



Changing Markets

*Economic Opportunities
from Lifting the U.S. Ban
on Crude Oil Exports*

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LIST OF ACRONYMS AND ABBREVIATIONS

| | |
|------------------|--|
| AEO 2014 | Energy Information Administration's Annual Energy Outlook 2014 |
| ANS | Alaskan North Slope crude oil |
| API | American Petroleum Institute |
| b/d | Barrels per day |
| bbl | One barrel. Unit of measurement equaling 42 gallons or approximately 159 liters |
| BIS | Bureau of Industry and Security, U.S. Department of Commerce |
| BLM | Bureau of Land Management, U.S. Department of Interior |
| BRICS | Brazil, Russia, India, China, and South Africa |
| BSD | Barrels per stream day |
| CAFE | Corporate Average Fuel Economy |
| CDF | Condensate distillation facility |
| CRS | Congressional Research Service |
| DOE | United States Department of Energy |
| EAA | Export Administration Act of 1979 |
| EIA | Energy Information Administration |
| EPCA | Energy Policy and Conservation Act |
| EU | European Union |
| FTA | Free trade agreement |
| GATT | General Agreement on Tariffs and Trade |
| GHG | Greenhouse gas |
| GDP | Gross domestic product |
| IEEPA | International Emergency Economic Powers Act |
| IEO | Energy Information Administration's International Energy Outlook |
| LLS | Louisiana Light Sweet crude oil |
| LNG | Liquefied natural gas |
| LR2000 | A searchable database constructed by BLM to record all rights of way granted over federal land |
| LTO | Light tight oil |
| mbd ¹ | Million barrels per day |
| MLA | Mineral Leasing Act of 1920 |
| MOIP | Mandatory Oil Import Program (1959-1973) |
| NAFTA | North American Free Trade Agreement |

¹ For the purpose of this report, we have used mbd to refer to million barrels per day in order to maintain consistency with NERA's units.

| | |
|---------|--|
| NATO | North Atlantic Treaty Organization |
| NERA | National Economic Research Associates |
| NGL | Natural gas liquids |
| NPRPA | Naval Petroleum Reserves Production Act |
| NYMEX | New York Mercantile Exchange |
| OAPEC | Organization of Arab Petroleum Exporting Countries |
| OCSLA | Outer Continental Shelf Lands Act |
| OECD | Organization for Economic Co-operation and Development |
| OPECFix | OPEC maintains crude oil exports |
| PADDs | Petroleum Administration for Defense Districts |
| RFF | Resources for the Future |
| SNAP-R | Simplified Network Application Process – Redesign |
| SPR | Strategic Petroleum Reserve |
| TAPS | Trans-Alaska Pipeline System |
| TPP | Trans-Pacific Partnership |
| TTIP | Transatlantic Trade and Investment Partnership |
| VOIP | Voluntary Oil Import Program (1957-1959) |
| WTI | West Texas Intermediate crude oil |
| WTO | World Trade Organization |

NERA Study Abbreviations (These are terms used in NERA’s economic scenarios.)

| | |
|------------|---|
| GPM | Global Petroleum Model |
| HOGP | High Oil and Gas Resource |
| NoBan | U.S. allows exports of all crude oil types starting in 2015 |
| NoBanCond | U.S. allows exports of condensate only starting in 2015 |
| NoBanDelay | U.S. allows exports of all crude oil starting in 2020 |
| OPECCut | OPEC cuts crude oil exports to maintain crude oil price |
| OPECFix | OPEC maintains crude oil exports |
| REF | U.S. Reference Case |
| ROW | Rest of World |

PREFACE

In 2014, the Brookings Institution's Energy Security Initiative (ESI) convened the Crude Oil Task Force, a group of energy and legal experts drawn from academia, major energy consultancies, government, think tanks, research institutions, law firms, financial analysts, and industry to examine the history and efficacy of U.S. crude oil export policy. Charles Ebinger, director of ESI, and David Goldwyn, ESI nonresident senior fellow, served as co-chairmen of the task force to address the following issues:

- How and why the current laws in place were enacted;
- How the oil market has changed;
- Whether the 1975 laws in place are relevant to today's market; and
- Whether a new approach will enhance U.S. energy security, national and international prosperity and U.S. foreign policy interests.

One of the task force meetings centered on bringing together some of the lead analysts on other reports addressing the crude oil export issue to look at the methodologies each report employed, to better assess how each study reached its conclusions.

The policy issues were difficult to examine because they involve interactions between U.S. oil production and the global oil market, the U.S. and global refining systems, and the impact of U.S. policies on the global economy. Uncertainties include how much light tight oil (LTO) the

existing refining system and other market outlets can absorb, how the U.S. refining system might adapt to LTO supplies in the future, how the Organization of Petroleum Exporting Countries (OPEC) and other producers will react to rising U.S. production and the possibility of exports, and how global oil prices impact U.S. production and vice versa. Questions policymakers may ask in determining whether to support lifting the ban include: How will prices be affected in both the domestic and the international economy, and what will the impact will be on U.S. gross domestic product (GDP), unemployment, and foreign policy?

In addition, many policymakers will want to take a hard look at the environmental impacts of lifting the ban on crude oil exports, especially vis-à-vis rising emissions of greenhouse gases (GHGs). Clearly if lifting the ban leads (as we believe it will) to higher U.S. oil production and this oil is then burned either domestically or processed in foreign refineries, there will be larger GHG emissions than if the oil had remained in the ground. There will also be enhanced emissions from the production of the oil equipment that goes into the wells and the additional transportation networks (pipelines, barges, trucks) to move the oil to market. Furthermore, in areas where the oil is produced, there will be larger local emissions. Many policymakers will certainly be taking environmental concerns into consideration. While these concerns are not within the scope of this re-

port, we do not underestimate their importance. We do believe that it is difficult to quantify them unless we know where the oil will be processed (either domestically or internationally) and the particular configuration of each refinery in terms of its emissions profile. The environmental consequences are highly complex and while currently the data is unavailable, we do agree these issues need to be recognized, though the impact on global emissions (in comparison to U.S. coal exports) is likely to be negligible.

To address these economic questions, Brookings secured the modeling support of National Economic Research Associates (NERA),² a major international economics consulting firm, to better understand the interplay of markets and various interactions between the domestic and international economy. This interplay can be assessed credibly only with computable general equilibrium models of the U.S. economy and models of the global oil market and global refining market. In addition, our policy experts examined the market anomalies caused by the North American unconventional crude oil boom, and the distortions occurring in the pricing of various crude oils in North America due to the lack of infrastructure to move these crude oils to market. Refining experts advised our task force on the challenges refiners, especially those on the U.S. Gulf Coast, face in utilizing ultra-light oil while maintaining their current product slates.

We drew on the expertise of legal advisers to understand the laws and regulations applicable to trade of crude oil and petroleum products, as well as the policy motivations behind them. We examined what steps the U.S. government will need to take if it chooses to change or modify its current policies and investigated in depth the economic impact of lifting the ban under different policy

scenarios. As part of this process, we looked at a number of other studies that have been conducted on the issue and in the body of this report we compare and contrast our findings with those of other top analysts.³ Finally, before making our recommendations, we looked at the foreign policy implications of lifting the ban, since putting potentially large volumes of crude on the international market will have a differential impact on various nations, including some of America's major trading partners, allies, and neighbors in the Western Hemisphere.

NERA METHODOLOGY

This report is supported by the empirical analysis performed by NERA. The Brookings Institution asked NERA to perform this task based on its previous analysis for the U.S. Department of Energy (DOE) on the macroeconomic impact of exporting liquefied natural gas (LNG). Brookings asked NERA to run macroeconomic modeling scenarios to understand the impacts on the U.S. if the ban on crude oil exports and/or condensates were to be lifted. In carrying out the assignment, NERA focused on the following four major issues:

1. U.S. crude oil production potential based on EIA's Annual Energy Outlook 2014 (AEO 2014) reference and high oil and gas resource case (HOGR) scenarios;
2. Options for modifying/lifting the ban: allowing condensate exports only, lifting the ban entirely in 2015, and delaying lifting the ban until 2020;
3. Global energy market interferences: using the reference case⁴ for low crude oil prices, and lower demand for refined crude oil products in the Asia-Pacific region; and

² NERA was retained by the Department of Energy to do the economic modeling on the impact of allowing liquefied natural gas exports on the U.S. economy.

³ NERA used a computable general equilibrium model for the U.S. economy.

⁴ Modeled from the AEO 2014 and IEO 2013 reference cases.

4. OPEC's reaction to crude oil exports: either cutting exports to maintain prices, or continuing to keep export levels steady resulting in declining crude oil prices.

NERA utilized its Global Petroleum Model (GPM) and NewERA models to perform this analysis. According to NERA, "GPM is a partial equilibrium model of the petroleum industry and was used in this study to determine the impact of lifting the crude oil export ban on energy markets both in the U.S. and abroad. NewERA is a computable general equilibrium model of the U.S. economy. It determines how changes in the global energy market will ripple through the U.S. economy."⁵ To present a clear explanation of the economic impact on the previously outlined four factors, NERA set about quantifying these impacts on the U.S. oil market. Lifting the ban on U.S. crude oil exports will most certainly have a ripple effect through the U.S. economy. NERA accounted for these economic impacts by measuring them in terms of standard metrics of welfare and GDP for the United States; and changes in income, unemployment, and industry.

NERA's study focuses on the economic benefits of international trade. NERA's work outlines the data projections from 2015 to 2035 and illustrates the impacts under various scenarios on the economy, consumers, and crude oil and refined product markets. For further explanation and detailed analysis of the economic impacts of lifting the bans, refer to NERA's report, *Economic Benefits of Lifting the Crude Oil Export Ban*. For our analysis on NERA's findings of the economic impact on lifting the ban on crude oil for the United States, see Chapter 5.

DEFINITIONS AND ASSUMPTIONS FROM THE NERA REPORT:⁶

- **Tight oil** is a form of light sweet crude oil contained in low permeability shale or tight sandstone. It will not flow naturally into an oil well, and prior to new technological developments could not be produced profitably.
- The broadest measure of net economic benefits to U.S. residents is the measure of economic **welfare** known as the "equivalent variation." The equivalent variation is defined as the amount of money that would have to be given to U.S. households to make them indifferent between receiving the money and experiencing the changes in prices and income associated with lifting the ban.⁷
- The components of **GDP**: wage income, capital income, resource and sector-specific capital, and indirect tax revenues.
- **Unemployment** in the U.S. is projected by analysts to persist until 2018. NERA's data therefore only estimates reductions in unemployment during 2015–2020.
- In this report, we refer to crudes from shale formations with **API gravities**⁸ from 40 to 49 as light tight crude oil. Crudes with API gravity greater than 49 are referred to as condensates (see Exhibit A in Annex).
- All **baseline cases** assume that the U.S. retains its ban on crude oil exports while the scenario cases assume the ban is lifted in different ways.

⁵ See NERA Economic Consulting, *Economic Benefits of Lifting the Crude Oil Export Ban*, prepared for The Brookings Institution, September 2014, for a more detailed and comprehensive explanation of the GPM and the NewERA models.

⁶ NERA Economic Consulting, *Economic Benefits of Lifting the Crude Oil Export Ban*.

⁷ Hal R. Varian and Jack Repcheck, *Intermediate Microeconomics: A Modern Approach*, 7th Edition. (New York: W.W. Norton & Company, 2010), 255-256.

⁸ API gravity is a scale used to measure the density of liquid petroleum products. See EIA, "Definitions, Sources and Explanatory Notes," www.eia.gov/dnav/pet/tbldefs/pet_pri_wco_tbldef2.asp.

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SUMMARY FOR POLICYMAKERS

The skyrocketing growth of unconventional oil and natural gas production in the United States has ignited an intense debate on the impact of energy exports on U.S. energy and economic security and its foreign policy. Today, rising U.S. crude oil production, combined with declining demand for petroleum products, has led to falling oil imports and increased product exports (which are not prohibited). The absence of logistics systems for many of these new crude oil sources has forced domestic producers to discount prices in order to get them to refineries, while at the same time having to endure higher-cost rail, barge, and truck transportation networks. The market is distorted further by the fact that a large volume of these new crude oil supplies are light sweet crudes which are ill-suited for many existing refineries designed to process heavy crude oil, in the absence of large-scale capital investments. There is intense analytical debate on when the capacity of the U.S. refining system to process the entire volume of light tight oil available will end, the so-called “day of reckoning.” Few market observers, including the authors of this report, doubt that the day is coming. If this happens, there will be a mix of pressures on prices: downward pressure on domestic oil prices; slowing domestic production; rising unemployment; and declining tax and royalty revenues for federal, state, and local governments. The market harbinger that a glut is

emerging will be widening spreads in the price of Louisiana Light Sweet crude (LLS, the Gulf Coast price marker) against Brent prices (the international marker for the same quality of crude). When that day comes, there will be pressure on the United States to act, to avoid the self-inflicted harm of artificially constraining crude oil exports.

The market distortions arising from this situation have raised a debate on the utility of lifting the decades-old ban on U.S. crude oil exports. The issue has gained great political and economic potency because given current trends, it appears that the crude surplus will continue to grow in coming years. All of these issues together have fostered the need to examine the legitimacy of a set of laws in place for nearly 40 years, long before the unconventional revolution in the United States.

In our 2012 *Liquid Markets* report on U.S. LNG exports, we concluded that the U.S. should neither constrain nor promote LNG exports, but should instead let the market determine the viability of projects and the levels of exports.⁹ We concluded that allowing natural gas exports would not materially impact U.S. natural gas prices, but would contribute to energy security by diversifying global LNG markets while sustaining U.S. natural gas production and providing more competitive gas pricing.

⁹ Charles Ebinger, Kevin Massy, and Govinda Avasarala, *Assessing the Case for Liquefied Natural Gas Exports from the United States*, ESI Policy Brief, The Brookings Institution, May 2012, www.brookings.edu/research/reports/2012/05/02-lng-exports-ebinger.

Unlike the market for natural gas where the U.S. has become self-sufficient, the U.S. is still a major importer of heavy crude oil and will remain so for many years. Likewise, while natural gas shortages and price volatility have occurred in the past, these disruptions have been induced either by short-sighted regulatory policy or the absence of adequate pipeline capacity—not by searing politically-motivated interruptions as have been experienced in the oil market.

Our legal analysis shows that the president has the power to act at any time to lift the ban, by declaring exports to be in the national interest under the provisions of the Energy Policy and Conservation Act of 1975 (EPCA). Barring presidential action, Congress could act to lift the ban by amending the EPCA. The current presidential administration seems to believe that if a crude surplus does emerge, it will not happen imminently so there is little reason to propose any significant policy changes until after the 2014 midterm elections.

As in the case of LNG exports, we find that the United States should avoid selective easing of the ban, for example: to allow exports only to nations that are members of the North Atlantic Treaty Organization (NATO), or those who cooperate with U.S. policy in regards to Iran, or are members of the World Trade Organization (WTO). Likewise, we do not support as good policy only lifting the ban on condensates or limiting the volume of exports to some predetermined level. These selective discriminations will lead to market distortions and may violate U.S. trade commitments.

Based on our team's robust macroeconomic modeling of the U.S. economy, global oil markets, and global refining capabilities, we believe that the U.S. should allow the market to determine where

crude oil will go and move immediately to lift the ban on all crude oil exports. Our analysis shows categorically that the crude oil export ban does not, and for some time has not, advanced U.S. energy security. To the contrary, our analysis shows that lifting the ban will increase U.S. oil production, diversify global supply, reduce U.S. gasoline prices, and provide net benefits to the U.S. economy. An export option is indispensable to sustaining domestic production; absent the price support that exposure to international markets provides, U.S. production will not reach its full potential.

Below, we highlight the key findings of this report. As a leader in world trade circles, where the U.S. is a consistent advocate for open markets and transparency, continued restrictions on crude oil exports have the potential to tarnish U.S. global standing while hindering its pursuit of energy security. Allowing crude oil exports is in the national interest. Our analysis shows a direct correlation between increased U.S. oil production, net benefits to society, and lower gasoline prices. As a result, we find the ban an anachronism that has long outlived its utility and now threatens to impair, rather than protect, U.S. energy, economic, and national security.

KEY FINDINGS

The modeled effects of lifting the ban on crude oil exports from the United States are measured against a baseline projection that assumes the ban continues. The “reference case” is a projection of business-as-usual conditions calibrated to the best estimates of the U.S. Energy Information Administration. The study also examined alternative scenarios in which supplies of economically-recoverable oil turn out to be higher or lower than in the baseline scenario.

NERA's analysis makes several clear findings:

1. Lifting the ban on crude oil exports from the United States will boost U.S. economic growth, wages, employment, trade, and overall welfare. For example, the present discounted value of GDP in the high resource case increases through 2039 is between \$600 billion and \$1.8 trillion, depending on how soon and how completely the ban is lifted.
2. Benefits are greatest if the U.S. lifts the ban in 2015 for all types of crude. Delaying or allowing only condensate exports lowers benefits by 60 percent relative to a complete and immediate removal of the ban. If oil and gas supplies are more abundant than expected, allowing only condensate exports lowers the benefits by 75 percent relative to completely lifting the ban. The chief reason for this is that the greatest increase in LTO production comes in 2015. Therefore a delay would forego significant benefits. In addition, according to the EIA data, the volume of condensate is smaller than LTO and it is discounted less comparatively so exempting it entirely adds fewer benefits than all crude oil entirely.
3. The welfare benefits to U.S. households derive from higher real incomes (from higher wages) and lower gasoline prices. In the reference case, the decrease in gasoline price is estimated to be \$0.09/gallon, but only for about five years. If oil supplies are more abundant than currently expected, the decline in gasoline prices will be larger (\$0.07 to \$0.12 per gallon) and more enduring.
4. The benefits of lifting the ban depend on assumptions of energy market conditions and how other oil suppliers, especially OPEC, respond. For example: If the ban is lifted, will OPEC continue to produce at current levels to defend market share, even if this leads to lower prices? Or will it cut production to keep prices up effectively nullifying or limiting the impact of U.S. crude oil exports?

What is most important is our finding that in all these modeling scenarios, there are positive gains for U.S. households.

One might have guessed that keeping crude oil in the U.S. would make oil and gasoline cheaper here, and thus make Americans better off. So why does lifting the export ban on crude oil prove so beneficial? The answer hinges on how the ban on crude exports affects incentives to invest in domestic oil production and where the crude oil can generate the greatest net value for the resource and the global nature of the oil market:

- Without the ban on exports, U.S. oil producers can sell their product more profitably because they are not forced to sell it to U.S. refiners who discount their kind of crude, which is generally less well-suited to existing refining facilities than imported crude.
- With greater profits, producers invest in producing more oil in the United States, about 1.3 million to 2.9 million barrels per

day more in 2020 than under the ban, assuming the ban is lifted in 2015.

- The increase in U.S. oil production makes world oil prices fall. Accordingly, so do U.S. gasoline and diesel prices, at least temporarily. This lowers the costs of production for all kinds of businesses and makes households better off.
- Moreover, U.S. refiners do not spend money on modifying their facilities to accept U.S.-produced LTO.

Thus, allowing U.S. crude oil to go to the refineries that can process it most efficiently, whether at home or abroad, is in the broad national economic interest. Lifting the ban on exports of crude oil

also has important foreign policy benefits. U.S. allies in Europe and Asia will be able to diversify their crude oil supply sources away from dependency on Russia (in the case of Europe) and away from seaborne routes in the South China Sea increasingly claimed by China (in the case of Japan and South Korea).

After 40 years of perceived oil scarcity, the United States is in a position to help maximize its own energy and economic security by applying the same principles to free trade in energy that it applies to other goods. By lifting the ban on crude oil exports, the United States also will help mitigate oil price volatility while alleviating the negative impacts of future global oil supply disruptions.

1. INTRODUCTION

In a recent statement, U.S. Senator Lisa Murkowski stated, “The United States is the only member of the OECD and IEA [International Energy Agency] that has effectively banned the export of crude oil produced domestically.”¹⁰ While other countries have adapted to changes in the international petroleum market brought about by new technological advancements and changing global oil supply-and-demand market dynamics, the United States seems to be the only nation of its peers that continues to operate under a now arcane complex of rules designed for another age.

Throughout history, the United States has undergone significant energy market shifts. In earlier decades, the U.S. public had a national sense of entitlement to low energy prices borne from an era of energy abundance. Commencing in the 1950s and continuing to 1970, it was an axiom of the era that energy in the post-war period was, in the words of Daniel Yergin, “almost a free good,” with land and resources, abundance and self-sufficiency guaranteed by access to cheap oil, gas, and coal.¹¹

This myth of energy “abundance” was shattered in 1973-1974 when crude oil and, even more importantly, gasoline prices quadrupled in the aftermath of the 1973-1974 Organization of Arab Petroleum Exporting Countries (OAPEC) oil embargo, even with price controls in effect. American consumers were jolted again in 1979 following the fall of the Shah of Iran, and the outbreak of the Iran-Iraq War in 1980. New supply disruptions combined with unsuccessful policy choices hit world markets, causing prices to skyrocket to highs never seen before. With price controls still in effect from the Nixon administration, U.S. legislation meant to protect domestic oil producers failed to adjust to the new realities of the global marketplace. By suppressing domestic prices, price and allocation controls limited the domestic price response, creating artificial shortages. Unlike the situation today, at that time the U.S. not only used oil for transportation fuel but also for electricity generation, making the U.S. economy heavily dependent on any fluctuations in the world price of oil. In the aftermath of the shortages produced by the 1973 OAPEC oil embargo (as well as

¹⁰ Lisa Murkowski, “A Ban for One: The Outdated Prohibition on U.S. Oil Exports in Global Context Prepared by Minority Staff for Ranking Member Lisa Murkowski,” U.S. Senate Committee on Energy and Natural Resources, U.S. Senate, 26 June 2014, www.energy.senate.gov/public/index.cfm/files/serve?File_id=8749ae25-8446-4d5e-bab2-d68f02f293df.

¹¹ Daniel Yergin, “America in the Strait of Stringency,” in *Global Insecurity: A Strategy for Energy and Economic Renewal*, Daniel Yergin and Martin Hillenbrand, eds., (Boston: Houghton Mifflin Company, 1982), 97.

the oil price and allocation controls in effect since 1971),¹² legislative efforts were launched to curb energy demand and to promote alternative sources of supply. These early efforts were successful over time in advancing major structural changes in the power and industrial sectors as consumers worldwide flocked to alternative fuels such as coal, nuclear power, natural gas, wind, and solar. In addition, consumers wherever possible made their operations more fuel efficient.

