Written Statement by

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on

The Status and Outlook for U.S. and North American Energy and Resource Security

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Thank you, Chairperson Murkowski, Ranking Member Cantwell and members of the Committee for inviting me to testify at today's hearing on "The Status and Outlook for U.S. and North American Energy and Resource Security."

The American Security Project was founded in 2005 as a bipartisan initiative to tackle long-term challenges from a national security perspective, not encumbered by political bias. Our focus issues range from non-proliferation to counter-terrorism, American competitiveness to energy security. Our founders, Senators Kerry, Hagel, Hart, and Rudman, asked a host of retired general and admirals to join ASP because their only interest was the security of our country; they had spent years defending our country and planning for how to address threats. Our Chairperson, former New Jersey Governor Christine Todd Whitman, and our entire board share a strong belief that energy security – how the United States uses and produces energy – is a national security issue of preeminent importance.

My role in today's hearing will be to offer a perspective of a national security professional. I spent 30 years in the Marines where my primary specialty was artillery, but I focused extensively on entry-level training, commanding at every echelon at both Marine Corps Recruit Depots, to include being the Commanding General at Parris Island. For the military, assured access to energy is a pre-requisite to any operation. In the last 15 years, the military has learned the hard way that energy should not be taken for granted: our supply lines in Iraq and Afghanistan were a constant target for insurgents. In response, all four branches of the military have taken significant steps to both increase energy efficiency and reduce their single-source dependence on petroleum fuels. My testimony will show how our country can learn from the military's experience.

What is Energy Security?

Before we can discuss where we are on energy security, we have to understand what we are asking. Too often, policymakers use terms like "Energy Security" or "Energy Independence" – or now "Energy Dominance" without defining them: these mean different things to different audiences. For politicians, that can be a good thing! But for those of us trying to devise policies on how to build energy security, we need a definition.

Energy Security is generally defined – including by some of my co-panelists – as the ability to have uninterrupted access to energy resources at an affordable price. That's a start, but I do not think it is enough, because of the indelible link with global affairs. Our nation's concept of energy security was defined in the American mind by the two oil crises of the 1970s, where our country found its economy held hostage by hostile foreign powers over decisions that our leaders made in international affairs. To ensure that nothing like that ever happens again should be our goal in building energy security. Therefore, I would propose that we define energy security as ***the ability of a country to define its interests overseas independently from how it uses energy domestically***.

Most importantly, 'energy security' must not mean 'energy independence' in the sense that all the energy used in the United States comes from within its borders without international trade. In today's globalized world, this is neither obtainable nor desirable: even domestically produced energy sources are subject to fluctuations in global commodity markets. We must see energy security in today's world as one where countries, businesses, and people share and compete in the global marketplace. I will discuss the importance of trade relations in building shared energy security. In today's globalized world, if one country doesn't have security, their neighbors and allies don't have security either.

Finally, I will argue that we must see energy security as a long-term process, not as a moment frozen in time. Some policies and actions could build security today, while harming our future security. Climate change is already affecting security both at home and around the world, so we must make sure that we take the greenhouse gas emissions from energy into account, lest we trade increased energy security today for a warmer, more unstable world in the future. Likewise, we should be very careful about selling the Strategic Petroleum Reserve – our national hedge against oil shortages – in exchange for a short-term way for Congress to get around budget caps. Thinking long-term in this way also means that we must invest now in scientific research and development into the next-generation of energy technology.

Factoring together each of these variables, my message to you, Senators, is that ***the current "Status" of North American Energy and Resource Security is good, but the "Outlook" is hazy***. There are few threats to America today that could stop our access to global energy markets, but I am concerned that there are emerging threats that could undermine our future security, if not addressed soon. Moreover, we must guard against bad policy that could undermine our future security.

Security Built by an Energy Revolution – And Good Policy

I am certain that several of my co-panelists will talk about how the shale revolution has increased American energy security. And that is true. The events of the last decade in American energy production have been nothing short of revolutionary. The United States has gone from a major importer of natural gas, with plans for new Liquefied Natural Gas (LNG) import terminals along the East and West Coasts, to a point where the U.S. will be a net exporter of gas for the first time this year. For context, in April 2007, the United States imported 98,742 million cubic feet of LNG, a record. A decade later, in April 2017, by contrast, there was only 5,171 million cubic feet of LNG imported into the US, a 95% decline. LNG exports went from zero as recently as 2013 to a pace of almost 600 billion cubic feet this year.

