring of systems and apply solutions to mitigate stress on fossil systems that increasingly operate under cycling load conditions.

—*Extreme Environmental Materials:* $16M. CURC recommends $8M to support high temperature and pressure component testing under real operating conditions, a project underway between DOE and industry; and $8M for the A–USC Materials Consortium.

—*Water Management R&D:* $15M for thermoelectric applications of water use and reuse, reduced water withdrawals, clean-up of water discharge, and zero liquid discharge (ZLD) technologies.

—*Computational Science:* $11M.

—*Advanced Energy Storage Initiative:* $5M. CURC supports funding for thermal, mechanical, and chemical storage systems that can be integrated with fossil power systems.

—*University Training and Research:* $4M to develop the next generation workforce for the fossil energy generation industry which is experiencing a very large generation gap.

Other Initiatives Within Fossil Energy Research and Development:

Outside of the CCUS and Power Systems Program, CURC provides the following recommendations within the broader FE R&D portfolio:

—*Natural Gas Utilization:* $40M. CURC recommends the establishment of a new research and development initiative within the Natural Gas Technologies office to effectively utilize natural gas for decarbonization solutions. Within those funds, CURC recommends $40,000,000 for sustainable fuels and chemicals research and development focused on conversion of natural gas, natural gas liquids and other gas streams to low-carbon products, including chemicals and fuels such as ammonia and low carbon hydrogen. Comprehensive planning approaches for transitioning segments of the economy to hydrogen and other low-carbon fuels should be a part of the program, including analysis of the infrastructure required to store and transport these fuels. CURC also supports the establishment of a Center for Sustainable Fuels and Chemicals at the National Energy Technology Lab and a funding level of up to $15,000,000 for this initiative from within available funds for sustainable fuels and chemicals research and development.

—*Hydrogen RD&D:* $86M. CURC encourages the FE to expand hydrogen research, development and demonstration activities that support fossil fuel-derived hydrogen production equipped with CCUS technologies that results in significantly reduced carbon dioxide intensity. CURC encourages the Committee to recognize the importance of low- and zero-carbon hydrogen production for a variety of end uses and to support continued collaboration with the EERE, OE, and NE.

[This statement was submitted by Shannon Angielski, Executive Director, Carbon Utilization Research Council.]

PREPARED STATEMENT OF THE CENTRAL ARIZONA WATER CONSERVATION DISTRICT

On behalf of the Central Arizona Water Conservation District (CAWCD), I encourage you to include an allocation of $10.7 million for the U.S. Bureau of Reclamation's Salinity Control Basinwide Program for the Colorado River Basin in the Fiscal Year 2022 Energy and Water Development Appropriations bill. Continued funding for the Basinwide Program, which supports salinity control projects, will help protect the water quality of the Colorado River that is used by approximately 40 million people for municipal and industrial purposes and used to irrigate approximately 4 million acres in the United States. CAWCD further supports continued prioritization of funding for the Drought Contingency Plan designed to reduce risks to the Colorado River basin from ongoing drought.

CAWCD manages the Central Arizona Project, a multi-purpose water resource development and management project that delivers Colorado River water into central and southern Arizona. The largest supplier of renewable water in Arizona, CAP delivers an average of over 1.5 million acre-feet of Arizona's 2.8 million acre-foot Colorado River entitlement each year to municipal and industrial users, agricultural irrigation districts, and Indian communities.

Our goal at CAP is to provide an affordable, reliable and sustainable supply of Colorado River water to a service area that includes more than 80 percent of Arizona's population. These renewable water supplies are critical to Arizona's economy and to the economies of Native American communities throughout the state. Nearly 90% of economic activity in the State of Arizona occurs within CAP's service area. The canal provides an economic benefit of $100 billion annually, accounting for one-third of the entire Arizona gross state product. CAP also helps the State of Arizona meet its water management and regulatory objectives of reducing groundwater use and ensuring availability of groundwater as a supplemental water supply during future droughts. Achieving and maintaining these water management objectives is critical to the long-term sustainability of a state as arid as Arizona.

THE COLORADO RIVER BASIN SALINITY CONTROL PROGRAM—ITS HISTORY AND SIGNIFICANCE

Recognizing the rapidly increasing salinity concentration in the Lower Colorado River and its impact on water users, Arizona joined with the other Colorado River Basin States in 1973 and organized the Colorado River Basin Salinity Control Forum (Forum). In 1974, in coordination with the U.S. Department of the Interior

and the U.S. State Department, the Forum worked with Congress in the passage of the Colorado River Basin Salinity Control Act (Act) to offset increased damages caused by continued development and use of the waters of the Colorado River. Title I of the Salinity Control Act deals with the United States' commitment to the quality of water being delivered to Mexico. Title II of the Act deals with improving the quality of the water delivered to the U.S. users.

In the early years of the Program, Reclamation implemented salinity control through large projects that were funded with specific line item amounts. In 1995, Congress amended the Act and created Reclamation's Basinwide Program. Under this program, Reclamation funds competitive proposals that will decrease the salt load to the Colorado River. Most of the received proposals target off-farm irrigation distribution systems such as canals and laterals. The lining or piping of canals and laterals prevents leakage into the groundwater and the dissolution and transportation of salts to the Colorado River and its tributaries. States provide a 30 percent cost share of the projects implemented by Reclamation. CAWCD and other key water providers in the United States and Mexico are working to maintain salinity standards.

NEGATIVE IMPACTS OF CONCENTRATED SALTS

Natural and man-induced salt loading to the Colorado River creates environmental and economic damages. The Environmental Protection Agency (EPA) has identified that more than 60 percent of the salt load of the Colorado River comes from natural sources. With the significant federal ownership in the Basin, most of this comes from federally administered lands. Human activity, principally irrigation, adds to the salt load of the Colorado River. Further, natural and human activities concentrate the dissolved salts in the River.

The U.S. Bureau of Reclamation (Reclamation) has estimated the current quantifiable damages of salt at about $454 million per year. Modeling by Reclamation indicates that quantifiable damages would increase to approximately $671 million annually by 2040 if the program were not to continue.

These damages include: a reduction in the yield of salt sensitive crops and increased water use to meet the leaching requirements in the agricultural sector; increased use of imported water and cost of desalination and brine disposal for recycling water in the municipal sector; a reduction in the useful life of galvanized water pipe systems, water heaters, faucets, garbage disposals, clothes washers, and dishwashers, and increased use of bottled water and water softeners in the household sector; an increase in the cost of cooling operations and the cost of water softening, and a decrease in equipment service life in the commercial sector; an increase in the use of water and the cost of water treatment, and an increase in sewer fees in the industrial sector; a decrease in the life of treatment facilities and pipelines in the utility sector; and difficulty in meeting wastewater discharge requirements to comply with National Pollutant Discharge Elimination System permit terms and conditions, and an increase in desalination and brine disposal costs due to accumulation of salts in groundwater basins.

U.S. BUREAU OF RECLAMATION AND DROUGHT CONTINGENCY PLAN (DCP)

Federal legislation was enacted in 2019 to authorize the implementation of the DCP at the federal level. The DCP was designed to protect the Colorado River system through reductions in use and increased incentives for storage in Lake Mead, the Lower Basin's principal reservoir.

The DCP agreements were developed through a collaborative process amongst the federal government, states, water users and Mexico. CAWCD encourages Congress to continue to prioritize support for the implementation of the DCP, including resources for the Bureau of Reclamation to achieve the goal to conserve up to 100,000 acre-feet per year as part of the DCP, and to continue to explore means to augment Colorado River system supplies consistent with the Colorado River Basin Project Act.

CONCLUSION

Implementation of salinity control practices through Reclamation's Basinwide Program has proven to be a very cost-effective method of controlling the salinity of the Colorado River. In fact, the salt load of the Colorado River has now been reduced by roughly 1.2 million tons annually. However, shortfalls in recent Basinwide Program funding levels have led to inefficiencies in the implementation of the overall Program. The Plan of Implementation, as adopted by the states and approved by EPA, calls for 63,500 tons of additional salinity control measures to be implemented by Reclamation, the Bureau of Land Management and the USDA's Natural Re-

sources Conservation Services (NRCS) through 2021, or approximately 9,100 tons of new control each year by Reclamation.

The current drought that has significantly impacted the West affects the amount of and quality of available water, which in turn has the potential to exacerbate the salinity concentration levels. As such, we respectfully request $10.7 million for the U.S. Bureau of Reclamation's Basinwide Program for the Colorado River Basin in the Fiscal Year 2022 Appropriations bill. Continuation of adequate funding levels for salinity within this program will prevent further degradation of water quality of the Colorado River and significant increases of economic damages to its nearly 40 million municipal, industrial and irrigation users. In addition, we encourage Congress to continue to prioritize support for the implementation of the DCP.

[This statement was submitted by Theodore C. Cooke, General Manager, Central Arizona Water Conservation District.]

PREPARED STATEMENT OF THE CLEAN HYDROGEN FUTURE COALITION

SUMMARY OF CLEAN HYDROGEN FUTURE COALITION FISCAL YEAR 2022 RECOMMENDATION

CHFC (Clean Hydrogen Future Coalition) recommends $1,280,000,000 for clean hydrogen research, development, and deployment (RD&D) activities at the Department of Energy for FY 2022. These recommendations would direct $1,100,000,000 to clean hydrogen programs within the Office of Energy Efficiency and Renewable Energy (EERE) and $180,000,000 to clean hydrogen programs within the Office of Fossil Energy. However, CHFC stresses the importance of collaboration among the Offices of EERE, Fossil Energy, Nuclear Energy, and Science to effectively and efficiently utilize funds and ensure a comprehensive approach to clean hydrogen production, transport, and utilization.

Background on the Clean Hydrogen Future Coalition:

The Clean Hydrogen Future Coalition (CHFC) is a diverse group of stakeholders supporting federal clean hydrogen policies that will stimulate the adoption of clean hydrogen in the U.S. and enable our country to achieve national decarbonization objectives while also increasing U.S. global competitiveness. CHFC members represent a broad spectrum of forward-thinking entities in industries that will play a critical role in the transition to a clean energy economy with a robust role for clean hydrogen.

Importance of Scaling Clean Hydrogen:

With its ability to be used as a fuel source for transportation, as an industrial or chemical feedstock, or to produce and store electricity, clean hydrogen will have a critical role in accelerating decarbonization across all sectors of our economy. For example, clean hydrogen will be necessary to decarbonize heavier modes of transport—including heavy-duty trucking, shipping, and aviation—that are substantially more difficult, if not impossible, to electrify than passenger vehicles. Clean hydrogen can also be substituted for fossil fuels to power certain high-temperature industrial processes that cannot be electrified and for which other mitigation options are limited or unavailable. In the electric power sector, clean hydrogen can be used to produce CO2 emissions-free electricity and can be used to enable the long-duration energy storage necessary to achieve the net-zero emission electric grid envisioned by the Biden administration.

In order to create a clean hydrogen economy at the scale necessary to achieve national decarbonization objectives, the U.S. must take action to significantly reduce the cost of clean hydrogen production, propel its investment in clean hydrogen infrastructure, and incentivize its use in various end-use market applications. Scaling clean hydrogen will also provide an opportunity to transition existing—and create new—skilled, high wage jobs needed to support the clean energy transition.

Importance of Federal Support for RD&D:

Given the level of clean hydrogen production, infrastructure, and end-use demand that must be in place to power a clean hydrogen economy at scale, a comprehensive and coordinated federal investment strategy is required from the Department of Energy. The Department of Energy has demonstrated commercialization successes across its applied energy research offices and federal support has long played a critical role in commercializing energy technologies and making them economically viable for the private sector. There are typically long lead times for advancing energy technologies from concept to demonstration, then to commercialization, and each phase carries significant technical and cost risks as well as uncertainty in market

requirements and timing. To accelerate the energy transition, robust federal support is necessary to scale up clean hydrogen technologies through each of these stages, particularly if they are to be made available in a sufficient period of time to contribute to domestic decarbonization objectives.

FISCAL YEAR 2022 SPECIFIC BUDGET RECOMMENDATIONS—OFFICE OF ENERGY EFFICIENCY AND RENEWABLE ENERGY

The CHFC recommends $1.1 billion for clean hydrogen RD&D activities within the EERE. While EERE has traditionally housed the majority of federal RD&D programs related to hydrogen, CHFC encourages the Committee to provide direction to DOE requiring cross-Department collaboration on hydrogen RD&D activities.

Hydrogen and Fuel Cell Technologies:

CHFC recommends $800 million. The CHFC recommends funding as follows:

—*H2@Scale Commercial Demonstration:* CHFC recommends $500 million for the initiation of a commercialization program for technologies that have the potential to produce, transport, or utilize hydrogen with low-, net-zero, or net-negative carbon dioxide emissions. There are a number of clean hydrogen production technologies for which funding should support, including hybrid hydrogen production integrated with clean electricity generation, autothermal reforming, compact hydrogen generators, biomass combustion to hydrogen, and solid waste and plastics to hydrogen. The CHFC encourages the Committee to recommend that DOE utilize clean hydrogen produced from one commercial demonstration facility for the purposes of supplying hydrogen for medium- and heavy-duty hydrogen fuel cell vehicles and the associated fueling infrastructure to demonstrate the integration of clean hydrogen production with specific end use applications. The CHFC recommends that these activities be conducted in coordination with the Office of Fossil Energy.

—*H2@Scale Front-End Engineering and Design:* CHFC recommends $150 million for a front-end engineering and design (FEED) program for technologies that have the potential to produce, transport, or utilize hydrogen with low-, net-zero, or net-negative carbon dioxide emissions. The CHFC recommends that these activities be conducted in coordination with the Office of Fossil Energy.

—*Research, Development, and Demonstration:* CHFC recommends $150 million to expand clean hydrogen research, development and demonstration activities based on the priorities described in the Department of Energy's 2020 "Hydrogen Program Plan" and work in coordination with the Offices of Fossil and Nuclear Energy to advance the priorities outlined in the strategy. Within available funds, CHFC recommends continued research on novel onboard hydrogen tank systems, trailer delivery systems to reduce cost of delivered hydrogen, novel chemical hydrogen carriers, and development of material-based storage and hydrogen storage materials. CHFC also recommends continued electrolyzer development, including high-temperature electrolyzer RD&D activities, cost-shared with the office of Nuclear Energy, with a focus on improving the efficiency and reducing costs of electrolyzers. CHFC recommends continued fuel cell technology development for the transportation fleet, including for long haul and heavy-duty trucking. The CHFC encourages the Department to consult regularly with industry to avoid duplication of private-sector activities and to work with the Department of Transportation and industry on coordinating efforts to deploy hydrogen fueling infrastructure.

SuperTruck III Program: CHFC recommends $300 million for continued funding of the SuperTruck III program to improve the energy and freight efficiency of heavy- and medium-duty long- and regional-haul vehicles. Within this funding, CHFC recommends demonstration of hydrogen fuel cell technologies capable of meeting cost, efficiency, and performance targets identified by the Hydrogen and Fuel Cell Technologies Office for hydrogen-fueled long-haul Class 8 trucks.

FISCAL YEAR 2022 SPECIFIC BUDGET RECOMMENDATIONS—OFFICE OF FOSSIL ENERGY

The CHFC recommends $180 million for the Office of Fossil Energy to undertake hydrogen-related RD&D activities within the Fossil Energy Research and Development (FE R&D) Program. The FE R&D Program can leverage existing expertise to further develop clean hydrogen production from fossil fuels coupled with carbon capture, utilization, and storage (CCUS) with low- and net-zero CO2 emissions, or net-negative emissions when fossil fuels are co-fired with sustainable biomass resources. The Office of Fossil Energy is also home to existing expertise within the Department on hydrogen transport via pipeline and the use of clean hydrogen in industrial and power applications.

Natural Gas Technologies:

The CHFC recommends $90 million for the Natural Gas Technologies Program as follows:

—*Clean Hydrogen RD&D:* CHFC recommends $40 million to establish a new research and development initiative within the Natural Gas Technologies Office to decarbonize the use of natural gas to produce clean fuels, including low- or zero-carbon hydrogen and other low carbon fuels or feedstocks such as ammonia. Comprehensive planning approaches for transitioning segments of the economy to hydrogen and other low-carbon fuels should be a part of the program, including analysis of the infrastructure required to store and transport these fuels.

—*Natural Gas Infrastructure:* CHFC recommends $50 million. The CHFC recognizes the importance of leveraging our existing infrastructure and its potential for transporting clean hydrogen. Hydrogen blending in natural gas pipelines is being studied, and there is a need for additional research to understand the impacts to existing infrastructure. Within this funding, the CHFC recommends not less than $10 million to conduct research and development for hydrogen transportation and storage infrastructure, which should address the safety, mechanical integrity, and regulatory impacts of blending hydrogen into existing natural gas pipelines and assess whether those blends can be utilized throughout the distribution system. Pipeline research should also focus on novel, low-cost materials for use in pipelines to assess compatibility of higher-strength steels with hydrogen and first-of-a-kind demonstrations of novel pipeline technologies. Storage research should focus on geologic storage of hydrogen. Comprehensive planning approaches for transitioning segments of natural gas users to increased hydrogen use should be part of the program, including analysis of the infrastructure required to store and transport hydrogen

CCUS and Power Systems:

CHFC recommends $90 million for hydrogen-related RD&D activities within the CCUS and Power Systems Program as follows:

—*Advanced Turbines R&D:* Within available funds for Advanced Energy Systems, CHFC recommends $50 million for Advanced Turbines R&D, with direction to use funds for a research and development program focused on utilizing clean hydrogen, clean hydrogen-natural gas blends, and ammonia and ammonia-hydrogen blends, to test and validate components and their performance as an integrated system, working cooperatively with industry, universities, and other appropriate parties. Funding should also support demonstrating hydrogen turbines that can be fueled with pure hydrogen.

—*Solid Oxide Fuel Cells:* Within available funds for Advanced Energy Systems, CHFC recommends $40 million for the development of next generation solid oxide fuel cell (SOFC) technologies to produce power and hydrogen from fossil fuels. This activity builds on significant progress made through research and development in this program to enable efficient, cost-effective electricity generation and hydrogen production with minimal use of water. These activities will result in development of SOFC technologies to produce hydrogen from fossil fuels while benefiting from synergies with EERE's Hydrogen and Fuel Cell Technologies Program relative to infrastructure developments and safety of end use. This funding will preserve U.S. leadership in SOFC technology, ensure utilization of extensive fossil fuel resources in the U.S., and will result in ultra-high efficiency production of power and hydrogen.

[This statement was submitted by Shannon Angielski, President, Clean Hydrogen Future Coalition.]

PREPARED STATEMENT OF THE COLORADO RIVER BASIN SALINITY CONTROL FORUM

Waters from the Colorado River are used by approximately 40 million people for municipal and industrial purposes and used to irrigate approximately 5.5 million acres in the United States. Natural and man-induced salt loading to the Colorado River creates environmental and economic damages. In 2020 the Bureau of Reclamation (Reclamation) estimated the quantifiable damages to Lower Basin water users due to elevated salinity levels at about $354 million per year. Congress authorized the Colorado River Basin Salinity Control Program (Program) through the Colorado River Basin Salinity Control Act (Act) (P.L. 93–320) in 1974 to offset increased damages caused by continued development and use of the waters of the Colorado River. Modeling by Reclamation indicates that the quantifiable damages will rise to approximately $671 million annually by the year 2040 without continuation

of the Program. Congress has directed the Secretary of the Interior to implement a comprehensive program for minimizing salt contributions to the Colorado River. Reclamation serves as the lead federal agency in implementing the Program. Reclamation primarily institutes salinity control through its Basinwide Program. A funding level of $10.7 million is required in 2022 to prevent further degradation of the quality of the Colorado River and a commensurate increase in downstream economic damages to water users.

EPA has identified that more than 60 percent of the salt load of the Colorado River comes from natural sources. The majority of land within the Colorado River Basin is federally owned, much of which is administered by the Bureau of Land Management (BLM). In authorizing the Program, Congress recognized that most of the salts in the Colorado River originate from federally owned lands. Title I of the Act deals with programs downstream of Imperial Dam that enable the U.S. to meet its commitment regarding the quality of waters being delivered to Mexico (Minute No. 242 of the International Boundary and Water Commission, United States and Mexico). Title II of the Act addresses measures upstream from Imperial Dam, thus improving the quality of the water delivered to users in the United States. This testimony deals specifically with Title II efforts.

In the early years of the Program, Reclamation implemented salinity control through large projects, which were funded with specific line-item amounts. In 1995, Congress amended the Act and created Reclamation's Basinwide Program. Under this program, Reclamation funds competitive proposals for projects which will decrease the salt load to the Colorado River. Most of the received proposals target off-farm irrigation distribution systems such as canals and laterals. The lining or piping of canals and laterals prevents leakage of water into the groundwater system and the dissolution and transportation of salts to the Colorado River and its tributaries. It is more efficient and cost effective for Reclamation to perform the off-farm distribution system improvements prior to NRCS treating the on-farm acres with salinity control practices (i.e., Reclamation should pipe a canal or lateral prior to the Natural Resources Conservation Service (NRCS) putting a pressurized sprinkler system on farm). Shortfalls in recent Basinwide Program funding levels have led to inefficiencies in the implementation of the overall Program. The funding amount identified above is required to get the Basinwide Program back on pace with the overall Program implementation needs.

Concentration of salt in the Colorado River causes approximately $354 million annually in quantified damages and significantly more in unquantified damages in the United States and results in poor water quality for United States users. Damages, by water usage sector, include the following:

—a reduction in the ability to reclaim and reuse water for beneficial uses, including drinking water and irrigation water supplies, due to high salinities in the water delivered to water treatment and reclamation facilities,

—a reduction in the yield of salt sensitive crops, increased water use to meet leaching requirements and additional actions necessary to comply with the Clean Water Act within the agricultural sector,

—increased use of imported water and cost of desalination and brine disposal for recycling water in the municipal sector,

—a reduction in the useful life of galvanized water pipe systems, water heaters, faucets, garbage disposals, clothes washers and dishwashers, and increased use of bottled water and water softeners in the household sector,

—an increase in the cost of cooling operations and the cost of water softening, and a decrease in equipment service life in the commercial sector,

—an increase in the use of water and the cost of water treatment, and a corresponding increase in sewer fees in the industrial sector,

—a decrease in the lifespan of treatment facilities and pipelines in the utility sector, and

—difficulty in meeting wastewater discharge requirements to comply with National Pollutant Discharge Elimination System permit terms and conditions, and an increase in desalination and brine disposal costs necessary to minimize accumulation of salts in groundwater basins.

The Colorado River Basin Salinity Control Forum (Forum) is composed of gubernatorial appointees from Arizona, California, Colorado, Nevada, New Mexico, Utah and Wyoming. The Forum is charged with reviewing the Colorado River's water quality standards for salinity every three years to facilitate compliance with Section 303(c) of the Clean Water Act (P.L. 92–500). In so doing, it adopts a Plan of Implementation consistent with these standards. The level of appropriation requested in this testimony is in keeping with the adopted Plan of Implementation. If adequate funds are not appropriated, significant damages from higher salinity concentrations in the water will be more widespread in the United States and Mexico.

In summary, implementation of salinity control practices through Reclamation's Basinwide Program has proven to be a very cost-effective method of controlling the salinity of the Colorado River and is an essential component to the overall Program. Adequate funding levels for salinity control within this Program will prevent the water quality of the Colorado River from further degradation and significant increases in economic damages to municipal, industrial and irrigation users. A modest investment in source control pays huge dividends in improved water quality for nearly 40 million Americans.

[This statement was submitted by Don A. Barnett, Executive Director, Colorado River Basin Salinity Control Forum.]

PREPARED STATEMENT OF THE COLORADO RIVER BASIN SALINITY CONTROL PROGRAM

SUMMARY

This Statement is submitted in support of Fiscal Year 2022 appropriations for the Colorado River Basin Salinity Control Program (Program) of the Department of the Interior's Bureau of Reclamation (Reclamation). Reclamation serves as the lead federal agency in implementing the Program. Reclamation primarily institutes salinity control through its Basinwide Program. A total of $10,700,000 is requested for Fiscal Year 2022 to implement the authorized salinity control program of the Bureau of Reclamation. An appropriation of $10,700,000 for Reclamation's salinity control program is needed to protect water quality standards for salinity and to prevent unnecessary levels of economic damage from increased salinity in water delivered to the Lower Basin States of the Colorado River.

STATEMENT

The water quality standards for salinity of the Colorado River must be protected while the Basin States continue to develop their compact apportioned waters of the river. The salinity standards for the Colorado River have been adopted by the seven Basin States and approved by the Environmental Protection Agency. While currently the standards have not been exceeded, salinity control projects must be brought on-line in a timely manner to counter the effects of future development that could result in unnecessary damages from higher levels of salinity in the water delivered to the Lower Basin States of the Colorado River.

The seven Colorado River Basin States, in response to the Clean Water Act of 1972, formed the Colorado River Basin Salinity Control Forum (Forum), a body comprised of gubernatorial representatives from the seven states. The Forum was created to provide for interstate cooperation in response to the Clean Water Act and to provide the states with information necessary to comply with Sections 303(a) and (b) of the Act. The Forum has become the primary means for the Basin States to coordinate with federal agencies and Congress to support the implementation of the salinity control program for the Colorado River Basin.

The Colorado River Basin Salinity Control Act was authorized by Congress and signed into law in 1974. This authorized the Secretary of the Interior to initiate the Program, and it created the Colorado River Basin Salinity Control Advisory Council representing the seven Basin States. This federal advisory committee works closely with the Forum.

Colorado River water is used by approximately 40 million people and irrigates approximately 5.5 million acres in the United States. Bureau of Reclamation studies show that quantified damages from Colorado River salinity to United States water users are about $354 million per year. Unquantified damages are greater. Reclamation's modeling indicates that the quantifiable damages would increase to $671 million per year by 2040 if the Program is not continued. Control of salinity is necessary for the states of the Colorado River Basin, including New Mexico, to continue to develop their compact-apportioned waters of the Colorado River.

Timely appropriations for the funding of the salinity control program are essential to comply with the water quality standards for salinity, prevent unnecessary economic damages in the United States, and protect the quality of the water that the United States is obligated to deliver to Mexico. The Basin States and federal agencies agree that increases in the salinity of the Colorado River will result in significant increases in damages to water users in the Lower Colorado River Basin. Continued strong support and adequate funding of the salinity control program is required to control salinity-related damages in the United States and Mexico.

Congress amended the Colorado River Basin Salinity Control Act in July 1995 (Public Law 104–20), creating Reclamation's Basinwide Program. The Basinwide Program has proven to be cost-effective, and the Basin States provide up-front cost-

sharing. Proposals from public and private sector entities in response to Reclamation's requests for proposals and funding opportunity announcements have exceeded available funding appropriated in recent years. The Basin States' cost-sharing adds 43 cents for each federal dollar appropriated.

Public Law 106–459 gave the Bureau of Reclamation additional spending authority for the salinity control program. With the additional authority in place and cost-sharing available from the Basin States, it is important that the salinity control program be funded at the level requested by the Forum and Basin States to protect the water quality of the Colorado River. Some of the most cost-effective salinity control opportunities occur when Reclamation improves irrigation delivery systems concurrently with on-farm irrigation improvements undertaken by the U.S. Department of Agriculture's Environmental Quality Incentives Program (EQIP). The Basin States cost-share funding is available for both on-farm and off-farm improvements. The EQIP funding appears to be adequate to accomplish the on-farm work. Adequate funding for Reclamation's off-farm work is needed to maintain timely implementation and effectiveness of salinity control measures.

I urge Congress to appropriate $10.7 million to the Basinwide Program of the Bureau of Reclamation for the Colorado River Basin Salinity Control Program. This investment in water quality will pay for itself many times over. Also, I fully support testimony by the Forum's Executive Director, Don Barnett, in request of this appropriation.

[This statement was submitted by Rolf Schmidt-Petersen, Director, New Mexico Interstate Stream Commission.]

PREPARED STATEMENT OF THE COLORADO RIVER BASIN SALINITY CONTROL PROGRAM

SUMMARY

This Statement is submitted in support of Fiscal Year 2022 appropriations for the Colorado River Basin Salinity Control Program (Program) of the Department of the Interior's Bureau of Reclamation (Reclamation). Reclamation serves as the lead federal agency in implementing the Program. Reclamation primarily institutes salinity control through its Basinwide Program. A total of $10,700,000 is requested for Fiscal Year 2022 to implement the authorized salinity control program of the Bureau of Reclamation. An appropriation of $10,700,000 for Reclamation's salinity control program is needed to protect water quality standards for salinity and to prevent unnecessary levels of economic damage from increased salinity in water delivered to the Lower Basin States of the Colorado River.

STATEMENT

The water quality standards for salinity of the Colorado River must be protected while the Basin States continue to develop their compact apportioned waters of the river. The salinity standards for the Colorado River have been adopted by the seven Basin States and approved by the Environmental Protection Agency. While currently the standards have not been exceeded, salinity control projects must be brought on-line in a timely manner to counter the effects of future development that could result in unnecessary damages from higher levels of salinity in the water delivered to the Lower Basin States of the Colorado River.

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The Colorado River Basin Salinity Control Act was authorized by Congress and signed into law in 1974. This authorized the Secretary of the Interior to initiate the Program, and it created the Colorado River Basin Salinity Control Advisory Council representing the seven Basin States. This federal advisory committee works closely with the Forum.

Colorado River water is used by approximately 40 million people and irrigates approximately 5.5 million acres in the United States. Bureau of Reclamation studies show that quantified damages from Colorado River salinity to United States water users are about $354 million per year. Unquantified damages are greater. Reclamation's modeling indicates that the quantifiable damages would increase to $671 million per year by 2040 if the Program is not continued. Control of salinity is nec-

essary for the states of the Colorado River Basin, including New Mexico, to continue to develop their compact-apportioned waters of the Colorado River.

Timely appropriations for the funding of the salinity control program are essential to comply with the water quality standards for salinity, prevent unnecessary economic damages in the United States, and protect the quality of the water that the United States is obligated to deliver to Mexico. The Basin States and federal agencies agree that increases in the salinity of the Colorado River will result in significant increases in damages to water users in the Lower Colorado River Basin. Continued strong support and adequate funding of the salinity control program is required to control salinity-related damages in the United States and Mexico.

Congress amended the Colorado River Basin Salinity Control Act in July 1995 (Public Law 104–20), creating Reclamation's Basinwide Program. The Basinwide Program has proven to be cost-effective, and the Basin States provide up-front cost-sharing. Proposals from public and private sector entities in response to Reclamation's requests for proposals and funding opportunity announcements have exceeded available funding appropriated in recent years. The Basin States' cost-sharing adds 43 cents for each federal dollar appropriated.

Public Law 106–459 gave the Bureau of Reclamation additional spending authority for the salinity control program. With the additional authority in place and cost-sharing available from the Basin States, it is important that the salinity control program be funded at the level requested by the Forum and Basin States to protect the water quality of the Colorado River. Some of the most cost-effective salinity control opportunities occur when Reclamation improves irrigation delivery systems concurrently with on-farm irrigation improvements undertaken by the U.S. Department of Agriculture's Environmental Quality Incentives Program (EQIP). The Basin States cost-share funding is available for both on-farm and off-farm improvements. The EQIP funding appears to be adequate to accomplish the on-farm work. Adequate funding for Reclamation's off-farm work is needed to maintain timely implementation and effectiveness of salinity control measures.

I urge Congress to appropriate $10.7 million to the Basinwide Program of the Bureau of Reclamation for the Colorado River Basin Salinity Control Program. This investment in water quality will pay for itself many times over. Also, I fully support testimony by the Forum's Executive Director, Don Barnett, in request of this appropriation.

[This statement was submitted by Rolf Schmidt-Petersen, Director, New Mexico Interstate Stream Commission.]

PREPARED STATEMENT OF THE COLORADO RIVER BOARD OF CALIFORNIA

This testimony is in support of Fiscal Year (FY) 2022 funding for the Department of the Interior for Title II Colorado River Basin Salinity Control Act of 1974 (P.L. 93–320), as amended. In the Act, Congress designated the Department of the Interior, Bureau of Reclamation (Reclamation) to be the lead agency for salinity control in the Colorado River Basin. Reclamation primarily implements salinity control through its Basinwide Program, established by Congress through an amendment to the Act in 1995. Funding levels for the Basinwide Program have fallen behind in recent years, and a funding level of $10.7 million is requested to be provided in FY–2022 to prevent further degradation of the quality of Colorado River water supplies and increased economic damages.

The Colorado River System is used by approximately 40 million people for municipal and industrial purposes and used to irrigate approximately 5.5 million acres in the United States, and supplies municipal and agricultural uses in Mexico. Within Southern California, the Colorado River serves close to 20 million residents and 860,000 acres of irrigated agriculture, including municipal, industrial, and agricultural water users in Imperial, Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura Counties. Natural and human-induced salt loading to the Colorado River creates environmental and economic damages. In 2020 Reclamation estimated the quantifiable economic damages from salt in the Colorado River at about $354 million per year. Modeling by Reclamation indicates that these economic damages could rise to nearly $671 million annually by the year 2040 without continued implementation of the Basinwide Program.

The Colorado River Board of California is the state agency charged with protecting California's interests and rights in the water and power resources of the Colorado River system. In this capacity, California participates along with the other six Colorado River Basin states in the Colorado River Basin Salinity Control Forum (Forum), the interstate organization responsible for coordinating the Basin States' salinity control efforts. In close cooperation with the U.S. Environmental Protection

Agency (EPA) and pursuant to requirements of the Clean Water Act, the Forum is charged with reviewing the Colorado River's water quality standards every three years. Every three years the Forum also adopts a Plan of Implementation consistent with these water quality standards. The level of appropriation being supported by this testimony is consistent with the Forum's 2020 Plan of Implementation for continued salinity control efforts within the Colorado River Basin. The Forum's 2020 Plan of Implementation can be found on this website: https://coloradoriversalinity.org/docs/2020%20REVIEW%20-%20Final%20w%20appendices.pdf.