Despite these profound changes in the marketplace, the myth of energy abundance remained. In 1980, when Ronald Reagan predicted that following his phased decontrol of oil prices, the country would be self-sufficient within five years, few pundits challenged him.¹³ However, despite the president's bravado, most Americans had learned that the era of energy abundance had passed and that an era of scarcity and higher prices was here to stay. Even though markets began to stabilize and prices fell, culminating in an oil price crash in 1986, the mindset of energy scarcity remained fixed in the minds of most of the public. Then during the 1990s, a period of low prices, research and development successes, and a resurgent OPEC led to transformations in energy markets both domestically and internationally.

In response to low prices and OPEC's failure to curtail production even after Iraq returned to the market, global demand (albeit slowly) began to pick up by the early 2000s. Demand for oil skyrocketed as the newly emerging economies of Brazil, India, China, Russia, and South Africa (BRICS) took off, surprising analysts around the world. China was particularly important because

while most oil analysts focused on China's burgeoning industrial and transportation demand, the demand from the power sector rose by nearly 1 mbd, catching many "oil market" analysts by surprise.¹⁴ With global oil demand soaring, prices rose as OPEC's spare capacity disappeared. At the same time, mounting prices for conventional gas, and the perception that the U.S. was running out of gas and would within a decade need to import as much as 40 percent of its overall gas demand, led to renewed interest in unconventional gas, leading to the surplus situation we have today.

One of the most important factors sparking the unconventional oil revolution was the price of oil hitting an all-time high of \$147/bbl in 2008.¹⁵ High prices resulted not only from Chinese demand rising to 9-10 mbd but also owing to rising demand elsewhere in the emerging market world. Price rises also occurred because about 3-4 mbd was shut in as a result of civil conflict in a number of oil-producing countries. With the advent of the U.S. economic and global recession, demand fell, causing prices in 2009 to drop to below \$60/bbl.¹⁶ By 2010, however, U.S. GDP grew and consequently, tight oil and NGL production were able to flourish. West Texas Intermediate (WTI) prices bounced back to \$80/bbl and then to nearly \$100/bbl in 2011, creating an anomaly where, "more than at any time in its history, the U.S. oil economy was one of staggering abundance and simultaneous scarcity."¹⁷ With a strong demand for crude in the international market, U.S. oil production grew at a faster pace than anywhere else in the world. However, like all previous oil booms, the pace of development self-corrected as the huge volumes of ultra-light products (including eth-

¹² Daniel Yergin, *The Prize: The Epic Quest for Oil, Money & Power*, (New York: Simon and Schuster, 2011), 659.

¹³ Yergin, "America in the Strait of Stringency," 102.

¹⁴ International Energy Agency, "World Energy Outlook 2005," www.worldenergyoutlook.org/media/weowebsite/2008-1994/weo2005.pdf, p. 82.

¹⁵ Madlen Read, "Oil sets new trading record above \$147 a barrel," *Associated Press*, 11 July 2008, http://usatoday30.usatoday.com/money/economy/2008-07-11-3815204975_x.htm.

¹⁶ Catherine Contiguglia and Matthew Saltmarsh, "Oil Prices Fall Below \$60 a Barrel," *New York Times*, 10 July 2009, www.nytimes.com/2009/07/11/business/energy-environment/11oil.html?_r=0.

¹⁷ Blake C. Clayton, *Market Madness: A Century of Panics, Crises, and Crashes* (Oxford, UK: Oxford University Press, 2015).

ane, butane, and propane) soon overwhelmed the existing storage and transportation capacity to move these volumes to the U.S. Gulf Coast where they could be refined and exported. This created a profound change in the market where, while WTI had traditionally been priced at a premium of several dollars to Brent (the basis for most other crude oil futures contracts outside North America), WTI soon commenced selling at a discount, a classic market response to oversupply. The light crude oversupply became so huge that the differential widened to nearly \$30/bbl at one point.

These changing market dynamics, combined with progress in reducing gasoline demand through higher Corporate Average Fuel Economy (CAFE) standards, have now put the United States in the position to export crude oil: a development many never thought would become a reality. The acceleration in U.S. production is having a profound impact on the market, with imports of light sweet crude oil having fallen precipitously.¹⁸ However, because much of this new oil comprises light tight oils (LTO) and condensates with very high

API gravities (for NERA's oil type classification, see Exhibit A in Annex), they have significantly different product yields than conventional crudes. This causes technical challenges for U.S. refiners who do not have the capacity to process them.¹⁹ The large volumes of light sweet crude produced domestically have had a dramatic market impact with price discounts for these crudes reaching as much as \$30/bbl compared to their Brent equivalents, a clear signal of excess supply especially during the periods when refineries cut back demand as they change from winter (heating oil) to summer (gasoline) blends of products (or vice versa) known as "market turnarounds."

Even as policymakers and oil market analysts debated the implications of these profound market changes and their impact on a new "geopolitics of energy," what most analysts failed to see was that one of the major policy issues that would emerge was whether or not the nation should lift the ban on crude oil exports.

¹⁸ Marianne Kah, "The Need for U.S. Crude Exports." Presentation at Brookings ESI Workshop on U.S. Crude Exports, Brookings Institution, Washington, D.C., 25 April 2014.

¹⁹ Ibid.

2. U.S. CRUDE OIL PRODUCTION DEBATE FROM ABUNDANCE TO SCARCITY TO ABUNDANCE: THE EVOLUTION OF POLICY

Throughout its history, the United States has attempted to ensure energy security (defined for the public primarily as gasoline price moderation) by regulating the price of oil, controlling the imports of oil, and by restricting the exports of oil. In each case, powerful market forces, rising or falling demand, or discontinuities between U.S. and international prices have overwhelmed the policy of the day. Despite these policies (not because of them), the U.S. has swung from an abundance of oil supply, to scarcity, and today back to abundance.

A BRIEF HISTORY OF UNITED STATES CRUDE OIL POLICY

From 1910 to around 1950, the major force in global petroleum supply was the Texas Railroad Commission, which set petroleum prices and made decisions on the allocation of supply. In 1929, roughly a third of total global oil demand was met by U.S. exports. During World War II, 6 million of the 7 million barrels of oil used by the Allies were provided by the United States.²⁰ After the end of the war, oil demand in the rest of the world exploded, spurred on by the global economic recovery of the late 1950s and 1960s.

Between 1950 and 1970, as a result of its ready availability, the non-communist world increased its consumption of oil from 9 mbd to 30 mbd, an average annual compound rate of over 7 percent. While the U.S. attempted to protect its domestic production against competition from cheap overseas oil by regulating the volume of imports through both a Voluntary Oil Import Program (VOIP, 1957-1959) and a Mandatory Oil Import Program (MOIP, 1959-1973), owing to a number of regulatory loopholes on the eve of the 1973 OPEC oil embargo, the U.S. was 28 percent dependent on oil imports.

The 1960 formation of OPEC and its growing bargaining power over its first decade had created a situation where the U.S. was no longer able to produce reserves large enough to serve as a buffer for Western Europe in the aftermath of the 1967 Arab-Israeli war. As a result, the oil-consuming world became vulnerable to supply shocks.²¹ At this time, the Texas Railroad Commission was still restricting production and imports to keep U.S. crude oil prices high in order to protect the industry and to make it profitable. The result of this policy was that U.S. crude oil prices were about \$3/bbl in comparison to prices

²⁰ Yergin, "America in the Strait of Stringency," 98.

²¹ Charles K. Ebinger, Wayne Berman, Richard Kessler and Eugenie Maechling, *The Critical Link: Energy and National Security in the 1980s*, (Cambridge, Massachusetts: Ballinger Publishing Company, 1982), 2.

of around \$1.80 in the Persian Gulf. Although the U.S. might have been able to produce more, U.S. industry costs were too high to sell in the global marketplace. This artificial support of the U.S. industry angered OPEC, which believed that if allowed, it could sell more oil; OPEC also believed that the price it was receiving for its oil was too low, especially in comparison to U.S. prices. In response, Libya and Iran, followed by other OPEC members commencing in the late 1960s and early 1970s, demanded higher prices and greater shares of their production. In a new phenomenon known as “price leapfrogging,” no sooner had one OPEC nation renegotiated oil prices or production sharing terms, another OPEC member used this agreement on the next negotiation. When the international oil companies balked at a change in terms, OPEC used its bargaining power to up the ante on certain companies and, in the case of Venezuela and Libya, led to outright nationalizations. In hindsight, U.S. protectionist measures (VOIP and MOIP) backfired badly. While the intent was to restrict crude oil imports to protect higher cost domestic producers, the policies created scarcity rather than market stability.

In response to the flood of imported oil and concerns about inflation, President Richard Nixon in 1971 imposed broad wage, price, and allocation controls, including on the energy sector. Designed to curb inflation, price controls did not bring price stability but created greater scarcity since there were few economic incentives to look for oil and gas in a price-controlled environment. In addition, despite attempts to limit oil imports, between 1970 and 1973 imports rose dramatically as U.S. petroleum consumption was growing due to the rapid growth of the transportation sector

with the continued expansion of the Interstate Highway System.

THE OAPEC OIL EMBARGO

In 1973, the Arab members of OPEC (OAPEC) announced an oil embargo in retaliation to the U.S. support of Israel during the Arab-Israeli War.²² In response to the 1973-1974 OAPEC oil embargo and the resulting rise in oil prices that devastated the United States and other world economies, Congress gave the president broad statutory authority under the Energy Policy and Conservation Act of 1975 (EPCA) to restrict or permit energy exports.²³ EPCA vests the president with the authority to restrict the export of crude oil, natural gas, petroleum products, petrochemical feedstocks, and coal. Today, only crude oil exports remain banned.

The period between 1975 and 1981 was a contentious period in U.S. energy policy. While President Jimmy Carter began the phased deregulation of crude oil prices in 1978,²⁴ it was not completed until the Reagan presidency in 1981. During the loosening process, allocation controls continued to exist under the Powerplant and Industrial Fuel Use Act of 1978, which would not allow natural gas or petroleum to be burned in industrial boilers or new power plants as a primary fuel, leading to a surge in coal combustion.²⁵ During this six-year period, fuel economy standards were broadened, oil allocations were terminated, the International Energy Agency (IEA) and Strategic Petroleum Reserve (SPR) were created, global and domestic spot markets emerged, and oil increasingly became a globally-traded commodity with prices varying only by quality and transportation-cost differentials to select markets.

²² EIA, “Petroleum Chronology of Events: Arab Oil Embargo of 1973,” U.S. Government, www.eia.gov/pub/oil_gas/petroleum/analysis_publications/chronology/petroleumchronology2000.htm.

²³ For an in depth explanation of the EPCA, refer to Chapter 2 – Legal Framework.

²⁴ Yergin, *The Prize: The Epic Quest for Oil, Money & Power*, 663-664.

²⁵ EIA, “Petroleum Chronology of Events.”

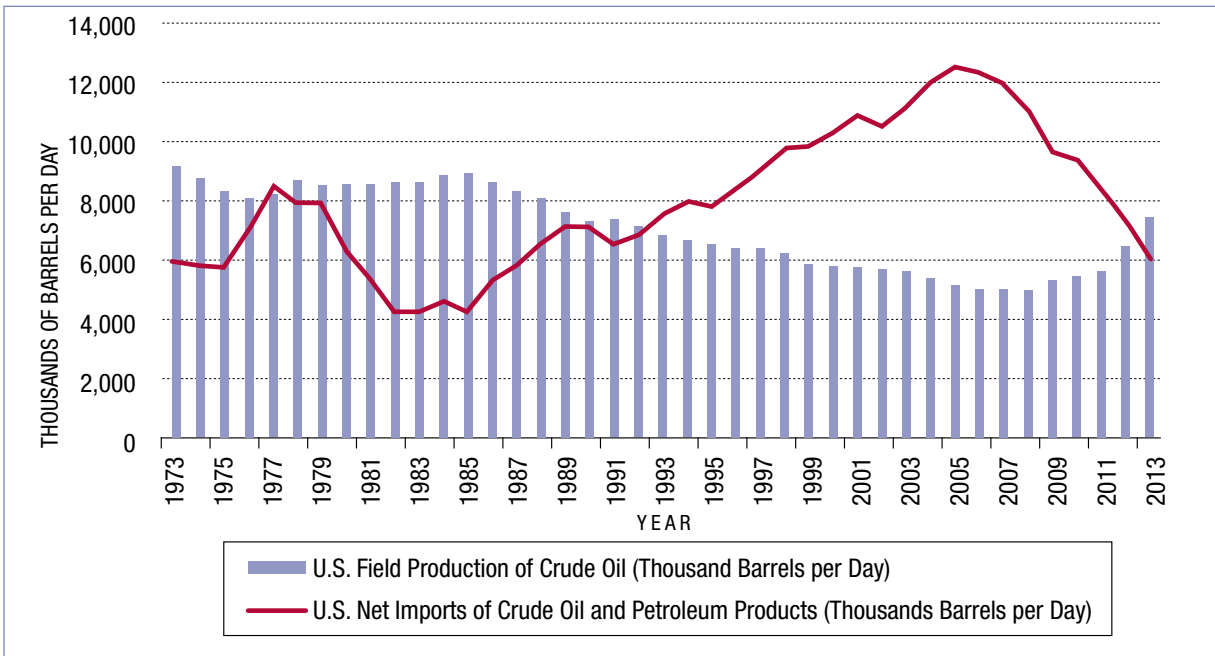
Still, the ban on crude oil exports remained until President Reagan in 1981 abandoned the phased decontrol of oil prices and lifted the ban on petroleum products.²⁶

Contrary to expectations, the EPCA failed to control prices, which nearly doubled in 2013 dollars from \$49.93/bbl in 1975 to \$92.08/bbl in 1981,²⁷ largely as a result of turmoil in the Middle East following the overthrow of the Shah of Iran and the outbreak of the Iran-Iraq War. Escalating petroleum prices stimulated fuel switching in the electric power sector from oil to other types of electricity. High prices led to major fuel switching, nearly eliminating oil demand in the electric power sector. Overall, the growth of alternative energy resources and innovations in fuel-efficient plants and new energy technology led to a

reduction in consumption. These structural changes led to a collapse in oil prices in 1986 and fears that the U.S. as a high-cost oil producer would see its production collapse. These events led to calls for oil import fees to protect the U.S. from a flood of cheap imported oil, especially from the Arabian Gulf.

Throughout the 1980s and 1990s and well into the 2000s, U.S. oil production continued to fall while imports of crude oil and petroleum products rose (see Figure 1) as OPEC nations continued to produce at high volumes, not realizing the profound shifts that had occurred in the demand for oil as a result of high prices. As the change in market dynamics became manifest and prices fell to low levels in 1986, domestic producers began to curtail new production and scrambled to stay

Figure 1: U.S. Oil Production to Imports, 1973-2013



Source: U.S. Energy Information Administration, "Petroleum and Other Liquids"

²⁶ The ban on petroleum product exports, including gasoline, was lifted in 1981. See Daniel Yergin and Kurt Barrow, "Why the U.S. needs to lift the ban on oil exports," *The Wall Street Journal*, 18 June 2014, <http://online.wsj.com/articles/why-the-u-s-needs-to-lift-the-ban-on-oil-exports-1403133535>.

²⁷ BP, "Statistical Data Workbook," June 2014, www.bp.com/en/global/corporate/about-bp/energy-economics/statistical-review-of-world-energy/statistical-review-downloads.html.

in business. For those producers that survived, the lesson learned was clear: if prices rise, U.S. oil production will rise; and if they drop, U.S. production will drop.

World oil prices recovered in the early 1990s, only to tumble again in 1998 as new fuel economy standards, enhanced energy efficiency, renewables, coal, and nuclear again took a toll on OPEC's efforts to maintain prices. Downwards price pressure also was affected by OPEC's decision not to cut back production despite Iraq's re-entry into the export market, the Asian financial crisis which severely curtailed demand, and near panic about the spread of bird flu which severely cut back on aviation fuel demand.

However, by the early 2000s the emergence of the BRICS and their skyrocketing economic growth rates caught the market off guard. Without the availability of an excess in capacity or large inventories, this surge in demand led to the re-emergence of OPEC as a dynamic force in world markets as price became the only tool to control the market. This surge in prices generated concern about the staggering size of the U.S. oil import bill and the impact that high oil prices were having on the global economy. This turnaround in the market led to renewed interest in unconventional oil and natural gas, which some independents had been talking about for years. From 2008 to 2013, oil production rose by nearly 2.5 mbd with the majority of gains being in unconventional resources such as tight oil plays.²⁸ In 2012 alone, crude production rose 0.835 mbd, and then in 2013 rose

0.954 mbd.²⁹ EIA's 2014 reference case projects unconventional production to jump to 4.8 mbd by 2019 and then peak.³⁰ Almost the entire growth in tight oil production is projected to come from the Eagle Ford field and the Permian Basin in Texas and the Bakken reservoir in North Dakota.³¹ Some analysts believe that other areas, such as the Utica basin, may see significant production gains.

REFLECTIONS ON THE ERA OF 'SCARCITY'

After nearly 40 years of global economic and financial instability, including oil price shocks occurring multiple times from 1973 through 2008, political volatility in the Middle East and other major oil producing countries, the Iranian hostage crisis, the rise of global terrorism, and three major wars involving threats to global oil supplies, a "scarcity mindset" has become ingrained in American consumers and many members of Congress. In reality, the U.S. did not experience a physical scarcity of oil after 1973; rather, the shortages were the result of price and allocation controls that created a false and self-inflicted sense of vulnerability. The economic threat the U.S. has faced over and over again is oil price volatility, and the pain of trying to adapt to rapidly escalating prices. Yet politicians and pundits have misunderstood the price threat as one of "scarcity" and thus have channelled policy in the wrong direction: to mitigate high gasoline prices by husbanding domestic supply while protecting the industry from foreign competition through a variety of mechanisms (oil import fees, volumetric quotas on imports, etc.)

²⁸ EIA, "Crude Oil Production," U.S. Government, www.eia.gov/dnav/pet/pet_crd_crpdn_adc_mbbldp_a.htm.

²⁹ Ibid.

³⁰ EIA, "Lower 48 onshore tight oil development spurs increase in U.S. crude oil production," EIA Annual Energy Outlook 2014, U.S. Government, December 2014, www.eia.gov/forecasts/aeo/MT_liquidfuels.cfm.

³¹ Some independent consultants believe that EIA's estimates are often too low from what actually is occurring in the market and that the EIA may be incorrect and that U.S. production may soar to even higher levels than in EIA's reference forecast. For example, there are analysts such as Ponderosa who believe that condensate reserves in the Utica basin which are listed by the EIA as zero may be larger than all the condensate in the referenced above basins. EIA's mandate does not correct for any policy changes. In addition, many other forecasters are not necessarily more accurate. The reason many production estimates are so far apart is that drilling in these areas on a large scale only recently commenced. Consequently, we are only now starting to learn about the longer term production rates of wells.

ENERGY INDEPENDENCE VS. ENERGY SECURITY

Since the 1973-1974 oil embargo, U.S. policymakers often have confused energy dependence and the vulnerability posed to U.S. energy security by America's large dependence on oil imports. However, there is a substantial difference between dependence and vulnerability. It is the high concentration of cheap petroleum reserves in unstable regions of the world which impose risks to the U.S. and global economy. Production in these regions can and has been disrupted, spiking world oil prices while imposing large costs to the U.S. and international economy. As pointed out in this report, rising U.S. production does not protect the U.S. economy completely from supply disruptions in the world market, but it does reduce wealth transfers from the U.S. to foreign sellers and adds resiliency to the U.S. and allied economies from the threat or the reality of periodic disruptions. Hence, U.S. production provides a higher level of energy security. More importantly, restricting U.S. exports does not reduce the costs of disruptions to the U.S. economy and to the extent that limiting U.S. exports reduces U.S. crude oil production, it both increases dependency while at the same time increasing vulnerability. Even in the case where dependency (as measured by gross imports) declines, if domestic production also declines, vulnerability increases.

RETURN OF THE ERA OF ABUNDANCE

As noted, from 2008 and 2013 U.S. oil production rose nearly 2.5 mbd, transforming U.S. oil import dependency.³² It also helped to offset the loss of other global production shut in, as noted, from

political turmoil in a number of countries while keeping global crude prices from skyrocketing. At the same time, the nature of oil production changed in the United States as light crude oil accounted for nearly all this new production making it difficult for many refineries in the United States, built to process heavy crude oils, to process this oil. This situation is complicated by a lack of pipeline infrastructure to transport this new oil production from its new locales. Much of the light crude oil is being produced in locations far from the existing pipeline networks, and only the steep price discount has allowed a massive investment in railroad, barge, and truck infrastructure to move it to market. To this day, pipeline infrastructure is lacking, a situation highlighted by the absence of final decisions on the Keystone XL pipeline and other pending pipeline infrastructure approvals.³³

The impact of this change has been transformative for various parts of the country. In Petroleum Administration for Defense Districts³⁴ (PADDs) 2 and 3, domestic production has replaced almost all non-Canadian light crude imports, while PADD 1 dependence on imported light sweet crudes has fallen in spite of significant infrastructure constraints (see Figure 2 for 2012 PADD refinery capacity). PADD 5 has also seen major reductions in oil imports. Another market change has been the rise in light crude exports to Eastern Canada (allowed under the EPCA and the Export Administration Act of 1979 [EAA]). The resurgence of American crude oil and NGL production has the potential to restore the United States as a "global powerhouse" in liquids production.³⁵

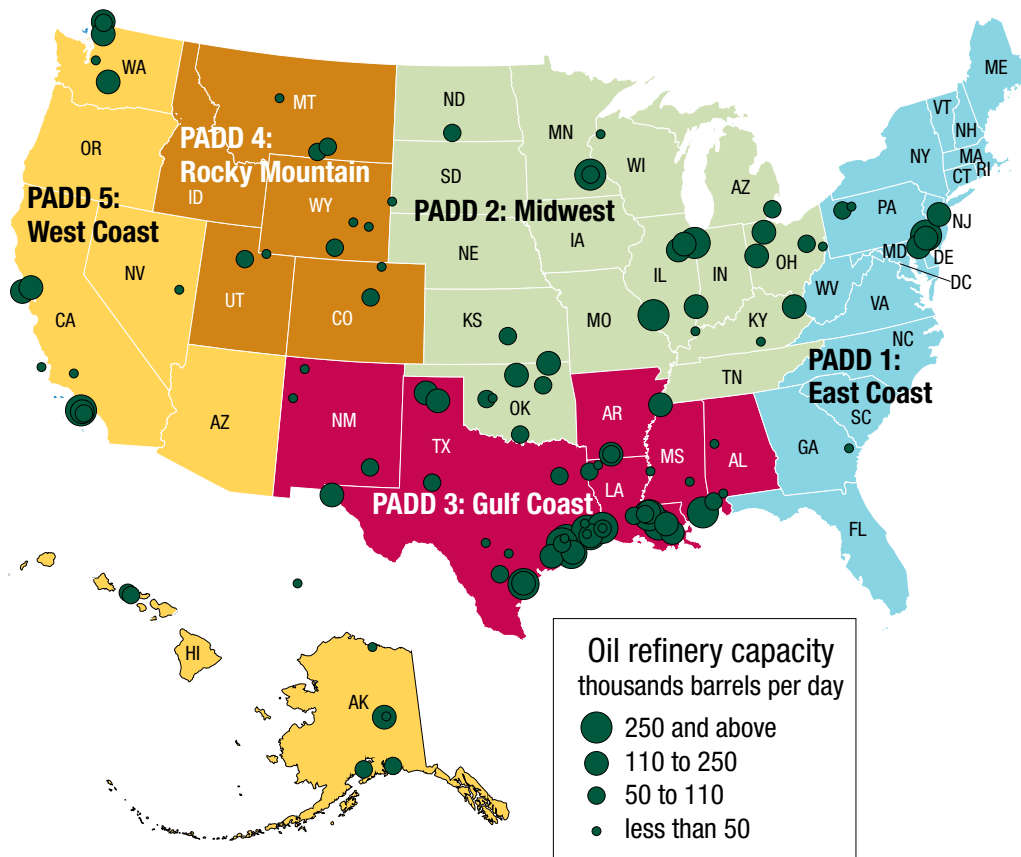
³² EIA, "Crude Oil Production," U.S. Government, www.eia.gov/dnav/pet/pet_crd_crpdn_adc_mbbldpd_a.htm.

