BEFORE THE SELECT COMMITTEE ON THE CLIMATE CRISIS
UNITED STATES HOUSE OF REPRESENTATIVES

"CLEANER, CHEAPER ENERGY: CLIMATE INVESTMENTS TO HELP FAMILIES AND BUSINESSES"

December 9, 2021

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Good afternoon, Chairwoman Castor, Ranking Member Graves, and members of the Committee. My name is Amy Myers Jaffe and I lead U.S. and global climate policy research at the Fletcher School at Tufts University. I have written several books on energy, including one on the link between the oil price cycle and global financial crises and more recently, one on digital energy innovation. Thank you for this opportunity to speak before this important committee.

I want to begin this afternoon by discussing what has caused recent energy price fluctuations. Unfortunately, it is not unusual for global energy prices to fluctuate sharply based on sudden changes in temporary market conditions. Notably, from 2005 to 2008, oil prices rose sharply, peaking at $147 a barrel in July 2008 and then dropped sharply in 2009 following the global financial crisis. Although tensions in the Middle East contributed to oil's rise in the 2000s, detailed analysis of the period concluded that markets had experienced a "demand shock" driven by a sudden surge in demand for commodities due to unexpectedly strong economic expansion of the Chinese economy following massive urbanization and a construction boom in the runup to the 2008 Beijing summer Olympics. A similar run up in oil prices took place in 2014 when prices reached $100 a barrel, as regional conflicts in Libya and elsewhere removed several million barrels a day suddenly. Oil prices collapsed in 2015 following a price war instigated by OPEC. U.S. natural gas prices have also fluctuated due to sudden surges in winter demand and production disruptions such as hurricanes in the U.S. Gulf of Mexico. For example, natural gas prices reached $15 per million BTU in 2005, in the aftermath of Hurricanes Rita and Katrina.

The COVID-19 pandemic has caused extreme energy market disequilibrium. The global collapse in demand as a result of pandemic related lockdowns sent prices sharply lower, which then were given more momentum by a price war initiated by Saudi Arabia. The problem was so severe in March 2020 that oil producers struggled to find storage tanks to place their unwanted oil in. Oil

prices fell to $16 in April 2020. US gasoline prices followed suit, reaching under $2 a gallon at that time. Oil companies and oil producing countries were forced to curtail drilling to alleviate the glut of unwanted oil. In the United States, domestic oil and natural gas producers also had to cut back rig operations as a result of the pandemic. In January 2020, there were nearly 700 rigs operating. By September, the oil rig count had collapsed 75% to under 200 rigs. Natural gas drilling also faltered, with rig counts falling by over 40%.

But eventually as demand made a sudden recovery in 2021, notably in the United States as economic growth skyrocketed at a pace of 6% increase in GDP, oil prices began to rise sharply. OPEC, led by Saudi Arabia, and Russia took advantage of the sudden imbalance of energy global supply and demand to create artificial price hikes to their geopolitical and financial advantage. **A primary driver behind major oil producing countries actions in recent months to create extreme energy price volatility was to try to convince political leaders in major economies to abandon plans to address climate change ahead of the Glasgow climate talks. Their motivation is clear. It is because those major oil exporting countries stand to lose geopolitical power and financial gain in the short run from successful global climate agreements. Their actions are not surprising but do harm to their own populations who are already subject to devastating extreme summer heat and localized flooding, and in the case of Russia, severe fires and permafrost melting in Arctic region.**

It is a large stretch of the imagination to say that these fluctuations that have been part of a structural and long-established boom and bust cycle in the oil and gas sector going back to the 1960s are currently the fault of the transition to cleaner energy. If anything, the addition of alternative energy helps us diversify our sources of energy, thereby reducing the market power of foreign oil producing countries within the OPEC plus cartel. Sadly, the energy transition has been slow to take hold, despite the crisis in rising global greenhouse gas emissions that are driving climate change. Global climate policies have not substantially removed oil and gas demand yet; both demand for oil and gas and emissions are rising this year. Greater ambition towards climate action at the next two upcoming climate gatherings could lead more quickly to a decline in oil and gas use globally, depending on the suite of policies selected to implement deeper decarbonization. Still, at least for this year, and probably next year as well, energy transition risk to oil is more theoretical than tangible. Global oil and gas demand did not collapse last year due to the energy transition, and it didn't recover suddenly this year because of the energy transition. While it is true that intermittency in wind power temporarily affected Northern European markets last summer and a drought which curtailed hydroelectric power exacerbated energy shortages in China earlier this year, those events might have been more easily overcome if the economic recovery from COVID-19 lockdowns had happened more gradually or if Russia had proceeded with providing its customary levels of energy instead of strategically manipulating markets ahead of its troop buildup on the border of Ukraine.

