1

The Role of Rules and Institutions in Global Energy: An Introduction

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Current public policy debates on energy security are characterized by a sharp focus on questions regarding access to resources and associated geopolitical and geoeconomic challenges. China's new "scramble for Africa" has already become the stuff of legend; access to the gas resources of the Caspian Sea region is the subject of extensive geopolitical scheming; and the race for the presumed resource wealth of the Arctic has begun in earnest.

This focus on the geopolitics of energy is rooted in the deep fears of consumers about security of supply, leading them to put strong pressure on policymakers to come up with effective fixes. In the United States, where during 2008 gas prices that briefly reached US$4 a gallon created a jittery political climate, energy independence emerged as a top issue in the recent election campaigns and will continue to play a prominent role on the agenda of President Obama's administration. In Europe, where consumers are more accustomed to consistently high energy prices, the debate has long been less shrill. However, high imports of Russian natural gas, combined with dwindling resources at home, have created a volatile political environment and have fueled fears of an energy weapon, with Russians and Europeans trading not just gas but also, increasingly, accusations. Russia's violent forays into Georgia in 2008 and the unresolved Russian-Ukrainian energy disputes have further heightened tensions over crucial

Eurasian transit routes. The more recent slackening in oil prices, and the global financial crisis, may take energy issues off the top of the political agenda for a time but will certainly not do so for long.

Oil and gas have always been politically charged commodities, as they have been (and will continue to be for decades to come) the primary sources of global energy supply. Oil is forecast to remain the single largest element in the primary fuel mix, supplying an estimated 30 percent of global energy until at least 2030. Gas, which accounted for 21 percent of energy on the world market in 2006, will increase its share to an estimated 22 percent by 2030. The world's total primary consumption is expected to increase by 45 percent during that same period.[1] Thus for consumers reliable access to oil and gas at a reasonable cost will continue to be of prime strategic value and consequently subject to significant government intervention. For producers, oil and gas are often dominant sources of state revenues and thus key growth engines for their economies.

However, this lopsided attention to the geopolitical dimension of energy security is based on the myopic and erroneous presumption that global energy politics is necessarily a zero-sum game, in which one country's energy security is another's lack thereof. This preoccupation deflects attention from some key issues that policymakers need to consider in their attempts to establish effective global energy governance: first, the central role played by increasingly international (in the case of oil, thoroughly global) energy markets in balancing demand and supply; second, and even more important, the significance of the rules of the game—national as well as international—that structure these markets. These rules of the game—that is to say, the institutional architecture that underpins global energy—govern central aspects of financing, trading, and hedging oil and gas ventures via financial markets, investment treaties, and trade agreements. These rules also address short-term supply risks in the event of market failure or disruption.

Rather than focusing exclusively on the supply side and thus the geopolitical dimension of energy security, it is imperative for researchers and policymakers to broaden their perspective and assess whether and to what extent the existing institutional architecture of global energy needs to be reformed in response to three major trends: first, rapidly changing framework conditions, driven above all by the rise of new consumers such as China and India; second, the growing relevance of state players in oil and gas markets; and third, emerging regional and global climate mitigation regimes.

1. International Energy Agency (2008), p. 78.

This book makes a first attempt to apply such a broader perspective by identifying and analyzing the important role that rules and institutions play in determining outcomes in international oil and gas markets, by examining how current trends are affecting the existing rules of the game, and by highlighting the consequences for public policy.

Why Markets and Rules Matter in International Oil and Gas

Current public policy debates on energy are shaped primarily by geopolitical and mercantilist frameworks. Typically, international energy policy is portrayed as being fashioned by states that compete for resources and are thus locked into a competitive struggle with zero-sum outcomes. This state-centered perspective not only neglects the fact that market forces matter in international oil and gas, it also ignores the fact that during the past three decades market forces have assumed a position of prime importance in determining outcomes in global energy, driven by reforms that were in many cases demanded by producers and consumers alike.

Already in Place: A Liquid and Competitive Global Market for Oil

Since the late 1970s international oil markets have been fundamentally transformed. One important consequence of these transformations is the existence of a liquid, competitive, and truly global market for oil. Before the first oil shock in 1973 international oil markets were dominated by the internal trading schemes of the major Western oil companies that had concessions in oil-exporting countries. Alongside these arrangements, though less prominently, ran state-to-state deals between consumer and producer nations. As a result, most of the globally traded oil was bound up in long-term bilateral contracts, resulting in low liquidity in international markets. These bilateral contracts were drawn up in an era during which supply cutoffs were simply not expected and rarely materialized (the few exceptions included the closing of the Suez Canal in 1956 and the embargo on Iranian oil exports in 1967 after the nationalization of the Anglo-Iranian Oil Company by the shah).

