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PGS Nuclear News and Views: Commentaries

2018 Edition

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New Congress Must Think Big on Climate and Nuclear (November 30, 2018)

The next Congress must respond quickly and comprehensively to the significant economic and national security impacts posed by climate change that were forcefully documented in the recent reports of the U.S. Global Change Research Program and the Intergovernmental Panel on Climate Change .

The answer is not the narrowly-drawn Green New Deal , a renewables-only proposal that has generated support from some climate concerned organizations and new members of the House of Representatives. This approach is not in the national interest and a single-path focus will not adequately address the full range of challenges, a key point that Bill Gates clearly articulated in an interview this week.

The new reports make clear that climate change will negatively affect the economic strength of the U.S., the well-being of its citizens, and its security throughout this century. The Pentagon, across administrations, has consistently made clear its serious concerns about how climate will impact is missions and infrastructure.

An effective congressional response must be comprehensive and balanced to be effective over the long term and adapt to evolving circumstances. It must include significant support to maintain and expand research, development and wide-scale deployment of renewable energy sources, non-carbon-emitting nuclear power, and atmospheric carbon removal and sequestration.

Renewables are on the rise and that trend should be fully supported. But, as the world moves toward a clean energy future, no one technology will be adequate to respond to the growing electricity demand in developing nations and the global need to decarbonize the transportation, manufacturing and agriculture sectors, which together account for almost 60 percent of the world's greenhouse gas emissions.

Nuclear energy generates 56 percent of the emission-free electricity in the U.S., roughly triple the amount generated by hydropower and wind, and almost 19 times the amount produced by solar power. The elimination of nuclear power in Germany and its significant curtailment in Japan have resulted in increased carbon emissions as those nations have been forced to rely more on fossil fuels, despite increasing their deployment of renewables.

Nuclear power also plays an important role in strengthening U.S. geopolitical competitiveness, sustaining America's leadership in technological innovation, and improving global security and governance.

The United States Congress has been a leader in responding to global challenges. It can and must rise to meet the serious challenges posed by climate change. A key element of that response must be a recognition that a full range of climate responses and technologies are necessary to bend the carbon emissions curve in the right direction. Time is limited, and renewables-only rigidity is not a sustainable path toward a zero carbon future.

Preserving Global Wealth by Strengthening Nuclear Governance (November 1, 2018)

There is an estimated $500 trillion of global wealth , equity and debt. If the earth warms by 3.7 ° Celsius by the end of the century – a business as usual trajectory – it will swamp that value and more, producing an estimated $551 trillion in damage.

That is the kind of wholesale financial disintegration that should stun every person and policymaker into rethinking their strategy for global decarbonization. No viable option can be dismissed and comfort zones need to be expanded.

The latest report of the Intergovernmental Panel on Climate Change (IPCC), clearly states that limiting the global temperature increase to 1.5 ° C to avoid the worst impacts of climate change will require "rapid, far-reaching and unprecedented" decarbonization action.

But, the IPCC itself equivocates on one of the largest existing zero-carbon technologies – nuclear power – citing its undisputed value but focusing on its perceived drawbacks rather than analyzing how they can be overcome. That produced a backlash from a number of prominent scientists and scholars who complained that the IPCC unfairly treated nuclear power and that it was an essential technology if the panel's extraordinary objective is to be achieved.

Their position is consistent with the determination in MIT's recent report that "realizing nuclear energy's potential is essential to achieving a deeply decarbonized energy future." And it is bolstered by two other new reports. One from the Department of Defense that looked positively on the value of nuclear power for supporting multiple missions and another from Google acknowledging the necessity of the existing nuclear fleet and the development of advanced reactors to reach its own ambitious corporate decarbonization goals.

But, the future of nuclear power can't be driven by climate objectives alone. There are global security, geopolitical competitiveness, and technology innovation objectives to which nuclear power also is essential. But this package of value will not be wholly realized if the nuclear governance system can't adequately adapt to new challenges and technologies.

Nuclear governance is an area where the U.S. and its allies have a significant advantage over its geopolitical competitors, Russia and China. They have been strong supporters and innovators in nuclear safeguards to prevent proliferation, nuclear security to prevent nuclear terrorism, and nuclear safety regulation.