If adequate funds are not appropriated to Reclamation's Basinwide Program, significant environmental and economic damages associated with increasing salinity concentrations in Colorado River water will become more widespread in the United States and Mexican portions of the Colorado River Basin. For example, damages occur from:

—A reduction in the ability and increased costs to reclaim and reuse water for consumptive beneficial use, including drinking water supply and irrigation, due to high salinities in the water delivered to water treatment and reclamation facilities;

—A reduction in the yield of salt-sensitive crops, increased water use to meet the leaching requirements to maintain crop productivity, and additional actions necessary to comply with the Clean Water Act in the agricultural sector;

—Increased use of imported water and increased cost of desalination and brine disposal for recycling water in the municipal sector;

—A reduction in the useful life of galvanized water pipe systems, water heaters, faucets, garbage disposals, clothes washers and dishwashers, and increased use of bottled water and water softeners in the residential sector;

—An increase in the cost of cooling operations and the cost of water softening, and a decrease in equipment service life in the commercial sector;

—An increase in the use of water and the cost of water treatment, and a corresponding increase in sewer fees in the industrial sector;

—A decrease in the lifespan of treatment facilities and pipelines in the utility sector; and

—Difficulty in meeting wastewater discharge requirements to comply with National Pollutant Discharge Elimination System permit terms and conditions, and an increase in desalination and brine disposal costs necessary to minimize accumulation of salts in groundwater basins.

The 2020 Plan of Implementation, as adopted by the Basin States and approved by EPA, calls for 62,400 tons annually of additional salinity control measures to be implemented by Reclamation, Natural Resources Conservation Service, and Bureau of Land Management by 2024. Over the past years, the Basinwide Program has proven to be a very cost-effective approach to help mitigate the impacts of increased salinity in the Colorado River. Adequate federal funding of this important program is essential. Based on current program cost levels, Reclamation's funding for the Basinwide Program must be at least $10.7 million to meet those annual salinity control targets.

The Colorado River is, and will continue to be, a major and vital water resource to the nearly 20 million residents of southern California, including municipal, industrial, and agricultural water users in Imperial, Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura Counties. The protection and improvement of Colorado River water quality through an effective salinity control program avoids additional economic and environmental damages to California, the other Colorado River Basin states and Mexico that rely on Colorado River water resources.

Thank you for your consideration of this testimony.

[This statement was submitted by Christopher S. Harris, Executive Director, Colorado River Board of California.]

PREPARED STATEMENT OF COLORADO SPRINGS UTILITIES

Dear Chairman Feinstein and Senator Kennedy:

I am writing to you on behalf of Colorado Springs Utilities to request your support for appropriations included in the President's recommended budget for FY 2022 to the Bureau of Reclamation, Upper Colorado Region for the Colorado River Compliance Activities and Endangered Species Programs.

Colorado Springs Utilities is the largest community-owned, not-for-profit, four-service utility in the nation. We provide water, wastewater, gas, and electric utility services to approximately 500,000 residents in the Pikes Peak Region of Colorado. The successful continuation of the Colorado River Compliance Activities and Endan-

gered Species Programs are of great importance to Colorado Springs Utilities and our community. These collaborative programs are critical to improving, conserving, and recovering endangered fish species, while maintaining water use and development, ESA compliance, and federal project authorized purposes.

The President's recommended budget included the following items and amounts:

Endangered Species Programs: The Endangered Species Programs provide $5.7 million for the Upper Colorado and San Juan River Endangered Fish Recovery programs for construction of facilities needed to recover endangered fish species: $2,500,000 for construction of a fish barrier at the Farmer's Mutual Ditch diversion structure on the San Juan River in northwest New Mexico, $500,000 for floodplain habitat development in northwest New Mexico on the San Juan River, $2,550,000 for rehabilitation of the fish screen and passage at the Grand Valley Irrigation Company diversion on the Colorado River near Grand Junction Colorado, and $150,000 for Upper Colorado Program Management for contracting, budgeting, reporting, contract administration, tracking expenditures, and addressing issues and concerns associated with capital project construction.

Colorado River Compliance Activities: The President's budget requests $21,400,000 for Colorado River Compliance Activities that includes:

—$8,640,000 for the Upper Colorado and San Juan River Endangered Fish Recovery Programs to restore critical habitat, enhance stream flows, maintain fish ladders and screens, augment and conserve genetic integrity through hatcheries and stocking efforts, manage non-native and sport fish, and research and monitoring to provide the scientific basis to guide decision making.

—$11,360,000 for the Glen Canyon Adaptive Management Program for scientific investigations, experimentation using Glen Canyon Dam releases and other tasks required to increase understanding of how to operate Glen Canyon Dam to meet statutory requirements, and experimental flow research.

—$1,400,000 for water quality and consumptive use studies to provide data required to meet legal agreements that regulate the flow and quality of the river and support consumptive use studies of water for municipal, industrial, and agricultural uses.

These highly successful, cooperative programs are ongoing partnerships among the states of New Mexico, Colorado, Utah and Wyoming, Indian tribes, federal agencies and water, power and environmental interests. The programs' objectives are to recover endangered fish species while water use and development proceeds in compliance with the Endangered Species Act. The programs provide ESA compliance for approximately 2,500 water projects in the Upper Colorado River Basin, including every Bureau of Reclamation project upstream of Lake Powell.

We appreciate the Subcommittee's past support and request the Subcommittee's assistance for fiscal year 2022 funding to ensure the Bureau of Reclamation's continued financial participation in and provision of federal cost sharing for these vitally important programs.

Sincerely.

[This statement was submitted by Earl Wilkinson III, Chief Water Compliance Innovation Officer, Colorado Springs Utilities.]

PREPARED STATEMENT OF COLORADO SPRINGS UTILITIES

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The President's recommended budget included the following items and amounts:

Endangered Species Programs: The Endangered Species Programs provide $5.7 million for the Upper Colorado and San Juan River Endangered Fish Recovery programs for construction of facilities needed to recover endangered fish species: $2,500,000 for construction of a fish barrier at the Farmer's Mutual Ditch diversion structure on the San Juan River in northwest New Mexico, $500,000 for floodplain

habitat development in northwest New Mexico on the San Juan River, $2,550,000 for rehabilitation of the fish screen and passage at the Grand Valley Irrigation Company diversion on the Colorado River near Grand Junction Colorado, and $150,000 for Upper Colorado Program Management for contracting, budgeting, reporting, contract administration, tracking expenditures, and addressing issues and concerns associated with capital project construction.

Colorado River Compliance Activities: The President's budget requests $21,400,000 for Colorado River Compliance Activities that includes:

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We appreciate the Subcommittee's past support and request the Subcommittee's assistance for fiscal year 2022 funding to ensure the Bureau of Reclamation's continued financial participation in and provision of federal cost sharing for these vitally important programs.

Sincerely.

[This statement was submitted by Earl Wilkinson III, Chief Water Compliance Innovation Officer, Colorado Springs Utilities.]

PREPARED STATEMENT OF THE COLORADO WATER CONGRESS

I am requesting your support for appropriations in the President's recommended budget for FY 2022 to the Bureau of Reclamation, Upper Colorado Region for the Upper Colorado River Endangered Fish Recovery Program and the San Juan River Basin Recovery Implementation Program. The budget items and amounts requested in the President's budget for these programs are described below.

Endangered Species Programs: The Endangered Species Program also provides $5.7 million for the Upper Colorado and San Juan River Endangered Fish Recovery programs for construction of facilities need to recover endangered fish species: $2,500,000 for construction of a fish barrier at the Farmer's Mutual Ditch diversion structure on the San Juan River in northwest New Mexico, $500,000 for floodplain habitat development in northwest New Mexico on the San Juan River, $2,550,000 for rehabilitation of the fish screen and passage at the Grand Valley Irrigation Company diversion on the Colorado River near Grand Junction Colorado, and $150,000 for Upper Colorado Program Management for contracting, budgeting, reporting, contract administration, tracking expenditures, and addressing issues and concerns associated with capital project construction.

Colorado River Compliance Activities: The President's budget requests $21,400,000 for Colorado River Compliance Activities that includes

—$8,640,000 for the Upper Colorado and San Juan Endangered Fish Recovery Programs to restore critical habitat, enhance stream flows, maintain fish ladders and screens, augment and conservation of genetic integrity through hatcheries and stocking efforts, manage non-native and sport fish, and research and monitoring to provide the scientific basis to guide decision making.

—$11,360,000 for the Glen Canyon Adaptive Management Program for scientific investigations, experimentation using Glen Canyon Dam releases and other tasks required to increase understanding of how to operate Glen Canyon Dam to meet statutory requirements, and experimental flow research.

—$1,400,000 for water quality and consumptive use studies to provide data required to meet legal agreements that regulate the flow and quality of the river

and support consumptive use studies of water for municipal, industrial, agricultural uses.

This funding for the recovery programs is authorized by P.L. 106–392, as amended.

These highly successful, cooperative programs are ongoing partnerships among the states of New Mexico, Colorado, Utah and Wyoming, Indian tribes, federal agencies and water, power and environmental interests. The programs' objectives are to recover endangered fish species while water use and development proceeds in compliance with the Endangered Species Act. The programs provide ESA compliance for approximately 2,500 water projects in the Upper Colorado River Basin, including every Reclamation project upstream of Lake Powell.

I appreciate the Subcommittee's past support and request the Subcommittee's assistance for fiscal year 2022 funding to ensure the Bureau of Reclamation's continuing financial participation in and provision of federal cost sharing for these vitally important programs.

Sincerely.

[This statement was submitted by Doug Kemper, Executive Director, Colorado Water Congress.]

PREPARED STATEMENT OF THE COLUMBIA BASIN DEVELOPMENT LEAGUE

Chairman Feinstein, Ranking Member Kennedy, members of the Subcommittee, thank you for giving the Columbia Basin Development League (League) the opportunity to submit testimony on the Bureau of Reclamation's budget for fiscal year 2022. This testimony is submitted on behalf of the League, its members, and stakeholders. The League is made up of farmers, businesses, civic and economic groups, and individuals that recognize the importance of completing the Bureau of Reclamation's Columbia Basin Project (CBP). The CBP is the largest Reclamation project in the U.S. and generates over $5.81 billion in annual, cumulative economic activity. The League was organized in the early 1960's to support the CBP so as to ensure delivery of essential water supplies to highly productive agricultural land in Washington State.

The League's long-term goal is full development of the CBP; but today it remains about 3/4 developed. And while the CBP is an existing line item in the Bureau of Reclamation's budget, we request an increase to that line item with funding dedicated to a critical economic and environmental issue: the decline of the Odessa Aquifer. The Odessa Aquifer is on the eastern-most side of the CBP in a region authorized to receive water. The State of Washington issued ground water permits in the 1960's and 1970's so agricultural and economic development could begin in the area while local communities waited for the federal government to build out the CBP. As already mentioned, the CBP is 3/4 completed. While communities and farmers waited, ground water levels severe declined in the Odessa region.

Saving the Odessa Aquifer would keep and create jobs in both the near and long term, maintain agricultural production, improve food security, protect and bolster economic vitality of Eastern Washington's communities, and fulfill a federal commitment—decades in the making—by providing access to the critical resource of water.

Since 1980, ground water levels in the Odessa area have dropped approximately 200 feet. In some cases, ground water must be pumped from wells as deep as 2,400 feet. Pumping water from this depth is costly and water found at this depth is of poor quality: high sodium concentrations, and often requiring treatment before use. Numerous farmers, and increasingly, municipalities drawing from the same aquifer have wells that are no longer productive, or produce water of such poor quality that is not useable. As the aquifer continues to decline, well failures increase.

Many parts of the United States are dealing with declining aquifers and share the economic consequences. However, the ground water supplies in the Odessa, unlike many other areas, can be replaced with a sustainable supply of surface water. The water and associated water rights are available and already secured. However, the water delivery infrastructure necessary to secure the entire region's economic vitality needs to be completed.

To solve this issue, the Odessa Ground Water Replacement Project (OGWRP) was established as the preferred alternative in the 2012 Odessa Subarea Special Study Final Environmental Impact Statement. OGWRP seeks to supply surface water from the CBP to irrigate land currently using ground water (as planned by the Bureau of Reclamation for build-out of the CBP). In addition to other dedicated CBP funding, the OGWRP received $1.28 million in formulated funding and $222,000 in additional capacity in FY2021. The President's FY2022 budget request includes

$27,985,000 for the CBP. A portion of these funds would be used for a variety of programs, including the phased development of the OGWRP.

We respectfully request Congress invest an additional $18,525,000 specifically for the OGWRP in FY2022.

The OGWRP is an environmental and regional economy rescue program. Ground water supplies conserved, as a result of OGWRP, will be reserved for domestic and municipal uses while preserving highly productive irrigated lands that drive thousands of jobs in the region. The program has completed all required environmental, water rights and Endangered Species Act reviews and is already in phased construction. A series of pumping plant and pipeline systems are being built along East Low Canal to serve land now irrigated from deep wells. The first system to be constructed at East Low (EL) canal mile 47.5 began operating this irrigation season. Three more systems are in the design phase. Our request of this subcommittee is for the necessary funding to complete those designs and begin design on additional systems required to implement Reclamation's preferred alternative for the program, which has a positive benefit/cost ration allowing Reclamation investment. Our request also includes $1,676,000 to automate East Low Canal (ELC) gravity head gates to adjust for fluctuations resulting from conveyance of new pump plant diversions. The automated gates will create consistent lateral flows regardless of canal fluctuations, reducing waste and labor and resulting in water conservation and safe operations.

The State of Washington and local land owners recognize the vital importance of finding a sustainable water supply. Since 2005, the state has contributed over $125 million in funding for projects to supply water to the Odessa region. This includes construction of major infrastructure components (including structures like siphons) which become the property of the federal government upon completion. Local landowners also invest in this project through the repayment of municipal bonds secured by the East Columbia Basin Irrigation District. These are significant investments in federally-owned projects.

Funding for OGWRP presents an excellent opportunity for federal investment in an innovative infrastructure project for rural and underserved communities. Additional funding will specifically help complete expansion of the East Low Canal and build out the pump and pipeline infrastructure necessary for surface water deliver to farmers. These are shovel ready projects that are vital for the continued development of the CBP as well as the preservation of groundwater for multiple municipalities across the region. Details for the various components are provided below. Without OGWRP, the aquifer will continue to decline at an unsustainable rate and both agricultural water supplies and the domestic water supply of many underserved communities will dry up. Allocating an additional $18,525,000 to the Bureau of Reclamation for OGWRP will help save these communities and protect annual economic activity that sustains the region.

The League recognizes the Senate Committee on Appropriations, and the Subcommittee on Energy and Water Development face numerous challenges as a part of the FY2022 appropriations process. We greatly appreciate the efforts of the Appropriations Committee as it works to address these challenges. We also appreciate the support and work of the Bureau of Reclamation, the State of Washington, and Washington's Congressional delegation. Their efforts are integral to meeting current and future water supply needs.

Chairman Feinstein and Ranking Member Kennedy, thank you again for giving the League the opportunity to provide testimony and thank you for your efforts to fund our nation's water infrastructure. Please let us know if the League and its members can be of assistance to you during this process.

Respectfully.

[This statement was submitted by Vicky Scharlau, Executive Director, Columbia Basin Development League.]

PREPARED STATEMENT OF THE COLUMBIA RIVER INTER-TRIBAL FISH COMMISSION

Madam Chair and members of the subcommittee, the Columbia River Inter-Tribal Fish Commission (CRITFC) is pleased to share its view on the U.S. Army Corps of Engineers (Corps) FY2022 budget. My testimony addresses FY 2022 and includes a summary of Corps projects developing in coming years. We specifically identify the following FY 2022 requests:

—$25.7 million—Columbia River Fish Mitigation—WA–OR–ID
  —$22M—Columbia River Biological Opinion
  —$3.7M—Willamette River Biological Opinion

—$3.0 million—John Day Mitigation/The Dalles Dam Pre-Engineering and Design with FY 2022 Workplan support
—$1.01 million—Tribal Partnership Program (TPP) for a Columbia River Zone 6 Tributary Delta Feasibility Study to address sediment management issues

The CRITFC request will support implementation of the Columbia River and Willamette River Biological Opinions, continued funding support for the full implementation of the John Day/The Dalles Dam Mitigation program and funds for the initiation of a Tribal Participation Project focused on Columbia River Bonneville Pool sediment issues. We appreciate the support in FY 2021 for Corps-implemented Pacific lamprey projects in fulfillment of federal commitments under the Columbia Basin Fish Accords.

Program Description: The Corps' Columbia River Fisheries Mitigation (CRFM) program mitigates impacts to anadromous fish resulting from the development and operation of federal dams on the mainstem Columbia and Snake rivers. Authority for this program is contained in the original Congressional dam construction and operation authorities.

The partnership between the Corps and the Lower Columbia River treaty tribes has expanded under the Columbia Basin Fish Accords. Multiple projects have been developed, funded, and completed. The record of success drove the agreement for a four-year extension of the Accords (2019–2022) to support projects in progress or in development.

Reviewing the BiOp and Proposed Action (PA) and commitments made in those documents, this level of funding is inadequate to meet these needs let alone additional needs that the tribes and other regional entities have identified. In addition, new needs are becoming more apparent such as the need for additional detections both upstream and downstream of Bonneville Dam to ensure reach survivals can be calculated. The new flex spill program has, through its success of diverting more migrating fish away from powerhouses, reduced detections and thus made it challenging if not impossible to estimate reach survivals. Future management actions will be based on this information. The BiOp and PA also outline a need to evaluate the flex spill program yet no funds have been identified for this.

The operation and management budget (O&M) has been flat funded and continues to be so. However, the new BiOp and PA has shifted more actions and responsibilities to the O&M budget, such as avian dissuasion and monitoring in the estuary. When one considers inflation and salary increase, it is apparent that this is an untenable position. These plans are requiring more from a budget that is already stretched too thin. The O&M budget is struggling to maintain the existing system let alone dealing with the aging infrastructure without even considering new obligations.

The Tribes are concerned that the Administration's trend in recent years of decreases to the CRFM budgets and this year's more than 29% proposed decrease in funding for CRFM—Columbia River leaves critical projects without budget support resulting in, for example:

—Reduction in management for avian predators, including the estuary and dam tailraces;
—Delay of the Bonneville Dam Second Powerhouse fish guidance improvement that would benefit both power operations and fish survival;
—Reductions by half the Corps' contribution to habitat improvements in the Columbia River estuary;
—Reductions by more than half of funds needed for research and development in the CRFM project area; and
—Additional pressures on already under-funded operations and maintenance budgets.

Recently, the Corps expanded the purposes of CRFM to include implementation of fish passage related improvements to Corps dams in the Willamette River basin and implementation of lamprey passage improvements at mainstem dams on the Columbia and Snake rivers through agreements detailed in the Columbia Basin Fish Accords. The revised cost and schedule from the Corps is calculated at $2.79 million through 2023. The Administration's request is contrary to that schedule.

John Day & The Dalles Fish Mitigation: Achieving In-place, In-kind Mitigation

Prior to hydropower development, the mainstem Columbia River from Celilo Falls to the confluence of the Snake River was one of the most important spawning and early rearing areas for upriver bright fall chinook. Construction of The Dalles Dam in 1957 and John Day Dam in 1967 inundated much of the available spawning habitat for fall chinook in the mainstem Columbia River. In the John Day and The Dalles Dam Mitigation program (JDTDM) Congress authorized the Corps to mitigate for anticipated future natural production losses caused by construction of the

dams as early as 1948. Funding for JDTDM was used initially to produce fall chinook at Bonneville State Hatchery and Spring Creek National Fish Hatchery, both of which are located downstream from the areas affected by the John Day and The Dalles dams and centuries old tribal fisheries.

While several production program adjustments have occurred in the last 10 years, additional work is still needed to meet in-place/in-kind mitigation objectives under the COE's JDTDM program to put the right fish (upriver bright fall chinook) in the right places (in the area impacted by the John Day and The Dalles Dams). Additional hatchery infrastructure is necessary to accommodate increased production of upriver bright fall chinook at an expanded Ringold Springs Hatchery or alternative to be developed by the Corps in FY 2022. To implement the plan developed in collaboration by the Corps, the treaty tribes and state co-managers and federal fish agencies, we anticipate the Corps will make a budget request for design and construction at the Ringold Springs Hatchery or other suitable alternative for FY 2022.

Pacific Lamprey Restoration Projects Restarted with FY 2020 Workplan Support

The Corps and the Commission's member tribes have been implementing a multi-year lamprey plan while simultaneously implementing high priority lamprey actions. The Columbia Basin Fish Accords have given both flexibility and stability to tribal projects and the contracting process. We are able to plan projects over longer—more meaningful—timeframes and adjust tasks between years, where necessary, for the good of the project or to address regional needs. The result is improved and more efficient projects and process. And the lamprey resource has responded, as measured through increased counts at mainstem Columbia River dams, increases in volitional returns of adults to the tributaries (guided by larval pheromones), documented spawning success, increases in larval abundance, and detections of translocation offspring and upper Columbia Basin siblings in the mainstem as outmigrants and in adult collections from the ocean. The long and complex life cycle of Pacific lamprey (~ up to 10 years from hatching to returning adults), combined with the lack of homing, requires a long-term strategy to address critical uncertainties and support conservation and restoration efforts. However, the numbers remain well below historical accounts of lamprey populations throughout the Columbia Basin. It should be noted that the benefits that lamprey provide to other fish and wildlife species cannot be overstated.

The Tribal-Corps lamprey technical team has worked collaboratively to identify priority lamprey actions throughout the Accord and Accord Extension periods. We are grateful for the robust commitment of project funds in the FY2021 Workplan in fulfillment of the Corps' four-year Accord extension. The Corps, CRITFC member tribes, and others are prioritizing the work to be accomplished with this funding. Priority actions being discussed include (but are not limited to) evaluating juvenile lamprey survival and downstream passage success through Columbia and Snake river dams, modifying fishways and lamprey-specific structures to improve upstream adult passage, and upgrading tribal translocation program infrastructure. Workplan funding has given assurance these projects will go forward, the investments made in the prior 12 years of work under the Accords will be protected, and lamprey populations will begin to reverse their precipitous decline. Based on the current inventory of unfunded projects, we expect that similar workplan commitments will be ongoing into the foreseeable future.

We ask Congress to fully support the Columbia River and Willamette River Biological Opinions through the Columbia River Fish Mitigation program above the request to include all capability identified by the Corps. These tribal recommendations total $25.7 million for FY2022.

History and Background of the Columbia River Inter-Tribal Fish Commission

CRITFC was founded in 1977 by the four Columbia River Treaty Tribes: Confederated Tribes of the Umatilla Indian Reservation, Confederated Tribes of the Warm Springs Reservation of Oregon, Confederated Tribes and Bands of the Yakama Nation, and the Nez Perce Tribe. CRITFC provides coordination and technical assistance to these tribes in regional, national and international efforts to protect and restore our shared salmon resource and the habitat upon which it depends. Our collective ancestral homeland covers nearly one-third of the entire Columbia River basin in the United States, an area the size of the State of Georgia.

In 1855, the U.S. entered into treaties with the four tribes [1] whereupon we ceded millions of acres of our homelands to the U.S. In return, the U.S. pledged to honor our ancestral rights, including the right to fish in all Usual and Accustomed locations. Unfortunately, a perilous history brought the salmon resource to the edge of extinction with 12 salmon and steelhead populations in the Columbia Basin listed under the Endangered Species Act (ESA).

The CRITFC tribes are globally recognized leaders in fisheries restoration and management working in collaboration with state, federal, and private entities. We are principals in the region's efforts to halt the decline of salmon, lamprey, and sturgeon populations and rebuild them to levels that support ceremonial, subsistence, and commercial harvests. To achieve these objectives, our actions emphasize 'gravel-to-gravel' management including supplementation of natural stocks, restoring healthy watersheds, and committing to collaborative efforts.

Ongoing and Future Need Areas Addressing Sedimentation in Lower Columbia Pools

Years of sediment accumulation behind federal hydropower projects in the lower Columbia River, and especially at the mouths of tributaries, is affecting the physical and biological characteristics of project reservoirs.

These characteristics are manifesting in ecosystem distress, navigation problems, and limiting access to treaty-protected tribal fishing access sites. Sediment accumulation affects invasive and non-native species management, anadromous fish migration, water quality temperature impairment, tribal fishing sites access, navigation hazards, increased need and risk in providing emergency response, and increased risk for recreational activities.

The Corps, in partnership with the Columbia River treaty tribes, have initiated work under the Water Resources Development Act and the Tribal Partnership Program on a feasibility study to identify a suite of possible management actions needed to address sediment issues in the Bonneville Pool on the Washington side of the river. Lessons learned in this pilot effort will be expanded to the Oregon side of the river as well as upstream into the other reservoirs created by the Columbia River Power System.

In summary, through the combined efforts of the four Columbia River treaty tribes, supported by a staff of experts, we are proven natural resource managers. Our activities benefit the region while also being essential to the U.S. obligation under treaties, federal trust responsibility, federal statutes, and court orders. We ask for your continued support of our efforts. We are prepared to provide additional information you may require on our views of the U.S. Army Corps of Engineers FY2022 Budget. Contact: Paul Ward, Director of Governmental Affairs, CRITFC, warp@critfc.org.

[This statement was submitted by Jeremy Takala, Chairman, Columbia River Inter-Tribal Fish Commission

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PREPARED STATEMENT OF DOLORES WATER CONSERVANCY DISTRICT

I am requesting your support for appropriations in the President's recommended budget for FY 2022 to the Bureau of Reclamation, Upper Colorado Region for the Upper Colorado River Endangered Fish Recovery Program and the San Juan River Basin Recovery Implementation Program. The budget items and amounts requested in the President's budget for these programs are described below.

Endangered Species Programs: The Endangered Species Program also provides $5.7 million for the Upper Colorado and San Juan River Endangered Fish Recovery programs for construction of facilities need to recover endangered fish species: $2,500,000 for construction of a fish barrier at the Farmer's Mutual Ditch diversion structure on the San Juan River in northwest New Mexico, $500,000 for floodplain habitat development in northwest New Mexico on the San Juan River, $2,550,000 for rehabilitation of the fish screen and passage at the Grand Valley Irrigation Company diversion on the Colorado River near Grand Junction Colorado, and $150,000 for Upper Colorado Program Management for contracting, budgeting, reporting, contract administration, tracking expenditures, and addressing issues and concerns associated with capital project construction.

Colorado River Compliance Activities: The President's budget requests $21,400,000 for Colorado River Compliance Activities that includes:

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[1] Treaty with the Yakama Nation, June 9, 1855, 12 Stat. 951; Treaty with the Tribes of Middle Oregon, June 25, 1855, 12 Stat. 963; Treaty with the Umatilla Tribe, June 9, 1855, 12 Stat. 945; Treaty with the Nez Perce Tribe, June 11, 1855, 12 Stat. 957.

—$8,640,000 for the Upper Colorado and San Juan Endangered Fish Recovery Programs to restore critical habitat, enhance stream flows, maintain fish ladders and screens, augment and conservation of genetic integrity through hatcheries and stocking efforts, manage non-native and sport fish, and research and monitoring to provide the scientific basis to guide decision making.
—$11,360,000 for the Glen Canyon Adaptive Management Program for scientific investigations, experimentation using Glen Canyon Dam releases and other tasks required to increase understanding of how to operate Glen Canyon Dam to meet statutory requirements, and experimental flow research.
—$1,400,000 for water quality and consumptive use studies to provide data required to meet legal agreements that regulate the flow and quality of the river and support consumptive use studies of water for municipal, industrial, agricultural uses.

This funding for the recovery programs is authorized by P.L. 106–392, as amended.

These highly successful, cooperative programs are ongoing partnerships among the states of New Mexico, Colorado, Utah and Wyoming, Indian tribes, federal agencies and water, power and environmental interests. The programs' objectives are to recover endangered fish species while water use and development proceeds in compliance with the Endangered Species Act. The programs provide ESA compliance for approximately 2,500 water projects in the Upper Colorado River Basin, including every Reclamation project upstream of Lake Powell.

Dolores Water Conservancy District believes that this program, which is successfully recovering the four ESA listed Upper Colorado and San Juan River Basin species, remains our best avenue to sustain our rural economy in southwestern Colorado in compliance with the necessary conservation of these fish. Any cessation of these programs would jeopardize the years of positive progress made to date and have rippling effects through our rural farming community supported by the Dolores Project, an integral part of the Colorado Ute Indian Rights Settlement.

I appreciate the Subcommittee's past support and request the Subcommittee's assistance for fiscal year 2022 funding to ensure the Bureau of Reclamation's continuing financial participation in and provision of federal cost sharing for these vitally important programs.

Sincerely.

[This statement was submitted by Kenneth W. Curtis III, General Manger, Dolores Water Conservancy District.]

PREPARED STATEMENT OF THE EDISON ELECTRIC INSTITUTE

The Edison Electric Institute (EEI) submits this testimony for the record to the Senate Committee on Appropriations Subcommittee on Energy and Water Development regarding fiscal year (FY) 2022 carbon-free energy research, development, demonstration, and commercial applications (RDD&CA) activities for the Department of Energy (DOE).

EEI is the association that represents all U.S. investor-owned electric companies. Our members provide electricity for 220 million Americans and operate in all 50 states and the District of Columbia. As a whole, the electric power industry supports more than 7 million jobs in communities across the United States. In addition to our U.S. members, EEI has more than 65 international electric companies as International Members, and hundreds of industry suppliers and related organizations as Associate Members. We are united in our commitment to get the energy we provide as clean as we can as fast as we can, without compromising on the reliability or affordability that are essential to the customers and communities we serve. Overall, carbon emissions from the electric power sector are at their lowest level since 1978- and continue to fall. Collectively, EEI's member companies are on a path to reduce their carbon emissions at least 80 percent by 2050, compared with 2005 levels, with many companies pledging to reduce their emissions even further and even faster. As of 2020, the industry is 40 percent below 2005 carbon emission levels. And, 40 percent of our nation's electricity comes from carbon-free resources.

Existing technologies can get us much of the way to a 100-percent clean energy future. Completing the work will require new, affordable, carbon-free, 24/7 technologies. As a result, there is an urgent need to significantly increase investments in these new clean energy technologies. Technology will drive the timeline to a 100-percent clean energy future.

Because of how electric companies are regulated at the state and federal levels, they cannot invest heavily in RDD&CA of new technologies; our industry is not like others, such as the defense or pharmaceutical industries, which spend billions of

dollars annually on research and development (R&D) activities. This is a major reason why EEI believes we cannot afford a "business-as-usual" approach to federal investments in carbon-free power technologies. The federal government's RDD&CA activities are a critical resource for our industry.

EEI has joined with non-governmental organizations to form the Carbon-Free Technology Initiative (CFTI), which is focused on implementation of federal policies that can help ensure the commercial availability of affordable, carbon-free, 24/7 power technology options by the early 2030s, when EEI's member companies must make investment decisions that will enable them to reach their longer-term climate commitments. The CFTI includes EEI and its member electric companies, Clean Air Task Force, Bipartisan Policy Center, Center for Climate and Energy Solutions, ClearPath, Great Plains Institute, Information Technology & Innovation Foundation, Nuclear Energy Institute, and Third Way.

The CFTI focuses on policy recommendations to advance a number of key technology areas:

—Long-duration energy storage and advanced demand efficiency;
—Advanced, 24/7, and renewable super hot rock deep geothermal;
—Zero-carbon fuels, such as hydrogen;
—Advanced nuclear energy (both fission and fusion);
—Carbon capture, utilization, and storage; and
—Advanced wind and solar energy systems.

CFTI also supports the creation of a domestic supply chain and increased demonstration projects for advanced clean energy technologies.

For FY 2022, CFTI recommends a nearly tripling of funds above the roughly $4.2 billion authorized levels for specific DOE RDD&CA programs for carbon-free power-sector technologies. Funding projects beyond R&D will be critical to achieving deep carbon reductions. At a minimum, key new authorizations from the Energy Act of 2020 should be fully funded in FY 2022 and should be increased above authorization levels through FY 2025.

The President's budget request for FY 2022 invests more than $10 billion in clean energy innovation across multiple non-defense agencies, DOE's budget request would make historic investments that would lay the foundation to build a clean energy economy and help the electric power industry reach its long-term carbon emission reduction goals.

We are very pleased that the President's budget request includes $400 million to create the Office of Clean Energy Demonstrations at DOE. This new entity would become the hub for scaling up near- and mid-term clean energy technology projects and provide awards for multi-year demonstration projects in conjunction with private-sector partners. The CFTI recommends the creation of the new office. It is essential that the federal government play a role in demonstrating new clean energy technologies to help provide enough certainty about the performance of a technology that lenders, plant owners, and customers consider it to be sufficiently de-risked for commercial use.

ADVANCED NUCLEAR

We recommend $2.23 billion in FY 2022 funding for high-priority advanced nuclear programs. This would include:

—Doubling appropriations to at least $340 million per FY for 5 years for nuclear fission technologies R&D within the light water sustainability reactor program, advanced reactor technology program, and used nuclear fuel disposition program;
—Providing up to $900 million per FY for the next 5 years to ensure that the Versatile Test Reactor (VTR) will come online by 2026;
—Establishing multi-year funding sufficient to support the existing Advanced Reactor Demonstration Program (ARDP) and providing continuing rounds of risk reduction awards to the projects awarded under ARDP's first phase, as well as expanding ARDP to fund additional projects, including additional awards for the commercial demonstration of 3 Generation IV reactor designs and an award for the commercial demonstration of 2 micro-reactor technologies that can be commercially deployed by 2027;
—Maintaining funding for existing programs benefitting advanced reactor development, such as the advanced small modular reactor cost-share; and
—Providing additional and consistent funding of at least $150 million per FY for at least 5 years to the Nuclear Regulatory Commission for advanced reactor licensing.

In addition, we recommend providing $1.2 billion per FY for the next 5 years for the applied fusion program that was authorized in the Energy Act of 2020.

ENERGY STORAGE

We recommend funding critical energy storage programs at the $648 million authorized level for FY 2022 and focusing the funding on longer-duration storage. We support:

—Maintaining or increasing funding for Energy Storage Grand Challenge, Grid Storage Launchpad, HydroWIRES, and ARPA–E DAYS;
—Increasing appropriations for the Grid Modernization Initiative (GMI) and ARPA–E's Green Electricity Network Integration (GENI);
—Establishing a financial assistance program to support demand efficiency R&D and pilot demonstrations involving upgraded software platforms, power system planning tools, and modeling platforms; and
—Directing DOE to utilize existing grant funding programs to prioritize pilot demonstration projects involving the integration of demand efficiency technologies.

ZERO-CARBON FUELS

We recommend appropriating $3.43 billion in FY 2022 for high-priority RDD&CA activities for zero-carbon fuels (ZCF), such as hydrogen. We support:

—Providing DOE with approximately $3 billion annually to support integrated demonstrations on a variety of use cases with ZCF and increasing appropriations for ZCF-related RDD&CA efforts to $400 million per FY;
—Fully funding at FY 2020 levels for at least 5 years (a 5-year, $50 million initiative) the H2NEW consortium and other existing Hydrogen and Fuel Cell Technologies (HFTO) consortia; and
—Increasing funding for HFTO and other DOE offices to create new consortia of electric companies and other types of energy and infrastructure companies to foster one or more integrated ZCF "value chain" demonstrations.