The oil shocks of the 1970s fundamentally changed the rules of the game in international oil. Consumers found themselves facing tremendous difficulty in replacing oil supplies lost as a result of the 1973 embargo and the political turmoil in the Persian Gulf region at the end of the decade. In the immediate aftermath of the 1973 crisis (compounded by the removal of U.S. import quotas by the Nixon administration), finding alternative sources proved complicated and costly. While oil market conditions eased significantly in the late 1970s, consumers had,

for the first time in history, seen the effective application of the oil weapon by producer nations.[2] This perceived vulnerability also triggered the sense that a forum for consumers was needed for effective information sharing and emergency coordination in response to supply shocks.[3]

Thus in the aftermath of the oil shocks, consumer nations of the Organization for Economic Cooperation and Development (OECD) created emergency sharing mechanisms and combined forces in the International Energy Agency (IEA). At the same time, oil exporters' efforts to nationalize domestic production not only deprived Western Big Oil of concessions and hence access to reserves, it also broke up the vertical integration of the industry and, as a consequence, deprived the newly created national oil companies (NOCs) of refining and retail outlets in importing markets. This process had dramatic results, significantly increasing the fungibility of crude oil and thus helping to create a virtual global pool of oil that made price formation more transparent and predictable. In fact it marked the starting point of large-scale liberalization of the global oil market. This push toward liberalization was at least tolerated by some of the producer countries (most notably Saudi Arabia), which hoped to attain a higher degree of control over government budgets that were highly sensitive to fluctuating oil prices. While admittedly driven by market forces rather than government design, this process also resulted in the creation of spot oil markets in New York and London and of oil futures contracts (paper oil), thereby crafting a new oil world no longer depending on bilateral long-term contracts.[4] In turn, the liberalization of international oil generated major efficiencies, facilitated the development of new supplies, and fostered price competition.[5]

The liberalization of international oil markets proved spectacularly effective. Today the bulk of oil is traded on exchanges or at least under relatively short-term contracts whose prices are linked to prices on the commodity exchanges. In that it has become "visible." A certain amount of oil produced remains bound in long-

2. As it turned out, however, the years following the 1973 embargo saw an easing of oil market conditions, primarily as a result of the global economic downturn, which depressed demand for oil. In addition, the price hike initiated by OPEC also triggered powerful conservation and technology-switching efforts in consumer countries, which progressively reduced the energy intensity of consuming economies.

3. See also Maugeri and Lyons (2006), p. 116.

4. See, for example, Biolsi (1995).

5. Price competition is primarily a result of the fact that, in a liberalized market, new oil producers find it easier to sell through spot markets because long-term contracts are often out of reach in the absence of a significant, long-term production record.

term contracts and bilateral deals. Yet even if it is assumed that only 50 percent of all globally produced oil is subject to market mechanisms, that amounts to more than 40 million barrels a day being currently traded under open-market schemes.[6] Thus there exists a liquid, global market at volumes that exceed the markets of almost all other commodities—in terms of physically traded volumes as well as derivatives.

The existence of a global and liquid market for oil has several important consequences. First, it makes effective oil embargoes literally impossible. Therefore talk about the oil weapon, which has recently come back into fashion, simply does not make sense. Once oil is sold on the global market, no producer can control where and to whom it goes.[7] Also the extensive strategic reserves developed by most consuming nations in recent decades effectively reduce the potency of potential disruptions. Second, given the competitive forces to which the global oil market is subject, price stability through national or even international policy intervention is an unattainable goal. A case in point is OPEC's repeated failure in its attempt to steer global production and, with it, prices. That does not mean that betting on price levels may not force oil prices up or down in the short term. It does mean that the global price for oil is first and foremost a function of market forces and cannot be artificially lowered or increased by policy design in the long term. In fact, attempts to manipulate price levels or otherwise influence the global oil market will prove inefficient and, as demonstrated on occasion, even counterproductive.

In the Making: A Global Market for Gas

To date, primarily as a result of transport based on pipelines, natural gas has remained mostly a regionally traded commodity. Major markets are by and large geographically restricted to Eurasia, North America, and the Asia-Pacific region. As a consequence, markets for gas have been slower to liberalize, with the bulk of supply contracts remaining long term in nature. While major consumer markets, in particular the United States, have liberalized, much gas trading, notably in Eurasia, remains tied to long-term bilateral deals characterized by destination clauses and prices indexed to a gas substitute, most commonly oil.

6. Moreover, excluding volumes from trading does not necessarily mean they cost less; that will depend first and foremost on the contract in question.

7. It is important to note that some OPEC producers tend to sell oil under contracts entailing destination clauses that limit further resale by the buyer. Hence the most successful spot markets are located in the United States and Europe.

However, recent years have begun to see a global market for gas in the making, driven primarily by the expanding role of liquefied natural gas (LNG). Falling indigenous supplies of natural gas, combined with rising demand, falling costs, and enhanced technologies for the liquefaction of gas, are turning LNG into an increasingly attractive, indeed necessary, alternative source of energy, particularly in Europe.[8] True, the recent economic slowdown has yet again turned the European market into a buyers' market, while recent discoveries of unconventional gas have helped to slow down the need for increased LNG imports into the United States. Yet the widely expected gas glut in Europe may turn out to be rather short-lived once the economy picks up again—and particularly if the EU is to comply with its ambitious climate goals. In the liberalized U.S. market, depending on evolving cost structures, LNG may still play an important role in gas-to-gas competition.

