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BROOKINGS DOHA CENTER WORKING PAPER, March 2015

Navigating Uncertainty:

Qatar's Response to the Global Gas Boom

Naser al-Tamimi

This is an advance release for the **Brookings Doha Energy Forum**, taking place March 25-26, 2015. A full version of this Analysis Paper will be published in English and Arabic in May 2015.



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Acknowledgments

I am most grateful to the people whom, without their support, it would not have been possible to write this paper. My special thanks go to Sultan Barakat, the director of research at the Brookings Doha Center, for his enthusiasm and consistent encouragement to complete the paper on time. My grateful thanks also goes to Andrew Leber, research assistant at Brookings Doha Center, for his excellent editorial support, and my friend Saad Al-Ghanim for providing me with up-to-date statistics.

> Naser al-Tamimi Doha, March 2015

EXECUTIVE SUMMARY

ver the last decade, Qatar has emerged as the world's leading liquefied natural gas (LNG) exporter. However, the country faces formidable challenges and direct competition from the shale gas boom. First, a changing landscape in global gas markets—with more competitors entering the scene and the emergence of new LNG-exporting hubs—could lead to Qatar losing its position as the undisputed king of the LNG market. Second, the increase in supplies from countries such as the United States and Australia may lead to lower prices for years to come. Third, the availability of alternative supplies for Asian markets will allow the region's buyers to negotiate hard over any future deals. Most importantly, the new supplies will inevitably serve as the basis of a strong spot market and create a larger, flexible, and more diverse global LNG market. Finally, Qatar may lose its status as a sole "swing producer," a position that has given Doha strategic importance at the international level.

The outlook for the global LNG market has changed drastically and will continue to do so in the future. The International Energy Agency (IEA) projects unprecedented growth in LNG supply, with 150 billion cubic meters per year (bcm/y) of LNG capacity (equivalent to 40 percent of the current global total) either under construction or planned to start between 2015 and 2019. Australia's LNG export capacity is set to more than triple to reach 106.6 bcm/y before the end of current decade, which would make the country the largest LNG exporter in the world.

If these projections turn out to be correct, they will have far-reaching repercussions on Qatar's position on the global gas map. Although the decision-makers in Doha are fully aware of these rapid developments in the global gas markets, their options are still limited. Qatar has imposed a moratorium on increasing natural gas production from its Northfield that will last until 2015. Apart from the \$10.3 billion Barzan gas project, which will largely feed growing domestic demand, no further gas projects have been sanctioned. Qatar also has not announced any plans to expand its LNG export capacity beyond its existing facilities. Consequently, Qatar's gas strategy will remain at a standstill, at least in the short term.

Qatar has, however, indicated that it may increase its LNG production by improving the

efficiency of its LNG production plants. In the medium and long term, Qatar may also expand its production capacity of gas-to-liquids (GTL) and LNG fuel for the shipping industry. Qatar has also pursued the option of "buying up the competition," particularly through its joint venture with ExxonMobil at the Golden Pass LNG terminal in Texas. This investment is expected to reach over \$10 billion with over 20 bcm in annual export capacity. Although the decline in oil, LNG, and piped gas prices make such projects look less attractive, economically speaking, Qatar may press ahead with the project as the cornerstone of its long-term LNG strategy.

There are also emerging LNG export opportunities in the Middle East and North Africa (MENA). The annual demand in MENA is projected to jump from 5.4 bcm in 2015 to 12.2 bcm by 2020 and hit 31.3 bcm by 2025, (see figure 5). Most importantly, if GCC states overcome their political differences and agree on a collective satisfactory price mechanism, Qatar could meet most, if not all, projected gas demand in the UAE, Oman, Kuwait, and possibly Saudi Arabia via the Dolphin pipeline. There is also significant room for increasing Doha's LNG exports to the EU, especially if the European Commission goes ahead with its plan to reduce EU dependence on Russian gas. Nevertheless, Qatar has to show more flexibility in signing new contracts.

