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ABSTRACT

Title: The Potential Cartelization of Natural Gas: Challenges for Energy and Antitrust Policy

Author: Diana L. Moss, American Antitrust Institute

This paper analyzes the factors that bear on the formation and maintenance of a potential cartel of natural gas producers--regionally and globally. The analysis considers key structural and supply-side, product and demand-side, and other industry features that could affect the potential for cartelization. Given its dependency on natural gas and proximity to large gas suppliers such as Russia, Europe is evaluated as a case study of a regional market where a natural gas cartel could harm consumers. The paper notes that cartelization is not imminent. This is due, among other factors, to the significant uncertainty governing the evolution and potential integration of liquefied natural gas markets and ongoing changes in natural gas pricing and contracting practices. However, the paper notes the importance of proactive responses to a possible collusive agreement among large gas suppliers. The paper examines both the economic and legal avenues available to combat cartelization, noting that the former are more likely to bear fruit than the latter. The paper offers a number of policy recommendations in conclusion.

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Author contact: dross@antitrustinstitute.org

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THE POTENTIAL CARTELIZATION OF NATURAL GAS: CHALLENGES FOR ENERGY AND ANTITRUST POLICY

Diana L. Moss*

I. INTRODUCTION

Energy issues have always commanded high priority in national policymaking. During the 2000s, energy has gained particular prominence both domestically and abroad. Increasing energy demand from rapidly expanding countries such as China and India, the grip of high oil prices, global climate change concerns, and the prospect of “peak” supply effects in exhaustible resource markets have served—more than at any other time in our history—to highlight the global proportions of the energy problem. Amongst this chaos, natural gas has been held forth as the “fuel of choice” for industrialized and industrializing economies. Its low carbon properties relative to other fossil fuels, plentiful supplies in many quadrants of the globe, and relatively low price make it attractive for both electricity generation, residential and industrial fuel uses, and increasingly as a transportation feedstock.¹

Policies for ensuring an efficient transition to a lower carbon portfolio that contains a growing proportion of renewable, nuclear, and natural gas technologies must grapple with a variety of problems. One chronic problem is price signals for fossil fuels that fail to reflect all costs, including those associated with pollution and protection of

* Vice President and Senior Fellow, American Antitrust Institute (AAI). The AAI is a non-profit organization dedicated to promoting competition through enforcement of the antitrust laws in the U.S. and abroad, supporting international cooperation, and protecting the interests of consumers. For more information, visit www.antitrustinstitute.org. Many thanks to Bert Foer and John Connor for useful review and comments.

¹ See, e.g., Datuk Abdul Rahim Hj Hashim, “Natural Gas for Vehicles - Fuel of Choice for Asia Pacific. Status & Challenges” *ngvglobal.com* (August 3, 2005), <http://www.ngvglobal.com/en/editorial-comment/natural-gas-for-vehicles-fuel-of-choice-for-asia-pacific.-status-challenges-00257.html>.

U.S. petroleum interests in the Middle East. Another issue is imperfectly competitive fuel markets that are in many cases dominated by a tight oligopoly of large firms. But yet another challenge looms on the horizon—consumers are at risk from the potential formation of a natural gas cartel by large gas-producing countries.

In 2001, the Gas Exporting Countries' Forum (GECF), an informally structured group of producers, was formed to represent and promote their mutual interests. Currently, GECF members include: Algeria, Bolivia, Brunei, Egypt, Equatorial Guinea, Indonesia, Iran, Libya, Malaysia, Nigeria, Qatar, Russia, Trinidad & Tobago, United Arab Emirates, and Venezuela, with Norway and Kazakhstan as observers. In October of 2008, the largest producers of GECF, known as the gas “troika,” (Russia, Iran, and Qatar) met in Tehran to discuss pricing and output decisions, with the expectation of quarterly meetings.² At the 7th ministerial meeting of the entire forum in December 2008 in Doha, Qatar, the energy ministers of member countries approved a charter for the organization.

A cartel composed of some of the largest natural gas reserves holders in Eurasia and the Middle East could potentially control pricing for Europe, which is highly dependent on natural gas for electricity generation and industrial use. The specter of a natural gas cartel has generated significant public outcry in Europe and a scramble to combat its development. Natural gas use is also growing rapidly in economies such as China and India that are also potentially at risk for supracompetitive pricing. Effective cartelization of natural gas (if only in parts of the world) and the high prices and output restrictions that come with it would wreak additional havoc in a world economy that is

² See “A New OPEC for Gas?” *washingtonpost.com* (October 22, 2008), http://newsweek.washingtonpost.com/postglobal/energywire/2008/10/a_new_pec_for_gas.html.

already staggering under global recession. Moreover, it would disrupt policies to address climate change that feature low-carbon natural gas.

This white paper explores the factors that would bear on the ability of countries with significant natural gas reserves and production capacity to form an effective and durable cartel. The paper proceeds as follows. The first section considers the structure of the supply side of regional markets. The second section evaluates the possibility of a global natural gas market, driven by the growth of trade in LNG. The third section analyzes product and demand characteristics that could facilitate anticompetitive coordination among natural gas suppliers. The fourth section focuses on the European market as a case study of potential cartelization. The paper concludes with an analysis of possible policy options for combating the development of a cartel.

II. STRUCTURE OF REGIONAL NATURAL GAS MARKETS

Much like oil, other fuels, and minerals, natural gas resources are dispersed unevenly throughout the world. As a result, reserves—or those resources that are economic to produce—tend to reside in resource-rich geologic pockets, many of which lie within national boundaries or geo-political regions.³ Possession of large reserves alone, however, may not be enough to wield market power unilaterally or in coordination with other suppliers. Natural gas reserves-holders must have the infrastructure to produce the reserves and transport the commodity via a pipeline system for delivery to the ultimate consumer. We will assume generally that reserves estimates for large natural gas suppliers are generally indicative of their ability to produce them. Some exceptions exist, however. For example, Russia’s natural gas fields are maturing and the state-owned

³ United States Geological Survey, “Mineral Reserves, Resources, Resource Potential, and Certainty,” (undated), <http://www.nwrc.usgs.gov/techrpt/sta13.pdf>.

natural gas entity, Gazprom, does not have the infrastructure in place to develop new ones. This may also be true for other reserves-rich former Soviet bloc countries such as Turkmenistan and Uzbekistan.⁴

A. Concentration in Regional Markets

Natural gas is transported primarily via pipeline networks that link a producing area(s) to a consuming area(s) in a discrete geographic region. Without regional integration via a broader transportation system, markets will continue to be defined by pipeline networks and thus limit the exercise of market power by a potential cartel to a particular geographic region. A look at regional markets where cartels could form gives some sense of their structure. One is South America, with Venezuela, Bolivia, and Colombia as major players. A second is Eurasia, with Russia, Iran, and Qatar as dominant sellers. A third is Africa, where Algeria, Libya, and Sudan would likely be major suppliers. A fourth potential regional market is North America but any agreement among countries would be subject to restrictions under the North American Free Trade Agreement.⁵

Increasing decline rates for natural gas fields; high exploration, development, and production costs; and shifts toward LNG as the major source of natural gas imports characterize many former gas producers in the Organization for Economic Cooperation and Development (OECD) countries. For example, net production (production less domestic consumption) is expected to decline in OECD countries over the next 25 years.

⁴ “Global Market Brief: Skyrocketing Natural Gas Prices and Europe's Economy,” *Stratfor Global Intelligence. com* (July 10, 2008), http://www.stratfor.com/analysis/global_market_brief_skyrocketing_natural_gas_prices_and_europes_economy.

⁵ Monika Ehrman, *Competition is a Sin: an Evaluation of the Formation and Effects of a Natural Gas OPEC*, 27 *ENERGY LAW JOURNAL* 175 (2006), at 192.

The U.S. may be one exception to this observation in that over the last two decades, production has matched increases in consumption. This may be due, in part, to upward revisions in gas reserves estimates since 1990.⁶ As shown in Figure 1, the U.S. has a significant share (about 74%) of the natural gas reserves in North America, much of which is relatively costly to produce at current prices. But new sources of supply, including unconventional resources, are expected to play a larger role in the future.