<u>What are the best options for short term solutions</u>

The solutions to temporary fluctuations in energy market conditions are well known. The U.S. Strategic Petroleum Reserve (SPR) (and similar strategic stocks in the world's largest economies) were created to prevent a major oil exporter or group of exporters to threaten energy shortages to influence the foreign policy of oil consuming nations. Addressing climate change is

an important element to US foreign policy. The Biden Administration correctly acted to tap the SPR, in conjunction with other major countries including China, India, the U.K. and Japan tapping their reserves at the same time, to prevent this geopolitically motivated manipulation of global energy markets. Congress has authorized the sale of 58 million barrels from the SPR by 2025. In light of current conditions, it did not make sense to delay the sales of this oil to 2024 or 2025. Selling a higher volume now provides a double benefit. It brings American consumers and the global economy immediate price relief, helping curtail inflation and preventing further financial strain on low-income economies already reeling from the pandemic. It also means the U.S. treasury benefits from selling oil when prices were high instead of waiting several years when prices could be significantly lower. The strategic stock sales announcement has helped push speculators out of the futures markets, reducing for now any undue upward momentum such speculation was driving.

There are other levers that have been successfully used in the past to ease winter fuel shortages in the United States that should be considered. Temporarily waiving the Jones Act, which prohibits deliveries between U.S. locations to be carried on non-U.S. vessels, could ease bottlenecks in energy supply movements within the U.S. With limited supply of U.S. flagships, it can be difficult and expensive to find a vessel to ship fuels from one part of the country to another. Waiving the Jones Act temporarily has been used in the past to facilitate getting the energy American families need in times of shortages. The United States currently exports 5.5 million barrels a day of refined products, such as gasoline, heating oil, diesel fuel, and propane, to global markets. If that product is needed inside the United States, policy makers should act to facilitate that. Waiving the Jones Act would be one way to do this. Beefing up the U.S. Energy Administration's emergency preparedness work with industry leaders and states to identify and clear up supply bottlenecks and hasten inventory stores in preparation for winter would be another. In addition, rising costs of credits used to meet the Environmental Protection Agency's renewable fuel standards is adding to the price of ethanol used to blend for gasoline at the pump. The Administration could temporarily suspend the ethanol compliance credit program to ease the supply pressures. This is not to say that the aims that underpin the Jones Act or the EPA's ethanol programs are not important, just that temporary adjustments can have an outsize influence on removing bottlenecks from fuel availability and promoting easy distribution to Americans who need it most.

