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"Hearing to Examine the Use of Energy as a Tool and a Weapon"

The purpose of the hearing is to examine the use of energy as a tool and a weapon, and ensuring energy security for the United States and its allies.

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At a macroeconomic level, energy security refers to the concept that unexpected energy price increases and unanticipated disruptions in energy supply create dislocations that compromise welfare and economic activity. As such, energy security is often interwoven with national security, particularly when the threat of energy-derived economic dislocations come from a foreign actor. Unfortunately, history is all too familiar with malign intent and the use of energy as a weapon to influence geopolitical outcomes.

The link between energy availability, price and macroeconomic performance has been a subject of intense study for decades and it is one that was taken up the T20 in its communique to the G20 in 2020.[1] Energy security is an international concern, as evidenced by the fact that every G20 "Leaders Declaration" since St. Petersburg (2013) has included a reference to energy security, with a focus on market transparency, improved data collection and all energy sources and technologies.

Despite the attention given to the topic of energy security, it still has no single, universally accepted definition. Nonetheless, avoiding the macroeconomic malaise associated with an unanticipated shock to price or availability of supply of energy is one salient definition,[2] that has many variants, including the IEA's own definition of energy security as the uninterrupted availability of energy sources at an affordable price. More generally, the literature on energy security encompasses a broad range of topics from security of supply to security of demand to health to environment to efficiency.[3]

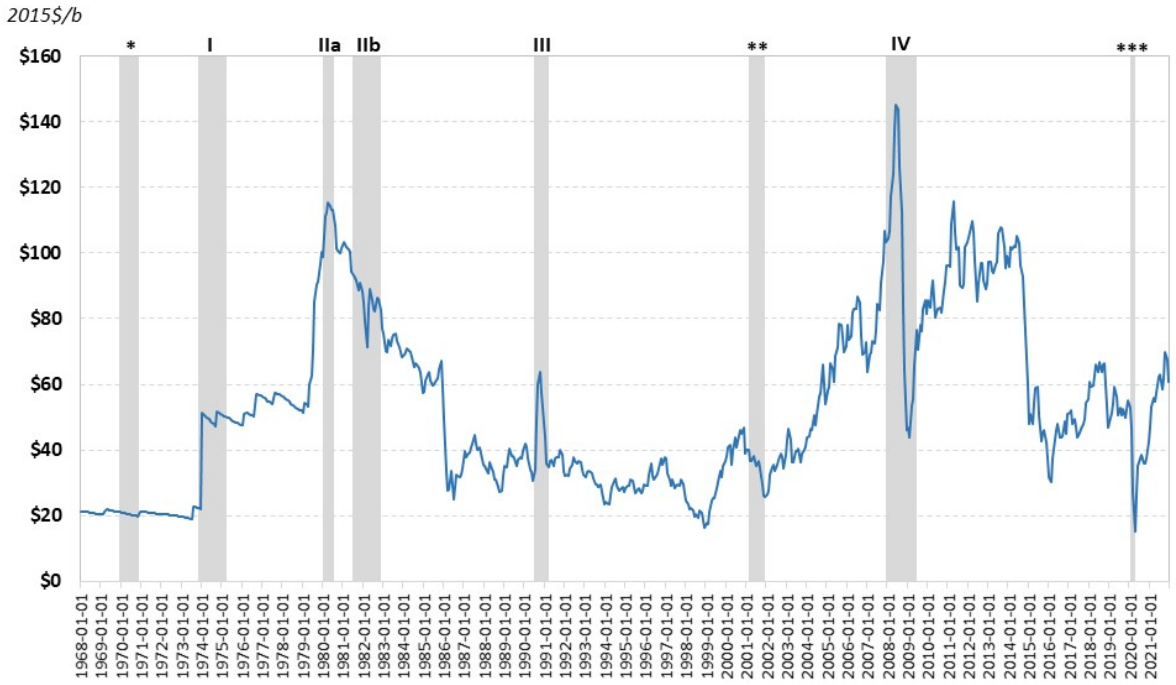
As the portfolio of energy choices expands with the development and deployment of new energy technologies, attention must shift to supply chains for all forms of energy. Supply chain function is a classic coordination problem, and the scale of future global energy requirements alongside the need for energy sources with lower environmental impact will have enormous implications for future supply chain development. Hence, energy security concerns are not disappearing as establishing low vulnerability energy systems remains paramount.[4] Indeed, energy security is already penetrating discussions about electricity sector resilience and reliability as the electric power sector expands and transitions toward new technologies and energy sources.