CARBON CAPTURE, UTILIZATION, AND STORAGE (CCUS)

Carbon capture for natural gas facilities is critical given the essential role that natural gas plays in providing 24/7 electricity as companies continue to add variable resources to the grid. For FY 2022, we recommend $4.995 billion for critical CCUS programs. We support:

—Establishing an additional grant program with at least $1.2 billion per FY for the 5 years that would be available to commercial-scale carbon capture projects to complete construction;
—Appropriating at least $500 million per FY through FY 2025 to facilitate the commercialization of large-scale saline storage locations with the capacity to accept at least 10 million tons of carbon dioxide (CO2);
—Increasing appropriations by $100 million annually for 5 fiscal years to provide funding to cover front-end engineering and design (FEED) studies for commercial-scale capture plants;
—Increasing appropriations to $700 million over the next 5 years for the Carbon Storage Assurance Facility Enterprise (CarbonSAFE) program to complete existing projects under Phase VI (covers six existing projects), and to initiate at least 4 new CarbonSAFE projects and provide support for their completion from Phase I to Phase VI;
—Increasing appropriations to $450–650 million per FY for at least 5 years for the Office of Fossil Energy's activities to improve the cost and performance of capture technologies;
—Providing $20 million for FEED study grants for CO2 transportation infrastructure.

SUPER HOT ROCK (SHR) DEEP GEOTHERMAL

We recommend appropriating $100 million in FY 2022 for SHR deep geothermal, including:

—At least $30 million per FY for 5 years for a dedicated program and laboratory focus on SHR geothermal innovation through coordination between ARPA–E and the Geothermal Technologies Office; and
—$70 million per FY for 5 years to support demonstration projects under different scenarios.

ADVANCED WIND AND SOLAR ENERGY

We recommend funding advanced wind and solar programs at the $425 million authorized funding level in FY 2022. In particular, we recommend identifying specific cost reduction targets and timetables across the value chain for advanced re-

newables R&D to help achieve cost targets by 2030 and amending R&D priorities to include offshore wind, onshore wind, solar, grid modernization, and end-of-life reuse.

[This statement was submitted by Thomas R. Kuhn, President, Edison Electric Institute.]

PREPARED STATEMENT OF THE ELECTRIC DRIVE TRANSPORTATION ASSOCIATION

The Electric Drive Transportation Association (EDTA) is the cross-industry trade association promoting the advancement of electric drive technology and electrified transportation. We are writing to support robust FY2022 funding for the Department of Energy (DOE) electric transportation programs, including the Vehicle Technologies Program, Hydrogen and Fuel Cell Technologies Office, ARPA–E, ARPA–C, Department of Energy Loan Programs, and Clean Cities. DOE's research, development and deployment programs speed clean technology innovation, increase U.S. competitiveness and will play an important role in achieving the Administration's goals for electric transportation.

EDTA's members represent the entire value chain of electric drive, including vehicle manufacturers, battery and component manufacturers, utilities and energy companies, smart grid and charging infrastructure developers. Collectively, we are committed to realizing the economic, national security and environmental benefits of displacing oil with electricity in hybrid, plug-in hybrid, battery, and fuel cell electric vehicles. The Department's research and work with private partners will help the many industries that comprise the electric drive ecosystem to meet net zero emissions goals.

This Committee has consistently recognized that electric transportation is critical to the effort to reduce emissions, create good-paying jobs and livable communities and increase U.S. competitiveness in the global marketplace. In her testimony to the Subcommittee on May 6, 2021, Secretary Granholm echoed that recognition, emphasizing the Department's role in addressing climate change, including over funding opportunities to advance clean energy R&D projects and the Department's loan programs, including Title 17 and Advanced Technology Vehicles Manufacturing (ATVM).

The importance of electrifying transportation has been widely documented. Emissions from the transportation sector have exceeded those from power plants since 2016. Electric transportation solutions reduce emissions, while advancing our leadership in global energy technology markets. The Union of Concerned Scientists studied the total emissions reductions of electric drive in every region of the country. The study found that no matter where in the U.S. an EV is charged and operated, it has fewer total well-to-wheels emissions than the average gasoline-powered vehicle sold today.

Electrification is also a national security imperative. In 2019, the transportation sector accounted for approximately 28 percent of the nation's energy use; 91 percent of that energy came from petroleum fuels. This reliance is a chronic threat to U.S. energy and economic security. It also keeps consumers vulnerable to volatile markets and fluctuating prices for petroleum.

As the global transportation sector electrifies, the U.S. needs to secure leadership in this market. By 2040, electric vehicles are projected to account for 58 percent of all passenger vehicle sales and make-up more than one-third of the global fleet. Electrification is growing in all transportation applications: 67 percent of municipal buses, 47 percent of two-wheelers, and 24 percent of light-duty commercial vehicles are expected to be electric by 2040. International governments have made clear their intentions to dominate this market. China is investing heavily in research and development, expanding efforts to secure critical component materials.

EDTA also supports efforts to strengthen and diversify the battery supply chain and expand advanced manufacturing capacity in the U.S. We support the Department's initiatives to fund R&D for advanced battery materials and the use of ATVM loans to build, update, re-tool, and expand manufacturing facilities to support this domestic imperative.

DOE's portfolio of electrification programs is vital to addressing these emissions, security and competitiveness challenges. Specifically, DOE's Vehicle Technologies Program is a critical element of the national effort to decarbonize transportation, leveraging private sector investments to promote innovation in advanced vehicles, infrastructure and manufacturing chains. The program advances research in batteries and power electronics, electric drive motors, components and charging technologies. Increased range, reduced costs, and improved performance are battery advances supported by the Battery and Electric Drive Technology subprogram. Critical

supporting infrastructure, including charging systems and codes and standards for communication with the grid, are being developed in the Vehicle Systems Simulation & Testing program.

The Vehicle Technologies Program is also advancing electric alternatives in commercial vehicles. The truck and transit segment is projected to grow rapidly in the next two decades. Research, demonstration, and deployment of electric drive technologies for combination tractors, heavy-duty pickup trucks and vans and vocational vehicle technologies' systems and components will speed technology breakthroughs and contribute to cost reductions while providing public health benefits and energy cost savings throughout the economy.

The SuperTruck 3 Program is an important part of this effort. We support increased program investment in Class 7 and Class 8 vehicles, which are a significant part of the commercial fleet. An expanded program should continue to engage partners from across the manufacturing chain—chassis original equipment manufacturers, intermediate and final stage manufacturers, including hybrid system suppliers, and infrastructure providers—to improve performance in vocational vehicles.

Through the Hydrogen and Fuel Cell Technologies Office, DOE is working with industry to accelerate the availability of fuel cell electric vehicles, which are essential zero-emission options in the transportation portfolio. Three light-duty fuel cell vehicles are commercially available today, with several new models planned for release through 2023, including buses and trucks in the medium- and heavy-duty segment. At the same time, hydrogen fueling infrastructure is being built out as a critical component of this emerging market.

The Department's recently announced Hydrogen Shot is an important program to reduce the cost of clean hydrogen to advance the deployment of light-, medium-, and heavy-duty fuel cell vehicles. Developing lower costing carbon-free hydrogen is a critical step in cutting emissions for long-haul trucking, last mile delivery vehicles, light-duty passenger vehicles, and other industrial applications. Hydrogen Shot's goal of achieving $1 per kilogram for clean carbon—an 80% reduction—will help create good-paying jobs while supporting American innovation.

We ask that the Subcommittee continue its record of support for these programs, particularly in vehicle and infrastructure deployment activities and in early market development, education, validation and enabling activities. At this early market juncture, public/private collaborations are especially important in accelerating technology development and private infrastructure investment.

ARPA–E has advanced pre-commercial technologies such as Robust Affordable Next Generation Energy Storage Systems (RANGE) and Batteries for Electrical Energy Storage in Transportation (BEEST) that improve performance and reduce costs of batteries. The program can also expedite innovation in critical materials, secondary uses and recycling of batteries. ARPA–E's role is essential in overcoming high-risk technological barriers that the private sector may not attempt in the early stages of research and development.

Similarly, ARPA–C would develop technologies to help move the U.S. toward a net zero economy by 2050. This new initiative's focus on zero-emission vehicles and transit systems, carbon-free hydrogen, and energy storage are key levers in achieving net zero emissions. Reducing emissions across all segments of the economy will benefit all communities, especially low-income and BIPOC communities who are disproportionately affected by poor air quality.

As the Administration has highlighted with its procurement goals, the federal government can lead the electrification of transportation, reducing the fleet's energy costs and its carbon footprint. At the same time, government purchasing power will reinforce private investment in infrastructure, and promote the development of advanced power and storage solutions that maximize the potential of electric vehicles as a grid asset.

EDTA also strongly supports the Clean Cities program. Clean Cities works with nearly 100 local and regional coalitions to expand deployment of electric drive and alternative fuel cars and trucks and recharging/fueling infrastructure. These voluntary and locally driven efforts have a demonstrated record of success, including the cumulative displacement of more than 8.5 billion gallons of petroleum with alternative fuels since the program began in 1993.

We appreciate the Committee's long-standing support for the important research, development and deployment programs at Department of Energy. These programs will play an even more critical role in achieving the Administration's goals for net-zero emissions by 2050 and in speeding the electrification of the transportation sector. We respectfully request that appropriations for FY2022 reflect the magnitude of our national energy, economic and environmental challenges and the enormous opportunities to address them through electric transportation innovation.

Thank you for your consideration.

[This statement was submitted by Genevieve Cullen, President, Electric Drive Transportation Association.]

PREPARED STATEMENT OF THE ENERGY EFFICIENCY AND RENEWABLE ENERGY

We, the undersigned, write today to urge you to support robust energy efficiency investments at the U.S. Department of Energy (DOE)'s Office of Energy Efficiency and Renewable Energy (EERE). Investing in energy efficiency is an investment not only in reducing energy costs for consumers and businesses across the nation; it is an investment in domestic job creation, manufacturing, competitiveness, and innovation. Energy efficiency improves energy affordability, security, reliability, and resilience; it achieves these outcomes by simply doing more with less. Today, the United States uses two-thirds less energy than it would otherwise consume without the investments in energy efficiency since 1980, according to the American Council for an Energy-Efficient Economy.

Energy efficiency is a workhorse, leading the clean energy sector at more than 2 million jobs, down from nearly 2.4 million prior to the pandemic. Energy efficiency jobs are located in 99.7% of counties across all 50 states and the District of Columbia. Energy efficiency jobs support families, with workers earning 28% more than the national median, according to Environmental Entrepreneurs, and cannot be exported. Furthermore, EERE RDD&D programs enable cost-effective emissions reductions and energy affordability through innovative partnerships and focused deployment programs that shepherd emerging technologies from concept to market, enabling cost reductions for businesses and consumers, and achieving critical scale needed to avoid the worst impacts of the climate crisis.

We respectfully request FY2022 regular appropriations funding for the following DOE programs:

Buildings Technologies (BTO): $530 million to develop innovative, cost-effective technologies, tools, and solutions that help U.S. homeowners, consumers, and businesses achieve peak energy efficiency performance in their buildings across all sectors of our economy. Robust funding is needed for:

—*Residential Buildings Integration (RBI):* $80 million for DOE to collaborate with the residential building industry to improve the energy efficiency of both new and existing homes. RBI develops critical technologies, tools, and solutions that help U.S. consumers and businesses achieve peak efficiency performance in residential buildings across the country. RBI's work supports workforce development and training and has partnerships with thousands of small businesses in this sector, the construction trades, equipment, smart grid technology and systems suppliers, integrators, and state and local governments. The integration research, demonstration and market transformation activities of RBI are critical as we transform America's new and existing residential buildings and work towards the Administration's goal of weatherizing 2 million homes.

—*Commercial Building Integration (CBI):* $80 million for the program's research, development, and evaluation, to help advance a range of innovative building technologies and solutions, paving the way for high performing buildings that could use between 50% and 70% less energy than typical buildings. CBI works with industry, small businesses, academia, the national labs, and other entities to advance energy efficiency solutions and technologies for commercial buildings. The program, which considers buildings as systems and as part of the electric grid, continues to be transformative in moving industry partners to embrace innovation.

—*Efficiency Standards, Building Codes, and Test Procedures:* $60 million for appliance standards and $100 million for the Building Energy Codes Program. DOE is responsible for setting minimum energy efficiency standards for appliances, equipment, and lighting to ensure new models continue to make progress on efficiency as technology matures. The Department is far behind in issuing new appliance standards, making an increased focus critical. DOE plays an important support and technical assistance role in the development and implementation of building energy codes, which are adopted by states and local governments for new construction and renovations of residential and commercial buildings, that reflect developments in building energy efficiency and "lock in" savings for the life of the building. Education, training, and technical assistance have been woefully underfunded over the past several years and can be very impactful in assisting in codes' adoption and effective implementation.

—*Emerging Technologies (ET):* $160 million for the program to enable cost-effective, energy-efficient technologies to be developed and introduced into the marketplace. ET funds and directs applied research and development (R&D) for

technologies and tools that support building energy efficiency, particularly electric technologies for a carbon free grid.

—*Grid-interactive Efficient Buildings (GEB):* $50 million for DOE to ensure that a high level of energy efficiency is a core element of this new crosscutting program and a baseline characteristic for GEBs which are also connected, smart, and flexible. The Office should engage with the public and private sectors, including the building and manufacturing industries and state and local governments, to share information on GEB technologies, costs, and benefits, and to provide information to position American companies to lead in this area. Funding for demonstrations and deployment programs such as Connected Communities, the Low Carbon Buildings Pilot, and other BTO deployment activities is encouraged.

Advanced Manufacturing Office (AMO): $800 million to enable the research, development, demonstration and deployment of industrial energy efficiency and advanced manufacturing technologies. This level of funding is intended to accommodate and ambitious agenda of decarbonizing U.S. manufacturing by midcentury. This goal of dramatic reductions requires increases in activity level across the office and some important changes in the orientation of the office's goals. AMO should expand its efforts from promoting energy efficiency to include efforts to reduce carbon emissions for manufacturing and reduce the embodied carbon in manufactured products. Additionally, as AMO rebuilds its staffing, the office should focus on adding expertise in important decarbonization technology areas identified in its research road mapping.

—*Energy Management:* $10 million for efforts to promote Strategic Energy Management practices and $30 million for the establishment of a program to provide competitive grants to companies for the hiring or designation of plant energy managers. For Strategic Energy Management, AMO should focus efforts on small- and medium-sized manufacturing plants.

—*Save Carbon Now:* $55 million for the Better Plants program to expand that program to offer comprehensive assessment and engagements to the 1,500 largest greenhouse gas emitting manufacturing facilities. These engagements shall include, but not be limited to, targeted assessments, staff training, technical analyses of opportunities, and education.

—*Industrial Assessment Centers:* $25 million for the Industrial Assessment Centers (IAC) program to expand that program in order to increase the number of university-based centers to 40; to establish satellite centers at community colleges, technical schools, and union training facilities; and to establish an apprenticeship program with matching funding for IAC students at facilities that have received assessments in the recent past to facilitate the implementation of recommendations.

—*Flex Tech:* $40 million for the establishment of a program that provides competitive grants to states and tribal governments in partnership with educational institutions and trade associations to provide assessments of energy and greenhouse gas (GHG) reducing measures and loans to implement those measures to medium sized manufacturers.

—*Transformative Technology Adoption:* $100 million for the establishment of a competitive grant program that provides cost-share payments to manufacturing sites or consortiums that make first-three, at-scale implementation of transformative technologies to reduce GHG emissions in the most GHG-intensive manufacturing processes as determined by the Secretary.

—*Existing Low-Carbon Technology:* $60 million for the establishment of a competitive grant program to provide cost-share payments to manufacturing plants for the installation of underutilized existing low-carbon technologies.

—*Smart Manufacturing:* $30 million for support of the development and adoption of smart manufacturing practices directed towards small and medium-sized manufacturers. This includes, but is not limited to, expanded funding for the Clean Energy Smart Manufacturing Innovative Institute (CESMII) to increase educational and technical assistance activities directed toward smart manufacturing adoption.

—*Industrial Process Heating Decarbonization:* $55 million for the establishment of a research, development, and deployment effort by AMO to develop and promote the adoption of technologies that can dramatically reduce the GHG emissions from process heating applications. Efforts may include the establishment of one or more new Manufacturing USA Innovation Institutes that might focus on electrification and/or hydrogen and low-carbon fuels.

Federal Energy Management Program (FEMP): At least $56 million to provide project and policy support to all federal agencies, including $2 million for the Performance Based Contract National Resource Initiative and at least $20 million for

the AFFECT grant program. With minimal funding, FEMP supports all agencies of the Federal government in their quest to save energy and money for the American taxpayer while improving agency infrastructure and addressing deferred maintenance. FEMP is at the forefront of efforts to improve federal building energy performance, which is accomplished in part by accessing and leveraging private capital in performance contracts. The additional private capital has been used to finance hundreds of projects across two dozen agencies, creating 30,000 jobs and reducing energy outlays by $8 billion over the next 18 years. Note: Our request for AFFECT represents a minimum funding request for FY22 as the initial installment towards the President's request of $400 million for AFFECT, which we strongly support. AFFECT provides small grants to federal agencies to maximize their retrofits through performance contracting. AFFECT leverages at least $10 for every federal grant dollar invested, thereby maximizing federal infrastructure investments and addressing backlog maintenance.

Weatherization (WAP) and State Energy Program (SEP): $477 million. Within this amount, at least $325 million is recommended for WAP, with $10 million for training and technical assistance at DOE, and $21 million for the new Weatherization Readiness Fund. At least $121 million is recommended for State Energy Program grants including $25 million to be used for energy and related air quality in schools. At least $90 million of the SEP funds shall be utilized for direct formula grants to the states, with $6 million for technical assistance. Since 1976, WAP has helped make more than 8 million homes more efficient, saving the average recipient about $4,200 over the lifetime of their home. R&D investments will continue to make emerging technologies cheaper and more accessible, but DOE's Weatherization Assistance Program is particularly important for bringing energy efficiency to communities and families that need it most. According to the Energy Information costs, while over 12 million households report being unable to use their heating or cooling equipment. The Weatherization Readiness Fund will provide critical repairs to prepare homes for weatherization while increased training and technical assistance will empower DOE to implement modernized and innovative practices. Each WAP dollar produces $4.50 in benefits, including energy savings as well as improved health and safety. Federal weatherization assistance also helps workers and small businesses, directly supporting more than 8,500 jobs and supporting thousands more in related industries. SEP leverages over $10 for every federal dollar invested and saves over $7 for every federal dollar invested. In addition to energy efficiency and renewable energy programs, SEP is critical for dealing with cyber security and energy emergency preparedness and response. SEP is extremely flexible and is the basis for a variety of partnership programs.

U.S. Energy & Employment Report (USEER): $2 million for the Office of Policy to complete the annual U.S. energy employment report that includes a comprehensive statistical survey to collect data, publish the data and provide a summary report. The information collected will include data related to employment figures and demographics in the U.S. energy sector. The report presents a unique snapshot of energy efficiency employment in key sectors of the economy, including construction and manufacturing.

Energy Information Administration: $135 million to continue important data collection, analysis, and reporting activities on energy use and consumption including the Commercial Buildings Energy Consumption Survey and the Residential Buildings Energy Consumption Survey.

We would urge the Subcommittee to consider additional funding either through regular appropriations or supplemental funding in the event an energy/infrastructure package is considered.

In the event that opportunity presents itself, we would urge the Subcommittee to consider the following additional items:

—Title VI of the House-passed, FY21 House Energy and Water Development Appropriations Bill as a starting point to fund the State Energy Program (SEP)($730 million—$3.8 billion if adjusted for inflation from the American Recovery and Reinvestment Act [ARRA]) (for base, formula funds), Weatherization Assistance Program (WAP)($3.25 billion—$6.2 billion if adjusted for inflation from ARRA) and the Energy Efficiency and Conservation Block Grant (EECBG) ($2.25 billion—$3.9 billion if adjusted for inflation from ARRA) (distributed via the statutory formula, with an increase for the competitive fund);

—Federal Energy Management Program's (FEMP) incremental AFFECT grant funding if not fully funded in annual appropriations as requested in the President's FY22 Budget Request of $400 million;

—Advanced Manufacturing Office (AMO) large manufacturing energy audits and tech assistance ($1 billion over ten years), establishment of a program at DOE to support the hiring of energy managers by paying a portion of annual salary

costs ($1 billion over ten years), and a federal program to provide grants to states to fund follow-up project implementation following assessments ($1 billion over ten years);
—Building Technology Office (increase to $100 million for building energy codes training and technical assistance and an increase of $50 million for grid interactive efficient buildings);
—HOPE for HOMES program to advance workforce training and residential retrofit rebates supported by the President's Budget Request ($2 billion); and
—"Open Back Better" (Smith/Blunt-Rochester legislation to fund resilience upgrades at mission-critical facilities with private financing for energy efficiency and renewable energy investments), which is scalable and could be implemented through the existing SEP and AFFECT programs.

We stand ready to work with Congress, the White House, and federal agencies, to identify ways the U.S. can improve the affordability and access of energy-efficient technologies, unlock utility savings for consumers, reduce energy-related carbon emissions, and improve public health.

Sincerely.

A. O. Smith
Acuity Brands Lighting Inc.
Alliance to Save Energy
American Council for an Energy-Efficient Economy (ACEEE)
Association of Energy Engineers (AEE)
Building Performance Association (BPA)
Digital Climate Alliance (DCA)
E4TheFuture
Environmental and Energy Study Institute
Federal Performance Contracting Coalition
Intel Corporation
International Copper Association
Institute for Market Transformation (IMT)
National Association of State Community Services Programs (NASCSP)
National Association of State Energy Officials (NASEO)
Natural Resources Defense Council (NRDC)
Polyisocyanurate Insulation Manufacturers Association (PIMA)
Schneider Electric
U.S. Green Building Council (USGBC)
Uplight

PREPARED STATEMENT OF THE FEDERAL ENERGY MANAGEMENT PROGRAM

Chairman Leahy, Ranking Member Shelby, and members of the Subcommittee, as you deliberate on the important programs to be funded in the FY22 appropriations bills, we respectfully request that $36 million be allocated to the Federal Energy Management Program (FEMP) in Office of Energy Efficiency and Renewable Energy (EERE) at the Department of Energy (DOE) with an additional $400 million designated to the FEMP Federal Energy Efficiency Fund (FEEF), also known as AFFECT grants.

We also request the following report language be included:

"The Committee directs FEMP to prioritize the full amount allocated to the Federal Energy Efficiency Fund (FEEF) (formally referred to as AFFECT) to continue to be used to leverage private sector investment in federal infrastructure to ensure maximum overall investment in resiliency, efficiency, emissions reductions and security. Funding should be directed to projects that achieve a 5–1 return for each federal dollar through public-private partnerships like energy savings performance contracts (ESPCs) and utility energy service contracts (UESCs)."

The President's FY22 Budget request included $400 million to be FEMP with an increase in the funding for FEEF. The FPCC recommends that this funding continue to be leveraged with performance contracting to address resiliency, backlog maintenance, critical upgrade and maintenance needs, and other infrastructure on our federal sites such as military bases, VA hospitals and GSA building. The FPCC knows that we can address such critical infrastructure needs using much less dedicated federal dollars through performance contracting and the FEEF program facilitates just that.

The FPCC believes that using smaller amounts of appropriated dollars for particular priorities such as cybersecurity and resiliency will net more: more dollars invested in the federal government, more resiliency, more savings over time, and more attention to operations and maintenance, and replacement costs. In fact, fewer dollars can be appropriated overall if they are leveraged with private sector dollars allowing not only the ability to focus precious federal resources on mission, but also transferring the risk of projects to the private sector. With this increase in the FEEF program, hundreds of additional buildings and facilities across the agencies

can utilize grants to make reduce the carbon emissions from its facilities and make these buildings more efficient.

FEMP is the appropriate place for these dollars as they will be available to leverage performance contracting for all federal agencies. For the past several years, FEMP has provided small amounts of appropriated dollars to leverage performance contracting through the AFFECT Grant program. The $11 million appropriated in FY2020 was invested in 16 projects that when combined with the investment from the private sector could surpass $439 million. These projects, which focus on new technologies and resiliency, will help agencies across the federal government address backlog maintenance, which the Office of Management and Budget (OMB) estimates is $169 billion government wide. It would specifically address the $9–15 billion in energy related backlog maintenance already identified in Congressionally mandated audits (EISA 2007, Section 432), which must now be addressed after the passage of the Energy Policy Act of 2020 included as part of the omnibus package.

FEMP, with very minimal funding, supports all agencies of the federal government in their quest to save energy and money for the American taxpayer while improving aging infrastructure and addressing deferred maintenance. The most significant activity of FEMP, and that which utilizes most of its funding, is to support performance contracting throughout the government.

In an Energy Savings Performance Contract (ESPC) or Utility Energy Savings Contract (UESC), the private sector works with the government customer to develop a project, but then the private company implements that project, measures and verifies savings every year, and guarantees that the savings will accrue. The private sector is repaid out of these guaranteed utility bill savings allowing for no added expenditures by the federal government. Since inception, ESPCs have achieved over $20 billion in guaranteed energy savings across the federal government.

FEMP's role in this is instrumental. It provides the overall contract for ease of use for agencies, technical and financial assistance, and training for personnel in all federal agencies. Additionally, FEMP provides life of contract oversight for every single ESPC during the performance period. Because agencies are reducing personnel, this is a critical function and was cited as such by the Heritage Foundation in a recent report as a necessary FEMP role.

Utilizing performance contracting to address infrastructure improvements instead of using appropriations funds for direct services is a commonsense approach that reduces risk to the federal government and ensures that projects are well managed since the private sector partner must guarantee performance to get paid.

Over the past few years, when appropriated dollars have been scarce, FEMP funding has leveraged between $800 million and $1.4 billion in private investment in federal infrastructure with no added cost to the federal government, using money from existing funding streams. A 2013 report by the Oak Ridge National Laboratory (ORNL) titled Beyond Guaranteed Savings: Additional Cost Savings Associated with ESPC Projects found that for a typical ESPC the actual cost savings to the federal government is 174% to 197% of the guaranteed savings by the contractor.

The members of Federal Performance Contracting Coalition (ABM, AECOM, Ameresco, Constellation, CEG Solutions, Energy Systems Group, Honeywell, Johnson Controls Inc., Noresco, Siemens, Schneider Electric, SitelogIQ, Southland Energy, and Trane (an Ingersoll Rand company) know firsthand how impactful ESPCs are in saving energy costs, taxpayer money, and creating jobs in every state in the country. Our members represent approximately 95% of the Energy Savings Performance Contracts (ESPCs) in federal facilities.

Thank you for your consideration of our request.

[This statement was submitted by Ms. Jennifer Schafer, Executive Director, Federal Energy Management Program.]

PREPARED STATEMENT OF THE FEDERATION OF AMERICAN SOCIETIES FOR EXPERIMENTAL BIOLOGY

SUMMARY

Federal investments in fundamental research have led to remarkable progress in the biological and biomedical sciences. Basic research was the groundwork for the speed—months instead of years—in the development of COVID–19 vaccines, and pre-clinical research, such as animal studies, has been essential to every step of achieving medical progress.

Despite Congress' bipartisan support for investing in science, federal funding for research has not kept pace, posing a threat to our nation's competitiveness. We face a real threat of losing our edge in industries such as biotechnology if we do not

prioritize increasing investments in science and building a diverse workforce.[1] The U.S. spends less on research and development (R&D) than many countries. If the U.S. is to be prepared to respond to future threats, our scientific leadership must progress. According to Science Is Us, there is the added benefit of jobs. STEM supports 69 percent of U.S. gross domestic product, touches two out of three workers, and generates $2.3 trillion in tax revenue.[2]

The federal government should commit to robust, predictable, and sustained funding increases for science agencies.

THE DOE OFFICE OF SCIENCE

The DOE Office of Science (SC) is the nation's largest funder of basic physical sciences research. Transformative innovations and technologies can be traced to its work, including solar cells, superconductors, and nanotechnology.

Agencies like NIH, NSF, and DOE SC work in concert to advance research in key areas including artificial intelligence and genomics. SC supports the network of DOE national laboratories and builds and operates the most sophisticated, world-class scientific user facilities used by over 34,000 researchers from universities, industry, and other federal agencies. National Labs were integral to the creation of the National Virtual Biotechnology Laboratory and the COVID–19 High Performance Computing Consortium that brought together the best minds to address Covid.

Recent budget increases have allowed the office to proceed with key facility upgrades. However, for the U.S. to remain at the forefront of science and technology, Congress must sustain and expand DOE SC infrastructure investments. A FY 2022 budget of $7.4 billion ($380 million above FY 2021) would enable continued critical facilities upgrades and support pathbreaking research in emerging areas such as quantum science.

FASEB FY 2022 recommendation: at least $7.4 billion for DOE SC.

[This statement was submitted by Ellen Kuo, Associate Director, Legislative Affairs, FASEB.]

PREPARED STATEMENT OF THE FUEL CELL & HYDROGEN ENERGY ASSOCIATION

Chairwoman Feinstein, Ranking Member Kennedy, and members of the Committee, I would like to thank you for the opportunity to discuss the funding priorities of the fuel cell and hydrogen industry for Fiscal Year 2022. My name is Morry Markowitz and I serve as the President of the Fuel Cell and Hydrogen Energy Association (FCHEA). FCHEA is the national trade association representing nearly 60 leading companies and organizations that are advancing innovative, clean, safe, and reliable fuel cell and hydrogen technologies. FCHEA member organizations represent the full global supply chain for hydrogen and fuel cells, including automakers; material, component, stack and system manufacturers; hydrogen producers and energy companies; trade associations; utilities; and end users. Collectively, our members employ hundreds of thousands of people across the country. On behalf of the members of FCHEA, our organization is requesting $300 million for hydrogen and fuel cell activities managed by the Hydrogen and Fuel Cell Technologies Office (HFTO) within the Office of Energy Efficiency and Renewable Energy (EERE) for hydrogen fuel and infrastructure research and development, fuel cell research and development, market transformation and technology acceleration activities, the H2@Scale initiative, safety, codes, and standards initiatives for vehicle and infrastructure safety, and advanced fuel cell and hydrogen component manufacturing. FCHEA requests $100 million for EERE's Advanced Manufacturing Office (AMO) to work in conjunction with HFTO on large-scale hydrogen production, fuel cell supply chain, infrastructure supply, on-site hydrogen production, and hydrogen for industrial applications such as materials production and as an alternative heating source for industrial processes. FCHEA additionally requests $160 million for solid oxide fuel cell (SOFC) activities and fossil-based hydrogen within the Office of Fossil Energy (FE), with $50 million reserved for the SOFC Program, and $15 million reserved for the Office of Oil and Natural Gas. This funding is vital to completing work on fuel cell technologies deployed around the country, as well as fueling the transition from fossil sources to renewable hydrogen. Finally, recognizing the versatility and numerous applications of hydrogen and fuel cells, FCHEA request specific language directing the Department of Energy to coordinate hydrogen and

[1] NSF Science Indicators 2018.

[2] STEM and the American Workforce. You've heard it before: STEM jobs—...by Science is US Medium.

fuel cell funding across its different offices to ensure the maximum effectiveness of funding.

Fuel cell and hydrogen energy technologies are capable of significantly contributing to the widespread decarbonization of transportation, power generation, heating, and industrial markets, while providing economic growth through investments and jobs. A recent report by McKinsey and Company, Road Map to a US Hydrogen Economy, determined that the hydrogen sector has the potential to generate 700,000 jobs and $140 billion in revenue by 2030. By 2050, that economic impact could grow to 3.4 million jobs, $750 billion in revenue, 16% reductions CO_2 emissions, 36% reduction in NO_x emissions, and account for 14% of US energy demand.

Fuel cells generate electricity through a combustion-free electrochemical reaction with hydrogen, with the sole byproduct being water vapor. Hydrogen is an environmentally friendly fuel, and when used in a fuel cell or as feedstock in an industrial process, there are no carbon, NO_x, SO_x, or particulate matter emissions. When hydrogen is generated from renewable or low-carbon sources—such as wind, solar, biomethane, or natural gas with carbon capture and sequestration—carbon emissions are either completely or nearly eliminated, or carbon negative.

Today there are nearly 10,000 light-duty, zero-emission fuel cell vehicles (FCVs) operating in California offered by major automakers, with more companies planning to enter the marketplace in the near-future. Fuel cell cars are the only vehicles capable of replicating today's driving experience of a 300 to 400-mile range on a single tank of fuel along with refueling in just three to five minutes. Beyond light-duty cars, fuel cells are being used across the country in more than 40,000 forklifts, dozens of buses, and several demonstrations of Class 7 and 8 trucks. Due to the scalability of fuel cells, hard-to-decarbonize markets such as medium- and heavy-duty vehicles, aviation, and maritime applications are looking to fuel cells as a zero-emission alternative for power. McKinsey's US Hydrogen Road Map suggests that by 2030, the fuel cell industry has the capability of reaching 1,200,000 FCV sales, 4,300 hydrogen fueling stations, and $8 billion in annual investments in the United States.

Fuel cells are also enhancing our capacity, efficiency, and reliability of our overall energy system. Stationary fuel cells are commercially available with over 550 megawatts of systems deployed across the country today at power utility substations, data centers, cell phone towers, corporate headquarters, schools, universities, hospitals, and more. Fuel cells are able to provide distributed, clean primary power to fill needs when renewable power is intermittent, as well as improve the reliability and stability of an electric grid with a high penetration of renewable power generation. Fuel cell systems generate 24/7, clean, load-following power at close to 100% capacity factors. Compared to other front-of-the-meter distributed energy resources (DER), the combination of fuel cell high efficiency and extremely high-capacity factor results in the displacement of more GHG emissions than equivalent-sized intermittent resources.

Hydrogen is increasingly being viewed as the first viable avenue for long-term and large-scale seasonal energy storage. Hydrogen energy storage is a process wherein the surplus of energy created by renewables during low energy demand periods is used to power electrolysis, a process in which an electrical current is passed through water to produce hydrogen. The hydrogen can be stored in large quantities for weeks or months at a time for later use in a variety of energy applications. The International Energy Agency predicts that hydrogen generated from wind will be cheaper than natural gas by 2030.

