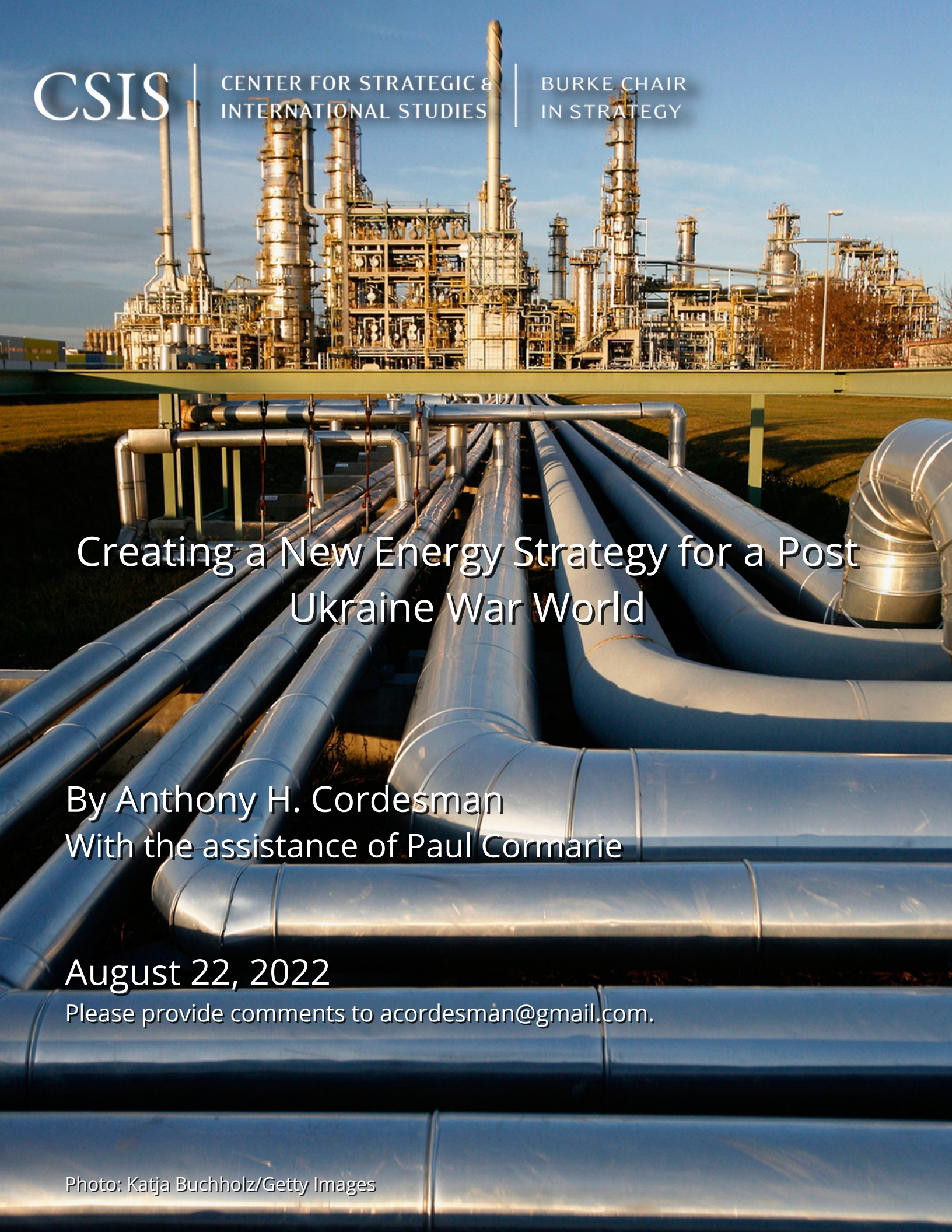

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Creating a New Energy Strategy for a Post Ukraine War World

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Photo: Katja Buchholz/Getty Images

There is every reason for the U.S. to focus on the dangers of climate change and the need to change the sources of its energy supplies to reduce carbon emissions. The new Inflation Reduction Act that President Biden signed on August 16, 2022, is an important step toward achieving these goals. At the same time, however, the U.S. needs to work with its European strategic partners to permanently reduce their dependence on Russian oil and gas exports and work with Asian partners like Japan and South Korea to ensure that they will not confront a similar threat in the future from China.

The Ukraine War may well end within a few years, but unless Russia's leadership changes fundamentally in character, the energy crisis triggered by the Ukraine War is a warning that NATO European states and Europe must not return to dependence on Russian gas and oil. The war is also a warning that America's strategic partners in the Pacific could face a future Chinese threat to their energy imports that could be as serious as the one Europe faces today.

These risks also change the strategic calculus in U.S. energy planning. They make shifting to renewable sources of energy as important for security reasons as they do in reducing the impact of climate change. At the same, there are serious limits to how fast the supply of renewable energy can be increased using existing technologies, and how cost-effective major new efforts to increase such supplies can be in the near term.

