



March 8, 2019

The Honorable Lamar Alexander
The Honorable Dianne Feinstein
Subcommittee on Energy and Water Development
Committee on Appropriations
United States Senate, SD-140
Washington, DC 20510



Dear Chairman Alexander and Ranking Member Feinstein:



We are writing to request your support for increased research and development funding for innovations to develop and use natural gas resources better (economically and environmentally) within the Fiscal Year (FY) 2020 Energy and Water Development Appropriations Bill. Increased research and development will ensure that our domestic resources are produced, delivered and used safely, efficiently, and in an environmentally responsible manner.



According to PricewaterhouseCoopers and the American Petroleum Institute, the natural gas and oil industry now supports about 10.3 million jobs and over \$1.3 trillion (7.6%) of economic activity in the United States—an amount that is rapidly growing. In 2018, about 63% of primary energy produced in the U.S. came from natural gas and petroleum liquids production. Natural gas and natural gas liquids production in 2018 is over 75% greater than in 2005 and, according to the American Chemistry Council, has led to over \$200 billion of investment and projected 430,000 additional jobs through 2025 in the chemical and petrochemical industry alone.



The U.S. economy has been substantially enriched by abundant domestic natural gas resources, low energy prices, and natural gas domestic energy independence—after a four-decade struggle— is now a reality. Natural gas abundance has led to over \$50 billion in annual energy cost savings (compared to 2007 energy prices) for the approximately 75 million residential, commercial, and industrial consumers. Further, natural gas has helped moderate electricity price impacts and been a major contributor to the 14% drop in U.S. CO₂ emissions from 2005–2017. Natural gas is the number one energy resource produced in the U.S.—with continued growth forecasted by 2050.



We did not gain this economic bounty by accident. Shale gas is one of America’s premier examples of joint government and industry R&D yielding tremendous benefit/cost ratios and long-term, transformational societal changes. Innovations in reservoir mapping, hydraulic production methods, and horizontal drilling coupled with favorable tax policies, unlocked a national treasury of unconventional natural gas and oil. The technically recoverable reserves promise a securely accessible, low-cost energy resource for the 21st century. Despite the incredible impact that research and technology development have played in this sector, the President’s proposed budget plans would decimate important Applied Research Programs at the Department of Energy. Continued support of

The Honorable Lamar Alexander
The Honorable Dianne Feinstein
March 8, 2019
Page 2



innovations for applied R&D through pilot and demonstration scales is a prime means for the Federal Government to secure and enrich our economy, and the current efforts to reap the results of energy innovations with all our natural energy resources are simply inadequate.



To that end, we respectfully request the inclusion of the following funding requests and Report Language to the Fiscal Year 2020 Energy and Water Development Appropriations Bill.



EERE, Building Technologies

Request: \$30,000,000 for R&D for the Efficient Use of Natural Gas in Buildings
Report Language: The Committee is concerned with the lack of funding for applied natural gas R&D within the Buildings Technology Program. Within available funds, the Committee provides \$30,000,000 for applied research and development for energy efficiency efforts related to the direct use of natural gas in residential and light-commercial applications, including natural gas-powered thermal heat pumps that provide space heating and/or water heating, on site combined heat and power (CHP), self-powered natural gas appliances to improve reliability and resilience, and further venting research.



Fossil Energy R&D, Natural Gas Technologies, Emissions Mitigation R&D

Request: \$15,000,000
Report Language: Emissions Mitigation from Natural Gas Infrastructure. Nearly 30% of the total methane emissions from production through to distribution occurs during the gathering, processing, and transmission of natural gas. Up to 70% of these emissions related to compressor packing, seals, and equipment operations could be captured and recovered through re-compression and downstream introduction of the gas back into the delivery system. Therefore, the Committee recommends that the Department provide \$15,000,000 for research and development of energy efficient technologies to mitigate emissions through capture and re-compression downstream into the natural gas infrastructure.