In the long run, Qatari officials are optimistic that LNG demand will be strong and probably exceed the combined capacity of the existing projects. Yet several factors could alter LNG market dynamics once again in the future. The rapid technological advances in energy exploration, drilling, and production could increase gas supplies in several countries. Though it is difficult to replicate the experience of the United States in shale development on a global scale, constantly improving technology shows that it is still possible. Secondly, there is a strong desire among many of the energyconsuming countries, especially in Asia, to reduce their dependence on Middle Eastern energy imports. Measures such as energy efficiency, promoting research and innovation, and increased investments in nuclear energy and alternative energies may limit the increase in any future demand. Finally, U.S. policy in the Middle East is still evolving, so all possibilities could be on the table, including signing a final nuclear agreement with Iran, withdrawal from Afghanistan, and reaching a political solution in Iraq and Syria. Together these factors could, over the long term, gradually erode Qatar's (and the Gulf's) strategic importance to the United States and its allies. As such, Qatar and the Gulf states urgently need a common strategy that takes into account all scenarios.

Overview

The state of Qatar on the Arabian Peninsula is regular cited as one of the richest countries in the world on a per capita basis, with hydrocarbon revenues fueling an outsized presence on the world stage as well as rapid developments at home. The source of that wealth lies in the world's third largest gas reserves—24.7 trillion cubic meters (tcm)—representing about 13.3 percent of global proven reserves.¹ In 2013, the country also ranked third in gas production (after the United States and Russia) with 161 bcm of output, and second in exports, shipping some 121 bcm abroad.²

Over 84 percent of Qatar's gas exports are in the form of liquefied natural gas (LNG), and more than two thirds (71.4 percent) are shipped to Asia.³ Helped by rising global demand amid tight supply, Qatar saw its LNG exports surge from 25.3 bcm in 2004 to over 104.7 bcm in 2013, representing more than a third of global supply in that year.⁴ Japan is Qatar's largest market, followed by South Korea, India, and China. These four countries together account for 62 percent of Qatar's total exports of LNG (see Table 6). Japan and South Korea are the world's dominant LNG importers, consuming more than half of LNG supplied to the market in 2014.⁵

	Proved Re	eserves		Production				
World	Country	Trillion	Share	Ranking	Country	Trillion	Share	
Ranking		cubic				cubic		
_		meters (Tcm)				meters (Tcm)		
1	Iran	33.8	18.2%	1	U.S.	689	19.8%	
2	Russia	31.3	16.8%	2	Russia	671	19.3%	
3	Qatar	24.7	13.3%	3	Qatar	161	4.6%	
4	Turkmenistan	17.5	9.4%	4	Iran	159	4.6%	
5	U.S.	9.3	5.0%	5	Canada	155	4.5%	

Table 1: Top 5 countries by natural gas: reserves & production

Source: BP and IEA. Statistics are for 2013, the latest year available.

Globally, the construction of LNG plants could add around 159 bcm/y of capacity to the existing 396 bcm/y by 2018, according to data compiled by International Gas Union (IGU).⁶ In 2013, the Middle East supplied 42 percent of the world's LNG or 134 bcm, with about 79 percent coming from Qatar. However, this trend is likely to reverse

in the coming years by what The Economist calls "The Next Qatar," as new Australian projects are expected to come on stream after 2015.⁷ Australia is expected to have over 84 bcm/y of new capacity online before the end of this decade and to replace Qatar as the world's largest LNG exporter.⁸

Meanwhile, the United States could also emerge as an LNG-exporting hub by the end of this decade. Estimates of how much natural gas America could export vary considerably, however. IHS expects LNG export capacity in the United States to reach almost 68 bcm/y by 2020, making it the third largest LNG producer after Australia and Qatar.⁹ Canada and East Africa are also seen as new frontiers. Russia may also compete with Qatar in Europe if it goes ahead with Novatek's planned Yamal LNG project in the Russian Arctic. Russia already competes with Qatar by selling LNG to the Asia-Pacific market and plans to boost its output, with ambitions to produce over 68 bcm/y of additional liquefaction capacity by the early 2020s. Above all, if geopolitical circumstances change, exports from Iran could prove to be a competitor to Qatar's exports to countries in the Middle East and South Asia (India and Pakistan in particular).

