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ASIA'S GROWING HUNGER FOR ENERGY: U.S. POLICY AND SUPPLY OPPORTUNITIES

HEARING

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OF THE

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CONTENTS

Page

WITNESSES

Mr. Mikkal E. Herberg, Senior Advisor, director, Energy Security Program, The National Bureau of Asian Research 5
David W. Kreutzer, Ph.D., senior research fellow for energy economics and climate change, Center for Data Analysis, Institute for Economic Freedom and Opportunity, The Heritage Foundation 15
Mr. Jake Schmidt, director, International Program, Natural Resources Defense Council 22

LETTERS, STATEMENTS, ETC., SUBMITTED FOR THE HEARING

Mr. Mikkal E. Herberg: Prepared statement 8
David W. Kreutzer, Ph.D.: Prepared statement 17
Mr. Jake Schmidt: Prepared statement 24

APPENDIX

Hearing notice 50
Hearing minutes 51

ASIA'S GROWING HUNGER FOR ENERGY: U.S. POLICY AND SUPPLY OPPORTUNITIES

THURSDAY, SEPTEMBER 8, 2016

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON ASIA AND THE PACIFIC,
COMMITTEE ON FOREIGN AFFAIRS,
Washington, DC.

The subcommittee met, pursuant to notice, at 3:01 p.m., in room 2255, Rayburn House Office Building, Hon. Matt Salmon (chairman of the subcommittee) presiding.

Mr. SALMON. The subcommittee will come to order.

Members present will be permitted to submit written statements to be included in the official hearing record, without objection. The hearing record will remain open for 5 calendar days to allow statements, questions, and extraneous materials for the record, subject to the length limitation in the rules.

Asia Pacific nations are predicted to consume more than half the world's energy by the year 2035, bringing both enormous opportunities and significant challenges as the global energy sector seeks to meet the demand. As Asia continues to diversify from traditional energy to nuclear, liquefied natural gas, and solar power, innovative U.S. suppliers of energy and energy-based technology stand to play a pivotal role.

Today, we will discuss U.S. policy toward the ever developing Asia Pacific region as it hungers to fulfill its energy needs. This hearing will focus on energy demand, production, consumption, security, and policy in the Asia Pacific region.

As we assess the challenges and the opportunities, it is important to note that over 700 million people in the Asia and the Pacific region lack access to electricity, and nearly 2 billion burn wood, dung, and waste for cooking and heating needs. As Asia continues to modernize and develop a substantial middle class, demand for energy will increase exponentially, requiring vast investments in infrastructure.

Energy demand in Asia is largely fueled by enormous populations, urbanization, and the transportation industry. Newly mobilized and politically active populations are driven first and foremost by whether governments are able to provide for a better standard of living, a factor driven almost entirely by access to dependable and affordable energy. Demand will continue to rise by an estimated 2⅕ percent annually, with oil and gas to remain the prevailing energy source.

East Asia has become a net oil importer, causing a close association of energy needs with national security concerns. Much of Asia's energy is imported from volatile regions and is transported through vulnerable transit corridors, most notably including the highly disputed South China Sea. This subcommittee has closely followed the issues of the South China Sea and the insecurities of the nations who rely on energy transit through these narrow straits, and we believe those concerns are well founded. Add to that the estimates of oil and natural gas reserves in the South China Sea, with their own highly disputed sovereignty rights, and as we are all aware, these territorial disputes are very complicated and will take time to resolve.

We continue to urge China and others to respect the rule of international law and agreed-upon frameworks for dispute resolution rather than resorting to manipulation and bullying tactics.

As diverse cultures and national boundaries affect much of the energy infrastructure, regional energy cooperation is paramount, but many Asian nations appear to be more interested in a go-it-alone approach.

Attempts have been made to collaborate on energy issues within Asia for some time now, including cooperation initiatives through ASEAN and the East Asia Summit. These dialogues are just that: Talks. Region-wide hesitance to pursue multilateral development projects and persistent territorial disputes that hinder the efficient use of resources have prevented Asian states from working together to resolve energy conundrums. Energy options are limited throughout much of Asia, and the fact remains that regional cooperation will be necessary to overcome the challenge of energy shortages.

Currently, coal is the region's leading energy source, but market demand for nuclear energy and liquefied natural gas continues to rise. Skepticism of nuclear energy following Japan's Fukushima disaster remains a concern, but a thirst for nuclear power thrives in many of the Asian nations. The U.S. has various degrees of civil nuclear cooperation in the region with China, South Korea, India, Vietnam, Taiwan, Malaysia, Australia, Indonesia, Japan, and Thailand. Many in the United States have concerns with some of these projects, in particular with regard to nuclear proliferation and dual-use repurposing.

For our part, the United States began shale gas exports by sea this year and is projected to become the third largest world supplier of LNG within 5 years. Asian buyers have already contracted to purchase more than half of U.S. energy's supply of LNG and will continue to affect global energy policy on a massive scale.

The Asia Pacific needs American leadership to assist with the security concerns of our partners and allies, to maintain the rule of law and Freedom of Navigation crucial for energy security, and to provide critical energy supplies and access to new energy technologies.

We should advocate for policies that encourage a market-driven approach to fill the demand, and I look forward to hearing from our witnesses today on how best to facilitate that outcome.

And, I would like to turn the time over to Ranking Member Sherman for any comments he might have.

Mr. SHERMAN. The gentlelady from New York will give her opening statement.

Mr. SALMON. Thank you.

Ms. MENG. Thank you, Chairman Salmon and Ranking Member Sherman for calling this timely hearing. Asia as a whole is the largest energy consuming region in the world. China is the single largest energy consumer, followed by the U.S. and then India. In a world where our energy needs only increase with each passing year, we must take stock of our resources and assess our ability to fulfill those needs, while ensuring our security and minimizing the environmental consequences.

Asia's growing energy needs leave many open questions, including how well-positioned these countries are to fulfil their commitments to reducing greenhouse gas emissions, and what the geopolitical implications are for Asia's current energy reliance on coal and the Middle East oil.

I welcome our distinguished panelists today and look forward to hearing your thoughts.

Thank you, and I yield back.

Mr. SALMON. Thank you. Mr. Sherman.

Mr. SHERMAN. When we look at energy and Asia, we see a number of foreign policy and national security concerns. The first of these is the price of oil. For reasons that God may explain to us at some point in the future, he has put oil in so many of the wrong places. And, anything that drives down the price of oil is not just good for motorists in my district, it is good for American foreign policy.

Second, global warming. China emits twice as much greenhouse gases as the United States. We are in second place, but we are a distant second. China has made this great announcement with much pageantry that they will keep increasing their greenhouse gases right up until 2030, and then maybe without any enforcement, they will turn the corner, although we have no idea how high up they will go before they turn the corner, and we do not know whether they will turn the corner very sharply at all.

If you look at the current situation, China is deploying and building many coal-fired electric plants. Those plants will serve their full useful life. And, coal produces twice the greenhouse gases per kilowatt as any other fuel, and so one would expect that these plants will be turning out an awful lot of greenhouse gases for a long time.

In addition, China is going all over the world building coal-fired electric plants. And, while technically this is not Chinese global warming, because the burning of the coal will take place elsewhere, it would not occur but for these plants.

The next national security issue is the transport of oil to our allies in Asia. And here, I think, there is an exaggeration of the risk and the problem. Where both in Beijing and in Washington, we are firing up nationalist concerns about, oh, my God, can we figure out a way that both countries can justify a larger military by fighting over these islands, uninhabited islands. And, we are told that trillions of dollars worth of trade passes close to these disputed islands. Keep in mind almost all of that trade is going in or out of a Chinese port, and if China were able to establish naval bases on

these islands, they would be able to blockade their own ports, something that is not particularly of concern to the United States.

But, in addition, there are oil tankers from the Middle East going to Japan and South Korea. Those tankers may choose to go close to these islands, but they—in a worst case scenario, and they should never have to do this, but in a worst case scenario, they could take a slightly different route and go far away from these islands. These islands, therefore, have a massively exaggerated strategic importance since virtually no trade that doesn't go in or out of Chinese ports goes close to them.

And, then there is the economic issue. Much of the reason for this hearing is to discuss the export of American natural gas. Keep in mind that there are two ways to look at this from an economic standpoint. One is to say, hey, if you export some natural gas, that creates jobs in the natural gas industry. The other approach is to say if you refuse to export natural gas, you drive down the price of natural gas in this country, you give American manufacturers a big leg up on their Asian competition, and then you get a lot of manufacturing jobs. There are more jobs involved in using natural gas than in producing natural gas.

Finally, as I think is illustrated by this hearing, there is the discussion that by exporting natural gas, we could have an effect on Europe and Ukraine's, in particular, dependence on Russia. Russia is charging far less for natural gas than Asia is willing to pay. So, if we are going to export natural gas and we are going to remain a free market country, we are going to export natural gas to Asia, where it will have the economic effects I have described, both good and perhaps undercutting our manufacturers.

But, we are not going to be exporting natural gas to Europe, where they are used to paying far less to Russia for it than the Japanese and the South Koreans are willing to pay.

And with that, I yield back.

Mr. SALMON. Thank you. Mr. Duncan.

Mr. DUNCAN. Thank you, Mr. Chairman. Thank you for holding this hearing.

Energy is a passion of mine, and American energy independence, the energy renaissance that we have experienced is something that I have advocated for. I was glad to hear Mr. Sherman mention natural gas, and it is a fossil fuel that we have an abundance of here in this country. And, the export of natural gas is critical to the American energy sector. And, when you have an abundance of something, then you can put it out on the market, and the companies can realize a profit, which will, I think, help keep jobs here in this country.

Asia is definitely a growing area that needs energy to provide that 24/7 baseload power needed to manufacture and help with the quality of life issues. It is really a global phenomenon when you talk about quality of life issues. If you want to improve the quality of life of people all over the globe, you do it with energy.

Mosquitos, we talk a lot about Zika. If you want to cut down the threat of Zika, then help provide electricity so they can have air conditioning in their house, they don't have to have the windows open at night, because mosquitos are prone to come in. We can do that in sub-Sahara Africa, we can do that in Latin America, and

a lot of other places that don't experience the same sort of energy abundance that we have.

Twenty-four-seven baseload power provided by fossil fuels, provided by nuclear power, hydroelectric, but one thing that, going back to the natural gas, is that abundant supply here that can provide natural gas-powered electricity generation in third world countries and in Asia, and not necessarily in third world, but definitely improve the quality of life. Too many people around the world are using wood and charcoal to heat their homes and cook their food, and they can't keep food for a long period of time fresh, they can't have air conditioning, we talked about. There are just so many different things that we can use American energy to help improve the lives of other people around the world.

You know, we push wind and solar. I think it is groovy technology, I really do like it, but it is intermittent, and doesn't provide the 24/7 baseload power that helps to keep incubators running that help with the neonatal intensive care. And, we have an infant mortality rate that is too high around the world. When we have the ability to provide energy sources, such as natural gas, to help those countries keep those incubators running, keep those neonatal intensive care units operating that you are not going to get with intermittent power.

So, I am glad that we are having a discussion about energy and improving the quality of life of people around the globe, focusing on Asia right now, and I am glad of that. So I look forward to a robust discussion as we move forward in this Congress and the next Congress to provide energy through American energy resources as we hopefully will reboot our energy renaissance in this country.

And with that, Mr. Chairman, I yield back.