For consumers, LNG both helps diversify sources of supply (thereby fostering energy security) and contributes to price competition in gas markets (since price arbitrage is possible across different, previously disconnected regions). On the basis of recent trends the IEA projects that by 2010 up to 20 percent of demand for gas in the OECD countries will be met by LNG. In fact it is believed that LNG will account for 80 percent of the increase in interregional trade up to 2030.[9]

Clearly, a truly global market for gas does not currently exist and will take time to develop fully. In addition, as is argued in further detail in this book, a global gas market will not have the same characteristics as the global market for oil. Cost structures in the two industries are fundamentally different; the costs of liquefaction, transport, and regasification will remain significant, despite technological advances; and in contrast to oil, gas deteriorates over time, rendering storage difficult. In consequence, even an internationalized market for gas is likely to remain dominated by long-term contracts. Yet the natural gas business is in flux and is likely to further integrate in the years to come. In this context, the rise of LNG may fuel the development of spot markets for gas (already operating, albeit on a fairly small scale) and thus provide an additional buffer for consumers, who may be confronted with unexpected supply disruptions triggered by political or other events.

No Markets without Institutions: The Rules of the Game

Thus despite all the talk about access and the often-invoked specter of supply disruptions, it is important to recognize that both oil and gas are commodities that

8. See also Yergin (2004).
9. International Energy Agency (2008), p. 119.

are already (in the case of oil) or increasingly (in the case of gas) traded on a global scale. Market forces of demand and supply, mediated by the price mechanism, are key factors in determining levels of investment in, as well as the production and consumption of, oil and gas.

But it is equally important to recognize that these markets, like any others, do not function without institutions. Following a definition developed by Douglass North almost two decades ago, institutions can be defined as the rules of the game according to which actors play.[10] Institutions are composed of formal rules (laws, regulations) and informal constraints (norms, conventions) and usually embrace some form of enforcement mechanism. The study of institutions is based on the recognition that markets would work perfectly only in the absence of transaction costs. As we do not live in such an ideal world, institutions are crucial in order to lower transaction costs and to set incentives for market participants to compete on price and quality.

A comprehensive typology of institutions in energy markets is beyond the scope of this volume, but in brief, institutions can be classified according to various principles, for example by source (public, private, or public-private), enforcement mechanism (on a continuum from legal fiat to voluntary compliance), and function (what they do or are supposed to do). For the purpose of this volume, we set out a functional categorization of institutions in global energy markets and use it as a purely heuristic device to highlight and emphasize the important role these institutions play in making energy markets tick. On the basis of such a functional categorization, institutions in international energy markets can be grouped into three types.

First, some institutions are designed to correct market failures. International oil and gas markets are no nearer perfect than any other market structure. As a prime example, and as also discussed in further detail in this volume, following the 1973–74 oil price shocks major energy-consuming nations established the IEA. In addition to acting as a source of energy market statistics, the IEA introduced distinct rules for two specific mechanisms of short-term supply (risk) management: the International Energy Program (IEP, founded in 1974, which established national emergency oil stocks among members) and the Coordinated Emergency Response Mechanism (CERM, founded in 1979). The linchpin of the framework is the reserve system of IEA member states, maintaining mandatory emergency oil reserves (strategic petroleum reserves, or SPR) equivalent to at least ninety days' worth of their respective oil imports.

10. North (1990).

The SPR enables a stock draw—the release of reserves—during a crisis, producing barrels immediately, with a simultaneous calming effect on global prices.[11]

Second, some institutions are designed to lower transaction costs (such as by sharing and disseminating information). Examples include mechanisms to foster consumer-producer dialogue, such as the International Energy Forum (IEF). As yet the IEF is a rather soft institution, with the role of promoting informal dialogue, as opposed to a forum for decisionmaking or negotiations. While producers and consumers usually disagree on price levels, both sides have a primary interest in promoting transparency. As is explained in further detail later in this volume, more transparency would reduce uncertainty in international energy markets and thus adjustment costs for both consumers and producers. The IEF enhances mutual understanding and allows the discussion of long-term issues between producers and consumers. The IEA's data-gathering and data-sharing activities are another example of lowering transaction costs. The database maintained by the IEA has emerged as a key tool with which market players can enhance their knowledge about present and (expected) future national, regional, and global consumption levels, thus fostering planning security.[12]

Third, some institutions are designed to set rules and standards for market exchange. These institutions prescribe, encourage, or constrain certain behaviors on the part of market participants. At the international level this includes rules set and surveyed by bodies such as the World Trade Organization (WTO). The primary objective of the multilateral trading system as established by the WTO is to provide mutual market access without barriers. Hence trade in energy goods is in principle covered by WTO rules.[13] In the past this has however been of little consequence, as is also further discussed in this volume.