In oil, the difference is just as stark. After three decades of decline, oil production surged 88% in just six years, from 5 million barrels per day in 2008 to over 9 million per day by 2015. To reflect the new

abundance, Congress allowed crude oil exports in 2015. Just a year and half later, exports are now shooting up, with exports of over 900 thousand barrels per day in the first week of July. In our exuberance, however, we must remember that the United States still remains the world's second largest oil importer, behind only China.

However, we should not make the mistake of thinking that security comes from domestic supply alone. Policies implemented in the 1970s, like the creation of the International Energy Agency (IEA), have built a coordinated global response to shared energy security. International trading markets allow for a true global price of energy commodities – oil prices are seen on newscasts every night – allowing policymakers to see potential shortages and problems before they occur. The Strategic Petroleum Reserve – which holds oil stocks capable of replacing 90 days' worth of imports – acts as a strategic buffer against threats and manipulation by energy-producing states.

Another key part of America's energy security is our fleet of nuclear reactors. We are nuclear proponents. The 99 currently operating nuclear reactors provide about 20% of the electricity our country uses. They have a commendable service record as an always-on baseload supply of energy. They are the largest source of carbon-free energy we have. Although there are political questions about how to store spent nuclear fuel, it would be good for our security to increase our investment in nuclear power. It is somewhat ironic that the energy revolution of the last decade was supposed to be paired with a "Nuclear Renaissance." Unfortunately, lower cost natural gas, combined with regulatory uncertainty, appears to have limited the number of new nuclear plants. Developments in the next generation of nuclear power, like small modular reactors, will help us build a predictable energy supply. For those worried about safety, we should note that the Navy has operated varieties of "Small modular Reactors" aboard ships and under the seas for 60 years with no adverse effects at all.

Role of Efficiency, Renewables in Security

This massive change in fossil energy production has been matched by dramatic (if less reported) increases in energy efficiency and renewable energy. Our cars and trucks now go further on a tank of gas than ever before, as new vehicles are surpassing stringent federal fuel economy standards. The price of solar and wind have dropped dramatically. New technology means that even old-line hydropower can increase its utilization level. Emerging techniques for battery manufacturing will ensure that the electricity grids of the future are able to bring more variable renewable power onto the grid than had been thought possible.

What does the boom in renewables mean for security? Any form of renewable power presents few concerns about energy security because they do not use a fuel that has to be imported.

While some complain about dependence on imported solar panels or other energy-producing goods from China, but this is not the same as energy security. Unlike dependence on a commodity like oil, importing solar panels – for example – constitutes a one-time-only fixed cost. Once the cost is borne, there is very little variable cost for generating renewable energy.

An economy that relies on renewable power for its energy needs would be fundamentally more secure. Centralized electrical grids are threatened by physical disruption from the weather or attacks, cyber

disruption, electromagnetic pulse attacks and regulatory disruption. A renewable grid, on the contrary, is a fundamentally distributed grid.

A grid of distributed power sources would generate electricity from many smaller and more secure energy sources in contrast to large centralized power plants, with expansive and vulnerable infrastructure.

However, given the separation in fuels between electricity generation and transportation, policymakers should not be deluded into thinking that increasing renewable electricity generation will automatically increase energy security. There also needs to be a coherent strategy to use more renewable power in transportation. Only by giving consumers a choice about how to fuel their cars will policymakers be able to break the grip that oil has on transportation.

In the United States, transportation is primarily by automobiles, so any proposal to use more renewable energy to increase security (particularly with respect to oil) must begin by either electrifying the auto fleet or significantly increasing the availability and use of ethanol and advanced biofuels.

Trade and Global Markets Build Security

Energy security is only possible is a "shared" environment. No nation can really be secure in energy if its neighbors or its allies are insecure. The recent developments in both energy supply and demand that have boosted America's energy security can also be used to boost the security of our allies and neighbors.

NAFTA has been critically important in integrating the North American energy market. To our north, the Canadian and American energy market has been thoroughly integrated for years, both in oil and the electric grid. Only recently, however, has that changed to our south. Mexico's recent efforts to liberalize its energy investment laws will allow deeper cross-border integration between the U.S. and our southern neighbor. We must be careful in the proposed renegotiation of NAFTA that we do not allow the growing integration between Mexico and the United States to be harmed by unrelated tensions.

Often overlooked, our smaller neighbors to the South, in the Caribbean and Central American are some of the most energy insecure places in the world. They do not have assured access to energy, and they often depend on the whims of one country (Venezuela) to supply their energy. The American energy revolution can supply investment in both renewable energy and the local grid, while also acting as a much-needed alternative source of fuel. I must add that perhaps the greatest opportunity in this region is Cuba. American businesses and investors could thrive in our nearest overseas neighbor if only Congress would allow them. Instead, the Cubans rely on imports from our global adversaries like Russia and Venezuela. It does not have to be this way.