Mr. SALMON. Thank you. We are joined today by Mr. Mikkal Herberg, senior advisor and director of Energy Security Program at the National Bureau of Asian Research. Thanks for coming today, Mikkal. And, he happens to come from a wonderful place, Arizona. So glad to have you here. The rest of the country is great too, it is just Arizona is better, right?

Mr. HERBERG. I like it, I like it.

Mr. SALMON. All right. Dr. David Kreutzer, senior research fellow for energy economics and climate change at Heritage Foundation Institute For Economic Freedom and Opportunity. Thank you for being here.

And, Mr. Jake Schmidt, director of international program at the Natural Resources Defense Council.

We are thrilled to have you all here today, and Mikkal, we will start with you.

STATEMENT OF MR. MIKKAL E. HERBERG, SENIOR ADVISOR, DIRECTOR, ENERGY SECURITY PROGRAM, THE NATIONAL BUREAU OF ASIAN RESEARCH

Mr. HERBERG. Okay. Thank you, Chairman Salmon, Ranking Member Sherman, committee members. I appreciate the opportunity to speak with you today about Asia's growing energy consumption, some of the implications of U.S. policy, U.S. supply, and what role it can play.

I think it is worthwhile to keep in mind there is a fundamental dilemma that Asia faces in energy. It is kind of a dual challenge. On the one hand, developing Asia, energy demand is growing at extraordinarily high rates. You talked about that. It will account for two-thirds of global energy consumption growth. So, clearly they are scrambling to mobilize the energy supplies they need and to prevent energy from becoming a bottleneck to economic growth and job creation. Developing countries need the jobs and are pushing for development. At the same time, they are looking for affordable energy, because remember, these are developing countries and they are looking to find affordable energy, and I think here is a key to understanding that coal dilemma for Asia.

And third, at the same time they made all this booming demand, they have to shift from a very carbon-coal-intensive energy mix in the region, to a much cleaner energy mix, if they are going to meet their climate goals, and then probably more importantly, meet their air pollution goals, which in China, India, Southeast Asia, air pollution is a deadly, quite truly deadly problem, obviously for China.

But, the challenge is how to meet that growing energy demand that they need now, but shift to this cleaner energy mix when they need the energy now, and so what happens is there is a chronic temptation to default to what is an abundant, cheap, available energy supply all across Asia, and that is coal, to meet that growing electricity demand. So, the pressure to clean up the energy mix, but the pressure to have affordable energy leads to this problem of constant defaulting to coal, and that gets in the way of all these environmental and climate goals that we have.

U.S. energy policy and supplies can make a big difference in both energy security in Asia, it already has in a big way, but it can also play a big role in Asia's transition out of this dominant role for coal and toward a cleaner energy mix. And, in my mind, there is no contradiction between using natural gas and making progress on moving toward your climate goal.

Just a few metrics. If you look at how much energy demand is going to grow in just developing Asia, it is the equivalent of adding another China energy consumption to the global energy mix just in the next 20 years. Remember, China is the largest energy consumer in the world. Just the increase is equivalent, at least the latest International Energy Agency forecast, just the increase is equal almost to the entire China energy consumption. So, these are big, big, big numbers. Two-thirds of CO2 emissions, most of the world's nuclear capacity growth, most of the natural gas growth, and all of the coal consumption growth. So, this is a truly staggering scale to this.

Now, to switch to energy security. Energy security in Asia is national security. It is not like here. I mean, this is at the top or near the top of the strategic agenda. The region imports two-thirds of its coal, China imports 60 percent of its oil supplies—or the region imports two-thirds of its oil; China, 60 percent, and that continues to rise; 100 percent for Japan, South Korea. So, this is really a serious strategic concern for the region.

And the other dimension of that is the growing and heavy dependence on Middle East supplies, and this is where the sea lanes

come in. China gets half of their imports from the Middle East. Japan and South Korea get 85 percent of their imported oil from the Middle East. So, these sea lanes between the Persian Gulf and Asia are critical sea lanes; and not only the South China Sea today, but also increasingly the Indian Ocean. As China's blue water capacity begins to be able to project into the Indian Ocean, they are building, I don't want to be an alarmist about this, because, you know, I am not, but China is building a Navy base at Djibouti now, which is part of their concern about the security of those sea lanes, particularly for their oil supplies.

What role can the U.S. play in this? Obviously the sea lanes issue, we are the most important player. We can have a dialogue about the South China Sea, how important they are. I agree with Ranking Member Sherman that China is not going to block their own sea lanes. That makes no sense whatsoever. But, here is the issue. If you go to Tokyo, the notion of turning over the security of their oil and LNG supply lines to the Chinese Navy, the tender mercies of the Chinese Navy, makes them very nervous. Now, we can argue about whether that is a reasonable concern or not, but I can tell you it is a very worrying notion for planners in Tokyo.

U.S. unconventional oil supplies are critical for Asia, because they are bringing down prices, giving them an alternative supply, so anything we can do to continue to grow our conventional oil production will be good for Asia's energy security. Similarly with natural gas, LNG supplies to Asia allow them to diversify their supplies away from Southeast Asia and the Middle East. So, all of these things are going to be very important to the metrics of energy security for Asia, things we can do, continue to work with China on energy cooperation. India will be the largest increase, absolute increase in energy consumption. We need to do more with India in the future.

So, let me just stop with those brief remarks and let the others go ahead.

[The prepared statement of Mr. Herberg follows:]

NBR THE NATIONAL BUREAU of ASIAN RESEARCH

Testimony before the
House Committee on Foreign Affairs
Subcommittee on Asia and the Pacific
United States House of Representatives

Hearing: "Asia's Growing Hunger for Energy: U.S. Policy and Supply Opportunities"

Testimony by:
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September 8, 2016
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Chairman Salmon, Ranking Member Mr. Sherman, Members of the Committee, thank you for this opportunity to appear before the Committee today to discuss Asia's growing energy needs, U.S. energy policy, and U.S. energy supplies. These views are mine alone and do not reflect the views of NBR which does not take institutional positions on any policy issue.

Asia faces a daunting dual energy challenge today. First it needs to meet rapidly rising energy demand on a huge scale in order to continue fueling rapid economic growth and rising standards of living at an affordable price. The region has a very modest energy resource base, outside of coal which it has in abundance, which forces it to rely heavily on imported energy supplies from often unstable regions of the world. Simultaneously, Asia must achieve a profound structural shift away from a very coal/oil carbon intensive regional energy mix toward a far cleaner, more environmentally sustainable energy mix. The challenge is that the pressure to meet urgent near-term energy needs and ensuring energy security tends to push Asian policymakers toward continued reliance on large indigenous coal supplies and imported fossil fuels and undermines more expensive and longer-term efforts to move toward cleaner energy sources like renewables, nuclear, and hydroelectric.

U.S. policies and energy supplies can play a major role in helping Asia meet its booming energy needs while shifting towards this cleaner energy future. The unconventional oil and natural gas revolution in the U.S. is already having a powerful beneficial impact on Asia's energy security and the region's ability to meet its rising current conventional energy needs. U.S. natural gas exports can help Asia shift away from damaging coal use. U.S. clean energy technology can also play an important role as well as strong U.S. participation in global climate change efforts to support and encourage more urgent efforts across Asia to transition towards cleaner energy.

Asia's Energy Context and Global Impact

Asia is quite literally the ground zero for global energy demand growth. The region's energy needs will rise enormously over the next 25 years. Demand growth will

be driven by rapid economic growth, rising standards of living and incomes, as well as rapid, large-scale urbanization and population growth. It will be centered in developing Asia which is in the midst of an era of booming electricity consumption, rising transportation needs and motorization, and rapid industrialization. The Asian region also will drive global energy demand growth for the foreseeable future. The International Energy Agency (IEA) in its most recent World Energy Outlook 2015 forecast that Asia is likely to account for fully two-thirds of total global energy demand growth over the next 25 years. This isn't necessarily surprising since Asia accounted for two-thirds of global energy demand growth over the past two decades as well. China and India alone are expected to account for roughly one-half of total world energy demand growth from 2013 to 2040.

The richer countries of the Organisation for Economic Co-operation and Development (OECD) in Asia, including Japan, South Korea, and Australia, as a group will likely experience essentially flat to slightly negative energy demand growth typical of highly advanced industrial countries. In Japan, overall energy demand is expected to decline by more than 10% by 2040 under the pressure of the severe aging of the population.

Global oil markets, oil demand growth, and oil prices will be powerfully influenced by Asia. While oil demand in the rich OECD countries is expected to *decline* by 11 million barrels per day (mmbd) between 2013 and 2040, developing Asian oil demand is expected to rise by nearly 14 mmbd. China and India alone are expected to rise by 11 mmbd. Total world oil demand is only expected to rise by a net 13 mmbd during that period. So effectively developing Asia will account for the entire *net* increase in global oil demand.

In Asia energy security is national security. Energy security will remain a key strategic worry for the governments in the region, especially China, Japan, South Korea, and India, all key powers in the region. China now imports 60% of its total oil consumption and 30% of its natural gas needs. Japan and South Korea import virtually all

of the oil, natural gas, and coal. India as well imports 75% of its oil and over 20% of its natural gas. ASEAN is also now a net importer of oil and is transitioning from a net liquefied natural gas (LNG) exporter to a net importer.

In energy security terms, Asia is benefiting enormously with the huge growth in U.S. unconventional oil production, the global oil supply abundance, the sharp decline in the cost of imported oil, as well as the knock-on effect on lower LNG prices which in Asia are largely linked to oil prices. This has eased regional fears over energy security somewhat for the time being. However, longer-term market balance and geopolitical risks are growing. The governments in Asia remain deeply concerned about heavy dependence on supplies from the Middle East. This dependence is rising as low cost production rises in the Persian Gulf while at the same time production is declining from many other parts of the world, including sharp recent declines in U.S. unconventional production. Asia, especially China, will need to play a greater role in supporting political stability in the Middle East and security of the sea lanes from the Persian Gulf to Asia. Collaboration between the U.S. and China on security of the Indo-Pacific sea-lanes will be essential to energy security for Asia. This is a key strategic challenge for the U.S. and the rest of oil import-dependent Asia.

China has recently become the largest global oil and gas investor as its national oil companies (NOC) seek supplies around the world. This further accentuates the growing importance of China in global energy security diplomacy. Beijing is facing growing risks to its overseas energy investments, the security of its oil imports, and safety of Chinese citizens working in these areas. It is expanding its diplomatic and strategic footprint across the world's key energy exporting regions with important implications for U.S. strategic and foreign policy influence, especially in the Middle East. The U.S. will need to find ways to work with China to collaborate on our common interests in providing security and strengthening political stability in these key energy exporting regions, including the Middle East, Africa, Central Asia, and Latin America.

Asia will lead global growth across fuels, especially for natural gas which is key

to making near-term progress on achieving Asia's goals to reduce severe air pollution and long-term climate goals. Natural gas is a relatively underutilized fuel in Asia accounting for only about 13% of the region's energy use compared to nearly one-quarter on a worldwide average. LNG supplies will be important to Asia's ability to transition as rapidly as possible toward much less carbon intensive natural gas and away from coal during the long transition to renewable energy supplies. U.S. LNG exports are a key factor in today's much lower LNG prices, along with growing supplies from Australia and elsewhere. U.S. LNG exports are also extremely important to Asia's ability to diversify its LNG imports away from potentially unstable suppliers and to maintain affordable LNG prices. This is especially important to Japan and South Korea, key U.S. allies in the region and the two largest LNG importers in the world.