In this context, Qatar faces formidable challenges. Firstly, a changing in the landscape of global natural gas markets will see more competitors entering the scene. Secondly, the steady surge in U.S. exports (and possibly Iranian exports) could threaten Qatar's dominance in other markets such as condensate and liquefied petroleum gas (LPG). Thirdly, the rise in LNG supplies is leading to significant downward pressure on pricing, which will translate to huge losses in Qatar's export earnings. Finally, the availability of alternative supplies to the Asian market (Qatar's major market) will allow buyers there to negotiate hard over long-term supply contracts. This may challenge the standard Qatari model of tying long-term contracts to oil prices rather than natural gas prices. As a result, competition from new suppliers of LNG could hit Qatar's major source of revenue.

On the basis of these drastic developments in the global gas market, the paper seeks to answer the following questions:

- How might the global shale gas boom and direct LNG competition affect Qatar?
- Will Qatar shift its LNG marketing strategy in response to the advent of new LNG suppliers?
- What are Qatar's alternatives in dealing with the new developments?

These are important questions that must be answered in order to understand the profound change that is currently under way in the global LNG market. This paper will consist

of four main sections. The first will map the changing landscape with regard to global LNG supplies and identify the new competitors entering the scene. The second section will assess global demand and the emerging uncertainty regarding the demand from LNG-importing countries. Then the third section will evaluate the wider implications for Qatar's LNG strategy. Finally, the last part will be more focused in evaluating Qatar's strategy for dealing with the new developments in the global natural gas market.

INTERNATIONAL LNG SUPPLIES: New Competitors

Reprint the Fukushima disaster in March 2011, Japan shuttered the nuclear power plants that provided around 30 percent of the country's generating capacity. The use of coal and gas-fired power plants to fill the gap helped drive a spike in demand for natural gas, creating tight conditions in the global LNG market. However, the outlook for the market is changing drastically as both newcomers such as the United States and existing producers such as Russia and Australia provide global LNG markets with greater flexibility and liquidity. This in turn is projected to impact Qatar's position on the global gas map. Still, other developments might ultimately slow this growth or turn the whole picture upside down.

Last year, global LNG production increased by 6.8 bcm over 2013, reaching 339 bcm.¹⁰ This number is forecasted to grow further to 350.88 bcm in 2015 as new Australian projects are completed.¹¹ Overall, more than 81.6 bcm of new LNG supply is expected to come on-stream by the end of 2016.¹² This will lift global capacity by around 20 percent, to some 469 bcm/y.¹³

This year, despite the sharp decline in global oil and gas prices, there are several projects in the United States, Russia, Africa and possibly Canada that are set to move forward.¹⁴ The IEA projects unprecedented growth in LNG supply, as 151 bcm/y of LNG production capacity, equivalent to 40 percent of the current global total, is either under construction or planned to start during 2015-19.¹⁵ This growth potential is supported by similar predictions from the IGU, which expects over 159 bcm of new capacity by 2019, and BP, whose annual energy outlook charts 7.8 percent annual growth, or 229.8 bcm in new capacity by 2020.¹⁶ Australia will lead the way, with nearly 85.6 bcm of new capacity expected online before the end of the current decade.¹⁷

Consequently, LNG production may outstrip demand by 10 percent by 2020, resulting in a "multiyear bear market," according to Bank of America.¹⁸ For the long term, BP expects overall LNG supply to add ~508 bcm by 2035, with Australia and the United States each contributing around a third of that increase.¹⁹ As a result, Qatar's market share, currently the largest, is projected to fall to around 12 percent by 2035—falling behind Australia (24 percent), Africa (21 percent), and the United States (18 percent).²⁰

Australia: The Next King

Australia was the world's third largest LNG exporter (30.2 bcm/y) in 2013, with three LNG projects online.²¹ The country has another seven LNG projects worth \$200 billion under construction, more than 50 percent of new projects globally, with four of these due to start exporting by 2016.²² Consequently, Australia's installed liquefaction capacity (the ability to process raw natural gas into transportable LNG) will be the highest in the world at 117 bcm/y by 2018, while its export capacity will triple to 106.6 bcm/y.²³ As a result, Wood Mackenzie expects Australia to move ahead of Malaysia as the world's second largest LNG exporter in 2015, and ahead of Qatar by 2018.²⁴ By 2020, Australia will also account for 17 percent of the global liquefaction capacity, ahead of Qatar's projected 15 percent.²⁵