The new tool in our trade toolbox is LNG exports, and they can help American allies in two key regions – Europe and Asia – by undercutting the political clout of dominant producer states and by expanding the quantity of total energy supplied to allies starved of energy. LNG exports could improve the energy security of America's closest allies. Exporting LNG can help America's allies around the world bridge from dirtier sources of energy, like coal and oil, to cleaner, carbon-free sources of energy. U.S. LNG exports would create a more liquid market, with deliveries based on supply and demand fundamentals.

This would allow America's allies to diversify their energy sources, reduce the burden on their economies, and free themselves from dependence on unfriendly countries.

New Threats to Critical Infrastructure: Cyber Security

For decades, we have primarily thought of energy security as through the dependence on imported commodities. However, a new threat is emerging in the form of cyber-attacks. Although "hacks" by our global adversaries are in the news all the time, the threat to our grid is different – and more dire – than someone stealing your email. Recently, the FBI and the Department of Homeland Security alerted the energy sector that "advanced, persistent threat actors" were behind recent cyber-intrusions into the business systems of U.S. nuclear power and other energy companies. The fear is that these foreign agents could find weaknesses that allow a hostile actor to shut-down the American energy system from afar.

One doesn't need to think too hard to imagine the potentially devastating effects this threat poses to U.S. energy security. The energy sector is the major source of essential services provided to billions of Americans daily- namely water and electricity- services upon which we depend.

We need to develop a public-private partnership to implement increased cyberdefenses. Unlike the previous responses to cyber threats, we cannot afford to wait to implement counter measures until after an attack. The allowance of continued cyber security breaches by both nation states and individual hackers leaves the door open for increased threats to our nuclear infrastructure.

Tomorrow's Security from Today's Investments: More R&D Needed

If events of the last decade have taught us anything, it should be about making predictions based on recent trends. We make a fundamental mistake if we assume that today's energy mixture is what the energy mix of 2030 or 2050 will look like. The fact is, the energy mix will change – because of concerns about climate change, accelerations in technology, and changes to global markets.

The downside risk on energy security comes from not investing in research and development. If other national countries, particularly competitor countries like China, are successful in commercializing breakthrough energy technologies, then they will sell the technology abroad, at the expense of U.S. competitiveness. I am particularly concerned that the U.S. is pulling back from technology R&D programs like ARPA-E that provide smart federal investments in high risk, high reward technologies that boost our competitiveness by keeping America at the forefront of global energy technology research.

We also believe that America needs more investment into game-changing energy technology, like fusion energy. An American Security Project report lays out a roadmap for how an investment of $30 billion over 10 years could lay the groundwork for a fusion-powered economy much faster than anyone is predicting.

In all of these, the danger to our energy security comes from *not* investing for the future. Just because we are secure now, does not mean we will always be.

We Should Take A Lesson from the Military

Over the last decade, the Marine Corps has worked to create an "Energy Ethos" – a shared vision that the efficient use of energy is a critical component of mission readiness. They say that Marines must be aware of and value limited energy and water resources. They don't do this because they've suddenly become tree huggers, they do this to enhance mission readiness and resiliency on installations and operational effectiveness in combat.

Other services have similar programs, like the Army's "Net Zero" program for installations, the Air Force's "Energy Flight Plan," and the Navy's "Great Green Fleet."

These have had an effect. According to the Department of Energy's Federal Energy Management Program (FEMP), by 2015 energy used by the US Department of Defense has fallen to its lowest recorded level since fiscal year 1975 (FY 1975). Reducing DoD dependence on petroleum and expanding into alternative energy sources will not only promote efficiency, it will save lives, and there is arguably no better barometer for success than that.

Conclusion: Energy and Resource Security Come From Variety and Variety Alone

When Americans talk about energy security and energy statecraft, too often we forget that the rest of the world gets a vote as well. As the sole superpower, American policy is watched closely around the world. That's why we should ensure that we do not become complacent about our current time of relative energy security.

Over a century ago, after he ordered the Royal Navy changed from coal to oil, Winston Churchill said that "safety and certainty in oil lie in variety, and variety alone." That decision was a farsighted investment in the future that helped the navy beat Germany. Today, energy security depends on variety as well – variety in all sources of energy. Maintaining energy security for the future will rely on the same farsighted thinking that allows us to perceive looming threats and coming opportunities, while maintaining our security today.

Thank you for the opportunity to testify today, and I look forward to your questions.