Asia and especially China will lead global growth in nuclear power in order to meet rising electricity demand but also to reduce their very high carbon intensity. China has roughly 25 nuclear plants operating with another 29 under construction. Its long-term goal is to have 150 nuclear power plants in operation by 2030 making it the world's largest nuclear generator. The speed of increase in nuclear generation in China raises key safety and nuclear governance issues. The U.S. should work with the International Atomic Energy Agency (IAEA) and directly with China to strengthen nuclear safety arrangements, effective safety training, and strong global governance of nuclear energy use. India also plans to increase its nuclear capacity and the U.S. should work closely with India as a follow to the earlier U.S.-India nuclear agreement.

China's energy demand growth, after driving rapid global energy demand growth for the past 20 years, is finally experiencing a historic slowing due to the overall economic slowdown, the changing structure of the economy, and strong policies to slow electricity demand growth and shift towards cleaner fuels. China's coal consumption has essentially peaked much earlier than expected and is likely to decline gradually over time. This is hugely positive for China and globally for achieving global climate goals. Renewable energy supplies are also growing rapidly, especially wind and solar. China is the world's largest investor in renewable energy last year accounting for one-third of

global renewable investment. The U.S. has been working very effectively with China on its renewables development and improving Chinese energy efficiency.

Because the scale of Asia's energy consumption is so large and is biased toward carbon intensive fuels such as coal and oil, Asia is central to meeting global carbon emission reduction goals. The good news is that China is making significant progress in slowing the rate of increase in its carbon emissions and is cooperating with the U.S. on implementing the Paris climate accord. The U.S. and China jointly submitted their ratification of the Paris Climate Agreement on the sidelines of the recent G-20 meeting. However, Japan and South Korea face difficult challenges in meeting their climate commitments due to public resistance to expanding nuclear energy, the high cost of LNG, and the resulting pressure to use more coal. Each country is pushing the expansion of renewable energy but they are starting from a very low base and the impact of renewables will take time. Japan has begun re-starting a few of its nuclear power plants after the shut downs following the Fukushima nuclear disaster but it remains very uncertain how far the government will be able to go in rebuilding Japan's nuclear capacity in the face of continuing public resistance and safety concerns.

Southeast Asia faces greater challenges in lightening up their coal and oil intensive energy footprint while meeting booming electricity demand. Extremely rapid electricity demand growth is driving them to expand their coal use and virtually every country in the region has plans to expand coal use. Indonesia and Vietnam are both large coal consumers and exporters and their energy plans include substantially expanding coal use. While the U.S. needs to work with the region to expand renewables and the spread of natural gas-fired generation in order to reduce the need for coal, the U.S. also needs to work with the region to expand the use of much higher efficiency coal-fired power plants which can reduce the climate impact of coal use. In this regard, the U.S. also needs to expand its research efforts on carbon capture and storage (CCS). This should be done collaboratively with other countries to spread the cost and expand the scale of research efforts.

Finally, India is a special case because it will be critical to global energy demand growth and efforts to reduce carbon emissions. India's energy demand is expected to rise by the most of any single country over the next 25 years, more even than China. It will lead in oil demand growth to fuel an enormous increase in motorization. India also plans to rapidly expand its already huge coal use to overcome severe electricity shortages and to meet rising electricity demand. Three hundred million Indians still do not have access to electricity. This bodes ill for global climate goals. In India, the U.S. also needs to expand its efforts to encourage natural gas use and to expand the role of cleaner coal burning technology. Otherwise, India and developing Asia outside of China will "lock-in" an enormous fleet of relatively inefficient, coal-burning power generation.

Mr. SALMON. Thank you. We are going to probably be called to vote in the next 15 minutes or so, and we would like to get through all the witnesses, at least get a stab at some questions, and it is the last votes of the day, so we probably won't reconvene afterwards. The little box in front of you usually tells you the timeframes.

Mr. KREUTZER. I got it. I am good with time.

Mr. SALMON. Okay. When it goes amber, that means, just like we drive, drive faster.

Mr. KREUTZER. No, no. When it goes to the amber, I say the end.

Mr. SALMON. The red means stop. All right. Thanks.

STATEMENT OF DAVID W. KREUTZER, PH.D., SENIOR RESEARCH FELLOW FOR ENERGY ECONOMICS AND CLIMATE CHANGE, CENTER FOR DATA ANALYSIS, INSTITUTE FOR ECONOMIC FREEDOM AND OPPORTUNITY, THE HERITAGE FOUNDATION

Mr. KREUTZER. Okay. Chairman Salmon and Ranking Member Sherman, I want to thank you and the other members of the committee for giving me an opportunity to address you today about the opportunities for American energy.

My name is David Kreutzer. I am senior research fellow in energy economics and climate change at The Heritage Foundation. However, what I say today should not be construed as an official position of The Heritage Foundation; they are my own views.

America is an energy powerhouse. The last decade has seen a phenomenal transformation. As recently as 2008, petroleum was trading at over $140 per barrel, natural gas was over $10 per million BTU. As oil and gas production was waning a decade ago, the peak oilers were in ascendance. The President, Obama, joined them in their pessimism. He loudly proclaimed that because we only had 2 percent of the world's resources, we could not continue to sustain our energy consumption. Further, he said we cannot drill our way to lower gasoline prices. And, on a more personal note, I was all but called a liar at a House budget hearing in September 2008 for proposing that we have a target for increasing petroleum production by 2 million barrels a day. One of the members held a letter from the head of the Energy Information Administration saying that even if we could do that, we wouldn't get more than a couple of dollars or a few dollars gain in price. Well, we were all wrong. From 2008 to 2015, America doubled its petroleum production. Natural gas production went up by about 60 percent. Not only did prices fall more than the $20 I was hoping for, they are $100 below the peak level in 2008 right now.

Today, the U.S. is the world's top producer of petroleum and natural gas. However, this energy revolution took place in the face of a hostile environment. The Obama administration within weeks of taking office cancelled already completed oil and gas leases in the southwest. They essentially within a year put a moratorium on not only deep water drilling, but shallow water drilling as well offshore. They started the clock. They tore up the 5-year energy plan, which further delayed access to resources on the Federal estate.

Perhaps most telling was the attitude of an EPA administrator in Texas who, taking his version of ancient history, claimed that

when the Romans went into a town, they would crucify the first two people they found so as to get everybody else to fall in line, and he used that analogy for his strategy in regulation.

Mr. SHERMAN. That is not true.

Mr. KREUTZER. It is on tape.

It shouldn't be surprising in the face of this sort of attitude toward energy production that the energy revolution we have seen has taken place almost exclusively on State and private land.

Asia's growing hunger for energy and U.S. supply opportunities depend on us being able to produce more. And, if we had positive, pro energy policies, it would be interesting to see what sort of results we could get from that. Whether for domestic consumption or for strategic reasons, moving forward with energy policy requires that we open up more of the Federal estate than we have to get better access to the resources that we own. To get an idea of what would happen if we did that, we at The Heritage Foundation, we have a clone of the Energy Information Administration's national energy modeling system, we ran their high resource case through the macro model and compared it to the reference case. And, I should note that the high resource case in 2008, its projections for last year were more accurate than the reference case was. What we find—the high resource case essentially assumes there is a 50 percent greater access to energy, the resources are 50 percent greater. When we ran that model, we found that between now and 2035, aggregate GDP in the U.S. would go up by $3.7 trillion.

A nominal family of four over that same period would see $40,000 additional income. That is roughly $2,000 per year. On average, the difference in employment is 700,000 jobs to the good if we have 50 percent greater access to energy. Households would spend 10 percent less on electricity. And, all of this without increasing Federal expenditure or taxation.

So, I would make a plea to the committee to consider proposing policies that would give greater access to our energy resources owned by the Federal Government. Thank you.

[The prepared statement of Mr. Kreutzer follows:]

CONGRESSIONAL TESTIMONY

Asia's Growing Hunger for Energy: U.S. Policy and Supply Opportunities

Testimony before
Foreign Affairs Committee: Subcommittee on Asia and the Pacific

United States House of Representatives

September 8, 2016

David W. Kreutzer, PhD
Senior Research Fellow in Energy Economics and Climate Change
The Heritage Foundation

My name is David Kreutzer. I am Senior Research Fellow in Energy Economics and Climate Change at The Heritage Foundation. The views I express in this testimony are my own and should not be construed as representing any official position of The Heritage Foundation.

Affordable and reliable energy are the lifeblood of a modern economy. This is evident when supply disruptions provide a negative shock to our economy. Examples here would be the Arab Oil Embargo of the 1970s and the Iraq war of the early 1990s. Energy-economy link is also evident when supply increases boost the economy. Here, the best example would be the U.S. oil and gas revolution brought on by smart-drilling technology. Events and policies that cripple energy access hobble the economy. Policies and technologies that improve access to affordable and reliable energy help the economy grow.

Drilling Our Way to Lower Prices

A common refrain of President Barak Obama was, "We can't just drill our way to lower gas prices."[1] However, we did drill our way to lower gas prices. Using smart-drilling technology and hydraulic fracturing, the U.S. nearly doubled its oil production between 2008 and 2015, which has led to dramatically lower world petroleum prices.

These lower prices leave consumers with more money in their pockets. The new technology gives American producers an ability to rapidly ramp up production. This fast-supply response guts the threat

[1]For examples, see news release, "Weekly Address: Investing in a Clean Energy Future," The White House, March 10, 2012, https://www.whitehouse.gov/the-press-office/2012/03/10/weekly-address-investing-clean-energy-future (accessed June 17, 2016); Andrew Restuccia, "Obama: Nation Can't Drill its Way out of Soaring Gas Prices," *The Hill*, May 6, 2011, http://thehill.com/policy/energy-environment/159705-obama-more-drilling-is-not-the-solution (accessed June 17, 2016); and "Obama: Can't Drill Our Way to Lower Gas Prices," video, YouTube, https://www.youtube.com/watch?v=bEyPkY0Kf-Y (accessed June 17, 2016).

of production cuts by foreign oil exporters. As a result, instability in the Middle East no longer threatens economic growth everywhere else and OPEC is no longer Master of the Energy Universe.[2]

Even more amazing is that this American energy renaissance occurred despite the Obama Administration's policies that blocked oil and gas production on the federal estate. In the early months of his first term the Department of Interior cancelled oil and gas lease sales.[3] In 2011, the Interior Department instituted a de facto moratorium on drilling for offshore oil and gas.[4] Perhaps most telling was the Environmental Protection Agency's (EPA's) outright hostility toward conventional energy production as displayed by Al Armendariz. A political appointee, Mr. Armendariz was an EPA regional administrator whose stated policy was to "crucify" select oil and gas companies so that others would be too terrified to challenge his policies.[5] It was almost as if President Obama's "Can't just drill our way to lower gas prices" statement was a command and not simply a seriously flawed observation.

It should not be surprising that oil and gas production on the federal estate has been stagnant for most of President Obama's tenure. However, the U.S. and energy consumers worldwide have been fortunate that his Administration's hostility to oil and gas production had less impact on state and private lands. These state and private lands are where the energy renaissance blossomed.

What if Federal Policy Were Pro-Energy?

Increasing the supply of energy will reduce prices. The lower prices allow consumers to spend less on heating, cooling, lights, and on fuel for their cars. This means more is left over to spend on everything else. In addition, lower energy prices lead to lower costs of production for producers. The lower production costs combined with the higher residual income on the part of consumers means producers can sell more output. Producing more output requires more labor. As the benefits of lower energy prices circulate through the economy there will be more jobs and higher income.