Australia exports LNG exclusively to Asian markets, with Japan purchasing about 80 percent of those exports in 2013; other key consumers include China (16 percent) and South Korea (3 percent).²⁶ Going forward, 91 percent of Australian LNG under development has been already been assigned under long-term contracts, with the bulk of it going to Asian countries (90 percent to Japan).²⁷

Despite this optimistic outlook, Australia's LNG projects have not been without serious problems. Many have suffered considerable cost overruns, due to shortage of skilled labor, the high cost of labor and transporting materials, the appreciation of the Australian dollar to the US dollar, stricter environmental regulations, and land rights issues.²⁸ McKinsey has estimated it costs 20-30 percent more to build projects in Australia than in the United States or East Africa.²⁹

Adding to these complications, the sharp decline of oil and LNG prices, coinciding with low demand in Asia (Asian LNG and oil prices have decline nearly 60 percent since June 2014), could make the situation even more worrisome for investors.³⁰ Some experts warn that a slowdown in global demand for LNG and lower oil prices is threatening to undermine investment in exploration and development.³¹ Shell has already ditched plans for a new \$20 billion LNG project to produce up to 24.5 bcm/y, on Queensland's Curtis Island.³²

Despite these difficulties, though, nearly all Australia's impending LNG projects are almost complete, leaving the country well on its way to replacing Qatar as the world's top LNG exporter.

THE U.S. SHALE BOOM: CHALLENGING QATAR'S DOMINANCE

According to current U.S law, companies must acquire approval from the U.S.

Department of Energy (DOE) to export LNG to non-free trade agreement (FTA) countries (states with which the United States does not have a FTA) as well a license from the Federal Energy Regulatory Commission (FERC) for the project, subject to environmental review. To date, despite more than 40 applications with the DOE to export almost 397 bcm/y of LNG, only nine projects have been approved by the DOE, and only four have gone on to receive FERC approval.³³ These four export terminals, combined, will have a contractually obligated capacity of 56 bcm/y with potential peak capacity of 69 bcm/y.³⁴ Cheniere is set to be the first company to export LNG this year and already has 21.7 bcm/y worth of purchase and sale agreements (PSA) on contract.³⁵

Project name	Project sponsor	First Contract	Export Capacity	Total Volume	%
		Start	(bcm/y)	Contracted (bcm/y)	Contracted
Sabine Pass	Cheniere Energy	2015	28.2	27.8	98.6%
LNG,1&2	Partners				
Cameron LNG	Sempra Energy	2017	17.4	17.4	100.0%
Cove Point	Dominion Cove	2018	8.4	8.3	98.8%
LNG	Point LNG				
Corpus Christi	Cheniere Energy	2018	26	11.5	44.4%
LNG	Partners				
Freeport LNG	Freeport LNG	2018	18.4	17.9	97.6%
	Development				

Table 2: Major Liquefaction Projects in the United States

Source: Bloomberg, BMI

Final estimates of how much LNG the United States could export vary considerably, anywhere from Stratfor's 54.4 bcm/y prediction to as high as 108.8 bcm/y by 2020, according to Business Monitor International (BMI).³⁶ Credit Suisse and RBN Energy have put their figure at around 95.2 bcm/y whilst the IEA views volumes of 101.1 bcm/y as reachable.³⁷ Even with a more optimistic outlook though, the United States alone will not radically change LNG markets in the short or medium term.

Still, U.S. LNG exports have been tied to domestic gas spot prices or signed based on Henry Hub prices (the main price set for the North American market), while projects under construction in Australia and Russia as well as those proposed in Canada and some African countries, also link their exports to oil prices, or a combination of oil and gas indexes. Based on Henry Hub prices of \$3-4 per million British Thermal Units (mmBTU), a number of U.S. export terminals appear to be economically attractive.³⁸ With U.S. gas prices thus "de-linked" from oil prices and a "tolling-fee" model that ensures steady revenues from liquefaction stations and the absence of destination clauses from export contracts, U.S. LNG looks highly competitive as well as more flexible than competitors.³⁹ Most importantly, the Panama Canal is undergoing an expansion that will allow for the passage of even larger vessels, greatly facilitating LNG transport in the region.⁴⁰ However, the collapse in oil prices has shaken the LNG industry as it brings down oilindexed LNG prices.⁴¹ As a result, current LNG prices are eroding the competitive edge for U.S. LNG exports.⁴² Most of the U.S. LNG projects are competitive in Asia only if long-term Henry Hub gas prices are below \$4 mmBTU and oil is sold above \$80 a barrel.⁴³ Even the low US gas prices that make several US LNG projects competitive, may not last forever. A recent EIA study concluded that a surge in LNG exports would cause domestic supply prices to rise 4-11 percent on average, between 2015 and 2040, depending on the volumes of LNG exports.⁴⁴ The World Bank projects that Henry Hub may reach \$5-6/mmBTU by 2020 (see Figure 1), whilst the French international association for gas (Cedigaz), predicts prices as high as \$7.10/mmBTU by 2035.⁴⁵