³³ Roger Diwan, "The Unbearable Lightness of U.S. Crudes: When Will the Levee Break?" PFC Presentation at the Center for Strategic and International Studies, Washington, D.C., February 2014, p.13, http://csis.org/files/attachments/120210_Diwan.pdf.

³⁴ Petroleum Administration for Defense Districts (PADDs) are regions of the 50 states and the District of Columbia categorized into five districts. PADDs help illustrate data patterns of crude oil and petroleum product movements throughout the United States. See EIA, "PADD regions enable regional analysis of petroleum product supply and movements," U.S. Government, www.eia.gov/todayinenergy/detail.cfm?id=4890.

³⁵ Kah, "The Need for U.S. Crude Exports."

Figure 2: Operable Refinery Locations and Capacity Volumes as of January 1, 2012



Source: EIA Today in Energy, "Much of the country's refinery capacity is concentrated along the Gulf Coast," EIA, U.S. Government, 19 July 2012, <http://www.eia.gov/todayinenergy/detail.cfm?id=7170>.

Despite these trends and the restoration of America's role in the global energy economy, storm clouds linger on the horizon, especially in PADD 3 and, to a lesser extent, PADD 2. The crux of the problem is the growing surplus of light sweet crudes for which there is inadequate refinery infrastructure. Given projections of further substantial growth in U.S. oil production, the inability of existing U.S. refinery capacity to process the growing production of light sweet crude oil forms the cornerstone of the policy debate over the ban on crude oil exports.³⁶

As noted, since 2008 U.S. oil production has risen dramatically and is scheduled to rise further before it peaks in 2019, according to EIA's Annual Energy Outlook 2014.³⁷ However, despite the likelihood of these projections actually coming to pass or being surpassed, most members of Congress and much of the American populace simply either are unaware of these facts or are skeptical of oil industry assertions that a glut will emerge. Consequently, trying to point out that the United States actually has an abundance of oil and gas and that restrictions on crude oil exports are no

³⁶ Kah, "The Need for U.S. Crude Exports."

³⁷ EIA, "Annual Energy Outlook 2014," U.S. Government, 7 May 2014, www.eia.gov/forecasts/aeo/

longer needed is extremely politically contentious. The notion that the market will function efficiently is simply not believed by many people and is mistrusted by others, including members of the political establishment. Americans strongly believe that dependence on imported oil threatens national security, poses grave threats to both the domestic and international economy, and that moving towards “energy independence” is essential to the success and prosperity of the United States.³⁸ With such a mindset, which has been ingrained over 40 years, it is exceedingly difficult for the public to grasp the possibility that the United States can export crude oil without endangering national security or economic prosperity.

In the subsequent chapters, we state why we believe that lifting the ban on crude oil exports will in fact bring strong benefits to the U.S. economy and national security while opening up new opportunities for U.S. foreign policy. We also hope that critics of lifting the ban will look at past attempts to “protect” the domestic industry, such as the Voluntary Oil Import Program (1957-1959) and Mandatory Oil Import Program (1959-1973), the price and allocation controls of the 1970s which extended into the mid-1980s, calls for oil import fees and so on, and will realize that in every case, (rather than protecting the American consumer) such policies facilitated scarcity, whereas today the United States has crude oil abundance.

³⁸ John Pappas, “Texas A&M poll shows American support renewable energy—but don’t want to pay for it at the pump,” Dwight Look College of Engineering, Texas A&M University, 9 November 2012, <http://engineering.tamu.edu/news/2012/11/09/texas-am-poll-shows-americans-support-renewable-energy-%E2%80%94but-dont-want-to-pay-for-it-at-the-pump>.

3. LEGAL FRAMEWORK

The laws and regulations governing the U.S. export of energy have evolved in response to changing market conditions, perceived threats to U.S. national security, and concerns regarding the health of the domestic oil industry. During this evolution, they have become more complex and laden, with a host of exceptions and restrictions on whether and how particular hydrocarbons can be moved at all. The president retains the power to allow exports of all energy forms and the power to restrict exports of energy currently allowed, if the president finds that national circumstances necessitate. In this chapter, we review these laws and regulations to explain how we got to where we are today. We examine how changing market conditions have led to the relaxation of previous restrictions, and discuss how exports may be licensed today, even when a broad legislative ban on crude oil exports persists.

THE ENERGY POLICY AND CONSERVATION ACT OF 1975

As stated in Chapter 1, the EPCA was passed in reaction to the oil embargo of 1973 in an attempt to counter the drastic spike in oil prices and to

ensure that U.S. consumers had adequate supplies of petroleum products. This act instilled the president with the authority to restrict the export of, “coal, petroleum products, and natural gas or petrochemical feedstocks,”³⁹ as well as crude oil if he or she determines such action to be in the national interest.⁴⁰ The EPCA vests the Secretary of Commerce and the Department of Commerce’s Bureau of Industry and Security (BIS) with the responsibility to implement any rules stipulated in the legislation, but mandates that both the president and the secretary of commerce shall, when imposing restrictions, ensure that the national interest is left “uninterrupted or unimpaired.” Past administrations have allowed crude exports, determining that the national interest is protected through exchanges in similar quantities and quality either for convenience or enhanced transportation efficiencies with persons or the government of a foreign state; and/or temporary exports for convenience or increased transportation efficiency across parts of an adjacent foreign state which exports re-enter the United States and the historical trading relations of the United States with Canada and Mexico.⁴¹ The BIS has also allowed:

³⁹ Energy Policy and Conservation Act of 1975, P.L. 94-163, 89 Stat.871, U.S. Government, 22 December 1975; for similar provisions in the Export Administration Act of 1979 see 50 USCS Appx 2401 et seq.

⁴⁰ Ibid., Section 6212 (b)(1).

⁴¹ Ibid., Section 6212 (d).

- exports from Alaska’s Cook inlet;
- exports to Canada for consumption therein;
- exports in conjunction with refining or for exchanges of oil in the Strategic Petroleum Reserve;
- exports of heavy California crude not in excess of 25,000 b/d;
- exports provided for in certain international agreements;
- exports consistent with presidential findings under certain legal statutes;⁴² and
- exports of foreign oil (predominantly Canadian) where the exporter can prove that the crude is not of U.S. origin or has not been co-mingled with U.S. crude.⁴³

These allowable export categories are codified in the BIS’s Short Supply Controls, which are explained later in this chapter.

THE EXPORT ADMINISTRATION ACT AND THE INTERNATIONAL EMERGENCY ECONOMIC POWERS ACT

In addition to the EPCA, the Export Administration Act (EAA) grants the president the right to regulate exports for reasons of national security, foreign policy, or short-term supply shortfalls. It authorizes the president to establish licensing mechanisms while placing clear limits on his/her authority.⁴⁴ Although the EAA expired in August 2001, its provisions and the regulations pursuant to it, administered by the BIS, remain intact via the International Emergency Economic Powers Act of 1977 (IEEPA) which authorizes the presi-

dent to, “deal with any unusual and extraordinary threat, which has its source in whole or substantial part outside the United States, to the national security, foreign policy, or economy of the United States, if the President declares a national emergency with respect to such a threat.”⁴⁵

SECONDARY LEGISLATION REGARDING EXPORT CONTROLS

In addition to the EPCA and the EAA, other statutory regimes impose additional limitations on exports. The Mineral Leasing Act of 1920 (MLA) prohibits exports of domestically produced crude oil transported by pipeline over federal rights of way,⁴⁶ namely over federal lands, imposing an additional restriction on otherwise qualified export transactions such as swaps. The Outer Continental Shelf Lands Act (OCSLA) prohibits the export of crude oil produced from the Outer Continental Shelf,⁴⁷ and the Naval Petroleum Reserves Production Act (NPRPA), disallows the export of petroleum produced from these reserves.⁴⁸

From a policy perspective, these statutes (OCSLA and NPRPA) are designed primarily to facilitate access to federal resources, with the export restrictions viewed as ancillary and embedded in secondary provisions. The main purpose of the MLA is to allow the construction of pipelines and other infrastructure to transport energy resources by granting rights of way over federal land for such pipelines.⁴⁹ The OCSLA was enacted to facilitate a regime for the development of deepwater resources, primarily in the Gulf of Mexico.⁵⁰

⁴² For a delineation of these statutes see Phillip Brown, Robert Pirog, Adam Vann, Ian F. Fergusson, Michael Ratner and Jonathan L. Ramseur, *U.S. Crude Oil Export Policy: Background and Considerations*, Congressional Research Service, Washington, D.C., 26 March 2014, www.energy.senate.gov/public/index.cfm/files/serve?File_id=dfe108c9-cef6-43d0-9f01-dc16e6ded6b4.

⁴³ 15 CFR 754.2-Crude oil (i).

⁴⁴ P.L. 96-72.

⁴⁵ CRS, *U.S. Crude Oil Export Policy*, p. 6.

⁴⁶ 30 U.S.C. § 185(u).

⁴⁷ 43 U.S.C. 1354.

⁴⁸ 10 U.S.C. 7430(e).

⁴⁹ 30 U.S.C. § 185(a).

⁵⁰ 43 U.S.C. 1332.

The export restrictions under these laws can be lifted only by presidential executive orders, based on national interest findings; historically such orders have been entered into sparingly and under narrow circumstances (see Exhibit B in the Annex). The “national interest” criteria are extraordinarily broad supporting nearly every basis or justification for presidential action.⁵¹ Such findings are not subject to any procedural requirements or to judicial review.⁵²

In reality, these laws have had little impact on the scope of exports allowed by executive order. President Reagan made national interest findings under the EPCA, as well as the MLA, allowing crude oil exports to Canada.⁵³ On the other hand, in ruling on specific license applications, the BIS lacks the authority to waive the MLA or OCSLA restrictions, even when the export license meets the “national interest” criteria.⁵⁴ Although, these laws impose additional layers of prohibition and complexity to U.S. crude oil export restrictions they apply only to domestically produced oil. While these secondary statutes reinforce the president’s authority to control crude oil exports, when produced or transported in different ways, they do not apply to the re-export of foreign-origin crude oil facilitating the export of Canadian crude oil from U.S. ports.

PRESIDENTIAL AUTHORITY TO ALLOW EXPORTS IN THE NATIONAL INTEREST

The authority to allow exports under the EPCA based on a national interest determination has

been exercised by only three presidents on five different occasions. However, there have been a number of permits granted allowing exports under more narrow circumstances.

In 1985, President Reagan permitted crude exports to Canada. He again allowed crude exports to Canada produced from Alaska’s Cook Inlet.⁵⁵ In 1988, he permitted the export to Canada of 50,000 b/d of Alaskan North Slope crude oil (ANS) that had been transported over the Trans-Alaska Pipeline.⁵⁶ In 1992, President Bush allowed 25,000 b/d of California heavy crude oil to be exported.⁵⁷ Lastly, in 1996, President Clinton expanded President Reagan’s initial finding regarding ANS crude oil, allowing unlimited amounts of exports of ANS crude oil to any destination, provided certain transport conditions were met.⁵⁸ Currently, no ANS crude is exported outside the U.S. and Canada (see Exhibit B: Presidential Allowances for Crude Oil Exports in the Annex for further information). With the exception of ANS exports, all of the above-mentioned categories of exports require a license which BIS has granted on various occasions.⁵⁹

Most of the above presidential actions have involved allowing crude oil exports to Canada, reflecting the unique commercial relationship reinforced by treaties such as the North American Free Trade Agreement (NAFTA).⁶⁰ The EPCA does not specifically set out criteria that the president should consider in making a “national interest” determination, which is not unusual. In all cases, however, the export permits were

⁵¹ 64 Fed. Reg. 73744.

⁵² The Administrative Procedure Act (APA) does not apply to executive orders, allowing the President to act without any notice or public input. 5 U.S.C. 706. Moreover, courts are very reluctant to review Presidential actions authorized under a “national interest” or similar criteria.

⁵³ 50 Fed. Reg. 25189 (18 June 1985).

⁵⁴ 15 C.F.R. § 754.2(c).

⁵⁵ 50 Fed. Reg. 25189 (18 June 1985); 50 Fed. Reg. 52798 (26 December 1985).

⁵⁶ 54 Fed. Reg. 271 (5 January 1989).

⁵⁷ Presidential Memorandum of 22 October 1992, *Exports of Domestically Produced Heavy Crude Oil*.

⁵⁸ Presidential Memorandum of 26 April 1996, *Exports of Alaskan North Slope (ANS) Crude Oil*.

⁵⁹ 15 C.F.R. § 754.2.

⁶⁰ 42 U.S.C. 6212(d)(3).

viewed as having only a minimal impact on the U.S. economy.

Despite the fact that there are no restrictions on the export of petroleum products, the president, under the EPCA, has the authority to tighten restrictions if found to be in the national interest. However, since export controls on refined petroleum products were lifted in the 1980s, no president has exercised this power.⁶¹

REGULATORY CONTROLS ON CRUDE OIL EXPORTS

The BIS export processes and procedures apply not only to crude oil exports, but also to all goods subject to export restrictions. Consequently, BIS regulations do not always address unique issues arising with crude oil export transactions. Soaring unconventional oil production has required the BIS to become more familiar with the oil industry and to adapt its procedures to the industry's unique commercial environment. This issue has gained saliency over the past two years as the number of license applications has burgeoned. Similarly, the industry has had to become better informed about the BIS's licensing standards and processes in order to advocate effectively for their export applications. As noted, crude oil exports are governed by the Short Supply Controls, which generally require a license for the export of any hydrocarbon commodity falling within the definition of "crude oil."⁶²

If a product is governed by BIS regulations, a license application must be filed and, if granted, exporters must abide by the license's terms. This often requires companies to implement significant compliance programs.

By comparison, a license is not required for petroleum "products," including gasoline. Unfinished oils and topped crude oil can be exported without a license because they specifically fall outside the scope of the definition of crude oil.⁶³

A company seeking reassurance in a close case that its product is not crude oil has the opportunity to seek a classification ruling (in effect, regulatory approval) allowing the product to be exported without a license. The BIS has specific procedures in place for obtaining such rulings.⁶⁴

While BIS export regulations are publicly available, current law mandates that BIS maintain the confidentiality of all license applications, all relevant communications and deliberations, and the license itself.⁶⁵ Accordingly, even though the BIS enforces and administers its regulations consistently and by the book, without a political or policy-making agenda, the fact that the agency operates in a "black box" creates concerns about a lack of transparency over how its regulations are interpreted and applied. This lack of transparency exists primarily because the BIS relies heavily upon the voluntary cooperation of the private sector. There is a long history of the Department

⁶¹ When propane shortages occurred in the Midwest in the winter of 2013/14, stakeholders called on President Obama to restrict the exports of propane. They argued that, while the Midwest was suffering greatly as a result of propane shortages, large quantities were exported to foreign markets. See Julia Edwards and Sabina Zawadzki, "Analysis: Propane freeze squeeze may harden resistance to U.S. oil exports," *Reuters*, 26 January 2014, www.reuters.com/article/2014/01/26/us-energy-propane-usa-analysis-idUSBREA0P0K520140126.

⁶² "Crude oil" is defined as "a mixture of hydrocarbons that existed in liquid phase in underground reservoirs and remains liquid at atmospheric pressure after passing through surface separating facilities and which has not been processed through a crude oil distillation tower. Included are reconstituted crude petroleum, and lease condensate and liquid hydrocarbons produced from tar sands, gilsonite, and oil shale. Drip gases are also included, but topped crude oil, residual oil, and other finished and unfinished oils are excluded." 15 C.F.R. § 754.2.

⁶³ 15 C.F.R. § 754.2(a).

⁶⁴ 15 C.F.R. 748.3.

⁶⁵ 15 C.F.R. § 748.1(c).

of Commerce protecting the commercial data in order to sustain long-term cooperation with the private sector. The BIS therefore protects the information of the private sector that might turn out to harm the competitive positions of U.S. companies across various commercial activities. There is no publication of BIS decisions or precedents on which applicants can rely. While the BIS alleges that it follows its own precedents, with no confirmation of this fact publicly available it appears that license applications are reviewed and granted on a case-by-case basis creating a situation where, often the only way to obtain a license is for each exporter to take its case directly to the BIS, either through a license application or commodity classification.⁶⁶

Depending on the proposed export, the BIS may grant (what, for the purposes of this report, are termed) a “passport” license or a “transaction” license. While the formal regulations do not distinguish between these two types, the passport license holder can conduct any amount of the approved export transactions typically for a period of one year. The license holder does not have to use it. Licenses for exports of U.S.-origin crude oil to Canada are an example of a passport license.

Transaction licenses involve BIS review and approval of one-time transactions. They could be granted for an export transaction swapping the exported domestic crude oil for a corresponding import of crude oil or petroleum products of equal quality or quantity.⁶⁷ Generally, an application for a transaction license requires the submission of specific contract documentation that,

if the license is granted, it will govern the entire transaction.

Exporters of crude oil apply for export licenses on the BIS Simplified Network Application Process-Redesign (SNAP-R) online application system.⁶⁸ The SNAP-R system, however, is not tailored to address specific export transactions, such as those executed in the commodities arena.

THE CASE OF CONDENSATE

The restrictions on the export of crude oil also apply to “lease condensate,” also referred to as “unprocessed,” “field,” or “straight run,” condensate. Condensate can be found as a gas separated from crude oil underground or even dissolved within the crude. This type of crude oil has been under much controversy lately as it has been accused of being mislabeled as a crude oil. Condensate is not identified or viewed in the industry as crude oil. In addition to the fact that it is comprised of lighter hydrocarbons and produced mostly from natural gas wells, lease condensate has distinguishing physical characteristics the most important of which is that lease condensate typically has an API gravity greater than 48 degrees. For example, Eagle Ford shale lease condensate often has an API Gravity of 60-70 degrees and sometimes exceeds 80 degrees.⁶⁹ In contrast, industry standards for light crude oil provide for an API gravity of 42 degrees or lower.⁷⁰ For reasons unrelated to export controls, the definition used by the Commerce Department is keyed to whether the hydrocarbon mixture has been distilled in any manner. “Lease condensate” thus is a hydrocar-

⁶⁶ 15 C.F.R. § 748.

⁶⁷ See e.g., 15 C.F.R. § 754.2(b)(2)(i).

⁶⁸ 15 C.F.R. § 748.1(d).

⁶⁹ Sandy Fielden, “With or Without Splitting? Changing Lease Condensate Export Definitions,” RBN Energy LLC, 25 June 2014, <http://rbnen-ergy.com/with-or-without-splitting-changing-lease-condensate-export-definitions>.

⁷⁰ For example, NYMEX specifications for light crude oil include an API gravity of 37-42 degrees (CME Group, “NYMEX Rulebook – Chapter 200: Light Sweet Crude Oil Futures,” New York Mercantile Exchange Inc., 2009, www.cmegroup.com/rulebook/NYMEX/2/200.pdf) and Light Louisiana Sweet specifications according to Capline Pipeline include a API gravity of 34-41 degrees (Capline Pipeline, “Light Louisiana Sweet (LLS) Common Stream Quality Program,” 27 June 2007, www.caplinepipeline.com/documents/LLS_SPECIFICATIONS.pdf).

bon mixture included in the definition of “crude oil,” as long as it has not been distilled.⁷¹ On the other hand, any distilled hydrocarbon mixture is not “crude oil,” but a product not subject to export restrictions.

The BIS recently was reported to have issued rulings to two companies, Pioneer and Enterprise, allowing condensate exports that classify as a “product” condensate processed through a field condensate distillation facility (CDF), also referred to in the industry variably as a “splitter,” “stabilizer,” or other more technical terms. The product is referred to as “processed condensate.” The BIS rulings are based on the fact that the processed condensate has been “processed through a distillation tower” in the CDF.⁷² While there are many different distillation-based equipment and technologies, at its essence a distillation tower involves the use of heat, evaporation, and condensation to fractionate the lease condensate into separate petroleum products.⁷³ From a regulatory perspective, these uses support the rulings that the distillation in the CDF produces a product—processed condensate—which is distinctly different from the lease condensate feedstock. Finally, the BIS apparently based its rulings on the fact that the regulations are designed to restrict the export of crude oil, while allowing freely the export of petroleum products. BIS recognized that processed condensate is much like other, readily exportable products, such as natural gasoline, produced in a gas processing plant, and refinery-produced naphtha. These recent rulings illustrates that there may be incentives for producers to find low cost options to make their condensate a product.