As amazing as the U.S. energy renaissance has been, one wonders how much better and broader it might be with federal policies that do not hinder production and distribution of energy? While it is not a direct answer to that question, sensitivity analysis produced by the Energy Information Administration (EIA) can give us a hint.

In its yearly reference work, the *Annual Energy Outlook*, the EIA runs high-resource and low-resource side cases in addition to its reference case. Though not intended to model any particular policy, the side cases illustrate the importance of energy to the economy.

The side case of interest, here, is the high-resource side case. The high-resource case assumes 50 percent greater resource availability than the reference case. Comparing economic projections of these

[2]Chriss Street, "OPEC Accepts Defeat in Anti-Fracking War with U.S.," *American Thinker*, May 30 2015, http://www.americanthinker.com/blog/2015 (accessed September 6, 2016).
[3]Amy Joi O'Donoghue, "Salazar Halts Sale of Utah Oil, Gas Leases," *Deseret News*, February 5, 2009, http://www.deseretnews.com/article/705282698/Salazar-halts-sale-of-Utah-oil-gas-leases.html?pg=all (accessed June 17, 2016).
[4]Institute for Energy Research, "Obama's Offshore Plan: One Giant Leap Backwards," May 8, 2012, http://instituteforenergyresearch.org/analysis/obamas-offshore-plan-one-giant-leap-backwards/ (accessed June 17, 2016).
[5]Christopher Helman, "EPA Official Not Only Touted 'Crucifying' Oil Companies, He Tried It," *Forbes*, April 26, 2012, http://www.forbes.com/sites/christopherhelman/2012/04/26/epa-official-not-only-touted-crucifying-oil-companies-he-tried-it/#e26e2097ac32 (accessed June 17, 2016).

two cases gives a point of reference for pro-energy policies. We have been able to do just that at The Heritage Foundation.

The Heritage Foundation has installed a clone of the EIA's National Energy Modelling System (NEMS). In addition Heritage also runs the IHS/Global Insight macroeconomic model that is paired with NEMS. This combination allows us look at a variety of economic outcomes when comparing the reference and high-resource cases.[6]

Subtracting the projected employment in the reference case from the projected employment in the high-resource case gives the employment differential for each year. The process for income differential was similar. For each year through 2035, the reference-case income is subtracted from the high-resource-case income.

In brief, the comparison found greater energy access would lead to more jobs and greater income. Running the model through the year 2035 produced a peak employment differential of 1,500,000 jobs and an average employment differential of 700,000. The projected income differential was also positive. The bump in annual personal income for a nominal family of four averaged about $2,000 per year. Under the high-resource case aggregate, gross domestic product through 2035 would be $3.7 trillion greater than under the reference case.

Energy-intensive sectors of the economy see larger than average improvements with greater energy availability. For instance, by 2035, machinery manufacturing would see roughly 7 percent greater employment under the high-resource case than in the reference case.

Though a 50 percent higher resource availability is far from trivial, it should be noted that actual oil production in 2015 was 50 percent higher than the EIA's reference-case projection done in 2008. In the *2008 Annual Energy Outlook* the projected domestic oil production was 6.16 million barrels per day. Actual 2015 production was 9.40 million barrels per day. Actual natural gas production in 2015 was 38 percent higher than that projected in the EIA reference case published in 2008.[7]

Economic Security Dividend

In a 2012 regulatory impact analysis, the EPA quantified the benefits of reducing oil imports.[8] It was an attempt to estimate the external cost of importing oil, but it simultaneously gave a value for the reciprocal external benefit of domestic oil production because producing a barrel domestically obviates the need for a barrel of imported oil.

[6]For more in-depth analysis and an explanation of the methodology, see Kevin D. Dayaratna, David W. Kreutzer, and Nicolas Loris, "Time to Unlock America's Vast Oil and Gas Resources," Heritage Foundation *Backgrounder* No. 3148, September 1, 2016, http://www.heritage.org/research/reports/2016/09/time-to-unlock-americas-vast-oil-and-gas-resources.

[7]U.S. Energy Information Administration, *Annual Energy Outlook 2008*, June 2008, https://www.eia.gov/oiaf/archive/aeo08/index.html (accessed June 20, 2016), and U.S. Energy Information Administration, *Annual Energy Outlook 2016*, July 7, 2016, http://www.eia.gov/forecasts/aeo/ (accessed June 20, 2016).

[8]U.S. Environmental Protection Agency, *Joint Technical Support Document: Final Rulemaking for 2017-2025 Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards*, August 2012, p. 4-31, https://www3.epa.gov/otaq/climate/documents/420r12901.pdf (accessed September 5, 2016).

The reported mid-point value for 2020 was $17.64 per barrel in 2010 dollars. That is, for every barrel produced in the U.S. that displaces an imported barrel, there are benefits of $17.64 that accrue to those who do not either consume or produce that barrel. In the not-quite-accurate jargon of the EPA, this is the per-barrel social benefit of domestic oil production—a measure of the benefits that are not captured by either buyer or seller in the energy market.[9]

To be fair, I have been very critical of the EPA's other social-cost estimates, in particular its estimate of the Social Cost of Carbon.[10] However, the EPA also needs to be consistent. If they claim there are external benefits of cutting imports, they need to apply that benefit to domestic production as well as to energy conservation.

For instance, if $17.64 per barrel is a good estimate of this external benefit, then for the years 2009 through 2015, the total external benefits of the increased oil production (over and above the 2008 levels) was more than $80 billion. The benefit was more than $28 billion in 2015 alone. Since nearly all of the increased production is from hydraulically fractured wells, we could call these figures the external benefit of fracking.

These calculated external benefits are for the U.S. and do not include the benefits of economic stability for the rest of the world. Including worldwide impacts (as the EPA does in its Social Cost of Carbon calculations) would increase the estimated external benefit of our domestic oil production.

Conclusion

Increasing the availability of affordable and reliable energy makes an economy stronger. This relationship is easiest to see in the case of petroleum. In the 1970s and again around 2007–2008 we saw the negative economic impact of high energy prices brought on by shocks to the petroleum markets. As the more recent shock was playing out, game-changing technology spread across the U.S. oil patch. Smart-drilling technology combined with hydraulic fracturing added the vast shale resources to our petroleum reserves. Old production fields were revitalized and new fields came online. U.S. oil production nearly doubled in less than a decade. Energy modeling shows that expanded production can add hundreds of thousands (if not millions) of jobs and add thousands of dollars per year to average family income.

Applying EPA estimates of external benefits of reducing oil imports reaches a similar conclusion about the benefit of increased energy production. Unsubsidized and profitable domestic oil production makes for a stronger and more stable economy.

[9]Social cost is the sum of private costs and external costs. What the EPA calls the Social Cost of Carbon is actually an attempt to estimate the external cost of carbon. The definition of social benefit is similar. It is the sum of private and external benefits.

[10]For example, Kevin D. Dayaratna and David W. Kreutzer, "Unfounded FUND: Yet Another EPA Model Not Ready for the Big Game," Heritage Foundation *Backgrounder* No. 2897, April 29, 2014, http://www.heritage.org/research/reports/2014/04/unfounded-fund-yet-another-epa-model-not-ready-for-the-big-game, and Kevin D. Dayaratna and David W. Kreutzer, "Loaded DICE: An EPA Model Not Ready for the Big Game," Heritage Foundation *Backgrounder* No. 2860, November 21, 2013, http://www.heritage.org/research/reports/2013/11/loaded-dice-an-epa-model-not-ready-for-the-big-game.

Perversely, our federal energy policy has been antagonistic toward domestic oil and gas production (to say nothing of coal). The entire oil and gas revolution has taken place on state and private land. Locking up the vast oil and gas reserves on the federal estate is bad policy for the American economy.

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Mr. SALMON. Thank you. Mr. Schmidt.

STATEMENT OF MR. JAKE SCHMIDT, DIRECTOR, INTERNATIONAL PROGRAM, NATURAL RESOURCES DEFENSE COUNCIL

Mr. SCHMIDT. Thank you. Thank you, Chairman Salmon and Ranking Member Sherman, and distinguished members of the committee. Thank you for inviting me on behalf of the Natural Resource Defense Council to present my views on the energy opportunities and challenges for the Asia region.

This region, as was mentioned, is one of the fastest growing energy markets in the coming decades, so the actions that this region takes on clean energy and climate change will be critical in helping the world move to a climate-safe trajectory. This region has a huge opportunity to expand renewable energy and energy efficiency, and the United States has an important role to play in helping this region develop its energy future in a responsible and environmentally sound manner. I will hit on three points from my full written testimony to summarize.

First, there is a new dynamic emerging in the Asia region, as reflected in the historic Paris Agreement. This agreement includes new climate commitments from all of the major countries in the world, including the countries in the Asia region. The countries in the Asia region are already showing that they are prepared to help this agreement deliver over time. There is, I would say, a very high likelihood that we will reach the threshold for this agreement to enter into force this year. We have now 59 countries that account for more than 60 percent of the world's emissions that have formally said that they will join this agreement this year. Just last week, China and the United States both formally took that step to join this agreement, and we expect that more countries in the Asia region will take that step this year as well.

So, key countries as a part of this have put forward robust climate and clean energy targets as a part of the Paris Agreement. One hudred eighty-seven countries responsible for more than 97 percent of the world's emissions put forward climate pollution targets as a part of this Paris Agreement, including all major countries in the Asia region.

Second, this region is a major market for clean energy, and this opportunity is poised for significant expansion. The Asia region has witnessed a huge uptick in clean energy deployment in the past few years. According to Bloomberg New Energy Finance, clean energy investment in the Asia Pacific region totaled $161 billion in 2015, an increase of almost 700 percent since 2005.

The current climate targets, including those contained in the Paris Agreement, mean that Asia's largest economies are committing themselves to clean energy goals and implementing the necessary domestic actions to meet these goals. Significant renewable energy expansion is expected in China, India, and other countries in the region as a result. As a result, the deployment of clean energy in the Asia region is projected to continue to surge in the coming years. Again, according to Bloomberg New Energy Finance, renewable energy will make up nearly two-thirds, or $3.6 trillion, of

the electricity capacity added over the next 25 years in the Asia Pacific region.

Lastly, what can the United States do to help with this clean energy revolution in the Asia region? The U.S. can embark, I think, on three key actions, many of which are building blocks that the U.S. has already been delivering over time. First, the U.S. has active climate and clean energy bilateral agreements with a number of countries in the region, including China and India. The U.S. should strengthen the bilateral clean energy efforts with these countries. At the same time, the U.S. should further develop bilateral clean energy efforts with others in the region, such as Indonesia and Vietnam, since both countries have large untapped renewable energy potential.

Second, it is important to ensure that countries create both the right policy framework and the right finance dynamics to track the needed private sector investments in clean energy space. For example, my organization, NRDC, has found that new innovative finance models like green banks and green bonds can help unleash even larger amounts of private capital over time. The U.S. should play a key role in helping countries in the Asia region put in place better policy and finance frameworks for clean energy.

Third, by mobilizing U.S. investments for clean energy, the U.S. helps create growing clean energy markets in the Asia region. The U.S. should continue to fund contributions to the GCF. At the same time, the U.S. can help to mobilize additional investments through such mechanisms as the Overseas Private Investment Corporation, trade missions, and other venues where the U.S. helps to catalyze these private sector investments.

