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HEARING TO EXAMINE A DISCUSSION DRAFT BILL, S.\_\_\_\_, THE AMERICAN  
NUCLEAR INFRASTRUCTURE ACT OF 2020

Wednesday, August 5, 2020

United States Senate

Committee on Environment and Public Works

Washington, D.C.

The committee, met, pursuant to notice, at 10:05 a.m. in room 406, Dirksen Senate Office Building, the Honorable John Barrasso [chairman of the committee] presiding.

Present: Senators Barrasso, Carper, Capito, Cramer, Braun, Rounds, Sullivan, Ernst, Cardin, Whitehouse, Booker, Van Hollen.

STATEMENT OF THE HONORABLE JOHN BARRASSO, A UNITED STATES  
SENATOR FROM THE STATE OF WYOMING

Senator Barrasso. Good morning. I call this hearing to order.

Clean, reliable nuclear energy is a cornerstone of America's energy infrastructure. Nuclear provides over half of our Nation's emission-free power. Today's nuclear reactors can run up to two full years without needing to be refueled.

America's nuclear engineers and scientists also support our national security. Nuclear energy powers our Navy's aircraft carriers and our submarines. Nuclear technology is fundamental to meeting our energy, environmental, economic, and national security goals.

Since America's first nuclear engineers worked on the Manhattan Project to win World War II, the United States has led the world in developing new nuclear technologies. For the last 75 years, our nuclear energy industry has been the world's leader in safety as well as performance. We must ensure that our leadership endures.

The draft bill we are discussing today, the American Nuclear Infrastructure Act of 2020, will do just that. The legislation will ensure we maintain the United States' historical position as the global nuclear energy leader. Our foreign competitors, specifically China and Russia, seek to

undermine America's nuclear industry for their own advantage.

President Trump's recent Nuclear Fuel Working Group Report unequivocally states that Russia weaponizes its energy supplies to advance their strategic goals. I agree with this assessment. Time and again, Vladimir Putin has used energy as a geopolitical weapon.

It is well-documented that Russians have withheld its vast natural gas supplies to bully energy-dependent foreign neighbors to achieve their geopolitical aims. Even in the United States, Russia has been deliberately trying to dump uranium into our energy markets. This undercuts American uranium production, and it drives our American companies out of business.

The Administration report describes the dire situation facing our Nation's uranium producers. America is on the brink of finding ourselves completely reliant on foreign uranium to power our homes and our businesses.

Wyoming is the leading uranium producer in the United States. Production is down significantly. The Energy Information Administration recently reported that last year's American uranium production was at an all-time low. It is dangerous, and we must reverse this trend.

The draft legislation establishes a uranium reserve to receive and revive and strengthen our uranium production. American-mined uranium would fill the reserve. The material

would be available in the event of a supply disruption.

This strengthens our energy security, and it preserves critical uranium mining jobs around the Country. If we lose our ability to mine uranium, it would take a generation to rebuild it. Establishing a uranium reserve preserves good jobs and protects our national security. It is a win-win situation.

I applaud the Trump Administration for their efforts to protect our uranium industry. I support the Department of Commerce's actions to extend an agreement to limit how much Russian uranium can enter the United States. If those efforts succeed, Congress will establish those Russian importation caps into law. If we fail, it will lead efforts to set the needed caps in law.

The draft legislation takes other important steps to maintain America's leadership on nuclear energy. The bill directs the Nuclear Regulatory Commission to coordinate with foreign nuclear regulators to enable the safe use of innovative nuclear designs. The draft builds on Nuclear Energy Innovation and Modernization, an act that we have gone on, which is authorized by members of this Committee to expand nuclear energy to advance nuclear technologies.

The draft legislation also modernizes environmental permitting requirements to address the needs of new technologies. The bill identifies regulatory barriers that

limit the safe deployment of new nuclear technologies. These new technologies are capable of radically reducing carbon emissions. It is time to remove regulatory roadblocks for the next generation of nuclear reactors.

This discussion draft would preserve America's existing nuclear power plants by authorizing temporary, targeted financial credits to reactors at risk for closing. It will help develop advanced fuels needed to power cutting-edge reactors. The draft will also help reduce construction costs to build advanced nuclear reactors. Finally, it reauthorizes critical training programs to bolster our nuclear workforce.

The American Nuclear Infrastructure Act is a blueprint to revitalize our nuclear energy industry. I would like to thank Senators Whitehouse and Booker and Crapo and Carper for working with me on this draft. The policies in this draft legislation will keep the United States on track to remain the undisputed international nuclear energy leader for the next 25 years.

I would now like to turn to Ranking Member Carper for his opening statement.

[The prepared statement of Senator Barrasso follows:]

STATEMENT OF THE HONORABLE THOMAS R. CARPER, A UNITED STATES  
SENATOR FROM THE STATE OF DELAWARE

Senator Carper. Mr. Chairman, thanks so much for holding today's hearing. To our witnesses, the two that are here live and in-person, we welcome you. To the witness who joins us from afar, thank you for doing that.

Mr. Chairman, as the United States continues to battle a deadly respiratory pandemic that has tragically claimed the lives now of more than 159,000 Americans, emerging evidence continues to show that people living in places with greater, longer-term exposure to air pollution are experiencing far worse health outcomes. So at a time when breathing clean air is paramount to public health and quality of life, it is only appropriate that we talk about the potential for nuclear power.

Today, nuclear power is our Nation's largest source of clean, reliable, carbon-free energy. That is why when I think about nuclear power, I think about clean air. I also think about economic opportunity and the potential we have as a Nation to lead the world in advanced nuclear technologies. In fact, there was a time not long ago when the United States did lead the world in nuclear manufacturing, nuclear construction, and nuclear production.

By supporting the next generation of advanced nuclear technologies that are being developed here at home, technologies

that are safer, that produce less spent fuel, that are cheaper to build and to operate, and that provide good-paying manufacturing, construction, and operating jobs for Americans, the U.S. can lead the world again.

I believe that Congress, and this Committee in particular, have an important role to play in ensuring that our Nation invests wisely in nuclear energy while maintaining our focus on safety to ensure cleaner air for our people and this planet we call home.

That is why, in the last Congress, I was proud to work with you, Mr. Chairman, and with a number of our colleagues on this Committee and off this Committee to enact the Nuclear Energy Innovation and Modernization Act, known as NEIMA. Among many things, NEIMA directs the Nuclear Regulatory Commission to develop a new framework to accept and process license applications for advanced nuclear technologies.

These changes are already being implemented at the NRC today, resulting in greater efficiency, greater transparency in the licensing process. With NEIMA, we are moving closer than ever before to making advanced nuclear power a reality in this Country, and we are doing so without jeopardizing safety.

The draft legislation before us today represents the Chairman's efforts to build on NEIMA's success, and it attempts to move us even closer to that reality. A number of us on this

Committee, and that certainly includes me, share our Chairman's enthusiasm for supporting advanced nuclear technologies. Let me be clear in saying that I support the broader goal of what this legislation aims to achieve.

That being said, I would be remiss if I didn't hasten to add that I have several serious reservations with the legislation as it is currently drafted, and I suspect that some of our colleagues, both on and off this Committee, share several of those reservations.

Let me just mention a couple of them here this morning. I am particularly concerned with the additional changes to the permitting process, which I believe could result in unintended adverse consequences for environmental quality, for public safety, and for public health.

We only recently made a number of necessary changes to the NRC's regulatory structure for advanced nuclear technologies through NEIMA. I fear that making additional, unwarranted changes at this time could seriously disrupt the regulatory process in a way that threatens the safety reviews of these new technologies.

We have seen the damage that nuclear power can inflict if proper safety precautions are not in place, are not kept up to date, or are not followed. Safety has been and must always remain a top priority in the operation of nuclear reactors and,

oftentimes, regularly conducting these safety reviews is a critical part of ensuring the safety that we all seek.

It is also critically important that the NRC remains the world's gold standard of nuclear regulatory agencies. I believe we all agree that a strong, independent NRC is essential to ensuring a safe nuclear industry. A safe nuclear industry is essential to ensuring public confidence, and maintaining public confidence in this vital industry is absolutely essential to ensuring that nuclear power can continue to play the vital role that it plays in this Country and, I believe, around the world.

If we want to lead the world in advanced nuclear technologies, and I believe that many of us do, we must be careful, very careful, not to jeopardize the still promising future of the nuclear industry by further streamlining safety regulations, largely for the sake of streamlining. Colleagues, if we do not proceed with genuine caution on this front, shortcuts on safety will do more to harm this industry in the long run, not help it.

I am not going to dwell on this this morning, but I also have several concerns about the Environmental Protection Agency's incentive program for the existing nuclear industry that is included in this bill, especially in light of the recent cuts to EPA's budget.

We need to keep in mind that the proposed federal budget

for fiscal year 2021 calls for cutting EPA's budget by 27 percent, a reduction of \$2.4 billion from the appropriation we enacted for the current fiscal year. By creating this new program at EPA without new funding, we run the risk of asking the agency to do even more with, quite possibly, far fewer resources.

With those cautionary notes in mind, Mr. Chairman, let me thank you again for holding today's hearing. I appreciate very much the opportunity to discuss those concerns further with you and our colleagues and our witnesses, both today and in the days to come. I also appreciate the opportunity for us to focus, as well, today, on the potential that nuclear power still holds for our Country, and what it can still mean for our air quality, our economy, and our global competitiveness.

When it comes to nuclear power, we have a real opportunity here. If we are smart about it, we will seize the opportunity, and we will do so without foregoing safety. And if we are smart about it, we will enable our Country to reap the economic, the environmental, and public health benefits that flow from realizing that opportunity. America will be a world leader in nuclear energy once again, while helping to make Planet Earth a safer, healthier home for us all.