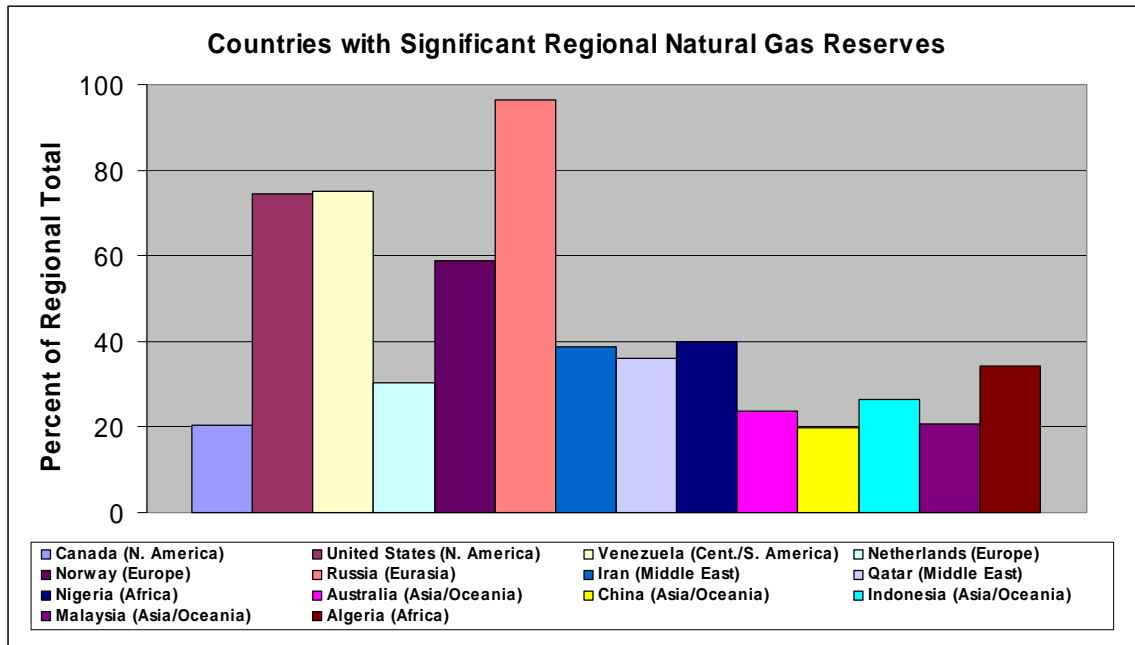
In contrast, non-OECD sources of supply will account for up to 90% of the projected increase in production over the period 2005 to 2030.⁷ Many of the major natural gas reserves-holders reside in non-OECD countries (Figure 1). Venezuela holds most of the reserves (about 75%) in Central and South America; and China, Malaysia, Australia, and Indonesia each have about 20% of reserves in Asia/Oceania. Iran and Qatar are largest reserves-holders in the Middle East, each with about a 40% share of regional reserves, and Nigeria and Algeria are the large reserves holders in Africa, with about 40% and 35%, respectively. Finally, Russia has about a 96% share in Eurasia.⁸

⁶ U.S. natural gas reserves estimates increased, on average, by about 2% per year from 1990 to 2007. See U.S. Energy Information Administration, "Annual U.S. Dry Natural Gas Proved Reserves," http://tonto.eia.doe.gov/dnav/ng/hist/rngr11nus_1a.htm, "Annual U.S. Natural Gas Gross Withdrawals," <http://tonto.eia.doe.gov/dnav/ng/hist/n9010us2A.htm>, and "Annual U.S. Total Natural Gas Consumption," <http://tonto.eia.doe.gov/dnav/ng/hist/n9010us2A.htm>.

⁷ U.S. Energy Information Administration, "Chapter 3 – Natural Gas," *International Energy Outlook 2008* (June 2008), at 40, http://www.eia.doe.gov/oiaf/ieo/nat_gas.html.

⁸ U.S. Energy Information Administration "World Proved Reserves of Oil and Natural Gas: Most Recent Estimates," (August 27, 2008), <http://www.eia.doe.gov/emeu/international/gasreserves.html>.

Figure 1⁹



Based on regional shares, concentration in South America would be close to about 6,000

HHI points, a very highly concentrated market based on antitrust guidelines.¹⁰

Concentration in an African regional market would be about 3,000 HHI and a Eurasian market would have an HHI of about 2,400. The foregoing estimates--at least for the Eurasian market--are similar to those produced by the International Energy Agency (IEA) using net export potential for a sample of five European countries. For example, the agency obtains what it terms an “energy security market concentration” (ESCM) index (unadjusted for political risk) of 2,200 HHI in 2004, which falls to about 1,000 HHI in

⁹ Id., source data.

¹⁰ See U.S. Department of Justice and the Federal Trade Commission, *Horizontal Merger Guidelines* (1992), <http://www.usdoj.gov/atr/public/guidelines/hmg.htm>. The Herfindahl-Hirschman Index is a measure of market concentration (equal to the sum of the squared market shares for all suppliers in the market). In the case of unconcentrated markets, total market output is controlled by a relatively large number of firms and the HHI is low.

2010.¹¹ When adjusted for political risk, the ESMC index is much higher—about 4,800 HHI in 2004, decreasing to about 1,700 HHI in 2010. The decline in Eurasian market concentration from 2004 to 2010 is driven primarily by the effects of growth in global LNG trade and the accompanying expansion of markets.

Other metrics provide additional benchmarks for measuring market concentration. For example, Eurasian market concentration based on natural gas production and the reserves-to-production (R/P) ratio is 2,500 HHI and 2,600 HHI in 2008, respectively.¹² Both of these are similar to concentration derived from reserves statistics from the U.S. Energy Information Administration (EIA) and IEA. But the *relative shares* of suppliers are dramatically different based on the underlying metric. For example, Russia's share of the Eurasian market using reserves and production is 38% and 47%, respectively, but only 5% based on R/P. The relationship between reserves size and production for potential members of a natural gas cartel has important implications for cartelization, as discussed in a later section.

B. Other Supply-Side Factors That Facilitate Collusion

Regardless of how concentration is measured, the collective market shares of Russia, Qatar, and Iran are significant in the Eurasian market, ranging from 57% to about 80%.¹³ The likelihood of relatively few participants in a cartel, high market concentration, and a high market share of a potential cartel are all factors that bear on the

¹¹ See International Energy Agency, *Energy Security and Climate Policy* (2007), http://www.iea.org/textbase/nppdf/free/2007/energy_security_climate_policy.pdf>IEA security, at 84-85. The five countries are Czech Republic, France, Italy, Netherlands, and the United Kingdom.

¹² See also Michael J. Economides, "The Coming Natural Gas Cartel," *foreignpolicy.com* (March 2006), http://www.foreignpolicy.com/story/cms.php?story_id=3417&page=1.

¹³ *Supra* notes 8 and 12. The troika's shares based on reserves, production, and R/P are 80%, 57%, and 71%, respectively.

possible formation, effectiveness, and durability of a cartel. These conditions similarly characterized OPEC, which controlled about 66% of world oil reserves when it was formed in 1960, and the International Bauxite Association (IBA), which controls 85% of non-communist world bauxite production. On the other hand, the Conseil Intergouvernemental des Pays Exportateurs de Cuivre (CIPEC, the international copper cartel) controls only about 33% of world copper production and has been notably unable to raise copper prices.¹⁴

Maintaining a high cartel market share depends critically on incentives for members to cheat on the agreement. It is a central tenet of oligopoly theory that cartel members earn higher profits by coordinating but that any individual member could do better by defecting from the cartel. Defections from a cartel—or decisions not to join an agreement by relatively new suppliers (e.g., Russia)—are likely to explain why OPEC now controls less than 25% of the world's crude oil production, down from about 48% in 1979.¹⁵ This phenomenon is relatively easily explained by simple models that relate demand and supply elasticities and market share. For example, the market power of the cartel (as measured by residual elasticity of demand facing the cartel) falls with a decline in cartel market share, but also with increases in the elasticity of market demand and elasticity of supply elasticity for non-cartel suppliers.¹⁶

¹⁴ See Dennis W. Carlton and Jeffrey M. Perloff, *MODERN INDUSTRIAL ORGANIZATION*, 4th ed. (2005), at 132, citing Paul L. Eckbo, *THE FUTURE OF WORLD OIL* (1976). Eckbo's study of successful cartels showed that 15 out of 19 had four-firm concentration ratios over 50% and in 14, the share of total production was greater than 75%.

¹⁵ Marian Radetzki, *A HANDBOOK OF PRIMARY COMMODITIES IN THE GLOBAL ECONOMY* (2008), Cambridge University Press, at 161. There have been some notable defections from OPEC (e.g., Ecuador and Gabon) and refusals to join the cartel in the 1980s.