But the nuclear governance system will need to be more rapid and agile in dealing with the coming deployment of smaller, advanced nuclear technologies and new challenges posed by cyber threats, the impact of artificial intelligence, and other emerging disruptive technologies.

A positive development is the IAEA Symposium on nuclear safeguards that will convene next week. It has multiple sessions devoted to the safeguards challenges posed by advanced reactors and the implications of new technologies. The Global Nexus Initiative will be presenting its analysis on Advanced Reactor Design – Ensuring Excellence in Non-Proliferation and Security.

There is no guarantee that the technical reports from this wide-ranging symposium will influence international governmental, corporate and expert policy makers and influencers. But, global decision makers ignore at their peril the clear link between strengthening nuclear governance and the potential wipe-out of global wealth caused by a runaway global temperature increase.

Moving Beyond the Barricades to Conquer Climate Change (October 18, 2018)

The shock-wave generated by the U.N. Intergovernmental Panel on Climate Change's new report on the severity of the climate crisis is rattling the long-standing climate canon, leading to a reconsideration of the required partnerships and the role of nuclear power in meeting this urgent challenge.

In an unprecedented joint Op-Ed , the president of the MacArthur Foundation, one of the largest philanthropic supporters of climate solutions and nuclear risk-reduction programs, and the CEO of Exelon, a leading U.S. energy company with significant nuclear facilities, agreed on four steps to address climate change: "a limit on carbon emissions, the rapid deployment of renewables, the exploration of carbon-capture solutions, and the use of safe and secure nuclear power that does not increase the risk of nuclear weapons proliferation."

Their collaboration marks a dramatic departure from the climate clash that has made meaningful progress difficult. It is a battle that has divided environmentalists, the energy industry and the non-proliferation communities for more than three decades.

The courage shown by MacArthur and Exelon, despite opposition to their partnership, should inspire other leaders in the business, philanthropic, and non-governmental sectors to move out of their comfort zones. Real progress requires that all sides collaborate and rethink their entrenched positions.

This change might be easier for the electric utility industry than the philanthropic and NGO communities, which for the most part view renewable energy as the primary solution to the climate crisis and have significant antipathy toward nuclear power despite its zero-carbon benefits.

Utilities are profit-driven, and they see low-carbon requirements coming at them, if not at the federal level then by the states. Getting ahead of that trend makes economic sense, but it requires a healthy, vibrant, and socially responsible nuclear power industry.

The nuclear industry is not monolithic, and it operates in a global context. At the moment companies in the U.S., Europe, Japan, and South Korea are struggling against the aggressive,

state-financed companies of Russia and China that are winning contracts for new nuclear projects around the world.

Western companies have proven their willingness to work with civil society on climate, nuclear security and related issues, but it is unclear whether Chinese or Russian companies would do so, since they operate in lock-step with the geopolitical objectives of their country. This has profound implications for nuclear and global security because historically the strongest nuclear supplier nations have written the international governance rules. The winner of this competition can be expected to impact the effectiveness of nuclear safety, security and nonproliferation in this century and beyond.

There is some momentum behind the MacArthur-Exelon proposal. The MacArthur Foundation has supported from its pilot-project origins the Global Nexus Initiative , which is a first-of-its-kind collaboration among top climate, nuclear, security, and energy policy stakeholders. It analyzes and develops policy responses to the real-world linkages between climate change, nuclear power, and global security. Exelon has been an important and constructive voice at a number of multi-stakeholder policy conferences on the climate-nuclear connection and has financially backed the Schultz-Baker carbon pricing proposal .

Together, MacArthur and Exelon have created a platform on which this necessary cross-sector dialogue can continue. To take deep root, it will be important for others in the philanthropic and corporate communities to join them and all stakeholders in expending political and financial capital to make this a success - because the price of failure is much higher for everyone.

The IPCC determined that the world has to limit global warming to 1.5°C within two decades, and that achieving this goal will require “unprecedented changes.” This assessment won’t support business as usual. It is a call to arms.