The only short- to medium-term way to reduce NATO European dependence on Russian oil and gas would be to increase the supply of gas and oil exports from other regions and countries, and the only way to provide added security for America's Asian strategic and trading partners may be to provide better defenses of their sources of exports and the maritime routes that deliver such exports through the South China Sea and Strait of Malacca.

The trade-offs involved are highly complex, and finding the right answers requires analysis in depth. One key area for such analysis is how fast renewable and alternative sources of energy can actually be increased, and with what real-world levels of cost-effectiveness. Another area is what new sources of oil and gas exports can be increased to meet European and Asian demands, and how well such sources and export routes can be protected. Such increases in oil and gas supplies are likely to create significantly higher levels of dependence on the volume of Middle Eastern oil and gas exports and make the security of such exports significantly more important – particularly to key U.S. strategic partners like Japan, South Korea, Australia, as well as key trading partners in Southeast Asia.

Looking at the Projected Shifts in Global Energy Supplies

Dealing with these issues also means dealing with major increases in global energy needs. **Figure One** shows the trends that four different expert sources have projected in global energy supply through 2050. All call for massive increases in energy supply between 2020 and 2050. The highest increases are driven by the estimated needs of developing states, but the trends also reflect major increases in the energy needed by the U.S., all of its developed strategic partners, and the rest of the world.

It should be stressed that such projections were highly uncertain before Russia's invasion changed perceptions of the level of risk in Europe. Some of these uncertainties are addressed in more detail in an earlier CSIS Emeritus Chair study, entitled, *U.S. Strategy: Rebalancing Global Energy between Europe, Russia, and Asia and U.S. Security Policy in the Middle East and the Gulf.*[1] However, even a glance at the different summary graphic projections of the future global trends in

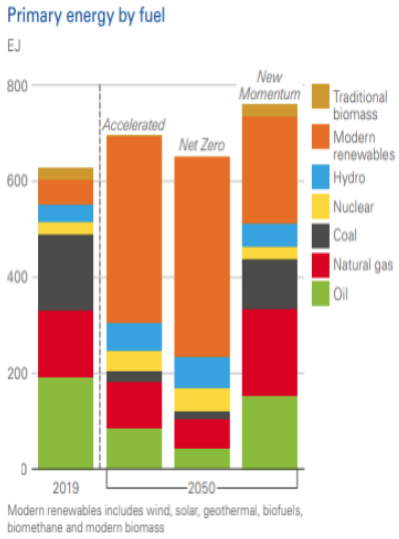
Figure One provide a clear warning that dependence on oil and gas exports will grow in many areas through 2050, and that credible estimates of the growth of renewable energy supplies will not change this situation.[1]

It is all too clear that there was nothing approaching an expert consensus over what rates of increase in energy would be needed before the invasion, and even less consensus over how much energy would continue to come from traditional sources of energy like fossil fuels versus new sources of energy like renewables. Moreover, the parametric estimates of possible changes in energy use made by the International Energy Agency (IEA) and British Petroleum show that both the future levels of total energy use, and of the share of renewable energy, vary sharply in any parametric analyses that take account of the uncertainties involved in national policy, technology, and global economics.

[1] These projections also consider the decreasing costs of renewables, such as solar and wind energy. Oil and gas use is expected to continue to grow globally even if it is more expensive than alternative sources of fuel.

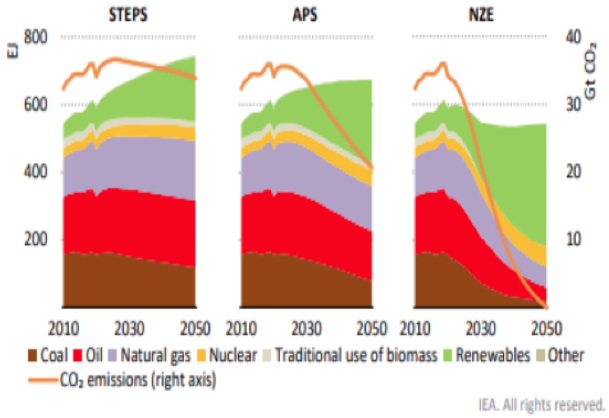
Figure One: Four Expert Estimates of Global Energy Use During 2020 to 2050

British Petroleum (BP)



Source: BP, International Energy Outlook 2022, accessed at https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/energy-outlook/bp-energy-outlook-2022.pdf

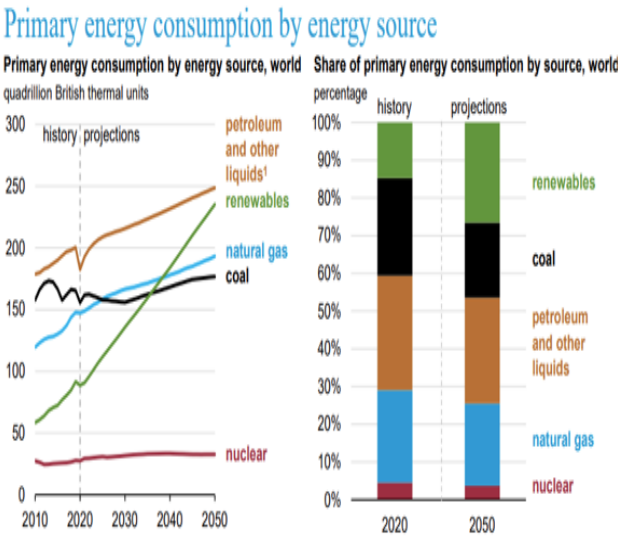
International Energy Agency (IEA)