¹⁶ *Supra* note 15, at 147. The residual elasticity of demand is computed as:

Other supply-side factors also bear on the formation, effectiveness, and durability of a cartel. Similarity of cost structures across cartel members, low product innovation rates, and entry barriers would collectively act to make a market more conducive to cartelization. While there is less information on the relative costs of the major gas producers that could participate in a cartel, it is certainly true that possession of large natural gas reserves constitutes an effective barrier to entry. Moreover, while the natural gas and oil industries are known for significant advancement in exploration and development technologies, there has been relatively little end-use product innovation that could make it more difficult to maintain a collusive agreement.¹⁷ Coupled with high market concentration and the likelihood of a high cartel market share, these factors create a picture that is sufficiently concerning—at least on the supply side—to warrant a close look at policy options for combating cartelization.

III. GLOBALIZATION OF NATURAL GAS MARKETS – THE ROLE OF LIQUEFIED NATURAL GAS

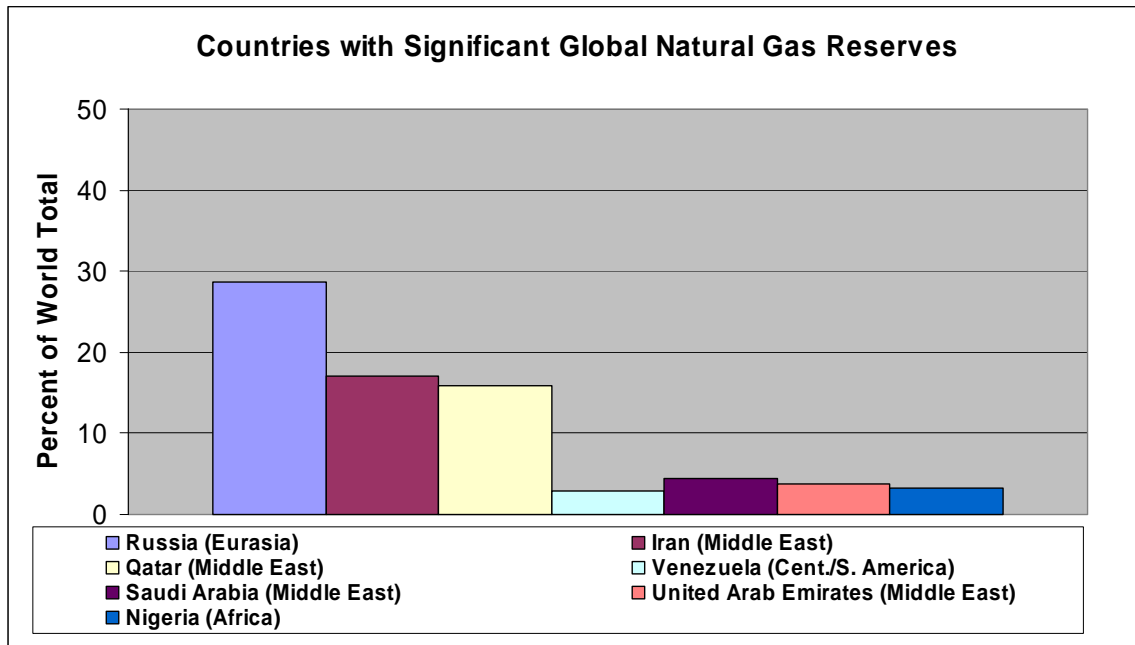
Estimates indicate that about 75% of total world natural gas reserves are located in the Middle East and Eurasia.¹⁸ Relatively few countries rise to the level of global players, as shown in Figure 2. Based on recent EIA estimates, Russia has by far the largest share of world reserves with about 29%, followed by Iran and Qatar, each with 17% and 16%, respectively. A hypothetical cartel comprised of Russia, Iran, and Qatar would therefore control about 64% of total global reserves.

$E_{DR} = (1/S)E_{DM} - (1/S)(1-S)E_{SR}$, where S is market share, E_{DM} is elasticity of market demand, and E_{SR} is elasticity of supply outside the fringe.

¹⁷ See, e.g., John T. Cuddington and Diana L. Moss, “The Finding Cost of Natural Gas: Technological Change versus Resource Depletion,” 91 *AMERICAN ECONOMIC REVIEW* 1135 (2001).

¹⁸ U.S. Energy Information Administration, “Figure 45: World Natural Gas Resources by Geographic Region (2008-2025),” (September 2008), http://www.eia.doe.gov/oiaf/ieo/graphic_data_natgas.html.

Figure 2¹⁹



World reserves and/or production estimates are relevant, much like crude oil, if there is a global natural gas market. The potential exercise of market power by a cartel could expand beyond pipeline network boundaries only if significant volumes of natural gas can be transported to demand centers in the form of LNG. This will require significant development and/or expansion of infrastructure to liquefy natural gas delivered via pipeline to a liquefaction facility, tanker LNG to demand centers, and regasify the fuel at the take-off point for re-injection into a conventional pipeline system. Growth in LNG trade will allow natural gas to be moved more easily without dependence on a particular pipeline network, thus expanding the geographic market. This means there are potentially more producers in the market for any given buyer and more shipping choices for any producer, yielding a more competitive market that is less prone to cartelization. At the same time, however, a cartel that successfully captures the LNG market would be globally powerful.

¹⁹ For source data, see *supra* note 8.

A. Growth in LNG Trade

Meeting natural gas demand in existing and emerging consumption centers such as India and China will require that gas be transported over larger distances. The significant disparity in distribution of supply and demand centers across the globe will create additional pressures for the development of international gas trade, with LNG as the central mode of delivery. Various estimates of growth in global LNG trade worldwide range from about 4% to 10% per year through about 2020.²⁰ Forecasted growth in LNG demand cannot be accommodated by existing infrastructure. For example, existing regasification facilities number 56, most of which are in the major consuming centers of Europe, Japan, and China/India. Twenty-four facilities are under construction and 116 facilities are proposed, primarily in the U.S., Europe, and China/India.²¹ Regasification facilities under construction or on the drawing boards represent an increase over existing capacity of 30% and 107%, respectively.

Based on demand growth projections, it is no surprise why natural gas-rich Middle Eastern and African states are scrambling to develop the infrastructure necessary to enter the LNG market. For example, of the 15 existing natural gas liquefaction facilities in the world, almost all are located in Africa (Nigeria, Algeria, Libya, and Egypt) and the southwestern Pacific Rim region, including countries such as reserves-rich Malaysia. Ten liquefaction facilities are under construction and there are 50 proposed projects—increases of 40% and 233% over existing capacity, respectively. This

²⁰ “As LNG Supply Tightens, Uncertainty Mounts,” *Petroleum Economist.com* (November 2007), <http://www.petroleum-economist.com/default.asp?page=14&PubID=46&ISS=24329&SID=697237>.

²¹ See California Energy Commission, Liquefied Natural Gas Worldwide,” *ca.gov* (no date). March 20, 2009, http://www.energy.ca.gov/lng/worldwide_northeastern_europe.html.

additional capacity will expand the liquefaction capabilities of existing players in the market and introduce large new participants from the Middle East (e.g., Qatar) and Northeast Europe (e.g., Russia).

Expansion of liquefaction capacity and entry of new players could fundamentally change the structure of the supply side of a global natural gas market. Market participants will include the major gas reserves-holders with pipeline infrastructure to deliver gas from producing regions to LNG facilities located within their national boundaries. Land-locked reserves-holders with access to pipeline transportation services to move gas to LNG liquefaction facilities in neighboring states are also potential players. Finally, countries with few reserves themselves, but that are in close proximity to reserves-rich states with accessibility to ports and waterways will enter the market via construction of liquefaction facilities and development of LNG tanker fleets. On the regasification side, expansion of LNG receiving terminals signals a greater diversity of players. In the U.S., for example, the small number of existing regasification facilities are owned by gas pipelines. Ownership of proposed facilities, however, will cover a range of industry players, including other gas pipelines and distributors, independent power producers, electric utilities, and integrated petroleum companies.²²

Despite a rosy forecast for growth in LNG trade and falling input costs in some areas of LNG production, actual developments are likely to be constrained by infrastructure development. A number of challenges face the industry, including the infrastructure necessary to access gas reserves and availability of skilled labors such as

²² See, e.g., John P. Cogan, "New Contracting Practices Evolve for Global LNG Trade," *LNG Observer* (July/September 2005), at 2 (reprint edition).

qualified seafarers.²³ Whether the current, global recession further slows the pace of LNG expansion remains to be seen. Moreover, growth is limited by environmental concerns and opposition to LNG terminals, particularly in the U.S. Collectively, these factors increase the probability that only a fraction of proposed LNG facilities will actually be constructed.