PGS has been a pioneer in the climate-nuclear-security space through GNI and other initiatives. It will be supporting this new “break the mold” collaboration enthusiastically.

The Global Consequences of Absent U.S. Leadership (October 4, 2018)

Three events happened in the last week to underscore that the United States is losing its global leadership edge in the 21st Century – particularly in carbon reduction, nuclear innovation and international governance.

First, the Trump administration stated that it assumes the global temperature will rise by 4 degree Celsius by 2100 – a full two degrees higher than the target set by the Paris Agreement. Then, one of the leading companies designing a next-generation nuclear reactor announced it was closing its doors. And last, a new book made the point that if the U.S. steps away, global policy making takes place without its input. Or, as the authors colorfully say, "if you are not at the table you are on the menu."

The administration's temperature projection was buried in a 500-page draft environmental impact statement related to transportation issues. It offered no remedial action to prevent this increase. The implications of a temperature rise of that magnitude are significant. The Intergovernmental Panel on Climate Change's (IPPC) has noted that temperature increases above 1990 levels can cause changes in precipitation patterns, greater hurricane intensity, and arctic ice melting leading to sea level rise. The U.S. Global Climate Research Program starkly identified the impacts on the country by region and none of them are positive. Some of the projections have already been experienced, including drought and fires in the west, rain deluges in the mid-west, and intense hurricanes in the south-east and Gulf coasts.

On the heels of the administration's revelation came the announcement that Transatomic Power was shutting down its operations. Transatomic was one of the first advanced technology, small reactor start-up companies whose design was intended to transcend todays large, predominantly light water-cooled reactors, while supporting zero carbon emission objectives. There are still over 70 other companies pursuing next-generation reactor technologies. And, one positive development is a new law designed to speed up advanced reactor development and testing in the U.S.

But, the public and private financial support they are receiving in western nations pales in comparison to that provided to state-owned nuclear companies in Russia and China. Indeed, some U.S. companies are looking to China as the test bed for their technology because of these challenges at home.

This advanced reactor class is new, and though many of their principles are based on previous designs, the regulatory, security, and safeguards systems for them are still nascent. This raises important global governance concerns because, historically, the dominant nuclear suppliers wrote the nuclear ground rules. In the 20th century this group was led by the U.S. and its allies. In this century, the key players are increasingly Russia and China.

Two key features of these reactors are their ability to provide distributed power in under-served areas and their flexibility in deployment. Because of their coolant properties and design, they do not need to be deployed near water and can be placed in arid landscapes. However, these features also raise concerns about how they will be secured from insider threats and outside attack, whether effective safety regulations can be developed to coincide with their development schedule, and how their operation will be safeguarded to prevent potential nuclear weapons proliferation. (The Global Nexus Initiative will address the security and safeguards issues in its next report, set for release early next year.)

If the U.S. is not a major player in the advanced reactor game, it is unlikely that it is going to be able to exert significant influence over how these three key issues are addressed, and that has serious global security implications. There is little evidence that if Russia and China become the dominant suppliers of next generation nuclear technology that global nuclear governance will conform to the objectives and principles of the U.S. or its close allies.

Climate, clean energy, geopolitics, global competition, technological innovation, global security, and governance are key pillars upon which the stability and prosperity of the 21st Century rests. At the moment, the U.S. is losing its leadership edge in all these areas.

Civil Nuclear Competition, Climate, and Global Security (September 20, 2018)

We're not winning the war on carbon and the failure to act effectively on this challenge has real domestic and global security consequences. Global greenhouse gas emissions have risen to the highest level in 800,000 years with no dip in sight. It has been a steady climb for over 60 years. While developed nations have driven most of this rise, it is developing nations that are sustaining it in this century.

In the U.S., this summer was a grim reminder of the increasing toll that climate change is taking on the country. Tinder dry conditions in the West fueled hundreds of destructive wildfires that charred more than 10,000 square miles, the smoke from which plagued millions of residents.

In the East, yet another "1,000 year rain event", Hurricane Florence, crushed the Carolina's. This after the massive destruction of Hurricane Harvey in Houston last year and Super Storm Sandy's paralyzing of the New York metro area in 2012.