STEPS=Stated Policies Scenario, APS=additional push, NZE=Net Zero

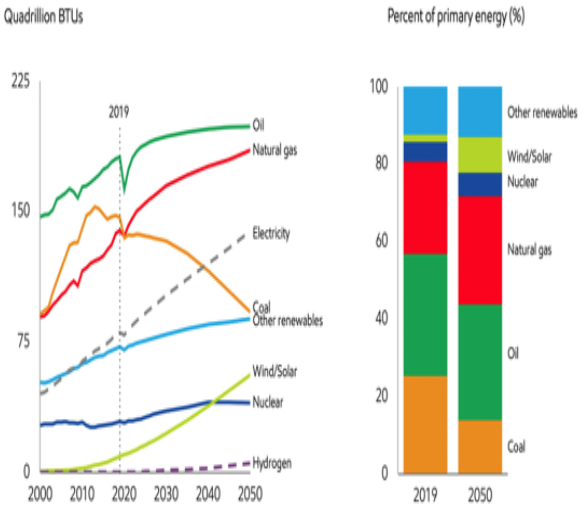
Source: IEA, World Energy Outlook 2021, accessed at https://iea.blob.core.windows.net/assets/88dec0c7-3a11-4d3b-99dc-8323ebfb388b/WorldEnergyOutlook2021.pdf

Energy Information Administration (EIA)



Source: U.S. Energy Information Administration, International Energy Outlook 2021, accessed at https://www.eia.gov/outlooks/ieo/

ExxonMobil



Source: ExxonMobil, Energy demand: Three drivers, Outlook for Energy 2021, accessed at https://corporate.exxonmobil.com/Energy-and-innovation/outlook-for-energy/Energy-demand#Transportation

Continued Dependence on Oil Gas for Three More Decades or Speeding the Shift to Renewables?

One key area where most of the estimates in **Figure One** broadly agree is that increased global oil and gas exports will remain critical to the global economy through at least 2040, and possibly well beyond 2050. Such estimates cannot anticipate a major breakthrough in some area of supply like fusion or some aspect of renewables, but such breakthroughs are not something anyone can credibly plan for today, nor in the near future.

Wanting a carbon free world and getting one are two very different things. It is also clear from examining the studies on which these projections are based that the need to meet both the rising demands of developed economies, and to provide adequate energy to developing ones, make the zero change cases in **Figure One** far more imaginary than real.

At the same time, it should be noted that most of the different estimates project high levels of global dependence on oil and gas supplies even though they also project rapid rises in renewable energy**.** Even if major new incentives are provided to expand renewable sources, it seems likely that the global economy will remain highly dependent on major increases in oil and gas use for the next three decades.

It is true that there are other projections of the rate of increase in renewable energy that are more optimistic about the ability to reduce future oil and gas consumption.[2] Such estimates, however, seem to be based more on national political goals and efforts to limit climate change than real-world probabilities.

The current politics of the U.S. are a case in point. It is striking that the original version of the legislation to create new incentives for renewable energy in the U.S. that was signed by the President on August 16 was being advocated on the basis of claims that it would decrease carbon emissions by 40% by 2030, a rounded figure that was never linked to any detailed official analyses of how this could happen or its impact on U.S. dependence on coal, oil and gas.[3]

The changes made to this legislation by the time it was signed mean this 40% estimate no longer applies, and so far, there have been no similar estimates of how these percentages have changed, but one thing should be clear. The last thing the U.S., or any other nation needs, are over-optimistic projections of alternative global supplies. Producing such forecasts for political or ideological reasons is very different from enhancing the practical ability to change the realities of world energy use. Protecting the environment and reducing the impact of climate change is a critical strategic goal. Wasting money and/or ignoring the realities of what can actually be done will inevitably do more harm than good.

The Impact on the Strategic Importance of the Middle East and North Africa

Any major effort to reduce European dependence on Russian energy exports will have a major strategic impact that goes far beyond Europe, and it is clear that the Middle East will have to be a major source of any secure gas and oil exports that will not face a high level of threat from Russia and China. Even today, the largest Middle Eastern oil and gas exporters provide some 17% of world oil exports and 12% of world gas exports.[4]

Figure Two draws on the latest estimates by the U.S. Energy Information Agency (EIA) to show that the Middle East was projected to drive the increase oil exports through 2050 from the areas outside the U.S., Canada, Europe, Russia, and China. While these projections were made before

the Ukrainian War, the EIA projected that the MENA region would continue to increase its share of global production. It also projected that Russian oil production would increase more modestly, while U.S. and Canadian production would only make limited future increases or begin to drop.

These increases in energy use will make the MENA region even more critical in meeting global needs for oil. They also indicate that the U.S. and its strategic partners should encourage MENA states to increase their export capability even as they plan to increase production of renewable energy.