Fossil Energy R&D, Natural Gas Technologies, Emissions Quantification R&D

Request: \$7,000,000
Report Language: The Committee recommends \$7,000,000 for the Emissions Quantification from Natural Gas Infrastructure research subprogram to update and improve component-level emissions factors and on better characterizing the regional and temporal variability of methane emissions across the value chain.



The Honorable Lamar Alexander
The Honorable Dianne Feinstein
March 8, 2019
Page 3



FREEDOM EQUIPMENT LLC



EERE, Vehicle Technologies, Fuels and Lubricant Technologies

Request: \$15,000,000 for Natural Gas Vehicle Research

Report Language: The Committee is concerned with the lack of funding for natural gas vehicles. Abundant, domestic, low-cost natural gas, provides the largest and most cost-effective NOx emissions reductions and is often the only viable alternative fuel for high fuel-use fleets. Further research is needed on natural gas storage, natural gas engines, and fueling infrastructure optimization. Within available funding, the Committee includes \$15,000,000 to address technical barriers to the increased use of natural gas vehicles, including medium and heavy duty on-road natural gas engine research and development, energy efficiency improvements, emission after-treatment technologies, fuel system enhancements, new engine development, natural gas storage, natural gas engines, and fueling infrastructure optimization.

EERE, Vehicle Technologies, Clean Cities Program

Request: \$2,000,000 for RNG Technology Integration Workshops

Report Language: Domestically produced renewable natural gas (RNG) use is expanding and is the vast majority of cellulosic biofuel used in the nation. Extensive outreach and deployment analysis is needed in order to expand its use into existing and future natural gas powered fleets. The Committee provides an additional \$2,000,000 to identify RNG innovation gaps for natural gas powered vehicles through dedicated workshops nationwide.

EERE, Vehicle Technologies

Request: Natural Gas Vehicle Deployment Study

Report Language: The Committee directs the Department to undertake a comprehensive study, with stakeholder input, on natural gas vehicle deployment in on and off-road transportation, identifying regulatory and federal policy barriers to increased deployment of natural gas vehicles.

Fossil Energy R&D, Coal R&D, Advanced Energy Systems

Request: \$30,000,000 for Advanced Gas Turbine R&D

Report Language: Within available funds, the Committee recommends \$30,000,000 for the advancement of turbine technologies for higher efficiency, including the application of hydrogen-fueled turbines combined with novel fossil-based hydrogen generation to increase power generation efficiency with reduced emissions.

Fossil Energy, Supercritical, Transformational Electric Power Initiative

Request: \$24,000,000 – STEP Program

Report Language: The Committee recommends \$24,000,000 for STEP and supercritical CO2 component development, including \$4,000,000 to complete the

The Honorable Lamar Alexander
The Honorable Dianne Feinstein
March 8, 2019
Page 4



necessary design and construction of the 10MW pilot facility, and conduct the necessary testing, including long-duration testing for the facility. The Committee provides \$20,000,000 to extend operational conditions and test at longer durations, evaluate and implement modifications necessary to perform cascaded cycle tests to expand the application of the facility to waste heat recovery R&D, extend compressor evaluation conditions, perform alternate turbine/compressor testing and to begin component development and integration of a direct-fired, supercritical CO₂ oxy-combustor for greater improvements in efficiency and performance.



EERE, Bioenergy Technology Office, Feedstock and Supply Logistics

Request: \$20,000,000 increase for Pretreatment of Wastes for Biofuels

Report Language: The Committee provides \$50 million for feedstock supply and logistics. In order to successfully address issues for the use of wastes (such as municipal solid waste, refuse derived fuels, and mixed wastes incorporating agriculture and forest residues) as feedstock for biofuels and biochemical products, industry involvement is critical. The Committee is concerned that the current efforts by the Department only stress early stage research at national labs and are deficient in private sector involvement. Therefore, within available funds, the Committee provides \$20 million for TRL 3-6 industry led projects that focus on the development and proving of solutions for pretreatment of wastes to meet conversion process specifications.