One of the puzzling aspects of tackling the climate challenge is the unwillingness of many that clearly understand the dire implications of failure to embrace the full solution set. In this selective energy generation hierarchy, zero carbon wind and solar energy sources are fully embraced but equally emission-free nuclear power is at best tolerated at current levels or outright opposed. Natural gas is embraced as a "bridge fuel" but it is no carbon reduction panacea and is likely to be a critical power source for at least another 15 years , taking us into the middle phase of this century.

The continuing carbon challenge is going to be driven by energy demand in developing economies and urban expansion in Asia, South America, Africa and the Middle East. Projections for 2040 are for U.S. energy demand to be static and Europe and Japan to decrease. Some of the developing economy countries may not have the expansive space to widely deploy solar and wind technologies, particularly in Asia. As a result, many have an interest in nuclear power, but not much experience with it.

If nuclear is part of the full range of options for cleanly powering these economies, who will supply it and how will it be effectively governed? Traditional nuclear suppliers, particularly the U.S., are on their heels and their governments are not providing much of an effective life line. But, state-backed companies in Russia and China are expanding their reach and deliberately integrating their global civil nuclear outreach into their geopolitical strategies.

There are real geopolitical and security consequences to ceding the global nuclear power playing field to Russia and China. They are trying to limit U.S. and allied democracies influence in the world. They have not been strong initiators of proposals for strengthening global nuclear governance. They may be more willing to provide sensitive nuclear technologies, like uranium enrichment and spent fuel reprocessing equipment, if it is a condition of the recipient nation. They may not consider nuclear terrorism to be as serious a concern as other nuclear nations.

The U.S. and its allies are not out of the global nuclear game yet, especially since South Korea has emerged as a significant nuclear supplier. These two allies have collaborated on big nuclear projects in the past. But they also are competitors for new business. That model may be outmoded in the face of the challenge from Russia and China. The U.S. and South Korea need to work more closely together on analyzing potential markets, supporting new technologies, strengthening nuclear governance, and leveraging their national and industrial strengths in concert.

Nuclear competition in the 20th century value may have been dominated by commercial and energy imperatives. But in the 21st Century it is being driven by the need for clean energy, effective global governance, and geopolitical influence. Given the impact of climate change on all nations and the implications of ceding global influence to authoritarian competitors, strengthened U.S.–South Korea nuclear collaboration seems both important and inevitable.

Balancing Nuclear Geopolitics and Nonproliferation in the Middle East (August 23, 2018)

Last week, two articles highlighted the complex geopolitical and global security challenges posed by Saudi Arabia's decision to build nuclear power plants. One argued that a Saudi rejection of the Westinghouse's bid for their first two plants would be a clear win for U.S. nonproliferation policy. The other underscored that decreasing U.S. engagement in the Middle East was limiting American influence in the region and driving nations into closer cooperation with Russia and China.

The loss of American influence over the nascent Saudi nuclear program would not guarantee a non-proliferation victory for the U.S. or the global community. It could put the U.S. at a geopolitical disadvantage in relation to Russia and China, both of which have very different standards and political calculations for international nuclear cooperation.

At the heart of the non-proliferation issue is the real value of the "Gold Standard," a mandatory limit on uranium enrichment and spent fuel reprocessing – the pathways to the bomb. The U.S. has included this standard in only two of twenty-three agreements with other nations (Taiwan and the United Arab Emirates). The remaining pacts contain stringent non-proliferation requirements that must be met to allow for the transfer of U.S. nuclear technology.

Is the gold standard or an alternative set of limits best applied to Saudi Arabia? The answer is not simple, and its implications are complex and high-stakes.

Secretary of State Pompeo has told Congress that the U.S. "wants[s] a gold-standard 123 agreement" with Saudi Arabia. But, Saudi officials have stated that they want to extract uranium and produce nuclear fuel as part of their nuclear self-sufficiency. More concerning, top Saudi officials have declared that they would seek a nuclear weapon if Iran develops that capability. This situation would create a global non-proliferation crisis and must be prevented. Partnering with the U.S. would put a brake on this proliferation potential, but first there has to be a deal.