I am going to stop my prepared remarks there, Mr. Chairman. I can't leave this hearing today without expressing my dismay at

the news that a couple of utilities in this Country have been, apparently, caught bribing two States to implement State programs to support this industry. One of those is in, I think it is in maybe in Illinois, ComEd, a subsidiary of Exelon was charged, I think, \$200 million by the Federal Government for bribery in Illinois. First Energy is involved in a \$60 million bribery case in Ohio.

In addition to that, we have the new construction of the AP1000 reactors in the Georgia Vogtle site that continue to face billions of dollars in overruns, in costs, in years of delays.

I have been wearing a special mask this week, and it is a mask of my favorite baseball team. How a kid born in West Virginia, grew up in Virginia, went to Ohio State, could end up as a lifelong Detroit Tigers fan is a long story, but I am. The Tigers are not playing this week; they are supposed to be having a four-game series, I think, with the Cardinals. That series has been cancelled because six of the Cardinals came down with the Coronavirus. About a half dozen of the folks who work in the clubhouse came down as well. They cancelled the series.

This past weekend, on Sunday, there was a very special game. The Tigers played Cincinnati. Cincinnati walked off to a three-nothing lead, I think, in the third inning, and the Tigers brought in a young relief pitcher named Tyler Alexander that most people in this Country, even in Detroit, had never heard of.

Tyler Alexander struck out the first nine batters he faced.

That has never happened but maybe once in the history of baseball. Nine. That day, he brought his best, very best, to the mound and to the game, and we need to bring our very best to this game. This is not a game; this is serious business. I will just say to the industry itself whose efforts we support and have for years, you have got to bring your best game. You have got to bring your very best game, as well.

Thank you.

[The prepared statement of Senator Carper follows:]

Senator Barrasso. Well, thank you very much, Senator Carper, for your continued leadership on this and so many other topics related to this Committee.

I also want to thank Senator Whitehouse for his significant involvement in putting this draft together, and I ask and invite Senator Whitehouse, if you would like to say a few words.

STATEMENT OF THE HONORABLE SHELDON WHITEHOUSE, A UNITED STATES  
SENATOR FROM THE STATE OF RHODE ISLAND

Senator Whitehouse. I would be delighted to, Chairman. Let me thank you for the way you have had this Committee work in a really good, bipartisan fashion, both on the Nuclear Energy Innovation Capabilities Act, which is the collaboration bill between the national labs and the industry and academia, and also on the Nuclear Innovation and Modernization Act, which put together a new regulatory framework to solve what I said was the problem of, how do you get a Tesla through regulatory procedure that requires the testing of its carburetor.

By analogy, we have to change the regulatory framework for nuclear innovation to adapt to the fact that these are going to be innovations. Both have passed, both are underway, both are successful, and I appreciate it very much.

I think that two of the big issues we need to address here, one is, how do you deal with the fact that the nuclear energy industry is financially burdened by the fact that it doesn't get compensated for the carbon-free nature of its power? It makes no damn sense to shut down a safely operating nuclear plant to open up a gas-fired plant that actually costs more, but gets away with actually costing more because the carbon differential doesn't factor into the equation.

This bill works in that space in ways that I think are very

helpful, very close to what we did on 45Q. We also have this problem of spent fuel, nuclear waste, for which we have no solution.

Some people say we are going to put it in Nevada. Good luck with that. I don't think so. I don't think we have a solution.

As we steer nuclear innovation forward, I want to make sure that we make it a really important strategic priority to have that innovation focus on the potential, the holy grail, of dealing with that terrible burden of spent fuel and actually turning that burden into an asset.

Senator Braun is here; he comes with a business perspective. If we were a company, that spent fuel would be a liability on our books, and every single member of that board of that company would be saying, oh, my God, how do we get that liability off our books? If we have a million-dollar liability, we have a \$999,000 incentive to get it off your books. But it just sits there, and this bill actually creates some incentives and some reporting to kind of get it onto America's books so we pay attention.

So, I thank the Chairman for both of those. We have work to do before I can fully support this bill on the environmental review side, on what we call streamlining, and with respect to foreign investment. That is what is keeping me from being on

this bill at this point, but I think the Chairman and the members of the Committee know that I have been a good partner on these issues, have worked in good faith and in good bipartisan spirit.

I expect that we are going to get there on this bill as well. I pledge that I will work as hard as I can to make sure that we do get there.

And I thank you, and I want to give a particular shout-out to Armond Cohen, one of our witnesses today. You may not notice, but many, many, many, many years ago, my first job as a new kid in the Rhode Island Attorney General's Office was the job nobody else wanted. You are the last one in, you get public utility regulation. Armond Cohen and I and Mary Kilmarks, now not with us any longer, and a few others, worked together, and in Rhode Island, we made the first conservation-based electric rates in the United States of America.

With Armond in Utility Narragansett Electric, which is now a part of the great national grid empire, and with a wonderful start, Armond's work in that was super important, and we have this long, long, long tradition. So it is really wonderful for me to see him in this Committee hearing after all those many years of good work, now multiple decades ago.

I think we started something with those conservation-based rates, and they are all over the Country now.

Thank you, Chairman.

[The prepared statement of Senator Whitehouse follows:]

Senator Barrasso. Well, thank you very much, Senator Whitehouse, for your continued partnership. You really have been a good-faith partner with us and an honest broker. We appreciate your commitment too, and I believe we will get to that same point that we are all aiming for.

We will now hear from our witnesses. We have Ms. Amy Roma, who is here, Founding Member of Atlantic Council's Nuclear Energy and National Security Coalition. We have Mr. Paul Goranson, who is the President of Uranium Producers of America. And as Senator Whitehouse just said, Mr. Armond Cohen, who is the Executive Director of the Clean Air Task Force, and Mr. Cohen is joining us remotely via WebEx from Boston.

I would like to remind the witnesses that your full written testimony will be made part of the official hearing record today. Please keep your statements to five minutes so we may have time for questions. I look forward to the testimony.

Ms. Roma, please proceed.

STATEMENT OF AMY ROMA, FOUNDING MEMBER, NUCLEAR ENERGY AND NATIONAL SECURITY COALITION, ATLANTIC COUNCIL; PARTNER, HOGAN LOVELLS

Ms. Roma. Thank you. Good morning. My name is Amy Roma, and I am a founding member of the Nuclear Energy and National Security Coalition at the Atlantic Council and a nuclear regulatory lawyer at Hogan Lovells. Thank you for the opportunity to testify at this hearing in support of the draft, American Nuclear Infrastructure Act of 2020, or ANIA, for short. My testimony today represents only my views and observations.

ANIA is a great step forward for ensuring that U.S. nuclear capabilities will be preserved and expanded, providing America with clean and reliable energy, tens of thousands of jobs, and billions of dollars in foreign trade opportunities for U.S. companies, while protecting U.S. interests.

In 1954, at the dawn of nuclear power, President Eisenhower delivered his famous "Atoms for Peace" speech, offering to share U.S. nuclear energy technology with other nations who committed not to develop nuclear weapons. This program resulted in three important economic and national security objectives. One, it prevented the spread of nuclear weapons; two, it made the U.S. a leader in nuclear power, ensuring that the U.S. maintained dominance in nuclear safety and security, nuclear technology development, and nuclear trade; and three, it ensured the U.S.

benefited from the geopolitical relationship that goes with such significant assistance with a foreign country's power supply.

President Eisenhower's historic move has paid dividends for decades, and the U.S. was well-positioned as a global leader in commercial nuclear power as well as safety and non-proliferation. While the U.S. still leads the world with the biggest nuclear power program and 95 reactors providing 20 percent of the U.S.'s electricity and the best-run plants, we have seen our international roles sharply decline, replaced largely by Russia, with China close behind, who have identified building nuclear power plants and nuclear trade as national priorities, promoted by the highest levels of government and backed by State financing and State-owned enterprises.

Russia now dominates nuclear power plant construction around the world, using it as a tool to exert foreign influence and reap significant economic benefits. With \$133 billion in orders for nuclear reactor exports, nuclear energy is also a component of China's "Belt and Road" initiative, with China estimating it would build as many as 30 foreign reactors by 2030, with an estimated value of \$145 billion. China further estimates that capturing just 20 percent of the "Belt and Road" Market could create 5 million Chinese jobs.

The U.S. nuclear power industry competing against foreign governments for new projects has quickly been sidelined on the

foreign stage with no orders for new reactors abroad. While we have ceded the mantle at the moment, we have a chance to regain it when it comes to the next generation of nuclear technology, such as advanced reactors. ANIA will close the gap between U.S. potential and execution of these technologies, further supported by actions to preserve the operating nuclear fleet and support nuclear infrastructure.

While there are many helpful provisions in ANIA, I would like to specifically note two examples and explain how they could help. One, the environmental review provisions set forth in Section 201; and two, the investment by allies provision set forth in Section 304.

To the first example, over the years, the National Environmental Policy Act, or NEPA, has brought forth immense environmental health and safety benefits. Nonetheless, both sides of the aisle have recognized that NEPA reviews can be lengthy and create delays, all driving up project costs without making environmental reviews any better.

By regulation, NEPA reviews should be concise, clear, and to the point. But when implemented at the agency level, the concise and clear elements often get lost. With no change in the law, NRC modern environmental reviews for new reactors can be a thousand pages longer than they were with the last wave of nuclear power plant construction for projects with less

environmental impact.

While the NRC has spent significant energy in the last few years trying to right-size its safety-focused technical reviews of advanced reactors, it has paid little attention to applying a right-size practical approach to environmental reviews.

Importantly, ANIA asks the NRC to do just that: evaluate and consider how to conduct its reviews more effectively, leveraging existing resources, lessons learned, and evaluating the ways the reviews can be improved.

To the second example, ANIA offers a refreshing revisit to the Cold War era foreign owners restriction in the Atomic Energy Act, which was implemented at a time when U.S. policy focused on closely guarding nuclear technology without the national security safeguards we have in place today. Notably, it was implemented before the Committee on Foreign Investment in the United States, or CFIUS, was established, which now polices significant foreign investment into the U.S. nuclear industry.