The analysis supporting these projections states that, [5]

> In the Reference case, crude oil production in OPEC countries increases over the projection period. Compared with the four largest non-OPEC oil producers—Russia, the United States, Canada, and Brazil—OPEC crude oil production shows significant growth. Although OPEC member countries in Africa and South America contribute to this production, the Middle East drives increases in projected OPEC production, increasing production by more than 50% from 2020 to 2050 in this region. The combination of resources available in this region and the proximity of the Middle East to growing non-OECD economies in Asia contribute to the growth. The Middle East is already a prevalent supplier of crude oil to Asia, and we project it to remain so as demand for liquid fuels continues to increase and as many Asian refineries configure to process the Middle East's crude oil.
>
> … Russia's proximity to the growing non-OECD Asian markets provides a strong incentive to continue increasing production rates. By 2050, production in Russia will approach levels close to those of the United States.
>
> Meanwhile, the United States will increase production at a much more modest level. U.S. production will begin to decrease after 2030, and similarly, Canada's production growth will begin to subside after 2040. The leveling off of production in North America occurs as tight oil development moves into less productive areas and well productivity declines. The relatively high transportation costs associated with moving North America's crude oil to Asia also contributes to the leveling off in production. Additional production growth from Brazil relies on overall increasing oil prices and continued technological and efficiency improvements. Brazil's future production originates primarily in technically challenging offshore environments.

Figure Three provides a similar projection of the future sources of gas exports. It shows that most of the projected increase in global gas exports -- before the Ukrainian War -- was expected to come from Russia. It clearly shows that the current problems created by the leverage Russian gas exports have over importing states were projected to rise far beyond the leverage Russia can now exploit in its war with Ukraine.

This means that the U.S. and its strategic partners must look well beyond current levels of demand for gas imports if they are to find ways to provide alternative sources of gas and other forms of energy that can extend decades into the future. To put this challenge into perspective, the shifts in total energy exports -- and the resulting impacts on supply, inflation, and the economies of importing states issues that have arisen since the second Russian invasion of Ukraine -- have been larger than the direct impacts of the Arab oil embargo in 1973.

The strategic impact of the rise in future demand for energy exports also goes well beyond NATO Europe. **Figure Three** also shows how sharply Asian demand for oil and gas are projected to be through 2050. It warns that the longer-term strategic challenges in ensuring that increases in meeting Chinese, Indian, and other non-OECD Asian demand for oil and gas exports will be as critical in strategic terms over the coming decades as finding alternatives to dependence on Russian exports. This makes some kind of future confrontation with China over energy exports from the Middle east and the Gulf to America's strategic partners even more likely, and again highlights

the need to provide a security dimension to U.S. and allied efforts to ensure the secure flow of exports to both NATO Europe and east Asia.

The U.S. Never Had Real "Independence" from Oil and Gas Imports

Finally, **Figure Four** sounds a warning that U.S. "energy independence" from oil and gas imports has always been marginal, even if one ignores the broader economic realities involved. The EIA's reference case for the U.S. shows that the U.S. now only has a limited surplus in domestic oil production, and that this surplus is projected to decline to something close to zero by 2050. U.S. projections of domestic gas production are more reassuring, but the data scarcely indicate that the increase would allow U.S. increases in gas exports to meet a large part of European and other needs.

At the same time, direct U.S. dependence on oil and gas exports have never been a realistic measure of "energy independence." In the real world, measuring U.S. "energy independence" in terms of direct oil and gas imports has always been little more than analytic nonsense. The U.S. economy has shifted from a focus on manufacturing to one on services, and the U.S. is now dependent on manufactured imports from Europe, Asia, the Americas, and of minerals from Africa. This dependence is illustrated by the fact that the top five suppliers of U.S. imports of goods in 2019 were: China ($452 billion), Mexico ($358 billion), Canada ($319 billion), Japan ($144 billion), and Germany ($128 billion).[6]

Seen from a transatlantic perspective, U.S. goods imports from the European Union were $515 billion – much higher than from China.[7] The U.S. is the largest services exporter in the world, but its share of global manufacturing has long declined, and even if this trend can be reversed, the U.S. has every reason to increase the share of manufacturing imports from its strategic partners and reduce China's import share.

U.S. imports of manufactured goods can only come from partner states, however, if oil and gas or other sources of energy are available to such U.S. trading partners. A major cut in the flow of oil and gas exports to U.S. trading partners (many of which are critical strategic partners as well), would quickly show that an indirect dependence on energy exports is just as real as a direct one.

This real-world level of energy import dependence should have a major impact on U.S. energy strategy and the level of indirect U.S. dependence on the steady flow of energy exports to its strategic and major trading partners. The EIA projections in **Figure Two** and **Figure Three** show that MENA oil and gas exports will become steadily more important in meeting the world's expanding needs for energy, which means that the strategic importance of the MENA region to the U.S. must be judged accordingly – especially in light of the fact that there is currently no way to predict at any point in the future where dependence on Russian exports will not pose a threat.