B. Changes in Contracting Practices and Development of Short-Term Markets

A host of other factors will also affect LNG trade and its implications for globalization of natural gas markets. For example, historical contracting practices which have reinforced regional gas price disparities between the two major consuming sectors—the Pacific Basin and Atlantic Basin—are changing.²⁴ Traditional long-term (i.e., 20-25 year) contracts are giving way to shorter-term agreements with more flexible terms for pricing, volumes, and shipping.²⁵ Buyers are increasingly signing contracts at f.o.b. prices, which include shipping costs up to the point of off-loading, which provides more flexibility to trade surplus cargoes.

Also disappearing from contracts are destination clauses, i.e., prohibitions on resale of the cargo to third parties, that constrain arbitrage and entrench pricing

²³ See U.S. Energy Information Administration, “The Global Liquefied Natural Gas Market: Status and Outlook,” (December 2003), <http://www.eia.doe.gov/oiaf/analysispaper/global/lngmarket.html>.

²⁴ Id. Import prices in the Pacific Basin are about 33% higher than in the Atlantic Basin. Much of this difference is driven by the “backstop” prices for LNG, i.e., the fuels or modes of delivery that provide the next best substitute. For example, the Pacific Basin is almost entirely dependent on LNG for meeting fuel needs and prices are linked to imported crude oil. The Atlantic Basin utilizes both pipeline and LNG sources of natural gas and prices are set relative to pipeline natural gas (U.S.) or residual fuel oil (Europe).

²⁵ The EU has discouraged the use of long-term contracts (which serve as entry barriers) as part of its energy sector liberalization strategy. But some large gas purchasers claim long-term contracts are necessary to ensure stable prices to consumers. For further discussion, see, e.g., “Liberalisation of the EU Gas Sector,” *EurActiv.com* (December 19, 2008, <http://www.euractiv.com/en/energy/liberalisation-eu-gas-sector/article-171067>).

differentials across national (or regional) boundaries. The European Union (EU) has sought to eliminate destination clauses as part of its liberalization strategy for gas and electricity markets.²⁶ In 2003, the EU reached an agreement with Russia to remove destination clauses in pipeline supply contracts and in mid-2007, the EU and Algeria reached an agreement on profit-sharing mechanisms and destination clauses for LNG contracts.²⁷ While the EU has aggressively attacked destination clauses as restraining competition and therefore explicitly illegal, the effect of such contract terms would likely be considered in the U.S. under a more reasoned, cost-benefit approach. If the market for LNG were to be cartelized, destination clauses would be an important mechanism for limiting the flexibility of buyers.

Changes in purchasing norms and contractual mechanisms for both pipeline gas and LNG will almost certainly result in a number of improvements, including: (1) increased arbitrage, (2) development of short-term markets for uncommitted capacity, (3) stronger regional interdependencies in natural gas trade, and (4) tighter linkages between natural gas markets around the world. And as LNG markets develop, we would expect regional price differentials to narrow until they reflect only transportation costs.²⁸ When

²⁶ This strategy includes increasing competition in supply, ensuring access to networks, and promoting consumer choice by preventing lock-in. See, e.g., APX Energy Viewpoints, “EU to Punish Restrictive Business Practices in LNG Contracts,” (Summer 2005), at 16, http://www.moffatt-associates.com/energy_services/forecasting_market_trends/energy_viewpoints/documents/3/eu_to_punish_restrictive_business_practices.pdf.

²⁷ European Commission, “Commission and Algeria Reach Agreement on Territorial Restrictions and Alternative Clauses in Gas Supply Contracts,” Press Release (November 7, 2007). <http://europa.eu/rapid/pressReleasesAction.do?reference=IP/07/1074&format=HTML&aged=0&language=EN&guiLanguage=en>.

²⁸ A number of studies have examined market integration in pipeline natural gas and electricity markets. For general discussion on market integration see, e.g., George J. Stigler and Robert A. Sherwin, *The Extent of the Market*. 28 JOURNAL OF LAW AND ECONOMICS 555 (1985). See also John T. Cuddington and Zhongmin Wang, *Assessing the Degree of Spot Market Integration for U.S. Natural Gas: Evidence from Daily Price Data*, 29 JOURNAL OF REGULATORY ECONOMICS 195 (2006).

these effects are evident, it will be possible to think about a natural gas market that is “global” in scope. That market promises to host a greater variety of players than current regional markets, with potentially lower levels of market concentration and less risk to consumers from supracompetitive pricing.

IV. DEMAND-SIDE FACTORS THAT INFLUENCE CARTELIZATION OF NATURAL GAS

Relatively high market concentration on the seller side, few potential cartel participants, and a high cartel market share make natural gas a possible candidate for regional or even global cartelization. However, demand-side factors are also important determinants of cartel success, including: the level of product differentiation, purchasing patterns, elasticity of demand, buyer-side concentration, buyer shares, and growth in market demand.

A. Growth in Natural Gas Demand

Periods of declining or constant demand can create incentives for suppliers to boost or maintain profits through a collusive agreement.²⁹ How demand growth will evolve in different regions, however, is highly uncertain. For example, major energy models assume that natural gas replaces oil in all possible applications, with industrial use and electricity generation accounting for 43% and 35% of world gas consumption, respectively, by 2030.³⁰ Following ratification of the Kyoto Protocol and requirements to reduce carbon emissions by shifting away from coal, gas has become the fastest growing

²⁹ Wirl observes that OPEC members tend to cooperate more when quotas are high, and compete when quotas are low. See Franz Wirl, *Resource Extraction by Cartels Facing Constraints on Cooperation*, 30 ENERGY ECONOMICS 409 (2008), at 410.

³⁰ *Supra* note 7, at 37.

fuel in Australia and New Zealand. In Europe, carbon reduction commitments will have similar effects on increasing the intensity of use of natural gas in electricity generation.³¹

Even in the presence of these drivers, however, pressures to shift to renewables, improve energy efficiency, and stimulate conservation in OECD countries will dampen growth in natural gas demand. For example, annual projected growth in demand in OECD countries is only 1% per year from 2005 to 2030, with North America showing a significantly modest increase of .6% and Europe a slightly higher increase of 1.4%. Growth in U.S. demand for natural gas is particularly low--about .1% annually--due in large part to rising domestic prices that cause gas to lose share to renewables and nuclear energy. Annual growth in demand in the Pacific Rim countries, including Japan and South Korea is .7% and 2.2%, respectively.³²

In contrast, demand growth in non-OECD countries is projected to be almost 150% percent higher between 2005 and 2030 than in OECD countries. Non-OECD Asia is the driving force behind this upward trend with a projected annual increase of 4.4% per year (and particularly high increases in China (5.5%) and India (4.6%)). Annual increases of 3.6%, 3.5%, and 2.8% are estimated for Mexico, Africa, and Central/South America, respectively. Only in non-OECD Europe and Eurasia and in the Middle East is growth relatively low at 1.4% and 1.9% per year, respectively.³³

³¹ Even in the residential sector, growth in natural gas demand has been strong. One source estimates an increase of 133% in demand from 1960 to 2002. See, e.g., Frank Asche, Odd Bjarte Nilsen, and Ragnar Tveteras, *Natural Gas Demand in the European Household Sector*, 29(3) ENERGY JOURNAL 27 (2008), at 27.

³² *Supra* note 7, at 37-40.

³³ *Id.*

As of this writing, demand for LNG is expected to soar, at least in the near term. If LNG markets do expand--taking share away from conventional pipeline supplies and accounting for much of the increment in new demand--this could potentially temper incentives for suppliers to gather under the protective umbrella of a collusive agreement to shore up profits. For example, LNG as a share of total natural gas imports for a sample of five European countries will increase from 5% in 2004 to 25% in 2030, taking share from pipeline imports from Eurasia and Algeria.³⁴ In the U.S., LNG as a share of total U.S. imports is projected to double between 2007 and 2018 (due to decreasing imports from Canada) but fall off thereafter.³⁵ Much of the post-2018 decline in projected U.S. LNG imports is due to increases in domestic production from Alaska's North Slope, unconventional sources such as shales and coal-bed methane, and the growth of clean-coal technology that displaces natural gas in the generation sector.³⁶ To date, the U.S. has operated in a largely self-contained natural gas market. How the foregoing factors affect its position vis-à-vis the world market remains to be seen.

In light of the foregoing, there is some concern that forecasts for LNG consumption in the U.S. have been overstated. With a potential glut of LNG and the concurrent expansion of domestic LNG storage capacity, however, the U.S. could absorb a significant amount of increased production from other countries. A prominent U.S. role

³⁴ *Supra* note 11, at 84. See also "Future Trade of LNG Worldwide is Expected to Be More Than 10 TCF Annually by 2010," *Reuters.com* (February 12, 2008), <http://www.reuters.com/article/pressRelease/idUS202653+12-Feb-2008+BW20080212>.