So, to conclude, in our opinion, the U.S. can help the Asian countries meet their growing energy needs in a low carbon and environmentally responsible manner. This effort can create new markets for renewable energy and energy efficiency companies and workers, help secure a more stable region, and protect all Americans from the devastating impacts that will occur if we don't act aggressively on climate change. Thank you.

[The prepared statement of Mr. Schmidt follows:]

TESTIMONY OF JAKE SCHMIDT

DIRECTOR, INTERNATIONAL PROGRAM,

NATURAL RESOURCES DEFENSE COUNCIL

HEARING ON

"ASIA'S GROWING HUNGER FOR ENERGY: U.S. POLICY AND SUPPLY OPPORTUNITIES"

BEFORE HOUSE COMMITTEE ON FOREIGN AFFAIRS, SUBCOMMITTEE ON ASIA AND THE PACIFIC

U.S. HOUSE OF REPRESENTATIVES

SEPTEMBER 8, 2016

Chairman Salmon, Ranking Member Sherman and distinguished members of the Committee, thank you for inviting me to present the Natural Resources Defense Council's (NRDC's) views on Asia's energy opportunities and challenges.

The Asia region is a diverse region with a huge opportunity to spur more renewable energy and energy efficiency deployment and reduce the greenhouse gas emissions that are causing climate change. The region is projected to be one of the fastest growing energy markets in the coming decades so the actions this region takes on clean energy and climate change will

be critical in helping the world move to a climate safe trajectory.[1] The United States has an important role to play in helping this region shape its energy future in a responsible and environmentally sound manner. This action will help create new markets for renewable energy and energy efficiency companies and workers, help secure a more stable region, and protect all Americans from the devastating impacts that will occur if we don't act aggressively on climate change.

We have a responsibility to protect our children and future generations from the effects of climate change by reducing emissions of carbon dioxide and other heat-trapping pollutants. The historic Paris Agreement secures commitments to cut carbon pollution from all major countries, including the key countries in the Asia region. The U.S. can help these countries meet their climate targets by helping further unleash the clean energy potential in the region.

A new dynamic has emerged in the Asia region as reflected in the historic Paris Agreement on climate change. For almost two decades opponents of climate action in the U.S. have argued that the U.S. shouldn't act until other major emitters also act. In the past couple of years one of the key shifts is the perception that countries like China aren't doing anything on climate change – a relic of the debate almost two decades ago – to a new reality – that all major emitters are taking more aggressive climate action. The Paris Agreement adopted last December reflects this shift.

Countries finalized an historic new international climate change agreement that includes new climate commitments from all major countries and sets in motion efforts to require deeper

[1] The Energy Information Administration (EIA) in its International Energy Outlook 2016 projects that primary energy use in "OECD Asia" will grow at 0.8 percent per year from 2012-2040 and "non-OECD Asia" will grow at 2.2 percent per year over this timeframe. In comparison, EIA projects that Africa's primary energy-use will grow at 2.6 percent per year from 2012-2040.

emissions reduction commitments from all countries over time. The agreement contains provisions to hold countries accountable to their commitments and mobilize greater investments to assist developing countries in building low-carbon, climate-resilient economies.

The countries in the Asia region play an important role in helping ensuring that the Paris Agreement delivers over time. These countries are already showing that they are prepared to help the Paris Agreement deliver. When the Paris Agreement was opened for signature over 175 countries – including all key countries in the Asia region – signed the Agreement, signifying their intent to formally join. And, leading Asian countries are moving forward with their relevant domestic processes to formally join the Agreement.

In order for the Paris Agreement to "Enter into Force", fifty-five countries that account for fifty-five percent of the world's emissions will need to formally join. There is a high likelihood that we will reach these thresholds this year. Fifty-nine countries that account for more than sixty percent of the world's emissions have publicly announced that they will formally join the Paris Agreement this year.[2] Last week, China formally joined the Paris Agreement alongside the U.S.[3] More countries in the region are likely to follow the U.S. and China this year as most of the key countries in the Asia region have announced their intent to formally join the Agreement this year.[4]

Key countries in Asia have put forward robust climate and clean energy targets as a part of the Paris Agreement. Before and during the meeting in Paris, 187 countries responsible

[2] According to the tally from NRDC based upon public announcements by key government officials.
[3] See: https://www.whitehouse.gov/the-press-office/2016/09/03/fact-sheet-us-china-cooperation-climate-change
[4] According to NRDC calculations, see Table 1.

for more than 97 percent of the world's climate pollution announced specific plans – so called "intended nationally determined contributions" (INDCs) – which outline the emissions reduction targets that they will commit to in the Paris Agreement. Key countries in the region have meaningful climate targets as a result of the Paris agreement including:[5]

- *China* – committed to: peak its carbon pollution no later than 2030 with the intention to try to peak early, increase the non-fossil fuel share of all energy to around 20 percent by 2030; and to reduce carbon emissions per unit of gross domestic product GDP by 60 to 65 percent from 2005 levels by 2030;[6]
- *India* – committed to: reduce emissions intensity by 33 to 35 percent from 2005 levels by 2030, increase cumulative electric power installed capacity from non-fossil fuel energy resources to 40 percent by 2030, and create additional carbon sequestration of 2.5 to 3 billion tons of carbon dioxide equivalent by 2030;
- *South Korea* – committed to reduce greenhouse gas emissions by 37 percent from business-as-usual levels by 2030 across all economic sectors;
- *Japan* – committed to cut its emissions 26 percent below 2013 levels by 2030; and
- *Vietnam* – committed to cut greenhouse gas emissions eight percent by 2030 compared to the business-as-usual scenario.

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[5] For a brief summary on new climate targets of key countries, see: https://www.nrdc.org/experts/jake-schmidt/paris-climate-agreement-explained-what-actions-did-countries-commit-implement. For a summary of the climate targets of key Asian countries see Table 2.

[6] This is a commitment to even deeper cuts in the country's climate pollution than many expected was achievable just a few short years ago. In fact, prior to the announcement many experts predicted that China's emissions wouldn't peak for several more decades. Prior to the announcement, the U.S. Energy Information Administration's reference scenario, projected that China's CO_2 emissions wouldn't peak until well after 2040, and other estimates followed a similar trend.

- *Indonesia* – committed to cut emissions by 29 percent by 2030 compared to its BAU level.

The Asia region is a major market for clean energy and this opportunity is poised for significant expansion. The Asia region has witnessed a huge uptick in its clean energy deployment the past few years. According to Bloomberg New Energy Finance, clean energy investment in the Asia and Pacific region totaled $161 billion in 2015 – an increase of almost 700 percent since 2005.[7] This clean energy deployment is being driving by the renewable energy and energy efficiency policies in these key countries, coupled with the continued decline of the cost of clean energy. For example:

- *China* has a National Renewable Energy Law that has helped the country increase its domestic wind and solar energy deployment from almost nonexistent levels a decade ago to the largest in the world today. More recently, China's renewable energy deployment has been aided by renewable energy quotas that require provinces to meet specific non-hydro renewable energy targets. China's wind power grew by an incredible 32.5 GW and its solar PV by 15 GW in 2015, to a total of 129 GW and 43 GW respectively. Similar opportunities are materializing in China's energy efficiency efforts.[8] China achieved its energy-intensity target set in its 12th Five Year Plan (2011-2015) and

[7] REN21, Renewables 2016: Global Status Report, available at: http://www.ren21.net/status-of-renewables/global-status-report/

[8] See: Schmidt and Lin, *US and China Formally Join the Paris Agreement*, available at: https://www.nrdc.org/experts/jake-schmidt/us-and-china-formally-join-paris-agreement

has set a binding energy efficiency target in its current Five Year Plan to cut energy consumption per unit of GDP by 15 percent from 2016-2020.[9]

- *India's* solar market has grown more than 500 fold in the past six years to nearly 8 GW of commissioned projects by the end of July 2016. India is also the world's fourth largest wind energy producer. In energy efficiency, the Indian government is also helping to drive more deployment. The government plans to make the Energy Conservation Building Code mandatory nationally by 2017. This code establishes energy efficiency levels for commercial buildings. Twelve of India's 29 states have adopted the code as of April 2016, and several more plan to follow. India has repeatedly doubled an innovative tax on coal to a current level of over $6/tonne, with the proceeds earmarked for investments in environmental activities.

The current climate targets, including those contained in the Paris Agreement, mean that Asia's largest economies are committing themselves to clean energy goals and implementing the necessary domestic actions to meet these goals.[10] For example:

- China's renewable energy deployment is expected to increase to 250 GW for wind power and 150 GW for solar PV by 2020, an average yearly increase of 24.2 GW and 21.4 GW respectively.

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[9] See: Lin, *How China's 13th Five Year Plan Climate and Energy Targets Accelerate its Transition to Clean Energy*, available at: https://www.nrdc.org/experts/alvin-lin/how-chinas-13th-five-year-plan-climate-and-energy-targets-accelerate-its

[10] See Table 3 for a summary of the renewable energy targets in country INDCs and the current status of renewable energy deployment.

- India's flagship National Solar Mission, which originally aimed to install 20 GW of solar power capacity by 2022, is now targeting 100 GW of solar by 2022. The Modi government is also aiming to achieve 75 GW of wind power capacity by 2022.
- Indonesia has a target to have renewable energy produce 25 percent of its primary energy by 2025.

As a result, deployment of clean energy in the Asia region is projected to continue to surge in the coming years driven by their climate targets in the Paris Agreement and the declining cost of renewable energy technologies. According to Bloomberg New Energy Finance:

> "The Asia-Pacific region will experience colossal growth in new power generation capacity over the next 25 years, with installed capacity tripling and electricity generation doubling. Renewable energy will make up nearly two-thirds –or $3.6tn –of the 4,890 GW added during this period."[11]

The United States can help the Asia region embark on a clean energy future. The best course for the U.S. is to embrace this clean energy transition and strengthen our engagement in the Asia region focused around clean energy deployment. Towards that end, the U.S. should work with key countries in the region by:

(1) Strengthening our bilateral engagement. The U.S. has active climate and clean energy bilateral agreements with a number of countries in the region including China and India. These bilateral efforts have made important strides in helping these countries unleash stronger climate and clean energy actions. The U.S. should strengthen bilateral efforts

[11] Bloomberg New Energy Finance, *New Energy Outlook 2016: Powering a Changing World.*

with China and India as they embark on major clean energy deployment efforts. At the same time, the U.S. has bilateral agreements with a number of countries in the region that are less developed (e.g., Indonesia and Vietnam). Following from the Paris Agreement, the U.S. should work with Indonesia and Vietnam to help these countries meet their energy needs in a low carbon manner. Both countries have large untapped renewable energy potential.

(2) Helping create the policy and finance landscape for even greater action. Energy deployment has moved away from a world where the "economics" favor dirty sources of energy, as wind, solar, and other renewable energy sources are now cost competitive even without factoring in the damaging climate costs of dirty energy. As a result, it is important to ensure that countries create both the right policy and finance dynamics to attract the needed private sector investments. For example, NRDC has found that new innovative finance models – such as Green Banks and Green Bonds – can help key countries unleash even larger amounts of private finance.[12] The U.S. should play a key role in helping countries in the Asian region put in place better policy and finance frameworks to unleash the huge clean energy potential in the region.