While it is unclear whether the foreign ownership restriction ever served any national security benefit, it has been very problematic in recent years when applied to the NRC, resulting in projects being cancelled, impeding investment, creating huge regulatory uncertainty, and costing billions of dollar to the commercial U.S. nuclear power industry.

The NRC unsuccessfully requested that Congress remove this

restriction 20 years ago, and recently, this Committee received a letter from 10 former NRC commissioners, again urging Congress to remove this restriction.

ANIA would amend this restriction to permit investment by certain U.S. allies, while the investment would still be subject to a CFIUS review, and the NRC's own non-inimicality finding, to ensure it does not harm U.S. interest. This is a simple change, but it can open the door to significant investment in this industry.

Thank you. I am happy to discuss these or other provisions of ANIA or answer any other questions you may have.

[The prepared statement of Ms. Roma follows:]

Senator Barrasso. Well, thank you so much for your testimony. It was very thoughtful, and we look forward to getting to questions in a few moments.

I would now like to welcome Mr. Paul Goranson this morning. In addition to serving as the president of the Uranium Producers of America, he is currently the Chief Operating Officer for Energy Fuels. It owns two uranium production facilities in Wyoming. He has lived in Wyoming for many years. He is the past president of chemical resources based in Cheyenne, also lives in Casper, and I am delighted to have you here, my friend. Please proceed.

STATEMENT OF WILLIAM PAUL GORANSON, PRESIDENT, URANIUM PRODUCERS OF AMERICA; CHIEF OPERATING OFFICER, ENERGY FUELS INC.

Mr. Goranson. Chairman Barrasso, Ranking Member Carper. Thank you for holding this hearing on the American Nuclear Infrastructure Act of 2020.

I am the President of the Uranium Producers of America, a trade association representing the domestic uranium mining and conversion industry. I am also the Chief Operating Officer for Energy Fuels Resources, and I have worked in the U.S. uranium industry for over 30 years.

The UPA strongly supports this bill, which will help reclaim America's leadership in global nuclear markets. As I started my career, the U.S. led the world in uranium production, employing over 20,000 workers, supplying almost all our own nuclear fuel, and we were a net exporter of uranium.

Today, commercial reactors in the U.S. import more than 90 percent of annual demand, and less than 1 percent of the uranium they use is mined in the United States. This has left the domestic production on the brink of collapse.

Earlier this year, the multi-agency Nuclear Fuel Working Group recommended immediate government actions to address the predatory market tactics of the state-owned uranium enterprises. U.S. mine production in 2019 was the lowest since 1949. The U.S. mined only a fraction of uranium needed to fuel even one of

our 95 commercial nuclear reactors.

Employment is at all-time low, we are almost entirely dependent on imported uranium, and we rely heavily on strategic competitors to sell us uranium. Uranium imports from the former Soviet Union, Russia, Kazakhstan, and Uzbekistan, represent almost half the fuel used by America's nuclear reactor fleet.

Let me be clear: we have a more than ample uranium supply in the U.S. We have over 40 million pounds annually of licensed and partially licensed capacity, almost enough to fuel America's entire commercial nuclear fleet. When normal market forces are in play, U.S. mines are cost-competitive globally. We have abundant high-quality uranium resources for the future.

The challenge today for any free market uranium company, whether it is in the U.S., Canada, or Australia, is that we are not competing with other free-market companies; we are competing with governments that seek to use energy as political capital. State-owned enterprises are not price sensitive.

When global prices plummeted a decade ago, free-market companies were forced to reduce production and lay off workers, while Russia, Kazakhstan, and Uzbekistan increased their production, drove down prices, and took control of global supply chains. The potential expiration of the Russian Suspension Agreement at the end of 2020 will only hasten the demise of the U.S. industry. The agreement already guarantees Russia 20

percent of the U.S. market, but Russia has already contracted to increase imports significantly, should the agreement expire.

The UPA strongly supports the Commerce Department's effort to extend RSA with protections for the domestic industry, as well as legislation to codify more restrictive limits on Russian uranium.

We appreciate the support of Chairman Barrasso in leading a bipartisan effort to rein in Russian uranium imports. It is not just Russia; China is increasingly dumping underpriced uranium in the global markets. Data from the Departments of Energy and Commerce show that tens of millions of dollars' worth of Chinese uranium has entered the U.S. reactors in recent years. The U.S. must immediately take bold action to reserve a domestic supply chain for nuclear fuel in the United States.

The UPA strongly supports the draft American Nuclear Infrastructure Act. Section 402 would codify the Nuclear Fuel Working Group's proposal to establish a strategic uranium reserve. This reserve would ensure domestic uranium supply in the event of market disruption and reduce our reliance on state-owned enterprises.

The Department of Energy's fiscal year 2021 budget requests \$150 million for the uranium reserve, a modest investment, considering it will preserve the nuclear fuel cycle in the U.S., instead of ceding it to Russia, China, and their allies.

The UPA also supports the U.S. nuclear fleet, our Nation's largest source of carbon-free baseload power. Section 301 of the draft bill would provide financial incentives to prevent the premature shutdown of nuclear power facilities.

We appreciate the draft's recognition that such facilities should be buying American uranium. We look forward to working with the Committee to strengthen this requirement and ensure that nuclear power facilities receiving taxpayer funds procure U.S.-mined and converted uranium.

Also, codifying the recent MOU signed by the EPA and NRC would further strengthen the legislation by providing certainty, robust, effective regulation of the in-situ uranium recovery industry.

Thank you again, Chairman Barrasso, Ranking Member Carper, and members of the Committee. I look forward to your questions and working with the Committee to address these important issues.

[The prepared statement of Mr. Goranson follows:]

Senator Barrasso. Well, thank you so much for your testimony.

We will get to questions in a few moments, but first, we will go ahead to Boston, where Mr. Armond Cohen, Executive Director of the Clean Air Task Force, is joining us via WebEx.

Mr. Cohen, welcome to the Committee, and please proceed.

STATEMENT OF ARMOND COHEN, EXECUTIVE DIRECTOR, CLEAN AIR TASK  
FORCE

Mr. Cohen. Thank you very much, Mr. Chairman, and thank you for letting me participate remotely.

Mr. Chairman, Ranking Member Carper, members of the Committee, I appreciate the opportunity to engage this morning. I want to especially thank Senator Whitehouse for his acknowledgement of our past work together, forging an agreement among consumers, environmentalists, and industry around what was then a very novel approach to conservation in the utility sector.

I think that is an interesting model for what we can do on nuclear. The challenges are different than they were when Senator Whitehouse and I worked together years ago, but I think that the process could be the same. I think there is a huge center of gravity around moving this option forward.

So, as an environmentalist and a climate change fighter, why am I here? Because managing climate change is just a huge challenge. We have to achieve deproductions in carbon emissions by mid-century. It is not just electricity, which we usually focus on, but it is the rest of the system, which is 75 percent of total consumption, from transport, industry, and building heat.

All of the work that we have done and that many other

groups have done has suggested that we need to maximize our options to achieve success. So we support rapid expansion of renewables, like wind and solar, development of other renewable resources like advanced geothermal as well as nuclear energy and carbon capture and storage, which can help complement the suite of zero carbon resources.

Nuclear energy has some distinct contributions to make to this if we can get it right. First of all, it is where most of our current zero-carbon electricity comes from, as was noted by the Chairman at the outset. Its major advantage, maybe its first major advantage, is that it is always on. Having an always on, always available, zero-carbon source to complement variable renewables that are weather-dependent, most studies have shown, can substantially reduce the cost of a zero-carbon grid by reducing the need for redundant renewable capacity and expensive storage.

Second, it is very power-dense, a lot of energy per square kilometer. Minimizing infrastructure footprints can be a key asset because infrastructure is not easy to build, and we need to increase our total amount of carbon-free energy at about five to ten times the rate that we ever have historically.

Finally, because of its power density, it is also quickly scalable, at least when we are able to build standardized designs. For example, France substantially decarbonized its

grid in 15 years, mainly with nuclear.

Nuclear also has some distinct advantages regarding its ability to produce zero carbon-hydrogen, which we may get to later, which will be necessary for the things we can't electrify.

But if we are going to replicate those past successes, we are going to need to make a lot of changes in the way we do nuclear, reducing costs, and improving delivery times. Some of this can be done with existing light water technology, but some of the advanced reactor designs will provide some distinct advantages in terms of lower costs, ability to standardize, faster to go from water to operation, lower material inputs, and so forth.

With that in mind, there is a lot to like in this draft bill that would advance those objectives. I will mention a few. First of all, we very much like the notion of incentives for continued operation of the existing fleet. That will keep carbon out of the atmosphere during our transition and keep the infrastructure in place to build on.

Second, getting the NRC to think ahead on permitting for non-electric applications in places like the industrial sector and other novel applications. We like the provisions that allow for more international cooperation with trusted allies in the areas of harmonized licensing and joint investment and domestic

plants, front-running the regulatory issues related to use in advanced manufacturing, and so on. We provided staff with detailed comments to refine and enhance some of these provisions.

Before I close, though, I do want to echo Senator Carper in expressing our concern regarding the Section 201 and 23 permit and streamlining provisions. Our view is that the NRC currently has a very strong mandate from the Nuclear Energy and Innovation Modernization Act, as well as the environmental review provisions of the Fixing America's Surface Transportation Act of 2015, which streamlined environmental review. We think those provisions should be given a chance to work before we contemplate other major efforts in this area.

I agree with previous comments that nothing could be more damaging to a relaunch of this industry than a perception that environmental safeguards have been specially trimmed. Nuclear energy can be safe, but it also has to be perceived to be safe, and maintaining strong environmental permitting review would be important to public confidence.

There are several other provisions in this draft which I have noted in my testimony which I believe may be unnecessary or counterproductive, and we can get into that, but that was the major one.