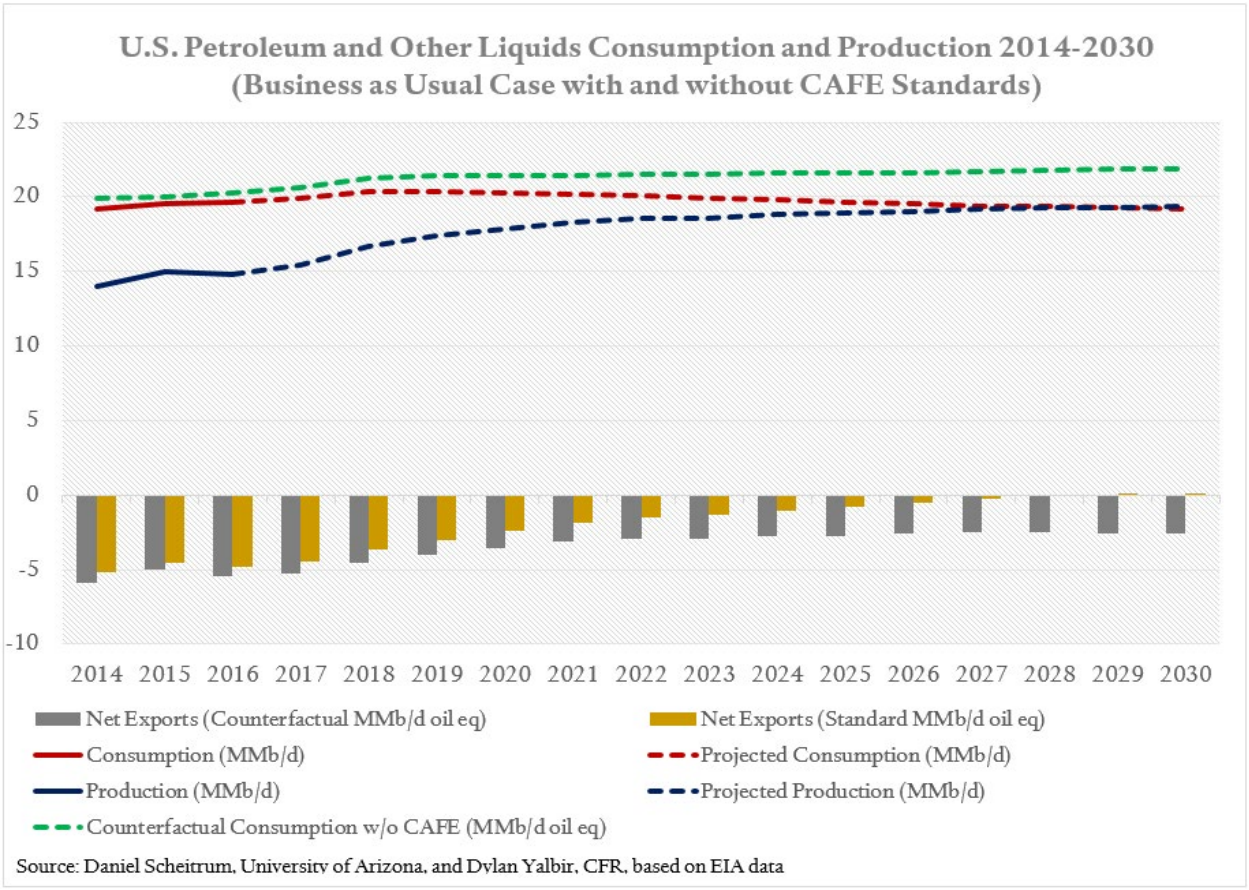
Preparing for the future

Given the financial losses stacked up from investment in oil and gas since 2015, investors and banks are more cautious about lending to drillers moving forward. Uncertainty about future market dynamics also contributes to hesitancy. However, a recent preliminary review by the Federal Reserve Bank of Dallas found that American oil and gas companies have been able to access bond markets at the same costs and availability this year than in the past. The U.S. rig count currently stands at 569, up almost 50% from last November, but still below February 2020 levels.

Years of study on energy security have identified various mechanisms to smooth anomalies in energy markets and ease shortfalls in supply. But it is important to note that strategies that focus solely on increasing supplies without addressing underlying drivers of excess demand will be

ineffective. For example, even when U.S. oil production was surging strongly, it was the implementation of corporate average vehicle efficiency standards (CAFE) that limited internal U.S. demand and created the pathway for surpluses that could be exported to our allies and international markets, influencing global supply and pricing. Figure 1 illustrates the impact of CAFE standards on U.S. petroleum net exports trends by plotting how trends would have looked had the efficiency standards not been implemented (green line vs red line).

Figure 1



Better performance in energy efficiency, both in vehicles and in buildings and industry, lowers demand, potentially reducing the chances of energy shortfalls but also automatically reducing the burden of any rise in energy costs to consumers and businesses because it takes less energy to do the same task. Electric motors in vehicles are more efficient than traditional internal combustion engines. Electric motors convert the vast majority of their electric energy (60% to 85%) into usable power (e.g. movement). An internal combustion engine is much less efficient, converting only 40% of its gasoline fuel to usable energy. When losses in the form of heat in the drivetrain are considered, gasoline combustion vehicles only use around 20% of the energy from burning fuel into moving the car.

Just as vehicle efficiency standards have eliminated a measure of the potential increases in U.S. oil demand, promotion of EV sales in the United States would also reduce U.S. oil demand,

increasing the chances that any lower investment in drilling for oil would be matched by similar decreases in the need for that oil. Virtually no oil is used in generating electric power in the United States.

The EV tax credit for new electric vehicles, Section 136401, and the tax credit for used electric vehicles for households of a certain means, Section 136402, and for commercial vehicles, Section 136403, in the Build Back Better legislation are important tools to accelerate wider EV adoption and thereby reduce demand for gasoline in a way that will contribute to lowering road fuel costs for all Americans. Many countries around the world have used credits of some sort to promote EV sales successfully, improving urban air quality and lowering carbon emissions while stimulating new jobs. The more individuals that make the switch to EVs, the lower the undue market influence OPEC Plus oil exporters will have in geopolitics and the stability of global financial markets. The U.S. government can play a strong role in launching higher U.S. production and adoption of EVs by electrifying federal vehicles and the U.S. postal fleet, saving money on vehicle maintenance and fuel requirements through operational efficiency. These steps are important actions that have already been taken in other growing economies and should be considered a minimum competitive standard for an economy as diverse and preeminent as ours.

Some critics have raised concerns about the burden EVs will place on the U.S. electric grid. The U.S. power generation sector uses a wide variety of fuels including natural gas, renewables, hydroelectric, nuclear power, and coal. As the grid shifts to cleaner power sources, technology solutions will lower energy costs by reducing the costs of backup power for renewables, which in many locations can be produced more cheaply than traditional energy. We are also seeing new software solutions that can modulate demand management to shed electricity load at critical times to reduce surges in prices.