EXPORTS OF U.S. CRUDE OIL TO CANADA AND CANADIAN CRUDE OIL

The vast majority of licenses have been granted for domestically-produced crude oil exported to Canada but the U.S. crude oil must be used or consumed in Canada.⁷⁴ While U.S.-origin crude cannot be diverted from Canada to third-country destinations, products refined in Canada from U.S. crude can be sold anywhere. In April 2014, the United States exported the greatest volume (268,000 b/d) of crude oil in the last 15 years (see Figure 3). Most of it was shipped to Canada.⁷⁵

In recent months, the BIS issued licenses for the export of Canadian crude from the United States. Canadian oil can be exported as “foreign” crude if it has not been commingled with any U.S.-origin crude oil. An export condition is that the Canadian crude must always remain segregated. An emerging issue with the re-export of Canadian heavy crude oil from U.S. ports has arisen regarding the possible blending in of a diluent of U.S.-origin containing “lease condensate,” which the BIS defines as “crude oil.” Previously, this “lease condensate” has been exported from the United States unblended with other diluent products. There is no issue when the diluent is of Canadian origin or when the U.S. diluent is a product that does not fall within the definition of crude oil, such as natural gasoline, naphtha, processed NGLs, or plant condensates. If a small quantity (more than a de minimis quantity of lease condensate as compared to the entire batch volume) of U.S. lease condensate does find its way

⁷¹ 15 C.F.R. § 754.2.

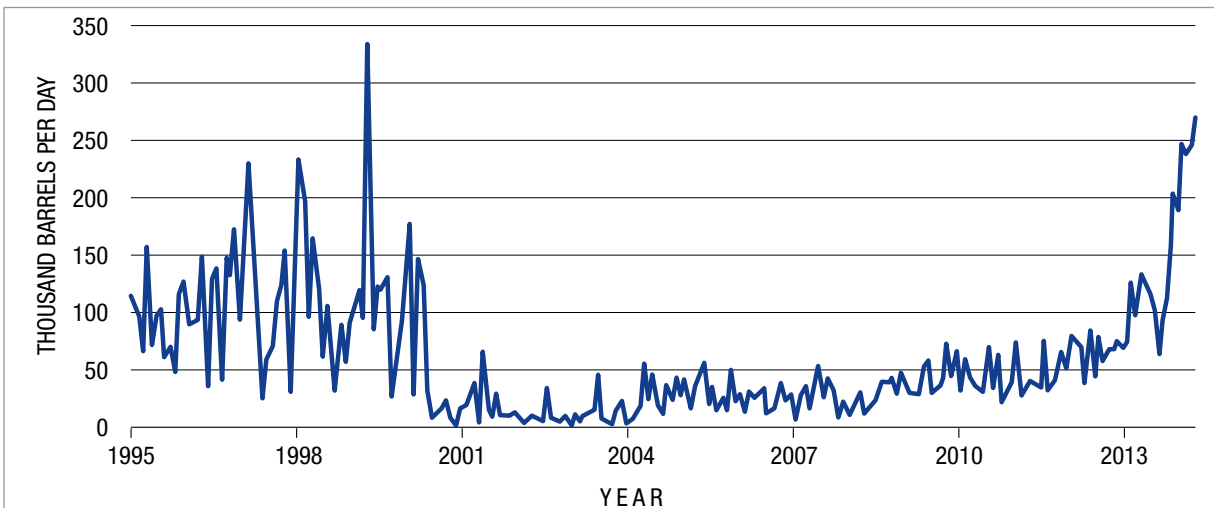
⁷² Jennifer A. Dlouhy, “US challenges oil export ban with approvals for two Texas companies,” *FuelFix*, 24 June 2014, <http://fuelfix.com/blog/2014/06/24/feds-open-door-to-condensate-exports/>.

⁷³ EIA Today in Energy, “Crude oil distillation and the definition of refinery capacity,” EIA, U.S. Government, 5 July 2012, www.eia.gov/today-in-energy/detail.cfm?id=6970.

⁷⁴ 15 C.F.R. 754.2(b)(1)(ii).

⁷⁵ EIA Today in Energy, “U.S. crude exports in April rise to highest level in 15 years,” EIA, U.S. Government, 16 June 2014, www.eia.gov/today-in-energy/detail.cfm?id=16711.

Figure 3: U.S. Crude Exports, January 1995-April 2014



Source: U.S. Energy Information Administration, "Petroleum Supply Monthly"

into Canadian heavy crude oil as a diluent, it would not qualify for re-export from the United States.⁷⁶

SWAPS AND EXCHANGES

A license option that has not been widely granted is to execute a swap transaction. To obtain such a license, an applicant must meet the requirements outlined in the "Commerce Department's License Requirements to Swap Crude Oil," see textbox.⁷⁷ The purpose of these restrictions on swap exports is to ensure that there is no "net" energy leakage from the United States owing to a particular export.

A swap license is difficult to obtain because the licensee must demonstrate that the export is justified for "compelling economic or technological reasons."⁷⁸ Compelling economic reasons can focus on the price discount between the grade of U.S. crude to be exported and the international

Commerce Department's License Requirements to Swap Crude Oil

1. Must demonstrate that the exported crude will be part of an "overall transaction."
2. This "overall transaction" must result *directly* in the importation into the U.S. of an equal or greater quantity and an equal or better quality of crude oil or petroleum products.
3. The applicant must demonstrate that for compelling economic or technological reasons beyond its control, the crude oil cannot reasonably be marketed in the U.S.
4. The transaction takes place only under contracts that may be terminated if the petroleum supplies of the U.S. are interrupted or seriously threatened.

⁷⁶ The option to export Canadian crude oil was enhanced this year when the BIS, while applying the non-commingling requirement strictly, provided stakeholders with guidance to address issues such as tank bottoms and pipeline interface in a commercially and logistically reasonable manner. Generally speaking, BIS may deem an export of Canadian crude compliant where there has been very minimal interface in each phase of the transport and storage route with U.S.-origin crudes and where, additionally, such interface is solely incidental to the sequential use of pipelines or tanks. Therefore, while ensuring segregation may prove more challenging for storage in tanks and pipeline infrastructure, it is more readily demonstrable when Canadian crude oil is transported by rail.

⁷⁷ 15§ 754.2(b)(2)(i).

⁷⁸ 15§ 754.2(b)(2)(i).

price benchmark for a comparable grade (e.g. Brent-WTI). Compelling technological reasons could include the inability of domestic refineries, primarily configured to process heavy oils, to process the crude. Finally, the “overall transaction” requirement obligates the applicant to submit with its application contracts confirming that both the import and the export legs will occur.

It is unclear whether the “compelling reasons” need to apply to the specific exporter’s circumstances or if they can be market-based. The latter would appear to be a more sensible approach from a regulatory standpoint, and would help to create market-wide certainty.

One impediment to a swap export transaction is the MLA restriction on the export leg of a swap transaction.⁷⁹ As noted, the MLA prohibits the export of domestically produced crude oil that is transported through pipelines crossing federal rights of way.⁸⁰ This restriction affects a large number of pipelines, especially in the western United States. In contrast, the MLA restriction is less of an impediment in Texas, where there is little federal land, and the oil is subsequently exported from the Gulf of Mexico, or where the crude oil is transported by rail, which is not governed by the MLA.

Determining whether a pipeline is subject to MLA restrictions is another complicated undertaking. The Department of Interior’s Bureau of Land Management (BLM) is the government agency that grants rights of way over federal land

for pipeline construction,⁸¹ but there is no comprehensive list of pipelines that cross over federal lands. The BLM maintains records of all rights of way granted over federal land in its searchable database called LR2000.⁸² It is difficult, however, to determine whether specific pipelines cross over federal land, because the LR2000 provides the company associated with the granted right-of-way rather than naming the specific pipeline. The safest approach to ascertain whether a pipeline crosses federal rights of way is to contact the pipeline operator, as the pipelines should possess records of all rights of way obtained during construction. Operators are not obliged, however, to share this information, placing a significant burden on the party designing the transaction.

Licenses for crude-for-crude exchange with adjacent countries can be obtained if the transaction promotes “efficiency of transportation” or “convenience.”⁸³ Since licenses for exports to Canada are freely granted, this provision essentially only applies to exchanges with Mexico. “Convenience” is not defined but should likely include quality, price and other benefits. Importantly, unlike swap exports, an exchange with Mexico is exempt from the MLA pipeline restriction.⁸⁴

There is no specific BIS precedent for what constitutes a permissible exchange, but based on BIS regulatory history, other federal regulations involving exchanges, and industry practice, the following factors appear to help create a permissible exchange: a single contract, a similar product—crude-for-crude, reciprocity, two or more

⁷⁹ 30 U.S.C. § 185(u).

⁸⁰ 30 U.S.C. § 185(u).

⁸¹ 30 U.S.C. § 185(a).

⁸² Bureau of Land Management, “Bureau of Land Management’s Land & Mineral Legacy Rehost 2000 System - LR2000,” U.S. Department of the Interior, www.blm.gov/lr2000/index.htm.

⁸³ 15 C.F.R. § 754.2(b)(2)(ii).

⁸⁴ 30 U.S.C. § 185(u).

physical transfers, separate locations, the economics justifying the exchange, and price adjustments for quality as well as other factors.⁸⁵

Similar to Canada, Mexico is a special case for crude exports. The EPCA directs the president and the BIS to, “take into account the national interest as related to . . . the historical trading relations of the United States with Canada and Mexico.”⁸⁶ Subsequent to the EPCA, Mexico became part of NAFTA. Currently, Mexico may not pose a significant option to reduce the potential emerging oil glut since Mexican crude oil exports have fallen over the last decade, from 2.1 mbd in 2004 to 1.3 mbd in 2012, largely as a result of falling production.⁸⁷ Consequently, based on this trend, swaps may not be the ideal route to alleviate the glut of crude oil

when it emerges on the Gulf Coast (see Exhibit C: Other Export Transactions in Annex).

As described in depth in the previous chapter, the U.S. is currently undergoing a major energy sector transformation. While the patchwork of legislation and executive decisions described in this chapter were developed in response to the challenges of the time, re-examination of such restrictions and requirements, with an eye towards the challenges of today, is vital for the construction of a coherent energy policy. With a major oil glut in the United States on the horizon, perhaps it is time for policymakers to reassess past legislation, including outright bans on crude oil exports and bring them in line with this new energy era.

⁸⁵ EIA defines a “Petroleum Exchange” as a “type of energy exchange in which quantities of crude oil or any petroleum product(s) are received or given up in return for other crude oil or petroleum products. It includes reciprocal sales and purchases.” See EIA, “Glossary,” U.S. Government, accessed 17 July 2014, www.eia.gov/tools/glossary/index.cfm?id=E.

⁸⁶ 42 U.S.C. § 6212(d)(3).

⁸⁷ Murkowski, “A Ban for One.”

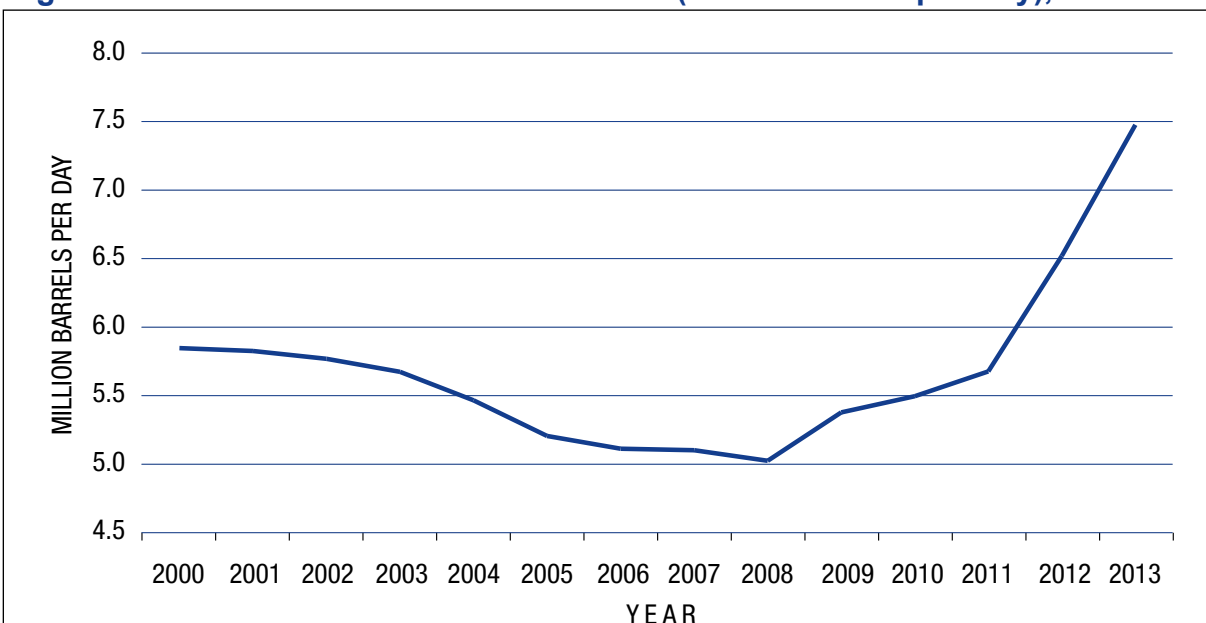
4. IMPLICATIONS OF THE POTENTIAL EMERGENCE OF A CRUDE OIL SURPLUS

The pressure to revisit the wisdom of a crude oil export ban has arisen for several reasons. First, the crude oil being produced in ever greater volumes is not the same quality as crude U.S. refineries were designed to use. As noted, between 2008 and 2013, U.S. oil production skyrocketed by nearly 4 mbd (see Figure 4).⁹⁰ Much of this super light tight oil and condensate, however, have

very high API gravities producing very different product yields than conventional crudes used by most U.S. refineries.

Second, the crude oil pipeline system was designed to move imported oil from the Gulf Coast to inland refineries, not to move oil to the Gulf Coast. These infrastructure discontinuities are

Figure 4: U.S. Field Production of Crude Oil (Million Barrels per Day), 2000-2013



Source: U.S. Energy Information Administration, "Petroleum and Other Liquids"

⁹⁰ EIA, "U.S. crude oil production in 2013 reaches highest level since 1989," EIA This Week In Petroleum, U.S. Government, 12 March 2014, www.eia.gov/oog/info/twip/twiparch/2014/140312/twipprint.html.

multifaceted: the new production in the Bakken is geographically dispersed; consequently, pipelines are not yet in place to bring the crude to market. East Coast and West Coast refineries, which use lighter grades of oil and import them from overseas, are not connected by pipelines to the new producing areas, and the Jones Act requirement that U.S. oil be shipped only by U.S. merchant marine (see box, “Requirements of the Jones Act”) makes it impossible or uneconomic to deliver those crudes to East and West Coast refineries by water. Modifications to the Jones Act, including a time-limited waiver on crude oil, would allow a sensible option for U.S. refiners to compete for U.S. crude in the near term. There is, however, limited but improving capacity to move oil in the midcontinent to Gulf Coast refining centers (see Figure 5).

The market manifestation of these discontinuities is revealed in heavily discounted prices for crudes far away from existing markets. The spread, or

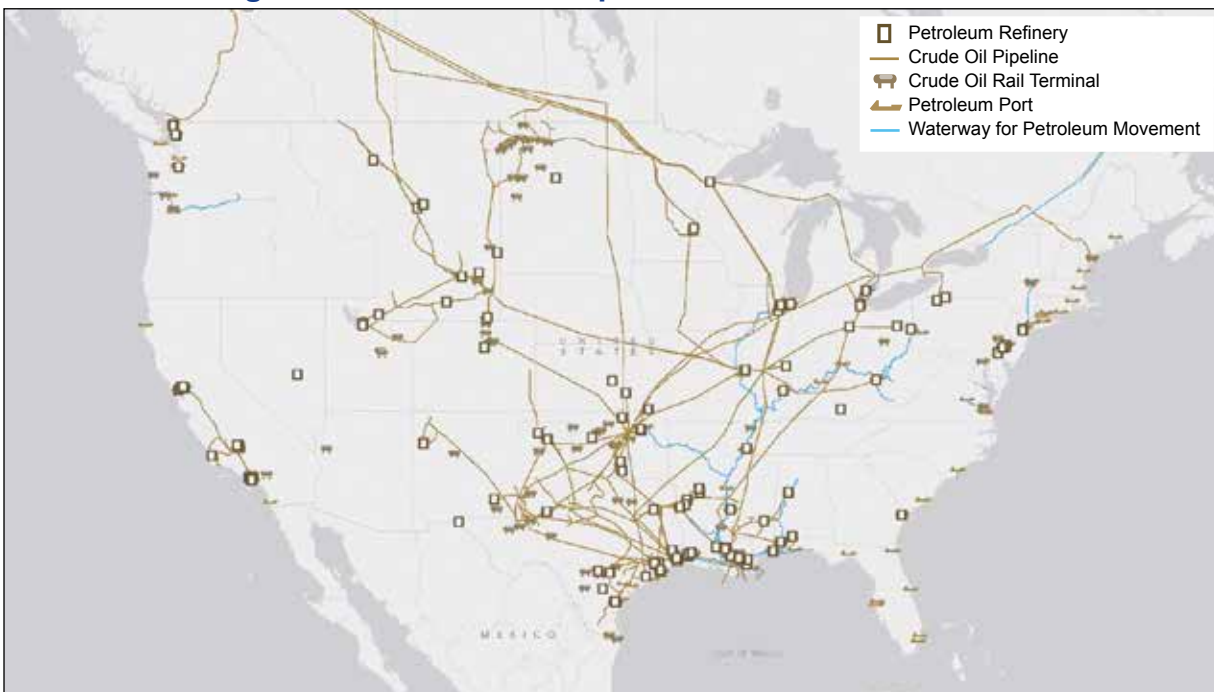
Requirements of the Jones Act

All goods transported between U.S. ports must be taken by U.S. ships. These ships must be:

- Manufactured in the U.S.
- U.S. flagged and owned.
- Operated by U.S. citizens and permanent residents.

differential, between the price of U.S. and Canadian crudes and their international benchmark for the same crude quality represents the cost of the current export restrictions. These differentials occur when the market for U.S. supply, in the case of LTO, can no longer process any additional LTO. Once the allowable demand is met, the U.S. price declines. In an open market, the balance would be exported, relieving pressure on international markets. The crude export ban defeats that outlet, leading to a widening price spread.

Figure 5: Crude Oil Transport Outlets and Refineries



Source: EIA Energy Mapping System, www.eia.gov/state/maps.cfm

This market impact has been growing as U.S. LTO production grows. The concerns for policymakers are: whether the problem will fix itself; if not, what consequences will result from inaction; and whether relaxation of the export ban will result in net benefits for the U.S. economy.

WILL A SURPLUS EMERGE?

Absent new investment in upgrading refineries, domestic oil prices will decline once existing outlets are subscribed. Investors need a policy signal to know whether to build new refineries, more splitters,⁸⁹ or additional pipelines and terminals to export oil. Without that policy signal, investment is more likely to be sub-optimal. It is extremely difficult to project when U.S. refiners will stop being able to process all the LTO coming onto the market and how disruptive this may be without knowing how fast U.S. production will grow. All we can say is that EIA's and other government agencies' projections consistently have underestimated oil production growth, as technology continually outpaces expectations.⁹⁰

CAN THE POTENTIAL SURPLUS OF LIGHT SWEET CRUDES BE ABSORBED?

One of the central issues of the crude oil export debate is the degree to which the refinery industry will be able, both technically and financially, to absorb the surplus. As noted, three critical questions in the crude oil export debate are: whether the U.S. refining industry will be able with additional investments to process the surplus, how much can be exported to Canada, and how much can be blended into the existing refinery mix. We believe there are limits to all three options.

Estimates vary as to when the existing system, considering infrastructure improvements already under way, will reach capacity. Turner Mason, a leading refinery analysis firm, estimates that production will exceed capacity by 2017; though other analysts, as well as NERA's data indicates this may occur in 2015. Exports to Canada may also reach a limit in 2016. As described in Chapter 2, under current BIS regulations, crude oil exports to Canada are exempt from restrictions. Consequently, eastern Canada has become a major export destination for U.S. crudes moving by rail and tank cars. Currently, eastern Canada imports about 500-700 mbd of light sweet crude, about 200 mbd of which come from the U.S. These volumes are expected to double this year. By late 2014 or early 2015, the advent of new pipeline supplies to eastern Canada from western Canada will begin to back out U.S. exports.⁹¹ To deal with the crude glut, refinery capacity expansion plans have mushroomed (Table 1) leading critics of lifting the ban questioning whether the market might not be taking care of the potential glut. NERA's analysis does not agree with this assessment, since it believes that this is an uneconomical way to deal with the potential crude surplus.

Money spent on refinery upgrades could be more productively invested elsewhere in the economy (as explained at the end of this chapter). A third question is whether PADD 3 (Gulf Coast) refiners might substitute imported medium crude blends with light domestic blends, reducing imports and absorbing significant flows of LTO. These medium-grade crudes, sourced primarily from the Middle East, will have to be priced competitively with domestic LTO to keep U.S. refiners from modifying their crude slates.⁹²

⁸⁹ Splitters or topping units are refineries which can be used for distillation of very light crude oils and condensates into products such as naphtha, kerosene, diesel, and gas oil which can be freely exported under current law. See Kristen Hays, "Enterprise plans to export condensate soon, others may follow suit," *Reuters*, 25 June 2014, www.reuters.com/article/2014/06/25/us-usa-condensate-enterprise-prodt-idUSKBN-0F02Z720140625.

⁹⁰ Adam Sieminski, "Outlook for Shale Gas and Tight Oil Development in the U.S." Presented at the Deloitte Energy Conference, Washington, D.C., 21 May 2013.

⁹¹ *Ibid.*, 4.

⁹² Roger Diwan, "The Unbearable Lightness of U.S. Crudes: When Will the Levee Break?" PFC Presentation at the Center for Strategic and International Studies, Washington, D.C., February 2014, p.13, http://csis.org/files/attachments/120210_Diwan.pdf.

Table 1: Refinery Capacity Expansion Plans

| | 2014 | 2015 | Total planned increase 2014-2015 |
|---------------------------------|------|------|----------------------------------|
| North Dakota refinery additions | 20 | 60 | 80 |
| Refinery expansions | 59 | 204 | 263 |
| Condensate splitters | 88 | 350 | 438* |
| Total refinery capacity | 167 | 614 | 781* |

Source: Edward L. Morse and Eric G. Lee, "Out of America: Aspects of the U.S. Crude Export Debate," Citi presentation in Center for Strategic and International Studies (CSIS), February 2014, 2.