That said, we applaud the efforts of the Chairman, Ranking

Member, and other members of this effort to move forward with modernization of this important technology to make it relevant to the extremely daunting challenge of managing climate change.

Thank you very much.

[The prepared statement of Mr. Cohen follows:]

Senator Barrasso. We thank you so much, Mr. Cohen, and as you stated, we are working together collaboratively. I appreciate your comments; they are very helpful.

As Senator Whitehouse talked about, we are a bipartisan committee in our efforts here. We want to make sure we get the best results. As Senator Carper said, we need to make sure that we bring our best game today and every day. So thank you for the comments to all three of you.

We will start with questions. I would like to start with you, Mr. Goranson. We know American uranium production is right now at an all-time low. This has had a devastating impact on production, certainly in our home State of Wyoming. To revitalize the nuclear fuel supply chain, the Department of Energy is proposing establishing a national uranium reserve. The discussion draft legislation follows through on that proposal.

Will you please describe how this strategic reserve will help preserve the Nation's nuclear fuel supply?

Mr. Goranson. Thank you, Chairman Barrasso. The U.S. uranium industry is faced with a situation where, over the last several years of declining commercial purchases, it has led to an industry that is on the verge of collapse.

The uranium reserve would provide the U.S. Government with a backstop to support this industry in this vital piece of the

industrial base, in order to preserve it and maintain a skilled workforce, as well as maintaining the infrastructure necessary to produce uranium.

It would also provide for a domestic basis in case we have supply disruptions from our foreign imports, as well as a means for supporting any future national security and also energy security needs for the Country.

Senator Barrasso. On this committee, we have members of the Foreign Relations Committee. We have the chairman of the Armed Services Committee.

So I wanted to just ask you, Mr. Goranson, about Russia. Russia has weaponized its energy supplies, all of us are well aware, in terms of their efforts to advance their strategic interest. With regard to uranium, in Russia, they tend to manipulate the market by flooding America with cheap uranium to undercut our Nation's producers.

The Commerce Department right now is working to extend existing caps that limit the import into the United States of Russian uranium. If the caps are allowed to expire, Russia could have unlimited access to our uranium market. So I am leading efforts to make sure that doesn't happen.

Could you explain to the Committee why it is so important that we establish limits on how much Russian uranium comes into the Country, and do it by law?

Mr. Goranson. Chairman Barrasso, thank you. As you know, the Russian Suspension Agreement has been in effect since the early 1990s. It is in place and it has gone through several sets of reviews where the Commerce Department has determined without that suspension agreement, the Russians will dump uranium on the market. That is harmful for our domestic industry and for our national security.

As we go forward, looking forward to the Commerce Department's efforts to renegotiate the suspension agreement and extend it, we know one thing, that the Russian government we are dealing with today is not the same Russian government we were dealing with in 1992 or around that period.

It is important, in my perspective, to see legislation to codify those terms on the Russian Suspension Agreement to assure that it shows that the U.S. Government, the whole U.S. Government, supports this vital piece of protection of our domestic industry, but also to keep from becoming extremely reliant on a strategic competitor.

Senator Barrasso. Ms. Roma, we talked earlier, and Senator Whitehouse did as well, on modernizing the regulatory approach. So tomorrow's advanced nuclear reactors, they are going to be smaller, safer than today's designs. They will also have a reduced environmental impact while they are generating clean energy.

The draft bill that we are working on requires the Nuclear Regulatory Commission to examine its environmental review process, and then identify opportunities to update outdated environmental requirements. What aspects, Ms. Roma, of environmental reviews must we update to enable the safe deployment of these new technologies?

Ms. Roma. Well, there is a whole handful that I can think of, but just a few off the top of my head. The NRC can examine the use of generic environmental impact statements to address issues that are common across several different advanced reactor designs, such as the use of high SALAU fuel, or other common issues that would enable a subsequent site-specific license to incorporate by reference that earlier analysis, and streamline the NRC's subsequent review of a site-specific application.

Another area that the NRC could look to is reevaluating the presumption that advanced reactors necessarily require an environmental impact statement. The one thing that I would note is that the NRC requires an environmental impact statement for power reactors, which have traditionally been large-scale, light water nuclear reactors. But it doesn't require an environmental impact statement necessarily for smaller reactors, such as commercial non-power reactors, which tend to be 10 megawatts or less.

A lot of the designs that we are looking at in the advanced

reactor designs are micro-reactors, so they would fall within that window. The only difference between the existing regulations for commercial non-power reactors and for power reactors is power requires EIS. So one thing that they could look at is that as well.

Another way that they could streamline is looking at co-located facilities and the alternative siting analysis that you need to do. Oftentimes, new reactors are located at the same site as an existing reactor. Yet, under the NEPA methodology as implemented by the NRC, there is a very significant, in-depth analysis of putting that reactor at another location that would be a greenfield site, for example, that needs to be analyzed, where the NRC staff flies out and looks at all these other sites, when it is just going to come back to putting it at the exact same site as the existing nuclear power plant.

So there are a number of areas that the NRC could streamline and improve efficiencies. But the one thing that I would note is that, I actually thought, I understand and I hear the concerns that people are raising about doing a less in-depth environmental review. But I don't actually see that in the draft legislation. The draft legislation asks the NRC to look at ways that it can do the review more efficiently by looking at lessons learned and other areas that it can do a better review, not a less in-depth review.

I just want to go back to the earlier comment that I made in my opening remarks. Longer doesn't mean better. The NRC, for the Fermi 3 environmental impact statement, the NRC wrote 2,200 pages. That is a lot of writing, not a lot of analysis. So I think that the NRC can look at ways where it is not necessarily making very long environmental reviews, but doing better environmental reviews, that would be better for everybody.

Senator Barrasso. Thank you, Ms. Roma.

Senator Carper?

Senator Carper. Thanks, Mr. Chairman.

Again, our thanks to our witnesses, those who are really here, and those who wish they were here.

I want to start off with a question or two to Mr. Cohen if I could. Less than two years ago, Congress passed, as you know, the Nuclear Energy Innovation and Modernization Act, which made significant changes to the NRC's budget structure and to the NRC's regulatory framework for advanced nuclear reactors.

This law has significant changes, including caps on NRC's budget, which phase down over time, and restrictions on the amount of money that the NRC can charge industry. The budget caps are expected to ratchet down starting, I believe, this coming fiscal year. But I am already hearing reports that the NRC's budget may be too low to meet its existing workload.

In February of this year, the NRC Inspector General surveyed 2,800 NRC staff to assess NRC's safety culture. The IG reported that 64 percent of the surveyed NRC employees said they were worried about the NRC's budget and what it might mean for the NRC's future.

My question for you, Mr. Cohen, have you heard similar concerns about the pending NRC budget cuts, and how important is it for the NRC to have the funding necessary to successfully fulfill its mission? Please proceed.

Mr. Cohen. Right, thank you. Yes, Senator Carper, we do share that concern. We have heard both from employees at the NRC as well as some of the advanced reactor developers, who are concerned about constraints. Obviously, the developers are interested in getting things moved through as quickly as possible.

We are concerned about the funding flows. Again, it goes back to the question of credibility and the ability of NRC to do its job, which is really critical to getting this industry back in business at scale. So we do share that concern.

In my testimony, I suggested that the caps that were put in place in the Nuclear Energy Innovation and Modernization Act be revisited and removed, or at least that the ratchet that starts at 30 percent, I believe, of the 2021-2022 request at least be frozen there and not be reduced further.

We are extremely concerned about understaffing at the agency. It can always be more efficient. I know that Chairman Svinicki is working very diligently to improve efficiency at the NRC. But we think overly restrictive funding is not going to help the cause.

Senator Carper. Okay, thank you. I have one more question for you, and then a question for Ms. Roma.

My second question for you, Mr. Cohen, deals with NEIMA and [indiscernible] and advanced nuclear framework. In your written testimony regarding the draft American Nuclear Infrastructure Act, you state that, "this bill proposes some alterations to environmental permitting that this committee must reconsider. These provisions are not necessary and could even be damaging to the future of the advanced nuclear industry."

My question is, Mr. Cohen, can you further discuss for us why you believe the streamlining provisions in the Chairman's draft legislation could be damaging to the advanced nuclear industry?

Mr. Cohen. Thank you. As I said in my opening remarks, Senator Carper, I think the major concern is that this industry needs not only to be safe, but to be perceived as safe. I think at least among the nuclear critics, there is already a view that the modernization that was undertaken in the Modernization Act that moves the agency to a more risk-informed, performance-based

licensing approach is already a step, I guess from their standpoint, it is a step in the wrong direction, from our standpoint, it is a step in the right direction, to move from a prescriptive, burdensome, sort of widget-based review to something that is more like looking at the whole safety case. We already have, I believe, a good framework in place to move things forward faster.

Then there is the FAST Act, or the federal permitting, the Surface Transportation Act Amendments of 2015, that further provide environmental permitting streamlining. These are very significant provisions that apply to the NRC already.

There is a lead agency, there has to be a plan, all the agencies have to coordinate, there is a fixed schedule, you can't deviate from that schedule without extraordinary circumstances. It expands the agency's ability to provide categorical exclusions, which the NRC could do. It establishes a federal permitting improvement steering council, which can make further streamlining initiatives. And then it restricts judicial review of NEPA-related reviews. It is a very substantial streamlining, again, not universally supported, but nonetheless, it is law.

My answer really is that with these two major efforts to clear the way and expedite environmental and safety review already in place, our view is that should be given a chance to

work out. If we have problems down the road, then we will talk about those problems.

I just should say, I am a cofounder of the Nuclear Innovation Alliance, which is an alliance of environmental organizations, academic groups, and developers. I can tell you that this is not what I am hearing that is priority number one for the advanced reactor sector, or even priority number two.