EERE, Bioenergy Technology Office

Request: \$20,000,000 increase for Power to Gas and Biomass Integration R&D

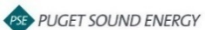
Report Language: The increases in solar and wind generation on the U.S. electric grid has, in some cases, led to load shedding or negative pricing in parts of the country, where excess renewable electricity cannot be used by customers. Numerous entities are exploring “Power to Gas” options, converting excess renewable electrons into hydrogen or renewable natural gas. The Committee recognizes the fact that thermochemical biomass conversion processes require additional hydrogen to create drop-in biofuels, renewable natural gas and biochemical products. Therefore, within available funds, the Committee provides \$20 million for industry led projects researching the integration of power to gas and thermochemical biomass conversion processes.



Fossil Energy R&D, Unconventional Fossil Energy Technologies

Request: \$55,000,000 - Unconventional Field Test Site Report Language

Report Language: The Permian Basin of West Texas is estimated to have an oil and gas resource in place that equals or exceeds the giant reserves in the Middle East. Energy dominance and possible energy independence for the U.S. is possible. The challenge resides in the fact that the resource is locked up within very low permeability shale formations.



The Honorable Lamar Alexander
The Honorable Dianne Feinstein
March 8, 2019
Page 5



The solution to the overall challenge is comprehensive field experiments that collect adequate and critical data. Significantly greater understanding of the created stimulated reservoir volume (SRV) is required. This data is both expensive to collect and risky to obtain, placing it beyond most E&P companies' capability to obtain.



These test sites can be further leveraged to address the very low recovery factors (less than 10%) for resources (both oil and gas) from shale formations. Existing test sites in the Permian Basin present an excellent opportunity for enhanced oil recovery (EOR) research to increase recovery factors. In fact, through past research associated with shale formations and field test sites, it has become clear that understanding hydraulic fracturing and EOR can no longer be addressed independently. Successful EOR relies on successful and clearly understood hydraulic fracturing. Field test sites provide the laboratory to perform the research linking the two.



General Provisions:
Technical Readiness Levels:



The Committee is very concerned regarding the Department's desire to restrict funding only to Basic Research (TRL projects 1-3) within the Applied Research Programs. Congress already directs more than \$5 billion per year on basic energy research through the Office of Science and other programs. Such restrictions in the Applied Programs will cripple innovation and development, and will reduce the number of energy technologies adopted in the marketplace. This would result in higher energy prices for all Americans, and would eliminate the United States' role as a worldwide leader in energy innovation. The Committee directs that, within available funds, at least 60% of all Applied Research Program funding (Fossil Energy; Energy Efficiency and Renewable Energy; Nuclear Energy; ARPA E; and Electricity Delivery and Energy Reliability) must be allocated to projects at TRL 3-8, including pilots and demonstrations.



Thank you for your consideration of these important research and development initiatives. Support for these areas will result in additional jobs across the country, and ensure that our resources are used more safely, more efficiently, and in a more environmentally sustainable manner.



Sincerely,

David Carroll
President & CEO
GTI

Lori Traweck
COO
American Gas Association

Bert Kalisch
President & CEO
American Public Gas Assn.

The Honorable Lamar Alexander
The Honorable Dianne Feinstein
March 8, 2019
Page 6



Daniel Gage
President
NGVAmerica



Bert Kalisch
President
APGA Research
Foundation



Seung W. Baik
President
Agility Fuel Solutions



American Natural Gas
Drew West
Founder & CEO



Mark Williams
President
ANGI Energy Systems



Robert Bonelli
President and CEO
Adsorbed Natural Gas
Products, Inc.



