



MEMORANDUM

December 3, 2023

TO: Members of the Subcommittee on Energy, Climate, and Grid Security

FROM: Committee Majority Staff

RE: Hearing entitled “America’s Future: Leading a New Era of Energy Dominance, Security, and Environmental Stewardship.”

I. INTRODUCTION

On Tuesday, December 5, 2023, at 10:00 a.m. (ET) in 2123 Rayburn House Office Building, the Subcommittee on Energy, Climate, and Grid Security will hold a hearing entitled “America’s Future: Leading a New Era of Energy Dominance, Security, and Environmental Stewardship.” The hearing will explore opportunities to expand access to affordable, reliable, and clean energy.

II. WITNESSES

- **Edmund O. Schweitzer III, Ph.D.**, Founder, President, and Chief Technology Officer, Schweitzer Engineering Laboratories;
- **Anne Bradbury**, CEO, American Exploration & Production Council;
- **David Gattie, Ph.D.**, Associate Professor of Engineering and Senior Fellow, Center for International Trade and Security, University of Georgia; and
- **Noah Kaufman, Ph.D.**, Senior Research Scholar, Center for Global Energy Policy at Columbia University.

III. BACKGROUND

American Global Energy Leadership

The United States is a global leader in energy production and environmental stewardship. Over the last decade and a half, the U.S. has seen strong economic and population growth, and the rapid deployment of technological innovations that have unlocked new energy resources and improved the efficiency of energy systems. The U.S. has emerged as the world’s number one producer of oil and natural gas, while simultaneously improving air quality and reducing emissions of carbon dioxide. According to the Energy Information Administration (EIA), by 2030, U.S. energy-related carbon emissions are projected to decline by 25-38 percent below what

they were in 2005, a trend driven by higher utilization of natural gas, increased electrification, higher efficiency, and renewable deployment in the electric power sector.¹

From the 1950's until 2005, U.S. reliance on foreign imports of crude oil and petroleum products increased rapidly, as domestic production failed to keep pace with U.S. demand. The year 2005 was an inflection point in U.S. energy markets, when consumption of petroleum peaked at 20.7 million barrels per day, production declined to 7.9 million barrels per day, and the U.S. imported more than 60 percent of the petroleum it consumed.² Since 2005, with the advent of new innovations in domestic drilling and production technologies, domestic production has dramatically increased, and imports have plummeted. In 2020, the U.S. became a net energy exporter for the first time in nearly 70 years. Today, the U.S. is producing record high levels of crude oil and natural gas, with approximately 13.2 million barrels of crude oil production and 104.4 billion cubic feet of natural gas production per day.^{3,4}

With the increase of domestic energy production, the U.S. has exerted more influence on global energy markets, with average daily exports of 3.5 million barrels of crude oil and 10.6 billion cubic feet of natural gas in 2022.^{5, 6} U.S. energy exports provide numerous economic and national security benefits to the American people, including strengthened U.S. energy security, improved balance of trade, lessened volatility in global markets, and the reduced ability of adversarial countries to use energy as a weapon. Additionally, U.S. energy exports allow trading partners to reduce their emissions by switching to cleaner and more efficient energy supplies for their electric and transportation sectors. According to a report by the National Energy Technology Laboratory, the lifecycle greenhouse gas emissions of U.S. liquefied natural gas (LNG) is approximately 40 percent lower than natural gas supplied by Russia, which is the second largest natural gas exporter globally.⁷ The U.S. is now the largest supplier of LNG to Europe, and as global energy demand continues to grow in Asia and the developing world, the U.S. will continue to play an important global leadership role as a stable provider of clean energy.

American Nuclear Energy Leadership

American nuclear energy has also played important role in American energy security, the reliable generation of power, and in American international relationships and leadership. In many respects, the nuclear industry today reflects the success of U.S. nuclear policy dating to Congressional determinations following World War II to foster peacetime development of “atomic” energy. The Atomic Energy Act of 1954 established the policy that “the development, use, and control of atomic energy shall be directed so as to promote world peace, improve the general welfare, increase the standard of living, and strengthen free competition and private

¹ U.S. Energy Information Administration, [Today in Energy \(March 16, 2023\)](#).

² U.S. Energy Information Administration, [Oil imports and exports](#).

³ U.S. Energy Information Administration, [Weekly U.S. Field Production of Crude Oil](#).

⁴ U.S. Energy Information Administration, [U.S. Dry Natural Gas Production](#).