I think that while there might be some perceived gain, I believe that the negative consequences of yet a third major reform on top of the previous two could undermine confidence in the integrity of the permitting process. That is an issue of perception. I think we can argue the merits, but I think at least at a level of perception, this would be a bad move at this time when we are trying to get the industry back on its feet.

Senator Carper. Okay, thanks very much for those thoughtful comments.

Mr. Chairman, when we come back for a second round, I have one follow-up with Ms. Roma and maybe Mr. Cohen on clean hydrogen production at reactor sites, which I think is quite promising. Thank you.

Senator Barrasso. Thank you, Senator Carper.

Right now, we have Senator Capito joining us remotely.  
Senator Capito?

Senator Capito. Thank you, Mr. Chairman. I want to thank

our witness panel today.

Ms. Roma and Mr. Cohen, I have been working in a bipartisan fashion, particularly with Senator Whitehouse, on the Clean Industrial Technology Act, which is to promote the decarbonization of industries that inherently create greenhouse gas emissions, like steel production. Nuclear energy is primarily viewed by the public in terms of power generation.

So, your testimonies touched on nuclear technologies may be applied to industrial non-electric purposes, such as generating heat for use at a chemical facility, or hydrogen fractionization, or desalinization. Section 204 of the American Nuclear Infrastructure Act explicitly directs the NRC to review potential regulatory barriers to such deployments.

In your opinion, is the NRC currently equipped to review those applications for deployment of nuclear technologies outside of the spaces of power generation and medical research reactors, and what obstacles do you think they might face in that regulatory space? Ms. Roma, I will go to you first.

Ms. Roma. Thank you. That is a wonderful question.

The NRC is well-equipped to probably handle a commercial, non-power reactor design that is similar to a research reactor that has already been deployed in the United States. So that would be a smaller version of a light water reactor design. They have an existing guidance document that applies to that.

They are looking at them now and applying them to the medical isotope community that is looking at getting licenses.

I think if you look at how the NRC regulations would apply to the non-power uses with advanced reactors, I think that that is an area that the NRC should further evaluate to do a gap analysis of where its regulations may fall short, or what guidance may need to be examined.

I am just going to give a quick example. I was working with a medical isotope client that was looking at preparing a commercial, non-power reactor application. So really, a first-of-a-time type application. One of the things that we rolled up and sleeves and realized, is how many times the NRC makes a distinction between a power reactor and a non-power reactor that doesn't really have a regulatory necessity.

The NRC just implemented a regulation thinking that, well, the only types of reactors that would do this are large-scale, light water, nuclear power reactors. So they put the word power in there. For example, a medical isotope production facility building a commercial non-power reactor can't apply for a combined operating license. It needs to submit a separate application for a construction permit, and then another application later for an operating license.

Just looking at the regulations and evaluating ways that there could be unintended consequences from the ways that the

NRC worded their regulations at the time of the rulemaking I think would be helpful to ensuring when those applications come in, the NRC is prepared to evaluate them.

Senator Capito. I am going to skip Mr. Cohen. She gave a very good answer there, very complete answer there, because I want to get a chance to get a last question in.

There was an article in the Wall Street Journal yesterday, you can probably see the headline here, Saudi Arabia, With China's Help, Expands Its Nuclear Program. My question is, as you read through the article, you couldn't distinguish what the actual usage was going to be for the help that they are getting from China. Is it power, is it a weapons program? A lot of unanswered questions there.

I guess my question is, where do you see, since these reactors last for maybe a hundred years, this relationship of Saudi Arabia and China in the nuclear space, do you feel that is an issue? How are you all looking at that? Mr. Cohen, I will go with you first. I am going to ask everybody that question.

Mr. Cohen. Senator Capito, we don't necessarily focus as much on the geopolitics of nuclear as some of the economic issues. But yes, I think it is a concern, and I would just flip that around and say, China is going to do what it is going to do. It has a mercantile model of export, often at below-cost just for strategic reasons.

We are not going to do anything about that. I think we need a better mouse trap, and we need to be talking to our allies, An examples is what we did in the United Emirates in collaboration with the Korean institutions to build a western, or at least an OECD-originated reactor, and under sort of western standards, with western non-proliferation agreements and so forth.

So I think our view is that the only way to win this one is to really come with a very robust, cost-effective product, but also bring along the kinds of things that are in this bill in terms of international coordination of licensing. The Chinese will do what they do, and we may not win every commission. But we are not in the running right now.

Senator Capito. Right. Thank you.

Mr. Goranson, do you have a comment on that?

Mr. Goranson. Senator Capito, yes, I do. As you have mentioned in your question, is that once a nuclear power plant is built into another country, that creates basically a hundred-year relationship between those two entities.

This is another case for, as I mentioned in my testimony, as that were countries like China can use this to leverage foreign policy objectives. The Saudis have been a traditional ally of the United States for quite some time, but bringing the Chinese in and giving them this opportunity to be able to have

such a critical part of their infrastructure under their control could create some challenges in our foreign policy as we move forward in the future with our foreign policy objectives.

As far as an answer as to how to resolve that, I am not an expert in foreign policy myself. But I will say that this is another example of why we need to be cognizant of these state-owned enterprises where they can go in and use the leverage of their government to be able to compete. The U.S. companies did try to compete for that nuclear technology in Saudi Arabia and also other nuclear fuel supply as well. As you can see, the state-owned enterprises have an edge over the United States.

Senator Capito. Thank you.

Ms. Roma, do you have a comment on that?

Ms. Roma. I do. Thank you, Senator. To answer your question directly, does this concern me? Yes, it does concern me that China is providing nuclear technology and services for Saudi Arabia.

I think it gets back to the crux of my testimony that underscores the importance of the U.S. asserting global leadership so that we can ensure that we have the highest level of safety and nuclear non-proliferation standards in place.

To echo the statements of the other panelists, particularly Mr. Cohen, what can we do about it? Well, right now, not much. We are not well-positioned to compete against China,

particularly in areas like Saudi Arabia, because we don't know if they want to build any of our plants.

That is why it is the importance of implementing the provisions of ANIA and ensuring that we can get out in front, particularly on these emerging technologies where the U.S. currently has the global lead in advanced reactors and in fusion facilities as well. We are going to lose the next generation of lead that we have because we are not going to be able to get our act together in time to compete against Russian and China.

Senator Capito. Right, and as we repeated, these are generational decisions that are being made, so thank you all very much.

Thank you, Mr. Chairman.

Senator Barrasso. Thank you, Senator Capito.

Senator Cardin?

Senator Cardin. Thank you, Mr. Chairman. Let me thank all of our witnesses for their testimonies. This is a really important hearing.

In Maryland, nuclear power is very important, as it is around our Country. We have two nuclear reactors located at Calvert Cliffs. They produce about 20 percent of our State's electricity needs, and 55 percent of our carbon-free electricity needs. It is an important source of energy in the State of Maryland, and of course, in our Country.

I want to just underscore the point that Senator Carper made earlier with Mr. Cohen, and that is, I am proud of the workforce of NRC located in the State of Maryland, headquartered in the State of Maryland. They are understaffed, and they are losing a lot of their expertise.

So I think the budget support here is an important part of what we do in regard to modernizing our nuclear energy fleet, as well as preserving our aging fleet.

Senator Barrasso, you are absolutely right. This is an issue that has brought our committee together. We have worked in a bipartisan manner in order to advance nuclear energy in this Country. I am proud to be part of that team.

I know your bill was introduced as a way to advance our mutual efforts. You hear that we have concerns in regard to the environmental aspects, and in regard to the traditional role of the NRC. So we look forward to working together to try to come to grips with the differences so that we can continue to advance this issue in the best tradition of our committee.

Your bill deals with several aspects, including how we deal with advanced nuclear reactors, but also what do we do in regard to our existing nuclear fleet. Senator Cramer and I have introduced a different approach dealing with our fleet, in that it provides an investment tax credit of 30 percent so that we can maintain our current nuclear fleet.

The challenge today is the cost of energy. As we know, it has fluctuated, declined, and it has made nuclear power much more challenging. The tax codes were developed at different times, giving certain incentives to other forms of energy that the nuclear industry does not enjoy.

My question to the panel is, how critical is it for us to deal with the economics of the pricing of energy as influenced by the policies of our own Country in the tax code and elsewhere that could affect the ability to have economical nuclear modernization done for energy?

Mr. Cohen. Mr. Chairman, I would be happy to take a swing at that, if you would permit.

Senator Cardin, I agree with your statement of the problem. Basically, the bogey right now in the market is low-cost natural gas, and we know that several, many units are not able to compete with that carbon-emitting fuel.

The academic answer is that we need some sort of carbon policy that would level the playing field. That is happening in some States, but it is anyone's guess as to when that might happen federally, so we are really dealing with second-best solutions.

CATF has been very active in States like New Jersey to enact provisions that would do much like what your bill did to recognize the value of the carbon-free energy from the nuclear

units and enact a sort of a per-unit or per-kilowatt hour payment.

That is the reason we support the section of this draft that would provide for a federal version of that. It is, frankly, catch-as-catch-can as you go around to the States. As the opening anecdote suggested about Illinois and Ohio, there is often mischief that can occur when some of those deals are done. So I think a very transparent federal support mechanism for existing nuclear units to run makes a lot of sense.

The questions of where the money comes from is, of course, important, but the design that we see in the draft is fundamentally sound. Our only comment on there is that we would, the draft as written doesn't really put a cap on that payment. There should be some reasonable upper cap on the payment. You don't want to have something completely that is out of whack, with say, the value of the carbon avoided.

We recommended actually using as a possible benchmark the 2.5 cents per kilowatt hour subsidy for wind that is currently in the production tax credit. It has to be transparent; the public needs to understand that someone is reviewing these numbers, and we are not just giving out goodies without making sure that they are needed.

Finally we recommend that we defer caps on roll, because EPA is not really an economic regulator, and they may not be as

confident to review the numbers.