Tom Rastin
Executive Vice President
Ariel Corporation



Linn Evans
President & CEO
Black Hills Energy



Lisa Jacobson
President
The Business Council for
Sustainable Energy



Nicole A. Kivisto
President & CEO
Cascade Natural Gas
Corporation; Great Plains
Natural Gas Company;
Intermountain Gas
Company; Montana-
Dakota Utilities Company



Thomas Lawson
President
California Natural Gas
Vehicle Coalition



Scott E. Doyle
Natural Gas Utility
Business Lead
CenterPoint Energy



Barry P. Carr
Coordinator
Clean Communities of
CNY, a US DOE Clean
Cities Coalition



Andrew J. Littlefair
President and CEO
Clean Energy Fuels



C. S. "Chuck" Warrington
Managing Director &
Executive Officer
Clearwater Gas System,
FL

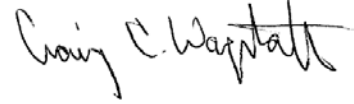
The Honorable Lamar Alexander
The Honorable Dianne Feinstein
March 8, 2019
Page 7



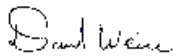
Tom Swenson, P.E.
Business Development
Manager
Cummins Westport Inc.



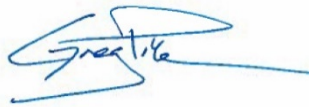
Charles Musgrove
President
Dillon Logistics Inc.



Craig Wagstaff
President, Gas
Distribution
Dominion Energy



David Weiss
Executive Director
Energy Solutions Center



Gregory Pilkinton
VP U.S. Sales
Énestas Natural Gas



William J. Akley
President, Gas Operations
Eversource Energy



William Winters
Owner & Managing
Partner
Freedom CNG



Roger Oldigs
Chief Financial Officer
Freedom Equipment LLC



Kenneth Garland
Vice President
Operations
Houston Distributing Co.



Ronald P. Cuenod, Jr
President & CEO
Indumar Products



Aaron Johnson
President & CEO
Kinetrex Energy




Susan Fleck
President
Liberty Utilities (NH)



Dennis Foose
CEO
Nat-G CNG Solutions



Ronald J. Tanski
President & CEO
National Fuel



Ross Turrini
Chief Gas Engineer,
Senior Vice President, US
Gas Engineering and
Process
National Grid

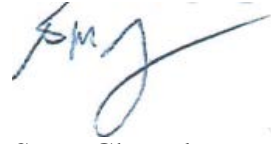
The Honorable Lamar Alexander
The Honorable Dianne Feinstein
March 8, 2019
Page 8



Thomas J. Massaro, Jr.
Senior Vice President,
Marketing, Customer
Service & Energy
Efficiency
New Jersey Natural Gas



Joe Hamrock
President & CEO
NiSource Inc.



Steve Ghormley
Vice President,
Operations and Business
Development
Novus Wood Group



Kimberly A. Heiting
Senior Vice President
NW Natural



Rita L. Hansen
CEO
Onboard Dynamics, Inc.



Ron Snedic
President
Operations Technology
Development



Christine Cowsert
Chapman
Sr. Director, Asset
Management and System
Operations
Pacific Gas and Electric
Company



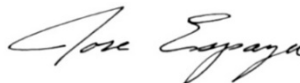
Craig E. White
President & CEO
Philadelphia Gas Works



Nina Odell
Director, Government
Affairs & Public Policy
Puget Sound Energy



Sharon Tomkins
Vice President, Customer
Solutions & Strategy
SoCal Gas



Jose Esparza
Vice President, Energy
Solutions
Southwest Gas
Corporation



Susan M. Shifflett
President
Texas Natural Gas
Vehicle Alliance

The Honorable Lamar Alexander
The Honorable Dianne Feinstein
March 8, 2019
Page 9



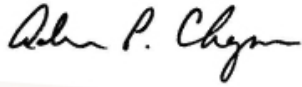
William (Bill) Zobel
Vice President: Business
Development &
Marketing
Trillium CNG



Michael Kiely
SVP - Managing Director
U.S. Government Affairs
UPS



Ron Snedic
President
Utilization Technology
Development



Adrian Chapman
President & CEO
WGL Holdings Inc. &
Washington Gas



Billy Holt
E-Commerce & Business
Development
Wood Fuel