While the fuel cell and hydrogen industry has been gaining significant momentum in recent years, this progress could not have been possible without the support and partnership from the Department of Energy's fuel cell and hydrogen programs. America is currently the world leader in fuel cell technologies, however that gap is quickly tightening due to government interest abroad. 2020 saw one of the greatest increases of hydrogen interest across the globe, with countries from in Europe, Asia, North America, and South America releasing dedicated national hydrogen strategies along with committing billions of dollars to developing and deploying hydrogen and fuel cells. For example, Germany plans to invest €9 billion (~$11 billion) into its hydrogen economy, and France has pledged €2 billion (~$2.4 billion). Spain, Finland, Italy, the United Kingdom, the Netherlands, Australia, South Korea, Japan, Chile, Canada, India, and China have all committed to a hydrogen future through new policies or the release of hydrogen strategies. The European Commission's hydrogen strategy calls for the installation of 6 gigawatts of renewable hydrogen electrolyzers by 2024, and 40 gigawatts by 2030. It is important that America recognizes the importance of hydrogen technologies, as other countries have, and massively scale up investments or we could risk ceding our technology leadership abroad.

Immense progress has been made to date through the collaboration of industry and the DOE through HFTO. The cutting-edge research developed through DOE funding has led to more than 730 hydrogen and fuel cell patents, including more than 30 commercial technologies such as fuel cell catalysts, high-pressure hydrogen tanks, electrolyzers and low carbon hydrogen production, and fuel cell system components. DOE-funded research has also cut the cost of automotive fuel cells by 60% in the last decade, quadrupled durability to over 120,000 miles, cut electrolyzer stack costs by 80% since 2002. We are excited by Biden administration's interest in hydrogen and our industry looks forward to working with DOE to on the recently announced Hydrogen Energy Earthshot Initiative to accelerate reductions in the cost of hydrogen.

Further support is still needed for early, middle, and late-stage development, demonstration, and deployment activities to help industry clear the remaining technical and regulatory barriers to accelerated adoption of fuel cells and hydrogen energy, and to ensure the incorporation of these technologies into a grander clean energy plan to combat the climate crisis. FCHEA is grateful for the past support that the Senate Energy and Water Development Appropriations Subcommittee has given to DOE's hydrogen and fuel cell programs. While the funding levels requested are a significant increase from previous years, we believe now is the time to double down on hydrogen and fuel cell technologies to launch the technology into the mainstream. It is crucial that hydrogen and fuel cells are adequately funded so that they may become an integral component of America's climate and economic strategy. We urge the Subcommittee, under your bipartisan leadership, to continue this support with our FY 2022 appropriations request and ensure the long-term success of our innovative, sustainable energy industry. By supporting continued development fuel cell and hydrogen technologies, America can both mitigate the causes of climate change, while supporting our economic future and maintaining our nation's energy technology leadership. Thank you for your consideration.

[This statement was submitted by Morry B. Markowitz, President, Fuel Cell & Hydrogen Energy Association.]

PREPARED STATEMENT OF THE GRAND VALLEY WATER USERS ASSOCIATION

My name is Mark Harris. I am the General Manager of the Grand Valley Water Users Association in Grand Junction, Colorado. We are deeply involved with the Upper Colorado River Endangered Fish Recovery Program. We are requesting your support for appropriations in the President's recommended budget for FY 2022 to the Bureau of Reclamation, Upper Colorado Region for the Upper Colorado River Endangered Fish Recovery Program and the San Juan River Basin Recovery Implementation Program. The budget items and amounts requested in the President's budget for these programs are described below.

Endangered Species Programs: The Endangered Species Program also provides $5.7 million for the Upper Colorado and San Juan River Endangered Fish Recovery programs for construction of facilities need to recover endangered fish species: $2,500,000 for construction of a fish barrier at the Farmer's Mutual Ditch diversion structure on the San Juan River in northwest New Mexico, $500,000 for floodplain habitat development in northwest New Mexico on the San Juan River, $2,550,000 for rehabilitation of the fish screen and passage at the Grand Valley Irrigation Company diversion on the Colorado River near Grand Junction Colorado, and $150,000 for Upper Colorado Program Management for contracting, budgeting, reporting, contract administration, tracking expenditures, and addressing issues and concerns associated with capital project construction.

Colorado River Compliance Activities: The President 's budget requests $21,400,000 for Colorado River Compliance Activities that includes:

—$8,640,000 for the Upper Colorado and San Juan Endangered Fish Recovery Programs to restore critical habitat, enhance stream flows, maintain fish ladders and screens, augment and conservation of genetic integrity through hatcheries and stocking efforts, manage non-native and sport fish, and research and monitoring to provide the scientific basis to guide decision making.

—$11,360,000 for the Glen Canyon Adaptive Management Program for scientific investigations, experimentation using Glen Canyon Dam releases and other tasks required to increase understanding of how to operate Glen Canyon Dam to meet statutory requirements, and experimental flow research.

—$1,400,000 for water quality and consumptive use studies to provide data required to meet legal agreements that regulate the flow and quality of the river and support consumptive use studies of water for municipal, industrial, agricultural uses.

This funding for the recovery programs is authorized by P.L. 106–392, as amended.

These highly successful, cooperative programs are ongoing partnerships among the states of New Mexico, Colorado, Utah and Wyoming, Indian tribes, federal agencies and water, power and environmental interests. The programs' objectives are to recover endangered fish species while water use and development proceeds in compliance with the Endangered Species Act. The programs provide ESA compliance for approximately 2,500 water projects in the Upper Colorado River Basin, including every Reclamation project upstream of Lake Powell.

We appreciate the Subcommittee's past support and request the Subcommittee's assistance for fiscal year 2022 funding to ensure the Bureau of Reclamation's continuing financial participation in and provision of federal cost sharing for these vitally important programs.

[This statement was submitted by Mark Harris, General Manager, Grand Valley Water Users Association.]

PREPARED STATEMENT OF HANNON ARMSTRONG

As a leading investor in climate solutions, including energy efficiency, renewable energy and other sustainable infrastructure projects, Hannon Armstrong respectfully urges your support for funding the Federal Energy Management Program ("FEMP"), an important program that oversees and facilitates the implementation of Energy Savings Performance Contract (ESPC) and Utility Energy Service Contract (UESC) activities, which are currently contemplated in the Fiscal Year (FY) 2022 Energy and Water Development Appropriations bill. We urge you to support an increase in funding for FEMP in FY22.

Hannon Armstrong (NYSE: HASI) has 40 years of experience in sustainable infrastructure financing. We specialize in providing preferred or senior level capital to established sponsors and high-credit quality obligors, such as U.S. federal, state and local governments, Global 1000 corporations and private developers, for assets that generate long-term, recurring and predictable cash flows.

Our company provides and arranges debt and equity financing for a broad range energy efficiency projects that reduce energy usage or the cost of energy use. We often work with global energy service companies (ESCOs), which design and install improvements to various building components, including HVAC systems, lighting, energy controls, roofs, windows and/or building shells. We originate many of our transactions through programmatic finance relationships with ESCOs as well as renewable energy manufacturers, developers, and operators who own and operate renewable energy projects, including a number of U.S. utility companies.

In December 2020, we announced that the company has exceeded $6 billion in energy efficiency investments from more than 600 individual transactions with leading behind-the-meter energy service companies serving federal, state, local and commercial energy efficiency markets since 2000. Hannon Armstrong's total investments in energy efficiency projects have an average CarbonCount(r) score of 0.38 metric tons of CO2 equivalent ("CO2e") emissions avoided annually per $1,000 invested, as well as a WaterCount(tm) score of 658 gallons of water consumption avoided annually for every $1,000 invested. The estimated 21.2 million tons of CO2e avoided emissions over 20 years is equivalent to the amount of CO2e emissions from 116,390 rail cars of coal, which would stretch from Annapolis, Md. to Kansas City, Mo. when linked end to end. The 36.3 billion gallons of water consumption saved by these investments over the same period could fill three bathtubs for every person in the United States.

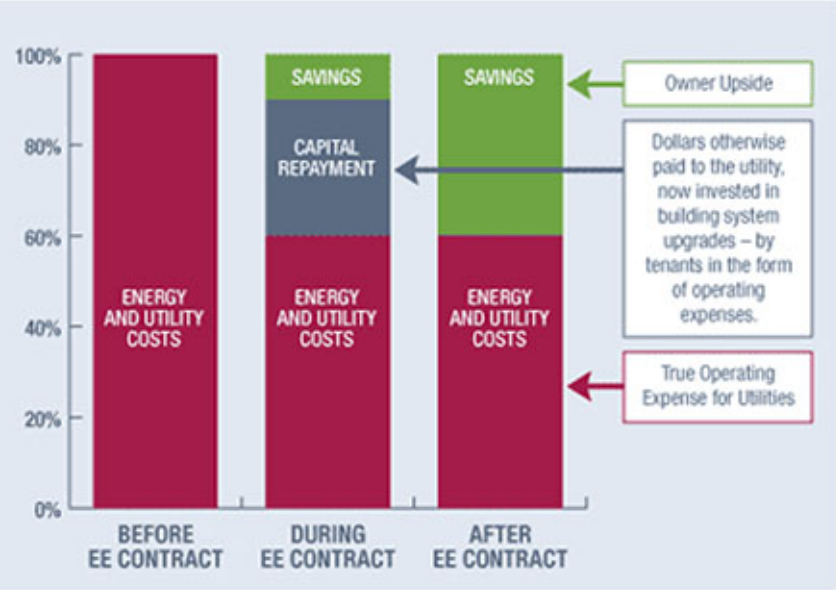
THE NUMEROUS BENEFITS OF ESPCS

ESPCs are a highly effective public-private partnership model to improve building energy efficiency. In this budget-neutral approach, future guaranteed energy savings are used to pay the financing cost of facility upgrades. Federal ESPCs have been one of the most efficient and successful programs reducing energy use and carbon emissions while improving resiliency in the federal built environment. ESPCs allow federal agencies to procure energy savings and facility improvements with no upfront capital costs or special appropriations from Congress. Studies by the Oak Ridge National Laboratory show that, on average, actual cost savings exceed guaranteed savings for federal ESPC projects.[1] Projects under the FEMP ESPC program

[1] https://www.energy.gov/sites/prod/files/2018/12/f58/2016__savings__espcs.pdf.

reported achieving 14.155 million MMBtu in energy savings in FY2019, outperforming estimates.[2]

ESPCs and UESCs enable agencies to procure energy services and projects without relying solely on appropriated funds to replace, operate, and maintain aging energy-using equipment. At no added cost to the government, ESPCs and UESCs assist agencies and installations in reducing their energy intensity, saving taxpayer dollars and in many cases improving mission readiness. These innovative contracts also require the assurance of financial savings.



ESPCs and UESCs have also resulted in the creation of thousands of local and un-exportable jobs. According to the Federal Performance Contracting Coalition (FPCC), for every $10 million of investment in ESPCs and UESCs an estimated 95 high paying jobs are created. 40 of these jobs are created in the manufacturing sector, 35 jobs are created with subcontractors and installers and finally, 20 of the 95 jobs created are with the ESCOs.

ESPC and UESC contracts are excellent examples of the federal government leveraging private capital. With more than 350,000 energy-using buildings and structures representing nearly 2.4 billion square feet of facilities, the federal government is our nation's largest energy consumer. Federal agencies have a tremendous opportunity and an obligation to reduce energy and water use in their operations. According to the most current data from the Department of Energy, there are nearly $8 billion in identified energy conservation measures for federal agencies, which would save the government almost $800 million a year in energy and water-related costs. Implementing these measures would avoid approximately 3 million metric tons of CO2e emissions annually.

ESPCs can and should be used to leverage private sector dollars—this allows important and often mission critical projects to be accomplished with far less taxpayer dollars. ESPCs often have a very strong return on investment, as well as a host of additional benefits, including accelerated project timelines, reduced energy infrastructure costs, and low-cost financing. The budget-neutrality of ESPCs ensure financial stability in both the short- and long-term. Agencies should prioritize leveraging private sector financing to take full advantage of these numerous benefits, creating jobs while saving taxpayer dollars and improving facility performance.

As the federal program responsible for providing services to enable all agencies to implement successful ESPC and UESC projects, FEMP provides crucial assistance, guidance, and training. We therefore strongly urge funding of $36 million for FEMP so it may continue its vital work to cut energy waste and increase efficiency across the federal government through the public-private partnerships required

[2] https://info.ornl.gov/sites/publications/Files/Pub150841.pdf.

under ESPCs and UESCs. Of that funding, we request $2 million to support the Performance Contracting National Resource Center (PCNRC), a hub within FEMP housing all of DOE's best practice resources and solutions for ESPCs. We also request $400 million for the Assisting Federal Facilities with Energy Conservation Technologies (AFFECT) program within FEMP, in alignment with President Biden's budget request-as long as it continues to leverage private financing to get the greatest return on investment for the American taxpayer. The AFFECT program increases resilience and cybersecurity in Federal performance contracts by leveraging private capital. AFFECT grants can be used to help fund those energy related measures that typically have very long paybacks but, when included with an ESPC, can create a deep retrofit and enhanced resiliency for federal agencies. The Biden FY22 Budget request prioritizes deep retrofits under AFFECT, in accordance with these aims.

The AFFECT grant program supports agency projects that spur energy generation, energy efficiency, and energy storage projects across the country. In 2020, the program distributed $11 million in grants to 16 federal agency projects, which will lead to a total investment of over $439 million.[3] The FY22 funding for FEMP would increase support of ESPCs, which are a cost-effective way to make much needed upgrades and increase resiliency of vital federal assets, including military facilities. FEMP's most important effort is the coordinated and defined program management of ESPCs for federal agencies. FEMP staff help agencies use ESPCs in several ways: advising agencies on scoping, procurement, and performance requirements for energy conservation measures (ECMs); helping agencies select third-party ESCOs; finalizing contracting terms and project approval; and monitoring project implementation and performance.

FEMP is at the forefront of efforts to improve federal building energy performance, which is accomplished in part by accessing and leveraging private capital in performance contracts. The additional private capital has been used to finance hundreds of projects across two dozen agencies, creating 30,000 jobs and reducing energy outlays by $8 billion over the next 18 years. As mentioned, the President requested $400 million for AFFECT via the Federal Energy Efficiency Fund—which could be used to leverage at least 10 dollars for every federal grant dollar invested—and is critical to tackling the backlog of needed maintenance in our federal infrastructure, while also leading by example and addressing climate change through supporting clean energy in buildings.

FEMP is the program ma-nager for the critical ESPC contracting tool used by federal agencies for the implementation of ESPCs—the Department of Energy, Indefinite Delivery Indefinite Quantity, Energy Savings Performance Contract (DOE IDIQ ESPC). These contracts have historically been instrumental in achieving the aforementioned energy and cost savings as well as the job creation outcomes for the nation. Since the inception of the DOE IDIQ ESPCs in 1998, 431 projects have been awarded and approximately $7.66 billion has been invested in federal energy efficiency and renewable energy improvements. These improvements have resulted in approximately 618.7 trillion Btu in life cycle energy savings and $17.53 billion in cumulative energy cost savings for the federal government.[4]

Fiscal year 2020 was the most successful year in the history of the DOE IDIQ ESPC program with a record $842 million total project investment which will generate $1.7 billion in energy and water savings for the federal government.[5] We also urge FEMP to increase its support to military services seeking ESPCs for upgrades to military facilities across the county. One of the main reasons these infrastructure and resiliency upgrades remain uncompleted is lack of appropriated funding. Employing ESPCs to make these much-needed upgrades is a cost-effective way to increase the resiliency of important infrastructure systems and the services they provide to base personnel and operations.

Again, we strongly urge a total of $36 million in funding for FEMP, including $2 million for the Performance Contracting National Resource Center, alongside $400 million for the AFFECT program—so that FEMP may continue its vital work as the program manager of ESPCs and the ESPC DOE IDIQ ESPC contract in FY2022 and beyond. We thank you for providing this opportunity to submit this testimony and we look forward to working with you.

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[3] https://www.energy.gov/eere/femp/2020-assisting-federal-facilities-energy-conservation-technologies-affect-federal-agency.

[4] https://www.energy.gov/eere/femp/awarded-doe-idiq-energy-savings-performance-contract-projects.

[5] https://www.energy.gov/eere/femp/awarded-doe-idiq-energy-savings-performance-contract-projects.

[This statement was submitted by Robert Johnson, Senior Vice President, Hannon Armstrong.]

PREPARED STATEMENT OF THE IZAAK WALTON LEAGUE OF AMERICA

The Izaak Walton League of America appreciates the opportunity to submit testimony concerning appropriations for fiscal year (FY) 2022 for programs under the jurisdiction of the Subcommittee. The League is a national, nonprofit organization founded in 1922 with 40,000 members and 200 local chapters nationwide. Our members are committed to advancing common sense policies that safeguard wildlife and habitat, support community-based conservation, and address pressing environmental issues. The following pertains to programs administered by the U.S. Army Corps of Engineers (Missouri River Recovery Program construction at $30.4 million, Missouri River Recovery Program operations and maintenance at $5.2 million, Upper Mississippi River Restoration Program at $31.17 million, and the South Florida Ecosystem Restoration Program at $725 million).

Army Corps of Engineers, Construction and Operations and Maintenance, Missouri River

The Missouri River Recovery Program

The League urges the Subcommittee to reject the President's request of $8 million for construction for the Missouri River Recovery Program (MRRP) and instead appropriate $30.4 million for FY 2022 for the MRRP. This funding level will adequately fund the Army Corps to successfully implement the Missouri River Recovery Management Plan (Plan) and the Fish and Wildlife Mitigation Project for the Bank Stabilization and Navigation Project (BSNP). We ask that the funding meet the Corps capability level identified in the Environmental Impact Statement for the Plan, $30.4 million for construction and $5.2 million for operations and maintenance of existing projects. With this funding, the Corps, U.S. Fish and Wildlife Service (FWS), states, and other partners can continue important ecosystem restoration efforts that are producing long-term ecological and economic benefits.

The requested increased FY 2022 funding would allow the Corps to fund long neglected aspects of the BSNP Fish and Wildlife Mitigation Project for the Missouri River. Funding for this critical effort has been severely lacking in recent years. Mitigation Project goals are falling further and further behind projections and expectations.

The BSNP Fish and Wildlife Mitigation Project, as authorized by Section 601(a) of WRDA 1986 and Section 334(a) of WRDA 1999, is required to offset habitat loses from the Corps' ongoing maintenance and operation of the Missouri River System. The Fish and Wildlife Mitigation Project will help reduce Missouri River flooding, improve water quality, provide for self-sustaining fish and wildlife populations and increase recreation for families in the basin.

Funding the full capability will enable the Corps to collaborate with a growing list of landowners willing to help reduce flood risk and restore critical habitat. Years of declining funding has caused the Corps to fall further and further behind established habitat and species targets identified in Congressionally mandated recovery plans. Over 100,000 acres of previously authorized mitigation that would build resiliency to flooding and benefit fish and wildlife has not been secured due to insufficient appropriations for the MRRP. Willing landowners are anxiously waiting on the Corps to fulfill its BSNP Mitigation obligations.

With adequate funding, habitat restoration efforts could include reconnecting portions of the river to floodplain wetlands, bottomland forests, and native prairies. This will increase the river's capacity and resiliency and increase the ability to capture carbon and reduce the movement of nutrients to the Gulf of Mexico. These actions will also reduce the river's stage and velocity during high flows, while creating much needed slow and slack water habitat for the pallid and other fish species during other times of year.

In 2011, the Missouri Department of Conservation and the Nebraska Game and Parks Commission found recreational spending provides $68 million in annual economic impact to communities along the Missouri River from Yankton, South Dakota to St. Louis, Missouri. In addition to the economic boost from tourism, restoration projects support job creation throughout the entire region. The Corps contracts with local construction companies, creating jobs, and injecting dollars into local economies through purchases of materials, fuel, food and lodging. With the funding requested, the Corps could readily implement more of these important restoration projects.

Army Corps of Engineers, Construction, Upper Mississippi River

Upper Mississippi River Restoration Program

The League is an active and long-time proponent of restoring the Upper Mississippi River (UMR) ecosystem. We have supported the Upper Mississippi River Restoration (subaccount for the Environmental Management Program) since its inception and continue to support this vital restoration initiative. We urge the Subcommittee to continue to provide $33.17 million for the UMRR–EMP as provided in the FY 2021 omnibus.

The Upper Mississippi River is one of the most complex ecosystems on earth. It provides habitat for 50 species of mammals, 45 species of reptiles and amphibians, 37 species of mussels, and 241 species of fish. The need for ecosystem restoration is unquestionable. As the Corps correctly stated in its study of navigation expansion, this ecosystem is "significantly altered, is currently degraded, and is expected to get worse." Researchers from the National Academy of Sciences have determined that river habitat is disappearing faster than it can be replaced through existing programs such as the Upper Mississippi River Restoration (UMRR) program, which was authorized at $33.2 million annually by Congress in 1999. Since its inception, the UMRR has restored critical fish and wildlife habitat on more than 100,000 acres across Minnesota, Wisconsin, Iowa, Illinois, and Missouri. The UMRR is also able to deliver the restoration of these acres at the average cost of $3,000 per acre, an impressively low cost.

Our nation relies on a healthy Mississippi River for commerce, recreation, drinking water, food, and generation of electricity. More than 12 million people annually recreate on and along the Upper Mississippi River spending $1.2 billion and supporting 18,000 jobs. More people recreate on the Upper Mississippi annually than visit Yellowstone National Park. Each of the more than 50 completed restoration projects generates half of its labor from local workers living near the sites. During construction, each of these projects infuses an average of $750,000 into the local economies and small towns.

Army Corps of Engineers, Construction, South Florida Ecosystem Restoration

The League requests the Subcommittee reject the President's request for $350 million and appropriate $725 million for construction for the South Florida Ecosystem Restoration (SFER) for FY 2022 as requested by Florida Congressional delegation, Florida state officials, and the Everglades conservation community. This request prioritizes funds needed now to adequately restore the Everglades, reduce polluted discharges from Lake Okeechobee, and protect drinking water for 8 million Americans living in Florida.

This funding will advance important restoration projects under the Comprehensive Everglades Restoration Plan (CERP), including the critical Everglades-Agricultural Area Reservoir recently authorized in WRDA 2018. The reservoir would allow water to flow south from Lake Okeechobee and be stored and treated before flowing into Everglades National Park and Florida Bay, greatly reducing the need for the Army Corps to release polluted lake water into the Caloosahatchee and St. Lucie Rivers, which can lead to harmful algal blooms on Florida's Gulf and Atlantic coasts. Adequately funding SFER would also allow the Army Corps to complete other CERP projects vital to restoration of the Everglades, including Picayune Strand Restoration, Broward County Water Preserve Area, Biscayne Bay Coastal Wetlands, and Indian River Lagoon-South.

Economic benefits that would come from restoration of the Everglades are astronomical. Gains in biodiversity, groundwater purification and aquifer storage, increasing property values, park visitation, carbon sequestration, and improved fish and wildlife habitat that would come from a full restoration of the Everglades, as described in the CERP, would drive an economic increase of $46.5 billion. Even with a price tag of $11 billion, much of which will be borne by non-federal partners, restoration of the Everglades represents an impressive benefit to cost ratio greater than 4.00.

The Izaak Walton League appreciates the opportunity to testify about these important issues.

[This statement was submitted by Jared Mott, Conservation Director, Izaak Walton League of America.]

PREPARED STATEMENT OF METHANE ACTION AND REMINERALIZE THE EARTH

Madam Chair et al.,

Yesterday, the world-renowned former science advisor to the U.K., Sir David King of Cambridge University, declared that he believes we have five years left to solve the climate crisis. He announced the formation of a new Climate Crisis Advisory Group to help reduce emissions, remove greenhouse gases already emitted and restore the climate to truly healthy temperatures and functioning. See, https://www.businessgreen.com/news/4033355/reduce-remove-repair-climate-crisis-advisory-group-sketches-climate-priorities.

In April Sir David led a group of 31 scientists in writing a letter in advance of the White House Climate Summit declaring that governments need to expedite the reduction of emissions, the deployment of methods of removing ambient methane and other greenhouse gases (GHGs) and the development of governance capable of ensuring the safe and effective use of those methods. (See, MethaneAction.org).[1]

Our testimony focuses primarily on how this Subcommittee can expedite the research and development of the technologies that can buy us time as we seek to restore safe levels of GHGs including CO_2 below 300 ppm and methane below .8 ppm. Peer reviewed science and on-going laboratory tests indicate we can achieve that methane goal within this decade buying time to deal with the longer-term problem of CO_2. We filed complementary testimony on the 24th with the Interior-EPA Subcommittee and recommend that you compare notes with them in order to ensure the best fit for each Subcommittee and recommendation that you find useful. For example, some of the work we have recommended that the EPA direct could be initiated by ARPA–E but (1) not all are energy related as methane and other GHGs have other sources and sinks, and (2) some of the research would be done more efficiently in some cases with non-U.S. principal investigators who are already, with too little funding, working on these approaches, and (3) the overall program should in any case be geared for both international cooperation and policy coordination. So we will not repeat those requests here. Our testimony will largely be in the legislative language we recommend from here on:

(I) Reducing emissions and concentrations of climate forcing agents.

In order to reduce greenhouse gases and other climate forcing agents to historically healthy levels as soon as possible, the Secretary of Energy, in consultation with the Administrator of the Environmental Protection Agency (EPA), the Secretaries of Agriculture, the Interior, State and Treasury, the Administrator of USAID, the Chief Executive Officers of the Millennium Challenge Corporation and the U.S. International Development Finance Corporation and the Export Import Bank, using funds appropriated for their other relevant programs as well as those appropriated for this Title, shall, as directed below:

(A) Review existing and pending patents for methods of removing climate forcing agents and limiting the emissions thereof, and grants and contracts for the development of such technologies made by the U.S. and other governments, including but not limited to the United Kingdom, and foundations and ensure, in consultation and cooperation with the Special Envoy and Domestic Advisor on Climate Change and the appropriate departments and agencies, including but not limited to the Chair of the Council on Environmental Quality, and foreign and international governments, that the research, development, and deployment of such methods is completed and advanced each year to the extent practicable, and incorporated in their actions, including but not limited to their foreign assistance, intergovernmental cooperation, and international finance programs, and provisions. The Secretary shall complete the steps of paragraph (A) and its subparagraphs by July 1, 2022 unless otherwise noted in the schedule set forth as follows:

(i) Develop an interagency agreement on GHG Drawdown Research, Development and Deployment to collaborate with the Administrator of the EPA and the Commandant of the Coast Guard, as the U.S. liaison to the International Maritime Organization, on research, development, assessment and trials of methods of methane oxidation and catalysis for near source and ambient removal and measure co-benefits including removing other pollutants such as Nitrous Oxide, CO_2, soot and preventing ground level ozone. (See Interior-EPA testimony of Methane Action and RTE for research projects.)

[1] Today we learned that a Penn State research team has shown that oil and gas methane emissions are larger than EPA inventory values by 48% to 76%. (https://phys.org/news/2021-06-ethane-proxies-methane-oil-gas.html).

(ii) Surface-based Photocatalytic Enhanced Methane Oxidation (SPEMO). In cooperation with the Environmental Protection Agency and the Secretary of State and the Administrator of USAID the Secretary of Energy shall contract for three years of research and development of surface-based photocatalytic enhanced methane oxidation (SPEMO) to: (I) Lower methane emissions from coal mines, oil wells and animal farms, to ensure that the CH4 concentration from ventilated air is less than 1.7 ppm by volume; and (II) Apply photocatalytic paint to buildings, rooftops, photovoltaic panels, or in a ventilated conduit to reduce methane in the general atmosphere as a complement to commercial photocatalytic paints and coatings already being used because of their self-cleaning property and ability to reduce urban pollution such as nitrogen oxides and volatile organic compounds. At $1,000,000, or one third of that from each of three agencies, per year for a total contract in FY2022 for (I) and (II) of: $3,000,000

(B) Integrate GHG removal in Development Assistance and Trade.

(1) The Secretary of Energy, Directors of the DOE Office of Fossil Energy and Carbon Management and the Advanced Research Projects Agency-E, the Chief Engineer of the USACE and the Commissioner of the Bureau of Reclamation shall assist the U.S. Customs and Border Protection, and the Administrator of US EPA, in calculating the difference between the climate forcing agents emitted in the production of fuels, hydroelectric power of different types, other energy sources, wetlands management (e.g. draining or re-watering) and the production of the goods and services in other countries and those emitted in the United States, the extent to which other countries remove emitted GHGs and the economic costs thereof and inform U.S. Trade Representative, the Secretary of Commerce by June 1, 2022 of the results of those calculations so that they may ensure that those receiving assistance in programs under their jurisdiction or control or exporting goods or services to the United States will limit and sequester, oxidize or otherwise remove the climate forcing agents or the carbon dioxide equivalent thereof to the extent practicable currently and endow a fund for the future reclamation of such agents as technical or natural capacities for so doing are available.

(2) Assist the U.S. Customs and Border Protection, and the Administrator of US EPA, and the U.S. Trade Representative and the Secretary of Commerce, in calculating by June 1, 2022 tariff and trade adjustments that would internalize the avoided costs and externalities that exceed those of comparable production in the United States; so that they are in a position to impose tariffs and embargoes accordingly by September 1, 2022.

(C) Ensure Global Governance of GHG Removal Methods. Beginning no later than one week after the date of enactment and continuing thereafter, the Secretary shall assist the Secretary of State, the Administrator of the EPA and the US Trade Representative, in consultation with the Special Envoy for Climate Change, the Commandant of the Coast Guard and other agencies participating in the affected U.S. delegations, in proposing and pursuing resolutions and agreements for supporting the proper assessment and deployment and governance of methods of reducing the atmospheric presence of climate forcing agents to historic healthy levels; of assessing the effects thereof to ensure the sufficient, safe and proper use of technologies for reducing the emissions of carbon dioxide, methane, CFCs, HFCs, black soot and other climate forcing agents or the climate forcing impact of them; and for actively removing such agents from the atmosphere, within or apart from existing international agreements in a manner that is complementary to their objectives and not preemptive of conservation and restoration efforts. Those agreements shall include but not be limited to the UNFCCC and its protocols and accords, the London Convention on Marine Pollution (via the International Maritime Organization), the Vienna Convention on the Protection of the Ozone Layer and its protocols, UNECE Convention on Long-range Transboundary Air Pollution, the Convention on Migratory Species, the Convention on Biological Diversity and other conservation agreements, the major international trade agreements, and the United Nations, and UNEP, FAO, UNDP and any other relevant subsidiary bodies; $3,000,000

(D) Report on Plans. The Secretary of Energy in cooperation with the Secretary of State shall form a Committee on Climate Restoration comprised of the Secretaries and agency heads tasked under this Title to report as directed in subsections (D) and (E) to the Committees of jurisdiction within ninety days of enactment on their training programs and plans for cooperating with the United Nations, the Organization for Economic Cooperation and Development and their subsidiary bodies, other interested nation states in implementing paragraphs

(A)–(D) and for incorporating these elements in their work and measuring the success of their implementation; and

(E) Report on Results. Within 180 days of enactment and annually thereafter the Committee on Climate Restoration shall report to the Secretaries and Administrators listed in Section I, and the Congressional Committees of jurisdiction, on their progress and report any requests and suggestions for expediting the deployment of methods found to be effective in light of their direct and indirect costs and co-benefits as informed in more detail every two years by the assessments produced by those agencies and other competent authorities. The Secretary shall ensure that the report and plan are produced with the cooperation of appropriate government agencies, including but not limited to the EPA, EIA, USAID and those included elsewhere in this Section. The Secretary shall further ensure that authors include a range of conservation biology, oceanic, agronomy and atmospheric scientists, among others, as well as economists, engineers, policy makers, regulatory experts. The federal agencies should also provide a companion report discussing their efforts, progress and challenges. The Secretary is directed to fund from his regular budget a report updating the initial report every 2 years.

For this Title in addition to the amounts specified above: $8,000,000

II. Integrating Climate Restoration across the Government.

The program requirements of these Sections are to be integrated into the regular order of business and carried out within the budget authorities and amounts appropriated for each of the affected agencies independent of further appropriations, this section however, hereby also provides such authorization as may be necessary through FY2028 as well as appropriations for FY2022.

PREPARED STATEMENT OF THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

The Metropolitan Water District of Southern California (Metropolitan) encourages the Subcommittee's support for fiscal year 2022 federal funding of $10.7 million for the U.S. Bureau of Reclamation's (Reclamation) Colorado River Basin Salinity Control Program (Salinity Control Program), Title II—Basinwide Program to prevent further degradation of Colorado River water quality and increased economic damages.

The salt concentration in the Colorado River causes an estimated $354 million in quantifiable damages to water users each year. While this figure is significant, had it not been for the efforts of the Salinity Control Program, damages would be much higher. Salinity Control Program actions have reduced the salinity of Colorado River water at key locations over 90 milligrams per liter (mg/L) from what they would have been without the actions. Modeling by Reclamation indicates that quantifiable damages could rise to approximately $671 million by the year 2040 without continuation of the program.

Metropolitan is the regional water supplier for most of urban Southern California, providing supplemental water to retail agencies that serve approximately 19 million people.

Water imported via the Colorado River Aqueduct has the highest salinity level of all of Metropolitan's sources of supply, averaging around 630 mg/L since 1976. This salinity level causes economic damages to all sectors. For example, high salinity has the following impacts:

—It reduces the useful life of water heaters, faucets, garbage disposals, clothes washers, and dishwashers, and increases use of water softeners in the household sector;

—It increases the cost of cooling operations, the need for and cost of water softening, and decreases equipment service life in the commercial sector;

—It increases water use, the cost of water treatment, and sewer fees in the industrial sector;

—It decreases the life of treatment facilities and pipelines in the utility sector;

—It increases the cost of desalination and brine disposal for recycled water in the municipal sector;

—It reduces the yield of salt sensitive crops and increases water use for leaching in the agricultural sector;

—It increases desalination and brine disposal costs due to accumulation of salts in groundwater basins, and reduces opportunities for water recycling due to groundwater quality deterioration;

—It reduces the ability to replenish groundwater in basins with relatively low salinity standards;
—It reduces the ability to reclaim and reuse water due to high salinities in the water delivered to water treatment and reclamation facilities; and
—It makes it more difficult to meet wastewater discharge requirements to comply with National Pollutant Discharge Elimination System permit terms and conditions.

There has been concern over salinity levels in the Colorado River for many years. To address the concern, the International Boundary and Water Commission signed Minute No. 242, Permanent and Definitive Solution to the International Problem of the Salinity of the Colorado River in 1973, and the President signed the Colorado River Basin Salinity Control Act of 1974 (Act) into law. Title I of the Act deals with the U.S. commitment to the quality of waters being delivered to Mexico. Title II of the Act deals with improving the quality of the water delivered to users in the United States. This testimony deals specifically with Title II efforts. To further foster interstate cooperation and coordinate the Colorado River Basin states' efforts on salinity control, the seven Basin states formed the Colorado River Basin Salinity Control Forum.