(3) Mobilizing U.S. investments. The U.S. should expand its investments in clean energy deployment in the region. By mobilizing U.S. investments for the Green Climate Fund (GCF), the U.S. helps to create growing clean energy markets in the Asia region. The U.S. should continue to fund the regular contributions to the GCF in order to meet the pledge of $3 billion. At the same time, the U.S. can also help to mobilize additional

[12] NRDC, *Greening India's Financial Market: Opportunities for a Green Bank in India*, available at: https://www.nrdc.org/resources/greening-indias-financial-market-investigating-opportunities-green-bank-india

investments through the Overseas Private Investment Corporation, the Millennium Challenge Corporation, trade missions, and other venues where the U.S. helps to catalyze private sector investments.

The U.S. needs to be responsible with other sources of energy. The U.S. and the Asia region also have energy interactions outside of clean energy. The U.S. must pursue these dynamics in an environmentally and climate-sound manner. NRDC acknowledges that nuclear energy will likely continue to play a role in the energy policies of countries in the Asia and Pacific region – notably China now has the greatest number of nuclear reactors under construction, and South Korea is developing as an exporter of nuclear reactors. However nuclear safety and spent nuclear fuel management are continuing challenges for the nuclear industry globally, and are enormous problems for Japan at this time. In addition, the capability to reprocess spent nuclear fuel being pursued by China and South Korea and unsuccessfully attempted in Japan is uneconomical; does not reduce the nuclear waste burden; has no merit in addressing climate change; and increases the risk of nuclear weapons proliferation from separating plutonium. NRDC opposes the reprocessing of spent nuclear fuel, and instead advocates for direct disposal of the highly radioactive waste in a deep geologic repository.

A number of countries in the Asia region are interested in U.S. oil and gas exports. Exports of oil and gas must be thoroughly and comprehensively analyzed to assess the full cumulative environmental impacts. Yet this analysis is not being done when new projects are considered. The potential impacts include not only the greenhouse gas emissions of the full life cycle, including those from any increased oil and gas production and transmission, but also

toxic air pollutants, contamination of groundwater and surface water, significant safety hazards, harms to the quality of life and economies of local communities, and destruction of sensitive ecosystems and wildlife habitat.

Conclusion. The U.S. can help Asian countries meet their growing energy needs in a low carbon and environmentally responsible manner. By working directly with key countries in the region to unleash their clean energy potential, the U.S. can help American companies and workers tap into this growing clean energy demand and help stave off the damages of climate change. The U.S. should work actively with key Asian countries to help them meet and exceed their climate and clean energy targets and put the world on a much safer climate trajectory.

Thank you.

Table 1: Status of key Asian countries in formally joining the Paris Agreement

Country	Signed the Paris Agreement?	Formally Joined?	Share of Emissions
China	Yes	Formally joined	20.09%
India	Yes	No announcement yet	4.10%
Indonesia	Yes	Announced - before end of 2016	1.49%
Japan	Yes	Announced - before end of 2016	3.79%
Malaysia	Yes	No announcement yet	0.52%
South Korea	Yes	No announcement yet	1.85%
Vietnam	Yes	Announced - before end of 2016	0.72%

Source: Natural Resources Defense Council, based upon public announcements

Table 2: National climate targets of key Asian countries as a part of the Paris Agreement

Country	Intended Nationally Determined Contribution
China	Reduce carbon intensity 60%-65% relative to 2005, 20% non-fossil fuels by 2030, increased forest cover, and to achieve the peaking of carbon dioxide emissions around 2030 and making best efforts to peak early.
India	reduce intensity 33-35% by 2030 relative to 2005
Indonesia	Reduce emissions 29% below BAU by 2030 (unconditional); reduce emissions 41% below BAU by 2030 (conditional)
Japan	26% below 2013 levels by 2030
Malaysia	Malaysia intends to reduce its greenhouse gas (GHG) emissions intensity of GDP by 45% by 2030 relative to the emissions intensity of GDP in 2005. This consists of 35% on an unconditional basis and a further 10% is condition upon receipt of climate finance, technology transfer and capacity building from developed countries.
South Korea	37% below BAU of 850.6 MtCO2e by 2030 (25.7% domestically and 11.3% by international market mechanisms)
Vietnam	GHG emissions will be reduced by 8% by 2030 compared to the Business as Usual scenario (BAU). The above-mentioned contribution could be increased up to 25% with international support.

Source: Natural Resources Defense Council, based upon country INDC submissions

Table 3: Summary of Renewable Energy Policies and Goals of Select Asian Countries

Country	INDC Renewable Goals	Current renewable levels
China	• To accelerate the construction of low-carbon communities in both urban and rural areas, promoting the construction of green buildings and the application of renewable energy in buildings, improving low-carbon supporting facilities for equipping communities and exploring modes of low-carbon community operation and management; • To proactively promote the development of hydro power, on the premise of ecological and environmental protection and inhabitant resettlement; • To scale up the development of wind power; • To accelerate the development of solar power; • To proactively develop geothermal energy, bio-energy and maritime energy; • To achieve the installed capacity of wind power reaching 200 gigawatts, the installed capacity of solar power reaching around 100 gigawatts and the utilization of thermal energy reaching 50 million tons coal equivalent by 2020; • To scale up distributed energy and strengthen the construction of smart grid.	By 2014 the following has been achieved: • The share of non-fossil fuels in primary energy consumption is 11.2%; • The installed capacity of on-grid wind power is 95.81 gigawatts (90 times of that for 2005); • The installed capacity of solar power is 28.05 gigawatts (400 times of that for 2005); • The installed capacity of nuclear power is 19.88 gigawatts (2.9 times of that for 2005).

Country	INDC Renewable Goals	Current renewable levels
India	• On the demand side, efforts are being made to efficiently use energy through various innovative policy measures under the overall ambit of Energy Conservation Act. • Achieve 175 GW renewable energy capacity in the next few years • With a potential of more than 100 GW, the aim is to achieve a target of 60 GW of wind power installed capacity by 2022. • The ambitious solar expansion programme seeks to enhance the capacity to 100 GW by 2022, which is expected to be scaled up further thereafter • A number of programmes have been initiated for promotion of cleaner and more efficient use, including biomass based electricity generation. It is envisaged to increase biomass installed capacity to 10 GW by 2022 from current capacity of 4.4 GW. • National Smart Grid Mission has been launched to bring efficiency in power supply network and facilitate reduction in losses and outages. Green Energy Corridor projects worth INR (Indian National Rupee) 380 billion (USD 6 billion) are also being rolled out to ensure evacuation of renewable energy. • The National Mission for Enhanced Energy Efficiency (NMEEE) aims to strengthen the market for energy efficiency by creating a conducive regulatory and policy regime. It seeks to upscale the efforts to unlock the market for energy efficiency and help achieve total avoided capacity addition of 19,598 MW and fuel savings of around 23 million tonnes per year at its full implementation stage. The programmes under this mission have resulted in an avoided generation capacity addition of about 10,000 MW between 2005 and 2012 with government targeting to save 10% of current energy consumption by the year 2018-19.	• Between 2002 and 2015, the share of renewable grid capacity has increased over 6 times, from 2% (3.9 GW) to around 13% (36 GW). • Wind energy has been the predominant contributor to the renewable energy growth in India accounting for 23.76 GW (65.2%) of the renewable installed capacity, making India the 5th largest wind power producer in the world. • Solar power installed capacity has increased from only 3.7 MW in 2005 to about 4060 MW in 2015, with a CAGR of more than 100% over the decade. • Biomass energy constitutes about 18% of total primary energy use in the country and more than 70% of the country's population depends on it. However, it is currently used in an inefficient manner with high levels of indoor pollution. • India had 258GW of total power capacity at the end of 2014 of which renewables represented 34GW (13%). • It has been estimated that thanks to strong sun, India has the potential to host no less than 749GW of solar power generating capacity. As of the end of 2014, however, the country had just 3GW installed. The 100GW solar by 2022 target outlined by the Modi government suggests 12GW of new build will be needed per year.

Country	INDC Renewable Goals	Current renewable levels
Indonesia	• Aims to boost renewables' share of the total primary energy mix to 23% by 2025, compared to 15% previously. The government also plans to encourage distributed renewable energy with an eye toward achieving 100% electrification by 2020 (up from 84.5% today).	• It has conducted reverse auction programs for power contracts with geothermal and solar projects. Meanwhile, biomass & waste and small hydro projects have been offered feed-in tariffs. The country also has biofuel consumption mandates for the transport, commercial and power generation sectors. Furthermore, the government makes available a broad range of tax incentives, including income tax rebates, accelerated depreciation and exemptions on import VAT. • Unfortunately, project development has been slower than expected largely because these policies have not delivered. The reverse auctions have not been conducted successfully, and the feed-in tariff rates were not sufficiently high to generate excitement among private developers. Furthermore, regulatory barriers have significantly slowed the rate of project approval, and financing difficulties have caused a halt in project development. In 2014 only 100MW of renewable capacity was built.
Japan	• Expanding renewable energy introduction to the maximum extent possible • Energy efficiency goals in commercial and residential sectors.	Total Power Generation: 1065 billion kWh • Renewables 22-24% (Solar, 7%, Wind 1.7%, Geothermal 1.0-1.1%, Hydro 8.9-9.2%, Biomass 3.7-4.6%)
Malaysia		• The Tenth Malaysia Plan (2011-2015) focussed on sustainable growth and introducing mitigation strategies to reduce emissions of GHG. A significant tool included in this plan is the introduction of a feedin-tariff (FIT) mechanism in conjunction with the Renewable Energy Policy and Action Plan (2010) to help finance renewable energy investment, providing fiscal incentives and funding for green technology investments and promoting projects eligible for carbon credits.
South Korea		

Country	INDC Renewable Goals	Current renewable levels
Vietnam	• Innovate technologies and apply advanced management and operation procedures for efficient and effective use of energy in production, transmission and consumption, especially in large production facilities where energy consumption is high; • Apply energy savings and efficiency, and renewable energy applications in the residential sector, trade and services; • Develop public passenger transport, especially fast modes of transit in large urban centers. Restructure freight towards a reduction in the share of road transport in exchange for an increase in the share of transportation via rail and inland waterways; • Establish standards on fuel consumption, and develop a roadmap to remove obsolete operations • Change the energy structure towards a reduced share of fossil fuel, encouraging the exploitation and use of renewable and low GHG emission energy sources; • Apply market instruments to promote structural change and improve energy efficiency; encourage the use of clean fuels; support the development of renewable energy; implement the roadmap to phase out subsidies for fossil fuels; • Develop and implement financial and technical mechanisms and policies to support research and the application of appropriate advanced technologies; exploit and optimize the use of renewable energy sources, both on-grid as well as off grid; • Develop a renewable energy technology market, domestic industries and local service providers.	• The Government has issued many policies on energy saving and efficiency, such as the "National Target Programme on Energy Efficiency" (2006), the Law on "Economical and Efficient use of Energy" (2010). The Government has prioritized policies, such as renewable energy development, consistent with Viet Nam's mitigation potential and conditions, in order to contribute to energy security and environmental protection. Policies encouraging energy savings and efficiencies in production and daily life, through the application of energy saving and renewable energy technologies, are also a priority. • Vietnam currently relies mostly on large hydropower and natural gas to meet its electricity needs, with the former accounting for 40% (59.8TWh) and the latter 30% (44.9TWh) of its total power generation of 148TWh. Both sources will recede from the total power mix in coming decades if the country's 'Power Master Plan 7' is carried out. • The government targets an increase in electricity generated from non-hydro renewable sources from the present 3.5% to 4.5% in 2020 and 6% in 2030. Wind and biomass are the sectors identified to realize the target. The installation target for wind is 1GW by 2020 and 6.2GW by 2030; for biomass it is 0.5GW by 2020 and 2GW by 2030. • Feed-in tariffs have been introduced for wind energy and biomass energy. • A preferential taxation policy offers an income tax rate of 10% for 15 years to all renewable energy technologies, compared to the statutory rate of 25%. Alternatively, project developers can enjoy tax exemption for the first four years and a 50% reduction in tax payable for nine subsequent years.