All this stated, policy directed at promoting energy security should have a clear definition of what it aims to achieve. In general, history reveals a continued focus on attempts to decrease

[1] Morgan Bazilian, Mark Finely, Steve Griffiths and Kenneth Medlock (2020), Refreshing Global Energy and Infrastructure for the Energy Transition," Policy Brief for T20 Task Force 10: Sustainable Energy, Water and Food Systems, available at https://t20saudiarabia.org.sa/en/forces/pages/Sustainable-Energy-Water-and-Food-Systems.aspx.
[2] See Douglas Bohi and Michael Toman (1996), "The Economics of Energy Security", Springer Publications.
[3] See Abdelrahman Azzuni and Christian Breyer (2017), "Definitions and dimensions of energy security: a literature review," Wiley Interdisciplinary Reviews: Energy and Environment, 7(1).
[4] See, for example, Jonathon Elkind (2010), "Energy Security: Call for a Broader Agenda," in *Energy Security: Economics, Politics, Strategies, and Implications*, ed Carlos Pascual and Jonathan Elkind, Brookings Institution Press, or Mark Finley (2019), "Energy Security and the Energy Transition: A Classic Framework for a New Challenge," Baker Institute Report no. 11.25.19. Rice University's Baker Institute for Public Policy.

vulnerability to energy price/supply shocks, as can be seen by aspirations of "energy independence" and freedom from "foreign oil." The motivation for such aspirations become self-evident upon a brief review of recent US economic history, which reveals a correlation between high oil (energy) price and recession (see Figure 1).

Figure 1. Real oil price and US Recessions



Key	Short explanation
*	**Mild recession**. Interest rate increased due to 60s inflation (over 5% in 1969). Ended when interest rates were lowered.
I	**The Oil Embargo**. In response to inflation pressures, price and wage freezes across major US industries were instituted, which triggered layoffs and "stagflation." Fed tried to accommodate by lowering interest rates, which led to very high inflation in the late 1970s.
IIa	**Iranian revolution** and **Iran-Iraq war** drove increases in oil price. Inflation climbed to 13.5%, which drove Fed to increase interest rates.
IIb	**"Double dip" recession**. Oil prices remained high. Fed increase interest rates to 21.5%, which quelled inflation but also shrunk GDP by 3.6% and raised unemployment to over 10%. Fiscal policy – tax cuts and defense spending – ultimately reversed the course.
III	**S&L crisis** and **Gulf War**. Mortgage lending collapsed and construction followed suit. Iraq invasion of Kuwait spikes oil price and compounds woes.
**	**"Dot-com" crash** and **9/11**. Mild recession in which Nasdaq lost 75% of its value and S&P500 lost 43% of its value. Housing boom helped end the recession.
IV	**The Great Recession** and **the Global Financial Crisis**. Perfect storm of events that included rising energy prices, and high risk moves in mortgage-backed securities by large financial institutions. S&P500 and DJIA lost half of their values. Massive fiscal support followed by quantitative easing pulled the economy out of the recession.
***	**COVID.** Pandemic-driven economic shutdown in attempt to slow spread of virus.

Sources:
WTI and CPI used to construct Real Oil Price are from the US Federal Reserve Database (https://fred.stlouisfed.org); Recession begin and end dates are from NBER US Business Cycle Expansions and Contractions (https://www.nber.org/research/data/us-business-cycle-expansions-and-contractions); Synopsis of causes of recession and recovery are from History.com "How the US Got Out of 12 Economic Recessions Since World War II" (https://www.history.com/news/us-economic-recessions-timeline).

Figure 1 indicates the real (inflation-adjusted) price of oil from January 1968 through December 2021 and NBER reported periods of economic contraction. Not every recession is caused by high energy prices, but periods in which energy prices rise are highly correlated with periods of economic contraction. There are number of reasons that have been posited for this correlation – ranging from monetary policy response to a reduction of real consumer disposable income to increased uncertainty that slows investment – and all possible channels of transmission from oil price to economic activity have bearing. Regardless of the drivers, recognizing the simple fact that high energy prices coincide with slowing economic activity naturally leads to an exploration of what drives energy prices higher, especially if energy-related economic contractions are to be avoided.

Of course, we also see economic dislocations at a more micro and regional scale when energy prices rise or energy supplies are disrupted. One needs to look no further than winter freeze Uri, which struck the central US in February 2021, and the resulting power outages that ensued driving loss of life and billions in economic damages. The causes of the electricity outages have been explored and policy has been reactive in attempt to abate similar crises in the future.[5] That stated, there is still much more to do to ensure electricity supply remains reliable.

While the events that unfolded in February 2021 are relatively localized, it is important to note that the primary driver of the calamity that ensued was a record freeze, or a "tail event" in the distribution of possible events. In turn, this highlights that energy systems must be able to withstand low probability events in order to avoid widespread economic losses, or worse. As such, energy systems must have redundancy and resilience if they are to remain secure.

In the energy-related episodes indicated in Figure 1 (I, IIa, IIb, III, and IV), the drivers of higher energy prices were embargo, conflict, and unexpected and rapid demand growth in developing countries. None of these issues are within the direct control of the US, and thus require diplomatic intervention and/or the development of tools to hedge against the risks these issue present. Indeed, we have seen interventions such as the development of strategic stocks and the adoption of greater efficiency standards bear some benefit. Notably, each is aimed at providing a hedge against the risk of disruption – stocks can be drawn upon for emergency supplies in the near term and efficiency reduces the need for energy input for basic services.