³⁵ *Supra* note 7, at 43. Canada will increasingly consume more of its own natural gas for domestic energy production, including the mining of oil sands deposits in western Canada.

³⁶ See "Who Knew, Looks Like We're in for an LNG Glut," 22 *ELECTRICITY JOURNAL* 1 (April 2009), at 1 and Katie Howell, "Natural Gas: Dramatic Growth Seen in Unconventional Plays," *eenews.net* (April 13, 2009), <http://www.eenews.net/public/Greenwire/2009/04/13/6>.

in the storage segment of the world LNG industry could have adverse effects on the effectiveness of a global natural gas cartel, were one to develop. This could put the U.S. in a unique position even though sluggish growth in natural gas demand favors the formation and maintenance of a cartel. Other countries that exhibit stronger growth in demand but greater dependence on LNG might actually be more at risk from cartelization.

B. Buyer-Side Market Structure and Purchasing Practices

The foregoing discussion emphasizes that high, variable, and unpredictable rates of growth in natural gas demand (and LNG demand in particular) discourage cartel formation and stability. However, other demand-side factors are important to consider. Energy security, climate change, and economic growth objectives that currently drive the demand for natural gas are, to a large extent, central features of many national energy policies. This ubiquity assures plentiful buyers and a relatively unconcentrated demand side. However, there are likely to be some shifts in market shares among buyers. In 2007, for example, the U.S. accounted for the largest proportion of world imports with a 14% share, followed by Japan with about 10%, and Germany and Italy with under 10%.³⁷ However, since the growth rates in natural gas consumption are vastly different between OECD and non-OECD countries, it is reasonable to expect that the shares of various buyers will change over time. Strong demand from India and China, for example, will alter the relative country rankings within the top gas consumers and could affect the structure and relative bargaining power of the buyer side of a global market, were a cartel to develop.

³⁷ U.S. Central Intelligence Agency, “Country Comparison – Natural Gas – Imports,” *The World Factbook* (April 19, 2009), <https://www.cia.gov/library/publications/the-world-factbook/rankorder/2182rank.html>.

Changing gas purchasing norms may also create some uncertainty on the demand side. Large, infrequent purchases generally make it harder to detect cheating among cartel members. As discussed earlier, long-term contracts have been the norm for the industry but reforms, particularly in Europe, could fundamentally change how gas is purchased. The development of LNG markets will likely create a mix of short and longer-term contract options and both forward and spot markets outside the U.S. are likely to develop. Finally, while product differentiation in regional gas markets is likely to be low, the development of LNG markets will introduce a greater variety of supply sources. Under those circumstances, quality differences might become more apparent—a potential impediment to cartel formation.³⁸

C. Demand Elasticity

The ability of cartel members to extract supracompetitive prices increases depends critically on the responsiveness of consumption to changes in prices. Demand elasticities are particularly important for natural resource cartels, since output decisions are based on a different calculus than for non-resource commodities. For example, a resource cartel will earn supracompetitive profits by changing the *timing* of extraction, as opposed to the total quantity extracted. A cartel therefore practices inter-temporal price discrimination (relative to a competitive market) by increasing prices in early periods and lowering prices in later periods.³⁹

³⁸ *Supra* note 5, at 184.

³⁹ Charles F. Mason and Stephen Polasky, *What Motivates Membership in Natural Resource Cartels: The Case of OPEC*, 25 ENERGY ECONOMICS 321 (2005), at 324. Note that because a resource monopolist will extract reserves over time, the price path differs from a non-resource commodity. Relative to a competitive industry, a monopolist's output is initially lower (and price is higher) and output is higher (and price is lower) in later periods.

Higher short-run residual demand elasticities are more likely to make a supracompetitive cartel-induced price increase unprofitable as consumers switch to close substitutes. Fuel-specific technology requirements, the long-lived nature of fuel-related investments, and even contracting practices can lock consumers into specific fuel choices for some time, lowering short-run demand elasticities. A recent version of EIA's regional short-term energy model estimates a short-run elasticity of $-.14$ for total natural gas use in the U.S. This translates into a 1.4% decrease in quantity demanded resulting from a 10% price increase—a much more responsive relationship between price and quantity demanded than that for oil, which has an elasticity of -0.4 .⁴⁰ However, there is some opportunity for short-term switching, typically in dual-fueled generation or industrial applications, which could increase short-run elasticities. Advanced metering (e.g., smart meters) techniques for natural gas may also play a role on the demand side by signaling consumers to decrease consumption when prices are high.

Given the emphasis placed on renewables and nuclear energy in many national energy policies as a way to promote energy security and lower carbon emissions, we would expect long-run demand elasticities to be higher than short run estimates.⁴¹ Indeed, higher long run elasticities will affect the current value of creating a cartel. A good illustration of this is CIPEC's failure to raise copper prices, something that has been

⁴⁰ Residential, commercial, industrial, and electricity generation demand elasticities are $-.04$, -0.5 , $-.27$, and $-.14$, respectively. See Dave Costello, *Reduced Form Energy Model Elasticities from EIA's Regional Short-Term Energy Model (RSTEM)*, Energy Information Administration (May 9, 2006), at 5, <http://www.eia.doe.gov/emeu/steo/pub/pdf/elasticities.pdf>.

⁴¹ *Supra* note 31, at 44. The authors estimate that long-run elasticities of demand for natural gas in the European residential sector are 1.4 to 4.1 times short-run values.

largely attributed to the existence of secondary (e.g., scrap) markets to which consumers switch when the price of primary copper increases.⁴²

V. EUROPE – A CASE STUDY

Europe provides fertile ground for examining the possibility of collusion in natural gas. It also provides an opportunity to consider factors *in addition* to market structure and demand characteristics that could bear on the formation and effectiveness of a cartel. For example, European countries are highly dependent on natural gas, collectively accounting for 42% of world imports. Current estimates indicate that Europe imports about 25% of its gas from Russia, 15% from Norway, 11% from Algeria, and 9% from Libya. Nigeria, Egypt, and Qatar together account for 9% of Europe’s natural gas imports.⁴³

Much of Europe’s gas therefore comes from GECF countries and, specifically, members of the gas “troika” that have actively participated in discussions to coordinate on prices and output.⁴⁴ While Norway is a GECF “observer,” it cannot engage in cartel activity given the restrictions imposed by its membership in the European Free Trade

⁴² *Supra* note 14 at 132. See also John Underwood, “Optimal Rules for Cartel Managers with Empirical Applications to the Copper and Tea Markets,” 6 ANNALS OF ECONOMIC AND SOCIAL MEASUREMENT 231 (1977), at p. 242.

⁴³ See, e.g., “Global Market Brief: Skyrocketing Natural Gas Prices and Europe's Economy.” *Stratfor Global Intelligence* (July 10, 2008), http://www.stratfor.com/analysis/global_market_brief_skyrocketing_natural_gas_prices_and_europes_economy, and “A New OPEC for Gas?” *washingtonpost.com* (October 22, 2008), http://newsweek.washingtonpost.com/postglobal/energywire/2008/10/a_new_opec_for_gas.html. However, another source notes that Russia supplies 44% of Europe’s gas. See, e.g., “Natural Gas Cartel Would be Tough to Achieve, Experts Say,” *ITH.com* (April 8, 2007), <http://www.iht.com/articles/ap/2007/04/08/africa/ME-FIN-Gulf-Natural-Gas-Cartel.php>.

⁴⁴ *Supra* note 37.

Agreement.⁴⁵ While economic models indicate a variety of potential market structures that would govern European gas trade, most have a few large suppliers in common that utilize pipelines and/or LNG as a major distribution channel. These include many current suppliers such as Russia, which is dominant in the natural gas market—a source of increasing concern in Europe. Other existing suppliers indicated in various models are Algeria, Qatar, Nigeria, and Norway. However, Iran, Oman, and Malaysia also play a potential role going forward.⁴⁶ Collectively, these factors emphasize the urgency of developing appropriate policy priorities for combating a potential cartel. However, a number of issues are important to consider, as discussed in the following sections.

A. Control of Pipelines

One major issue confronting the Europeans is control of the network (i.e., transportation system), which is central to the exercise of market power in any vertically-integrated market. This is a key issue in Europe because the pipeline system spans multiple national boundaries and infrastructure is not owned by natural gas suppliers. Rather, Ukraine and Belarus are the two dominant national owners of pipeline facilities into Europe, which create a bottleneck for transporting gas supplies from Eurasia and the Middle East. This increases the probability of “hostage taking” at either end of the pipeline.