The Saudis have clearly indicated that they view the U.S. as an important nuclear partner and desire its expertise. But, they have expressed a willingness to choose a non-U.S. nuclear supplier if an agreement cannot be reached.

It is not clear that Saudi Arabia would be denied sensitive technologies under non-binding international limits. However, it is highly unlikely that the U.S., South Korea, or France – three of the five final bidders on the Saudi reactors – would supply uranium enrichment and reprocessing equipment to the kingdom. It is not clear that Russia or China would feel similarly restrained. Their civil nuclear industries are state-owned, and their decision-making is linked to national and geopolitical objectives that may not prioritize nonproliferation and nuclear security.

Nuclear geopolitics and non-proliferation do not reside in separate issue silos to be evaluated in isolation. Valuing one over the other will not ensure global security in our intensely interconnected and complex world. Achieving the right balance between them will.

Can Nuclear Take the Heat? (August 9, 2018)

Last week the searing hot weather in Europe cast a worrisome light on the connection between climate change and nuclear power. Rather than offering a response to the carbon build-up in the atmosphere from fossil fuels, several nuclear reactors were adversely affected by the soaring temperatures.

Nuclear plants in Sweden and Finland were forced to reduce power because the temperature of the seawater they use for cooling was rising to unsafe levels. In France, four reactors were shut down because the temperature of their cooling water had risen, and water expelled from the plants threatened to overheat rivers and cause environmental damage.

The heatwave was a wake-up call for governments relying on renewable energy, too. The sultry conditions reduced wind output in Germany, Spain, Italy, the U.K., Denmark, and Sweden, even while solar power benefitted from abundant sunshine.

A changing climate is at the root of these challenges. University of Oxford scientists concluded that climate change made the current heatwave more than twice as likely.

Nuclear advocates should be concerned by this situation. It now seems the changing climate can be a catch-22 for water-cooled nuclear power plants. Because while their zero-carbon output is important for reaching the targets set by the Paris climate agreement, rising temperatures could cut the plants' output - and their carbon-limiting benefits.

Next-generation reactors that do not use water as a coolant are one possible answer to this situation. They are especially attractive in arid regions like Africa, where the population is projected to double to 2.4 billion people by 2050, increasing energy demand. But OECD countries are not supporting the R&D, demonstration and licensing for this new class of reactors as aggressively as needed, and there are unanswered nuclear security and non-proliferation questions that need to be addressed as well.

These concerns may not bother Russia and China, who currently are in the advanced reactor driver's seat and are actively seeking to dominate the energy supply of emerging economy nations as a geopolitical objective. This is an important, if non-traditional, global security test for the U.S. and its allies, who at the moment are wilting in the heat of it.

Taking Our Eye Off the Ball (July 26, 2018)

Several recent developments raise serious questions about whether the U.S. and its allies are focused on the real nuclear security challenges of the 21st Century.

At the Aspen Security Forum several U.S. officials outlined the long-term, and growing, global security challenge posed by China. But, it isn't clear that this warning is taking hold. A key element of China's challenge is to dominate advanced technologies, including the half-trillion dollar global nuclear power market as part of its Belt and Road Initiative, which is aimed at expanding its influence with developing economy nations.

One example is the United Arab Emirates, where the first nuclear reactor in the Arab world received its electricity generation license this week. The reactor and two others under construction are being built in cooperation with the Korean Electric Power Corporation (KEPCO), and they contain roughly $2 billion of U.S. content. China's President Xi Jinping was in the UAE this week and signed 13 strategic agreements, including one to advance energy cooperation. China is also in the running to build Saudi Arabia's first nuclear reactor.

Nuclear technology in the Middle East raises significant security and nuclear terrorism concerns, but it isn't clear that policymakers are taking them seriously. A new assessment by the Arms Control Association and the Partnership for a Secure America states that "while the worldwide use of nuclear and radioactive materials has grown, the issue of nuclear security…has all but faded from the U.S. national conversation." The report further cites a "concerning loss" of congressional leadership in preventing nuclear terrorism.