The Forum is charged with reviewing the Colorado River's water quality standards for salinity every three years. In so doing, it adopts a Plan of Implementation consistent with these standards. The level of appropriation requested in this testimony is in keeping with the adopted Plan of Implementation, which is to be implemented by Reclamation, the Bureau of Land Management, and the Natural Resources Conservation Service (NRCS).

In implementing the Act, Congress recognized that most of the salt load in the Colorado River originates from federally owned lands. The majority of land within the Colorado River Basin is federally owned and administered. The salts in the Colorado River Basin are naturally-occurring and pervasive, mostly resulting from saline sediments in the Basin that were deposited in prehistoric marine environments. They are easily eroded, dissolved, and transported into the river system, and enter the River through both natural and anthropogenic processes. The Salinity Control Program reduces salinity by preventing salts from dissolving and mixing with the River's flow. Irrigation improvements (sprinklers, gated pipe, lined canals) and vegetation management reduce the amount of salt transported to the Colorado River. Point sources such as saline springs are also controlled.

The Salinity Control Program benefits Lower Basin water users, hundreds of miles downstream from salt sources in the Upper Basin, through reduced salinity of Colorado River water.

The Salinity Control Program, as set forth in the Act, also benefits the Upper Colorado River Basin water users through more efficient water management and increased crop production, and benefits local economies through construction contracts and environmental enhancements.

In the early years of the program, Reclamation implemented salinity control through large projects which were funded with specific line item amounts. In 1995, Congress amended the Act and created Reclamation's Basinwide Program. Under this program, Reclamation funds competitive proposals for projects that will decrease the salt load to the Colorado River.

Most of the proposals target off-farm irrigation distribution systems such as canals and laterals. The lining or piping of canals and laterals prevents leakage into the groundwater and the dissolution and transportation of salts to the Colorado River and its tributaries.

The requested funding level of $10.7 million is required to keep the Basinwide Program on pace with the overall Salinity Control Program implementation needs. These federal dollars will be augmented by state cost sharing of 30 percent and by an additional 25 percent provided by the agricultural producers with whom the U.S. Department of Agriculture contracts for implementation of salinity control measures.

Over the past years, the Salinity Control Program has proven to be a cost-effective approach to mitigating the impacts of increased salinity in the Colorado River. Adequate federal funding of this important program is essential. Metropolitan urges the Subcommittee to fund the Bureau of Reclamation's Salinity Control Program, Title II—Basinwide Program for fiscal year 2022 in the amount of $10.7 million. This modest investment in source control pays dividends in improved drinking water quality to nearly 40 million Americans.

[This statement was submitted by Jeffrey Kightlinger, General Manager, Metropolitan Water District of Southern California.]

PREPARED STATEMENT OF THE MID-WEST ELECTRIC CONSUMERS ASSOCIATION

Chair Feinstein, Ranking Member Kennedy, and members of the Subcommittee, I am Jim B. Horan, Executive Director of the Mid-West Electric Consumers Association (Mid-West). Mid-West represents the interests of over 300 consumer-owned utilities across the Upper Great Plains that purchase power from the federal hydroelectric generators that are part of the Pick-Sloan Missouri Basin Program. That power is marketed by the Western Area Power Administration (WAPA), an agency of the U.S. Department of Energy, and is sold to Mid-West Members in the states of Colorado, Iowa, Kansas, Minnesota, Montana, Nebraska, North Dakota, South Dakota, and Wyoming. Mid-West's members rely on this cost-based, renewable, federal hydroelectric power for a significant portion of their power supply requirements.

Mid-West requests that the Subcommittee provide the full funding for Purchase Power and Wheeling (PP&W) authority requested by WAPA in the FY 2022 budget request. Mid-West also supports the continued use of "net-zero" for annual expenses and the public partnership financing that has worked so successfully in the Pick-Sloan Region for over 20 years.

PURCHASE POWER AND WHEELING

The PP&W authority is necessary for WAPA to fulfill its contractual obligations to deliver firm power to Mid-West's members and other WAPA customers, including federal and state agencies and Native American Tribes. These funds can only be used for PP&W costs and they are available until expended. While WAPA may not always spend the full PP&W appropriation in every year, a severe and prolonged drought can cause WAPA to incur PP&W costs that exceed their available funding. In that event, WAPA must use cash from other planned expenditures, including repaying customer advances for the rehabilitation of federal assets. This disruption to asset rehabilitation midstream can cause significantly higher costs due to contractor work stoppages and restarts, interest that accrues on money already spent on the project, replacement power due to asset outages, etc.

The PP&W budget is prepared approximately two years in advance of the fiscal year. Each legislated project for which WAPA markets and transmits power has unique power production and marketing characteristics, which results in differing methods to budget for purchase power. For the Pick-Sloan Missouri Basin Program—Eastern Division, WAPA staff look at the last 10–11 years of rolling hydrologic conditions, which include a multi-year drought, and averages the 5 median years, eliminating the other 6–7 higher and lower water years.

Using the hydrologic data, WAPA staff then prepare a conservative power price forecast for the period. The combination of forecasted water conditions, consequent purchase power and wheeling volumes, and the power price forecast yield the estimate of PP&W costs over the forecast period.

It is important to note, however, that a drought with worse hydrologic conditions than any of the years included in the study will likely yield PP&W costs significantly above what is forecast. Mid-West is committed to working with the Subcommittee staff and the Congressional Budget Office (CBO) to resolve any remaining issues associated with the methodology involving PP&W. We are very concerned that CBO changed a two decades-old agreement that PP&W appropriations would not score against the federal deficit. Despite the fact that all PP&W expenditures are paid by the WAPA customers (Mid-West member-utilities), CBO still proposed to score these expenditures. We hope any lingering issues can be resolved. This is very important to the customer-owners of the region, since federal cost-based hydropower is the life-blood of the regional economy and key to maintaining energy affordability.

CONCLUSION

The Subcommittee's longstanding support of the federal power program is greatly appreciated, and we thank you for your consideration of this testimony. We stand ready to respond to any questions.

[This statement was submitted by Jim B. Horan, Executive Director, Mid-West Electric Consumers Association.]

PREPARED STATEMENT OF THE MNI WICONI PROJECT

1. FY 2022 OMR Request

The Mni Wiconi Project respectfully requests $ 45.080 million in appropriations for operation, maintenance and replacement (OMR) activities in FY 2021, including $1.997 million[1] for the Bureau of Reclamation (Reclamation). The OMR request includes $ 21.6 million for necessary Coreline storage towers, crossing, and pump station. Additionally, the OSRWSS Core needs $38 million for South Core Line (Phase V) Replacement (see Section 2). Report language is also requested.

OMR funds will be used as summarized in Table 1 by the Oglala Sioux Rural Water Supply System (OSRWSS), Rosebud Sioux Rural Water System (RSRWS), and Lower Brule Sioux Rural Water System (LBSRWS).

TABLE 1
MNI WICONI PROJECT SPONSOR
AGENCY: BOR

	OSRWSS		RSRWS	LBSRWS	Reclamation	TOTAL
	Coreline	Distribution				
Number of Employees	17	33	17	13	8	88
Labor and Fringe Benefits	$1,372,027	$2,053,402	$927,271	$972,800	$1,003,563	$6,329,063
Labor Overhead Costs	626,879	831,628	.....	192,700	409,200	2,060,407
Non-Labor Costs						
Electricity/Natural Gas/Propane	650,000	753,239	211,160	135,800	258,819	2,009,018
Telephone/Communications	40,000	50,499	23,500	33,900	.....	147,899
Water Treatment Chemicals/Supplies	400,000	236,050	30,000	104,000	.....	770,050
Wells, Pumps, Motors & Replacement	590,000	85,933	82,500	101,500	.....	859,933
Water Testing	120,000	31,827	10,000	.....	.....	161,827
Vehicle OMR	83,000	290,687	78,000	91,700	18,414	561,801
Water Service Providers	.....	.....	250,500	.....	.....	250,500
Travel-Training	60,000	90,177	8,000	32,900	25,575	216,652
Other	257,000	92,297	318,729	199,200	281,325	1,148,551
Extraordinary Replacements						
Meter vault, fuel tank & security upgrades	.....	.....	.....	150,000	.....	150,000
Increase Capacity of Reservoir (New)	.....	.....	.....	.....	.....	.....
GPS/GIS	.....	100,000	.....	25,000	.....	125,000
Zebra Mussel Infestation	.....	.....	.....	200,000	.....	200,000
CB #4–6, Electrical/Generator	.....	200,000	.....	.....	.....	200,000
Replace #5 Reservoir 1 MG	.....	3,000,000	.....	.....	.....	3,000,000
Increase Pipe Size:8″ to 12′ (Sharps to Rockyford—15 mi)	.....	2,500,000	.....	.....	.....	2,500,000
Replace Sharps East Reservoir:1 MG	.....	2,000,000	.....	.....	.....	2,000,000
Existing Community Transfer						
Manderson OM&R	.....	25,000	.....	.....	.....	25,000
Oglala North OM&R	.....	40,000	.....	.....	.....	40,000
Sharps Corner OM&R	.....	25,000	.....	.....	.....	25,000
Priority Community System Upgrades						
Production Well Replacements	.....	.....	700,000	.....	.....	700,000
Reservoir Upgrades/Projects						
South Core Reservoir 1	5,000,000	.....	.....	.....	.....	5,000,000
South Core Reservoir 2	5,000,000	.....	.....	.....	.....	5,000,000
South Core Reservoir 4	6,000,000	.....	.....	.....	.....	6,000,000
White River Bore Crossing	3,800,000	.....	.....	.....	.....	3,800,000
High Service Pump Station VFD	1,800,000	.....	.....	.....	.....	1,800,000
TOTAL	$25,798,906	$12,405,738	$2,639,660	$2,239,500	$1,996,896	$45,080,700

The OSRWSS Core System is the heart of the Mni Wiconi Project and serves the three Indian Reservations and the West River/Lyman-Jones Rural Water System (WRLJ) in 7 off-reservation counties covering southwestern South Dakota with a design capacity of 52,000 people. The Project now serves 41,250. Public Law 100–516, as amended, our authorizing legislation, found that:

> ...the United States has a trust responsibility to ensure that adequate and safe water supplies are available to meet the economic, environmental, water supply, and public health needs of the Pine Ridge Indian Reservation, Rosebud Indian Reservation and Lower Brule Indian Reservation...

[1] This testimony uses figures provided by Reclamation for its FY21 work plan. We applied 2.3% inflation to those figures.

The request as presented in Table 1 will meet the purposes of the Act. Appropriation by Congress of adequate funds will fulfill the fiduciary responsibilities of the United States as articulated in the Act.

The Project has been treating and delivering more water each year from the OSRWSS Water Treatment Plant near Fort Pierre. The population will continue to grow within the service area and will reach the design population late in the next decade. The OMR budget must be adequate to (1) keep pace with the system and its growing population and (2) protect and preserve the $470 million investment held by the United States in trust for the Tribes and by WRLJ. Funds are needed to properly operate and maintain the infrastructure.

We appreciate the President's focus on improving critical water infrastructure in his Discretionary Request and await his specific requested funding level for the Mni Wiconi Project. However, we remind you of the Project's overall needs, including Coreline storage towers and OMR for community systems when they are transferred into the Project, along with the actual costs of the upgrade work. We also remind you that the oversight budget decreases funds for routine maintenance and extraordinary replacements as referenced in Section 7.

2. Coreline Storage Towers, Crossing, and Phase V Project/Existing Community Transfers/Extraordinary Replacements

Included in Table 1 is $21.6 million for OSRWSS Coreline Storage Towers, a crossing and pump station replacement. The OSRWSS needs to build these towers on the Coreline for added storage. They are necessary for the Project to function properly in scenarios when all Project Sponsors are pulling 100% of their allocations. The Coreline needs $16 million for these towers. The Coreline also needs $ 3.8 million to replace the White River Coreline crossing because there is a leak in the steel pipe under the river that is growing in size. This crossing is essential for the Pine Ridge Reservation and surrounding area south of the White River crossing. It also needs $1.8 million for the High Service Pump Station VFD Project.

Not included in Table 1 for the OMR request, but a critical need for the OSRWSS Core is the South Core Replacement (Phase V) Project, which will move the lines around the City of Ft. Pierre to address recurrent leaks in the area. Project costs are estimated at $38 million.

Annual budgeting by the Administration must reflect: (1) increases in water deliveries as project population was added between 2013 and 2015 with no corresponding increase in funding; (2) aging facilities in need of maintenance and replacement (since start of construction in 1994 and through end of construction in FY 2015); and (3) 40 existing communities that must be transferred to the respective Indian rural water systems. It is critical that Project features not fall into disrepair and that sufficient funds are available for the OMR of existing community systems that are scheduled for inclusion in the Project in FY 2022 (or were transferred earlier). Funding is also needed for the actual upgrade work, costs for which total in the tens of millions for the Indian Project Sponsors. We also ask the Subcommittee to be mindful of what Reclamation calls "extra-ordinary replacements," which are actually necessary and routine when pumps, water treatment equipment, pipelines, and other facilities fail and require replacement to continue operations.

The Mni Wiconi Project should be a shiny, new project that stands out as a beacon of modern technology. It provides under-privileged communities with safe and adequate drinking water of the highest quality and to improve the health and well-being of a low-income population, purposes that have been frustrated by inadequate attention to infrastructure maintenance.

It is important to remember that for OMR activities, the Indian projects are left with the appropriated figure minus the approximate $2 million that Reclamation takes for oversight. The reduced amount does not account for the needed storage towers, crossing replacement, the community upgrade work, any additional community system transfers, or unexpected extraordinary replacements.

The Promise Zone designation for the Pine Ridge Indian Reservation was announced in April 2015. It focused on developing solutions to infrastructure challenges and the necessary resources to upgrade existing community systems, among other things, to revitalize the region. The request in Table 1 is consistent with the Promise Zone designation (and last Administration's Opportunity Zone designation), and underscores the need for OMR funding for routine maintenance, "extra-ordinary" replacements and existing community systems following transfer.

The need is the same on the Rosebud and Lower Brule Indian Reservations. Adequate funding for all activities, including community water systems that are transferred, is a necessity for the three Indian rural water systems in the Mni Wiconi Project. The following report language is requested (see previous Congresses for similarity):

Mni Wiconi Project, South Dakota.-Reclamation is directed to continue working with the Tribes and relevant Federal agencies, such as the Department of Agriculture, the Environmental Protection Agency, the Bureau of Indian Affairs, the Indian Health Service, and the Department of Housing and Urban Development to coordinate use of all existing authorities and funding sources to finish needed community system upgrades and connections, as well as any transfers of those systems, as quickly as possible. The Administration is encouraged to include appropriate funding for transferred community systems in future budget requests. (House Report 114–532, FY 2017)

Reclamation's annual budget requests properly included the transfer of existing community systems and responsibility for operation and maintenance. The budget needs to reflect those transfers:

> ...The project consists of new systems to be constructed, as well as 40 existing Mni Wiconi community systems. Responsibilities of the Secretary under the Act include the operation and maintenance of existing water systems and appurtenant facilities on the Pine Ridge, Rosebud, and Lower Brule Indian Reservations. (FY 2012–18 Budget Justifications, p. GPR–49)

Reclamation and other federal agencies are now assisting the Tribes with a pathway for funding transfers and future OMR activities for the 40 existing community systems as they become part of the Project and eligible for funding. It is crucial that these efforts continue. OMR funding is needed for communities that were upgraded and will be transferred (or have been transferred) to the Project.

3. OSRWSS Regional Core Facilities

The staff of the OSRWSS core system includes 17 employees. The staff operates and maintains the 14 million gallon per day regional water treatment plant, 203 miles of main transmission pipeline from 12 inches to 27 inches in diameter, nine major pumping stations (4 Megawatt total capacity), nine reservoirs (4.2 million gallons of capacity) and supervisory control and data acquisition (SCADA) system, necessary to deliver safe and adequate drinking water to the service areas of OSRWSS, RSRWS, LRSRWS and WRLJ. Again, the Core Facilities need an additional three new Coreline storage towers, a crossing replacement, and pump station project at a cost of $21.6 million. The OSRWSS Core also needs $38 million for the South Core Line Replacement (Phase V) Project.

4. OSRWSS Distribution on Pine Ridge Indian Reservation

The OSRWSS Distribution's 33 employees are responsible for maintaining 760 miles of PVC water mains and service lines, 30 high production water wells, 33 booster pumps and treatment stations, 38 water storage reservoirs, and 2,206 metered residences. The water system has been designed and constructed over a 24-year period, and services a total population of 21,510 residents on the Pine Ridge reservation. The construction of the water system is now complete and valued in excess of $100 million, although 20 additional community system upgrades are still pending. To operate and maintain our water system has become a challenge. The core system east of Kyle has 4 reservoirs which have a total of 520,000 gallons of storage, this equates to only enough for less than 6 hours of storage in emergency situations. Table 1 shows a proposed 1-million-gallon reservoir to be constructed adjacent to Reservoir #5 which is near the reservation boundary north of Wanblee, SD. This added reservoir should increase our storage to more than 24-hours. In preparation for the projected South Unit development, Table 1 also proposes increasing the existing 8" waterline to a 12" line over the 15 mile stretch from Sharps to the Rockyford Hwy 27/Hwy 2 Intersection, and a proposed 1 million-gallon reservoir to be constructed adjacent to the Sharps East Reservoir.

5. Rosebud Sioux Rural Water System (RSRWS)

The staff of RSRWS or Sicangu Mni Wiconi will total 17 full-time employees in FY 2021. The staff operates and maintains 425 miles of mainline, 15 major pumping stations, 20 water storage reservoirs, 9 supply wells with two associated chlorination facilities, and SCADA system. A new production well is still needed for Rosebud Rural Water System due to decreased production and water supply. A previous RAX project request for a new production well was proposed and denied. Asset management indicates renovations are needed at some of the oldest constructed facilities in the project. A few RAX requests for system renovations have been submitted and some approved. The RSRWS budget also includes water service contracts with the City of Mission and Tripp County Water Users District (TCWUD) and others in the secondary service area at a total cost of $250,500 which reflects a reduction due less pumping for the Mission system. In 1995 the citizens of Mission voted to transfer their municipal system to the Mni Wiconi Project and in 2003 a final

agreement between the Tribe, City of Mission and Reclamation was consummated and the former municipal system is now held in trust for the Tribe as part of the RSRWS. The inclusion and OMR of the Mission system are authorized by Section 3A (a) (8) of the Mni Wiconi Project Act, as amended. The completed community upgrades in Antelope, Butte Creek, and Okreek communities are in the transfer process. Parmelee, Upper Swift Bear, and Spring Creek community water system upgrades will be completed by the end of FY 2022. RSRWS is proposing a budget request of $2,639,660.00 for FY2021 including the RAX request for a new production well.

6. Lower Brule Rural Water System

The Lower Brule Rural Water System (LBRWS) consists of a water treatment plant, six booster stations, three tanks/reservoirs, approximately 75 miles of core pipeline and approximately 300 miles of distribution pipeline. LBRWS has a staff of 12 full-time and two part-time employees to provide the operation and maintenance of these facilities. As shown in Table 1, wages and fringe benefits total $972,800.

The budget continues to include $150,000 to upgrade main line meter vaults and $25,000 to obtain the GPS location of water lines installed by ranchers and to add the lines to the current GIS database. The meter pit upgrades will improve access to the meter vaults and prolong the life of the equipment within the meter pits, while the GPS/GIS information will provide needed information for the operation and maintenance as well as the management of the system.

Zebra mussels were found in Lake Sharpe in 2019. Recent investigations of the LBRWS intake and intake pumps have found the zebra mussel infestation becoming a detriment to the LBRWS system. The result is a need to remove the zebra mussels currently on the infrastructure as well as installing a system to attempt to control the zebra mussel infestation on and within the LBRWS infrastructure. As a result, the budget includes $200,000 to deal with the zebra mussel infestation in Lake Sharpe. LBRWS will continue to work with the Bureau of Reclamation and the other sponsors to prioritize their needs and ensure that their system is operating to the standards that have been established over the past several years.

7. Bureau of Reclamation (BOR)

The BOR's budget is for oversight of operation and maintenance activities for all tribal systems, including the employment of an equivalent 8.0 persons. BOR pays the Western Area Power Administration for Project preference power used by the OSRWSS core system and Rosebud core system. BOR also pays for cathodic protection services for OSRWSS core system, Rosebud, and OSRWSS on-reservation DWM&C systems. Reclamation costs are expended before funds reach the Project.

[This statement was submitted by Ron Blacksmith, Core System Manager, Oglala Sioux Rural Water Supply System, Chuck Jacobs, Distribution System Director, Oglala Sioux RWSS, Young Colombe, Manager, Rosebud Sioux Rural Water System, and Jim McCauley, Manager, Lower Brule Sioux Rural Water System.]

PREPARED STATEMENT OF THE NATIONAL ASSOCIATION FOR STATE COMMUNITY SERVICES PROGRAMS

As Weatherization Director for the National Association for State Community Services Programs (NASCSP), I am pleased to submit testimony on the FY 2022 Energy and Water Appropriations bill. Specifically, I am writing in support of the Department of Energy's (DOE) Weatherization Assistance Program (WAP) and seeking an FY 2022 appropriations total of $356 million, with $325 million for the WAP, $10 million for Training and Technical Assistance at DOE, and $21 million for the Weatherization Readiness Fund. This funding level is essential to expand current program operations and empower the WAP to improve client services, develop workforce training, innovate efficiency technologies, and ensure equitable delivery of services.

NASCSP is the member organization representing the weatherization grantees in all 50 States, the District of Columbia, Native American Tribes and US Territories, who oversee a weatherization workforce operating in every county. The state offices represented by our organization would like to thank the members of this Committee for their support of the WAP over the years, particularly the reauthorization of the program last year and the increase provided in FY 2021. The WAP is a comprehensive whole-house retrofit program serving people with low incomes by improving energy efficiency, resident health and safety, and client finances through lower utility costs. WAP workers are highly trained energy auditors, certified by a national net-

work of accredited nonprofits, small businesses, and educational institutions in the use of advanced tools and technologies to diagnose home performance. The WAP is a proven investment in the sustainability, health, and resiliency of our communities, not only by permanently benefiting low-income families disproportionally burdened by energy costs, but also through supporting thousands of quality green jobs in the building trades. As we continue the recovery from the COVID–19 pandemic, the WAP is an opportunity to invest in a growing clean energy workforce, improve the health of thousands of families, and fight climate change.

FORMULA FUNDING—LEVERAGING FUNDS FOR ENERGY & NON-ENERGY BENEFITS

The Department of Energy (DOE) funding appropriated by Congress has allowed more than 8 million homes to be weatherized since the program's inception in 1976. Each home receives a site-specific suite of energy efficiency measures to be installed, such as insulation, air sealing, and high efficiency HVAC systems. By improving the energy efficiency of the home, these long-term investments save families money when they are installed and for years to come. With lower energy bills, families have more to spend on essentials like food, clothing, education, and health care. These whole-home benefits are central to the WAP's mission.

A robust appropriation for weatherization and DOE Training & Technical assistance is key to ensuring equitable allocation of funding, sustained WAP impact on a nationwide scale, and consistent and growing workforce development. WAP measures completed with DOE funds are subject to at least three layers of quality assurance: quality control is performed on every job by a local certified inspector; at least 5 percent of all completed jobs receive a second inspection by a state quality assurance monitor; and DOE monitors the quality assurance practices of all state WAP offices. This multi-layered approach to monitoring is designed to maximize the benefits from public funds and to ensure clients in every state receive the best possible services.

Another critical WAP benefit is improved health and safety for families. In homes that are cold and drafty, or affected by mold and excess moisture, there is an increased risk of chronic illnesses. Studies have shown the weatherization measures result in a healthier living environment. An evaluation by the Oak Ridge National Laboratory Evaluation [1] found that residents of weatherized homes experienced fewer asthma, allergy, and cold symptoms, as well as fewer missed days of work and school. Weatherization mitigates factors that can trigger an asthma attack, resulting in fewer emergency room visits and hospitalizations. WAP measures can also prevent other life-threatening events such as carbon monoxide poisoning and fires from unsafe heating sources. These benefits are especially critical at a time when many are staying at home more than ever. These outcomes pay off—every weatherization dollar spent returns $2.78 in non-energy benefits.[2] The Oak Ridge Evaluation found that families reported decreased out of-pocket medical expenses by an average of $514 and the total health and household-related benefits for each unit weatherized is estimated to be $14,148.

CREATING THE ENERGY EFFICIENCY WORKFORCE OF THE FUTURE

The WAP is overseen by the Office of Weatherization and Intergovernmental Programs within the Office of Energy Efficiency and Renewable Energy (EERE). DOE's focus on research and development brings the WAP significant benefits including technical expertise, access to the latest building science, and opportunities for collaboration with other critical energy efficiency and clean energy initiatives. DOE's technical standards and state offices' rigorous monitoring ensure that clients receive the latest weatherization measures, maximizing the benefits to low-income families. DOE's Standard Work Specifications [3] and Home Energy Professionals [4] certifications have become the gold standard for residential energy efficiency.

Every state crafts and implements a training and technical assistance plan to build a strong workforce in their state network and maintain skilled labor that meets the necessary DOE requirements. The WAP provides training and workforce development opportunities in the very same communities in which it is delivering energy efficiency services, introducing low-income people to a rewarding career field

[1] Oak Ridge National Lab, "Health and Household-Related Benefits Attributable to the Weatherization Assistance Program", 2014. https://weatherization.ornl.gov/Retrospectivepdfs/ORNL__TM-2014__345.pdf.

[2] Oak Ridge National Lab, "Weatherization Works—Summary of Findings", 2014. https://weatherization.ornl.gov/Retrospectivepdfs/ORNL__TM-2014__338.pdf.

[3] Standard Work Specifications for Home Energy Upgrades https://sws.nrel.gov/.

[4] Home Energy Professionals Certifications https://www.energy.gov/eere/wipo/guidelines-home-energy-professionals.

they may not have encountered otherwise. The energy efficiency work of the WAP supports more than 8,500 jobs in weatherization and thousands more across the supply chain of suppliers, trainers, and manufacturers. Additionally, because of the advanced diagnostics and technology developed in WAP, the program forms the foundation for the home performance industry, which employs thousands of workers who complete energy efficiency retrofits across the entire residential sector, contributing to the overall 2.38 million energy efficiency jobs found across the nation and in 99.8% of all US counties.[5]

As the WAP workforce and its impact grows, the training and technical assistance provided by DOE becomes even more critical. Since FY 2014 DOE has received $3 million or less each year for these purposes. As we have shown above, DOE's training, technical assistance, and technological support is critical to the WAP and the broader energy efficiency industry. By raising training and technical assistance support to $10 million, DOE will continue to develop new technologies, improve the health and wellbeing of thousands of low-income people, and ensure the United States leads the world in energy efficient and quality housing.

CONTINUING THE WAP'S HISTORY OF INNOVATION

The State WAP grantee is a key driver in developing new best practices for weatherization services. There are numerous examples of States across the country building on the success of the WAP and maximizing the impact of weatherization.

—Workforce Development & Career Building

Positions within the residential energy efficiency and building science trades offer workers extensive career advancement and training opportunities, in addition to a compelling mission helping their low-income neighbors. Numerous states partner with local technical colleges and community groups to provide excellent training opportunities, including to people with low incomes who may be served by the program. For example, the Illinois Home Weatherization Assistance Program offers trade school tuition reimbursement for new and existing employees and cosponsors a High School Energy Efficiency Summer Internship program.

We recognize the great potential of workforce development initiatives like these to provide quality careers to people from disadvantaged backgrounds while also ensuring the United States is a leader in the growing energy efficiency sector.

Enhancement & Innovation Grants

When the WAP allocation surpasses $275 million, DOE has the option to provide Sustainable Energy Resources for Consumers (SERC) grants for the purpose of expanding the materials, benefits and tools covered by the WAP.[6] The new WAP reauthorization established an additional WAP Enhancement and Innovation Competitive Grant Program, which utilizes 6% of the WAP appropriation for developing new practices. DOE plans to implement both SERC and the Competitive Grant Program in the coming year, providing a boost of investment in new technologies, innovative service delivery practices, and enhancement energy auditing techniques. State WAP grantees support innovation through both programs by implementing and evaluating new best practices. An evaluation from Oak Ridge National Lab[7] found that the national weatherization network is highly capable of installing and delivering a wide range of new and innovative renewable energy and energy efficiency measures and services.

Reducing Deferrals Through Pre-Weatherization Programs

Particularly severe conditions in a home can make installing weatherization measures unsafe or ineffective, causing the home to be deferred from receiving WAP services until the conditions are addressed. For example, standing water in a basement can damage appliances, old electrical wiring can be a fire hazard with insulation, and major structural or roofing deficiencies can make working in spaces unsafe. States have taken the lead with innovative Pre-WAP programs utilizing leveraged (non-DOE) funding sources to make homes weatherization ready. Pre-WAP initiatives like Ohio's Home Weatherization Assistance Program Enhancement fund and Pennsylvania's Homes in Need Program are formed through partnerships with their state Low-Income Home Energy Assistance Program to perform needed energy-related repairs. Washington's Deferral Pilot Program leverages State funding to address structural and mechanical issues at deferred homes while also developing

[5] Energy Futures Initiative and the National Association for State Energy Officials, "U.S. Energy & Employment Report", 2020. https://www.usenergyjobs.org/.

[6] 42 U.S.C. Chapter 81 § 6872. Authorization of appropriations.

[7] Sustainable Energy Resources for Consumers Grant Program Evaluation, Oak Ridge National Laboratory (ORNL/TM–2017/703).

best practices for tracking these deferrals. The success of these individual examples illustrates that additional investment in non-energy related upgrades leads to reduced deferrals and improved delivery of services to homes that otherwise would be excluded from receiving the benefits of WAP. These conditions exist in all States and highlight the need for investing in a Weatherization Readiness Fund to address deferrals.

Weatherization Plus Health

Many States are implementing pilot programs or partnering with State housing agencies to implement Weatherization plus Health initiatives. The need for programs addressing indoor air quality have become particularly pronounced due to the COVID–19 pandemic. Beyond the inherent health benefits of weatherization, these efforts leverage weatherization service providers to incorporate additional healthy homes measures, like hard surface flooring, enhanced ventilation, mold abatement, and accessibility improvements. Local WAP agencies have partnered with community health workers to provide enhanced client education on energy and health. Combined with basic weatherization measures, Weatherization Plus Health can target those with chronic health conditions that result from in-home factors, adding substantial healthcare savings on top of energy benefits.

CLOSING

In closing, I would like to underscore the critical need for continued Department of Energy funding for the Weatherization Assistance Program. An FY 2022 appropriations total of $356 million, with $325 million for the WAP, $10 million for Training and Technical Assistance at DOE, and $21 million for the proposed Weatherization Readiness Fund will sustain and expand the program as its scope and impact continue to grow. Through enhancing weatherization services, developing innovative new technologies, and building a strong and well-trained workforce, the Weatherization Assistance Programs uplifts low-income communities and cements the United States as a leader in residential energy efficiency.

We look forward to working with Committee members in the future to ensure the WAP continues to deliver cost effective results that support our economy and make a difference in the lives of the most vulnerable in our communities. Thank you.

Respectfully submitted.

[This statement was submitted by Andrea Schroer, WAP Director, National Association for State Community Services Programs.]

PREPARED STATEMENT OF THE NATIONAL ASSOCIATION OF STATE ENERGY OFFICIALS

Chairman Feinstein, Ranking Member Kennedy, and members of the Subcommittee, I am David Terry, Executive Director of the National Association of State Energy Officials (NASEO). I am testifying on behalf of our 56 governor-designated state and territory members. NASEO respectfully requests funding for the following U.S. Department of Energy (DOE) programs: $121 million for the U.S. State Energy Program (SEP) with $90 million directed for formula grants to the states (plus $5 million for technical assistance to states and $25 million to address energy and air quality in schools); $325 million for the Weatherization Assistance Program (WAP) (plus $10 million for technical assistance); $530 million for the Building Technologies Office, including $100 million for building energy codes-especially funding to support state and local technical assistance, and $50 million for grid-interactive efficient buildings; $400 million for the Vehicle Technologies Office; $280 million for the Solar Energy Program; $56 million for FEMP, including $2 million for the state collaborative; $252 million for the Office of Cybersecurity, Energy Security, and Emergency Response, including $50 million for energy-sector risk mitigation grants to states and $20 million for program direction; $225 million for the Office of Electricity, including $25 million for Transmission Permitting and State Technical Assistance; and $2 million for Office of Policy to produce the U.S. Energy Employment Report. The $90 million SEP request and $325 million WAP request is supported by the "Dear Colleague" letter, signed by 45 members, you received last week, led by Mr. Reed and Ms. Collins. These requests are separate from additional funding necessary for infrastructure and climate change responses. Section VI of the FY21 House Energy and Water Development Appropriations bill is a good starting point for addressing climate and infrastructure, with funding for SEP, WAP and EECBG. DOE must move quickly to fill the 150 jobs within EERE, or the Subcommittee's objectives and the Administration's agenda will not be satisfied.

The underlying SEP statute provides extraordinary flexibility and reflects the states' approach to advancing renewable energy, energy efficiency, transportation electrification, energy workforce development, resilience and climate actions, and energy-sector security. For example, the eight state REVWest initiative is advancing EV infrastructure and many states use SEP funds to accelerate this work. Southeastern states use SEP funds to collaborate on energy emergency planning, response, and resilience. States are coordinating on workforce development and equity programs with SEP. In addition, states from across regions use SEP funds to accelerate energy technology innovation initiatives in coordination with universities and the private sector. All of this work is accomplished through the SEP formula funds. Past Administrations have sought to "slice off" a portion of the SEP formula funds provided by Congress for DOE-directed competitive awards in areas selected by DOE. NASEO strongly opposes the use of this approach which limits states collaborative work on priority activities.

According to two Oak Ridge National Laboratory (ORNL) studies, SEP provides exceptional value. ORNL found that each dollar of SEP formula funds used by the states leverages $10.71 of state and private funds and realizes $7.22 in energy cost savings for citizens and businesses.

The State Energy Offices lead or co-lead energy emergency planning and response across electricity, natural gas, and petroleum products. This state-federal-private function is a hallmark of SEP. NASEO also strongly supports the role of CESER. It is critical to increase program direction funds to manage and deliver these critical functions. Finally, SEP is one of the only connections between billions of dollars spent by DOE on R&D and the priorities of states. A greater reliance by DOE on the states to ensure federal R&D meets real world conditions would maximize the impact of R&D funding and leverage the vast deployment capability of states. Greater coordination among EERE, FE, OE, CESER, ARPA–E and the states is necessary.