⁴⁵ Lichtenstein, Switzerland, and Iceland are the other three members of the agreement. Even though these states are not members of the EU, they are brought together with the 27 other EU member states through the Agreement on the European Economic Area. See European Free Trade Association, “EEA Agreement,” *efta.int* (April 15, 2009), <http://www.efta.int/content/eea/eea-agreement>.

⁴⁶ See Stefan Lochnar and David Bothe, *The Development of Natural Gas Supply Costs to Europe, the United States and Japan in a Globalizing Gas Market—Model-Based Analysis Until 2030*, 37 ENERGY POLICY 1519 (2009). See also *supra* note 11, at 78-81.

For example, disputes between Russia and Ukraine over contract terms, prices, and the timeliness of payments for gas volumes is almost a regular occurrence. In March 2008 (and again in January 2009) Russia's Gazprom cut off of supplies to Ukraine over an alleged payment dispute.⁴⁷ The severity of these disruptions and associated adverse effects on energy security and the economy has generated a strong policy response by the European Commission. Russia's role as a dominant supplier with an aggressive posture towards pricing may not be endemic to Europe. Should a global cartel develop, the lessons that Europe is currently learning may extend to other consuming countries.

Managing what has become a difficult gas trade between Europe and Russia highlights the inherent difficulties associated with coordination between levels in a supply chain, especially involving heterogeneous business cultures. If the Eurasian countries already spar among themselves regarding contractual matters, one wonders what the inclusion of more diverse Middle Eastern or African cultures in a cartel agreement would mean for coordination. Moreover, the conflict acutely emphasizes the different incentives facing private and national entities as potential cartel members. Disputes between Russia and Ukraine are thin disguises for Russia's discontent over low gas prices and political maneuvering vis-à-vis its former Soviet republics. Nationalized energy companies such as Gazprom are notoriously more likely to engage in political gamesmanship with regard to resource production, pricing, and output. In contrast, incentive structures behind private, profit-maximizing entities facilitate focused effort on creating and maintaining a collusive agreement.⁴⁸ There is little likelihood, however, that

⁴⁷ *Supra* note 7, at 42.

⁴⁸ This is subject to some debate. Some authors conclude that the success of resource cartels in the 1970 (e.g., oil, bauxite, and uranium) required the active participation of governments. See, e.g., *supra* note 15,

the situation in Europe or elsewhere will change in this regard. About 80% of the increase in oil and gas production in non-OECD countries that export gas to Europe is predicted to come from national energy companies between 2006 and 2030.⁴⁹

B. Diversification on the Demand and Supply Sides

The array of planned pipeline projects designed to bypass Belarus and Ukraine signals Europe's desire to diversify its supply sources away from Russia. Indeed, Europe has taken steps toward reorganizing its gas supply portfolio, take advantage of contract reforms (many of which the EU has promoted), and capitalize on the development of LNG markets. By the end of 2010, for example, some sources estimate that Europe will have replaced about two-thirds of the natural gas it receives from Russia--reducing the overall share of Russian imports to less than 10 percent.⁵⁰ Supply diversification would avoid disruptions resulting from cutoffs on the consuming end and the supracompetitive price increases that would result from regional cartelization. Diversification also highlights the potential role of fringe players that are interested in selling into the European market—assuming suppliers can procure pipeline service. For example, the planned Nabucco pipeline (to be completed in 2010) would deliver gas from the Caspian region around Georgia, Armenia, and Azerbaijan--through Turkey--to Austria.⁵¹

at 151 citing Enzo R. Grilli and Maw C. Yang, *Primary Commodity Prices, Manufactured Goods Prices and the Terms of Trade of Developing Countries: What the Long Run Shows*, 2 WORLD BANK ECONOMIC REVIEW 1 (1988).

⁴⁹ International Energy Agency, "World Energy Outlook 2008 – Presentation to the Press," (November 12, 2008), at 8, http://www.iea.org/Textbase/speech/2008/Birol_WEO2008_PressConf.pdf.

⁵⁰ *Supra* note 11.

⁵¹ The Nabucco project would rely on Azerbaijan to develop infrastructure to move more gas westward to feed the pipeline. See Tom Esslemont, "Azerbaijan's Pipe Dream for Europe," *BBCNews.com* (March 1, 2009), <http://news.bbc.co.uk/2/hi/europe/7908598.stm>.

Given its dependence on the pipeline infrastructure controlled by Belarus and Ukraine, Russia has powerful incentives to bypass those pipeline systems. Gazprom is thus attempting to gain control of the gas delivery system, both in terms of (1) distribution within Europe and (2) developing infrastructure necessary to move gas from the Russian gas fields to European delivery points. For example, Gazprom's purchase of Serbia's state-owned oil and gas company was made to secure assurances that one of its pipeline projects designed to bypass Ukraine and Belarus (SouthStream) construction go forward through Serbian territory.⁵² Russia has pursued a number of bypass projects designed to diversify its delivery routes and avoid third-parties, including: the Blue Stream pipeline that links Russia and Turkey; the planned South Stream pipeline that would connect Russia to Bulgaria; and the Nordstream pipeline, which would link Russia directly to Germany.

C. The Potential Role of Algeria in a Natural Gas Cartel

While Europe struggles to distance itself from Russia by rebalancing its gas purchasing portfolio more toward LNG, it may face another challenge, namely how Algeria will respond to aggressive proponents of cartelization. As one source notes, jointly raising prices would be the easiest form of coordination between two of the largest suppliers--Gazprom and Algeria's Sonatrach--"since it does not involve sharing technology or building new infrastructure."⁵³ However, the distribution of proven reserves across cartel members factors importantly into the maintenance of a cartel

⁵² The same scenario may unfold with regard to the Croatian national oil and gas company. See Sarah Arnott, "Paying the Piper: Gazprom Stokes Europe's Concerns," (December 31, 2008), <http://www.independent.co.uk/news/business/analysis-and-features/paying-the-piper-gazprom-stokes-europes-concerns-1218252.html>.

⁵³ Stratfor Global Intelligence, "Algeria, Russia: Europe's Natural Gas Dilemma," *stratfor.com* (August 10, 2006), http://www.stratfor.com/algeria_russia_europes_natural_gas_dilemma.

agreement. There is evidence that countries with large reserves and low domestic consumption rates are more likely to coordinate than those with more limited reserves.⁵⁴ This could change the value of a cartel for both Algeria and Russia. For example, both nations have much lower reserves-to-production (R/P) ratios than Iran and Qatar—other likely candidates for a cartel. For example, Russia’s R/P is about 81 years and Algeria’s is only about 55 years. In contrast, R/Ps for Qatar and Iran are 658 years and 322 years, respectively.⁵⁵

Algeria could temper the exercise of market power by a gas cartel were it to decline joining a collusive agreement. The dynamics of this scenario would be similar to those that characterize the western U.S. gas markets. For example, gas from western Canada that flows into northern California from the Northwest Pipeline competes with gas from the San Juan and Permian Basins that is transported into southern California via the El Paso and Transwestern pipelines. Geographically disparate suppliers that serve the same market can be a powerful disciplinary competitive force.⁵⁶ As a significant and geographically diverse supplier—with the added advantage of well-established pipeline connections to Western Europe—Algeria could be a disruptive force in a cartelized European market.

The foregoing discussion highlights the fact that while Europe has been proactive in taking steps to protect against cartelization, other gas producers, namely Russia, has attempted to solidify its control over the market. While it is too early to say how these

⁵⁴ *Supra* note 39, at 323.

⁵⁵ *Supra* note 12.

⁵⁶ See, e.g., *United States vs. El Paso Natural Gas* 376 U.S. 651 (1964). The U.S. Supreme Court found that a potential competitor provided sufficient discipline in the market to deem the acquisition of that competitor illegal under Section 7 of the Clayton Act.

conflicting initiatives will play out, it is clear that Europe and other countries that are potentially at risk should fully explore the policy options for combating the formation of a collusive agreement.

VI. POLICY OPTIONS FOR ADDRESSING CARTELIZATION OF NATURAL GAS

Similar to OPEC, regional and global consumers of natural gas may have little ability to prevent the formation and maintenance of a natural gas cartel. Exploring the potential options for combating cartelization, however, is worthwhile, not only to prioritize possible anti-cartel policy responses but to identify areas in which various tools can be improved. These possibilities fall into two categories. One group includes policy responses that would work to alter the underlying factors facilitating the formation or effectiveness of a cartel, including: (1) development of countervailing buyer power and (2) acceleration of efforts to diversify national energy portfolios and substitute permanently away from natural gas. A second group of responses are legal in nature and potentially include: (1) enforcement of national antitrust laws against a natural gas cartel and (2) development of dispute settlement capabilities in international organizations. As the following discussion reveals, policy responses that alter the underlying economic factors that could facilitate a natural gas cartel are likely to be more successful than any legal avenue.