The Energy Charter Treaty (ECT) is another rule-setting institution. The ECT, concluded in 1994, explicitly addresses the energy sector, especially natural gas, petroleum, and petroleum products, linking free-market policies with an open-access investment regime. The parties to the ECT include producing coun-

11. It is important to note that supply disruptions do not necessarily occur only as a result of market failure. As Hurricane Katrina and the First Gulf War reveal, natural disasters or political events may also disrupt supplies and require a release of strategic stocks to stabilize prices. Yet while these events can be regarded as wild cards exogenous to the market, the emphasis of our argument lies on the market structures as such and on the governance mechanism that characterizes them.

12. For a discussion, see Mitchell (2005).

13. For an overview, see Jiménez-Guerra (2001), pp. 191–218.

tries (such as Russia), consuming (European) countries, and transit countries (such as Ukraine). The ECT establishes a clearly defined set of rules for investment, transit, and trade in the energy sector, complemented by a dispute settlement mechanism. However, since some signatory states have yet to ratify the treaty, the ECT continues to be applied only provisionally by certain key actors, including the Russian Federation.[14]

In general, enforcement mechanisms vary across the rules of the game. Some institutions provide formal compliance mechanisms; others rely on voluntary commitments and peer pressure to promote implementation. However, all such mechanisms have an element designed to foster implementation and enforcement; this sometimes involves sanctions but in most cases is incentive based.

In sum, these rules of the game play important roles in determining outcomes in international oil and gas markets. Obviously, the historical evolution underlying these rules of the game to some degree reflects the realities of the cold war era—an era characterized by significant increases in the discovery of supply stocks (and by occasional supply shocks); intensifying conflicts between producer and consumer nations following decolonization and the formation of OPEC; and the geostrategic competition for influence on major supplier countries in the Middle East and in Africa as a direct consequence of the great-power conflict. Thus the structure of the rules of the game also reflects power differentials. Nonetheless, an exclusive focus on access to energy resources does not provide any guidance for analyzing current dynamics in international energy markets, nor does it provide a suitable lens through which to assess the implications of the fundamental shifts that are currently transforming these markets.

Rules under Pressure: Dwindling Low-Cost Reserves, the Rise of New Consumers, and the Lack of Investment

Despite the overall importance of markets and rules in global energy, popular debates on energy security have recently begun to move in a very different direction. In particular, intensifying concerns about security of supply have fueled great anxiety among consumer nations and have opened the field for state-centered energy policy formulas that many believed a thing of the past.

In essence, current fears of a supply crunch are fueled by three factors that are changing the dynamics of oil and gas markets: dwindling low-cost reserves, the

14. See, for example, the contributions in Wälde (1996).

rise of new consumers, and lack of investment.[15] After 150 years of constant supply increases, much of the world's low-cost conventional oil has been tapped, rendering exploration and production a progressively more demanding and thus more expensive endeavor in deep sea waters such as those of the Arctic or in more unconventional media such as tar sands. In addition, the input prices of drilling technology, skilled labor, and equipment have soared as a result of both the increasingly demanding exploration and production environments and market shortages. As CERA's Upstream Capital Costs Index (UCCI) reveals, finding and development costs in oil and gas have risen by a startling 210 percent since 2000, adding a significant cost increment to crude supply.[16]

Although ample supplies of gas still exist, these too are often locked up in places that are not easily accessible; what matters most in the case of Europe and much of the emerging Asian economies, however, is that reserves are far away from their consumer markets. Furthermore, as a consequence of their meteoric economic rise during recent decades, China and India—certainly to be followed by other emerging economies—have virtually stormed global markets and have triggered a fundamental shift in the traditional consumer base of global oil. In fact, according to some estimates, roughly 43 percent of the increase in global oil demand up to 2030 will come from China and 19 percent from India.[17] Finally, rising demand and skyrocketing exploration and production costs are outstripping actual investment levels in upstream and infrastructure, which are estimated at US$6.5 trillion up to 2030 in oil alone.[18] The main reason for this mismatch is identified as a rise in resource nationalism and a lack of access to foreign capital in key producer regions. In fact the IEA has repeatedly warned how little investment has gone into exploration and development, as producers concentrate on the development of aging fields.

Together, these factors have led to a resurgence of state-centered energy policy programs aimed at rolling back the liberalization of oil and gas markets and

15. It is important to note that, while the predominant focus regarding consumption is on emerging economies, additional trends need to be accounted for as well. In particular the growth in energy consumption in oil-exporting countries, mainly encouraged by subsidies, might constrain their export capacities and even make some of these countries net oil importers in years to come. See Mitchell and Stevens (2008). Additionally, while two-thirds of the projected global consumption increment up to 2030 will be caused by emerging economies, the remaining third still remains with importing industrialized economies, that is, the OECD world. See International Energy Agency (2008).

16. See Cambridge Energy Research Associates, "IHS/CERA Upstream Capital Costs Index" (http://ihsindexes.com/ucci-graph.htm).