* Total figures do not include 97 mbd of existing condensate splitter

Refinery economics limit the amount of LTO that can be absorbed without negatively impacting the products the refineries produce. The price of LTO will need to be heavily discounted to compensate, both to make it cheaper than the price of the current imported medium crude imports and to adjust for the impact on the product output. U.S. LTO varies in API qualities from 30 degrees API to over 70 degrees API. It may be possible to absorb some of the lower-gravity crudes, but this is probably not the case for higher gravity crudes which are more similar to natural gas than conventional crudes. Because many U.S. refineries are designed or have been retrofitted to utilize heavy, sour crudes, they cannot readily process a large volume of LTOs. In the Bakken and Eagle Ford fields, a large volume of heavy oil has to be imported to blend in LTO feedstock. The economic merits of refining all these crudes is further complicated by the fact that some LTOs are more easily used in petrochemical manufacturing, raising

the question in some analysts' minds whether they should be exported as crude or used in higher value domestic applications.⁹³

From an economic perspective, one relevant policy question is: What is the most efficient use of the resource, i.e. what use provides the greatest net benefits to the U.S. economy? Today, in the absence of a clear policy direction, refinery capacity expansion plans have grown (Table 1). A central conclusion of NERA's analysis is that the most efficient response is to allow excess crude to be used by consumers who will pay the highest value for it, providing the greatest net benefits to the U.S. economy. Building new refinery capacity, not to meet U.S. demand but simply to meet a legal restriction, produces lower income as well as fewer jobs. In addition, to increase the use of LTO and condensates in the U.S., refineries require significant investments ranging from \$104 million to \$390 million (see Table 2) with no certainty that there will be a demand for these products in the U.S. market.

Spending money to export hydrocarbons as product versus crude is not more beneficial simply because money is spent to convert the crude into a product. The question is which pathway provides a greater net benefit. Put another way, could money spent on refinery upgrades be more productively invested elsewhere in the economy? NERA's analysis (which we share) is that the net benefits of allowing an export option provides far greater net benefits to the U.S. economy, while still allowing the U.S. to be a refiner and product exporter.⁹⁴ Clearly the best markets for exports of U.S. LTO are overseas refineries possessing hydroskimmers. U.S. LTO exports are likely find a market in Europe and in the Asia-Pacific region where hydroskimming capacity is projected to be 9.1 mbd and 5.6 mbd in 2015 respectively.

⁹³ Deborah Gordon Senior Associate Testimony, "Should the U.S. oil export ban be lifted? The need for strategic thinking," Energy and Climate Program Carnegie Endowment for International Peace, 114th Cong., 2 April 2014, <http://docs.house.gov/meetings/FA/FA18/20140402/102039/HHRG-113-FA18-Wstate-GordonD-20140402.pdf>.

⁹⁴ NERA, *Economic Benefits of Lifting the Crude Oil Export Ban*.

Table 2: NERA Break Even Calculations for Refinery Investments to Increase Use of LTO and Condensate

| Company | Valero | Marathon | Marathon | Calumet & MDU |
|--|------------------|---------------|---------------|--|
| Refinery Name | Houston Refinery | Canton | Robinson | Dakota Prairie Refinery (new topping refinery) |
| Refinery Capacity (BSD) | 160,000 | 80,000 | 212,000 | NA |
| Increase in Light Sweet capacity (BSD) | 90,000 | 25,000 | 30,000 | 20,000 |
| Capital Investment (\$) | \$390,000,000 | \$104,000,000 | \$160,000,000 | \$300,000,000 |
| Refinery Utilization (%) | 86% | 86% | 86% | 86% |
| Payback Period (years) | 2.00 | 2.00 | 2.00 | 2.00 |
| Crude Oil discount (\$/bbl) | \$6.90 | \$6.63 | \$8.50 | \$23.89 |
| Completion Date (year) | 2015 | NA | NA | late 2014 |
| Type of Refinery | Cracker | Cracker | Coking | Hydroskimmer |

Source: NERA, *Economic Benefits of Lifting the Crude Oil Export Ban*

5. THE IMPACT OF THE CRUDE OIL EXPORT BAN ON THE U.S. ECONOMY

In previous chapters, we examined the implications of the emergence of a possible crude oil surplus in the United States in the context of the existing legislative and regulatory frameworks. Given the likelihood of a surplus in excess of the ability of the U.S. refining system and other outlets to process it, it is imperative that policymakers examine what the impacts would be if there were a change in policy. In this section, we analyze the consequences of lifting the ban on crude oil exports including the key domestic policy issues and impacts on key stakeholders.

WHAT VOLUMES MAY BE AVAILABLE FOR EXPORT?

Brookings asked NERA to assess the impacts of lifting the ban on crude oil and condensate exports using EIA's reference case and high and low production forecasts from its AEO 2014 report. NERA was asked to assess the impacts of timing if the ban were lifted on crude and/or just condensates alone in 2015 or if the lift were delayed. In addition NERA's model horizon covers 2015 (if the ban is lifted in 2015) to 2020, 2025, 2030, and 2035. NERA was also tasked to examine the economic impacts on the U.S. economy, including product prices, national welfare, and unemployment. NERA accounted for a number of

sensitivities, including potential reactions by OPEC and scenarios of slow growth in Asia, the region driving global oil demand.

Below we discuss the impact of lifting the ban on crude oil exports and its effect on several sectors of the U.S. economy and world markets. We examine the likely impact on domestic gasoline prices, as well as whether lifting the ban will hurt some U.S. refiners currently benefiting from distressed crude prices as a result of cargoes not having a ready logistics system to get them to market. We examine how lifting the ban is likely to affect domestic oil production. Finally, we assess which crude oil policy (lifting the ban, modifying the ban, or keeping it) will provide the greatest net benefit to the U.S. economy.

Before presenting our findings, it is important to note that currently the U.S. does not ban exports of petroleum products, coal, natural gas, petrochemicals, and certain raw ultra-light oil components (such as natural gas liquids or plant condensates). Over the past eight years (2005-2013), the export of these commodities increased nearly threefold, reaching 3.56 mbd in 2013.⁹⁵ The export of these commodities has been a financial boon for the U.S. economy with petroleum product exports accounting for nearly \$150 billion in

⁹⁵ EIA, "Petroleum & other liquids exports," U.S. Government, 27 June 2014, www.eia.gov/dnav/pet/pet_move_exp_dc_NUS-Z00_mbbldpd_a.htm.

2013, making the U.S. the largest exporter of petroleum products in the world.⁹⁶ The benefits of these exports raise the question of why crude oil should be treated differently from all these other oil-based products including gasoline.

KEY FINDINGS

The volume of oil the U.S. might export, if the crude oil ban is lifted, varies based on the international benchmark prices for matching grades of oil, the refinery demand for specific grades of oil, the grade of oil and what products can be made from it, and whether the U.S. will export condensates as well as crude oil. U.S. oil production levels vary significantly based on the available price of oil for a particular grade. As the ESI May 2012 report found in the case of LNG exports, there will be limits imposed by the market as to the volume of U.S. exports the global market can absorb.⁹⁷ The level available for export varies based on the amount of the resource available, domestic demand, the price, transportation costs, the

availability of requisite pipelines, and other transportation modes to move the oil to export facilities and domestic refining capacity.

NERA's analysis shows that in the reference case, if the ban were lifted in 2015, U.S. crude exports could increase by 1.7 mbd in 2015 and decline to 1.1 mbd in 2035 (Table 3). In this scenario, the change in U.S. national unemployment would fall on average over 2015-2020 by 200,000 and gasoline prices decline by \$0.09 in 2015. Comparatively, in the high oil and gas resource case (HOGGR), in 2015 the U.S. could increase exports by as much as 2.5 mbd if the ban were lifted in 2015, rising to an increase of 5.2 mbd by 2035 (see Table 4). Additionally, in the HOGGR, lifting the ban entirely in 2015 will lead to a drop in U.S. national unemployment of almost 400,000 (double the reference case) on average between 2015 and 2020. Additionally if the ban is lifted in 2015, U.S. gasoline prices decline by \$0.12 in 2015 in the HOGGR. The more the U.S. exports crude oil, the greater decline in gasoline prices; when U.S. pro-

Table 3: Reference Case: Crude Oil Exports from U.S. (MBD)

| | 2015 | 2020 | 2025 | 2030 | 2035 |
|-------------------------------------|------|------|------|------|------|
| Condensate Ban Lifted 2015 | 0.7 | 0.7 | 0.7 | 0.6 | 0.5 |
| Crude Oil Ban Lifted in 2015 | 1.7 | 1.9 | 1.6 | 1.7 | 1.1 |
| Asia Pacific Demand is Lower | 1.7 | 1.8 | 1.6 | 1.4 | 1.0 |

Table 4: HOGGR Case: Crude Oil Exports from U.S. (MBD)

| | 2015 | 2020 | 2025 | 2030 | 2035 |
|-------------------------------------|------|------|------|------|------|
| Condensate Ban Lifted 2015 | 1.0 | 1.1 | 1.4 | 1.4 | 1.5 |
| Crude Oil Ban Lifted in 2015 | 2.5 | 3.6 | 4.2 | 4.5 | 5.2 |
| Asia Pacific Demand is Lower | 2.5 | 3.4 | 4.1 | 4.4 | 5.1 |

Source: NERA Economic Consulting, *Economic Benefits of Lifting the Crude Oil Export Ban*

⁹⁶ "Exhibit 9. Exports, Imports, and Balance of Goods, Petroleum and Non-Petroleum End-Use Category Totals," U.S. Census Bureau, 6 February 2014, p. 16, www.census.gov/foreign-trade/Press-Release/2013pr/12/ft900.pdf.

⁹⁷ Ebinger et al., *Liquid Markets: Assessing the Case for U.S. Exports of Liquefied Natural Gas*.

duction peaks, the gasoline price benefit declines. Lifting the ban on just condensates in 2015 provides less than half of this benefit with exports of 0.7 mbd in 2015 in the reference case and 1.0 mbd in the high case.

According to NERA's analysis, if the demand in the Asia-Pacific market falls (Tables 3 and 4) U.S. crude oil exports would be minimally effected. For instance, in the reference case in 2015 and 2025 the amount of exports reflect a minimal difference (Table 3). This scenario of a fall in Asia-Pacific demand is reflected by the possibility of major Asian nations (China, India, Indonesia, and Vietnam) increasingly shifting from industrial to service sector economies. With this shift, oil demand in the industrial and manufacturing sectors will fall, leading to a weakening in overall Asian crude oil demand. This trend will be exacerbated in the power sector, where coal and diesel remain very competitive and will back out much of the current demand for oil in power generation.

IMPACTS ON GASOLINE PRICES

A major public (and political) concern is whether allowing crude oil exports will raise prices for

gasoline and other petroleum products. As counterintuitive as it may seem, lifting the ban actually lowers gasoline prices by increasing the total amount of crude supply, albeit by only a modest amount. NERA shows that in the reference case, 2015 gasoline prices decline by [\\$0.09/gallon](#) if the ban on crude oil is lifted entirely in 2015 while we see no impact on gasoline prices from 2025 through the model horizon of 2035 (Table 5). In the HOG, prices decrease [\\$0.12/gallon](#) in 2015 and [\\$0.10/gallon](#) in 2025 if the ban is lifted by 2015 (Table 6). Lifting the ban on condensates by 2015 reduces gasoline prices by [\\$0.04/gallon](#) in the reference case and [\\$0.06/gallon](#) in the high case in 2015 (Tables 5 and 6, respectively).

Gasoline prices decline when the ban is lifted because they are set in the international market. The international price of crude declines as more U.S. oil enters the market, driving down gasoline prices. The lowering in gasoline prices indicated in Tables 5 and 6 is based on a national average of gasoline prices, and may not actually reflect the changes on a regional or state level, where state gasoline taxes also will vary. Regardless of location, however, the data indicates that gasoline prices will fall across the board.

Table 5: Reference Case: Decrease in Gasoline Prices in U.S. (\$/Gallon)

| | 2015 | 2020 | 2025 | 2030 | 2035 |
|-------------------------------------|---------|---------|--------|--------|--------|
| Condensate Ban Lifted 2015 | -\$0.04 | -\$0.02 | \$0.00 | \$0.00 | \$0.00 |
| Crude Oil Ban Lifted in 2015 | -\$0.09 | -\$0.04 | \$0.00 | \$0.00 | \$0.00 |

Table 6: HOG Case: Decrease in Gasoline Prices in U.S. (\$/Gallon)

| | 2015 | 2020 | 2025 | 2030 | 2035 |
|-------------------------------------|---------|---------|---------|---------|---------|
| Condensate Ban Lifted 2015 | -\$0.06 | -\$0.04 | -\$0.03 | -\$0.04 | -\$0.04 |
| Crude Oil Ban Lifted in 2015 | -\$0.12 | -\$0.10 | -\$0.10 | -\$0.07 | -\$0.08 |

Source: NERA Economic Consulting, *Economic Benefits of Lifting the Crude Oil Export Ban*

Table 7: Reference Case: Decrease in Gasoline Prices in ROW (\$/Gallon)

| | 2015 | 2020 | 2025 | 2030 | 2035 |
|-------------------------------------|---------|---------|--------|--------|--------|
| Condensate Ban Lifted 2015 | -\$0.04 | -\$0.02 | \$0.00 | \$0.00 | \$0.00 |
| Crude Oil Ban Lifted in 2015 | -\$0.10 | -\$0.04 | \$0.00 | \$0.00 | \$0.00 |

Table 8: HOGR Case: Decrease in Gasoline Prices in ROW (\$/Gallon)

| | 2015 | 2020 | 2025 | 2030 | 2035 |
|-------------------------------------|---------|---------|---------|---------|---------|
| Condensate Ban Lifted 2015 | -\$0.06 | -\$0.04 | -\$0.03 | -\$0.05 | -\$0.04 |
| Crude Oil Ban Lifted in 2015 | -\$0.13 | -\$0.11 | -\$0.10 | -\$0.08 | -\$0.10 |

Source: NERA Economic Consulting, *Economic Benefits of Lifting the Crude Oil Export Ban*

IMPACT ON GLOBAL GASOLINE PRICES

As in the U.S., gasoline prices in the world market also decline the reference and the HOGR (Tables 7 and 8, respectively). In the rest of the world (ROW), the change in gasoline price is minimal as the U.S. is already a substantial exporter of gasoline and U.S. demand is projected to fall further as new CAFE standards ripple through the economy, freeing up more gasoline for export. The U.S. is already exporting 2.759 mbd monthly of petroleum products since the export of products is allowed under U.S. law.⁹⁸ As a result, the impact of lifting the ban on condensate or crude oil entirely may be that only a relatively small amount of the exports are made into gasoline in overseas markets where diesel rather than gasoline dominate transportation fuel markets. According to our analysis, in the reference case, the price of gasoline in the ROW decreases by \$0.04/gallon in 2015 with the ban on condensates having been lifted in 2015 and \$0.10/gallon if crude oil exports are allowed by 2015 (Table 7). These price decreases disappear quickly, for both condensates and crude oil by 2025 in the reference case. In sum, we find there

is no empirical foundation for the concern that exporting “our” crude and condensate will have a negative impact on consumer prices for gasoline.

IMPACTS ON U.S. REFINERS

As of 2014, the U.S. has about 18 mbd of operable crude oil distillation refining capacity, of which 51 percent is located on the Gulf Coast, PADD 3. These refineries typically use heavy and medium grades of crude oil⁹⁹ with traditionally lower-cost crudes. Over the last decade, significant investments have been spent to modernize them. These heavy crudes constitute the primary form of U.S. crude oil imports. All U.S. refiners can sell their products at world market prices.

If the ban is lifted, prices for crude oil, especially that which is currently heavily discounted owing to shortfalls in logistics capacity to get it to market, will rise and that cost, plus the cost of transportation, will be the refiners’ acquisition cost. East and West Coast refineries already buy largely at international prices. East Coast refineries utilizing Bakken crude must transport it by rail, costing nearly

⁹⁸ EIA, “U.S. Exports of Crude Oil and Petroleum Products,” U.S. Government, <http://www.eia.gov/petroleum/data.cfm>.

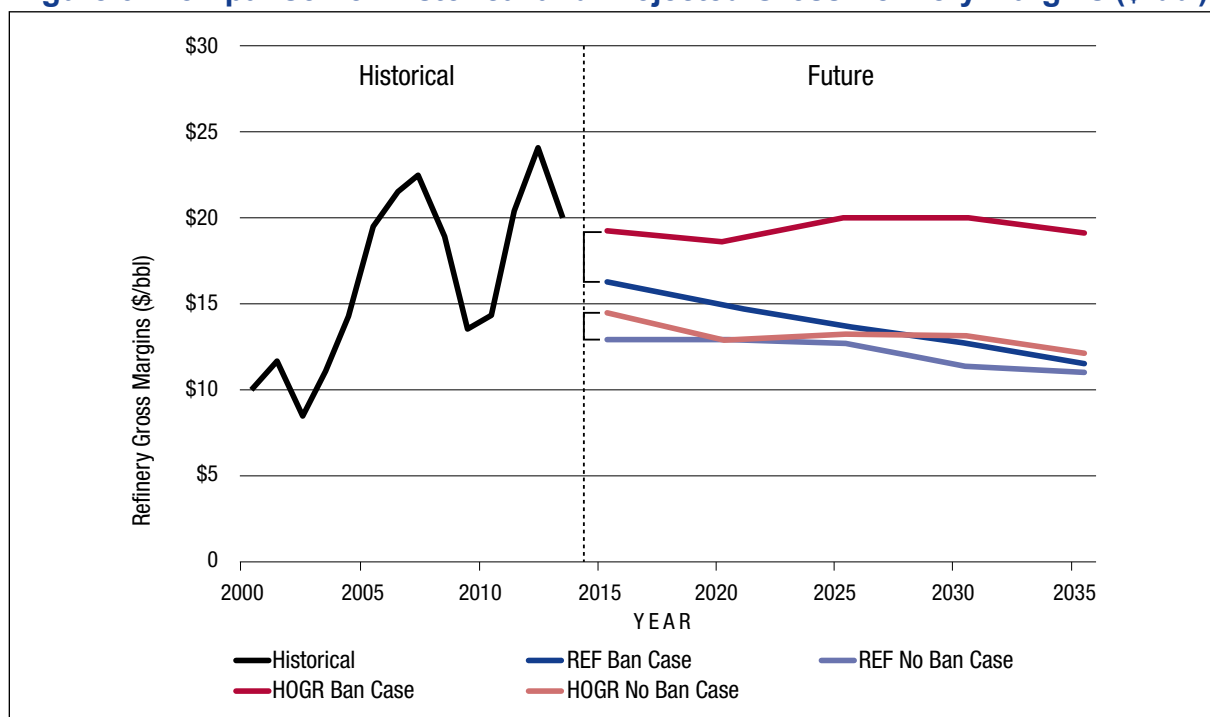
⁹⁹ EIA, “Number and Capacity of Petroleum Refineries,” U.S. Government, <http://www.eia.gov/petroleum/data.cfm>.

\$10-\$15 per barrel.¹⁰⁰ These refineries represent approximately 2 percent of U.S. gasoline production.¹⁰¹ Some Midwest refiners, which have bought light crudes at depressed prices owing to the lack of infrastructure to move those crudes out of Cushing, Oklahoma, and now off the Gulf Coast, will see higher acquisition costs.

From a policy perspective, two questions arise. One is whether U.S. policy should be based on shielding some industry subsectors from international prices. Another is whether it is a viable business model for any industry to base its profitability on a protected market. Clearly, if the ban on crude oil exports is lifted, there will be some short-term dislocations in some sectors of the U.S. economy. In this case, certain regional refining processing centers are likely to be harmed

by the movement towards free trade in crude oil. These refiners will experience downward pressure on their gross refinery margins merely returning them to their past averages (see Figure 6). These issues are serious for those companies involved and will entail real economic costs which should not be underestimated. These challenges may be particularly acute in the Northeast where some refinery closures may occur. We do believe that there are some short-term remedies which could ease the situation, such as granting a 2-3 year waiver of the Jones Act for the movement of crude oil within the United States. Nonetheless, despite these concerns, we believe based on above analysis that allowing goods to flow into the international market gives buyers access to competitive prices and sellers access to world market prices while enhancing free trade.

Figure 6: Comparison of Historical and Projected Gross Refinery Margins (\$/bbl)*



Source: NERA Economic Consulting, *Economic Benefits of Lifting the Crude Oil Export Ban*

* Historical data is from calculations using historical U.S. production and prices found on the EIA website.

¹⁰⁰ Trisha Curtis et al., "Pipelines, Trains, and Trucks: Moving Rising North American Oil Production to Market," EPRINC, 21 October 2013, p. 33, <http://eprinc.org/wp-content/uploads/2013/10/EPRINC-PIPELINES-TRAINS-TRUCKS-OCT31.pdf>.

¹⁰¹ EIA, "Refinery Net Production," U.S. Government, www.eia.gov/dnav/pet/pet_pnp_refp2_dc_rec_mbbldpd_a.htm.

IMPACTS ON PRODUCTION

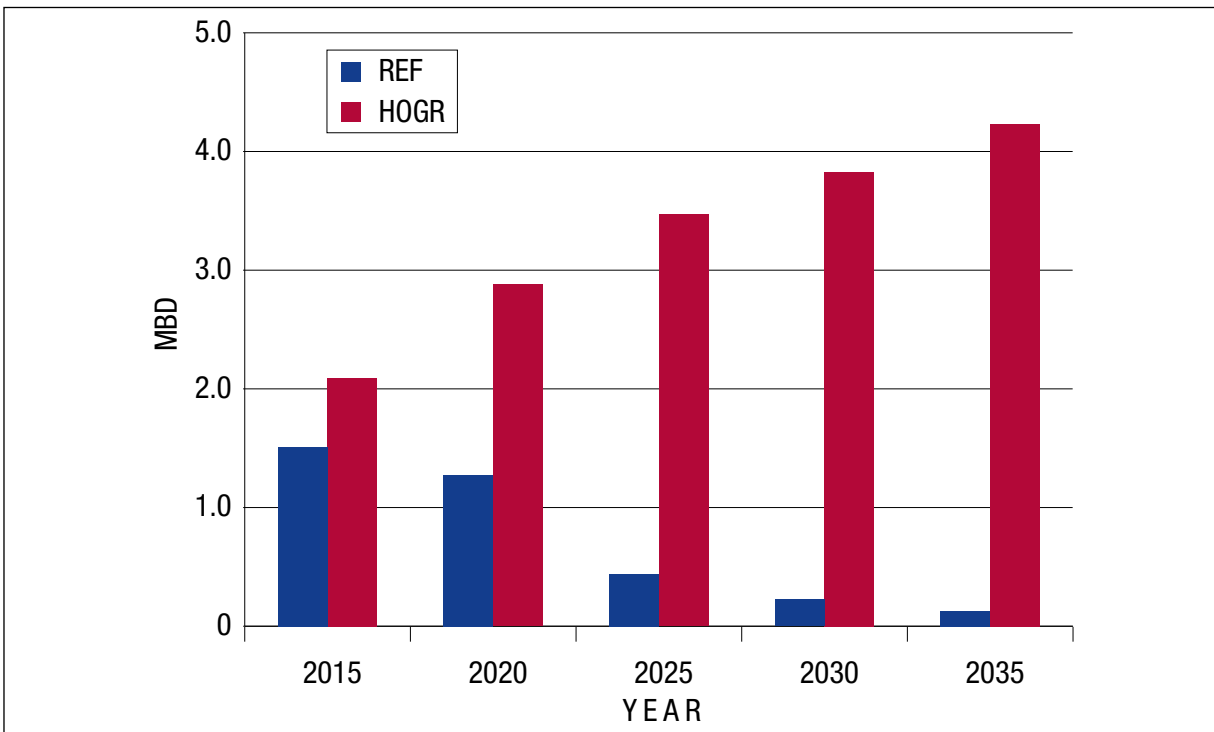
Our analysis shows that exposing U.S. producers to international prices increases U.S. production, sustains lower gasoline prices, and reduces unemployment. In both the reference and HOGGR scenario lifting the ban entirely by 2015 increases production. In the reference case that increment declines over time, while in the HOGGR case it continues to grow to 4.3 mbd in 2035 (see Figure 7).