Effectively addressing nuclear security challenges is not just essential for existing nuclear infrastructure, but also for next generation, advanced nuclear technologies – and who will supply them. Third Way released a new report that asked whether the U.S. can regain its nuclear security leadership. It noted that the country is "losing its leadership in the global civilian nuclear marketplace [and]…as a result, its influence on nuclear security is at risk."

Advanced reactors may have an important role to play in a carbon constrained world. As temperatures rise more pressure is being put on electric power sources. Just this week an excessive heat warning caused the California grid operator to ask residents to conserve power because "there is the potential for demand on the grid to exceed the grid's capacity." California is not alone as Japan recorded its highest temperature ever at 106 degrees.

Nuclear power, climate change, and global security. They are deeply entwined, and PGS's Global Nexus Initiative is addressing their connections. But, like China's challenge, it is not clear that our leaders are paying attention.

The NPT at 50: The Evolving Role of the Civil Nuclear Industry (July 12, 2018)

July 1 marked the 50th anniversary of the Nuclear Non-Proliferation Treaty (NPT). I was honored to have been one member of the U.S. government team that helped secure the indefinite and unconditional extension of this historic agreement in 1995.

While most celebrations of this anniversary are focused on the diplomatic triumph of the treaty, it is important not to overlook the contributions of other key stakeholders. This includes the civil nuclear industry and NGOs that have supported the peaceful uses of nuclear power and the strengthening of the non-proliferation and security regimes.

Beyond the legal requirements of the NPT, the nuclear industry in many nations has been an important partner in the prevention of nuclear proliferation and terrorism. Many observe the guidelines and restrictions of the Nuclear Suppliers Group and supported the regulations and "stress tests" that were implemented in the U.S. and Europe after the 9/11 terrorist attacks. The nuclear industry also was a full participant in all four of the Nuclear Security Summits . More recently, some nuclear companies and organizations have collaborated with NGOs to support Principles of Conduct for power plant exporters and the Global Nexus Initiative , which is focused on the intersection of nuclear power, climate change, and international security issues.

However, the changes now occurring in the international nuclear landscape are raising questions about whether the effectiveness of the nuclear non-proliferation and security regimes will be maintained though this century. The U.S. and its allies are losing ground to Russia in exports and influence just as nuclear power is expanding in security-challenged regions like the Middle East. And China has set its sights on becoming a globally dominant provider of nuclear technology, including the next generation of small reactors, which are particularly suited for developing economy nations.

We should celebrate the anniversary of the NPT at 50 and recognize the full range of supporters that have made it effective. But, new geopolitical challenges are emerging that will test the durability and adaptability of the treaty in this century. Responding to them will require new thinking and partnerships if we hope to celebrate its successful second half-century.

Powering Denuclearization in North Korea (June 21, 2018)

At the very least, the Singapore Summit between U.S. President Trump and North Korean leader Kim Jong-un created a period of lower tension and heightened fluidity in the relationship between the two nations. It did not solve the North Korean nuclear threat, but it did set the stage for potential progress. While complete, irreversible, verifiable dismantlement of the North Korean nuclear arsenal is the top U.S. goal, there are other issues that need to be addressed during this period of potential policy opportunity.

One important example is the U.S. intelligence community's concern about the potential threat of DPRK proliferation of WMD technology to other states or non-state actors. We already know of North Korea's assistance to Syria in building a nuclear reactor and there are suspicions of other nuclear assistance. North Korea has fissile materials, scientific knowledge and weapons-production technology. It all needs to be secured from potential export or leakage.

The danger posed by intentional or inadvertent transfer of sensitive nuclear materials or equipment highlights the gaps that exist in the global nuclear security system and the need to strengthen and unify it. Surprisingly, there are no international standards or legally enforceable rules on how all nations should protect their nuclear materials. It is a national decision cloaked in opacity, which gives rise to concerns about its effectiveness in some nations. This is an issue on which the U.S., South Korea, China, and Japan can agree while the difficult denuclearization discussions unfold. Agreeing to not transfer any nuclear technology or materials outside the country would be a goodwill action by North Korea and possibly a step toward them re-joining the Nuclear Non-Proliferation Treaty.