Anyway, Senator Cardin, that is a long answer, but fundamentally, we support this kind of federal intervention because we think doing this State by State is going to be a very long process, and we are probably going to lose a lot of carbon-free energy in that process.

Senator Cardin. I would just comment that there are different ways to do it, different opportunities in Congress. Sometimes we have the opportunity through the tax codes sometimes through appropriation and legislation. So I think I have to recognize there is an imbalance right now of carbon. I support that, I think that makes sense, but we have to look at what it is feasible to level the playing field so that nuclear power can compete, and therefore investments will be made in its modernization.

Mr. Chairman, I don't have a clock in front of me, I don't know if I have used my time, but if either of the other two witnesses want to respond, I would appreciate their views on this.

Ms. Roma. Thank you. I agree with the sentiments that Mr. Cohen just expressed. I think that moving this to the federal level from the State level would ensure some consistency. I think it provides much-needed support that recognizes the carbon-free benefits that nuclear power provides that it is

currently not compensated for. There are probably a number of different ways that that support could happen, whether it is a production tax credit or through this EPA measure that is set forth in ANIA.

Senator Cardin. Thank you.

Mr. Goranson. Senator Cardin, I will add that with respect to, from my perspective, if we go back and look at the President's Nuclear Fuel Working Group Report, in that report it also states, one of the important portions of part of that is to value what nuclear power brings to its generating, that is, the clean air side of it, the baseload, the 24/7 power, is vital to maintaining a strong economy as well as vital to supporting our Nation's growth and place in the world.

So that is why the UPA has taken such a strong support for Section 301, which provides some of that support.

Senator Cardin. Thank you, Mr. Chairman. I thank the witnesses.

Senator Barrasso. Thanks, Senator Cardin.

Senator Cramer?

Senator Cramer. Thank you, Mr. Chairman.

Thanks to all of our panelists. I have been sitting here the entire time listening to every single word from my colleagues on both sides and all of the witnesses.

First of all, I am encouraged by it. Second of all, I

continue to ask the question, how did we let this happen? How in the world did America ever allow its superiority in this realm slip away? Not just slip away, but we acquiesced it to our most dangerous adversaries. I think we need to get it back before it is too late.

One of the thoughts that has come to mind as I have been listening to some of this, Ms. Roma, when you were talking about the stockpiles or the reserves, whenever I bring up reserve to people, there are people that will say, oh, but we have several years of reserves. We don't really need to worry about that.

Then I think about the state-owned competitors that we have, who are run by emperors for life. Maybe you could just speak to the long game if you will, the importance of this, not just in the near future, but the consequence if we don't stop the bleeding soon.

Ms. Roma. The question that you asked, how did this happen, is something that I have studied extensively for my entire 17-year career in this field.

I think that there are a lot of different factors that went into it. But one of the things that strikes me is that there seems to be a lot of complacency. There seems to be just an acceptance within the industry that we are the best, and of course, everybody wants the best, and we operate the best plants. So by golly, we can build the best plants and design

the best plants, and the rest of the world will want our plants.

That happened in the last generation of build. But then the U.S. stopped building, and other countries continued to build. Countries like China are fairly newer to nuclear, and now they are doing lots of building, and so is Russia. They recognize, probably because of the integration of their state-owned enterprises with their government, that if we can export this technology and embed ourselves in critical infrastructure in foreign countries, then we have the ability to exert our geopolitical influence.

I don't think that the United States was looking at it with that holistic a viewpoint. So I think that is where we are now, and we just need to accept that fact. One of the best advantages that we have is we continue to operate the most efficient fleet and the largest nuclear fleet in the world. We need to continue to do that in order for other countries to want our input and our advice on what are the safety standards, what are the nonproliferation standards, what are the technology best practices, what are the operational best practices that we should implement.

If we don't operate as many nuclear power plants as we do, and we don't operate them as well as we do, they will stop asking us.

The second aspect is, right now, the United States, through

our incredible universities and our national labs, we are at the forefront of advanced reactor development. We have numbers and numbers of advanced reactor initiatives. We have numbers of fusion companies that are looking at building demonstration facilities and commercially deploying their technologies. They are struggling to do that in the current climate that we have.

So anything that we can do to help the NRC do a more efficient review, to put accountability on them for how much money it costs to do a review for a reactor design, and making sure that the resources they spend are achieving the objectives that they intend for it to achieve, such as in its environmental reviews, those are all good things, and those all better position us to be able to help with developing programs around the world.

Senator Cramer. This is so fascinating. I going to skip all my rate design stuff. I am a former regulator, nerd, but you just touched on something that I think is really, really critical. I think this is applicable to lots of things that we do in the United States.

I mean, China and Russia have taken our invention of hypersonic missiles, for example, and they are running with it while we are catching up. So often we do this.

I would rather export our excellence than import their mediocrity every time. But both of you have talked about, but

all of you have talked about the supply chain. The supply chain that I worry the most about compromising is the intellectual supply chain. We are going to wake up one day, and nobody, to your point about the expertise, it is not going to be available because the opportunities weren't available.

Maybe in the remaining moments, you could speak to that, sir.

Mr. Goranson. Senator Cramer, yes, I can. You are right. What we see here is our critical talent, what I consider one of the most key parts of our industry. I can speak from the uranium industry that, over the last few years, we seen a lot of people come in through the domestic uranium industry, new hires, people right out of college.

Unfortunately because of our competition with these state-owned enterprises, as recently as last April, I actually had to go tell talented, experienced people that their services were no longer needed because of market conditions created by our current situation. Unfortunately, since 2013, I have learned that that story doesn't get easier by experience. I have had to do it several times. It has been a decline that has been very dramatic and very marked.

What is important, I see, is that we have to keep the talent, we have to keep the people. If we don't have, speaking from the uranium mining perspective, there is no school of

uranium mining you can go to. It is a skillset and an industry that is unique amongst the different extractive industries simply because we deal with uranium.

So we have to have trained people. We want to do it safely; we want to be doing it in an environmentally protective manner. That means we have to have smart people who understand our regulations and understand how we do things on a regular basis to not only produce uranium, but also do it safely and efficiently.

Senator Cramer. Thank you, Mr. Chairman.

I am well over my time, but maybe in another round I will ask Mr. Cohen about some rate design things. I think reliability, for example, dispatchability has value that should be recognized in rates as well as the environmental pieces of it. So with that, thank you.

Senator Barrasso. Thank you.

Senator Whitehouse?

Senator Whitehouse. Thanks, Chairman.

Just to nail down a few things that I think are well-established in this hearing, there is value to the carbon-free nature of electric generation that does not create carbon emissions. Does anybody disagree with that proposition, or is that agreed?

Mr. Goranson. Agreed.

Senator Whitehouse. Agreed, and the nuclear industry is now ordinarily not compensated for that value. Does anybody disagree with that statement? Agreed, okay.

And finally, the effect of that failure to compensate the industry for that value creates what an economist would call a market distortion. Does anybody disagree with that? So that is our situation. We have a market distortion that hurts the nuclear industry because it is not compensated for one of the assets of its power. Correct? Yes, yes, yes? Okay, good.

I think off of that platform, we have got a lot of opportunity to build here in bipartisan fashion. I would like to drill down now a little bit into the question of nuclear waste storage. That, I think everybody will agree, creates cost, creates hazard, creates danger. It is a liability in an economic sense to have nuclear waste stockpiled at our facilities. Correct?

So there is value to finding a way to solve that problem. The question that I have is, as we embark on nuclear innovation, how can we make sure that the innovators see the value of that? Because if that is not on the table, then what you are going to see is a nuclear innovator who will say, I am going to put my money, my expertise, and my backing behind this power that costs 99 cents because it is cheaper than this other power that costs a dollar and one cent. They will save the two-cent difference.

But if the dollar and one cent used the nuclear waste stockpile, that is a huge value to America and to society. And a little bit like our problem with the market distortion of not pricing carbon, not pricing the value of drilling down on nuclear waste stockpile and turning it into a positive use, I think risks create on a smaller scale the exact same economic distortion.

So let me ask Mr. Cohen first, since he is coming electronically, am I right that that is a problem? Is that something we should continue to work on to find an economic solution, so that the direction of innovation is not distorted away from the value of solving, at least to some degree, the nuclear waste stockpile problem?

Mr. Cohen. Yes, and Senator Whitehouse, I absolutely agree with your approach. I applaud the provision of this draft that would actually require an annual report to Congress to quantify that liability and describe some of the opportunity. Yes, we do need to think about nuclear waste, spent fuel, as a potential asset.

The first thing we can do though, I think, is sort out the issue of the repository. It doesn't need to be first, but it should at least proceed in parallel. Regardless of reuse of spent fuel, there will be a residual amount, probably a significant amount, that will need to be dealt with and isolated

for many, many years.

Senator Whitehouse. Yes, that is a separate and larger issue. I am trying to focus on the innovation direction piece, here. Ms. Roma?

Ms. Roma. I agree that it is important to consider the spent fuel considerations for innovation. Two points, just to add. One, a number of the advanced reactor technologies that are under development embed in their commercial case the spent fuel consideration. Having sat through investor meetings with private equity and venture capitalists looking at investing in them, one of the first questions they say is, well, what about the waste?

Senator Whitehouse. Yes.

Ms. Roma. And so a lot of them are looking at, can we use spent fuel, can we use natural uranium, so we don't have high-level nuclear waste on the back end coming out? So, it is embedded in a number of these designs, but not all of them.

Senator Whitehouse. Yes. If you are a utility buying, then you have this incentive. If you are not, then you don't, and so it is not a complete market response, it is only in those specific cases, correct?

Ms. Roma. No. For any advanced reactor designer, who aren't necessarily looking at just selling to utilities, they actually consider it in their design because they have to go and

sell this to customers, and customers are like, well, what about the spent fuel?.

Senator Whitehouse. And some of them will be utilities?