⁵ U.S. Energy Information Administration, [U.S. Exports of Crude Oil](#).

⁶ U.S. Energy Information Administration, [Liquefied U.S. Natural Gas Exports](#).

⁷ National Energy Technology Laboratory, [Life Cycle Greenhouse Gas Perspective on Exporting Liquefied Natural Gas from the United States \(2019\)](#).

enterprise.”⁸ The ensuing forty years witnessed tremendous growth of the U.S. nuclear industry, supported by the government’s own nuclear industrial infrastructure for fuels and technologies, and then pioneering developments by private industry.⁹ At the same time, the United States embarked on expanding international nuclear relationships, through establishment of the International Atomic Energy Agency¹⁰ and through Atomic Energy Act section 123 agreements¹¹ as well as related nuclear treaties—all serving to establish the United States as a leader on nuclear technology, nuclear safety, and non-proliferation safeguards.

Today, the United States maintains the world’s largest nuclear power industry. With 93 operating reactors (down from 112 in 1990),¹² the U.S. domestic industry accounts for more than 30 percent of worldwide nuclear generation, and just under 19 percent of U.S. electrical output. The current operating fleet of reactors is operated by 21 different power companies at some 54 sites, across 28 different states.¹³ This energy output also represents about 55 percent of the nation’s carbon-dioxide free power generation—accounting for most of the clean power production in some states.

The U.S. nuclear industry has over 4,500 years of operational experience. Because of this experience, the U.S. nuclear fleet is operating at the highest levels in its history and has been ranked as the highest performing nuclear industry in the world.¹⁴ Despite this performance, growth of the U.S. nuclear industry, particularly in international nuclear commerce, has experienced a long period of stagnation. On the international front, the United States has been largely absent from what is estimated as a \$500 billion to \$740 billion market this decade, with Russia and China leading on plans to construct upwards of 66 reactors across multiple countries.¹⁵

Nevertheless, increasing activity that is focused on next generation nuclear technologies, buoyed by federal energy policies and support, holds promise for a resurgence of American nuclear development and deployment by the end of the decade. The Committee has been actively working to move legislation that will help for more timely, efficient, predictable regulation and deployment of nuclear energy, including for exports to allied nations.¹⁶ How nuclear can strengthen American

⁸ [P.L. 117-286](#). Section 3 of the Act states: “It is the purpose of this Act to effectuate the policies set forth above by providing for...a program to encourage widespread participation in the development and utilization of atomic energy for peaceful purposes to the maximum extent consistent with the common defense and security and with health and safety of the public...”

⁹ Westinghouse designed the first fully commercial pressurized water reactor (PWR), developed by Argonne National Lab (including at what is now Idaho National Lab), and GE designed a prototype boiling water reactor (BWR), also developed by Argonne, in 1960—designs which account for some 89% of world capacity. See “[Outline History of Nuclear Energy](#),” World Nuclear Association.

¹⁰ See IAEA [history](https://www.iaea.org/about/overview/history) at <https://www.iaea.org/about/overview/history>

¹¹ See “[123 Agreements for Peaceful Cooperation](#),” National Nuclear Security Administration.

¹² This number includes Plant Vogtle Unit 3 in Georgia, which recently started preliminary operations, and will increase to 94 reactors when Vogtle Unit 4 comes on-line, as expected, in early 2024.

¹³ See data and descriptions of U.S. industry from the U.S. Nuclear Regulatory Commission [Information Digest](#), 2022-20233 and [Nuclear Power in the USA](#), World Nuclear Association (April 2023).

¹⁴ Nuclear Energy Institute, *The Nexus Between Safety and Operational Performance in the U.S. Nuclear Energy*, <https://nei.org/CorporateSite/media/filefolder/resources/reports-and-briefs/NEI-20-04-The-Nexus-Between-Safety-and-Operational-Performance-in-the-US-Nuclear-Industry.pdf>.

¹⁵ See “[Restoring America’s Competitive Nuclear Energy Advantage: A Strategy to assure U.S. national Security](#),” Department of Energy, April 2020.

¹⁶ See <https://docs.house.gov/meetings/IF/IF00/20231205/116653/HMKP-118-IF00-20231205-SD1002.pdf>.

energy security, energy leadership, and environmental stewardship will be a key topic for this hearing.