Many types of solutions already exist and have been deployed in different geographies. The recently passed Infrastructure bill incentivizes demonstration of some of these solutions, including battery storage, distributed energy solutions, advanced small modular nuclear reactors, and hydrogen conversion. But the scale of what is needed would be best addressed in broader climate specific legislation that can further target deployment in a manner that can best achieve cost reductions over time through scale economies and learning by doing cost reductions. Between 2015 and 2020, the cost for 60-cell monocrystalline solar photovoltaic modules fell by 60%. Onshore wind costs declined a further 26% over the last five years, following sharp declines in previous decades. Offshore wind costs have fallen by 50% in key locations since 2014, with experts predicting a further 50% drop by 2050.

To keep the lights on and energy prices low, backup systems and system redundancies are needed no matter what energy fuel is used. It is a myth that gasoline is not affected in a power blackout. It takes electricity to run the vast gasoline distribution system in the United States, including wholesale terminals and retail stations that cannot deploy any supply without electricity. The final findings from the Texas electricity crisis were that firms did not have sufficient levels of natural gas inventories on hand to keep the grid afloat once the freeze curtailed ongoing natural gas production. More rechargeable battery storage or stored hydrogen that could have been run through a fuel cell might have eased the problem, not made it worse. We know how to backup energy generation capacity. What’s needed now is a national effort to

lower than costs of doing so. Europe and China are investing hundreds of millions of dollars to get there. The United States could lead.

The United States needs to capitalize on its current private sector technological edge to become the leading purveyor of the hardware and software that is going to revolutionize electricity markets in the coming decades. Projections are that global energy use in the form of electricity will rise to 50% by 2050, up from 20% today. The United States needs to invest more heavily in energy innovation and grid modernization in stay out front of that energy trendline. Our aged and failing grid puts us behind other major economies. U.S. companies have leading technologies in solar, micro-grids, and virtual power plants that allow firms to buy surplus energy capacity from rooftop solar panels, electric cars and battery storage systems and then sell it back to the grid when extra power is needed to avoid soaring prices or brownouts. There are automated software solutions that can program in power demand management practices to balance grid supply and demand more effectively, reducing waste and lowering costs to consumers. For example, Google is pioneering such technologies that would help residences modulate their electricity use tapping automation to better match availability of renewable energy output. Data assisted, digital technologies, properly regulated, also portend a greater ability to reduce energy use from daily transactions via smart appliances and equipment, optimized e-commerce deliveries, and improved supply chain management. We need to make the public expenditures in grid modernization, broadband, and technology promotion to make these technologies available at affordable cost to benefit all Americans and to create export products that will support American jobs.

Another key to lowering energy costs for average Americans is to improve availability and reliability of mass transit systems. Roughly 16% of all oil used in the United States goes to commuting by car. Traffic congestion is responsible for billions of gallons of wasted fuel (3.5 billion gallons in 2019). With a quarter of Americans still telecommuting, transit authorities need to reorganize routes and services to prioritize providing affordable transportation to essential workers who cannot do their jobs remotely. Collapse of public transit would have an extremely detrimental impact on families and on sustainability in cities, raising energy costs for workers.

The Build Back Better Act includes $9.75 billion in grants to enhance access to affordable housing and improve mobility for lower-income individuals and residents of disadvantaged communities. One very important element in the bill is support to transit authorities to expand areas of service and high frequency of service including rapid bus systems. Forward looking localities are experimenting with on-demand oriented services facilitated by big data and user smart phones to increase ridership and to modernize reliability. Fare free and reduced fare services are another tool small cities have used to improve mobility accessibility. Grants to promote zero-emissions bus service in disadvantaged communities lower oil use and bring positive health impacts. Investment in public transit is an essential tool lowering energy costs through reduced fuel use, lower congestion, and greater urban accessibility.

Conclusion

The energy transition is a global phenomenon now gaining momentum given the urgency of the climate crisis. To quote from my book, Energy's Digital Future, "The genie is already out of the

bottle on these [smart, clean energy] technologies. There is no benefit to allowing traditional energy incumbents to push the United States to go backward to save jobs. This is a formula to transfer those jobs to other countries that will be glad to fund or overtake U.S. intellectual property and move promising technologies forward, first in their own countries and later in the form of export products. These products would then go back to the United States as imported goods for American use made by workers in other countries… This time around, maintaining U.S. innovation culture will be just as important to maintaining America's power and influence globally as it has been in past eras of rapid technological change. The United States can decide not to lead on the technologies that will be needed to arrest climate change, but that means other countries will."