17. International Energy Agency (2008), p. 77.

18. International Energy Agency (2008), p. 89.

shifting to mercantilist approaches to energy security. Cases in point are China's much-discussed quest for energy in Africa, Japan's renewed flirtation with a more assertive government role in securing energy supplies, and the newly emerging role in global energy of the NOCs, which have pushed private (Western) Big Oil out of the world's top fifteen oil and gas corporations in terms of reserves.[19] Alarmist voices warning of looming resource wars over dwindling reserves or urging that energy security matters be included within the remit of military alliances such as NATO add to an overall retrograde trend toward a world in which one country's access to energy is another country's lack thereof.[20]

This narrow geopolitical lens is reductive and fosters a zero-sum mentality, when in fact energy markets are quite complex and offer joint benefits from cooperation between producers and consumers. Despite the reemergence of state players and resource nationalism, markets matter more than ever in global oil and gas. While, for instance, Chinese-owned foreign assets contributed between 10 and 15 percent to China's crude oil imports in 2005, the remainder was purchased on the global market, a vital mechanism to satisfy the country's exploding demand.[21] In addition, most of the oil produced by ventures in which China's NOCs hold stakes is sold on world markets, not shipped back to China—a function of price differentials between global and domestic Chinese prices. Furthermore, in a high-price environment, financial markets will continue to play the key role in financing global oil and gas endeavors. Finally, continuing large-scale liberalization efforts, such as the current reform of the European gas market, are based on the insight that price formation is better left to markets and not to governments.

In all, and counter to popular perceptions, the energy world of the future is unlikely to be one that pits producers against consumers or old consumers against new ones. The main reason for this is that the interests of all actors in the energy domain overlap. Most fundamentally, the consumers' quest for supply security is met by the producers' quest for demand security. And while new consumers have an interest in overcoming the disadvantages they experience as latecomers on the global market, old consumers have an interest in accommodating them at least possible cost, which means in a conflict-free manner. Hence current public discussions about who wins and who loses are focusing on the wrong questions.

19. On China and Japan, see Downs (2005); Evans (2006).

20. Most notably, prominent Central European politicians have repeatedly called for an Energy NATO to secure future supplies. For a geopolitical perspective on energy, see Klare (2008).

21. Eurasia Group (2006), p. 3; U.S. Department of Energy (2006), p. 28. For an overview of Chinese foreign assets, see also KPMG International (2005).

Instead, the main question is how and in what ways we need to adapt the currently existing set of rules governing global energy relations to the realities of the twenty-first century.

The continuing process of climate change—affecting consumers and producers alike—is putting further emphasis on this fundamental question. Climate change is now an almost universally accepted fact; and according to most projections the process is picking up the pace, rapidly closing the window of opportunity for policymakers to put in place policy frameworks conducive to preventing greenhouse gas emissions rising to a level that would inflict the gravest economic, environmental, and social damage.[22] As discussed also in more detail in various chapters in this volume, one dimension of the climate change conundrum is how appropriate incentives can be set in markets to shift investments away from fossil fuels toward climate-friendly technologies. The current landscape is characterized by a patchwork of national and international policy frameworks that have engendered some results (such as a higher share of renewable energy in electricity production in some European countries) but that fall far short of the capacity to achieve change on the massive scale needed to transform the existing energy paradigm. In addition, as further discussed in this volume, the patchwork of national and international rules also results in investment uncertainty for private market actors.[23] Finally, the alternative fuels available to date are not without adverse effects, raising new environmental and developmental challenges.

Rather than pointing to geopolitical options, the answer to these challenges is that functioning markets play a key role and, if properly managed and structured through appropriate rules and institutions, can satisfy the needs of all players involved. Avoiding a return to an energy world of zero-sum games requires that the rules of the game in global energy markets be adapted along all three fronts sketched above: building and extending markets, addressing market failures, and setting standards. Here, as emphasized by the contributions to this volume, existing institutions need to be overhauled and made ready for the new energy realities.

Outline of This Book

As pointed out above, the importance of assessing the political economy of rules and institutions in global energy has not yet entered the mainstream discourse on

22. Stern (2007).
23. See also Blyth and Sullivan (2006).

energy security. This book offers a first tack at applying a governance lens in analyzing contemporary challenges in international oil and gas markets. Adopting an institutionalist perspective on global energy, the contributions to this volume focus on two questions:

—What are the functional logics of existing institutions governing global oil and gas on financial markets; on investment treaties and bilateral, regional, and global trade agreements; and on supply risk management?

—How do these institutions need to adapt in order to meet the challenges of the twenty-first century in terms of security of supply at affordable prices, environmental sustainability, and good governance?

The book thus complements existing analyses by explicitly focusing on the main institutional structures regulating global oil and gas markets and the extent to which they need to be adapted to changing framework conditions. The analyses of the institutions contained in this volume span the entire spectrum of the global energy arena and are consequently organized into four parts: part 1, Global Energy and Trade and Investment; part 2, Global Energy and Financial Markets; part 3, Short-Term Supply Management and Long-Term Energy Cooperation; and part 4, Emerging Issues and Outlook. Analytical chapters in each part are followed by summary chapters presenting a policy perspective.