A significantly high portion of this growth, roughly 1.1 mbd in the reference case and 1.5 mbd in the high case will occur in PADD 3 (Gulf Coast) in 2015. PADD 2 (Midwest) is the second highest producing area at nearly 0.38 mbd in the reference case and 0.5 mbd in the high case (see Figure 8).

Rising U.S. oil production, primarily light oil production from the Bakken, Eagle Ford, and more recently the Permian basin, has (combined with falling demand since 2008) been largely responsible for declining crude oil imports.¹⁰² While the U.S. has ceased importing most light oils, a number of producers believe that this trend will not continue if the ban is left in place. This issue is significant since as NERA shows the rise in the price earned by domestic producers after the export ban is lifted leads to increased production, driving greater total oil supply and lower gasoline prices.

If the ban is left in place and price differentials between U.S. and international prices grow to a point where new investment in oil production declines, the positive economic effects of that production

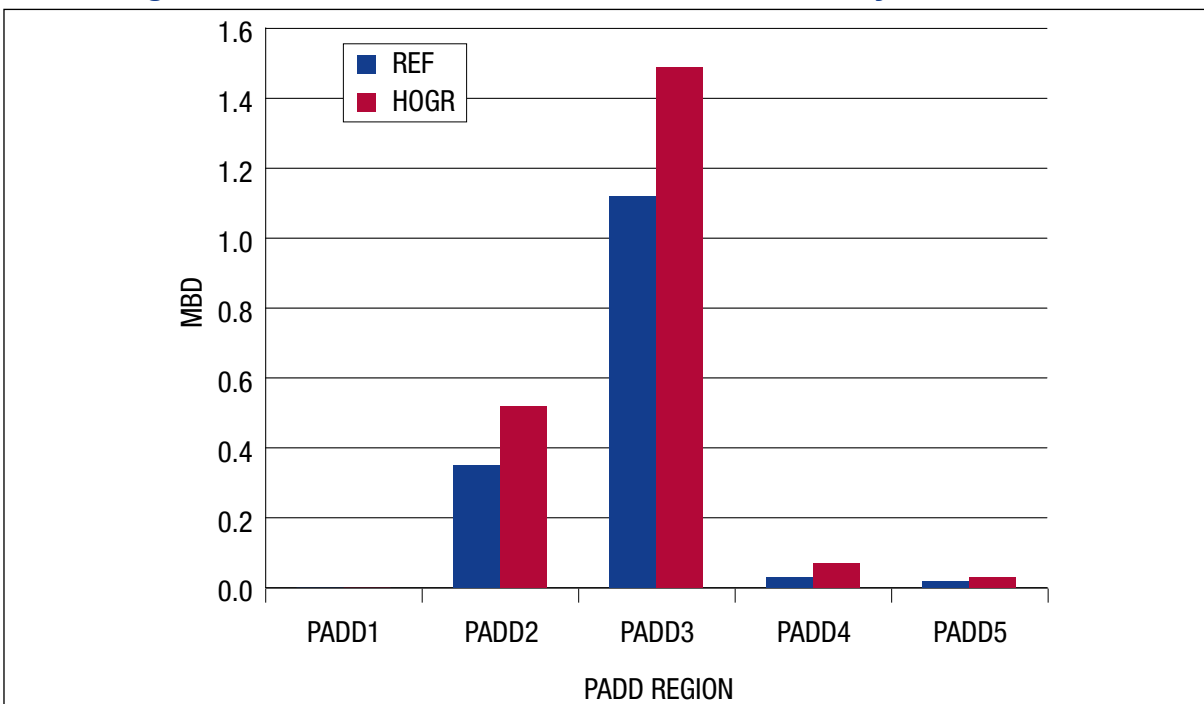
Figure 7: Incremental Crude Oil Production, Both Reference and High Case



Source: NERA Economic Consulting, *Economic Benefits of Lifting the Crude Oil Export Ban*

¹⁰² EIA, "Market Trends: Liquid Fuels," *EIA Annual Energy Outlook 2014*, U.S. Government, 7 May 2014, <http://www.eia.gov/forecasts/aeo/>.

Figure 8: Distribution of Incremental Production by PADD in 2015



Source: NERA Economic Consulting, *Economic Benefits of Lifting the Crude Oil Export Ban*

will recede. The current ban combined with the lack of transportation from Cushing, Oklahoma were significant factors leading to the emergence of large price discounting of WTI versus Brent crude. Since the end of 2010, that discount has averaged nearly \$15/bbl, a major increase from the \$1.41/bbl premium during the previous decade.¹⁰³ With crude exports constrained, the ability of domestic producers to take advantage of the huge price arbitrage has been limited.¹⁰⁴ As existing outlets for that crude becomes fully subscribed, according to NERA, by 2015 the price discount could lead to a slowdown investment with smaller increases in LTO production. While we believe this is the most likely scenario, some market observers believe that if these discounts became large enough they could discourage new production resulting even in some existing unconventional wells being shut in as uneconomic.

IMPACT ON THE PRICE OF OIL

Lifting the crude oil export ban will bring U.S. benchmark prices for crude closer to international prices, although the price of those benchmarks will decline as the result of competition from U.S. crudes. If the ban is lifted by 2015, according to the reference case, U.S. domestic crude prices will raise \$2.44/bbl in 2015 and \$3.52/bbl in 2020 (see Table 9). In the HOG case, prices will raise \$2.17/bbl in 2015 and \$4.28 in 2020 (see Table 10). Furthermore as U.S. domestic crude prices rise, producers will look for more oil and with the export ban removed will sell more oil on the international market leading to a drop in international prices.

Lifting the ban on condensates does comparatively little to alter domestic crude oil prices. As Table

¹⁰³ EIA, "Cushing, OK WTI Spot Price FOB," U.S. Government, www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=RWTC&f=A.

¹⁰⁴ Ibid., 5.

Table 9: Reference Case: Increase in Average Crude Oil Price in U.S. (\$/bbl)

| | 2015 | 2020 | 2025 | 2030 | 2035 |
|-------------------------------------|--------|--------|--------|--------|--------|
| Condensate Ban Lifted 2015 | \$0.70 | \$0.93 | \$1.55 | \$0.86 | \$0.72 |
| Crude Oil Ban Lifted in 2015 | \$2.44 | \$3.52 | \$2.17 | \$1.30 | \$0.89 |

Table 10: HOGGR Case: Increase in Average Crude Oil Price in U.S. (\$/bbl)

| | 2015 | 2020 | 2025 | 2030 | 2035 |
|-------------------------------------|--------|--------|--------|--------|--------|
| Condensate Ban Lifted 2015 | \$0.48 | \$0.55 | \$0.46 | \$1.12 | \$1.19 |
| Crude Oil Ban Lifted in 2015 | \$2.17 | \$4.28 | \$6.04 | \$7.51 | \$8.58 |

Source: NERA Economic Consulting, *Economic Benefits of Lifting the Crude Oil Export Ban*

9 shows, in the reference case, lifting the condensate ban alone has a negligible impact on the U.S. domestic price of crude oil since the increase per barrel ranges from as little as \$0.70/bbl in 2015 to as high as \$1.55/bbl in 2025 before declining to \$0.72/bbl in 2035.¹⁰⁵ In the HOGGR case, the U.S. produces more condensate than the global market can absorb, with the result that over time the price of crude increases by \$0.48/bbl in 2015 and by 2035 the price increases to \$1.19/bbl (see Table 10). If the ban is lifted, U.S. producers will be allowed to compete in the international market, adding to global oil supplies and driving down prices.

IMPACT ON THE U.S. ECONOMY

Lifting the crude oil export ban brings benefits to the U.S. economy in all circumstances. The greater U.S. production is, the larger the economic benefits. The most important policy question surrounding lifting the crude oil export ban is the impact on the economy as a whole. Some of the distributional effects of a change in policy are obvious. Oil producers, especially those closest to existing export infrastructure, will enjoy higher

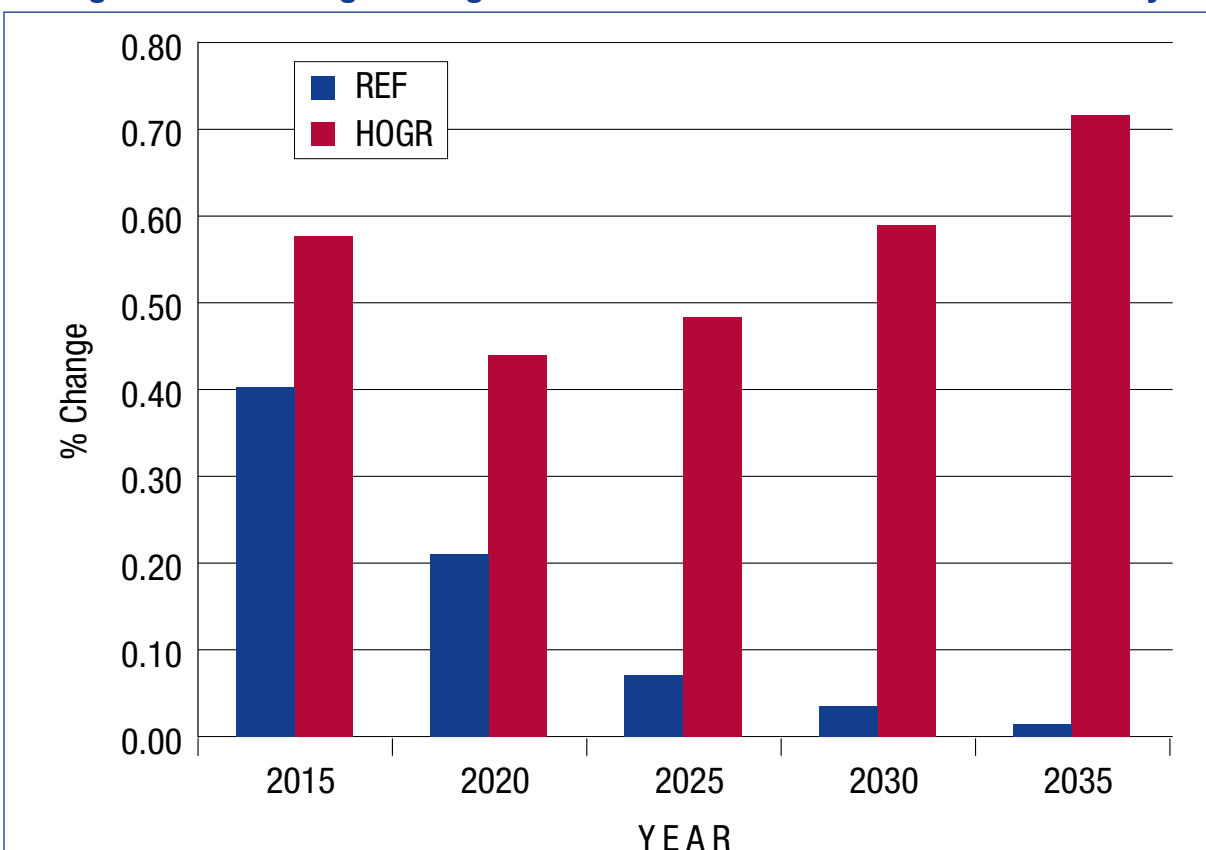
sales prices by selling into the international market at global prices. Refiners, who enjoy protected prices, may see lower margins. Opposition to lifting the ban has been expressed by a few large petrochemical companies and some airlines concerned about the impact on aviation fuel prices if refiners start utilizing more expensive feedstocks.¹⁰⁶ Looking at the wider frame of how the U.S. economy benefits as a whole, the NERA analysis—using a computable general equilibrium model of the entire U.S. economy—presents a very different picture.

NERA finds that lifting the ban on crude oil exports will have a positive impact on GDP and welfare while reducing unemployment (please see NERA Methodology in the Preface for clarification on definitions and assumptions). NERA ran several different scenarios to crystalize projections of economic change in the United States as a result of lifting the ban. In addition, NERA examined how partially lifting the ban, by only allowing condensate exports, would affect the economy. They also looked at the costs and benefits in delaying lifting the ban until 2020 compared with other policy options.

¹⁰⁵ 1 barrel equals 42 gallons.

¹⁰⁶ Graeme Burnett, “Prepared Testimony of Graeme Burnett to Senate Energy Committee: Hearing on U.S. crude oil exports: opportunities and challenges,” U.S. Senate, 30 January 2014.

Figure 9: Percentage Change in GDP When the Ban Is Lifted Immediately



Source: NERA Economic Consulting, *Economic Benefits of Lifting the Crude Oil Export Ban*

In regards to the impact on GDP, NERA found in the reference case that lifting the ban entirely by 2015 will result in an increased percentage change of 0.40 percent in 2015 (see Figure 9). While this percentage change may seem miniscule on the surface, there are very few actions that the U.S. government can take that as a long-term instrument of economic policy would make as measurable a difference in the economy. According to NERA, in all three cases (delaying lifting the ban until 2015, lifting the ban only on condensates, or lifting the ban entirely) there are positive percentage change impacts on GDP. Throughout the model horizon in the reference case, the size of these benefits falls as oil production declines. In the high case, an initial spike in GDP occurs after the ban is lifted and continues all the way to 2035 tracking closely, the high case increase in domestic production (see Figure

9). In short, increases in GDP move in conjunction with rising exports. Throughout 2015-2039, NERA finds that the discounted net present value of GDP in the reference case could be greater than \$550 billion, while in the high case it could exceed \$1.8 trillion. GDP percentage increases are greatest at the front end of lifting the ban and are in line with LTO production as it drops. In the HOGGR case, an increase in the percentage change in GDP is maintained through 2035, as it tracks closely with the continued increase in exports.

In addition to GDP, NERA examined the impact on U.S. welfare. NERA found that lifting the ban completely will have just over a 0.40 percent change in welfare in the HOGGR case over the model horizon; however, there is an overall net benefit to welfare inciting a positive change in the

NERA's Definition of Welfare

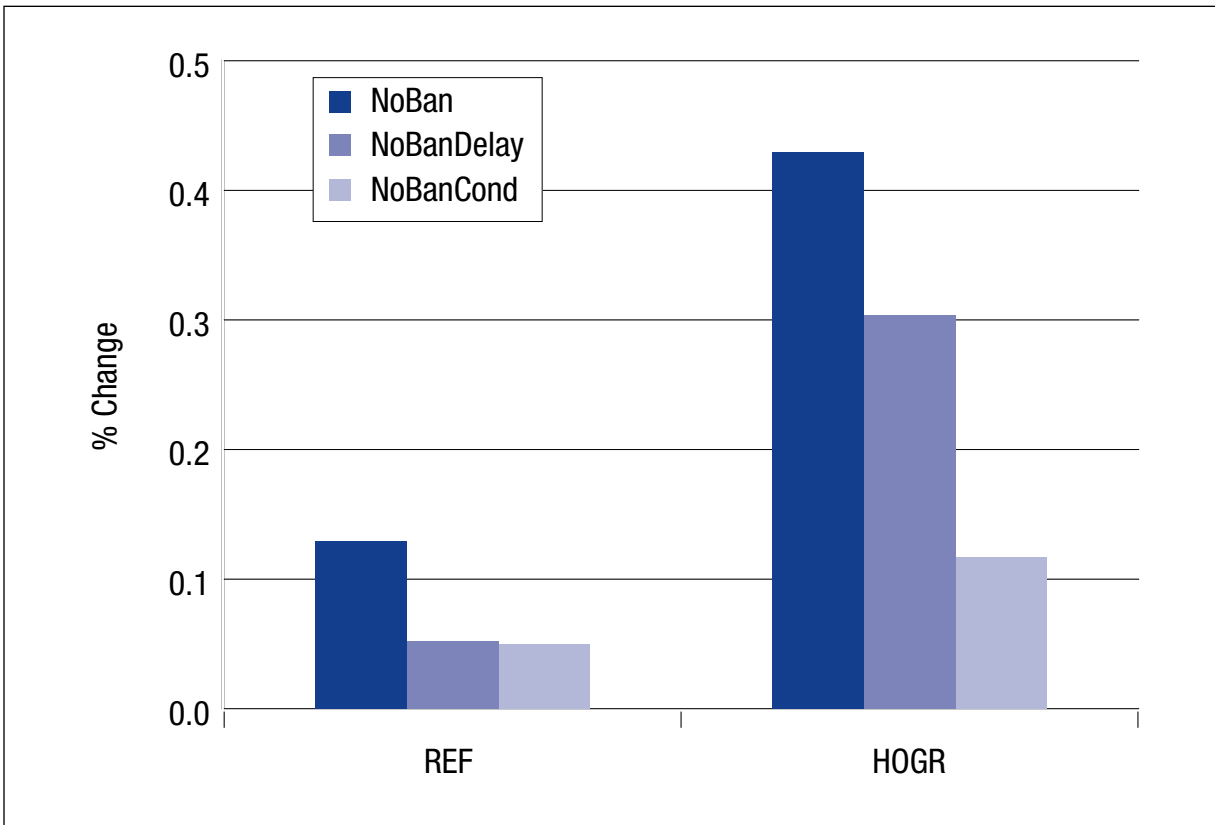
“The broadest measure of net economic benefits to U.S. residents is the measure of economic welfare, known as, ‘equivalent variation.’ The equivalent variation is defined as the amount of money that would have to be given to U.S. households to make them indifferent between receiving the money and experiencing the changes in prices and income associated with lifting the ban.”

See NERA Economic Consulting, *Economic Benefits of Lifting the Crude Oil Export Ban*, prepared for The Brookings Institution, September 2014; and also, Hal R. Varian and Jack Repcheck, *Intermediate Macroeconomics: A Modern Approach*, 7th Edition. (New York: W.W. Norton & Company, 2010), 255-256.

U.S. economy across all scenarios. In the reference case (see Figure 10) lifting the ban entirely in 2015 will ignite approximately a 0.14 percent change in welfare while waiting until 2020 will generate only a 0.05 percent change (half of the 2015 lifting scenario which is similar to lifting the ban only for condensate). A critical NERA finding in the HOGGR scenario (see Figure 10) is the higher production of crude oil leads to higher welfare benefits across all scenarios.