Accordingly, U.S. strategy must involve a continued focus on the threats to Middle Eastern, North African, and related Mediterranean oil and gas exports. This means continuing to help Arab partners secure their oil and gas exports, and being prepared to tackle Russian and Chinese efforts to win influence or control over the full range of MENA exports. The strategic challenges in energy go far beyond the narrow definition of U.S. energy dependence, encouraging renewables, and focusing on the level of strategic leverage Russia can exploit during the Ukrainian War.

Managing a Real-World Exercise in Chaos Theory

If is far easier to generalize, however, than it is to create a functional effort to deal with some many uncertainties and variables. The previous analysis has shown that the U.S. is only one side of an incredibly complicated and global problem, and one that involves so many players and variable that it is the real-world equivalent of an exercise in chaos theory. First, Europe must decide whether and how to reduce lasting dependence on exports of Russian oil and gas on both a national and collective basis.

This means finding the most effective way to obtain oil and gas exports from other sources and distribute them through ports and new pipelines. The best real-world way to increase supplies of alternative energy sources requires at least short-term reliance on nuclear and coal, but makes the most efficient effort possible to develop cost-effective alternative energy supplies at a faster rate and higher level, and do so on a realistic basis rather by trying to implement over-optimistic goals and plans.

In practice, the most immediate need is for some clearer picture of what Europe can and cannot do to reduce dependence on Russia. Here, the European Union (EU) and International Energy Agency (IEA) have the modeling and analytic capabilities to coordinate the energy planning side of such efforts, to the extent European states can actually agree on a concerted approach. The United Kingdom is now outside the EU, but should certainly be a part of such European effort, and these European efforts could also draw on the modeling and expertise of the U.S. Energy Information Agency. NATO and its member states can certainly help develop suitable security plans, but this kind of energy planning is scarcely the function of the military.

On a broader level, the U.S. will need to reexamine its current energy policies and national strategy, and coordinate with Canada (and possibly Mexico, in spite of Mexico' current shift away from a focus on renewables). There needs to be a concerted North American effort to consider how it could increase gas and oil exports, focus on aid its European security partners, and work with individual NATO members to help secure energy exports from North Africa, the Mediterranean, and from the Gulf.

The U.S. will also need to carefully reexamine its plans to secure oil and gas exports from the Gulf to Japan and South Korea, and its other Asian and Indian Ocean and Pacific strategic and trading partners, as well as how to work with India to ensure it can meet the growing needs reflected in the previous Figures.

To the extent possible, this means working with both friendly oil and gas exporters like the Arab Gulf states and other members of OPEC, as well as recognizing the probable tilt in Russian exports to China. It expands U.S. security interests far beyond the defense of Taiwan and other Asian security partners, to the defense of energy trading routes. This could not only benefit Asian security partners but secure their capability to export and trade with the U.S. – effectively defending indirect oil and gas exports.

More generally, the U.S. needs to recognize that there now is a direct link between U.S. military and security interests and the U.S. interest in reducing the threat from global warming, and U.S. efforts to work with other states in developing alternative energy supplies and technologies – a common interest that affects America's high technology strategic partners as well. This should encourage common research and development efforts where possible, and should ensure that the

manufacturing of advanced systems for producing alternative energy supplies will not be dependent on China, Russia, or other potentially hostile states.