Source: Natural Resources Defense Council, compiled from country "INDC" submissions and ClimateScope.

Mr. SALMON. Thank you. Given the fact that we are on kind of a truncated timeframe here, I am going to limit members' questions to 2 minutes. I apologize for doing so, normally we are pretty liberal with that, but I think we will just need to do that so everybody gets an opportunity.

With the opening of the U.S. shale revolution, America has become a global supplier of LNG. Adding American natural gas to the global market has helped diversify supplies and reduce the price of natural gas both home and abroad, especially in Asia, which was once the most expensive market in the world. The expansion of the Panama canal should also add to the ease of LNG shipments abroad.

Are the regulations on shale gas production and exports sufficiently open to facilitate free market flow of LNG? If not, what hindrances still remain for the industry, and aside from regulations, what is the state of infrastructure to facilitate these exports? Anybody want to try and stab at that? Dr. Kreutzer, go ahead.

Mr. HERBERG. You know, I think the bulk of the heavy lifting has been done on that. I would recommend we move—you know, simplify the process of getting these LNG terminals approved. It is very—you know, takes much too long, so I think we should simplify that process.

There are some shipping regulations, I am not familiar with all the details of it, that would make shipping a little bit easier, but I think the heavy lifting is getting these things approved. We have made a lot of progress, but we need to speed that up. The canal makes that a lot easier to ship that stuff. Europe will be able to use some of that LNG. And, I think, as they build their re-gas terminals in Europe, they will also be able to use it. So, I don't see any huge barriers.

Mr. SALMON. Typically, how long does it take to approve one of these permits?

Mr. HERBERG. Well, it has gone on for about 5 years. Some of them have taken—the early ones took up to 2 years to get approvals before the DOE approved this as in the national interests to export these supplies of gas. They have begun to speed that process up administratively, and they had tried to reverse, let FERC do the work first and then the DOE, but I think that process could be speeded up a great deal more.

Mr. SALMON. Okay. Dr. Kreutzer.

Mr. KREUTZER. Yeah. No. I was just thinking the regulatory problem is more on the production of gas than, I think, on the export terminals at this point. And, there seems to be creeping additional regulations on methane and other things, and that is worth watching.

Mr. SALMON. Okay. Thank you. Mr. Sherman.

Mr. SHERMAN. Dr. Kreutzer pointed out that we have had a decline in energy prices in the entire world, but I don't think we can attribute that just to U.S. production. We have had a recession in the world. We have conservation in other countries, but, obviously, it has helped the world price to increase production in the United States.

And, one thing I think the environmental community loses track of, they may focus on an individual production in the United States

or project and say, "Look at the local environmental effect," but also look at the world price effect. If we can drive down the price of oil and diminish the world's dependence upon the Middle East, we might avoid the next Iraq war and the environmental degradation that that involves.

I do also want to comment that we haven't talked much about nuclear, but we are seeing Japan, South Korea, and China looking to reprocess spent fuel. That makes no economic sense. The only reason that South Korea or Japan would do it is to open the door to becoming nuclear powers—nuclear weapon states at some point in the future if they wanted to go down that road.

I want to talk about solar panels. China is subsidizing and taking market share. That puts some of our companies at a disadvantage. On the other hand, it drives down the price of solar panels and increases their utilization.

Mr. Schmidt, should we be upset that China is selling its solar panels for too little, or rejoice in the fact that more solar panels are being deployed in more places?

Mr. SCHMIDT. That is a good question. I may not give you the yes and no answer that you are looking for.

I think fundamentally there has been some shifts occurring within the Chinese market on this dynamic. And, I think that the world of a year or 2 years ago is not exactly the world of today in terms of low cost solar being dumped by the Chinese for one particular reason. Part of that dynamic was being driven at a time when the Chinese were at a very early stage in terms of their domestic deployment of their solar panels.

So, you know, about 4 years ago, the vast majority of China's panel production, which was a massive amount at the time and has grown since, was actually being used in export markets in Europe and elsewhere. And that caused a lot of these trade tensions and so forth. That dynamic has shifted quite a bit. China now is installing about 20 gigawatts of solar a year, which is clearly head and shoulders above everybody else in terms of their own domestic deployment, and so much more of the Chinese domestic sort of production is actually being used within their own domestic context.

We think it is obviously really critical that we get this right. I am not sure that sort of trade disputes over this is necessarily the best way to solve it. I know that the Obama administration has sought sort of some recourse through, you know, some of the routes with India and elsewhere, but what we are finding is that it is really critical that we actually get these prices, you know, to a low point.

Mr. SHERMAN. I yield back.

Mr. SALMON. Thank you. The Chair recognizes Mr. Duncan.

Mr. DUNCAN. Thank you, Mr. Chairman. There are two factors, economic factors that affect this, the price of energy: Supply and demand. What we saw in the United States was an increase of supply based on the Bakken and Eagleford, and Barnett, and all these other energy-producing areas. And, even Pennsylvania and New York and Ohio increased production.

And, so you have supply go up locally in the United States, but also global supply goes up, because the Saudis saw the Bakken eating into their market share, so they increased production in defi-

ance of OPEC, and so you had this, and you still see it today, an increase of supply, global supply of oil and natural gas.

Then, the other factor is demand. Global demand is down because the economy globally is soft. In the United States we just saw GDP growth is, what, 1.1, adjusted in the first quarter down below 1 to .08. So, the economy is soft, nothing has rebounded, so demand is down as well. So, you have got increased supply and less demand, you are going to have low oil prices and low energy prices altogether.

The question I have is TPP. So, we are exporting and trying to increase LNG exports, but you also have signatories of TPP that are LNG exporters as well. I wonder how TPP is going to factor in, assuming it passes, in the United States' ability to compete with the Asian countries that are LNG exporters currently? So, if anybody can speak to that, because that is the question I don't have an answer for.

Mr. KREUTZER. I don't have an answer.

Mr. HERBERG. I don't have an answer to that.

Mr. SCHMIDT. I mean, I can. As a fact of how the TPP and all trade agreements, once a trade agreement like the TPP goes into effect, the ability for the United States—all these countries become sort of effectively de facto within the free trade, and so the Department of Energy's national interest determination is taken off the table. And any of these countries will now be sort of subject to this, obviously Japan and South Korea, well, you know, are big sort of potential demanders of LNG, and so they are a part of it. Vietnam, I don't think, is a major sort of potential hub for exports of LNG. So, it probably could in theory have a larger impact.

I suspect, having spent a lot of time working in these countries, that the actual amount of demand for LNG is much lower than many people would expect, as, you know, countries aren't necessarily looking to sort of flip out their dependence on the Middle East for dependence on some other, you know, form of energy. There is obviously a sort of large interest in a lot of these countries to get a lot more homegrown energy and sort of become a bit more energy independent to some extent, which is you see in China and India as they sort of look to coal imports versus coal domestically, versus oil imports, versus oil domestically.

Mr. HERBERG. Can I just add one little bit? I missed the point of your question, but to the extent that TPP is a free trade agreement, the whole DOE approval process was about permitting exports to nonfree trade agreement countries. So, once the TPP were to pass, then that opens the door to exporting wherever you want. You don't have to go through that DOE——

Mr. DUNCAN. Just a side comment. OPEC is a determining factor over the price of energy. So, whether you have a free trade agreement or not, the price of energy is going to be set by somebody that is not a signatory to the TPP.

And, Mr. Chairman, I yield back.

Mr. SALMON. Okay. Ms. Meng.

Ms. MENG. Thank you. Chairman Salmon is one of the few people who pronounce my name according to Chinese tradition, and it always throws me off. Thank you.

Mr. SALMON. You know, I realized even after I said it, you know, I speak Mandarin, I lived over in Taiwan, and so I have a really hard time, you know, like, saying Wang instead of Wong or Chen instead of Chun, and so I am kind of stuck with the, you know, Chinese pronunciation. So I apologize.

Ms. MENG. It is great. It is impressive.

Mr. SALMON. But, anyway, the Chair recognizes you anyway.

Ms. MENG. Thank you so much.

Mr. CONNOLLY. I am Connolly over here.

Ms. MENG. Connolly.

Asian countries will need more—may need more types of equipment and technology in order to reduce greenhouse gas emissions. How can the United States capitalize on some of these needs maybe to produce more jobs and exports in the United States?

Mr. KREUTZER. I think our goal is going to be to provide them—you know, we have developed technology in a lot of areas that they have been able to adopt, you know, for telephones and everything else. I don't think it is going to be—we are going to have to push it too hard. When we develop the technology, they will use it.

I think the critical question is we need to also develop the energy so that it is not coming from places that are politically unstable and antagonistic.

Mr. SCHMIDT. Yeah. And, just to add a bit more, I think—maybe I am an American optimist, but I think that many of the technologies that these countries are going to be seeking to deploy when you look across energy efficiency, renewables are places where the Americans do quite well. For example, in India, some of the very first solar projects that really started to boom were produced by First Solar, based in Arizona, and so that is, you know, obviously a huge opportunity.

The fastest growing place for job creation in the United States is within the clean energy space. And, you know, I guess we feel that the U.S. has a huge opportunity to play a role in helping these countries, you know, meet their energy needs through renewables and energy efficiency. And, that will create the sort of downstream supply jobs and so forth that creates, you know, huge benefits for Americans across the board. And, you know, as an anecdote, often the perception is that, you know, countries—even in China where they produce a lot of their own things, American technologies are always viewed as kind of the best, the gold standard, and so they tend to want to get the best and the gold standard in places. And, you know, I think that the Americans can compete pretty well.

Ms. MENG. Thank you. I yield back.

Mr. SALMON. Thank you. Mr. Connolly, if you want to be a Republican today, I will recognize you next, otherwise I have to——

Mr. SHERMAN. Never.

Mr. SALMON [continuing]. Otherwise I have to recognize Ms. Gabbard.

Mr. CONNOLLY. You know, there is an old line of a song, you know, kind of goes like that, you know, are you a Republican? I am right now.

Mr. SALMON. Well, then I recognize you.

Mr. CONNOLLY. No. I will wait my fair turn, but thank you, Mr. Chairman.

Mr. SALMON. Ms. Gabbard.

Ms. GABBARD. Thank you. And, thank you for your kindness.

I am wondering if you can speak to some of the strategic implications of the energy mix right now occurring in Asia, and how that may be driving or influencing some of the maritime disputes that are occurring there.

Mr. HERBERG. You know, I think that the role of energy in some of these maritime disputes is a little bit overestimated sometimes and overdramatized. Take the South China Sea, the likely resources there, we don't know a lot about them, but estimates for the U.S. side are relatively modest in terms of the resources there, certainly not worth fighting over. Now, Chinese estimates are three, four times ours, so you wonder maybe they really believe there is more there than there is.