A second opportunity is in the energy sector. If Kim is serious about shifting gears in his "dual track" policy to emphasize economic opportunities now that he has declared the nuclear weapons program completed, boosting the economy will require more power and significant electric grid upgrades. Energy is an area where South Korea, China, Russia, and the U.S. can put "power of prosperity" incentives on the table in exchange for DPRK denuclearization. This is a bargain that has faltered in the past, but if the unusual Singapore summit process offers any lasting legacy it is that opportunities are not always predictable.

Climate Needs Nuclear (June 7, 2018)

In a significant breakthrough, The New York Times and The Boston Globe acknowledged the role of nuclear power in addressing climate change in separate editorials this week. The Times editorial noted that while "many environmentalists have serious qualms about nuclear energy, retaining this capacity is smart from a climate perspective."

Examining the role of nuclear power in combating climate change and the security challenges it brings has been the focus of the Global Nexus Initiative (GNI), an innovative boundary-spanning project led by PGS. For the past three years, GNI has examined the issues at the intersection of climate change, energy demand, nuclear power and global security, producing 22 policy recommendations . The project marked the first time that experts from the nuclear power, environmental, and global security communities gathered to work on these vital issues.

The GNI's key findings recognized that nuclear power, in addition to other clean energy technologies, is an essential component in meeting increasing global clean-energy demands. But for nuclear power to continue being a major provider of zero-carbon energy, nuclear governance – including safety, security and nonproliferation measures and standards – must be strengthened.

Strengthening nuclear governance is particularly important for the next generation of small and advanced reactors, which have the potential to be more easily deployable and operationally flexible than large light-water reactors. It is also essential as nuclear power expands in the politically tense and unstable regions of Asia and the Middle East. Energy demand and populations are growing in these regions, and states are developing strategies to meet their sustainable development, climate and clean-air goals. Nuclear will play a role, that much is certain. What's less clear is whether the global nuclear safety and security framework can keep pace.

The Convergence of Nuclear Energy, Clean Air and Global Security (May 24, 2018)

This was an important week that brought significant attention to the nexus of nuclear power, carbon reduction, and global security – an issue integration pioneered by PGS through the Global Nexus Initiative .

At the Copenhagen 9th Clean Energy Ministerial , nuclear power was highlighted as a major decarbonization technology when the U.S., Canada, and Japan announced the creation of the Nuclear Innovation: Clean Energy (NICE) Future initiative. Argentina, Poland, Romania, Russia, the United Arab Emirates, and the United Kingdom will also participate in the project. This is a significant step forward in recognizing that it will be extremely difficult if not impossible to reach the Paris Climate Agreement objectives without nuclear power as part of the clean-energy technology mix. In fact, the International Energy Agency reported this week that current nuclear phase-out policies will decrease the probability of meeting the Paris Agreement climate goals by 2030.

Nuclear power is also a vital element in geopolitics, a point made this week by former US government officials at NEI's Nuclear Energy Assembly in Atlanta, Georgia. These experts painted a stark picture, noting that a civil nuclear environment dominated by Russia and China raises significant global security concerns. The U.S. has been ineffective in positioning its nuclear technology and governance advantages in the international market, while competitors such as Russia and China are calculating and deliberate in how they use nuclear power exports to further their geopolitical ambitions.

These strategies were apparent this week in announcements by Russia and China. Rosatom introduced a new agenda at the ATOMEXPO forum that takes into account the role of nuclear power in reducing CO2 emissions. It is also aggressively expanding its overseas business by forging agreements to promote nuclear cooperation, training and technological development with Chile , China , Cuba , Finland , Hungary , Italy , Kazakhstan , Serbia , Spain , and Zambia . Meanwhile, China signed a Memorandum of Understanding with Uganda to cooperate on nuclear energy, extending its investments in the country's infrastructure. Russia inked a similar agreement with Uganda last year.

It's gratifying to see that the policy discussion is at last starting to link nuclear energy, clean air, global security, and geopolitics. But the pace and urgency of these discussion needs to accelerate if these challenges are to be met.

FAILING TO CONNECT THE DOTS (May 10, 2018)

We're not connecting the dots on nuclear energy, climate change and global security, and that will create significant challenges in this century.