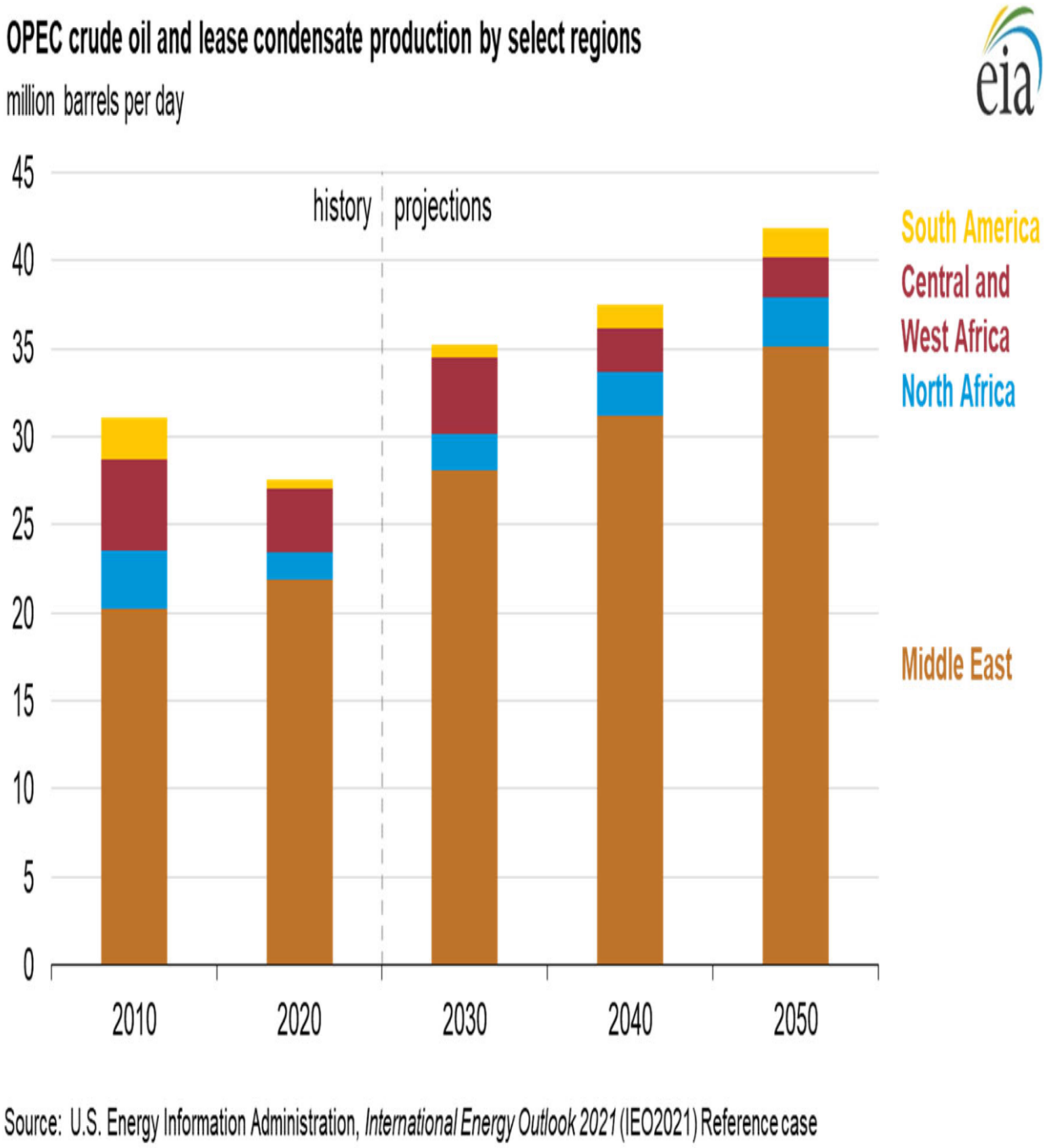
At the same time, such efforts will need to develop steadily better models and analytic tools, and be constantly updated to deal with a massive range of uncertainties and changing variables. Quite aside from all of the normal issues in international planning and security cooperation, there are as many emerging and disruptive technologies and approaches to such efforts as there are in the development of military forces, and the fact that unexpected breakthroughs in given area cannot be planned scarcely means that they do not occur.

Given the very different policies given countries will pursue -- and the competition that already affects national efforts in alternative energy development and technology -- much of this effort will also have to be ad hoc and have to mix complex compromises over national goals with common efforts on an ad hoc and constantly evolving basis.

Such an effort also cannot work if it focuses on broad goals rather than real-world plans and options, is politicized to the point of making shallow promises that can't be kept, takes on an ideological character, or ignores the need for honest and parametric analysis. Far too much current national policy deals in strategies that are little more than lists of good intentions, or reflects an ideological approach to renewables.

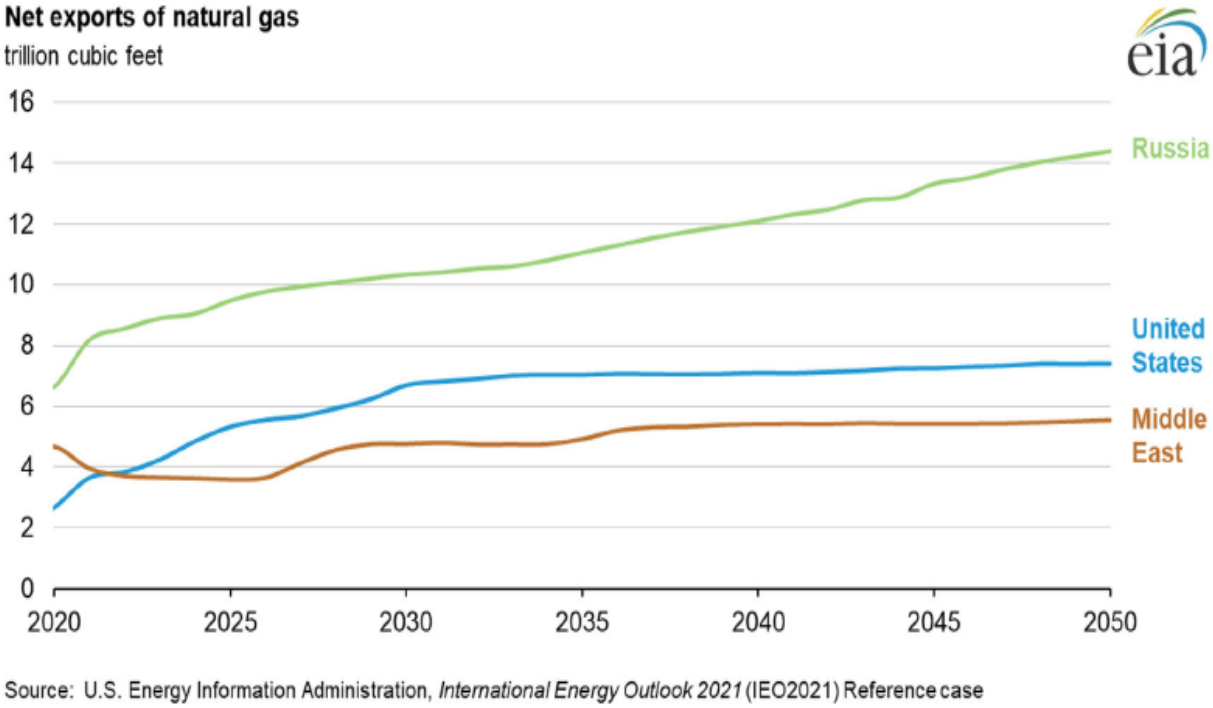
Fortunately, the fact that the equivalent of chaos cannot really be fully managed in no way means we cannot live with it if we recognize the challenges involved. Chaos and complexity are after all the dominant force in human history, and order has only been the dream.