Global Energy and Trade and Investment

At present there is no internationally agreed set of rules for trade of energy resources and investment flows. As a trend during the past twenty-five years, the political and economic mainstream promoted the liberalization of energy markets and the opening of investment opportunities to foreign actors on a nondiscriminatory basis. This has led to the establishment of multilateral institutions such as the World Trade Organization alongside regional arrangements such as the North American Free Trade Agreement (NAFTA), the Energy Charter Treaty, Asia-Pacific Economic Cooperation (APEC), accompanied by biregional forums such as the EU-Gulf Cooperation Council and the EU-Russian Dialogue. Today oil and gas are basically freely traded (though this is not based on international agreements), whereas related investment is mainly subject to national legal provisions. This patchwork of rules governing trade and investment of oil and gas is confronted with a variety of challenges, which are analyzed in this volume.

One challenge relates to the reemergence of energy diplomacy and its implications for trade and investment in oil and gas. Newly emerging consumer countries such as China, but also established market participants such as Japan, tend

to increasingly flank energy contracts diplomatically to secure their rising energy needs. In turn producer countries such as Russia foster the expansion of their NOCs toward upstream assets and markets abroad. Both tendencies presumably undermine principles of free trade and lever out generally accepted rules of investment. In chapter 2 Andreas Goldthau addresses the question to what extent energy diplomacy challenges existing market structures in oil and gas. Drawing on anecdotal evidence from the cases of China's quest for oil and Russia's expansion into foreign gas assets, he discusses the motivations for and the various forms of energy diplomacy and analyzes how empirically significant the trend is. Goldthau then offers some counterintuitive results with regard to energy diplomacy's perceived effectiveness.

Another challenge is the ongoing trend toward a proliferation of regional and bilateral trade and investment agreements, which is taking place independently of efforts to strengthen multilateral institutions in order to govern oil and gas trade- and energy-related investments. In some areas these different regimes may complement each other; in others, they are at odds. In chapter 3 Yulia Selivanova analyzes the patchwork of existing international rules governing trade and investment in energy. She presents the various forms of regulatory structures that exist outside global trade agreements, mostly on a regional level, and analyzes the implications of the rise of bilateral treaties on the effectiveness of a global rules framework in the context of the WTO. Selivanova argues that the existence of such a patchwork is not necessarily to the detriment of international regulation of energy trade and investment. She identifies energy-specific forums such as the Energy Charter Treaty as potentially effective providers of rules and standards specific to energy trade, and she concludes by highlighting potential public policy options for transforming the current patchwork of rules governing trade and investment into a more coherent framework suiting the interests of both producers and consumers.

A third challenge relates to the impact of existing trade and investment rules on the environment. For example, WTO regulations as well as rules established by regional and bilateral trade and investment treaties are partially at odds with objectives of environmental protection. Regional and bilateral trade and investment treaties are often aimed at fostering energy relations and thus by definition favor fossil resources over renewables. Moreover, they may run counter to UN initiatives to secure the environment and to combat climate change.[24] In addition, WTO regulations treat major renewable energy sources such as biomass as agri-

24. See also Wälde (1996).

cultural products. Hence they are subject to a set of rules and regulations that are a political minefield, as the two dominating world markets—the EU and the United States—have established a variety of mechanisms to protect their producer companies.[25] Since the agricultural sector enjoys elaborate subsidy schemes on both sides of the Atlantic, agricultural products are regularly subject to heated trade disputes.

In chapter 4 Simonetta Zarrilli provides a governance perspective on the biofuels arena. Zarrilli presents recent data on production, consumption, and trade flows in biofuels, analyzes biofuels policies of leading producing and consuming countries, and evaluates to what extent those policies have contributed to the shortcomings experienced by the biofuels industry as well as to the recent political backlash against biofuels. Zarrilli also provides guidance for policymakers intent on maximizing the potential of biofuels while minimizing their negative side effects.

A concluding policy perspective for part 1 is offered by Ralf Dickel in chapter 5.

Global Energy and Financial Markets

Energy being a highly capital-intensive industry, all oil and gas businesses heavily rely on financial markets to facilitate exploration and production projects. Moreover, financial market instruments enable oil and gas companies to at least partially transfer certain types of risks from operators to investors, including currency, commodity price, and operating risks as well as risks of expropriation. From a financial market perspective, investments in the energy sector principally follow the logic of investments in any other sector: that is, invested money has to generate a certain payoff over a defined period of time. Unlike other investment projects, however, the energy sector (and the resource extracting industry in general) often also entails considerable political risk. It thus depends on the ability of financial markets to mitigate or hedge these risks: its underlying rules of the game determine which oil and gas investment projects attract financing and which do not. Similar to the rules governing trade and investment, the rules underlying financial markets with regard to the oil and gas business are confronted with a variety of challenges (addressed in this volume).