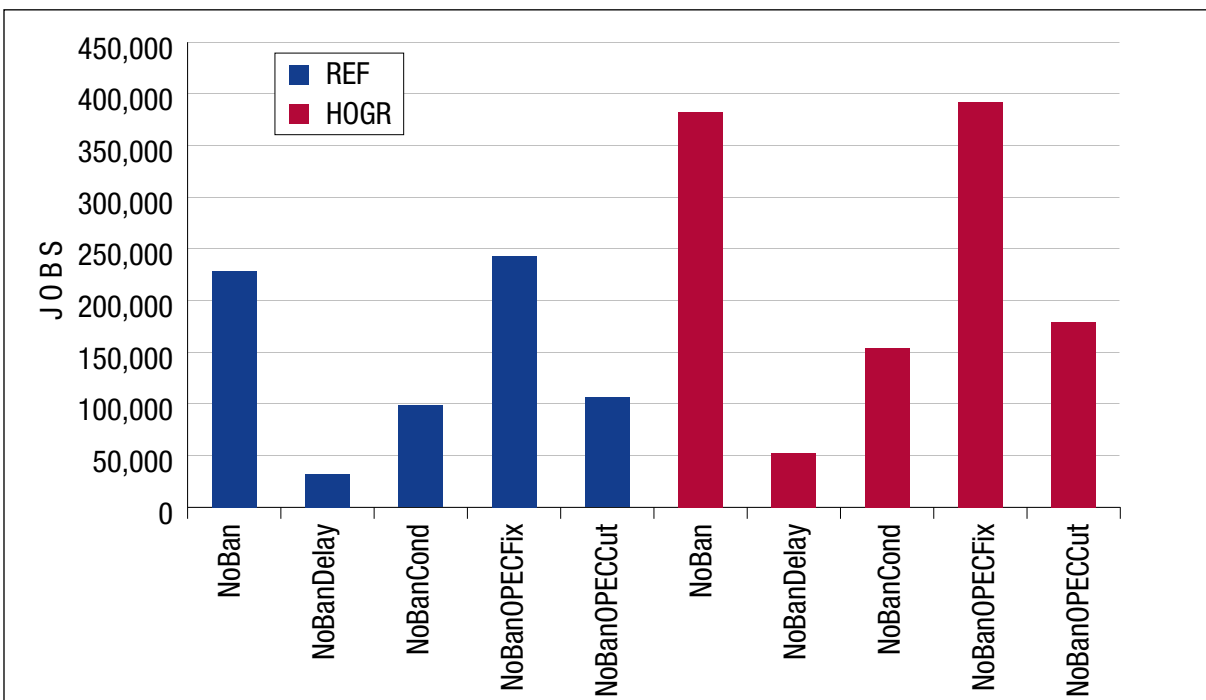
Finally, lifting the ban entirely by 2015 reduces unemployment at an average annual reduction of 200,000 from 2015-2020 (see Figure 11) in the reference case. Employment impacts are economy wide rather than solely oil industry specific or necessarily new jobs. Rather as the welfare benefits from lifting the ban ripple through the econ-

Figure 10: Percent Change in Welfare in NoBan, NoBanDelay, and NoBanCond in Reference and HOGGR Cases



Source: NERA Economic Consulting, *Economic Benefits of Lifting the Crude Oil Export Ban*

Figure 11: Average Annual Reduction in Unemployment Across All Scenarios and Both Cases



Source: NERA Economic Consulting, *Economic Benefits of Lifting the Crude Oil Export Ban*

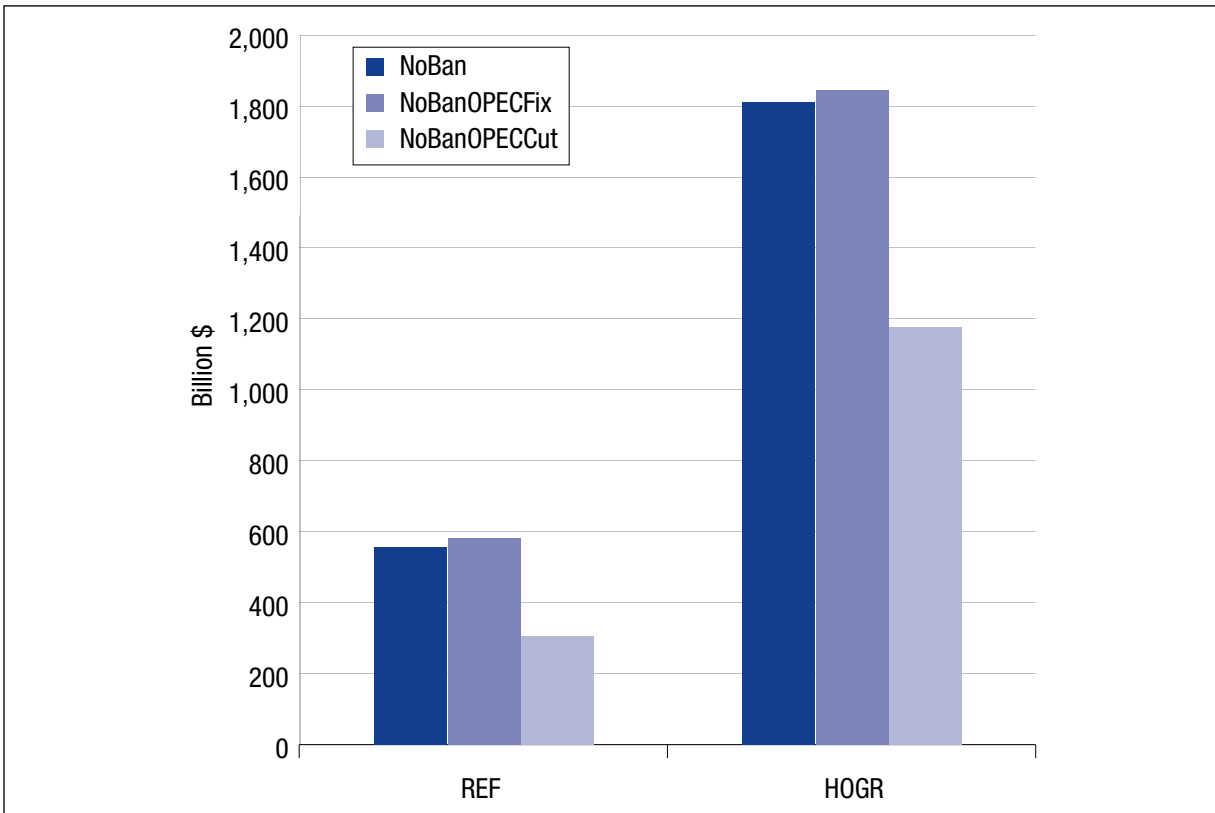
omy there will be a host of people flocking to new employment opportunities. Delays in lifting the ban or partial relief (such as condensate alone) reduce employment benefits significantly. A partial lifting of the ban for condensates decreases the employment gains by nearly half in the reference case. Furthermore, in the reference case, delaying action until 2020 decreases unemployment to less than 50,000 on average from 2015-2020 (see Figure 11). In sharp contrast, in the HOGH case, unemployment on an annual average falls by nearly 400,000 from 2015-2020 if the ban is lifted entirely in 2015 (see Figure 11).

Based on NERA’s data, it is clear that lifting the ban on crude oil exports will have a positive outcome for the overall U.S. economy generating lasting long term benefits through decreases in unemployment and benefits to welfare. In both the HOGH and the reference cases oil production scenarios, all data points to positive changes in

the economy. NERA also examined several other possible shocks to the market, such as curtailment of production by OPEC in response to a change in U.S. crude oil export policy and a drop in Asian energy demand, currently the locus of most of the increase in global oil demand. In each of these scenarios, the U.S. economy still enjoyed net benefits, albeit at lower levels. We analyzed how OPEC might respond to the increase in U.S. exports that might result from removing restrictions on U.S. crude oil exports (see Figure 12). If OPEC decides to maintain its current level of crude oil exports (OPECFix) the U.S. enjoys the greatest gains measured by the net present value of GDP. If OPEC decides to cut crude oil exports to maintain the current price of crude oil, (OPEC-Cut) then the U.S. enjoys positive, but smaller gains.

The more non-OPEC supply there is available to the market, the more OPEC must compete for market

Figure 12: Change in U.S. Discounted Net Present Value of GDP in NoBan, NoBanOPECFix, and NoBanOPECCut Scenarios in Both Cases



Source: NERA Economic Consulting, *Economic Benefits of Lifting the Crude Oil Export Ban*

share, and the more free-market dynamics determine price levels rather than cartel politics. If the U.S. chooses not to allow exports of oil, it will (alone among major non-OPEC oil producers) effectively limit market flexibility and market competition among producers on grades of crude oil, in effect

elevating prices and limiting global supply. This course of action would increase U.S. self-sufficiency for a time (until production fell again), but undermine U.S. energy security. More in-depth analysis of OPEC's response is addressed in the following chapter.

6. FOREIGN POLICY

From a U.S. foreign policy and national security perspective, the threshold question is whether removing crude oil export restrictions will enhance U.S. energy security and strengthen national power. The removal of oil export constraints enhances America's energy security by increasing self-sufficiency in oil and natural gas, reducing global price volatility, diversifying the global energy supply, and creating a more competitive oil market. These measures also enhance U.S. economic security by directionally lowering crude oil (and thereby gasoline) prices while enabling the U.S. to address oil supply disruptions by producing a supply response that delivers crude oil directly to the global market.

This chapter discusses the possibility that permitting the export of crude oil will enhance U.S. national power in several ways: by reinforcing the credibility of U.S. free and open market advocacy, by allowing for the establishment of secure supply relationships between American producers and foreign consumers, by increasing flexibility to export crude to others to address supply disruptions, by empowering another non-OPEC nation to meet Asia's and other rapidly developing nations' growing energy demand, by shifting oil

rents to the U.S. from less reliable suppliers, and by providing our own hemisphere with a competitive source of crude supply. Most importantly, allowing crude oil exports will increase revenues to domestic producers helping to maximize the scope of the production boom, boosting American economic power that undergirds U.S. national power and global influence.

U.S. ENERGY SECURITY

U.S. energy security policy, emanating from both Republican and Democratic administrations, has been developed on the premises of diversification of global oil supply,¹⁰⁷ investment in research and development for technologies (demand and supply side) to reduce dependence on foreign oil; and the creation and upkeep of strategic stocks to buffer the impact of supply disruptions. In the decades since 1973, the U.S. has made great strides in these areas, encouraging secure oil production from the Caspian, West Africa, and other non-OPEC nations; building strategic stocks of oil and products; raising fuel efficiency standards; investing in alternative fuels and engines; and maintaining policies that have encouraged dramatic growth in both deep water and unconventional oil and gas.

¹⁰⁷ See President George W. Bush's National Energy Policy: National Energy Policy Development Group, "National Energy Policy," May 2001, www.wtrg.com/EnergyReport/National-Energy-Policy.pdf; also: President William J. Clinton's National Energy Strategy, "Comprehensive National Energy Strategy," U.S. Department of Energy, April 1998, <http://prop1.org/thomas/peacefulenergy/cnesM.pdf>.

Less appreciated is the way changes in the oil market itself have enhanced U.S. energy security. For example, the impacts of the 1973 oil embargo were aggravated by the existence of bilateral oil supply contracts that impeded the flow of oil. In the decades since the rise of the futures and forward markets have led to greater market transparency and price discovery allowing the market to shift supplies rapidly and efficiently to meet demand. These mechanisms, however, only function when markets are open and free and are ill-served when artificial barriers (such as the ban on crude oil exports) exist. In addition, while markets have become more liquid over time, they are still subject to a lack of full transparency on critical issues such as pricing. Nonetheless, the market changes noted above and especially the rapid growth of the international oil products markets have enhanced U.S. and global energy security.

In the aftermath of the OPEC oil embargo, the U.S. system of emergency response changed in 1975¹⁰⁸ to one of collective response, rather than oil sharing, in recognition that a release of oil stocks and products by any country will most quickly and efficiently have an impact on global prices, free of the politics of dictating to which country oil will flow. The U.S. has been a primary beneficiary of these liquid markets. The aftermaths of both Hurricanes Katrina and Rita, in which gasoline supplies shifted from Europe to the U.S.,¹⁰⁹ demonstrated the effectiveness of this policy. Indeed, assuring a free market in oil trade while resisting mercantile tie-ups of supply that distort flows and prices, have been core tenets of bipartisan U.S. energy security policy through successive administrations.

MODERN ENERGY SECURITY POLICY

Since 1973, energy security policy has changed to focus more on managing price shocks than securing physical supplies of oil. As the recent oil supply disruptions from the Libyan revolution and the Iran sanctions have demonstrated, it is the global balance of supply and demand that determines U.S. gasoline prices. Furthermore, the avoidance of price shocks is best dealt with by ensuring that the right match of crude supply can get to the category of refiner most impacted by a disruption.¹¹⁰

For all the dramatic growth in U.S. oil supply, oil markets remain tight. Global spare capacity is thin, and most of it resides in a single nation: Saudi Arabia. Nearly 3 mbd of oil supply is disrupted today, much of it light grades of oil from Libya, Iran, and Nigeria. Crude and product prices have not risen as high as they might have because U.S. production has helped back out imports of those grades of crude, allowing them to flow to the refineries which process those grades of crude oil. Increased production from Canada, Iraq, and Saudi Arabia contributed in major ways to replace disrupted supply. Taking a broad view of energy security, it is clear that diversity of supply—a world that maximizes the greatest volume of production of oil by the greatest number of countries—remains the primary pillar of U.S. and global energy security. Efficient markets, allowing the free flow of goods including oil, are the circulatory systems of diversity of supply. Without, it price shocks cannot be effectively ameliorated.

While the U.S. oil boom helps make the U.S. a powerful contributor to global supply, it does not

¹⁰⁸ William F. Martin and Evan M. Harrje, “The International Energy Agency,” in Jan H. Kalicki and David L. Goldwyn, *Energy and Security: Toward a New Foreign Policy Strategy*, (Washington, D.C.: Woodrow Wilson Center Press and Johns Hopkins University Press, 2005).

¹⁰⁹ Amy Myers Jaffe, “Testimony to the Committee on Energy and Natural Resources: Opportunities and Challenges of the U.S. Crude Oil Export Ban,” United States Senate, 30 January 2014.

¹¹⁰ Michelle Billig Patron and David L. Goldwyn, “Managing Strategic Reserves,” in Jan H. Kalicki, Michelle Billig Patron and David L. Goldwyn, *Energy & Security: Strategies for a World in Transition*, second ed., (Washington, D.C.: Woodrow Wilson Center Press and Johns Hopkins University Press, 2013).

leave the U.S. immune from price shocks that may come from major disruptions in supply, whether they emerge from the Middle East, West Africa, or the Southern Cone. The only way to mitigate that risk is with a global system of oil trade that maximizes the ability of diverse supplies to meet shifting global demand.

THE IMPACT OF REMOVING OIL EXPORT CONSTRAINTS ON U.S. ENERGY SECURITY

Allowing the free export of oil will enhance U.S. energy security in multiple ways:

- First, allowing the U.S. producers to connect to global price signals will sustain U.S. oil production, securing self-sufficiency in light grades of oil.
- Second, by encouraging the production of light grades of oil, even as they remain surplus to U.S. refining needs, the U.S. increases global oil supply, directionally lowering U.S. product prices, which are priced to global benchmarks of crude oil.
- Third, the U.S. reduces the volatility of global crude oil prices by allowing U.S. supply to react to changes in global oil demand.
- Fourth, the U.S. can create a major source of diversification to the global oil supply. Indeed, the rapid growth of U.S. production has already diversified global supply, impacting global markets by displacement. As noted in Chapter 4, the U.S. is already reaching the limits to which it can displace light oil imports. The U.S. will only connect to the global oil market if it allows exports of surplus grades of oil to flow to those countries that needs those grades.
- Fifth, by allowing exports of U.S. crude oil the U.S. will create a more competitive oil market. For decades, incremental oil demand has been met first by non-OPEC

countries that (except for the United States) export all of their production not consumed domestically. The balance is met by OPEC, based on its desired price level. This level is implemented by production quotas and actual production levels. To the extent that incremental oil demand is met by non-OPEC production, OPEC must either cut its own production to maintain price levels, or cede market share to non-OPEC countries.

THE IMPACT OF REMOVING OIL EXPORT CONSTRAINTS ON U.S. FOREIGN POLICY

In the past, major oil producers have used their ability to supply the oil market to enhance their influence over other nations. For example, it is indisputable that Russia's supply relationships with Europe; Iran's supply relationships with China, India, South Korea, and Japan; and Venezuela's supply relationships in the Caribbean and the Southern Cone have a remarkable impact on their global political influence and the conduct of their trading partners. Likewise, Norway's commitment to free trade in oil and gas, Brazil's growing role as an exporter, and Canada's open investment and export policy have made major contributions to global energy security and set precedents for their neighbors. Likewise, the United States will be judged by the example it sets as a market actor, both in the consistency of its demands for others relative to its own conduct, and by its reliability as a supplier.

U.S. COMMITMENT TO FREE TRADE AND OPEN MARKETS

Oil-importing countries are watching to see if the U.S. will apply the same standards of open trade in commodities that are not in short supply to its own economy, while it demands these standards from others. America's strategy for economic security has long been anchored by a commitment to open markets and free trade, as

exemplified by its conduct in the World Trade Organization (WTO) [and its predecessor, the General Agreement on Tariffs and Trade (GATT)], and the International Energy Agency (IEA). The U.S. has completed successfully free trade agreements with 20 countries, including the North American Free Trade Agreement (NAFTA) with Canada and Mexico. In addition, the U.S. is currently in the midst of negotiations to expand that cadre of nations with pending agreements such as the Transatlantic Trade and Investment Partnership (TTIP) with the EU and the Trans-Pacific Partnership (TPP) with Asia.¹¹¹

While the issues are complex, banning exports of crude oil could be challenged as inconsistent with the “Most Favored Nation” requirement of Article I of the General Agreement on Tariffs and Trade (GATT 1994). This provision could also be utilized to argue that even different or slower licensing criteria for different countries (e.g. FTA versus non-FTA is a violation of the GATT). There is also a question as to whether under XI of GATT 1994 the concept of “national interest determination” without any specified criteria highlighted could be considered a violation of the Agreement.¹¹²

However, as the Congressional Research Service (CRS) notes, Article XXI may provide the U.S. another defense if challenged since it allows violations of Article I and XI based on “essential security interests.” While the U.S. has traditionally considered this exception to be “self-judging” it is possible that some member states of the GATT’s Appellate Body could challenge U.S. use of this exception.¹¹³ The U.S. could also utilize Article XX of

the GATT, which allows members to take an exception to GATT rules if the action is taken to protect an exhaustible natural resource or to protect human health or the environment. Invocation of such a claim for an exception in this case, however, could run into a problem. When China attempted to use this clause to exempt access to its rare earth minerals, the U.S. opposed the Chinese claim and won.¹¹⁴ Likewise, while fossil fuels are clearly exhaustible in the long run, advancements in technology that extend the life of or add to reserves and changing pricing conditions could result in such a claim being rejected. In addition, U.S. production would have to be limited in order for the U.S. to make this claim. Finally, Article XIII mandates that if an otherwise inconsistent GATT measure is allowed to remain in force under an Article XX exception; the measure must be administered in a non-discriminatory manner. Many lawyers question whether export restrictions that treat WTO Members differently would meet the nondiscriminatory requirements under Article XIII.¹¹⁵

The U.S. has launched (and won) WTO claims against China for restricting exports of rare earth materials when these materials are not in short supply in China.¹¹⁶ Basic politics and economics suggest that the optimal solution would be for the U.S. to adhere to its own trading requirements—export light tight oil, which is available in surplus, and import the oil that is needed to supply U.S. refineries. For an issue as fundamental as oil security, an issue on which the U.S. has strongly encouraged other nations to open their markets to investment and free trade, it is expected that the U.S. allow the free trade of U.S. oil.

¹¹¹ Office of the United States Trade Representative, “Trans-Pacific Partnership (TPP),” 16 June 2014, www.ustr.gov/tpa.

¹¹² Adam Vann, Daniel T. Shedd and Brandon J. Murrill, “Federal Permitting and Oversight of Export of Fossil Fuels,” Congressional Research Service Report, no. R43231, 17 September 2013, p. 9, <http://fas.org/sgp/crs/misc/R43231.pdf>.

¹¹³ *Ibid.*, 11.

¹¹⁴ WTO, “China—Measures Related to the Exportation of Rare Earths, Tungsten and Molybdenum,” Dispute settlement, 8 April 2014, www.wto.org/english/tratop_e/dispu_e/cases_e/ds431_e.htm.

¹¹⁵ *Ibid.*

¹¹⁶ Tom Miles and Krista Hughes, “China loses trade dispute over rare earth exports,” *Reuters*, 26 March 2014.

ESTABLISHMENT OF TRADING RELATIONSHIPS

Nations having national oil companies and foreign companies establish commodity trade relationships based on the match of a commodity with their needs, price, and reliability. For example, as China grew worried about Middle East stability, it sought supply from West Africa. As supplies of crude oil appeared to be getting heavier, U.S. refineries sought supply from Canada and Mexico, while Chinese companies built heavy coking refineries and loaned Venezuela \$40 billion, which is now being repaid with heavy oil.¹¹⁷ Countries and companies plan their future investments based on expectations of the quantity, quality, and reliability of future supply.

The question for the U.S. is whether it will permit companies to be the reliable suppliers of competitively-priced LTO to the global market. Based on the demand of European and Asian countries for the inclusion of crude oil exports in the TTIP and TPP agreements, it is apparent that there is foreign demand for U.S. crudes. In a world where disruptions are frequent in the Middle East, Africa, and South America, it is more than plausible that Asian and European refiners would benefit from expectations of supply from U.S. producers.

In specific areas, allowing these potential trading relationships to develop will enhance U.S. foreign policy. In addition, creating long-term relationships with oil trading partners would strengthen positive relations among some of the most influential nations in the world. The willingness of the U.S. to play this role will enhance its status in global oil markets and its relevance as a trading partner to these nations. Allowing these potential exports will also lower the U.S. trade balance for oil,

already declining owing to the exponential increase in petroleum product exports.¹¹⁸ In the Western Hemisphere, U.S. exports of petroleum products already have risen as Venezuelan supply has decreased. Many Caribbean nations dependent on Venezuelan crudes (medium grades), including the Dominican Republic and Jamaica,¹¹⁹ could get fair prices and reliable supply from U.S. producers. If relations were to improve with Cuba, the U.S. could also provide oil resulting in reducing Havana's near total dependence on Venezuela. Likewise, the nations the United States has asked to forego Iranian supply could plan their future supply relations based on U.S. supplies. Adding the potential to supply crude directly to these nations, rather than simply press for their cooperation in sanctions efforts, will only enhance U.S. persuasiveness.

Finally, it is not inconsequential that to the extent U.S. supply of crude replaces Middle East or Russian supply, the rents from those sales accrue to U.S. citizens rather than, say, Iranian, Russian, or Venezuelan producers. In addition, the U.S. economy has the potential to expand particularly with the growing number of jobs surrounding the crude industry. For example, the surrounding area of the Bakken formation in North Dakota has seen a tremendous increase in their economy and a significant drop in unemployment. According to a May 2014 *Bloomberg News* article: "The oil boom has helped send North Dakota's unemployment rate to 2.6 percent in April, the lowest in the U.S. according to the Labor Department. That compares with a national jobless rate of 6.3 percent."¹²⁰ These jobs are coming from the need for infrastructure to support the new populations in these oil rich areas, for example the building and maintenance of grocery stores, apartment

¹¹⁷ Peter Wilson, "Venezuela's Oil Heads East," *Bloomberg*, 28 April 2014.

¹¹⁸ Edward L. Morse, "Welcome to the Revolution: Why Shale is the Next Shale," *Foreign Affairs*, May/June 2014, 7.

¹¹⁹ EIA, "Country Analysis Brief: Caribbean," U.S. Government, 16 June 2014, www.eia.gov/countries/regions-topics.cfm?fips=cr.

¹²⁰ Brian Louis, "Shale boom lures developer for \$500M North Dakota project," *Bloomberg News*, 20 May 2014.

complexes, and basic retail, all of which used to be nearly a “two hour” drive away.¹²¹ In terms of the economy, North Dakota’s “grew 13 percent in 2012.”¹²² This growth can be seen as a direct influence of the crude oil expansion as the employment numbers jumped significantly from 5,051 in 2005 (a year before hydraulic fracturing was implemented) to 40,856 in 2011.¹²³

ENHANCED FLEXIBILITY OF THE SPR

The U.S. can contribute to mitigating serious adverse economic consequences of oil supply disruptions, in part, by releasing or exchanging stocks from the SPR. When the U.S. was a major importer of oil, it released stocks to meet its own refining needs, thereby freeing up global supplies. As the U.S. has a net reduction in its imports and its utilization of light grades of oil, it will be free to sell or exchange SPR crude to other nations to address supply disruptions. The SPR is already a powerful foreign policy tool, serving as a deterrent to nations that may withhold or interrupt global supplies of oil, for various reasons. This tool could be enhanced by greater flexibility to export this oil to nations in need.

THE REACTION OF OPEC

One key question is how exports of U.S. crude oil will impact OPEC nations. From an energy security perspective, OPEC’s reaction could impact global price levels and the ability of high cost producers to sustain production. From a geopolitical perspective, it is possible that reduced market share or income could produce instability in OPEC member states.