In the last month, two mainstream think tanks identified how the closure of U.S. nuclear plants will make cutting carbon emissions more difficult. In a worst-case scenario, retiring nuclear plants would set back clean energy goals by 13 years.
China and other developing countries, on the other hand, see a role for nuclear power in limiting carbon emissions. Some are looking at advanced nuclear reactors that are smaller, less expensive, and easier to deploy.

These new plants will need to be effectively safeguarded to ensure their peaceful use, which will place a significant additional burden on the IAEA at mid-century. According to the New York Times , the IAEA currently has 300 inspectors monitoring nuclear activities in 180 countries, including 80 assigned to monitor the JCPOA, from which the U.S. just withdrew.

The potential denuclearization of the DPRK adds to concerns about a shortage of monitoring talent. Former IAEA inspector, David Kay, estimated that 300 inspectors alone would be needed if there is complete denuclearization in North Korea.

Nuclear energy, climate change, and global security. They're linked, but we aren't connecting the dots.

COMMENTARY (April 26, 2018)

A recent letter sent by 24 bipartisan non-proliferation experts to Congress underscores the vital importance of preventing nuclear proliferation and an arms race in the Middle East while nations in that region move forward with nuclear power programs to meet their energy and environmental goals.

The most pragmatic way to prevent weapons potential in Saudi Arabia is to deeply engage that nation in the web of U.S. non-proliferation conditions and controls through a nuclear cooperation agreement. This approach will serve U.S. national security objectives and global non-proliferation goals. Failure to conclude an agreement with the U.S. will allow another nation to be the primary nuclear partner with Saudi Arabia for the remainder of this century – and it may be one that does not demand the same rigorous non-proliferation controls as the U.S.

Missing the Big Picture on Nuclear Security (April 12, 2018)

Since 9/11, the focus of nuclear security has been on eliminating and protecting weapon usable materials to prevent nuclear terrorism. But, as former CIA Deputy Director Michael Morell has noted, while "we were trying to protect the country from terrorists, we became blind to what was going on in the rest of the world." This also is true of nuclear security.

Competition between the U.S., China and Russia is the new global paradigm and this includes fighting for political, economic and diplomatic influence around the world. This geopolitical concept is bigger than the Trump administration – it's a significant concern of the Pentagon brass and others protecting U.S. global prerogatives. Nuclear security in this context requires that the U.S. and its allies maintain an influential role in supporting and strengthening the nuclear security and non-proliferation rules, recommendations and regimes.

But two interrelated trends are eroding this important objective: First, the hollowing out of U.S. nuclear education, expertise and diplomacy; and second, the significantly weakened position of the U.S. nuclear industry at home and as a competitor for international projects. U.S. legal requirements for nuclear supply are designed to prevent proliferation – a national objective that is not true for Russia and China. Yet, Russian reactors are under construction in half a dozen countries, and China will be the world's largest nuclear fleet operator by mid-century. By then most existing U.S. and Western European reactors will be ready for decommissioning.

Both Russia and China clearly see the looming vacuum of nuclear expertise, education, and infrastructure in the West and are positioning themselves to exploit it for their objectives – potentially leading a race to the bottom on security and proliferation standards. The U.S. and its allies need to provide robust leadership to reinforce the nuclear governance system. But that requires clearly recognizing new global realities, strengthening nuclear expertise, and supporting the competitiveness of the civil nuclear industry. Unfortunately, we seem to be blind to this big picture.

OUR EXPERT'S COMMENTARY (March 29, 2018)

The decision by Saudi Arabia to pursue nuclear power is an important step but it cannot lead to nuclear proliferation or an arms race in the Middle East. Direct cooperation with the U.S. on this technology will have important national and global security benefits. The U.S. represents the highest global standard in nuclear regulation and it has a long and strong record of opposing nuclear proliferation and strengthening global nuclear safety and security. These are important issues for the successful development and operation of the Saudi nuclear plants. Further, the U.S. offers unsurpassed educational and national laboratory infrastructure for the education and training of personnel. It is vital to understand that the global security value the U.S. provides as an important alternative to other nuclear suppliers that do not exhibit the same deep commitment to strong non-proliferation and nuclear security standards.