A. Policy Responses That Would Alter Economic Factors that Facilitate Cartels

It is clear that there are number of uncertainties on both the demand and supply sides of natural gas markets that could affect the potential development of a cartel. For example, how the expansion of LNG affects market structure—and therefore the potential for cartelization on a global level--remains to be seen. On the demand side, efforts to

liberalize natural gas markets, restructure gas contracts, and diversify supplies will give countries (particularly in Europe) more flexibility as gas purchasers. But disparate growth rates in natural gas demand and shifting buyer shares cloud the picture of which regions might be most at risk for cartel behavior. Policy responses that anticipate changes in the markets by ensuring maximum flexibility on the demand side are perhaps the best approach to addressing possible cartelization. These include, among others, those that promote movement toward mixed contract lengths, consumers' ability to arbitrage gas purchases, and substitution away from natural gas.

First, seller cartels are likely to be more successful if there are many relatively equal size buyers, each with little or no bargaining power in the market. It stands to reason, therefore, that market power on the buyer side can serve as a counterweight to a seller cartel. Europe and other increasingly large consumers such as China and India might be the best candidates for focusing on buyer-side mechanisms. Import unions or bargaining cooperatives--as employed by producers in some U.S. agricultural markets--provide one model for organizing the demand side to address discriminatory pricing. The viability of such a strategy would depend on the size and orientation of purchasers and national policies that govern exemptions and immunities for certain buyer groups. It is unusual for countries themselves—through an arm of the national government—to pursue policies designed to create buyer market power in any input markets, much less fuel. Perhaps the best example is South Korea, which is almost entirely dependent on LNG imports for domestic use and the second largest importer of LNG in the world. The state-owned monopoly, Korea Gas Cooperation, enters into long-term gas agreements with a

variety of sellers and then resells the gas to local distributors at regulated wholesale rates.⁵⁷

The South Korean experience is perhaps an outlier among buyer-side strategies to address seller market power. Gas purchasing by the U.S. government on behalf of private companies, joint purchasing agreements between geographically adjacent countries, or even collective purchasing by the EU on behalf of member countries seems a rather farfetched and improbable way of addressing cartelization. What is more likely to occur are marginal improvements to strengthen the buyer side. In Europe, for example, some large integrated utilities argue that vertical integration of gas production, transportation, and distribution is an important way to maintain a stronger negotiating position relative to large gas suppliers. This policy, however, is at odds with the EU's energy sector liberalization policies which encourage unbundling of procurement, transportation, and distribution.

Second, the effectiveness of any cartel depends critically on the sensitivity of consumption to changes in price. As discussed earlier, the availability of substitutes yields higher long-run demand elasticities than their short-run counterparts. The failure of CIPEC and the increasing challenges facing OPEC offer useful lessons for the potential cartelization of fuel markets. For example, OPEC is facing the specter of diminished revenues from the continued battering of consumers from high oil prices and reduced dependency on oil in most sectors is evident in many countries.⁵⁸

⁵⁷ "General Overview – Background Data," (Korea Institute for Industrial Economics and Trade), 12 KIET INDUSTRIAL ECONOMIC REVIEW 27 (March/April 2007), at 38.

⁵⁸ *Supra* note 49, at 6. OECD, North America, the Pacific Rim, and Europe will exhibit negative growth rates in oil demand from 2007 to 2030. However, non-OECD countries such as India and China will increase their demand.

Much of the shift away from oil in OECD countries is driven by energy security and climate change policies which favor lower-carbon fuels. While this transformation has taken years to accomplish, the forces that have driven substitution away from oil are growing stronger. Permanent switching out of natural gas in response to a cartelized market could therefore ride the same wave of reduced dependency on oil. Dual fuel capabilities in the generation and industrial sectors are ideal responses to shorter-term, cartel-induced gas price increases.

In the longer-term, renewables such as hydroelectric power, wind, solar, and biomass will account for increasing shares of total energy supply portfolios, most of which are likely to be helped along in OECD countries by subsidies, high fossil-fuel prices, and declining investment costs. In non-OECD countries, while there is no growth in renewables in the generation sector, their share is expected to remain at a substantial 22%, at least until 2030. In OECD countries, the share of renewables in electricity generation is expected to increase from about 16% currently to 26% in 2030.⁵⁹ In the U.S., for example, the current administration has made realignment of the energy supply portfolio a priority, setting a target of 25% of electricity to be generated by renewables in 2025. Indeed, the projected growth rates for the consumption of biomass and renewable energy in the U.S. are by far the largest of any fuel source.⁶⁰ Continued emphasis on reducing carbon footprints is likely to remain a central focus of most national energy policies in Europe, the U.S., and Canada.

⁵⁹ Id., at 7.

⁶⁰ U.S. Energy Information Administration, “Table A1: Total Energy Supply and Disposition Summary.” *Annual Energy Outlook 2009 Early Release* (December 2008), <http://www.eia.doe.gov/oiaf/aeo/pdf/appa.pdf>.

B. Legal Avenues for Combating a Natural Gas Cartel

Legal approaches to combating the potential development of a natural gas cartel will be more challenging to implement than economic policies. These approaches include enforcement of national antitrust laws and dispute settlement in international trade organizations. For example, there have been a number of private antitrust suits in the U.S. alleging OPEC to be an illegal conspiracy under Section 1 of the Sherman Act.⁶¹ These suits have been entirely unsuccessful. However, it is instructive to briefly review the history of cases against OPEC, in order to better understand what policy tools are needed to increase the probability of success in the future.

The earliest U.S. case, *International Association of Machinists & Aerospace Workers v. OPEC*, alleged price fixing by OPEC and its 13 member nations.⁶² The district court dismissed the case on multiple grounds, namely that the alleged price fixing was a non-commercial, governmental act involving decisions regarding sovereign natural resources. Such acts were therefore immunized under the Foreign Sovereign Immunities Act (FSIA) of 1976.⁶³ The Ninth Circuit upheld the lower court's decision but on alternate grounds, namely that under the Act of State Doctrine, the court's jurisdiction would be improper. This is because judging the legality of a presumptively valid

⁶¹ 15 U.S.C. § 1 (2000). The act provides that “[e]very contract, combination in the form of trust or otherwise, or conspiracy, in restraint of trade or commerce among the several States, or with foreign nations, is declared to be illegal.” Members of OPEC not only openly discuss pricing, but propose agreements on profit margins and other factors that affect prices and output levels. *Supra* note 5, at 199, citing to Ian Skeet, *OPEC: TWENTY-FIVE YEARS OF PRICES AND POLITICS* (1988), Cambridge University Press, at 15.

⁶² See *Int'l. Assoc. Of Machinists & Aerospace Workers v. OPEC*, 477 F. Supp. 553 (C.D. Cal. 1979).

⁶³ 28 U.S.C. §§ 1330. The court also found that IAM was (1) not a direct purchaser from OPEC and therefore could not bring an action for damages and (2) that foreign governments were not “persons” under U.S. antitrust law and therefore could not be sued.

sovereign act of a foreign state would force the court to adjudicate a politically-sensitive question properly left to the Executive or Legislative branches.⁶⁴

A second case, *Prewitt Enterprise Inc. v. OPEC* (2001) involved a gasoline station operator that sued OPEC under Section 1 for illegal price fixing and quota allocation. The district court opinion condemned OPEC for conspiracy and eliminated the FSIA and Act of State Doctrine defenses that appeared prominently in *International Association of Machinists & Aerospace Workers V. OPEC*. Importantly, the court concluded that OPEC was itself not a sovereign foreign state but a voluntary intergovernmental organization based in Vienna. The decision was reversed on appeal on procedural technical issues.

More recently there have been a number of private antitrust cases in the U.S. alleging that OPEC's activities violate Section 1.⁶⁵ In contrast to earlier cases, the current suits argue that illegal price fixing activities at the level of crude oil production affect the prices of *refined* petroleum products sold in the U.S. by the downstream refining-marketing affiliates of national or privatized oil companies.⁶⁶ Similar to earlier cases, however, the federal court dismissed plaintiffs' antitrust complaint on the grounds that the claims are a political question and immunized under established doctrine.⁶⁷ The

⁶⁴FSIA focuses on jurisdictional questions. The Act of State Doctrine is designed to avoid judicial action in sensitive areas. *Supra* note 66, at pp. 1.

⁶⁵ See: Refined Petroleum Products Litigation, Civil Action No. 4:07-01886 (Southern District of Texas, Houston Division). This is a consolidated action that combines three similar suits filed in federal district court over the period 2006 to 2008.