OPEC is no longer, if it ever were, a monolithic institution. Saudi Arabia is the leader of OPEC by virtue of being its largest producer and the largest holder of spare production capacity in the world

today. Saudi Arabia has proven multiple times its ability, and frequently its willingness, to mitigate the impacts of market disruptions by releasing spare capacity. So far, Saudi Arabian leaders have publicly downplayed their concerns over the prospects for tight oil production in the U.S.¹²⁴ To the extent that global demand for oil is strong, or disruptions persist, there is room for OPEC members to maximize production and for U.S. supply to gain share without impairing OPEC revenues.

If demand were to weaken, however, or if Iran, Iraq, Libya, Nigeria, or others were to restore disrupted production, Saudi Arabia and other OPEC members will be forced to choose whether to accept a smaller share of global oil exports to make room for U.S. and other supplies or to keep their market share at its current level by maintaining production driving down prices. In this scenario U.S. exports would rank far lower on OPEC’s agenda than a potentially resurgent Iraq or Iran.

Complicating the ability to project how Saudi Arabia and OPEC may react are the uncertainties facing OPEC production internally. Since the 1980s, Saudi Arabia has been the undisputed principal oil exporter within OPEC. Given instability and production problems in other OPEC nations, including Nigeria, Libya, and Angola, there have been fewer major OPEC producers to take into consideration when setting production targets. Looking forward, however, expectations are that production in Iran and/or Iraq could see a major upswing, meaning that internal decisions will have to be made about how best to allocate quotas and production targets. Iran or Iraq or both will seek larger production quotas within OPEC’s broader production cap. OPEC countries are highly dependent on oil revenues. Their reluctance to reduce their individual production quotas to make room for others and

¹²¹ Brian Louis, “Shale boom lures developer for \$500M North Dakota project,” *Bloomberg News*, 20 May 2014.

¹²² *Ibid.*

¹²³ *Ibid.*

¹²⁴ Ed Crooks, “Saudis welcome U.S. shale boom,” *Financial Times*, 13 May 2013.

forsake national export revenues has increased in recent years. This is because many states increasingly value these revenues as a means to alleviate public angst in the midst of major unrest in the Arab world. It is certain that OPEC faces a future of internal divisions and disparate goals, and it is unclear whether the organization will continue to function and impact the market as effectively as it has in the past.¹²⁵ However given the relatively small volumes of exports projected, at least in the reference case, it is unlikely that U.S. oil exports will be a major calculus in OPEC’s behavior.

According to NERA data, if OPEC competes for market share with the lifting of the ban on U.S. crude oil exports and maintains crude export levels, it will have a negligible effect on the U.S. crude oil exports

(see Tables 11 and 12, the reference and HOGGR case respectively). If, however, OPEC decides to maintain the price of oil and cut crude exports, the U.S. will be able to increase exports in the HOGGR case by 2.8 mbd in 2015 and by 5.7 mbd in 2035 (see Table 12).

Another uncertainty regarding OPEC is how U.S. exports of light sweet crude oil will impact the income levels of member states, particularly nations that have historically provided the market (and the U.S.) with light sweet crude. Nigeria, Angola, and Libya are all traditional producers of light sweet crude oil and important politically and geopolitically to the stability of Africa. Exports of U.S. crude could have a disproportionate impact on them, compared to other OPEC members.

Table 11: Reference Case: Crude Oil Exports from U.S. (MBD)

| | 2015 | 2020 | 2025 | 2030 | 2035 |
|--|------|------|------|------|------|
| Crude Oil Ban Lifted in 2015 | 1.7 | 1.9 | 1.6 | 1.7 | 1.1 |
| OPEC Maintains Crude Exports | 1.7 | 1.9 | 1.5 | 1.7 | 1.1 |
| OPEC Cuts Crude Exports to Maintain Crude Price | 1.9 | 2.0 | 1.6 | 1.7 | 1.1 |

Table 12: HOGGR Case: Crude Oil Exports from U.S. (MBD)

| | 2015 | 2020 | 2025 | 2030 | 2035 |
|--|------|------|------|------|------|
| Crude Oil Ban Lifted in 2015 | 2.5 | 3.6 | 4.2 | 4.5 | 5.2 |
| OPEC Maintains Crude Exports | 2.5 | 3.6 | 4.2 | 4.5 | 5.2 |
| OPEC Cuts Crude Exports to Maintain Crude Price | 2.8 | 3.9 | 4.5 | 5.0 | 5.7 |

Source: NERA Economic Consulting, *Economic Benefits of Lifting the Crude Oil Export Ban*

¹²⁵ Amy Myers Jaffe and Edward L. Morse, “OPEC: Can the Cartel Survive Another 50 Years,” in Jan H. Kalicki and David L. Goldwyn, *Energy & Security: Strategies and Security: Strategies for a World in Transition*, second ed., (Washington, D.C.: Woodrow Wilson Center Press and Johns Hopkins University Press, 2013).

U.S. FOREIGN POLICY: SECURITY, ECONOMY, AND DIPLOMACY

The policy decisions that face the nation will reflect broadly on what the U.S. stands for and what example it sets as it interacts with allies and adversaries over energy. Over the past few years, numerous energy analysts have cautioned policy-makers and attempted to educate the public about the consequences of choosing isolationist foreign policies because of the misperception that the U.S. will be “energy independent.”¹²⁶ U.S. leaders repeatedly say that while growing oil production in the U.S. (and North America more broadly) benefits the economy, lowers the need for imported oil, and allows America a greater opportunity to determine its own energy future, this abundance of oil will not sever ties to global oil markets, nor vulnerability to global price fluctuations.

The reality is that nations will judge the United States by its actions. The country faces a choice as to whether or not it will take steps to sustain and expand its contribution to global energy security at a time when insecurity is rampant in nearly every other region of the world. Economic analysis shows that the U.S. will need to remove last century’s export restraints to sustain this boom. Diplomatic analysis suggests that the U.S. will be judged by its willingness to share its surpluses

with others and practice the tenets of free trade and open markets that have been preached since the end of the Second World War.

The American refusal to do so may be seen as yet another form of isolationism, and one which will leave the U.S. more vulnerable to the fluctuations of the global oil market, and less capable of rapid response to alleviate those impacts. Isolationism will severely limit the U.S. capability to help allies achieve greater energy security. The U.S. policy on petroleum exports and decisions about the ban are only one of the foreign policy tools at the nation’s disposal, but it can be a very important tool. U.S. exports of crude oil, in addition to the petroleum products and coal already being exported and the LNG in the pipeline, will represent a significant U.S. commitment to global supply security and market stability. In addition to other foreign policies regarding energy security, including efforts to ensure supply diversity through infrastructure development abroad, the promotion of market reform and indigenous resource production, research and development focused on alternative fuels and energy efficiency, the U.S. commitment to global energy security will be enhanced. The foreign policy impacts of crude oil exports are weighty, and should not be overlooked in this policy debate.

¹²⁶ Michael Levi: “Rising U.S. oil production will help restrain global prices and provide some limited economic insulation from price spikes. But, contrary to some popular claims, it will fall far short of making the U.S. independent of events overseas. As I argued in *Foreign Policy* magazine last year, U.S. vulnerabilities stem mainly from how much the country spends on oil, not where that money is shipped to. Rising U.S. production won’t fundamentally change that” (Michael Levi, “The Experts: How the U.S. Oil Boom Will Change the Markets and Geopolitics,” *Wall Street Journal*, 27 March 2013); also David L. Goldwyn: “Suddenly having a great wealth of domestically produced gas and, increasingly, oil, the argument follows, will allow the United States to look inward and take less interest in international affairs, including those of the politically challenging countries that produce oil and natural gas in the Middle East, Africa and elsewhere. This is unlikely to happen....The most strategic factor in American consumption will remain the price of oil and the effect of disruptions on the U.S. and the global economy, not the source or quantity of U.S. imports,” (David L. Goldwyn, “Making an Energy Boom Work for the United States,” *International Herald Tribune, The New York Times*, 12 November 2012).

7. CONCLUSIONS AND RECOMMENDATIONS

Fundamental issues that we have addressed in considering the efficacy of the crude oil export ban include how it affects the U.S. economy as a whole and what the impacts will be on U.S. energy security. This report has illustrated how energy policy has evolved over time in response to changing market dynamics and geopolitical events that have sometimes sent the price of petroleum skyrocketing, and at other times plummeting. The current situation in the United States is not the same as it was 30 years ago or even 10 years ago. Over time U.S. energy policy has attempted to provide price stability for consumers through a variety of policies. Some have been successful, in particular efforts to support research and development of new technologies, raising CAFE standards, and the creation of strategic stocks to supply the market in the event of disruptions. Others have been impressive failures, notably efforts to manage the market through price and allocation controls or to restrict the size of imports. The removal of price controls on natural gas and the removal of export controls on petroleum products have incentivized production in those areas as did the phased decontrol of domestic crude oil prices commencing in 1980. We think the key lesson of our economic history in the energy space is that the U.S. economy works better embracing market forces than trying to resist them.

RECOMMENDATIONS

The U.S. energy market has changed, and for the better, as technological developments of three- and four-dimensional seismic technology, horizontal drilling and the fracking of unconventional oil and natural gas has allowed dramatic growth in production. Based on these market realities, we recommend that the U.S. reconsider and modernize its energy policy by lifting the ban on crude oil exports entirely and immediately. It is evident to us, based on our policy deliberations and the extensive macroeconomic modeling of the U.S. economy, and the global oil market research we have commissioned, that the greater U.S. exports of crude oil, the greater the economic and energy security benefit to the country. In addition to the parochial benefits to the nation, as a leader in world trade circles, where the U.S. is a consistent advocate for open markets and transparency, continued restrictions on crude oil exports have the potential to tarnish the U.S. global standing and hinder its pursuit of strengthening energy security.

Lifting the ban significantly enhances U.S. energy security in several ways. Allowing U.S. producers to connect to global price signals will generate expansion of U.S. oil production, securing self-sufficiency in light grades of oil. By encouraging this

production of light grades of oil, the U.S. increases global diversity of oil supply, while reducing the volatility of global crude oil prices. The U.S. has the opportunity to create a source of diversification to the global oil supply and create a more competitive oil market which will not only lower the global price of crude, but also enhances U.S. energy security.

In terms of economic prosperity, lifting the ban will generate significant economic benefits including declining unemployment, substantial GDP growth, and a lowering of domestic gasoline prices. Keeping the ban in place will forgo these benefits and likely lead to reduced production and by implication less national income, employment and security. It is ironic that the greatest political fear of lifting the ban comes from the analytically unfounded belief that it will raise, rather than lower, gasoline and other petroleum product prices. We appreciate that there will be positive and negative distributional impacts within the U.S. Nevertheless, it would be unwise to base national policy on protecting a small subset of U.S. refiners and questionable how sustainable a business model based on artificially suppressed input prices can be.

We take seriously the environmental concerns over climate impacts of increased U.S. production. Many environmental groups oppose lifting the ban out of concern that this will stimulate more oil and gas production leading to enhanced consumption of fossil fuels and rising GHG emissions. Another fear is that more production means more fracking, and hence a greater threat to water supplies throughout the country. In addition, some oppose lifting the ban because more production means more pipelines, more rail and barge traffic, and potentially more accidents. The impacts of lifting the ban on crude oil exports on global climate change are difficult to determine at this point as there is a lack of data available to make any accurate projections. These issues are complex and are not within

the capacity of this report to address. The impact will be dependent on whether U.S. production will offset that of others, whether there will be carbon reductions from less transport of oil to the U.S. and whether the U.S. refining system produces fewer emissions relative to others. Further research on the subject is needed in order to make an accurate case on the environmental consequences and potential impact on global climate change of lifting the ban on crude oil exports. These important considerations are beyond the scope of this report, yet we acknowledge the necessity to address these issues while considering lifting the ban on crude oil exports.

We also consider the utility of taking incremental steps, such as lifting the ban only on condensates, increasing swaps, or even delaying the timetable for lifting the ban. All of these options result in fewer benefits to the U.S. and merely forestall what is good public policy: namely, lifting the ban now. As noted, allowing only exports of condensates will have significantly smaller net benefits to the U.S. economy than lifting the crude oil export ban entirely and will have a minimal effect on the global crude market, providing minimal supply diversification.

Allowing the free flow of crude oil exports will increase flexibility in energy trade. For example: in the United States, refineries will be able to maximize their capacity instead of operating below it, which will allow for greater efficiency. If the ban on crude oil exports is lifted, producers who currently have to discount their oil will be able to export it, bringing in millions of dollars of revenue. Removal of restrictions on exports will lead to new production creating jobs while bolstering other important components of the U.S. economy. Free trade allows the U.S. to respond quickly to potential international market disruptions. In addition, because the production is still in the U.S., U.S. companies will be able to adjust to increased domestic demand by exporting less

(with the guidance of the U.S. government if necessary). Similarly, if world prices fell, the U.S. could in turn export less. Free and open markets are generally self-correcting; the industry can adjust based on the economics instead of being restricted by policy. Therefore, crude oil export restrictions are no longer essential for United States energy security policy.

In summation, increasing crude oil exports in any fashion will have positive affects both in the United States and in the world oil market. At the same time, world energy security will be enhanced by increasing the diversification of oil supply available globally, while also increasing U.S. energy security. As supported with data from reports on

the crude oil export issue, conducted by NERA/Brookings, IHS, Resources for the Future (RFF), and ICF, all of these documents show that lifting the ban leads to a positive outcome for the United States. As U.S. LTO becomes competitive once it is allowed to be marketed on the world market, gasoline prices in U.S. on average fall, and in turn the U.S. is able to take a commodity (currently price discounted) into a vibrant economic resource for the country. Lifting the ban generates paramount foreign policy benefits while increasing U.S. GDP and welfare, and reducing unemployment. It is time the United States commits to its position on free-trade markets as a true member of the OECD and global community and allows U.S. crude oil to flow.

Exhibit A: NERA Model API Gravity Assumptions Crude Oil Types and Products

| Type | API Gravity | Refined Petroleum Products |
|--------------------------|-------------|--|
| Condensate | 50+ | Gasoline, distillates, and other refined petroleum products. |
| Light Tight Oil (LTO) | 40-49 | |
| Conventional Light Crude | 33-39 | |
| Intermediate Crude | 23-32 | |
| Heavy Crude | >22 | |

Exhibit B: Presidential Allowances for Crude Oil Exports

Exports to Canada, 1985

President Reagan found unlimited exports of U.S. crude oil to Canada to be in the national interest, especially since simultaneously Prime Minister Mulroney removed price and volume controls on crude oil exports to the United States.¹²⁷ In-

ternal White House memoranda emphasize that imports of Canadian crude oil replace crude oil imports from unreliable and unstable sources.¹²⁸ These memoranda note that lifting restrictions on crude exports is a “logical extension of the special treatment which historically has been accorded Canada under U.S. export controls”¹²⁹ and that the United States and Canada’s energy markets and needs are interrelated.¹³⁰

¹²⁷ 50 Fed. Reg. 25189, 18 June 1985.

¹²⁸ William T. Archey and Jan W. Mares, “U.S. Crude Oil Exports,” White House Staffing Memorandum to President Reagan, 29 May 1985.

¹²⁹ William T. Archey, Acting Assistant Secretary for Trade Administration, Department of Commerce & Jan W. Mares, Assistant Secretary for International Affairs and Energy Emergencies, “U.S. Crude Oil Exports to Canada,” Department of Energy, U.S. Government, 2 May 1985.

¹³⁰ Ibid.

Exports from Alaska's Cook Inlet, 1985

President Reagan found that unrestricted exports from Cook Inlet would be in the national interest because they would encourage other countries to remove trade barriers to related domestic goods and services. He also found that crude oil from Alaska's Cook Inlet was advantageously located for export trade.¹³¹

Exports of 50,000 b/d of Alaska North Slope Crude (ANS), 1989

President Reagan saw the allowance of this limited amount of ANS crude oil to be exported to Canada as another means to promote free trade between the United States and Canada even though exports of ANS were still prohibited by the MLA as they were transported over the Trans-Alaskan Pipeline, which crossed over federal rights of way.¹³²

Exports of 25,000 b/d of California Heavy, 1992

In 1992, President Bush allowed 25,000b/d of California heavy crude oil to be exported, because, "California independent oil producers [were] suffering financial losses due to the surplus of heavy crude oil in the California market and their lack of alternative marketing options."¹³³ Additionally, he noted available supply of heavy crude oil exceeded refinery capacity.¹³⁴

While exports of California heavy crude oil were viewed as helping independent oil producers, the effect of such exports on the domestic maritime industry proved to be a major concern. Under the Jones Act, U.S. flag vessels are the only ones permitted to transport California oil to other U.S. destinations, such as the Gulf Coast, for refining

by domestic refiners.¹³⁵ Some officials in the Bush Administration feared the U.S. maritime industry would lose business, potentially leading to unemployment, since foreign vessels were then able to transport California heavy crude oil destined for foreign ports.¹³⁶

Exports of Alaska North Slope Crude (ANS), 1996

President Clinton allowed unlimited exports of ANS crude to any destination after an interagency review conducted by the National Economic Council and the Bureau of Export Administration found that such exports would not have a significant impact on the economy or the environment. The exports, however, were approved subject to very specific requirements; namely, that the crude oil is exported on U.S. registered and crewed vessels and the vessels adhere to specific export routes.¹³⁷

Exhibit C: Other Export Transactions

California Heavy Crude

Pursuant to President Bush's national interest finding, BIS is empowered to grant licenses for exports of California heavy crude oil if the exporter can demonstrate that its crude oil was produced in California, has a gravity of 20 degrees API or lower, and the average volume of such California heavy crude oil exported per day from the United States does not exceed 25,000 barrels.¹³⁸

With respect to the limit of 25,000 barrels, BIS takes a first-come-first-serve approach, in which

¹³¹ 50 Fed. Reg. 52798, 26 December 1985.

¹³² 54 Fed. Reg. 271, 5 January 1989.

¹³³ Susan Collins, "EPC Meeting on Oil Exports," 28 November 1989.

¹³⁴ *Ibid.*

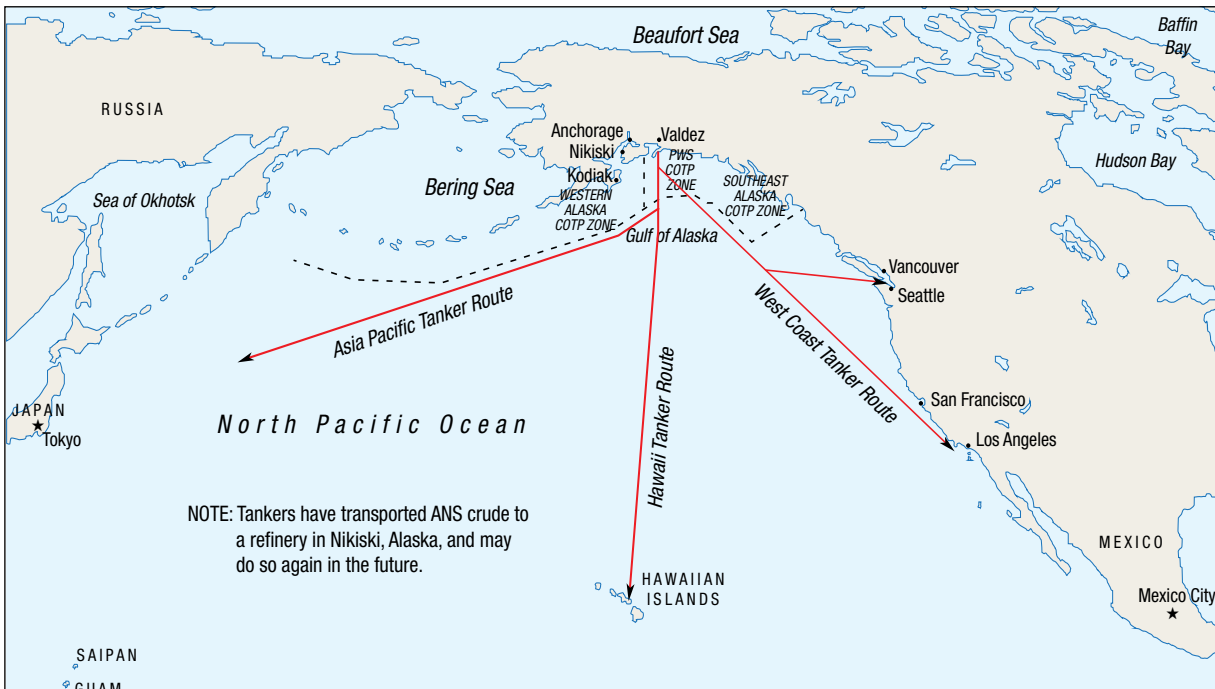
¹³⁵ The Jones Act, which is formally known as the Merchant Marine Act of 1920, 46 U.S.C. § 55102, among other things, prohibits vessel transportation of merchandise from one U.S. port to another U.S. port unless the vessel is a U.S. flag vessel that is owned by a United States citizen and documented under the laws of the United States.

¹³⁶ Council of Economic Advisers Memorandum from Michael Boskin to Susan Collins (Sutherland FOIA Material) page 1.

¹³⁷ Presidential Memorandum of 26 April 1996, Exports of Alaskan North Slope (ANS) Crude Oil.

¹³⁸ 15 C.F.R. § 754.2(g).

Figure 13: Tanker Route Map



Source: Trans-Alaska Pipeline System Renewal EIS (TAPSEIS)

it will grant licenses to export California heavy crude oil in the order the license applications are received with the total quantity authorized for any one license not to exceed 25 percent of the annual authorized volume of California heavy crude oil exports.¹³⁹

Exporters receiving license to export California heavy crude oil must export such crude oil within 90 calendar days after the license is issued and, within 30 days of any export; exporters must provide BIS with a certified statement confirming the date and quantity of crude oil exported.

Alaskan ANS Crude

Unlike California heavy crude oil, exports of ANS crude can be exported freely without a license, but such exports must adhere to specific export

requirements. First, ANS crude oil must be transported on a vessel documented under the laws of the United States and such vessels must use the same route employed for shipments to Hawaii until they reach a point 300 miles due south of Cape Hinchinbrook Light and then at that point, must remain outside the 200 nautical mile Exclusive Economic Zone.¹⁴⁰ Returning vessels from foreign ports to Valdez, Alaska must conform to the same route restrictions.

Additionally, owners and operators of vessels exporting ANS must adopt a mandatory program of deep water ballast exchange, ensure their vessels are equipped with satellite-based communications systems that will enable the Coast Guard independently to determine the vessel’s location, and maintain certain records.

¹³⁹ 15 C.F.R. § 754.2(g)(5).

¹⁴⁰ 15 C.F.R. § 754.2(j).

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