This brings us to a central point with regard to how energy can be used as a tool to affect other dimensions of global and regional interaction – be they geopolitical, territorial, economic, or all of the above. The US has seen dramatic increases in energy production, oil and gas in particular, over the last 17 years. According to the US Energy Information Administration, marketed natural gas production increased from 18.9 trillion cubic feet (tcf) in 2005 to 37.0 tcf in 2021. This has resulted in a shift in the US market from one of becoming more dependent on imported natural gas – via pipeline from Canada and LNG from the Middle East and Asia-Pacific – to one where the US now

[5] See Peter Hartley, Kenneth Medlock and Elsie Hung (2022), "ERCOT Froze in February 2021. What Happened? Why Did It Happen? Can It Happen Again?" available at https://www.bakerinstitute.org/electricity-in-texas/.

exports large volumes of natural gas by pipeline to Mexico and as LNG to 39 different countries in 2021. Similarly, US oil production has increased over the same time frame (2005-2021) from 5.2 million barrels per day (mmb/d) to 11.2 mmb/d in 2021. Notably , oil production was at its highest level ever recorded in late 2019, reaching almost 13 mmb/d before declining as the pandemic hit.

The dramatic shift in the domestic energy fortunes of the US was the result of innovations in the upstream that unlocked domestic shale resources, as well as a unique regulatory and legal architecture.[6] The outcome was one of the two single largest drivers of transition in the global energy system over the last two decades – the "shale revolution" – with the other being demand growth in Asia. In no small way, the growth in US oil and gas production altered global discourse on energy security in profound ways, leading to proclamations that the US "is the world's energy superpower" almost a decade ago.[7]

As discussed more than 7 years ago[8] and noted in a recent report[9] outlining the options available to Europe should Russian supplies of natural gas be severed, "the US has a valuable counterpunch to Russian actions that impact Europe's gas supplies: LNG." A fundamental lesson of the Cold War is that détente is born of a credible threat. Therefore, if US foreign policy is to be successful in swaying Russian (or any foreign actor with hegemonic intent) behavior – current and future – then such a lever must be presented.

The current situation in Europe is abhorrent. It extends well beyond energy, impacting lives and ways of life in irreversible ways as well as having ramifications for commodities in agriculture, energy and metals. Here, we focus on energy because that is the point of this exercise, but none of these issues can, or should, be taken in isolation when considering appropriate policy action.

Natural gas is the patrimony of the Russian economy and a major source of its political, economic, and diplomatic leverage over the Ukraine, the European Union, and its other former Soviet neighbors. Indeed, threats to Gazprom's market share in Europe are taken very, very seriously. This has been demonstrated in recent years by a concerted effort by Gazprom to defend its market, as seen in physical infrastructure investments (for example, Nord Stream 1 pipeline system, completed in two phases in 2011 and 2012) and a willingness to alter pricing terms in the face of competitive threats (such as a renegotiation of terms for gas sales to Lithuania when the LNG

[6] See Kenneth Medlock (2014), "The Land of Opportunity? Policy, Constraints, and Energy Security in North America," available at https://www.bakerinstitute.org/research/land-opportunity-policy-constraints-and-energy-security-north-america/.
[7] See US State Department website archives at https://2009-2017.state.gov/e/enr/index.htm.
[8] See Kenneth Medlock (2014), "A 'Credible Threat' Approach to Long Run Deterrence of Russian-European Hegemony," available at https://www.bakerinstitute.org/research/us-lng-exports-weapon-against-russia/.
[9] See Gabriel Collins, Kenneth Medlock, Anna Mikulska and Steven Miles (2022), "Strategic Options if Russia Cuts Gas to Europe," available at https://www.bakerinstitute.org/research/strategic-response-options-if-russia-cuts-gas-supplies-europe/.

import terminal there was built).[10] Each of these commercial actions has been undertaken to secure direct access to central and western European markets by avoiding transit country risk (in Belarus and Ukraine) and to maintain long term contractual relationships with customers in Europe.

Unseating the depth of European dependence on Russian natural gas (and energy more generally) will only come through concerted action by the EU and its member governments to develop sufficient infrastructure to import alternative sources of gas (LNG infrastructure and pipelines), enable more efficient utilization of existing gas infrastructure (regulation of storage, pipelines and LNG terminals), and develop redundancy through alternative and exiting sources of energy (hydrogen, nuclear, renewables, etc.). In almost every case, the solutions are long-term and of varying time horizons because they depend on investment and time-to-build. As such, the abundance of US energy resources will play a critical role in blunting the impacts of Russia's use of the energy weapon in Europe in the short term, and will likely remain critical for the ling term as well, even as energy systems continue their inexorable transition to a lower carbon future.

[10] See Nathalie Hinchey (2018), "The Impact of Securing Alternative Energy Sources on Russian-European Natural Gas Pricing," *The Energy Journal*, International Association for Energy Economics.