⁶⁶ *Supra* note 65, at 5. For example, Citgo is the Houston-based refining-marketing arm of the Venezuelan national oil company, Petroleos de Venezuela S.A.

⁶⁷ *Id.*, at 53. Moreover, a finding of illegality would "indicate a lack of respect for the Executive Branch's preferred approach to handling issues arising from the crude oil production decisions of foreign sovereigns." The court also rejected claims under the international comity, indirect purchaser, and Noerr-Pennington doctrines.

court's decision in *Refined Petroleum Products Litigation* is potentially troubling for two reasons. One, the court's findings appear to apply equally to both national and *private* petroleum companies. By extension, therefore, a private entity (e.g., Russia's Lukoil) may apparently participate in a conspiracy with other sovereign entities but still enjoy immunity. Second, the decision implies that if a commodity (e.g., crude oil) is purchased from a sovereign that is party to a conspiracy, all downstream sales are also immunized.

This case, coupled with other failed U.S. antitrust suits against OPEC, highlight an inherent conflict in national and international antitrust policy. One author puts it succinctly, for example: ". . .by not arguing against OPEC's price fixing, the United States is condoning the action internationally, while condemning it domestically."⁶⁸ Were this conflict limited to U.S. antitrust policy, its implications would be less severe. But arguably, the paucity in antitrust suits against OPEC abroad is due in large part to the U.S. case law established in early unsuccessful suits against OPEC.⁶⁹ Such policies would likely hamstring efforts to combat a natural gas cartel.

Finally, can we look to international bodies to fight the development of a natural gas cartel? International interest in cartel enforcement has bloomed over the last decade with the development of antitrust and competition regimes in a number of countries.⁷⁰

There is also considerably more agreement on cartel enforcement than existed in the early

⁶⁸ *Supra* note 5, at 200.

⁶⁹ "The Organization of Petroleum Exporting Countries, Competition and the World Trade Organization Might a WTO Agreement on Competition Constitute a Threat to OPEC?" (2004), at vi, http://www.unctad.org/en/docs/ditclp200311_en.pdf.

⁷⁰ For information on international cartel enforcement see, e.g., John M. Connor, "Effectiveness of Antitrust Sanctions on Modern International Cartels," 6 *JOURNAL OF INDUSTRIAL COMPETITION AND TRADE* 195 (2006). For a discussion of development of international competition regimes, see, e.g., Michael W. Nicholson, "Quantifying Antitrust Regimes," *Federal Trade Commission* (February 5, 2004), <http://www.ftc.gov/be/workpapers/wp267.pdf>.

1980s. For example, in *International Association of Machinists & Aerospace Workers v. OPEC*, the 9th Circuit was unequivocal in stating its reluctance to interfere where there was a “void of international consensus” condemning cartels, royalties, and production agreements.”⁷¹ International developments suggest two possible options for addressing a possible natural gas cartel.

First, the International Competition Network (ICN) has focused heavily on cartels with a working group dedicated to addressing enforcement challenges, particularly across diverse states. However, the ICN’s focus is largely on building best practices in prosecuting private cartels, not cartels comprised of sovereign member states. Nevertheless, its function in building awareness of the anticompetitive and anticonsumer practices and effects of cartels highlights the importance of combating their development.⁷²

The dispute settlement body of the World Trade Organization (WTO) is another possible venue for organizing support against a natural gas cartel. While the WTO has no authority to sanction cartel practices, its political actions can lend support to, or legitimize, enforcement at the national level.⁷³ For example, a Ministerial Declaration adopted at the Doha Conference in 2001 included competition measures condemning

⁷¹ *Supra* note 69, at 40.

⁷² See, e.g., International Competition Network, *Defining Hard Core Cartel Conduct Effective Institutions Effective Penalties*, 4th Annual Conference (June 6-8, 2005), http://www.internationalcompetitionnetwork.org/media/library/conference_4th_bonn_2005/Effective_Anti-Cartel_Regimes_Building_Blocks.pdf.

⁷³ United Nations resolutions are nonbinding instruments and do not constitute provisions of international law. However, some argue that Article XI of the General Agreement would allow such proceedings. *Supra* note 74, at 17.

hardcore cartels.⁷⁴ In 2004, the United National Conference on Trade and Development informally took up the question of whether creating an international WTO agreement on competition (under which OPEC would be proscribed) would encourage threats of antitrust suits at the national level.⁷⁵ However, given that the Doha proposals regarding hard-core cartels were later dropped and that there is almost always significant controversy over the WTO's role in international trade issues, it is unlikely that the organization will provide an effective mechanism to combat the development of a gas cartel.

Both the U.S. and others should expect little success in enforcing antitrust laws against a natural gas cartel unless there are a number of key developments. One is whether there is sufficient judicial incentive or latitude to reassess the older case-law to reflect a new interpretation of immunity and sovereignty defenses. A second is whether sufficient support emerges for the repeal or elimination of the doctrines and statutes that have heretofore prevented application of the U.S. antitrust laws to international resource cartels. Here, it is instructive to note that multiple attempts to pass legislation that amends the Sherman Act to make OPEC subject to the U.S. antitrust laws have met with failure.⁷⁶ A third factor is whether international organizations, through successful official condemnation of cartel behavior, can reinforce the legitimacy of combating cartels through the application of national antitrust laws.

⁷⁴ See "Ministerial Declaration," Fourth Session of the WTO Ministerial Conference, Doha, Qatar (November 14, 2001, http://www.wto.org/english/thewto_e/minist_e/min01_e/mindecl_e.htm).

⁷⁵ *Supra* note 74.

⁷⁶ For the most recent Senate bill, see "S. 204: No Oil Producing Exporting and Cartels Act of 2009," 111th Congress, <http://www.govtrack.us/congress/bill.xpd?bill=s111-204>.

However, even if antitrust laws were changed, the effectiveness of antitrust enforcement remains unclear. In an area where diplomacy and national security are fundamental, it is important to ask whether the U.S. Congress and the Executive would stand up to the counterstrategies that would be unleashed (especially by the cartel itself) if an antitrust case were brought against OPEC or a gas cartel, were one to form. A useful focus therefore might be on the types of reactions there might be to an enforcement action in the wake of a statutory change in antitrust law. Moreover, a major policy question remains as to whether private antitrust cases should be the major vehicle for determining something as important as the nation's oil and gas supply. It is possible that enforcement of the antitrust laws against cartels involving sovereign nations may not pass a broader cost-benefit test, putting additional emphasis on other means by which to combat a potential cartel.

VII. CONCLUSIONS AND RECOMMENDATIONS

Unlike the oil market, which was cartelized almost half a century ago, consumers of natural gas today may have different information, priorities, and responses to frustrating the development of a natural gas cartel. First-hand experience in coping with the harm delivered by cartels, heightened international interest in combating cartels, and acute awareness of global climate change and energy security all serve to motivate a coherent policy in addressing the possible emergence of collusion in natural gas markets.

With that said, it is not a foregone conclusion that the natural gas market is on the verge of cartelization. Major gas suppliers have attempted to organize themselves into an agreement for some time. The failure to codify and implement an agreement may be telling of the many factors that could facilitate (or frustrate) a collusive agreement. While

the supply sides of some regional gas markets or a global gas market exhibit a textbook structure that is conducive to cartelization, the markets are in a good deal of flux, brought on by the expansion of LNG, the wake-up call resulting from Russia squeezing Europe on natural gas supplies, changed contracting practices, a volatile demand side, and intense pressure to migrate toward renewable energy.

Time will tell, but if anything, uncertainty punctuates the need to expeditiously develop coherent policies to combat a possible cartel. As the dynamics themselves resolve, best efforts are needed to improve and harness both the economic and legal tools available to stymie a natural gas cartel. This will require concerted and coordinated effort between national energy policymakers, national antitrust enforcement agencies, and international competition bodies. The goals for such a plan should be two-fold: (1) to protect both U.S. consumers and consumers in allied nations from the adverse economic consequences of a cartel and (2) to limit the political and economic advantages that would accrue to cartel members.

The initiative would focus on major action areas that would more directly and effectively discourage the formation of a cartel, including: (1) the creation of substitute sources of energy (especially renewables and nuclear) that would provide alternatives to cartel-controlled natural gas; (2) encourage the orderly development of an efficient and competitive global LNG market; (3) promote legislation that would limit the anticompetitive, market-limiting effects of certain contract provisions (including destination clauses and term commitments), and (4) promote coordination and cooperation among major gas consuming nations to create international awareness of-- and pressures opposing—the potential cartelization of natural gas markets.