Ms. Roma. Yes. Some of the will be utilities. Some of them won't be. Some of them are intended to be foreign countries that have no nuclear power programs right now and won't be able to handle the nuclear waste. So that is why they are trying to consider it as part of their commercial case. But some of this is pie-in-the-sky technology advances that they are hoping to implement, and they haven't yet.

But to your second point about innovation, refer back to my earlier comments that we are at the forefront of advanced fission and fusion technology development. America is a great innovator. When it has the support it needs, it can do leaps and bounds. So I would urge everybody to consider any financial support for innovation for spent fuel, ways to handle spent fuel.

Senator Whitehouse. My time is up, so let me interject here, ask Mr. Goranson if he wants to add something, to add it as a question for the record, since my time is up.

But I do want to say, as somebody who has watched this for a while, there have been times when our leadership in this space has left a lot to be desired. There have been times when our innovation has not been so great. A lot of our existing reactor

fleet is big, cludgy, complicated, non-standardized, inefficient, not great design by anybody's standards.

I believe that is because they were built in a cost-plus environment, in which the utilities figured, spend whatever you can get away with, because you are going to earn a return on equity on whatever you can legitimately put into this thing. That is not a path to innovation.

Now, I think we are on a much stronger path to innovation. But I think we have got to be candid and clear that America has not always been a great and successful innovator in this space. There has been a lot of cludgy stuff that got built, and there have been a lot of failures as a result.

So let's make sure innovation really works. Thank you.

Senator Barrasso. Thank you, Senator Whitehouse.

Senator Braun?

Senator Braun. Thank you, Mr. Chairman. I have been here a year and a half, and in the general context of what we are talking about, I have always been interested in the environment.

I think Sheldon's comments on finally starting to quantify these external costs makes a lot of sense. We started the Climate Caucus here in the Senate less than a year ago, and I probably worked as hard on it, maybe not quite as much as trying to reform healthcare. The healthcare industry is fighting everything that we are trying to do. It does not want to reform

itself.

My observation has been across the different parts of energy, from agriculture to power generation, transportation, and more broadly than that, technology, finance, they are interested in being part of the solution.

So I think my frustration is that we have got something that does not emit carbon dioxide. But it seems like we have got a large gulf between light water, the current fleet, which seems to be operating fairly safely across the world, at least, recently. How do we get from where we are to where we need to be by 2050?

The first question would be for Ms. Roma. What can we glean from what France has done, to where they are now, I think, close to 80 percent of their power generation? What have they done that we haven't, and is it just that they are taking the risk? Please comment on that, and then I have a question for Mr. Cohen.

Ms. Roma. France, I believe, gets about 80 percent of its power from nuclear power. It did that because it needed energy security and independence, and it figured if it builds all these nuclear power plants, then it controlled its own power, and didn't rely on other countries for its power. That is how they got to where they are.

We had a lot more alternatives, and we had a lot more

natural resources in the United States, and so we have a more diverse energy portfolio.

Senator Braun. Is there anything we can learn from them specifically since they have put so many eggs in one basket? Will they try to migrate from light water to advanced technology to kind of hedge their safety bets over time?

Ms. Roma. I am not sure if they are going to migrate to advanced reactors. They are considering it, but they already get so much power from their operating fleet, which can operate for decades without having to develop a new technology. One of the lessons that we could look to for France is how they handle spent fuel, how to reduce its volume and size and storage.

Senator Braun. Thank you.

Mr. Cohen, in a more general sense, how do you see that interplay between our existing fleet and advanced technology, nuclear technology? What is your vision of where that can go between now and 2050? Because to me, it looks like it is the one bird in the hand that we have.

I think we are already running into maybe bottlenecks as it relates to solar and wind, and it has got other disadvantages. Kind of give me your vision there of how you see that reliance on our current fleet, and advanced nuclear technology, and what percentage it would be of total energy generation by 2050.

Mr. Cohen. Well, if we don't get busy, it is going to be a

very diminishing share, I am afraid.

Just going back to your previous question, Senator Braun, the secret to the French nuclear program was standardization, basically, settling on a design and building the same thing over and over again with the same people. We never did that in the United States. We actually had increasing costs rather than declining costs, as France was able to do.

So the key is getting back to that world where you are not building one-off big units that have to be built mostly onsite. I think my answer to you is basically for the near term, in the next ten years, we should be doing more export of conventional reactors. That is the kind that are being built right now in United Emirates. But innovation really offers us a number of opportunities to reduce material inputs to these units, making them much more manufacturable, much more standardizable, if that is a word. When we can get into that mass production mode, we are going to have a much better shot at scaling.

So that is where the innovation is really important, and that is a long discussion about what specifically needs to happen in the R&D space. But fundamentally, my view is that we do need a different kind of business model and probably technology model to get to the scale that we need to do in the time that we have.

Senator Braun. Thank you. That makes sense, and I think

that we can learn a lot from what we see works elsewhere if we want to hit the target by 2050. Thank you.

Senator Barrasso. Thank you. Senator Booker?

Senator Booker. Thank you very much, Mr. Chairman, and to Ranking Member Carper, as well.

I just want to say some introductory comments at the top, that I share the bipartisan remarks that have been said at the beginning. It is been an honor to work on this legislation. I have seen this as a space of urgency since I came to the Senate.

But we have, as Senator Whitehouse put it, terrible market distortions that undermine the value and the important part of our energy blend that nuclear is. In fact, it not only has an important role, I think it has a critical role as we transition as a Nation to net-zero carbon emissions as quickly as possible. If we are going to avoid the worse impacts of possible climate change, nuclear has got to be a critical part of that.

It also has a national security issue as had already been said in this hearing of the challenges that we see from foreign adversaries that have taken our singular positioning in this kind of energy away from us as they have charged to embrace this while we have gotten entangled in a lot of things that undermine nuclear energy.

I believe there are two really critical sets of policies that the Federal Government should be focused on now if we are

going to move forward. That is first, we need to enact policies to prevent the existing fleet that we have of reactors from shutting down permanently, and our existing fleet of reactors that do provide that majority of carbon-free electricity that is currently generated using these plants would be a massive step backwards that we cannot afford to take in the fight against climate change.

Second, we need to enact policies that facilitate the development of next generation advanced reactors. This is a discussion at this hearing which I think is of such urgency. Advanced nuclear reactors have the potential to be even safer, more economical, generate less waste than existing reactors.

That is why I am so proud to be a part of the bipartisan work we have done in this committee in recent years related to nuclear energy. I really believe that with the incorporation of some of the feedback that Senator Whitehouse and myself have, as well as from stakeholders, we can now really craft this important piece of legislation and move it forward out of committee in a very bipartisan manner.

I just want to ask really briefly in the two and a half minutes I have left, for Armond Cohen. Mr. Cohen, can you just explain why the Clean Air Task Force believes that it is important to have nuclear energy as a part of that mix as we try to de-carbonize our electricity generation as quickly as

possible?

Mr. Cohen. Certainly. If we are going to get to zero by mid-century, you do the math, and you say, we have to basically build carbon-free energy at five to ten times the rate that we ever have in the past. Those numbers are really daunting.

If we just rely on one source, as good as solar and wind are, and we support massive expansion of those resources, we are racing against time. We believe that nuclear could provide a lot of clean power very fast.

I gave the example of France earlier. If we could get to that kind of trajectory, we could provide a very significant chunk. So it is all about scale and time for us, nuclear being a very power-dense resource. That is why we think it needs to be in the running, but we have a way to go to get there.

Senator Booker. We have talked a lot about electricity generation, and of course the important role it has. But can you also talk about sort of the non-electric purposes, industrial applications, productions of zero-carbon fuels, and just hydrogen? Can you explain why it is important from a climate change perspective to focus on these elements of application of [indiscernible] through our [indiscernible]?

Mr. Cohen. Right. It is important, Senator, to recognize that electricity is only 25 percent of total, final energy consumption in the United States and the world. The other 75

percent is basically molecules that get burned. Right now, it is oil and gas, fundamentally.

So, if we dealt with electricity, that would be great, but then we have industry and transport and building heat and all kinds of other applications. So we need a zero-carbon fuel to substitute for those molecules and for the things we can't electrify. We are going to lose 75 percent of the game if we don't have that.

Nuclear is uniquely suited, for reasons we go into in the testimony, for that hydrogen production in particular, because we can supplement the electrolysis with high-temperature steam, and so forth. It is very power-dense, can scale quickly. That is why we need to think about non-electric applications of nuclear.

Senator Booker. Ms. Roma, really quick, if I could just ask my question, could you explain real quickly, again, this international perspective is so urgent. Why is it important from a non-proliferation perspective for this legislation to facilitate the U.S. exercising more of a leadership role internationally related to advanced nuclear energy?

Ms. Roma. One of the best tools that we have in our non-proliferation toolbox is exporting nuclear technology because with that can come the U.S. standards that go with that technology about how it can be used and where it can be used. I

will just give you an example.

If you have a U.S. origin nuclear reactor, even if it goes to another country, and they further develop it, and then they try to export it to a third country, U.S. standards go with that technology all the way, including what it can be used for and where it can go, making sure that the country that is the recipient of that technology has signed onto the highest level of nuclear non-proliferation agreements. If we don't have our hands in that technology, we don't really control where it goes or what somebody does with it.

To go back to Mr. Cohen's comment earlier about China and Saudi Arabia, does it concern us? Yes. Can we do anything about it? No, because what they are doing is perfectly legal, subject to the international agreements that they have committed to. So we lose our ability to have that voice in the development of technologies and how those technologies are used and where they can go.

Senator Booker. Thank you very much.

Mr. Chairman and Mr. Ranking Member, again, I am just really grateful to be a part of this partnership with you all to try to advance what I consider utterly urgent for national security reasons, for the planetary challenges we have in climate change and more. This is an exciting area, and I hope we can continue to make strides together in a bipartisan way.

Thank you.