Figure Two: Major Sources of Oil Production Through 2050

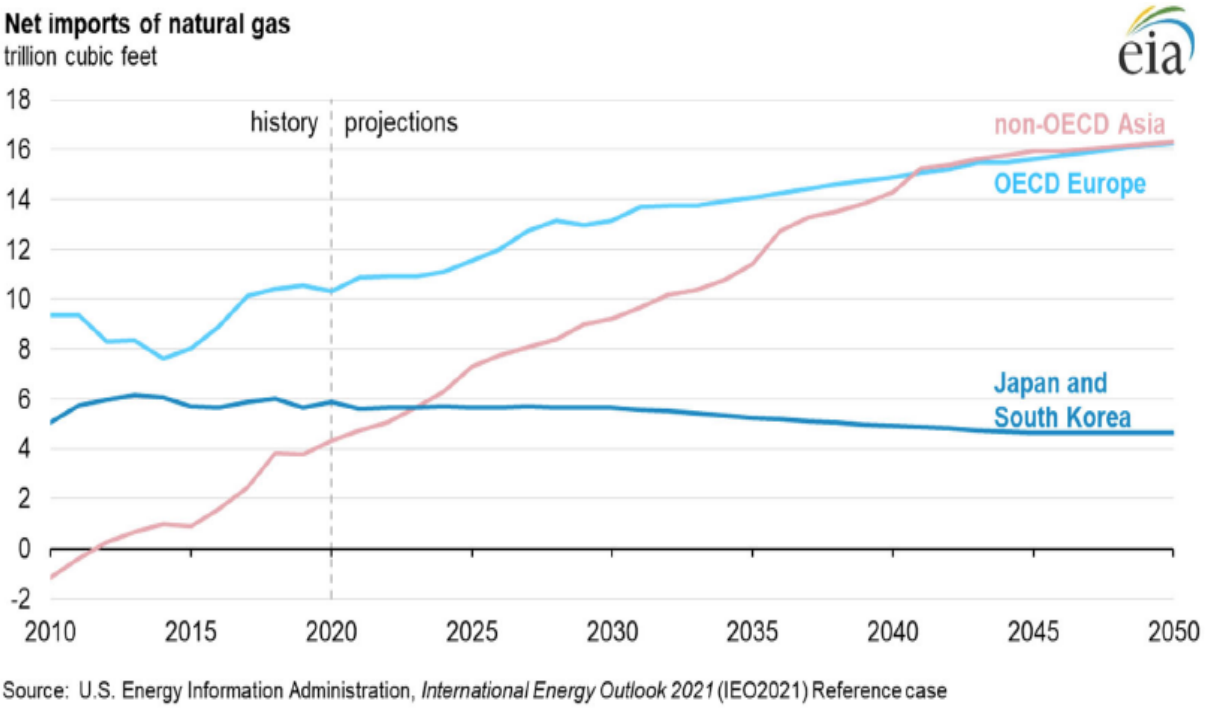


Source: U.S. Energy Information Administration, *International Energy Outlook 2021* (IEO2021) Reference case