Below are a few examples of the states' utilization of SEP funding:

Alabama.—The Alabama Department of Economic and Community Affairs (ADECA) supported energy efficiency upgrades at wastewater treatment plants and local facilities. ADECA issued 21 grants to local governments, universities, and nonprofits to reduce energy costs by making their facilities more efficient.

Alaska.—Support LED Streetlight Replacement in 64 Rural Alaska Communities. The Alaska Energy Authority (AEA) used SEP funds to support outdoor lighting retrofits in rural communities. Through a public-private partnership, AEA's Village Energy Efficiency Program (VEEP), and despite the COVID–19 pandemic, communities have actively managed to implement their projects totaling $2,156,851. Fourteen sites are complete, 594 lights have been replaced, and 225,774 kilowatt-hours (kWh) per year will be saved. Cost per kWh in these communities ranges between $0.19—$0.86. All 64 sites are expected to be complete by September 30, 2021.

California.—Supports Development of Appliance Standards. California uses SEP funds to develop and implement appliance and building standards. In 2020, appliance standards became effective for general services lamps (GSL), walk-in coolers and freezers, ceiling fans, ceiling fan light kits, portable air conditioners, spray sprinkler bodies, and pool pumps. New appliance standards will lead to energy and cost savings. For example, after GSL stock turns over, annual electricity savings will be 4,000–13,600 gigawatt-hours; portable air conditioners will realize 369 gigawatt-hours in savings; spray sprinkler bodies will save 150 billion gallons of water per year; and pool pump motors will save 62 gigawatt-hours annually.

Delaware.—Evaluation of Energy Efficiency, Green Energy and Weatherization Programs. The Delaware Department of Natural Resources and Environmental Control's Division of Climate, Coastal and Energy recently completed the Year 2 comprehensive evaluation of our Energy Efficiency Investment Fund (EEIF), Green Energy Fund (GEF) and Weatherization Assistance Program (WAP). The evaluation was done by an independent contractor as required by the Evaluation, Measurement and Verification (EM&V) regulations that are promulgated in Delaware. The Total Resource Cost (TRC) test results from the evaluation were 2.98 for EEIF; 1.38 for GEF; and 1.22 for WAP. In other words, with TRCs above 1.0, our programs are successfully leveraging funds at a rate greater than every dollar we invest.

Illinois.—Achieved 2,431,955 kWh Annual Savings in Environmental Justice Communities. The Illinois Energy Office used SEP funds to support upgrades at four publicly-owned wastewater treatment plants in 2020, leveraging $16,018,574 in matching funds from municipalities and saving 2,431,955 kWhs annually. Of the total $2,527,424 in funds awarded, 79% of was granted to facilities serving EJ communities.

Kentucky.—Support COVID–19 Energy System Response, Provided Generators for COVID–19 Testing Sites. The Kentucky Office of Energy Policy (KY OEP) used SEP

funds to perform critical emergency functions in response to the COVID–19 pandemic. During the commonwealth's response, KY OEP coordinated with the Kentucky Public Service Commission to support Emergency Support Function 12—Energy (ESF–12); Commonwealth agencies' response to energy issues in the Commonwealth; state level situational awareness around energy issues during an emergency; and with the private sector for the emergency repair and restoration of critical public energy utilities (i.e. gas, electric, fuels, etc.).

Louisiana.—Key Corridor LED Lighting Results in Energy Cost and GHG Reductions. The Louisiana State Energy Office partnered with Orleans Parish to install LED street lighting along two highway corridors, resulting in an estimated savings of approximately 40 percent in utilities costs, annual energy savings of 9,520,754 kWh, 7,946 tons of greenhouse gas emissions. The project was made possible through the SEP-supported Energy Efficiency Revolving Loan Fund, a program that was established in 2001 to offer low interest, tax exempt financing for public entities implementing approved renewable energy and energy efficient upgrades. The program has resulted in over 30 low interest public sector loans totaling $23.6 million.

Maine.—Support Clean Energy and Climate Efforts, Energy Efficiency Initiatives, and COVID Coordination. In Maine, the Governor's Energy Office (GEO) used SEP funding to pursue, develop, and implement nation-leading energy initiatives, including a floating offshore wind demonstration project and new programs aimed at installing 100,000 new high efficiency air source heat pumps by 2025. In 2020, the GEO assisted in the development of the state's 4-year climate action plan—Maine Won't Wait. This plan outlines how Maine will achieve the statutory requirement to reduce greenhouse gas emissions of 45 percent by 2030 from 1990 levels and 80 percent by 2050.

Michigan.—Energy Efficiency Upgrades Help Michigan Communities Save $241,874 Annually. The Michigan Energy Office-supported Community Energy Management (CEM) program enabled energy benchmarking in 708,380 square feet of buildings, with initial savings estimates of $241,874 annually after energy efficiency upgrades. CEM, funded in part by SEP, offers financial incentives directly to municipalities, tuition-free K–12 schools, and other community-serving public entities to accelerate the transition to energy efficiency and renewable energy. Projects range from creating energy plans, benchmarking and auditing, lighting and HVAC, to solar installations. This program allows communities to lead by example.

Montana.—Delivers Personal Protective Equipment to Essential Workers, Leads Energy Emergency Response. The Montana Energy Office leveraged SEP funding to respond to energy emergencies resulting from the COVID–19 pandemic, including delivering personal protective equipment to essential energy workers. The Montana Energy Office coordinates the state's Emergency Support Function 12 (ESF–12), the team charged with monitoring and responding to energy supply emergencies. Leveraging key funding from the State Energy Program, Montana's ESF–12 team reached out to utilities, refineries, and businesses across the energy sector to determine impacts of the pandemic on energy supply operations.

New Hampshire.—Reduced Local School Energy Costs. One example of the results of New Hampshire's annual School Energy Efficiency Development (SEED) grant program is the Lempster Community School. This schools saved over $7,000 in annual energy costs in 2020.

New Mexico.—Grid Modernization Roadmap Improves the Reliability, Efficiency, and Security of the Power System. In 2020, SEP funds were used to provide support for the development of the Energy Grid Modernization Roadmap that will help New Mexico improve the reliability, efficiency, and security of the power system. The New Mexico State Energy Office launched the Grid Modernization Advisory Group in September 2020.

North Dakota.—Deploy Solar Panels Bolster Resiliency, Educate Students at Career Academy. Supported installation of 115 panels and an inverter at the Bismarck Public Schools Career Academy in October 2020. In addition to powering the building, instructors at the school plan to start incorporating the panels into their lessons. The solar array was funded by a $92,000 State Energy Program grant though the North Dakota Department of Commerce.

Oregon.—Transitioning to Cleaner, Low-Carbon Energy Future. The Oregon Department of Energy (ODOE) released its 2020 Biennial Energy Report, which covers a range of energy topics germane to the state, and is designed to inform the legislature, state and local governments, other key stakeholders, and the public on policy development, planning, and investments. The 2020 Report offers discussions on an array of energy topics, including decarbonization, the transition of the electric grid, innovation in the natural gas system, cleaner transportation, the effects of the pandemic on the energy sector, and the built environment and Oregon's communities.

South Carolina.—Support Electric Vehicles and Decrease GHG Emissions from State Fleet. Using SEP funds, the South Carolina Energy Office purchased the first state fleet electric vehicle (EV) and installed EV charging stations at state parks. In 2016, the State Energy Plan included a "Lead by Example" recommendation to increase transportation fuel efficiency and diversity.

Tennessee.—Creates Plan to Double EV Charging Stations. The Tennessee Energy Office used SEP funds to support the roll-out of a statewide network of EV fast-charging stations, which will result in doubling the number of available EV fast-chargers. In 2019, Drive Electric Tennessee released a roadmap to increase EV adoption to 200,000 EVs (up from 11,000 EVs). This network will connect rural and urban areas and will improve efficiency and resiliency.

Vermont.—Support Low-Carbon Technologies Through Rate Design Initiative. In Vermont, the State Energy Office directed SEP funds to support the development of the Vermont Rate Design Initiative (RDI), which identified advanced forms of load management and rate designs to foster low-carbon technologies, customer-sited renewables, and energy storage that will further energy and environmental objectives while minimizing ratepayer challenges from electrification and power sector transformation over the long term. The Department of Public Service continues to build on progress in the RDI through its role as the State Energy Office.

Washington.—Develop State Energy Strategy, Prioritizes Underserved Communities. Washington's Energy Office helped the state move toward a clean, affordable, and just energy future by completing legislative rulemakings, developing a new state energy strategy, and incorporating equity principles into clean energy programs. Washington completed rules related to the clean electricity, clean buildings and new energy efficient appliance standards legislation passed in 2019. The state charted the next frontier of energy policy opportunities by completing the 2021 State Energy Strategy. The State Energy Office also administers the Clean Energy Fund grant awards, which prioritize communities underserved by EV infrastructure.

Wisconsin.—Create a $25 Million Energy Innovation Program. The Wisconsin State Energy Office implemented a program for manufacturers, municipalities, tribes, and k-12 school districts to increase energy efficiency and the use of renewable energy and transportation technologies, bolster resiliency in the energy system, and advance energy planning. For example, $5 million provided to 30 that leveraged $4.5 million in local and private energy investments.

[This statement was submitted by David Terry, Executive Director, National Association of State Energy Officials.]

PREPARED STATEMENT OF THE NATIONAL HYDROPOWER ASSOCIATION

The National Hydropower Association (NHA) respectfully requests $222 million for the U.S. Department of Energy's (DOE) Water Power Technologies Office (WPTO) in the Fiscal Year (FY) 2022 Energy and Water Development Appropriations measure. NHA recommends at least the authorized level of $137 million for marine energy along with the Biden Administration request of $85 million for the hydropower program, with full funding of both the EPAct 2005 Section 242 hydroelectric production incentive program and the Section 243 efficiency incentive program. NHA also supports robust funding for the operations and maintenance (O&M) programs of the U.S. Army Corps of Engineers (USACE) and Bureau of Reclamation (BuRec) to increase capacity and generation at their facilities, addressing the billions of dollars of backlogged O&M needs.

FUNDING JUSTIFICATION

The U.S. water power industry has tremendous beneficial impacts on our nation's electric grid, the economy, and environment. Hydropower delivers almost 40% of total U.S. renewable electricity generation and pumped storage projects provide 93% of total energy storage in the country. Hydropower also avoids approximately 200 million metric tons of CO2 emissions each year. In addition to providing affordable, renewable power to the grid, hydropower and pumped storage help integrate greater amounts of variable renewable generation, such as wind and solar, while maintaining grid reliability and resilience. Finally, thousands of Americans have high value employment due to water power projects in every region of the country.

Yet, the industry is poised to do even more. The U.S. has significant underutilized water power resources, including non-powered dams, conduits, new pumped storage, and marine energy. Advancement of new and innovative technologies, operations, and approaches to harness these resources in a globally competitive marketplace is greatly enhanced by federal funding that augments research, development, and de-

ployment (RD&D) efforts underway in the private sector. A growing U.S. water power industry will support efforts to address climate change and reduce carbon emissions, assist in grid reliability and resiliency, while also advancing our national economic goals. Increased funding is critical and will help create high-quality employment and support businesses across the country that comprise the water power supply chain.

NHA commends Congress for its increased support of the DOE WPTO in recent years, culminating in the $150 million funding level in FY 2021. However, this investment still remains well below that historically afforded other DOE renewable R&D programs. For comparison, the Biden Administration just requested an additional $106 million for the Solar Energy Office, which is currently funded at $273 million. Meanwhile, more than 5 GW of new solar capacity was installed in the U.S. during the first quarter of 2021, with total U.S. solar capacity now over 100 GW. This is up from just 1 GW of U.S. solar capacity in 2009. These commercial deployments are subsidized with approximately $2.5 billion of yearly federal expenditures through the Investment Tax Credit.

The view of NHA and its members is that these significant and sustained federal technology RD&D and market acceleration initiatives are one of the critical factors related to the tremendous growth in U.S. solar (and wind) deployments over the past decade. A similar level of federal investment for water power is required to accelerate the pace of technology demonstrations and deployments, reduce costs, and increase adoption.

NHA greatly appreciates the significant proposed FY 2022 budget increase for the WPTO, particularly that of the hydropower program, which NHA strongly supports. NHA's FY 2022 request builds on the foundation of the Administration's budget request by seeking $137 million for the marine energy program. This represents full funding of the reauthorized levels adopted as part of the Water Power R&D Act of 2020, enacted as part of the Consolidated Appropriations Act of 2021. NHA also supports full funding of the EPAct 2005 hydropower incentives within the $85 million for the hydropower program, also reauthorized in the FY 2021 appropriations bill. The Administration's FY 2022 budget request did not include any funding for the incentives.

OVERVIEW OF DOE WATER POWER TECHNOLOGIES OFFICE INVESTMENTS

Last year, as part of the Consolidated Appropriations Act of 2021, Congress renewed authorization of the DOE WPTO through passage of the Water Power R&D Act of 2020 and the Reliable Investment in Vital Energy Reauthorization Act (RIVER Act). These measures authorize investments in water power technology innovation and deployment as well as workforce development efforts. These federal investments are essential to create high value job growth and maximize the contribution of renewable water power resources as part of a 100% clean energy future.

The Water Power R&D bill provides annual authorization levels for the DOE WPTO RD&D activities for FY 2021–2025 of $137 million for marine energy and $49 million for hydropower. NHA views these recommendations as the minimum required to support WPTO investments on innovation of advanced technologies to increase power production and reduce costs, improve grid reliability and resilience, create new market opportunities that improve economic growth, and fund cross-institutional foundational research to support workforce development.

In addition, the RIVER Act authorizes $10 million per year for the Section 242 hydroelectric production incentive and $10 million per year for the Section 243 hydroelectric efficiency incentive, both of which were first adopted as part of the Energy Policy Act of 2005. The production incentive, which is currently oversubscribed, provides financial support for new hydropower facilities constructed at existing dams and conduits and was amended to include new small hydro projects constructed in areas of inadequate electric service. The efficiency incentive, which supports capital improvements at existing hydropower facilities that improve efficiency by at least three percent, has not previously received appropriations.

Hydropower.—NHA supports the Biden Administration request of $85 million for the hydropower program, with $10 million for Section 242 and $10 million for Section 243. Hydropower is a proven renewable electricity resource, accounting for nearly 7% of all U.S. electricity production. However, increased WPTO investments can significantly expand generation from this resource. For example, only 3% of the approximately 80,000 existing dams in the U.S. currently generate electricity. Other growth opportunities include increasing efficiencies and expanding capacity at existing hydropower projects, new pumped storage facilities, and new small hydro development. Pumped storage represents a significant opportunity because of its in-

creased grid reliability benefits, additional energy storage, and support for the integration of intermittent renewable generation resources.

The WPTO invests in hydropower technology RD&D for innovative standardized and modular approaches to hydropower development that can lower project costs versus traditional projects. For small hydropower specifically, the WPTO supports standardization of new turbine designs, as well as new advanced materials and manufacturing across the sector, including applications at non-powered dams, irrigation channels, and other waterways. This work increases generation opportunities with innovations that also improve environmental performance. It also helps reduces costs for companies that have capitalization challenges to fund this work. The WPTO supports DOE's Advanced Energy Storage Initiative and focuses on the role of hydropower and pumped storage in grid reliability and resiliency by supporting innovative technologies and conducting new research to evaluate and improve the flexibility and grid services provided by these projects. The WPTO also supports development of innovative environmental mitigation technologies, such as novel fish passage systems and other advancements.

Marine Energy.—NHA requests at minimum the $137 million for the marine energy program that was authorized on a bipartisan basis in the Water Power R&D Act. Marine energy technologies-powered by water-based renewable resources such as currents, tides, and waves-are undergoing rapid innovation and will be critical in helping to reach 100% clean energy targets and related climate change goals by 2035. Marine energy will also provide benefits to the electric system and facilitate off-grid "Blue Economy" market opportunities. These benefits include marine energy's location near demand loads, relative predictability, generating profiles, and resiliency. Finally, marine energy has significant near-term promise, particularly in coastal, riverine, and island environments that currently rely on high-cost fossil fuels. Marine energy technologies offer the opportunity to provide lower cost power while dramatically reducing harmful emissions for widely distributed, previously underserved, or economically distressed waterfront communities.

The U.S. has substantial marine energy resources, which are geographically diverse, reliable, predictable, and environmentally friendly. DOE conservatively estimates the marine energy resource in all 50 states at 2,300 TWh/year, equivalent to 57% of U.S. electricity generation (based on 2019 numbers). Utilizing just 10% of this potential resource would equate to nearly 6% of total generation and represents more than three times current solar generation, one quarter of the U.S. coal fleet, and is enough to power approximately 22 million homes.

The WPTO supports RD&D for marine energy systems and subsystems ultimately leading to reduced costs and increased deployments. The WPTO validates the reliability of marine energy technologies and the value of integrating energy from prototype devices into the electric grid and Blue Economy applications. These funds provide risk mitigation, technical advancement and review, and early market growth opportunities. The program has now established the following four focus areas:

1–Materials and Components Research and Development; 2–Systems Integration and Validation; 3–Testing and Reliability; and, 4–Data, Modeling, and Analysis

NHA strongly supports additional funding in these focus areas. There are wide ranges of design approaches to marine energy systems. It is likely that different designs will be most effective in diverse resource areas or for various market applications. Increased funding is required to support the design, construction, and validation of marine energy systems in open water deployments, with a balanced approach across resource areas that reflects the higher funding requirements of more mature designs. In addition, a key barrier to marine energy technology development is the difficulty of testing new designs. Funding is needed to establish and expand testing infrastructure including open-water test centers such as PacWave. Funds are also needed to conduct the tests along with environmental monitoring technologies and research to expedite permitting and in-water demonstration.

Unfortunately, the budget submission failed to request funding for the following focus areas, which NHA urges the subcommittee to support:

Foundational Research.—Marine energy technologies present unique engineering challenges that require collaborative foundational innovations by cross-institution teams of researchers. NHA urges establishment of dedicated funding for foundational research activities led by universities and other research institutions affiliated with the National Marine Energy Centers to accelerate development of the marine energy sector and help train a skilled workforce for the Labs and industry.

Powering the Blue Economy (PBE).—Marine energy systems can be a cost-effective and reliable power source in several distributed "Blue Economy" markets, such as aquaculture, desalination, oil and gas production, underwater data centers, and other emerging needs. However, prototypes must be tailored to specific applications

and their performance demonstrated to facilitate adoption in these markets. NHA urges continued funding of the WPTO PBE activities.

OTHER AGENCIES

NHA also recommends close DOE coordination with other agency partners, including the U.S. Navy on national security applications for marine energy devices, along with FERC, BOEM, and NOAA for regulatory efficiencies to support deployment. For hydropower deployment, continued DOE engagement with FERC, USACE, BuRec, and federal resource agencies is needed to address the amount of time to permit and license projects. Finally, NHA urges Congress to increase funding to USACE and BuRec to operate, maintain, and upgrade their existing projects, as well as to add non-federal hydropower development to their non-powered infrastructure. NHA also believes there are ways to make this investment that do not increase costs to the power customers. The federal hydropower system makes up approximately half of U.S. hydropower generation. Many of these projects have been identified, by the owners themselves or by equipment suppliers, as candidates for upgrade potential and/or have backlogged O&M needs. USACE and BuRec projects make the federal government itself one of the largest renewable energy providers in the U.S. Reinvesting in these projects will help to address climate change, provide economic and job opportunities, and maximize the benefits of this public infrastructure.

[This statement was submitted by Malcolm Woolf, President and CEO, National Hydropower Association.]

PREPARED STATEMENT OF THE NATIONAL MARINE MANUFACTURERS ASSOCIATION

Dear Chairwoman Feinstein and Ranking Member Kennedy,

On behalf of the National Marine Manufacturers Association (NMMA), I thank you for convening this hearing to review the FY22 budget submission for the U.S. Army Corps of Engineers (USACE) and the Bureau of Reclamation (USBR). The Biden Administration and 117th Congress face perhaps the most daunting challenges of our generation: rebuilding our country from the health and economic crisis brought on by the COVID–19 pandemic and addressing the global climate crisis. As the subcommittee looks to bolster the economy and address climate change through the FY22 appropriations cycle, we stress that USACE and USBR, leaders in providing public access for water-based recreation opportunities, have the resources and funding necessary to manage and build more resilient public recreation access, protect vulnerable communities, and rebuild local economies through facilitating recreation economic activity.

NMMA is the trade association for the U.S. recreational boating industry, representing nearly 1,300 marine businesses, including recreational boat, marine engine and accessory manufacturers. NMMA members collectively manufacture more than 85 percent of the marine products sold in the U.S. Furthermore, the recreational boating industry has a significant impact on our nation's economy and in communities across the country, employing nearly 700,000 American jobs across 35,000 U.S.-based marine businesses.

Led by the recreational boating industry, the outdoor recreation economy is a major contributor to the U.S. economy, accounting for 2.1% of GDP, $788 billion in economic output, and 5.2 million American jobs. The role of recreational boating in our economy has only grown more significant as Americans flocked to new outdoor activities amidst the COVID–19 pandemic, with sales of new powerboats in the U.S. increasing last year by an estimated 12% compared to 2019, reaching a 13-year high. Over 44,000 new boat buyers entered the market between March and June 2020, representing 10% year-over-year growth. There are many encouraging aspects of this new growth including that roughly 30 percent of the industry's growth was made up of new buyers, may of which were younger and more diverse.

While this rise has showcased the popularity of such activities as a safe and fun way to spend time with loved ones, it has also illuminated one of the most pressing issues facing the industry: the need for adequate, sound, and up-to-date infrastructure that meets demand. Given that a majority of public recreation access infrastructure is already in need of significant maintenance and modernizations, our aging access points and facilities are particularly vulnerable to the effects of climate change. From rapidly changing water levels to increased frequency and intensity of flooding events and natural disasters in coastal and inland waterway areas, public waterways and outdoor recreation infrastructure need bolstered resilience. Without robust investment in our country's outdoor recreation infrastructure, these economic

contributions—along with pastimes enjoyed by the vast majority of Americans—will be in jeopardy.

Considering that boating and fishing are the top contributing segments within the recreation economy and USACE and USBR together offer the majority of water-based recreation opportunities, significant potential to grow the outdoor economy—and the entire U.S. economy—can be achieved through elevating these agencies' role in supporting recreation, which must be reflected in the appropriations cycle. Higher prioritization of these agencies recreation-oriented activities can be achieved through ensuring adequate funding from existing programs and funding authorities and reforming antiquated project prioritization processes that neglect to recognize the significant economic, environmental, societal, and health benefits generated by recreation.

For example, USACE has over 5,000 sites in 43 states, generating over $10 billion in economic impact and supporting 189,000 total jobs, yet a majority of access infrastructure managed by USACE is in poor condition. Of note, there were 256 million visits to USACE lake and river projects in 2020 compared to the 237 million visitors NPS hosted. Providing USACE and USBR with the necessary tools and resources to better manage and support recreation access will go a long way towards preserving the nation's lakes, reservoirs, rivers, waterways and the economic impact of outdoor recreation.

It's important to note that USACE and USBR accounts that support recreation are historically underfunded and both agencies are more often than not completely excluded from or benefit considerably less than other agencies through significantly impactful federal lands and waters policy and funding mechanism such as the Federal Lands Recreation Enhancement Act (FLREA) and the Great American Outdoors Act (GAOA). For instance, While USACE manages recreation visitation and transportation infrastructure asset catalogues on scale with the National Park Service (NPS), U.S. Fish and Wildlife Service (FWS), and the U.S. Forest Service (FS), these three agencies 1) are able to retain a portion of recreation fee revenue to reinvest in recreation infrastructure through FLREA authority, 2) are all GAOA recipients, with NPS receiving 70 percent of total GAOA deferred maintenance funding, and 3) receive direct set asides from the Federal Lands Transportation Program (FLTP) that takes up a majority of the programs funding leaving USACE, USBR, and BLM (another GAOA recipient) to compete for any remaining funding to go towards maintaining infrastructure that provides access to high-visitation.

On the navigation side of USACE activities, small recreation-based ports are critical access points for inland and coastal communities where businesses depend on marine recreation-based economic activity. Yet, the benefit cost ration (BCR) criteria used to prioritize USACE navigation projects only recognizes commercial activity in assessing project economic benefits, failing to account for the value created by access for recreation activities leaving our economy at a disadvantage. Additionally, without sufficient dredging in recreation-based harbors and waterways, some recreational boaters are forced to use high traffic commercial channels, which can lead to potential user conflicts and safety concerns. The federal government has a responsibility to maintain all of nation's ports, harbors, and waterways, yet for too long water infrastructure projects that support recreation access have gone underappreciated and neglected, does not consistently account for recreation within the scope of economic benefits a project provides. Additionally, given that 84 percent of the U.S. recreational boating industry is made up of small businesses, this commonsense modernization of an antiquated process for prioritizing water infrastructure projects will reenergize Main Street in coastal communities across the country. BCR reform that would require USACE and the Office of Management and Budget (OMB) to account for recreation as an economic impact in project prioritization would exercise a more comprehensive approach that ensures critical water infrastructure projects are funded on an equitable, sustainable, and needs based system.

Systemic underfunding of these agencies' recreation facilities and management, combined with USACE's lack of authority to reinvest recreation fees into revenue-generating infrastructure assets, have allowed this infrastructure to decay in the face of rising demand. Maintaining this status quo jeopardizes the safety and viability of recreation opportunities managed by the leading providers of water-based public recreation access. Solutions that can be taken through the FY22 process to address these deficiencies include:

—An additional investment of $40 million in the Operations & Maintenance account allocated to USACE Natural Resources Management (NRM) to continue the operation, maintenance, and repair of existing recreation facilities and public access including unfunded infrastructure maintenance needed to sustain existing facilities at full capacity.

—Direct the Government Accountability Office (GAO) to conduct a survey to provide an inventory of all federally managed recreational boating infrastructure and facilities; an assessment of annual operation and maintenance needs associated with these sites; deferred operation and maintenance needs for such infrastructure and facilities to operate safely at full capacity; opportunities to expand capacity at existing access points; and the economic impact of recreation on regional economies and benefits of sustaining and improving public access at recreational infrastructure and facilities.
—Dedicated Federal Lands Transportation Program (FLTP) set-aside funding for USACE and USBR at amounts commensurate with each respective agencies' public transportation improvement needs and visitation demand.
—Extension of recreation fee retention authorities under FLREA to USACE to provide a much-needed revenue source to improve the quality of recreational assets and services and address the backlog of maintenance needs.
—Reform BCR criteria to require USACE and OMB to account for recreation as an economic impact to establish an equitable, sustainable, and needs-based system for prioritization USACE navigation projects.

On behalf of our members, I thank you for your leadership in preparing FY22 appropriations legislation and appreciate the opportunity to provide comments on how recreation infrastructure can play an important role in economic recovery. NMMA stands ready to work with you ensure adequate funding for federal land and water agencies integral to providing public recreation access, and better enable the thriving outdoor sector to get Americans back to work and revive local economies across the country.

Sincerely.

[This statement was submitted by Callie Hoyt, Director, Federal Government Relations, National Marine Manufacturers Association.]

PREPARED STATEMENT OF THE NATIONAL WATER RESOURCES ASSOCIATION

Chairwoman Feinstein and Ranking Member Kennedy,

Thank you for your efforts and attention to the importance of water infrastructure and its critical connection to our nation's economic wellbeing and recovery. You are not alone in recognizing the importance of water to our nation and its economy. The National Water Resources Association (NWRA) shares this conviction. As you embark on efforts to develop the FY2022 Energy and Water Appropriations bill we urge you to include robust funding for both the Bureau of Reclamation (Reclamation) and the Army Corps of Engineers (USACE). Under your leadership appropriations for Reclamation and USACE have increased in recent years. We thank you for this funding. We now ask that you double down on this effort and further increase funds allocated to our nations water infrastructure. Increasing appropriations dedicated to water infrastructure is one of the most effective ways to protect human health and drive economic recovery in both the near and long term.

The NWRA is a nonpartisan, nonprofit federation of state water resources associations, regional associations, agricultural, and municipal water providers. Our members provide water and hydropower to approximately 50 million individuals, families, agricultural producers, and other businesses in a manner that supports communities, the economy, and the environment. Our membership spans the Western United States as well as portions of the Southeastern United States.

In light of the country's current economic concerns, it is important to emphasize the positive impact water infrastructure has on both our health and the economy. Water infrastructure systems provide communities, businesses, industry, agricultural producers and our citizens with an all-important supply of water that is needed not only to survive and thrive, but to drive economy recovery.

Reclamation and USACE water infrastructure is a cornerstone of our nation's economy and will be a catalyst for economic recovery and prosperity. A total of approximately $20 billion dollars was required to build Reclamation's entire infrastructure system.[1] Every year, this infrastructure returns over $63 billion in direct and associated economic activity.[2] The USACE delivers similar economic benefit. Between 2010 and 2013, each dollar invested in USACE civil works generated about

[1] CRS Report R41844 The Reclamation Fund: A Primer https://crsreports.congress.gov/product/pdf/R/R41844.

[2] U.S. Department of the Interior, Department of the Interior's Economic Report FY 2018 https://www.doi.gov/sites/doi.gov/files/uploads/fy-2018-econ-report-final-9-30-19-v2.pdf.

$16 in economic benefits and $5 in U.S. Treasury revenues.[3] In other words, every year our economy recoups its investment in Reclamation and USACE projects multiple times over. These economic benefits are realized in communities large and small throughout the nation.

As the congressional panel which funds both Reclamation and the USACE we ask you to please support strong funding levels for water infrastructure across the board. We also recommend robust and targeted appropriations that would:

—Invest in aging infrastructure for both the delivery and storage of water. Both Reclamation and the USACE have multi-billion dollar aging infrastructure backlogs. On April 21, 2021 Reclamation released its Asset Management Report. In this report Reclamation identified approximately 2,800 major rehabilitation and replacement activities (MR&R) with estimated cost totaling $11.9 billion over the next 30 years.[4] Investing in aging infrastructure now, including implementation and funding of the aging infrastructure authority provided in recent omnibus (Division FF, Title XI, Sec.1101 of P.L. 116–260), will save considerable dollars. If these needs are ignored infrastructure will degrade, water services and the communities that depend on them will suffer, and repair and replacement costs will grow.

Last year Congress authorized a new Aging Infrastructure revolving loan program for Reclamation, the Administration has requested $1 million dollars for this program. This is not sufficient. We respectfully request you increase funding in this account to $10 million for FY2022.

—In recognition of climate impacts on water supply increase funding to; enhance, maintain, and upgrade physical infrastructure at surface, groundwater, and conjunctive use projects to help capture water in wet years for use in dry years. This would be cost effective, ease drought effects, address flooding and minimize environmental impact.

—Fund partnerships with state and/or local entities, to perform work on non-federal projects to optimize storage and delivery capability. Allow federal investment in repairing non-federal dams which are deemed unsafe by state regulators. When states limit reservoir capacity because of safety hazards to a full reservoir, the local community served by these reservoirs suffers economically.

—Provide a significant infusion of construction funds to the already under construction Reclamation rural water projects. These projects receive insufficient annual funding, increasing their total cost and forcing rural and tribal communities to wait even longer for safe and reliable drinking water supplies. Completing these projects would open additional funding opportunity to develop water efficiencies and better manage long-term drought impacts.

—Increasing investment in water re-use and recycling projects. This concept has experienced growing interest and advanced technology has made such projects more efficient and effective.

—Embrace technology and invest in effective green infrastructure projects including water conservation, fish passage, efficiency technologies, and habitat restoration.

—Identify and expand hydropower opportunities to support energy independence and carbon emissions reduction.

We welcome the opportunity to work with you and support your efforts to provide a significant increase of funding to Reclamation and the USACE.

Thank you for your consideration and your attention to the importance of our nation's water infrastructure. Please do not hesitate to contact me at ilyle@nwra.org if you would like any additional information. Thank you again for your dedication to our nation and its water infrastructure.

Respectfully.

[This statement was submitted by Ian Lyle, Executive Vice President, National Water Resources Association.]

PREPARED STATEMENT OF THE NATURE CONSERVANCY

Chairman Feinstein, Ranking Member Kennedy and members of the Subcommittee, thank you for the opportunity to present The Nature Conservancy's

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[3] U.S. Army Corps of Engineers (USACE), Determining the return on investment of Civil Works projects: A look behind the scenes, Sept. 28, 2017 https://www.lrb.usace.army.mil/Media/News-Stories/Article/1328990/determining-the-return-on-investment-of-civil-works-projects-a-look-behind-the/.

[4] U.S. Bureau of Reclamation (Reclamation), Asset Management Report, April 21, 2021 https://www.usbr.gov/infrastructure/docs/asset-management-report-to-congress.pdf.

(TNC's) testimony on fiscal year 2022 (FY22) appropriations for the U.S. Army Corps of Engineers (Corps), Bureau of Reclamation (Reclamation) and Department of Energy (DOE). TNC respectfully requests the Subcommittee's support for programs and investments needed to ensure the economic and environmental benefits of this work are enhanced today and made sustainable for tomorrow.

U.S. ARMY CORPS OF ENGINEERS

Chesapeake Bay Oyster Recovery: Ongoing oyster restoration work has functionally restored several tributaries in Virginia and Maryland, demonstrating that strong partnerships between private, state and federal agencies can accomplish tangible outcomes in the Chesapeake Bay. TNC supports the administration's FY22 budget request of $3.88 million to continue the essential work of restoring the eastern oyster.

Claiborne and Millers Ferry Locks and Dams (Fish Passage) Study, Lower Alabama River: The Claiborne and Millers Ferry locks and dams were built in the 1950s and 1960s to ease navigation and produce hydropower on the Alabama River. They also expanded recreational opportunities along the river. Unfortunately, they became major roadblocks for species that migrate up the Alabama River and into the Cahaba River. This study, for which TNC is the non-federal sponsor, will examine options for ecologically reconnecting the rivers. TNC supports the administration's FY22 budget request of $600,000 for the study.

Engineering With Nature (EWN): The Corps' EWN initiative is using a collaborative, science-based approach to better deliver a full range of economic, social and environmental benefits from the Corps' water resources infrastructure. It is also leading work to share, train and support Corps districts and other partners on how to effectively develop nature-based projects. Its innovative approaches are building stronger, more resilient communities and a healthier environment. TNC was pleased Congress created a new budget line for EWN in FY21 appropriations. TNC urges the Subcommittee to maintain funding for EWN at $12.5 million.