Senator Barrasso. Thank you so much, Senator Booker, for your leadership on this. I agree with you entirely. You might not have heard my opening remarks, but I made reference specifically to your good work in helping in our efforts here, so thanks so much, Senator Booker.

Senator Van Hollen?

Senator Van Hollen. Thank you, Mr. Chairman, Ranking Member Carper, and to the witnesses today.

I also share and believe much of the views that were expressed by my colleague, Senator Booker, during his questioning. I do want to follow up with the last issue he raised with respect to nuclear non-proliferation. While I support the development of advanced nuclear reactors as part of our own energy mix and also would support exporting that technology, the export of that technology has to come with that important caveat that it is consistent with our nuclear non-proliferation goals. There are some aspects of advanced nuclear reactors that could increase the risks of proliferation with the development of the paleo, the more highly enriched uranium, and also as part of the reprocessing efforts, the plutonium.

So let me start with Mr. Cohen. Mr. Cohen, do you agree that we have to address those additional risks? What kinds of measure do you think we should put in place?

Mr. Cohen. Yes, I agree, Senator, we do have to be mindful of that issue. I think the specific opportunities here and challenges are first of all, as was mentioned, if we are in the game, we have a better control over what the product is and how it is deployed. If we are not in the game, we don't, and our adversaries will set the rules.

Second is that specifically, the bill contemplates international harmonization and coordination of licensing. I think that can be expanded to include international cooperation over non-proliferation.

Third point is that some of these designs actually may pose less proliferation risk than more. For example, many of them are much more efficient, so it means that the amount of fissile material involved is lower.

Finally, as we discussed earlier, there are a lot of opportunities for R&D on the back end of the fuel cycle. There is no such thing as a completely proliferation-resistant reactor, let's just be honest, but there are many steps we could take as part of this innovation process to ensure that we have got as tight a rein on that problem as we possibly can.

Senator Van Hollen. Well, I fully agree with you, that we should encourage and incentivize the companies that are developing these advanced reactors to build in, to the maximum extent feasible, those protections against non-proliferation.

Would you agree that we could address that issue with an amendment to this draft proposal that would say that countries that are receiving these advanced reactors should implement the additional protocol of the IAEA? As you know, over 150 countries have signed that. It seems to be a basic protection that we could take to protect our non-proliferation efforts. Could you comment on that?

Mr. Cohen. Senator, I am not the staff non-proliferation expert. I would prefer to get back to you in writing, but that is the general direction of our program, is to try and socialize all of the newcomer countries into the existing international framework.

Senator Van Hollen. Ms. Roma, can you comment on that? You mentioned in your remarks the importance of protecting against nuclear proliferation. Can you talk about writing in a requirement that recipient countries agree to the additional protocol with the IAEA?

Ms. Roma. Senator, I am going to have to look into that and get back to you in writing. Namely, I would just want to evaluate more closely the existing framework that we have with our Section 123 agreements and our Part 810 process, and the restrictions and considerations that go with that to see what additional protections a write-in like that would afford. I just need to look at it more closely.

Senator Van Hollen. Sure. Well, the gold standard, which is what we have been applying in many of our recent agreements, would require recipient countries to sign the additional protocol with the IAEA to have that enhanced protection against nuclear proliferation.

Thank you for your comments. I look forward to your written responses.

Mr. Chairman, I look forward to working with you and the Ranking Member to address that aspect of this. Again, I am a proponent of nuclear energy as part of the mix, so long as we maximize the safety component, including the safeguarding against nuclear proliferation to the extent that we can. I think the IAEA additional protocol has been an important measure that we should ensure that people are complying with.

Senator Barrasso. Thank you, Senator Van Hollen, for your continued leadership and interest in this important topic.

Senator Carper, I know you had a few additional questions.

Senator Carper. Thanks, Mr. Chairman. It has been an important and, I think in many respects, a fascinating hearing. We are grateful to you, Mr. Chairman, for holding it, to our staffs for helping to put it together, and to our witnesses for being here with us today.

A long time ago, I was a Naval flight officer living in California, and stationed at a base about halfway between San

Francisco and San Jose right off of Route 101. It was called Moffett Field Naval Air Station. We shared half of that base with NASA, a big NASA installation on the other half of our base.

I was back visiting Moffett field, happened to be at Mountain View, visiting a technology company years later, and I revisited Moffett Field. It is no longer a Naval air station, but NASA is still there.

I happened to visit a facility actually using one of the buildings on the Moffett Field side, where they were doing some NASA experiments. They were trying to figure out how to create electricity on Mars. It was a NASA-funded operation, which led to the development of a company now called Bloom Energy, which is headquartered not too far from Moffett Field in California.

A tropical storm roared up the east coast yesterday, leaving a lot of wreckage and mayhem in its path. We almost never have tornadoes in Delaware. We did yesterday, and the weather forecasters tell us, the meteorologists tell us it is not going to be the last hurricane that is going to come visit us this summer. There will be plenty more, and we are going to lose power during those hurricanes, as we did yesterday in Delaware and other parts of our Country.

There is a company now that is headquartered in California, but they actually have a considerable manufacturing facility in

what used to be our Chrysler plant in the south side of the University of Delaware. It is called Bloom Energy, and they take hydrogen from natural gas and they turn it into electricity. Yesterday, when the electricity went out in a number of places up and down the east coast, they were able to restore the electricity right away by using these "bloom boxes."

It would be great if somehow, the hydrogen that is used in conjunction with fuel cells in these bloom boxes, it would be great if the hydrogen could be clean hydrogen, and not just come from carbon sources, like natural gas. I understand, I think one of you actually mentioned in your testimony, actually mentioned something about clean hydrogen production at reactor sites.

I am sitting here thinking, is there a way to not only create through these bloom boxes, electricity for, could be a housing development, could be for a hospital, it could be a shopping center, is what they were using them for all over this Country and around the world now. But the bloom boxes could be an even more environmentally friendly electrical source of energy in this Country if we could somehow come up with a clean hydrogen source, and nuclear power plants might somehow play a role in that.

Ms. Roma, would you just respond to that? Is that a pipe dream? Is that something that is realistic? I would welcome

your thoughts, along with Mr. Cohen.

Ms. Roma. No, I don't think it is a pipe dream, Senator, I think it is realistic. I think a lot of the non-power applications of advanced reactors are truly remarkable, from medical isotope production to water desalinization to heat processes, anything that you need to burn carbons for, hopefully can be replaced with advanced reactors. That is why I am in this field and excited about it.

Senator Carper. Same question, Mr. Cohen, do you have any thoughts on clean hydrogen production from the nuclear power industry?

Mr. Cohen. Yes, Senator Carper, definitely not a pipe dream. In fact, the Department of Energy right now has four demonstrations with four separate U.S. power companies to do precisely that, to test out a use of nuclear for electrolysis. As I mentioned earlier, the advanced reactors might even be better at doing that because they have higher heat, which will make the electrolysis process more efficient. So a lot of folks are chasing that right now. It should be part of the innovation process.

Our recommendation, although it is not, this committee doesn't have jurisdiction over the DOE R&D budget, but we are separately developing proposals to really put that whole effort of nuclear to hydrogen on fast forward.

Senator Carper. That is great.

Mr. Goranson, I don't want to pass you by if you have something you would like to add on this, you are welcome, and thank you.

Mr. Goranson. With respect to using nuclear power as a source of clean hydrogen generation, I think from my perspective I think it is an ideal way to do it. In fact, I was thinking here while you were raising it, it was raised by a science fiction writer 20 years ago, about doing that. To see some work being done right now to make it come to reality is, I think, it is an important thing to do.

Senator Carper. Good. Thanks for that. Mr. Chairman, I was handed a note by Lauren, who is sitting right behind me. The note says, France is reducing its dependency on nuclear power. Its goal is to reduce that dependency from 80 percent to maybe 50 percent by 2035, investing in renewables, and that is all well and good, and we commend them for going reliance on renewables.

We are seeing a growing reliance on renewable here, too, and we are seeing a dropping reliance on nuclear, which is concerning to a lot of us, Democrats, Republicans, and Independents, for a variety of reasons that we have discussed here today.

The nuclear industry, as I said earlier, has to bring their

A game to work every day, and in several instances that I have described earlier, they haven't, and I have been very disappointed with that. Having said that, there is still a lot of potential here, and it is important for us to seize the day. I look forward to working with you and our colleagues that are here and those that aren't to achieve that.

This won't surprise you, Mr. Chairman, but before this hearing ends, I want to ask for unanimous consent to submit for the record some statements from groups who have a real interest in these issues, too.

And with that, our thanks to the witnesses, great to see you all, and thanks to our staff for helping us pull all this together. Thank you. We look forward to following up with you.

Senator Barrasso. Well, thank you, Senator Carper. Without objection, those are submitted for the record.

[The referenced information follows:]

Senator Barrasso. I also have some unanimous consent requests for items for the record. One is my August 3rd, 2020 op-ed entitled "The Future of Nuclear Energy is American;" a July 17th article from the Energy Information Administration entitled "U.S. Uranium Production Fell to an All-Time Annual Low in 2019;" a July 2020 report from the Columbia Center of Global Energy Policy entitled "Strengthening Nuclear Energy Cooperation Between the United States and its Allies;" and a letter from the Nuclear Energy Institute supporting the draft American Nuclear Infrastructure Act of 2020.

[The referenced information follows:]

Senator Barrasso. I want to thank all of you, Ms. Roma, Mr. Goranson, Mr. Cohen, thank you so much for being here today.

Other members of the committee, and you saw a number of members came and left, some of them may submit additional questions for you to answer in writing, and we ask that you please respond as quickly with thorough answers as you could.

As a result, the hearing record will remain open for two weeks. We are so very grateful you would take the time to be with us and to share your knowledge and your expertise.

With that, I want to just thank you once again for your time and your testimony, and the hearing is adjourned.

[Whereupon, at 11:52 a.m., the hearing was adjourned.]