I think the bigger dimension of that is the sea lanes issue, because so much of Asia's, northeast Asia in particular, oil and LNG flows through those sea lanes. That is the bigger game and the bigger concern, as I mentioned, for northeast Asia about who controls those sea lanes, even though I think it is kind of a doomsday scenario to just think they would start getting in the way of those shipments, but I can tell you from being out there a lot, this worries a lot of the folks in northeast Asia as a strategic concern. You know, they want the U.S. Navy to still be a big force in those sea lanes for the security of their oil supply.

Ms. GABBARD. Okay.

Mr. KREUTZER. I would hope their energy policy would be more focused on allowing the energy producers to produce energy, and they can produce it at a cost less than the price at which they sell it. When we start forcing strategic concerns on energy producers, then we—at Heritage, we think we have got a pretty slippery slope to where should we be subsidizing this, should we be? We wouldn't propose that.

Ms. GABBARD. Thank you. Thank you.

Mr. SHERMAN. Can I say something?

Mr. SALMON. Sure.

Mr. SHERMAN. I would just comment that now the oil tankers to Japan and South Korea would tend to go west of the Philippines. If they rerouted themselves and went east of the Philippines, that might add, I have heard estimates of $0.01 per gallon to what consumers in Japan and South Korea have to pay. So, the doomsday scenario is $0.01 a gallon.

I yield back.

Mr. SALMON. Thank you. Mr. Lowenthal.

Mr. LOWENTHAL. Thank you, Mr. Chair. And, you pronounced my name right. I am very pleased.

Mr. SALMON. I couldn't really think of another pronunciation for yours, but——

Mr. LOWENTHAL. Chinese pronunciation? Thank you, Mr. Chair.

I am going to continue this discussion on renewables in the region. And, first I want to know, you know, with the recent signing United States and China, the joining of the Paris climate, do you feel that the Chinese are going to be able to transition their energy mix away from coal toward renewable sources and able to meet its

ambitious goals? Will they be actually able to do this, or are they going to really—is this a doable thing, Mr. Schmidt?

Mr. SCHMIDT. I guess we believe that it is. It won't be an easy challenge for them, but to give you, I guess, a couple of anecdotes, if anyone that has been in China, air pollution is really bad.

Mr. LOWENTHAL. We were there, and——

Mr. SCHMIDT. Yep.

Mr. LOWENTHAL [continuing]. We couldn't breathe in Beijing; could not breathe, actually.

Mr. SCHMIDT. So you feel the exact same thing that Chinese Communist Party officials feel and that everyday citizens feel, and so the number one social unrest issue right now in China is local air pollution challenges, and that has risen quite a bit. So, I think we have seen a huge——

Mr. LOWENTHAL. We know that there is that, right. I think you have pointed out rightfully so that the Chinese are very much aware. I am just saying is it really possible, though, given the existing state and reliance on coal, to really do that transition in the time?

Mr. SCHMIDT. Yes. And, to give you a couple of facts from the region, so the last 2 years, China has actually had a declining coal consumption year on year. This is the first time that that has happened in 10 years. That is a huge trend from a growing 7 percent per year to an actual declining amount of coal. The expectations are that this year will continue that trend. The first quarter of this year saw a declining coal consumption, and we have seen huge shifts.

Yes, China is still building a number of coal plants. They don't have a market economy as everyone knows, but what you are finding is that the vast majority of these coal plants are actually sitting idle, so they are running at about 40 to 50 percent capacity factors, which for anyone that knows coal, is a very bad economic investment to invest a lot in a very heavy capital investment and then to only run it less than half the time. And, so I think we are seeing huge decline in China's coal consumption, which is very tied to their carbon pollution, and so we are quite confident that China's CO2 emissions will peak well before 2030. There is some debate within sort of energy modelers about whether or not China's emissions have actually already peaked, and, you know, obviously they need a set of policies and continued sort of efforts over time to make sure to deliver.

Mr. HERBERG. Can I just——

Mr. SALMON. Thank you. Mr. Connolly.

Mr. HERBERG. I will just add one point. The forcing issue for China is not so much climate, it is air pollution in the cities and the east coast. And this is an existential issue for the Communist Party. They can't hide this. They can put people in jail and other stuff. They can't hide the bad air. And, so that is forcing a pace of change by the Communist leadership and the contributors to the air pollution, particularly coal, that is much faster than, I think, many people actually anticipated, and I think you can underestimate it.

Mr. SALMON. It really got under their skin, I know, when the State Department started publishing on a daily basis——

Mr. HERBERG. Yeah.

Mr. SALMON [continuing]. Those——

Mr. SCHMIDT. Air quality.

Mr. SALMON [continuing]. Those numbers, and it really got under their skin. I know. I was there at one of those times.

The other thing, first time I went to Beijing, had a white shirt on. By the end of the day, the color was completely black. It is pretty—pretty bad.

Mr. Connolly.

Mr. CONNOLLY. Well, first the time I went to Beijing was in 1986, and there were a lot of bicycles in Beijing. And then I went there in March this year, and there were a lot of BMWs and Toyotas and whatever. And, part of the problem too was in the Maoist period, they built a lot of, like, steel plants, I think, outside of Beijing to showcase the industrial might of Communist China. And, of course, sitting in a basin, it created huge pollution that now they would never do, but they are stuck with it, plus normal urban pollution.

Mr. Schmidt, and, gentlemen, if you could comment to, but when I was there in March, one of the bright sides of the bilateral relationship that I frankly did not realize the extent of was enormous cooperation apparently going on between our two governments on environmental and technological breakthroughs to try to address pollution, to try to curb both air pollution, water pollution, ground pollution, to look at new techniques that are environmentally neutral or friendly, and that the—apparently—I mean, the Chinese Government is quite aggressive about this. They are not being dragged into it. And, the collaboration is quite real and has a lot of promise. And, I was glad to hear that, given so many other aspects of the bilateral relationship.

Do you want to comment just a little bit about that before we all have to go and vote?

Mr. SCHMIDT. Yeah. I think one of the bright spots of the U.S.-China relationship over the past couple of years has been clearly on climate. And, that is not just for me. If you ask sort of general Asian hands, they clearly view that that relationship is quite well, and is quite well established. And, it was, I think, a very critical component of getting the Paris Agreement delivered, was the sort of relationship between those two. And, that is both at, I think, a political level, which is around negotiating agreements and so forth, but also on the sort of practical, how do we actually do this stuff. And, so the U.S. has a very active working group working with the Chinese on helping them deliver on, you know, grid integration, high voltage transmission, electric vehicles, and the set of things that gets back to the other speaker's question about how can American companies kind of play in that.

And, I think there is, you know, just an ongoing great relationship between the two. It is always fraught with tensions, but within the clean energy space, I think it is a very positive engagement that can kind of continue to build and go to the next level.

Mr. CONNOLLY. So, I would add drinkable water is a problem too, because even in the very finest hotels, you need filtered water.

Mr. KREUTZER. I would say that one of the surprising things is that we have already developed the technology to reduce particu-

late emissions from coal plants by over 99 percent. My understanding is that in some places in China, they have the pollution control turned off because there is a slight parasitism of the energy. So, I am unfortunately a little pessimistic that they are going to push forward with other technologies that would be more costly, and I am really surprised that they haven't already used the on-the-shelf technology that has already been developed that could dramatically reduce the pollution from even the coal that they are using.

Mr. SALMON. Thanks. We have got to get over for votes, but I am going to allow one last follow-up question of Mr. Sherman.

Mr. SHERMAN. Mr. Herberg, obviously they care about air pollution in their major cities. Can they build coal-fired plants either a few hundred miles west of their major cities and the less urbanized, or can they put them right on the beach in some windy area where it is all—can they solve their air pollution problem without helping the world solve its coal slash global warming problem?

Mr. HERBERG. They are moving plants to the west, you know, and that is one of the—one of the two steps forward, one step back parts of China's policy, you know, allowing building in the west but stopping it in the east. But, even so, I think in the east, tailpipe emissions are replacing, you know, coal emissions in the power plants.

So, I don't underestimate the scale of this thing, but in all the major cities, even as you head west, the pollution problem has become a political, social problem for them, and that is the forcing dynamic.

Mr. SHERMAN. My hope is they can't solve their problem without also helping the world solve its problem——

Mr. HERBERG. Well, you kind of get a one-for-one CO2 benefit from the air pollution effort. That is what I am assuming.

Mr. SALMON. I thank the panelists very much for being here today. It has been very edifying and very informative.

Mr. KREUTZER. Thank you.

Mr. SALMON. The committee is adjourned.

[Whereupon, at 3:55 p.m., the subcommittee was adjourned.]

APPENDIX

Material Submitted for the Record

SUBCOMMITTEE HEARING NOTICE
COMMITTEE ON FOREIGN AFFAIRS
U.S. HOUSE OF REPRESENTATIVES
WASHINGTON, DC 20515-6128

Subcommittee on Asia and the Pacific
Matt Salmon (R-AZ), Chairman

September 8, 2016

TO: MEMBERS OF THE COMMITTEE ON FOREIGN AFFAIRS

You are respectfully requested to attend an OPEN hearing of the Committee on Foreign Affairs, to be held by the Subcommittee on Asia and the Pacific in Room 2255 of the Rayburn House Office Building (and available live on the Committee website at http://www.ForeignAffairs.house.gov):

DATE: Thursday, September 8, 2016

TIME: 3:00 p.m.

SUBJECT: Asia's Growing Hunger for Energy: U.S. Policy and Supply Opportunities

WITNESSES: Mr. Mikkal E. Herberg
Senior Advisor
Director
Energy Security Program
The National Bureau of Asian Research

David W. Kreutzer, Ph.D.
Senior Research Fellow for Energy Economics and Climate Change
Center for Data Analysis
Institute for Economic Freedom and Opportunity
The Heritage Foundation

Mr. Jake Schmidt
Director
International Program
Natural Resources Defense Council

By Direction of the Chairman

The Committee on Foreign Affairs seeks to make its facilities accessible to persons with disabilities. If you are in need of special accommodations, please call 202/225-5021 at least four business days in advance of the event, whenever practicable. Questions with regard to special accommodations in general (including availability of Committee materials in alternative formats and assistive listening devices) may be directed to the Committee.

COMMITTEE ON FOREIGN AFFAIRS

MINUTES OF SUBCOMMITTEE ON *Asia and the Pacific* HEARING

Day *Tuesday* **Date** *9/8/2016* **Room** *2255*

Starting Time *3:00pm* **Ending Time** *3:50pm*

Recesses [ ] (____to ____) (____to ____) (____to ____) (____to ____) (____to ____) (____to ____)

Presiding Member(s)

Salmon

Check all of the following that apply:

Open Session [✓]
Executive (closed) Session [ ]
Televised [ ]
Electronically Recorded (taped) [ ]
Stenographic Record [ ]

TITLE OF HEARING:

Asia's Growing Hunger for Energy: U.S. Policy and Supply Opportunities

SUBCOMMITTEE MEMBERS PRESENT:

Duncan
Sherman, Meng, Gabbard, Lowenthal, Connolly

NON-SUBCOMMITTEE MEMBERS PRESENT: *(Mark with an * if they are not members of full committee.)*

HEARING WITNESSES: Same as meeting notice attached? Yes [✓] **No** [ ]
(If "no", please list below and include title, agency, department, or organization.)

STATEMENTS FOR THE RECORD: *(List any statements submitted for the record.)*

TIME SCHEDULED TO RECONVENE _____
or
TIME ADJOURNED *3:50pm*

Subcommittee Staff Associate