One challenge to existing rules governing financial markets relates to the ever more powerful role of state players in these markets. National oil companies now control the vast majority (over 80 percent) of proven oil and natural gas

25. For an overview see Desta (2002).

resources and will overwhelmingly dominate world oil production and pricing in the coming decades. The IEA projects that cumulative investment in the upstream oil and gas sector will amount to around US$8.4 trillion over 2007–30, or US$350 billion a year on average, to meet rising world demand for oil.[26] Despite these tremendous capital requirements, many governments intervene in energy markets in a manner that slows and even discourages this needed investment. Private sector firms that have in the past succeeded in amassing the capital required to make major risky and long-term investments in promising resources have been denied access to many of these promising regions. Generally speaking, resource development in the most prolific regions of the world, including the Middle East, Russia, and South America, can only proceed with adequate investment mobilized by national oil companies.

Hence the critical question for the immediate future is whether the world's major NOCs will be able to continue to invest adequate amounts to meet the projected rise in oil demand in the United States, Europe, China, and the emerging economies of Asia and elsewhere. This question is particularly pressing as governments have come to increasingly siphon off the NOCs' capital to meet domestic requirements for socioeconomic welfare priorities. Accordingly, chapter 6, by Amy Myers Jaffe and Ronald Soligo, investigates to what extent NOCs' state-backed finance or international credit markets finance their expansion programs. It then discusses how investment decisions and strategies of key NOCs are influenced by government preferences and assesses whether the pull of noncommercial obligations will continue to detract from the NOCs' abilities to tap rising revenues to foster adequate investment in oil and natural gas. The chapter concludes with a set of recommendations for international rules designed to increase the efficiency of the allocation of capital to oil and gas exploration and development projects given the dominance of NOCs in the sector.

A second challenge relates to climate change. While the rules governing trade and investment in conventional energy are incomplete and require reform, the rules governing the nascent carbon markets are at best embryonic. In chapter 7 William Blyth reviews the current state of existing carbon markets. Blyth argues that a top-down approach creating a global carbon market with universally accepted resource allocation is unlikely to emerge in the near future due to the political difficulties of making a global deal. Instead, national and regional carbon markets will continue to proliferate, resulting in a patchwork of systems

26. International Energy Agency (2008), p. 44.

and rules. Blyth posits, though, that this is not necessarily bad news. He suggests that tackling climate change needs a new multinational approach to assigning emissions rights and abatement responsibilities, building on the various bottom-up approaches in different jurisdictions, and in the medium to long term potentially culminating with a top-down approach to link these various schemes.

A third and related challenge lies in investments in low-carbon energy sources. Regarding increasing carbon emissions, the crucial question arises as to whether financial markets help to facilitate the necessary shift toward a low-carbon future. In recent years investments in alternative energy sources and environmentally sustainable projects have gained more attention on international financial markets. In fact the bond market has started to finance projects such as wind farms, and investment banks have become more interested in shares of companies active in the renewable sector.[27] It remains unclear however whether the price signals are strong enough to channel sufficient capital into environmentally sustainable energy projects (including solar power and biofuels). In chapter 8 Hillard Huntington and Christine Jojarth review technological, political, and economic factors that determine investments into alternative energy sources. Arguing that the recent credit crunch makes political action regarding the promotion of investments in low-carbon energy sources more necessary than ever, they identify various key arenas in which climate-friendly investment policies need to be promoted, including the introduction of an auction-based cap-and-trade-system, a shift in research and development expenditures, a review of energy policy (in particular price controls on coal, natural gas, and petroleum products), and a proactive harmonization of climate change and trade rules.

A concluding policy perspective for part 2 is offered by Joseph Stanislaw in chapter 9.

Short-Term Supply Management and Long-Term Energy Cooperation

In recent years the heightened global tensions emanating from the Middle East, as well as the oft commented on rise of India and China, have brought short-term risk management of global oil back to the forefront of global energy security. When added to the feared, though by no means agreed upon, impact of so-called peak oil, it is clear to see why the impacts of the 1973–74 oil crisis are being revisited and the mitigation mechanisms available to consumers dusted

27. For an overview on investment volumes, see REN21 (2006).

off and reassessed.[28] Following the 1973–74 oil price shocks, OECD members concluded that it was no longer sufficient for any single actor to protect itself in the global oil market, and they established specific mechanisms of short-term supply (risk) management within the realm of the IEA.[29] In addition, consumers took steps to institutionalize producer-consumer dialogue to facilitate greater market stability. The premier forum in this context is the International Energy Forum.

Governance structures for short-term supply management as well as for long-term energy cooperation are confronted with a variety of challenges, however. One prominent challenge stems from the fact that Chinese and Indian oil consumption represents a fundamental move away from the traditional consumer base. As these new consumers are not part of the institutional framework that encompasses short-term supply management mechanisms, they are excluded from the IEA's strategic petroleum reserves and other mitigation mechanisms. In addition, consumer country cooperation is required to effectively address the pressing problem of climate change. Starting from these observations, Wilfrid Kohl in chapter 10 first assesses the range of existing platforms, forums, and organizations mainly comprising consumer nations, including the IEA, the G-8, the EU, and global climate change regimes. He then assesses to what extent these forums are able to deal effectively with the effects of short-term supply disruption, to coordinate their policies, and to address climate change. Finally, he offers suggestions on how to foster consumer-consumer cooperation and how to accommodate the new consumer heavyweights in the existing structures of global oil governance, such as the IEA.