Hatchie/Loosahatchie Habitat Restoration Study (Tennessee and Arkansas): The Lower Mississippi River supports diverse fish and wildlife populations as well as outdoor recreation opportunities, yet it has access to just 10 percent its original floodplain. Ecological restoration can improve fish and wildlife habitat, facilitate groundwater infiltration and nutrient processing and provide recreational opportunities without negatively impacting flood risk management and navigation. This study is an important start in that effort. TNC supports the FY22 budget request of $600,000 for the study.

Navigation and Ecosystem Sustainability Program (NESP): NESP is an important, dual-purpose program that allows the Corps to address both navigation and ecosystem restoration in an integrated approach along the upper Mississippi and Illinois rivers. Past committee support led to $5 million in pre-construction engineering and design (PED) funding in the Corps' FY21 work plan. TNC requests the Subcommittee include $22.5 million for NESP in FY22 and the authority to begin construction to continue this important work and advance the program's navigation and ecosystem restoration benefits.

St. Louis Riverfront-Meramec River Basin Ecosystem Restoration: The Meramec River basin of central Missouri is among the most biologically significant river basins in North America. It contains diverse and rare aquatic and terrestrial species, including six species of endangered mussels. The Corps has completed an ecosystem restoration feasibility study of critical restoration projects within the Meramec River basin, which Congress authorized for construction in the Water Resource Development Act of 2020. TNC requests $1.4 million for PED for the project in FY22.

Sustainable Rivers Program (SRP): SRP is an initiative to modernize the operations of the nation's reservoirs to enhance water supply, flood protection, hydropower generation and recreation while restoring critical ecosystems and the economically valuable services they provide. The challenges related to providing water supply and flood protection are growing and will only increase due to climate change. SRP works collaboratively with local communities, water stakeholders, states and other federal agencies to update decades-old water management practices to better meet society's needs. With increased funding in FY20 and FY21, the Corps has been able to significantly expand the program from 16 rivers encompassing 66 reservoirs and 5,083 downstream river miles to 36 rivers encompassing 78 reservoirs, 10,114 downstream river miles in addition to new water infrastructure like locks and dams. TNC requests maintaining funding at $5 million for the SRP in FY22.

Upper Mississippi River Restoration (UMRR) Program: UMRR supports coordinated habitat rehabilitation and enhancement projects and monitoring for the upper

Mississippi River system. Thirty years of successful partnership has completed more than 56 projects benefiting more than 107,000 acres of aquatic and floodplain habitat. Completion of new projects in the pipeline will benefit an additional 75,000 acres of aquatic and floodplain habitat. TNC supports full authorized funding of $55 million for UMRR in FY22.

BUREAU OF RECLAMATION

Cooperative Watershed Management Program: This program helps diverse water interests throughout a watershed—tribes, local and state governments, landowners, farmers and ranchers, and nongovernmental organizations—work collaboratively to develop regional, multi-benefit water solutions. Applicants can use funding through Phase 1 of the program to help communities form watershed groups to assess and develop projects that respond to community water needs, and they can use funding through Phase 2 to help fund those projects. With so many successful Phase 1 groups now ready with plans and projects, TNC requests full funding for the Cooperative Watershed Management program at $20 million in FY22.

Upper Colorado River Endangered Fish Recovery and San Juan River Basin Recovery Programs: These programs take a balanced approach to recovering four endangered fish species by implementing a range of basin-wide strategies and provide Endangered Species Act compliance for more than 2,500 water projects. TNC requests full funding for these programs, including $5.7 million in the FY22 budget request for capital construction activities through the Upper Colorado Region's Endangered Species Recovery Implementation Program. TNC also appreciates the Subcommittee's efforts since FY19 to fund environmental programs for the Colorado River at $21.4 million, a portion of which supports the Upper Colorado River Endangered Fish Recovery Program and San Juan River Basin Recovery Implementation Program. TNC requests continued funding for these activities in FY22.

WaterSMART Program: The WaterSMART Program has new authority this year to award grants to non-profit organizations working with traditional grant recipients, provide higher levels of match for multi-purpose projects and support nature-based solutions. These changes will help prioritize projects that both enhance water delivery reliability and benefit watershed health. Nevertheless, TNC remains concerned that some projects funded through WaterSMART grants can increase consumptive use of water, which makes water shortages worse. TNC appreciates the Subcommittee's past attention to the program and requests continued oversight by again including report language similar to report language accompanying FY21 appropriations and directing Reclamation to prioritize multi-benefit projects, including such projects that incorporate nature-based strategies.

U.S. DEPARTMENT OF ENERGY

TNC supports robust funding for multiple DOE programs that accelerate the advancement of clean energy technologies and facilitate the department's shift in focus towards decarbonization of the U.S. economy. This includes programs that were created or reauthorized by the Energy Act of 2020.

Advanced Research Projects Agency—Energy (ARPA–E): ARPA–E is an innovative and successful program supporting "high-risk, high-reward" research that has the potential to drastically alter how the United States makes and uses energy in the future. TNC requests at least $500 million in FY22.

Solar and Wind Energy Technologies: TNC requests strong funding for overall research, development and deployment mission of these critical energy technology offices, including at least $370 million for the Solar Technology Office and at least $180 million for the Wind Technology Office. TNC also requests that the following report language be included:

The Committee provides no less than $30,000,000 for technology development, testing and verification of technologies and other research that help on- and offshore wind energy projects avoid, minimize and mitigate impacts on wildlife and habitat. The department's efforts should include technologies that enable near real-time monitoring and mitigation system for large whales, technologies that enable and improve scientific research into wind-wildlife interactions, research on how to site wind to avoid impacts to the most sensitive wildlife and habitat and research and demonstration projects to remove barriers to adoption of wind technology on previously disturbed lands such as landfills and former mines.

The Committee provides no less than $40,000,000 for technology development, testing and verification of technologies and other research that help solar energy projects avoid, minimize and mitigate impacts on wildlife and habitat, including through improved scientific research into avian-solar interactions, siting solar to avoid impacts to the most sensitive wildlife and habitat and research and dem-

onstration projects to remove barriers to adoption of solar technology on previously disturbed lands such as landfills and former mines.

Weatherization Assistance Program (WAP) and State Energy Program (SEP): Together, WAP and SEP provides critical funds to improve energy efficiency across the country, with both programs found to provide at least $4 in benefits for every federal dollar spent. TNC requests at least $350 million in FY22 for WAP and $70 million for SEP. We would also support additional funding for Challenge Grants as a supplement to SEP as outlined in the president's FY22 budget request.

Industrial Emissions Reduction Technology Development Program: TNC supports robust funding for this new program created under the Clean Industrial Technology Act to help accelerate reductions in emissions from industrial processes and manufacturing. That includes a specific request of $80 million in FY22 for demonstration projects, as authorized.

Advanced Nuclear Energy: TNC requests at least $405 million for the existing Advanced Reactor Demonstration Program and $33.075 million for the new Advanced Nuclear Fuel Availability Program as established by the Energy Act of 2020.

Carbon Capture, Utilization, Storage and Removal: TNC supports robust funding for the Office of Fossil Energy to deploy carbon management technologies. That includes a request of $871.3 million for carbon capture program. Within that, $225 million should be allocated to pilot projects, $500 million to demonstration projects and $50 million to support FEED studies. TNC also requests $200 million for the carbon storage program and $55.25 million for carbon utilization. TNC supports appropriations of at least $252.5 million across multiple offices for RD&D related to carbon removal, including $115 million for the DAC prizes and $63.5 million for the carbon dioxide removal program established in Title V of the Energy Act of 2020.

Energy Storage: TNC requests at least $150 million in FY22 to support DOE's Energy Storage Grand Challenge, including $100 million for the Office of Energy Efficiency and Renewable Energy and $50 million for the Office of Electricity.

Advanced Vehicle Technologies: TNC supports robust funding to help advance the decarbonization of the transportation sector or the development of new zero-carbon fuels for transportation and other end uses. TNC requests at least $494 million for the Vehicle Technologies Office and $200 million of the Office of Hydrogen and Fuel Cell Technologies.

Thank you for this opportunity to submit TNC's recommendations for the FY22 Energy and Water Development Appropriations Bill.

[This statement was submitted by Jimmy Hague, Senior Water Policy Advisor, The Nature Conservancy.]

PREPARED STATEMENT OF THE NUCLEAR WASTE STRATEGY COALITION

The NWSC is an ad hoc organization representing the collective interests of member state utility regulators, consumer advocates, attorneys general, and radiation control officials; tribal governments; local governments; electric utilities with operating and/or shutdown nuclear reactors; and other experts on nuclear waste policy matters. We call upon Congress to appropriate funds in Fiscal Year 2022 to the Department of Energy (DOE) and Nuclear Regulatory Commission (NRC) such that each agency has the sustainable annual funding necessary to undertake critical activities related to their respective roles in developing, managing, and regulating an integrated program for the storage, transportation, and disposal of the nation's spent nuclear fuel (SNF), Greater-Than-Class C (GTCC) waste, and other high-level radioactive waste (HLW). For DOE, these programs include:

—Office of Nuclear Energy (NE) Integrated Waste Management Systems (IWMS) activities;
—NE Used Nuclear Fuel Disposition Research & Development activities;
—"Nuclear Waste Disposal" activities per the FY 2021 Consolidated Appropriations Act; and
—Activities necessary to develop and manage a national integrated nuclear waste program, including establishment of and support for an office dedicated to nuclear waste management.

For the NRC, that entails funding for activities necessary to ensure the safety of a national integrated nuclear waste program, including storage, transportation, and disposal of SNF and GTCC waste from commercial nuclear power production. As a general matter, direction to both agencies concerning these matters remains unclear, and despite Congressional appropriations of a new $27.5 million to DOE in FY 2021 for "expenses necessary for nuclear waste disposal activities to carry out the purposes of the Nuclear Waste Policy Act of 1982, Public Law 97–425, as amended, including interim storage activities," this funding did not establish the

meaningful integrated nuclear waste management program that our nation needs and that we have gone without for more than a decade. Thus, our testimony focuses on the need for Congress to both appropriate funds for such an integrated program and to provide sustainable annual access to the Nuclear Waste Fund (NWF). It also highlights our concerns with prior Senate-proposed EWD language and our opposition to reinstatement of a uranium enrichment decontamination and decommissioning (D&D) tax.

EXISTING CHALLENGES TO NUCLEAR WASTE MANAGEMENT

The national nuclear waste management program established under the 1982 Nuclear Waste Policy Act (NWPA) was effectively terminated more than a decade ago by executive action. Subsequently, Congress has failed to provide meaningful direction or funding for that program or any national integrated nuclear waste management program. Since 1983, approximately $54 billion has been credited to the NWF, including over $21 billion collected from electric ratepayers and over $28 billion in interest that continues to accumulate at a rate of over $1.7 billion a year. The approximately $43 billion balance sits stranded in U.S. Treasury Securities and unappropriated for its intended purpose. These facts have resulted in a de facto national policy of inaction that negatively impacts:

—*Host States & Communities.* The de facto policy indefinitely strands 80,000 metric tons of commercial SNF and HLW at operating and decommissioned reactor sites in 34 states without their consent. At shutdown sites, the stranded waste impedes the potential beneficial reuse of the property (e.g., conservation, economic development).

—*All U.S. Taxpayers.* The de facto policy already has cost U.S. taxpayers more than $8.6 billion, and this liability is growing by approximately $2 million per day, money that could be used for infrastructure and other purposes.

—*Electric Customers.* While no longer paying fees into the federal NWF per court order, electric ratepayers in more than 40 states paid billions of dollars that are not being used for their intended purpose.

CALL FOR ACTION & SPECIFIC EWD REQUESTS

The federal government can and should establish a national integrated nuclear waste management program and simultaneously reform the federal budgetary treatment of the NWF to provide sustainable annual access to the $43 billion balance and the accumulating future interest. This action is needed now to avoid permanently stranding this material in host states and communities; address the negative economic impacts to states, communities, and taxpayers; and enable the federal government to meet its statutory and contractual obligations to electric customers under a law established nearly 40 years ago.

Specifically, the NWSC requests that Congress:

—Support reforms of the federal budgetary treatment of the NWF such that sustainable annual access is provided to the funds collected from electric customers to support the development and management of a national integrated nuclear waste storage, transportation, and disposal program.

—Fund establishment of a national integrated nuclear waste management program, including:

—*A dedicated office in DOE that reports directly to the Secretary and focuses on nuclear waste management.* A dedicated nuclear waste management office would provide a focal point for SNF and HLW work, facilitate necessary engagement with external stakeholders, and demonstrate an intent and commitment to take meaningful action. Congress has previously recognized the importance of a single-purpose entity that reports to the Secretary, and such an office would benefit external stakeholders and DOE's workforce. Whether coordinating with private entities on proposed consolidated interim storage (CIS) facilities; interacting with states and communities potentially interested in hosting a nuclear waste management facility; or managing future Congressional directives regarding the nation's nuclear waste, there are substantial tasks that can be pursued now, and DOE needs a dedicated team to focus on these issues and meet with interested and affected parties.

—*Simultaneous pursuit of permanent disposal and a CIS pilot with priority for SNF from shutdown reactors.* Because permanent disposal is necessary and a determination on the Yucca Mountain license application is necessary to move forward on permanent disposal, Congress should provide both NRC and DOE the funds necessary to resume their respective roles in the license review. Simultaneously, Congress should provide DOE funds to facilitate private or federal efforts to site a pilot CIS facility with priority for waste

stranded at shutdown commercial nuclear power plant sites, and Congress should provide NRC funds to carry out licensing activities pertaining to such CIS facilities.

—*Continuation and expansion of constructive initiatives related to transportation infrastructure.* Congress should fund work at federal agencies that facilitates SNF transportation, as it will be necessary regardless of destination. For example, the assessment of transportation infrastructure needs at shutdown plant sites and the testing, certification, and procurement of railcars and licensed transportation containers and components in sufficient quantities are constructive activities that should continue.

—*Increased financial and technical assistance to tribal, state, and local governments.* Such assistance for transportation-related emergency preparedness training and activities will provide the public greater assurance that the health, safety, and welfare of its communities will be preserved during SNF transport.

—Communicate to DOE that it is time to pursue measures beyond information-gathering and reports, particularly on topics that have been sufficiently examined by the Blue Ribbon Commission on America's Nuclear Future, the U.S. Government Accountability Office, et al.

We urge the Committee to address these items in its markup as a critical step and urge Congress to restructure the funding and spending mechanisms for the NWF to provide the necessary funding certainty to implement an integrated nuclear waste management program over multiple decades. This should include sustainable access to the NWF while maintaining Congressional oversight of the program's progress. These actions would demonstrate that Congress is committed to ensuring that the federal government carries out its statutory and contractual responsibilities.

CONCERNS WITH PRIOR SENATE EWD APPROPRIATIONS LANGUAGE

The NWSC has previously communicated concerns with certain Senate-proposed provisions (e.g., Section 306 of S. 2470, 116th Cong., 2019). First, such language would fail to move forward on CIS and permanent disposal in parallel, a key element of a successful integrated nuclear waste management program. Second, establishment of specific consent-based siting requirements by statute is not necessary, as potential hosts should have the flexibility to negotiate the process and conditions that best serve the interests of their jurisdictions. Third, it would not address underlying funding concerns while expanding Congressional authority to tap the NWF and increase the potential for restarting the fee on electric customers. Finally, such language raised consequential questions about whether DOE will be allowed to engage either federal or private initiatives to facilitate CIS and whether access to the CIS may be limited.

Having reiterated concerns with previous language, the NWSC greatly appreciates the EWD Subcommittee's focus on these important issues. Additionally, we seek an opportunity to engage further with your team on alternative approaches for making meaningful progress toward establishment of a national integrated nuclear waste management program.

URANIUM ENRICHMENT DECONTAMINATION & DECOMMISSIONING (D&D) TAX

NWSC opposes reinstatement of a uranium enrichment D&D tax. Although supportive of environmental cleanup of enrichment sites, U.S. nuclear-generating utilities and their customers should not be singled out again to pay for D&D of DOE facilities developed for national defense.

CLOSING

On behalf of the NWSC, we appreciate this opportunity, welcome further engagement, and respectfully request that Congress address these issues in a process with robust stakeholder input.

[This statement was submitted by Katrina McMurrian, Executive Director, Nuclear Waste Strategy Coalition.]

PREPARED STATEMENT OF THE OREGON WATER RESOURCES CONGRESS

The Oregon Water Resources Congress (OWRC) has been concerned over the last several years about reductions to the U.S. Army Corps of Engineers (USACE) Civil Works budget and is supportive the President's Proposed FY 2022 Budget requesting increased appropriations for this program at $6.8 billion. The USACE Civil

Works program addresses vital water resource needs throughout the nation, and in Oregon, the USACE Northwestern Division operates on our two largest river systems, the Columbia River, and the Willamette River, as well as maintaining Oregon's coastal rivers for navigation. Increased funding would help support and leverage collaborative state level planning efforts by USACE in Oregon and nationwide. A tangible example of the need is the impending reallocation of water resources among USACE's thirteen Oregon reservoirs among agricultural, municipal, and environmental uses.

OWRC was established in 1912 as a trade association to support the protection of water rights and promote the wise stewardship of water resources statewide. OWRC members are local governmental entities, which include irrigation districts, water control districts, drainage districts, water improvement districts, and other agricultural water suppliers that deliver water to roughly 1/3 of all irrigated land in Oregon. These water stewards operate and manage complex water management systems, including water supply reservoirs, canals, pipelines, and hydropower facilities.

Our members across Oregon face challenges related to irrigation water supply, reliability, and aging infrastructure. While there are common concerns and interests throughout irrigated agriculture, each basin is unique, and necessitates local communities working together to identify needs and developing solutions to best meet them. The two largest river systems in Oregon (the Columbia River and the Willamette River) are managed by USACE and play a vital role in providing not only water supplies for agriculture, but also ports and passage for transporting food and fiber globally, flood protection for communities, fish and wildlife benefits, hydropower production, and recreation. Additional funding for the Civil Works budget is needed to ensure USACE has the necessary resources to meet the myriad of infrastructure needs of those systems, without placing the entire burden on the backs of the farmers and ranchers who produce food and fiber for our nation.

FY2022 APPROPRIATIONS

We recognize we must make strategic investments with scarce resources. The USACE Civil Works program is a perfect example of a budget that should have funding increased because the water infrastructure it encompasses directly contributes to the economy as well protecting public safety and the environment. OWRC feels strongly USACE needs substantially increased funding to provide critical repairs on our nation's aging water infrastructure to prevent catastrophic failure, as well as address routine operations and maintenance on other infrastructure before it becomes irreparable.

WILLAMETTE BASIN RESERVOIR STUDY

The Portland District of the USACE Northwestern Division operates thirteen dams and reservoirs in the Willamette Basin, with a combined storage capacity of over 1.6 million acre-feet. The dams were constructed primarily to protect downstream communities from flooding but also store and release water for irrigation, hydropower generation, water quality, fish and wildlife flows, and recreation. Since the construction of the dams started in the 1930s, Oregon has seen a dramatic increase in population, which in turn has spurred increased development, agriculture, and a whole host of new demands on the reservoirs. Municipal water entities would like access to available stored water to better meet drinking water needs for growing communities as well as businesses such as the high-tech industry. Additionally, there are fish and wildlife species in the river system listed under the Endangered Species Act and related ecosystem restoration needs not contemplated when the facilities were constructed.

Following years of stakeholder engagement, the Willamette Basin Reservoir Study has been finalized and but there is still significant work that needs to occur before any reallocation can occur. It is crucial that ACOE remains at the table and collaboratively works with state agencies and stakeholders to flush out various details needed to determine how the reservoirs can best help meet the myriad of current and future water demands in the Willamette Basin. OWRC would like to see continued funding to support ongoing efforts related to the implementation of the Willamette Reallocation included in the USACE Civil Works FY 2022 budget to support this important effort.

ADDITIONAL FUNDING PROGRAMS

OWRC is encouraged by the recent additions to the USACE Civil Works program including funding for climate change response and resiliency, dam safety and earthquake hazard reduction; however, programs as important as these should receive

even more funding. Additional funding is needed to support and leverage state efforts to identify and address earthquake hazards. Oregon faces the risk of a catastrophic earthquake from the Cascadia Subduction Zone and the state is in the early stages of planning and mitigating to improve seismic resiliency. It is uncertain when or how devastating the earthquake could be, but it is clear there would be broad impacts, particularly since most infrastructure was constructed prior to the discovery of the fault and does not meet current seismic standards.

Aging water infrastructure is particularly vulnerable and there is a significant need for financial and technical assistance to upgrade reservoirs and other key facilities. Without increased earthquake preparedness and dam safety funding, Oregon cannot mitigate the potential damage. We encourage the House to further fund these programs to effectively prepare the states for earthquakes and prevent widespread devastation to people and property.

Additionally, like many other western states, Oregon has been experiencing more frequent and severe drought conditions. For Oregon, the drought stems from a lack of snowpack that serves as the natural water storage throughout the year for many farms, communities, and fish and wildlife. The impacts may take longer to show, but drought can be as devastating as earthquakes, hurricanes, and other natural disasters.

Impacts from prolonged drought take time to recover from and like other natural disasters, the best way to survive and help communities recover is through coordinated planning and developing diverse tools to use when these crises occur. We know from our experience working with our state agency and partner organizations in Oregon that funding for planning, feasibility, and implementation of projects to increase drought preparedness and resiliency is a cornerstone to an economically, socially, and environmentally sound approach for a sustainable water future.

In conclusion, we wholeheartedly support the proposed appropriation of at least $6.8 billion for the USACE Civil Works budget for FY 2022. The critical nature of the water infrastructure services the USACE provides requires a budget that matches the seriousness of the national need, and the importance of the water supply, navigation, public safety, and other natural resources benefits it provides. Thank you for the opportunity to provide testimony regarding the FY 2022 budget for the U.S. Army Corps of Engineers.

Sincerely.

[This statement was submitted by April Snell, Executive Director, Oregon Water Resources Congress.]

PREPARED STATEMENT OF PEARL CERTIFICATION

As a national market leader in residential energy efficiency certification, Pearl Certification ("Pearl") respectfully urges your support, through the Fiscal Year (FY) 2022 Energy and Water Development Appropriations bill, to provide robust funding to advance programs at the Department of Energy (DOE) that invest in residential energy efficiency and whole-house initiatives. The President's FY 2022 budget request makes significant investments in the Weatherization Assistance Program, State Energy Program, and Building Technologies Office. For the many reasons detailed below, we urge Congress to continue support for these programs and work to ensure that sub accounts within the DOE Office of Energy Efficiency and Renewable Energy are robustly funded so that their important work may continue and expand.

Pearl provides third-party certification of high-performing homes; homes that are healthy, comfortable, resilient, and energy efficient. Pearl's certification drives demand for these improvements by making them visible at time of appraisal, sale, and/or refinance, allowing their full value to be captured in the sale price. The Pearl Certification is designed to fill a gap that has existed in the residential marketplace by helping consumers find and sell high-performing homes with an easy-to-use, contractor-friendly certification system that creates an inventory of the home's energy efficiency, health, comfort, resilience and other "high-performing" assets.[1] Pearl has

[1] The Pearl system provides homeowners, homebuyers, real estate agents, appraisers, and underwriters with different and complementary information that meets their need to understand and value the home's features. New and existing homes can earn a Pearl certification, and the home's record and Pearl score can be updated as further improvements are made. The report that accompanies a Pearl certification includes detailed information on ways that the home's assets impact its comfort, indoor air quality, and energy consumption. Contractors also use the scoring system as an educational tool to help homeowners understand the benefits of high-performing equipment and services.

created networks of elite contractors and real estate brokers: market leaders who provide high quality goods and services.

With paying customers in over twenty states, Pearl has scored over 65,000 homes to date. Pearl is the only market-based firm approved by the Environmental Protection Agency and Department of Energy to administer their Home Performance with ENERGY STAR(r) program for existing homes, and was accepted into the 2017 National Association of REALTORS(r) (NAR) prestigious REACH Technology Accelerator. Pearl's current pilot partnership with NYSERDA positions Pearl's certification system as a voluntary home labeling system which will help states and municipalities meet carbon reduction goals.

Dollar for dollar, investments in energy efficiency create more jobs than investment in the utility sector or fossil-fuels.[2] As a result, investments in DOE programs that support energy efficiency—like those in the Building Technologies Office—lead to job creation and economic growth. In fact, energy efficiency is the largest employer and fastest growing sector in the energy industry. The 2020 "Energy Efficiency Jobs in America"[3] report from E4TheFuture found that, prior to the COVID–19 pandemic, the energy efficiency industry employed nearly 2.4 million Americans and was adding more jobs than any other energy sector. The industry was expected to see another 3% growth in 2020. Instead, over 18% of the energy efficiency workforce (430,000 workers) lost their jobs in the initial months of the pandemic. While other sectors experienced robust recoveries in the second half of 2020, energy efficiency did not: In December 2020, over half of energy efficiency workers laid off in the spring (230,000) were still out of work.

The residential buildings sector remains a largely untapped resource for carbon reduction goals. Residential buildings account for 21% of total U.S. energy consumption,[4] consume more electricity than any other sector,[5] and are the largest contributor to peak demand,[6] all of which make this sector particularly important from a carbon emissions reduction standpoint. In addition, the occupants of the vast majority of homes in the U.S. experience comfort problems, health issues, and/or high utility bills. The residential sector's energy consumption can be significantly reduced, and other related problems addressed, through single-measure and whole-house upgrades. Residential energy efficiency jobs were hit particularly hard by the pandemic and statewide lockdown orders. Supporting these jobs as part of our nation's recovery will be critical.

The Office of Energy Efficiency and Renewable Energy (EERE) at DOE has advanced innovative technology solutions and helped identify the most effective means to increase buildings' energy efficiency in order to reduce carbon emissions through research, development, field validation, deployment, demonstration, consumer education, and technical assistance activities. To ensure that these innovative energy technologies, practices, and information can be fully utilized by American consumers to reduce carbon emissions, Congress should support coordination with the private sector and support demonstration and deployment activities that integrate and bring these solutions to market.

Residential energy efficiency programs at the Department of Energy deserve the support of the American taxpayer as these programs are proven to provide a significant return on investment. When funded they will continue to provide energy cost relief to households, support American-based industry and American jobs, ameliorate issues with the aging electrical grid, and support national security goals. We also urge additional funding either through regular appropriations or supplemental funding in the event an energy/infrastructure package is considered. In the event that opportunity presents itself, we would urge funding for the HOPE for HOMES program to advance workforce training and residential retrofit rebates supported by the President's Budget Request ($2 billion in FY22).

We respectfully urge funding of $80M for the Residential Building Integration program within the Building Technologies Office, which has the capacity to fundamentally transform the performance of homes and greatly improve the energy efficiency in the 115 million existing residential buildings throughout this country. Residential buildings account for 21% of total U.S. energy consumption, use more electricity than any other sector, and are therefore an essential (albeit often overlooked) part of the carbon reduction equation. RBI can significantly improve the energy efficiency in the residential sector through its partnerships with the thousands

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[2] ACEEE. N.d. Energy Efficiency and Economic Opportunity. Retrieved from http://aceee.org/files/pdf/fact-sheet/ee-economic-opportunity.pdf.

[3] https://e4thefuture.org/wp-content/uploads/2020/11/EE__Jobs__America__2020.pdf.

[4] https://www.eia.gov/totalenergy/data/monthly/pdf/mer.pdf.

[5] https://www.eia.gov/electricity/annual/html/epa__01__02.html.

[6] https://www.energy.gov/sites/prod/files/2019/04/f61/bto-geb__overview-4.15.19.pdf.

of small businesses in this sector, the construction trades, equipment, smart grid technology and systems suppliers, integrators and state and local governments.

Home Performance with ENERGY STAR, which advances contractor engagement in high efficiency equipment installations, is just one example of a crucial residential program within RBI. To date, approximately 875,000 energy efficiency improvement projects have been completed on existing homes through the Home Performance with ENERGY STAR program. We recommend that this program receive a line item in the budget for at least $80 million and that the funding be focused on facilitating later-stage research, demonstration, and widespread deployment of technology solutions in new and existing homes, with an emphasis on whole-house energy efficiency retrofits (including outreach, engagement and training to private sector contractors) and continuing efforts to advance grid-interactive residential buildings and smart home technology.

We encourage the direct engagement with residential contractors and home certification businesses, which are crucial to the success of buildings programs. We also urge continued efforts to address visibility of high performing features in residential buildings as a way to ensure that they are properly valued and to create market incentives to drive additional improvements. RBI deserves the support of the American taxpayer as it is proven to provide a significant return on investment and provide economic, health, resiliency, and carbon reduction benefits. Again, we respectfully urge Congress to fund Residential Building Integration at no less than $80 million.

DOE's residential energy efficiency programs and initiatives are critical to the continued advancement of the energy efficiency industry, which contributes to the country's overall economic growth, energy independence, and international competitiveness, and also represents a significant and largely untapped resource for carbon reduction. We once again urge Congress to support these programs with robust funding for FY22 so they may continue their important work, including continued efforts to address property rating and valuation in buildings. Thank you for the opportunity to submit testimony. We look forward to working with you.

[This statement was submitted by Robin LeBaron, Co-Founder, President and COO, Pearl Certification.]

PREPARED STATEMENT OF SAN JUAN WATER COMMISSION

We are requesting your support for appropriations in the President's recommended budget for FY 2022 to the Bureau of Reclamation, Upper Colorado Region for the Upper Colorado River Endangered Fish Recovery Program and the San Juan River Basin Recovery Implementation Program. The budget items and amounts requested in the President's budget for these programs are described below.

Endangered Species Programs: The Endangered Species Program also provides $5.7 million for the Upper Colorado and San Juan River Endangered Fish Recovery programs for construction of facilities need to recover endangered fish species: $2,500,000 for construction of a fish barrier at the Farmers Mutual Ditch diversion structure on the San Juan River in northwest New Mexico, $500,000 for floodplain habitat development in northwest New Mexico on the San Juan River, $2,550,000 for rehabilitation of the fish screen and passage at the Grand Valley Irrigation Company diversion on the Colorado River near Grand Junction Colorado, and $150,000 for Upper Colorado Program Management for contracting, budgeting, reporting, contract administration, tracking expenditures, and addressing issues and concerns associated with capital project construction.

Colorado River Compliance Activities: The President's budget requests $21,400,000 for Colorado River Compliance Activities that includes:

—$8,640,000 for the Upper Colorado and San Juan Endangered Fish Recovery Programs to restore critical habitat, enhance stream flows, maintain fish ladders and screens, augment and conservation of genetic integrity through hatcheries and stocking efforts, manage non-native and sport fish, and research and monitoring to provide the scientific basis to guide decision making.

—$11,360,000 for the Glen Canyon Adaptive Management Program for scientific investigations, experimentation using Glen Canyon Dam releases and other tasks required to increase understanding of how to operate Glen Canyon Dam to meet statutory requirements, and experimental flow research.

—$1,400,000 for water quality and consumptive use studies to provide data required to meet legal agreements that regulate the flow and quality of the river and support consumptive use studies of water for municipal, industrial, agricultural uses.

This funding for the recovery programs is authorized by P.L. 106–392, as amended.

These highly successful, cooperative programs are ongoing partnerships among the states of New Mexico, Colorado, Utah and Wyoming, Indian tribes, federal agencies and water, power and environmental interests. The programs' objectives are to recover endangered fish species while water use and development proceeds in compliance with the Endangered Species Act. The programs provide ESA compliance for approximately 2,500 water projects in the Upper Colorado River Basin, including every Reclamation project upstream of Lake Powell.

I appreciate the Subcommittee's past support and request the Subcommittee's assistance for fiscal year 2022 funding to ensure the Bureau of Reclamation's continuing financial participation in and provision of federal cost sharing for these vitally important programs.

Sincerely.

[This statement was submitted by Aaron Chavez, Executive Director, San Juan Water Commission.]

PREPARED STATEMENT OF THE SOCIETY FOR INDUSTRIAL AND APPLIED MATHEMATICS

This written testimony is submitted on behalf of the Society for Industrial and Applied Mathematics (SIAM) to ask you to continue your support of the Department of Energy (DOE) Office of Science with funding of $7.7 billion in fiscal year (FY) 2022. In particular, we urge you to provide at least $292 million for Mathematical, Computational, and Computer Sciences Research in the Office of Advanced Scientific Computing Research (ASCR) within the Office of Science. We also emphasize the importance of support for graduate students through the Computational Sciences Graduate Fellowship and request that $20 million be provided in FY 2022.

On behalf of SIAM, we submit this written testimony for the record to the Subcommittee on Energy and Water Development Appropriations of the United States Senate.

SIAM has approximately 14,000 members, including applied and computational mathematicians, computer scientists, numerical analysts, engineers, statisticians, and mathematics educators. They work in industrial and service organizations, universities, colleges, and government agencies and laboratories all over the world. In addition, SIAM has over 500 institutional members-colleges, universities, corporations, and research organizations. SIAM members come from many different disciplines but have a common interest in applying mathematics in partnership with computational science towards solving real-world problems.

SIAM appreciates your Committee's leadership on and recognition of the critical role of the Department of Energy (DOE) Office of Science and its support for mathematics, science, and engineering in enabling a strong U.S. economy, workforce, and society. DOE was one of the first federal agencies to champion computational science as one of the three pillars of science, along with theory and experiment, and SIAM deeply appreciates and values DOE activities.

SIAM is grateful for the strong funding that the Office of Science received in FY 2021 and encouraged by the proposed increases in the President's FY 2022 budget request. We join with the research community to request that you continue this momentum by providing the Office of Science with $7.7 billion for FY 2022. The requested amount is necessary for ensuring continued support for areas such as mathematics and scientific research to help address national priorities, foster economic growth, and create jobs.

ADVANCED SCIENTIFIC COMPUTING RESEARCH

Activities within the Office of Advanced Scientific Computing Research (ASCR) play a key role in supporting research that begins to fulfill the needs described above. Within the overall amount for ASCR, we urge you to provide at least $292 million for Mathematical, Computational, and Computer Sciences Research in FY 2022. SIAM applauds the proposed increases in the President's budget request as this level of funding is needed to ensure the long-term health and viability of the high-performance computing (HPC) ecosystem that DOE relies on for conducting groundbreaking discovery science while supporting increased investment in priority areas such as quantum computing and artificial intelligence.

Core research activities within ASCR enable the development of critical tools for computational science, modeling, and data analysis that enhance advanced computing capabilities and seed new areas of research with potential for revolutionary advancements. Sustained investment in basic research ultimately enabled the global

leadership in HPC that the U.S. currently enjoys. While our strength in HPC is exemplified by the groundbreaking exascale systems currently being assembled, this position is increasingly being challenged by overseas competitors.