Changing Domestic Energy Mix

The U.S. energy mix is undergoing continual change. As the population and the economy has grown, energy efficiency has improved, and domestic energy demand has slowed. In 2022, 38 percent of energy produced in the U.S. was consumed by the electric sector, 27 percent by the transportation sector, and 23 percent by the industrial sector to produce electricity and heat for direct use.¹⁷ Although total annual U.S. energy consumption has trended upward over time as the U.S. population has increased, energy consumption per capita peaked in the late 1970s.¹⁸

While the transportation sector is supplied primarily by petroleum products, largely gasoline and diesel, the energy sources used to produce electricity have changed significantly since 2005. These changes are driven by a combination of low-cost natural gas replacing coal-fired generation, and the growth in renewable resources like wind and solar, and the combined effects of state policies, tax subsidies, and electric utility company commitments. According to the EIA, the share of all electricity produced by fossil fuels was approximately 71 percent in 2005 and 60 percent in 2022. However, the share of electricity produced by coal has been reduced from approximately 49 percent in 2005 to 20 percent in 2022, while the share from natural gas has increased from 18 percent in 2005 to 40 percent in 2022. Similarly, the share of electricity produced by non-hydro renewables increased from roughly 2 percent in 2005 to 15 percent in 2022. In 2022, the EIA reported that wind produced 10 percent and solar 3 percent of all electricity.¹⁹ Every scenario in the EIA's 2023 Annual Energy Outlook projects a decrease in the share of electricity produced by coal through 2050 while the shares of wind and solar are expected to increase in all scenarios.²⁰ The projections for natural gas vary by scenario but all show slight increases or decreases in the total electricity produced by natural gas.

Global Energy Outlook

Globally, the demand for energy is projected to grow through 2050 with increasing population and incomes. As U.S. energy-related CO₂ emissions are projected to continue declining, China remains the primary source of energy-related CO₂ emissions through 2050, while India and countries in the Asian-Pacific region are projected to displace the U.S. and Western Europe as the second and third highest emitters of emissions. Global production of crude oil and natural gas is expected to continue to rise to keep pace with growing demand from consumers such as China, India, and Africa.²¹ As energy security concerns and geopolitical events, such as Russia's invasion of Ukraine, disrupt traditional trade patterns, U.S. global energy leadership and exports will continue to help stabilize markets and ease supply constraints.

¹⁷ U.S. Energy Information Administration, [Use of energy explained](#).

¹⁸ *Id.*

¹⁹ U.S. Energy Information Administration, [Electricity Explained](#).

²⁰ U.S. Energy Information Administration, [Annual Energy Outlook 2023](#).

²¹ U.S. Energy Information Administration, [International Energy Outlook 2023](#).

Legislation to Advance Global Energy Leadership

Several bills have advanced in the 118th Congress that would further U.S. global energy leadership. Notably, H.R. 1, the Lower Energy Costs Act, included permitting reform provisions that would streamline the process for building energy infrastructure, expand U.S. access to global energy markets, and strengthen the supply chain for critical materials needed for renewable energy and battery technologies. According to estimates, the policies in H.R. 1 would lower energy costs by \$795 per household per year, increase oil production by 2 million barrels per year, and increase natural gas production by about 10 percent.²² H.R. 1 passed the House on March 30, 2023. Additionally, the Committee is considering several bills that would improve the affordability and reliability of energy, advance nuclear energy with licensing reforms at the Nuclear Regulatory Commission and promotion of advanced nuclear technologies, and expand renewable hydropower production in the U.S. by improving the licensing process and supporting next generational hydropower technologies. On October 24, 2023, the Subcommittee advanced 17 bills to secure reliable, clean, American energy, the majority of which were passed on a bipartisan basis.²³

IV. ISSUES

The following issues may be examined at the hearing:

- The importance of American global energy leadership;
- Policies that affect the supply and delivery of energy;
- Opportunities to expand access to clean, affordable, and reliable energy, including through innovation and technology; and
- The role of national security in domestic energy policy.

V. STAFF CONTACTS

If you have any questions regarding this hearing, please contact Brandon Mooney, Peter Spencer, or Mary Martin of the Committee staff.

²² The Heritage Foundation, [*Policies in the Lower Energy Costs Act Will Lower Energy Costs and Increase GDP*](#) (March 30, 2023).

²³ <https://energycommerce.house.gov/events/an-energy-climate-and-grid-security-subcommittee-markup-of-17-bills-to-secure-reliable-clean-american-energy>.