A second challenge relates to emergency risk management mechanisms in an emerging global gas market. Assessing the possible contribution of liquefied natural gas in supply risk management, Dick de Jong, Coby van der Linde, and Tom Smeenk, in chapter 11, review the role of LNG in the emergence of a globalized gas market. They show that flexible LNG could potentially play a role in addressing supply shortages in Europe and in lowering peak spot prices, but the authors also highlight the fact that the availability of LNG remains uncertain and that Europe is likely to be the least attractive market for suppliers. These authors' analysis also reveals that the changing nature of the natural gas business requires adjustment in gas market regulation. Given that price competition in the gas

28. Prominent studies in this field include Willenborg, Tönjes, and Perlot (2004); Kalicki and Goldwyn (2005); Emerson (2006).

29. Scott (1995).

market increasingly takes place on an international level, they argue that especially the EU needs to redesign its internal market. With regard to the issue of potential supply disruptions, the best option for policymakers may be to invest not in supply diversity but rather in diversification of the energy mix and in enhancing regional cooperation with neighbor countries.

A third challenge stems from the fact that, given that new consumers and major producing countries fail to publish crucial data on market fundamentals, markets are characterized by increasingly significant uncertainty. In chapter 12 Enno Harks focuses on the question of what contribution enhanced consumer-producer cooperation could bring to the table to tackle this problem. Thus far the IEF is the only place where producers and consumers engage in an institutionalized exchange on energy market developments and related policies. Harks argues that the IEF is likely to become central in providing the notoriously speculative oil market with more information given increasingly tight supply situations. Further, he identifies the IEF's Joint Oil Data Initiative (JODI) as an important instrument for rendering the oil market more transparent. Harks also explores the role the IEF plays in mitigating oil and gas market risks and offers policy options designed to strengthen its impact as a forum of dialogue between producers and consumers.

A concluding policy perspective for part 3 is offered by Albert Bressand in chapter 13.

Emerging Issues and Outlook

Part 4 considers emerging issues affecting the development of the international oil and gas markets and discusses their impact on global energy governance. In chapter 14 Thorsten Benner and Ricardo Soares de Oliveira focus on the efforts over the past ten to fifteen years to make good resource governance a part of the rules of the game for global energy governance. Whereas traditionally global energy governance was a value-blind enterprise dominated by crude realpolitik concerns in terms of profit, price, and security of supply, rhetorically at least a norm transformation has taken place. The G-8 declared that it "is in our common global interest that resource wealth be used responsibly so as to help reduce poverty, prevent conflicts, and improve the sustainability of resource production and supply. We firmly agree that significant and lasting progress in this area can only be achieved on the basis of transparency and good governance."

The chapter first analyzes the context and the drivers of the rise of good governance. The second part reviews the record of good governance reform initiatives. It analyzes voluntary transparency initiatives, chiefly the Extractive Industries

Transparency Initiative (EITI), and reviews its performance in crucial cases (Nigeria, Azerbaijan). It also looks at other institutional experiments, such as the Chad-Cameroon pipeline experience and the EITI++. The third part discusses the prospects for the role of the "good" in global energy governance. It argues that good governance is far from being anchored in the rules of the game of global energy governance due to the lack of political will on the part of Western political powers to mainstream the agenda into the financial system, the lack of coverage (that excludes major producers such as Saudi Arabia and Russia), and the lack of interest on the part of such new consumers as India and China, which never subscribed to the good resource governance reform agenda in the first place.

Chapter 15, by Jamie Manzer and Jan Martin Witte, focuses on the increasing importance of sovereign wealth funds in recycling petrodollars from producing countries. During the last decade oil price hikes have enabled producing countries such as Russia and Dubai to pile up enormous amounts of U.S. dollar reserves, a significant share of which are now stored in sovereign wealth funds. The rise of these state-owned investment vehicles has triggered a political backlash fueled by concerns over the accountability and transparency of these funds as well as the alleged propensity of government owners to utilize them for political-strategic rather than economic gain. Manzer and Witte analyze recent efforts under the auspices of the IMF to develop international rules of the game for the funds.

Andreas Goldthau, Wade Hoxtell, and Jan Martin Witte summarize the findings of the contributions in the book in chapter 16. They analyze the impact of the rise of new consumers, the reemergence of state players, and climate change for the three functional categories of institutions in global energy; they highlight key lessons learned from the various contributions to this book regarding the adjustment of the rules structuring global energy; and they elaborate on possible routes of further research to fully understand the key challenges and solutions for global energy governance in the twenty-first century.

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