Figure Three: Gas Exports and Imports: 2010-2050



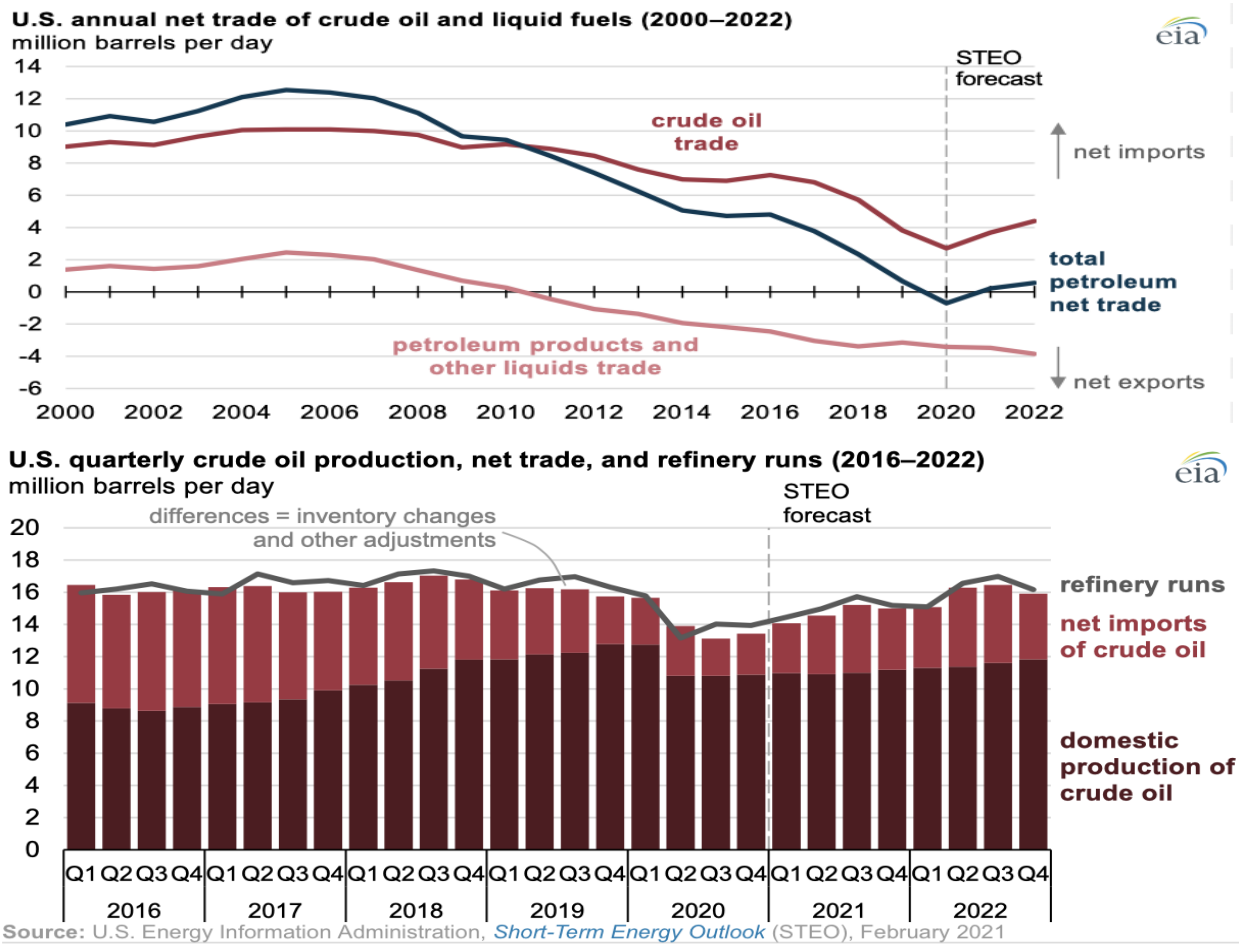
Source: U.S. Energy Information Administration, *International Energy Outlook 2021* (IEO2021) Reference case



Source: U.S. Energy Information Administration, *International Energy Outlook 2021* (IEO2021) Reference case

Source: Energy Information Administration, *International Energy Outlook 2021, Narrative*, Department of Energy, October 2021.

Figure Four: U.S. Independence from Energy Imports



Source: MacIntyre & French, "EIA forecasts the U.S. will import more petroleum than it exports in 2021 and 2022," *Today in Energy*, DOE/EIA, February 17, 2021, https://www.eia.gov/todayinenergy/detail.php?id=46776; and DOE/EIA, *Annual Energy Outlook 2022*, March 3, 2022, https://www.eia.gov/outlooks/aeo/narrative/production/sub-topic-01.php.

Endnotes

[1] *U.S. Strategy: Rebalancing Global Energy between Europe, Russia, and Asia and U.S. Security Policy in the Middle East and the Gulf*, is available for download at https://csis-website-prod.s3.amazonaws.com/s3fs-public/publication/220512_Cordesman_Rebalancing_Energy.pdf?67MZHvd0KqwPgSd1qLRJU6cyXrOIeFOX.

[2] International Energy Agency, *World Energy Outlook 2021*, October 2021, pp.16-18 and 73-74.

[3] Speaker of the House Pelosi stated that the Inflation Reduction Act will 'reduce carbon pollution by nearly 40 percent by the end of the decade', while Democrats in the Senate claim instead that the combined expenses of the FY2022 Budget will 'roughly reduce carbon emissions by 40% by 2030.'

[4] IEA, *World Energy Statistics, 2021*, pp. 13 & 15.

[5] Energy Information Administration, *International Energy Outlook 2021, Narrative*, Department of Energy, October 2021, pp. 35-36.

[6] Office of the U.S. Trade Representative, *Countries and Regions*, accessed August `16, 2022, *https://ustr.gov/countries-regions*.

[7] Office of the U.S. Trade Representative, *Countries and Regions*, accessed August `16, 2022, *https://ustr.gov/countries-regions*. The same source estimates that U.S. goods and services trade with United Kingdom totaled an estimated $273.0 billion in 2019. Exports were $147.4 billion; imports were $125.6 billion. The U.S. goods and services trade surplus with United Kingdom was $21.8 billion in 2019. The British withdrawal from the EU did not occur, however, until 2020.