We strongly support ASCR's reorientation toward longer term research as the Exascale Computing Initiative comes to fruition and funding for the associated Exascale Computing Project continues its planned decline. This shift is underpinned by strategic visioning exercises that have produced several recommendations for reinvigorating ASCR's research agenda. These include a substantial reinvestment in foundational science and increased support for high-risk/high-reward research activities, especially at universities.[1] Such an approach will help maintain the long-term viability and vibrancy of the broader HPC research community as ASCR looks toward the post-exascale future.

In addition to the critical role that it already plays in priority areas like artificial intelligence and quantum information science, ASCR's research portfolio will be a critical asset to the Department's efforts to drive innovation in climate and Earth systems predictability and renewable energy. Specifically, research in applied mathematics and computational science will enable new capabilities in environmental sensing and edge computing with applications in Earth systems prediction and climate forecasting. In addition, advancements in modeling, simulation, and optimization can help improve grid reliability and the integration of renewable energy sources into the broader power distribution system.

SUPPORTING THE PIPELINE OF MATHEMATICIANS AND SCIENTISTS

SIAM is grateful for the strong support of the Computational Sciences Graduate Fellowships (CSGF) and requests that $20 million be provided for the Computational Science Graduate Fellowship (CSGF) in FY 2022 within the overall amount for research. Researchers trained in computational science and working in universities, national laboratories, and industry are essential to propel advances in many DOE critical research areas. This program helps ensure the existence of an adequate supply of scientists and engineers with strong computational research experience and close ongoing ties to DOE to meet future national workforce needs.

CSGF has been flat-funded at $10 million since FY 2015, even as computational techniques continue to permeate every area of science and increasingly contribute to the advancement of DOE mission priorities. SIAM is pleased to see support for CSGF within the President's FY 2022 budget request to increase the number of fellows in AI and Quantum and participation of individuals from under-represented groups. The increase we are requesting to CSGF reflects the growing need for an expanded workforce in emerging areas of importance to DOE such as artificial intelligence and data science. As international competition in science and engineering intensifies, maintaining U.S. leadership in these areas will increasingly depend on our ability to cultivate a scientific workforce with strong research experience and close ties to DOE. An increase in funding to CSGF would also enable ASCR to address a consistent oversubscription in the program and advance diversity, equity, and inclusion through expanded outreach to minority serving institutions.

THE ROLE OF MATHEMATICS IN MEETING HEALTH, ENERGY, AND SECURITY CHALLENGES

Support for applied mathematics and computational science is critical to sustaining the nation's global scientific and technological leadership, energy production capabilities, and national security. By exploiting DOE's world class supercomputing capabilities, mathematicians and computational scientists supported by the abovementioned programs pioneer new modeling and simulation techniques that enable substantial breakthroughs in materials synthesis, energy distribution, and human physiology among other complex areas where laboratory experiments or field observations are too costly, time consuming, or simply insufficient. This was demonstrated recently in the midst of the novel coronavirus pandemic. Researchers at Oak Ridge National Laboratory (ORNL) developed a computational model of the novel coronavirus. They then ran the model on ORNL's supercomputer, Summit, and were able to identify 77 molecular compounds that could serve as the basis for therapeutic drugs to counter COVID–19.[2]

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[1] Advanced Scientific Computing Advisory Committee (ASCAC), Subcommittee on Exascale Transition, "Transition Report", https://science.osti.gov/-/media/ascr/ascac/pdf/meetings/202004/Transition__Report__202004-ASCAC.pdf?la=en&hash=5164916FE5158EE8919C26804B4CF7F6DDA36E9D.

[2] https://chemrxiv.org/articles/Repurposing__Therapeutics__for__the__Wuhan__Coronavirus__nCov-2019__Supercomputer-Based__Docking__to__the__Viral__S—Protein__and__Human__ACE2__Interface/11871402/3.

CONCLUSION

The programs in the Office of Science, particularly those discussed above, are important elements of DOE's efforts to fulfill its mission. They contribute to the goals of dramatically transforming our current capabilities to develop new sources of energy and improve energy efficiency to ensure energy independence and facilitate DOE's effort to increase U.S. competitiveness by training and attracting the best scientific talent into DOE headquarters and laboratories, the American research enterprise, and the clean energy economy.

Thank you again for your ongoing support of the DOE Office of Science. The DOE Office of Science needs sustained annual funding to maintain our competitive edge in science and technology, and therefore we respectfully ask that you continue your support of these critical programs. We appreciate the opportunity to provide testimony to the Committee on behalf of SIAM and look forward to providing any additional information or assistance you may ask of us during the FY 2022 appropriations process.

[This statement was submitted by Dr. Susanne C. Brenner, President; Dr. Anne Gelb, Vice President for Science Policy; and Dr. Suzanne L. Weekes, Executive Director, Society for Industrial and Applied Mathematics.]

PREPARED STATEMENT OF THE SOUTHERN UTE INDIAN TRIBE

Chairman Feinstein, Ranking Member Kennedy, and Subcommittee members:

The Southern Ute Indian Tribe requests your support for appropriations in the President's budget request for FY 2022 to the Bureau of Reclamation—Upper Colorado Region for the San Juan River Basin Recovery Implementation Program and the Upper Colorado River Endangered Fish Recovery Program ("Recovery Programs").

The importance of the Recovery Programs cannot be overstated. Westerners' water supply relies on water projects that store, channel, and pump water where it is needed. These Recovery Programs were established to recover endangered fish species while simultaneously allowing water use and development to proceed in compliance with the Endangered Species Act. The Recovery Programs provide Endangered Species Act compliance for approximately 2,500 water projects in the Upper Colorado River Basin, including every Reclamation project upstream of Lake Powell. That includes projects such as the Animas La Plata Project in southwest Colorado, where tribes are partners with Reclamation. The San Juan Program in particular was critical to the settlement of the Southern Ute Indian Tribe's water rights and is fundamental to future tribal water development.

The budget items and amounts requested in the President's budget for these programs are described below.

Colorado River Compliance Activities: The President's budget requests $21,400,000 for Colorado River Compliance Activities that include:

—$8,640,000 for the Upper Colorado and San Juan Endangered Fish Recovery Programs to restore critical habitat, enhance stream flows, maintain fish ladders and screens, augment and conserve genetic integrity through hatcheries and stocking efforts, manage non-native and sport fish, and research and monitoring to provide the scientific basis to guide decision making.

—$11,360,000 for the Glen Canyon Adaptive Management Program for scientific investigations, experimentation using Glen Canyon Dam releases and other tasks required to increase understanding of how to operate Glen Canyon Dam to meet statutory requirements, and experimental flow research.

—$1,400,000 for water quality and consumptive use studies to provide data required to meet legal agreements that regulate the flow and quality of the river and support consumptive use studies of water for municipal, industrial, agricultural uses.

This funding for the recovery programs is authorized by P.L. 106–392, as amended.

Endangered Species Programs: The Endangered Species Program provides $5.7 million for the Upper Colorado and San Juan River Endangered Fish Recovery programs for construction of facilities needed to recover endangered fish species. This includes $2,500,000 for construction of a fish barrier at the Farmer's Mutual Ditch diversion structure on the San Juan River in northwest New Mexico, $500,000 for floodplain habitat development in northwest New Mexico on the San Juan River, $2,550,000 for rehabilitation of the fish screen and passage at the Grand Valley Irrigation Company diversion on the Colorado River near Grand Junction Colorado, and $150,000 for Upper Colorado Program Management for contracting, budgeting, re-

porting, contract administration, tracking expenditures, and addressing issues and concerns associated with capital project construction.

These programs have been highly successful in achieving their purpose. For example, two of the fish species that the programs were designed to recover—the Razorback Sucker and the Humpback Chub—are in the process of being downlisted from "endangered" to "threatened." The programs are a success not just on the biological front. They are also a positive example of the value of cooperation. The partners in these programs include four federally recognized Indian tribes (the Southern Ute Indian Tribe, Ute Mountain Ute Tribe, Jicarilla Apache Nation, and Navajo Nation); four states (New Mexico, Colorado, Utah, and Wyoming), multiple federal agencies, including the Fish and Wildlife Service and the Bureau of Indian Affairs; water and power interests; and environmental groups. The partners have pooled resources—including funding, in-kind donations, and staff—to ensure the success of these Programs.

The Southern Ute Indian Tribe appreciates the Subcommittee's past support and requests the Subcommittee's assistance for fiscal year 2022 funding to ensure the Bureau of Reclamation's continuing financial participation in and provision of federal cost sharing for these vitally important programs.

Sincerely.

[This statement was submitted by Melvin J. Baker, Chairman, Southern Ute Indian Tribe.]

PREPARED STATEMENT OF THE SOUTHWESTERN WATER CONSERVATION DISTRICT

The Southwestern Water Conservation District (SWCD) appreciates the opportunity to submit this letter of support for appropriations in the President's recommended budget for FY 2022 to the Bureau of Reclamation, Upper Colorado Region for the Upper Colorado River Endangered Fish Recovery Program and the San Juan River Basin Recovery Implementation Program. SWCD is a political subdivision of the State that was established by the Colorado General Assembly in 1941 to protect, conserve, use and develop the water resources of the San Juan and Dolores River Basins as well as to safeguard all waters to which the state of Colorado is equitably entitled.

We are requesting your support for appropriations in the President's budget for these programs described below.

Endangered Species Programs: The Endangered Species Program also provides $5.7 million for the Upper Colorado and San Juan River Endangered Fish Recovery programs for construction of facilities need to recover endangered fish species: $2,500,000 for construction of a fish barrier at the Farmer's Mutual Ditch diversion structure on the San Juan River in northwest New Mexico, $500,000 for floodplain habitat development in northwest New Mexico on the San Juan River, $2,550,000 for rehabilitation of the fish screen and passage at the Grand Valley Irrigation Company diversion on the Colorado River near Grand Junction Colorado, and $150,000 for Upper Colorado Program Management for contracting, budgeting, reporting, contract administration, tracking expenditures, and addressing issues and concerns associated with capital project construction.

Colorado River Compliance Activities: The President's budget requests $21,400,000 for Colorado River Compliance Activities that includes $8,640,000 for the Upper Colorado and San Juan Endangered Fish Recovery Programs to restore critical habitat, enhance stream flows, maintain fish ladders and screens, augment and conservation of genetic integrity through hatcheries and stocking efforts, manage non-native and sport fish, and research and monitoring to provide the scientific basis to guide decision making. This funding for the recovery programs is authorized by P.L. 106–392, as amended.

These highly successful, cooperative programs are ongoing partnerships among the states of New Mexico, Colorado, Utah and Wyoming, Indian tribes, federal agencies and water, power and environmental interests. The programs' objectives are to recover endangered fish species while water use and development proceeds in compliance with the Endangered Species Act. The programs provide ESA compliance for approximately 2,500 water projects in the Upper Colorado River Basin, including every Reclamation project upstream of Lake Powell. Because these objectives align with our statutory mandate, SWCD has been a steadfast supporter of the Upper Colorado and San Juan Recovery Programs since their inception in 1988 and 1992, respectively.

I appreciate the Subcommittee's past support and request the Subcommittee's assistance for fiscal year 2022 funding to ensure the Bureau of Reclamation's con-

tinuing financial participation in and provision of federal cost sharing for these vitally important programs.

Sincerely.

[This statement was submitted by Steve Wolff, General Manager, Southwestern Water Conservation District.]

PREPARED STATEMENT OF THE TRI-COUNTY WATER CONSERVANCY DISTRICT

The Tri-County Water Conservancy District is requesting your support for appropriations in the President's recommended budget for FY 2022 to the Bureau of Reclamation, Upper Colorado Region for the Upper Colorado River Endangered Fish Recovery Program and the San Juan River Basin Recovery Implementation Program. The budget items and amounts requested in the President's budget for these programs are described below.

Endangered Species Programs: The Endangered Species Program also provides $5.7 million for the Upper Colorado and San Juan River Endangered Fish Recovery programs for construction of facilities need to recover endangered fish species: $2,500,000 for construction of a fish barrier at the Farmer's Mutual Ditch diversion structure on the San Juan River in northwest New Mexico, $500,000 for floodplain habitat development in northwest New Mexico on the San Juan River, $2,550,000 for rehabilitation of the fish screen and passage at the Grand Valley Irrigation Company diversion on the Colorado River near Grand Junction Colorado, and $150,000 for Upper Colorado Program Management for contracting, budgeting, reporting, contract administration, tracking expenditures, and addressing issues and concerns associated with capital project construction.

Colorado River Compliance Activities: The President's budget requests $21,400,000 for Colorado River Compliance Activities that includes

—$8,640,000 for the Upper Colorado and San Juan Endangered Fish Recovery Programs to restore critical habitat, enhance stream flows, maintain fish ladders and screens, augment and conservation of genetic integrity through hatcheries and stocking efforts, manage non-native and sport fish, and research and monitoring to provide the scientific basis to guide decision making.

—$11,360,000 for the Glen Canyon Adaptive Management Program for scientific investigations, experimentation using Glen Canyon Dam releases and other tasks required to increase understanding of how to operate Glen Canyon Dam to meet statutory requirements, and experimental flow research.

—$1,400,000 for water quality and consumptive use studies to provide data required to meet legal agreements that regulate the flow and quality of the river and support consumptive use studies of water for municipal, industrial, agricultural uses.

This funding for the recovery programs is authorized by P.L. 106–392, as amended.

These highly successful, cooperative programs are ongoing partnerships among the states of New Mexico, Colorado, Utah and Wyoming, Indian tribes, federal agencies and water, power and environmental interests. The programs' objectives are to recover endangered fish species while water use and development proceeds in compliance with the Endangered Species Act. The programs provide ESA compliance for approximately 2,500 water projects in the Upper Colorado River Basin, including every Reclamation project upstream of Lake Powell.

We appreciate the Subcommittee's past support and request the Subcommittee's assistance for fiscal year 2022 funding to ensure the Bureau of Reclamation's continuing financial participation in and provision of federal cost sharing for these vitally important programs.

Sincerely.

[This statement was submitted by Mike Berry, General Manager, Tri-County Water Conservancy District.]

PREPARED STATEMENT OF THE UPPER COLORADO RIVER ENDANGERED FISH RECOVERY PROGRAM AND THE SAN JUAN RIVER BASIN RECOVERY IMPLEMENTATION PROGRAM

I am requesting your support for appropriations in the President's recommended budget for FY 2022 to the Bureau of Reclamation, Upper Colorado Region for the Upper Colorado River Endangered Fish Recovery Program and the San Juan River Basin Recovery Implementation Program. The budget items and amounts requested in the President's budget for these programs are described below.

These highly successful, cooperative programs are ongoing partnerships among the states of New Mexico, Colorado, Utah and Wyoming, Indian tribes, federal agencies and water, power and environmental interests. The programs' objectives are to recover endangered fish species while water use and development proceeds in compliance with the Endangered Species Act. The programs provide ESA compliance for approximately 2,500 water projects in the Upper Colorado River Basin, including every Reclamation project upstream of Lake Powell.

Endangered Species Programs: The Endangered Species Program also provides $5.7 million for the Upper Colorado and San Juan River Endangered Fish Recovery programs for construction of facilities need to recover endangered fish species: $2,500,000 for construction of a fish barrier at the Farmer's Mutual Ditch diversion structure on the San Juan River in northwest New Mexico, $500,000 for floodplain habitat development in northwest New Mexico on the San Juan River, $2,550,000 for rehabilitation of the fish screen and passage at the Grand Valley Irrigation Company diversion on the Colorado River near Grand Junction Colorado, and $150,000 for Upper Colorado Program Management for contracting, budgeting, reporting, contract administration, tracking expenditures, and addressing issues and concerns associated with capital project construction.

Colorado River Compliance Activities: The President's budget requests $21,400,000 for Colorado River Compliance Activities that includes:

—$8,640,000 for the Upper Colorado and San Juan Endangered Fish Recovery Programs to restore critical habitat, enhance stream flows, maintain fish ladders and screens, augment and conservation of genetic integrity through hatcheries and stocking efforts, manage non-native and sport fish, and research and monitoring to provide the scientific basis to guide decision making.

—$11,360,000 for the Glen Canyon Adaptive Management Program for scientific investigations, experimentation using Glen Canyon Dam releases and other tasks required to increase understanding of how to operate Glen Canyon Dam to meet statutory requirements, and experimental flow research.

—$1,400,000 for water quality and consumptive use studies to provide data required to meet legal agreements that regulate the flow and quality of the river and support consumptive use studies of water for municipal, industrial, agricultural uses.

This funding for the recovery programs is authorized by P.L. 106–392, as amended.

I appreciate the Subcommittee's past support and request the Subcommittee's assistance for fiscal year 2022 funding to ensure the Bureau of Reclamation's continuing financial participation in and provision of federal cost sharing for these vitally important programs.

Sincerely.

[This statement was submitted by Mike King, Chief External Affairs Officer.]

PREPARED STATEMENT OF THE WATEREUSE ASSOCIATION

Thank you for providing the opportunity to submit written testimony on Fiscal Year 2022 appropriations. I write today on behalf of the WateReuse Association and its members to highlight the importance of the U.S. Bureau of Reclamation's (USBR) Title XVI–WIIN Water Reclamation and Reuse Competitive Grants Program. The Title XVI–WIIN program has helped communities across the West build drought resilience, keep nutrients and other pollutants out of sensitive waterways, save billions of dollars relative to importing water, and grow sustainable economies. It is a key economic and climate resiliency tool, but is hamstrung by insufficient funding.

Given the critical role that water recycling plays in water resources management and the overwhelming demand for projects as authorized in section 4009(c) of Public Law 114–322, we urge you to include at least $100 million for this program in Energy and Water Development appropriations legislation for FY 2022.

The WateReuse Association is a not-for-profit trade association for water utilities, businesses, industrial and commercial enterprises, non-profit organizations, and research entities that engage in and on water recycling. WateReuse and its state and regional sections represent more than 200 water utilities serving over 60 million customers, and over 300 businesses and organizations across the country. Our mission is to engage our members in a movement for safe and sustainable water supplies, to promote acceptance and support of recycled water, and to advocate for policies and funding that increase water reuse.

The USBR's Title XVI program is the only federal program with water reuse as its sole focus. Since Title XVI's inception in 1992, Congress has authorized 53 Title

XVI recycling projects producing more than 400,000 acre-feet of drought-resistant water supply. To date, Congress has appropriated over $700 million in federal funding, which has been leveraged with non-federal funding to implement more than $3.3 billion in water reuse improvements—a nearly 5:1 leverage ratio.

In 2016, the Water Infrastructure Improvements for the Nation (WIIN) Act established a mechanism, colloquially known as Title XVI–WIIN, to enable new projects to apply for competitive grants within Title XVI. Due to the popularity of Title XVI–WIIN in its first few years, the program now has a large and growing backlog exceeding $700 million in federal cost share for eligible projects, and demand is expected to grow as more projects become eligible.

Water projects funded through the Title XVI program have been used to increase the supply of fresh drinking water, generate sustainable irrigation water for landscaping and agricultural use, restore sensitive ecosystems, and help industries expand and create jobs, among other purposes. The program is not limited to the reuse of municipal wastewater—it also helps communities identify beneficial uses for industrial, agricultural, and domestic wastewater, as well as impaired ground and surface water. Investments through the Title XVI competitive grants program have helped both urban and rural communities across the West build a strong and secure economic future.

A recent GAO report (GAO–19–110) highlighted a number of illustrative Title XVI projects. For example, program investments helped one drought-stricken water district in California develop infrastructure to use more than 2 billion gallons of recycled water to irrigate sports fields, golf courses, parks, school grounds, and medians. Another project is providing drought-resistant recycled water to farmers to irrigate 45,000 acres of farmland, reducing demand on the area's over-drafted groundwater basin. Other Title XVI projects have been used to prevent saltwater intrusion into aquifers, restore marshes, wetlands, and other habitat, and create potable drinking water.

In addition to increasing funding for the Title XVI–WIIN program, we ask for your support in securing robust funding for USBR's Desalination and Water Purification Program in FY 2022. The Desalination Program invests in projects in Reclamation states that involve ocean or brackish water desalination. In the arid West, desalination is an important tool that can help communities increase their water supply.

Thank you for considering our requests and please do not hesitate to reach out if you have any questions.

Sincerely.

[This statement was submitted by Greg Fogel, Policy Director, WateReuse Association.]

PREPARED STATEMENT OF THE WESTERN GOVERNORS' ASSOCIATION

Chair Feinstein, Ranking Member Kennedy, and Members of the Subcommittee, the Western Governors' Association (WGA) appreciates the opportunity to provide written testimony on the appropriations and activities of the federal agencies under the Subcommittee's jurisdiction, including the Department of Energy (DOE), Bureau of Reclamation (BOR), and U.S. Army Corps of Engineers (Corps). WGA is an independent organization representing the Governors of the 22 westernmost states and territories. The Association is an instrument of the Governors for bipartisan policy development, information-sharing and collective action on issues of critical importance to the western United States.

The agencies within the Subcommittee's jurisdiction wield significant influence over the American West and the development of energy and water resources in the region. Western Governors recognize the importance of a close and productive working relationship between states and the federal government and understand that more effective intergovernmental cooperation depends on federal recognition of states as co-sovereigns and partners. The promotion of a greater partnership between states and the federal government is central to the mission of WGA and is reflected in WGA Policy Resolution 2021–01, Strengthening the State-Federal Relationship.

States possess the primary legal authority for the allocation, management, protection and development of water resources within their borders. Congress and the federal judiciary have consistently and expressly recognized, and deferred to, this state authority. Federal policy must respect and preserve state authority to manage water, as well as recognize state law and the financial, environmental and social values of water resources to citizens of the western states.

The following recommendations are intended to ensure that taxpayers realize a meaningful return on the investment of limited discretionary resources. This goal will be more readily achieved to the extent that federal agencies effectively leverage state authority, resources and expertise.

State Authority Over Groundwater: States have exclusive authority over groundwater within their borders and are primarily responsible for protecting, managing, and otherwise controlling the resource. WGA encourages the Subcommittee to prohibit the use of appropriated funds for any activity that would, or has the potential to, usurp state authority over groundwater resources. Federal agencies must work with the states to address any groundwater-related needs and concerns. The federal government has long recognized the right to use water as determined under the laws of the various states; Western Governors value their partnerships with federal agencies as they operate under this established legal framework.

Water Data: Western states need reliable information on the status, trends and projections of water availability. Accordingly, Western Governors support funding for improved predictive and adaptive capabilities for extreme weather variability and related effects, including improvements to sub-seasonal and seasonal precipitation and water supply forecasting. Forecasting improvements will better support water management decision-making and emergency preparedness. Data collection, monitoring and communications is most effective when coordinated across federal agencies and with state agencies.

Water Infrastructure: The need for new water projects, as well as for improvements to aging water, wastewater and hydropower facilities, is becoming increasingly urgent. Infrastructure investments are essential to our nation's continued economic prosperity, electric generation capacity and environmental protection, and they assist states in meeting federally mandated environmental standards. The Subcommittee should continue to fully use receipts accruing to the Reclamation Fund for their intended purpose: the conservation, development and use of resources to meet western water-related needs. Western Governors support the construction of congressionally authorized BOR rural water projects and facilities that are part of congressionally authorized Indian water rights settlements.

The Subcommittee can promote greater investment in water infrastructure by using such tools as loan guarantees, revolving funds, infrastructure banks, water trust funds, and the Water Infrastructure Finance Innovation Act (WIFIA) program. Western Governors urge that capital budgeting and asset management principles be used to determine funding priorities based on long-term sustainability and not annual incremental spending choices. Federal investments in infrastruture need to be supported by dedicated sources of funding and guided by appropriate financing, cost-sharing, pricing and cost recovery policies.

Aquatic Invasive Species: The spread of invasive quagga and zebra mussels continues to be a major threat to western water resources. The containment of these invaders at infested waters in the West depends upon the collaboration and cooperation of federal, state and local agencies. Many state-led containment programs benefit from federal cooperation and funding. Western Governors request that the Subcommittee provide BOR with the necessary funding to collaborate with western states to contain the spread of aquatic invasive species in western waters.

Waste Isolation Pilot Project: Continued funding for DOE's Waste Isolation Pilot Plant (WIPP) Transportation Safety Program is essential to the expeditious cleanup and disposal of transuranic (TRU) waste from U.S. nuclear weapons complex facilities in western states, including Idaho National Laboratory, Los Alamos National Laboratory in New Mexico, Lawrence Livermore National Laboratory in California, and the Hanford Site in Washington. DOE must continue to provide sufficient and timely in-kind, financial, technical and other appropriate assistance to states and tribes through whose jurisdiction TRU waste will be transported. This assistance is integral to planning, developing and implementing the WIPP Transportation Safety Program. The safe and uneventful transportation of TRU waste is a priority of Western Governors, and WGA encourages the Subcommittee to provide adequate funding to ensure that the important work of the WIPP Transportation Safety Program continues.

Energy: Western Governors support federal programs designed to: reduce reliance on oil imports by increasing North American production and improving fuel efficiency; develop renewable and alternative fuels; and increase innovation and application of energy storage. Congress should also: ensure adequate funding and resources for state emergency planning, response, and recovery; maintain funding for the State Energy Program (SEP), Rural Energy for America Program (REAP), Weatherization Assistance Program (WAP), and Low-Income Home Energy Assistance Program (LIHEAP); and provide appropriations for effective cybersecurity infrastructure, education, and workforce development programs. Congress should also

refrain from advancing the interim storage of commercial nuclear waste through the appropriations process without requiring the consent of affected Governors. The Subcommittee can also help ensure that DOE and other agencies create opportunities for ongoing, substantive, and meaningful state consultation in the West-wide energy corridor process.

Western Governors and federal agencies deal with a complex web of interrelated energy and water resource issues. It is an enormous challenge to judiciously balance competing needs in this environment, and Western Governors appreciate the difficulty of the decisions this Subcommittee must make. The foregoing recommendations are offered in a spirit of cooperation and respect, and WGA is prepared to assist you as the Subcommittee discharges its critical and challenging responsibilities.

[This statement was submitted by James D. Ogsbury, Executive Director, Western Governors' Association.]

PREPARED STATEMENT OF THE WESTERN RESOURCE ADVOCATES

Dear Chairman Feinstein and Senator Kennedy:

We request your support for appropriations in the President's recommended budget for FY 2022 to the Bureau of Reclamation, Upper Colorado Region, to fund the Upper Colorado River Endangered Fish Recovery Program and the San Juan River Basin Recovery Implementation Program. The programs' goals are to recovery four species of endangered fish and provide ESA compliance for approximately 2,500 water projects in the Upper Colorado River Basin.

These highly successful, cooperative programs are ongoing partnerships among the states of New Mexico, Colorado, Utah and Wyoming, Indian tribes, federal agencies and water, hydropower and environmental interests. The conservation group Western Resource Advocates (WRA) has been a partner in the program for nearly twenty years.

WRA requests full funding for these programs, including $5.7 million in the FY22 budget request for capital construction activities through the Upper Colorado Region's Endangered Species Recovery Implementation Program. WRA also appreciates the Subcommittee's efforts since FY19 to fund environmental programs for the Colorado River at $21.4 million, a portion of which supports the Upper Colorado River Endangered Fish Recovery Program and San Juan River Basin Recovery Implementation Program. WRA requests continued funding for these activities, at that level or above, in FY22. This funding for the recovery programs is authorized by P.L. 106–392, as amended.

Sincerely.

[This statement was submitted by Bart Miller, Healthy Rivers Program Director, Western Resource Advocates.]

PREPARED STATEMENT OF THE WESTERN STATES WATER COUNCIL

Chair Feinstein, Ranking Member Kennedy, and Members of the Subcommittee, on behalf of the Western States Water Council (WSWC) we welcome the opportunity to provide written testimony on federal agency activities and appropriations under the Subcommittee's jurisdiction. The WSWC is a government entity; an instrumentality of each and every participating state advising western governors of water policies and programs. Members are appointed and serve at the pleasure of their respective governors. The WSWC appreciates the opportunity to provide written testimony on activities and appropriations for the U.S. Bureau of Reclamation (USBR).

RECLAMATION FUND

Recognizing the critical importance of water in the development of the West, the Congress passed the Reclamation Act on June 17, 1902 and provided monies "reserved, set aside, and appropriated as a special fund in the Treasury to be known as the 'reclamation fund,' to be used in the examination and survey for and the construction and maintenance of irrigation works for the storage, diversion, and development of water for the reclamation of arid and semiarid land..." in seventeen western states, to be continually invested and reinvested.

The Council requests that the Subcommittee recommend fully appropriating the receipts and collections accruing to the Reclamation Fund, pursuant to the Reclamation Act and other acts, for their intended purpose in the continuing conservation, development and wise use of western resources to meet western water-related needs. "Needs" may include Reclamation project dam safety costs, financing extraor-

dinary maintenance and rehabilitation of aging infrastructure (including transferred works), funding authorized rural water supply projects, and the construction of Reclamation facilities incorporated as part of a Congressionally approved Indian water right settlements. We also support an investigation of converting the Reclamation Fund to a true revolving trust fund.

The Reclamation Fund was envisioned as the principal means to finance federal western water and power projects with revenues from western resources. Its receipts are derived from water and power sales, project repayments, certain receipts from public land sales, leases and rentals in the seventeen western states, as well as certain oil and mineral related royalties—but these receipts are only available for expenditure pursuant to annual appropriation acts. With receipts outpacing expenditures for authorized Reclamation purposes, the unobligated figure gets larger and larger, while the money is spent elsewhere for other federal purposes, contrary to the Congress' original intent. The actual unobligated balance at the start of FY2020 was $17.668 billion, and was estimated to have been $17.689 billion at the beginning of FY2021 and $17.794 billion at the beginning of FY2022.

RURAL WATER SUPPLY PROJECTS

The Council strongly supports funding to expedite construction of long-authorized Reclamation rural water supply projects in a timely manner, including projects that meet tribal trust and other federal responsibilities, while recognizing and continuing to defer to the primacy of western water laws and tribal settlements in allocating water among users. There are six authorized and active rural water projects located in Montana, New Mexico, North Dakota, and South Dakota, of which five have yet to be completed at an estimated federal cost of around $898 million. Construction costs continue to increase due to delays, inflation and the rising costs of materials and labor. At current levels of funding, completion of some projects could be delayed by decades. There is a Federal responsibility to complete authorized rural water projects, particularly those intended to fulfill in part a solemn Federal promise and trust responsibility to compensate States and Tribes for lost resources as a result of the construction of federal flood control projects and other actions.

PROJECT MAINTENANCE, REPAIR, AND REHABILITATION

The average age of Bureau of Reclamation dams is 70 years, with most requiring maintenance, repair, and rehabilitation (MR&R) estimated at $2.9 billion. We support federal investments and collaborative efforts in water-related infrastructure projects and programs that deliver adequate supplies of suitable quality water, and provide jobs and economic security, while protecting the environment. We also support dedicated federal water infrastructure funding. Reclamation operates hundreds of dams, reservoirs, and related infrastructure in the West, supplying water and power to millions of people, irrigating millions of acres for food and fiber, providing flood control and recreation, and supporting wildlife and habitat. The importance of these projects cannot be overstated.

Many of Reclamation's facilities are nearing, or have already exceeded, their original design lives and are in need of MR&R, in order to minimize risk to public safety and continue to serve their authorized purposes. MR&R needs refer to both maintenance that has been deferred and future projections or anticipated maintenance, repair and rehabilitation work. Reclamation's existing funding, and the funding from non-federal partners, which operates two-thirds of Reclamation's infrastructure under contract, are not sufficient to address all MR&R needs. We support stable and continuous funding streams for maintenance, rehabilitation and repair of Reclamation dams and related infrastructure, as well as updated evaluations of priority needs

DAM SAFETY

The Reclamation Safety of Dams Act of 1978 provides Reclamation with authority to preserve and maintain the structural safety of dams under its stewardship. The WSWC supports ongoing coordination of state and federal efforts to strengthen dam safety programs. We support actions that provide stable and continuous federal funding streams for Reclamation dam safety work and related infrastructure.

FORECAST INFORMED RESERVOIR OPERATIONS

The WSWC supports the use of innovative and forecast informed reservoir operations by Reclamation and other public and private entities at all levels. This would help to maximize the effective and efficient use of our existing and future infrastructure to benefit our myriad and growing economic uses of water, while at the same

time balancing and protecting our need for public health and safety, as well as a resilient and healthy environment.

OPENET

In the West, the predominant consumptive use of water is evapotranspiration (ET) from irrigation. The WSWC supports a $5M request under Reclamation's WaterSMART program for development of an Open Evapotranspiration (OpenET) software system and data platform through an operational use partnership (https://openetdata.org/). OpenET involves scientists from federal agencies and academic institutions using satellite and weather data to map evapotranspiration at the individual field scale. With these funds, Reclamation would be able to partner with the OpenET consortium and with a broad network of collaborators to refine, develop applications, and operationalize the use of OpenET, providing credible, transparent, automated, and easily accessible consumptive water use data across the West. No such system exists today. There is a need for developing new monitoring technologies that provide more timely data availability and more refined spatial coverage.

Currently, access to satellite and ET data is limited and expensive, keeping it out of the hands of many water users and decision-makers. OpenET will allow water managers to assess how much water is being used via a cost-effective and easy-to-use web-based platform, filling a critical water data management gap.

AGRIMET

We also support $1million in funding for Reclamation's Agrimet network of weather stations that provide data that serves as an important and efficient ground-truthing, calibration, and model validation tool for analysis of information products derived from satellite platforms such as OpenET. Agrimet provides basic data on precipitation, temperature, solar radiance, wind speed and humidity required to calculate reference ET and inform remote-sensing platforms. The Agrimet weather observing network suffers from the challenges of aging instrumentation infrastructure, deferred maintenance, need for technology upgrades, and funding that fails to keep up with these needs, making it difficult to maintain data continuity and coverage for users.

DROUGHT

As the Subcommittee members are aware, much of the West is again in the grip of severe to exceptional drought. We support Reclamation's Drought Response Program, authorized under the Water Sustain and Manage America's Resources for Tomorrow (WaterSMART) program and the Science and Engineering to Comprehensively Understand and Responsibly Enhance (SECURE) Water Act, and urge the Subcommittee to provide funding for a comprehensive and coordinated national drought preparedness and response program on par with federal efforts to address other natural disasters.

HYDROPOWER

We support reasonable hydropower projects and programs that enhance our electric generation capacity and promote economic development through streamlined permitting processes, while appropriately protecting environmental resources, consistent with States' law and certification authority under the Clean Water Act Section 401.

ENERGY AND WATER PLANNING

Finally, we support integrating water and energy program and project planning, including improved data on water and energy supply and demand, that promotes conservation and use efficiency while seeking to minimize economic, environmental, and other costs.

Thank you for the opportunity to provide written testimony.