Source: World Bank Commodities Price Forecast, 22 January 2015

The prospect of lower LNG oil-indexed supplies to Asia has ignited debate over the economics of new LNG projects planned in Australia and the United States. Still, Asian customers, especially Japan and South Korea, could view U.S. gas supplies as a key way to advance their own energy security, diversifying both energy sources and the associated shipping routes.

Condensates

Additionally, the shale boom in the United States has resulted in a significant increase in the production of petroleum products such as condensate, LPG and other natural gas liquids (NGLs). The Obama administration recently opened the door to export certain ultra-light oil products⁴⁶ such as condensate, LPG and NGLs.⁴⁷ As a result, American companies are vying with Qatar (and other Middle Eastern exporters) to win market shares, particularly in Asia. Over the same seven years, the U.S. NGLs exports have increased significantly. They jumped almost sevenfold from just over 71,000 barrels per day (b/d) in 2007 to nearly 0.470 million barrels per day (mb/d) in 2013.⁴⁸ More importantly, U.S. NGLs exports are predicted to grow from around 0.6 mb/d in 2014 to as much as 2.4 mb/d by 2020.⁴⁹ The sharp rise in U.S. NGLs exports is already having far-reaching implications globally:

- Middle East dominance of the condensate and LPG markets will fade
- U.S. supplies are also pressuring the existing global pricing mechanism
- Feedstock costs for global petrochemicals are set to fall

As a result, Qatar's exports may face stiff competition on several fronts. Total crude oil, condensates, and NGL production in 2014 was around 2.0 mb/d, of which 0.709 mb/d was crude oil and the remainder condensates and NGLs.⁵⁰ The country is facing a decline in oil production from mature fields, though, with crude oil production falling from a peak annual average of 0.845 mb/d in 2007⁵¹ to 0.73 mb/d in 2014.⁵² Without pumping billions of dollars to stabilize the situation, oil production may decline again in the future (see appendix 1).

Speaking in November 2014, Qatar's Minister of Energy and Industry Muhammed bin Saleh al-Sada warned of serious challenges to GCC petrochemicals: "As oil prices reach their lowest levels in 4 years, downstream economists have to re-evaluate their strategies. The impact of U.S. shale gas on the competitiveness of our region's industry



Figure 2: U.S. NGLs Production (mb/d)

Source: EIA, Citibank

is putting downward pressure on gas prices in the region and the emergence of coal based polyethylene in China shows that the country is looking at alternative feedstock to develop their downstream sector."⁵³

The first economic headache lies in condensate exports. Qatar is Asia's largest supplier of condensate and makes up more than 30 percent of global waterborne condensate trade.⁵⁴ However, the United States is competing strongly to grab the lead in the global condensate market. The IEA estimates that global condensate production will reach 7.8 mb/d in 2015 to reach around 9 mb/d by 2020, with almost all of this increase coming from the United States.⁵⁵ Doha may lose its lead to the United States by 2017, and possibly earlier. U.S. condensate exports could hit over 1 mb/d by the end of this decade.⁵⁶

Adding to these complications, Qatar's state-run oil marketing company Tasweeq plans to cut condensates exports by 150,000 b/d over the next two years.⁵⁷ This is in line with Doha's strategy to process larger volumes domestically, replacing condensates exports with naphtha and other higher-value products that it can market in Asia.⁵⁸ Qatar's Ras Laffan refinery aims to double its capacity for processing condensate by the end of 2016, while targeting a 42 percent boost in naphtha production to raise exports by 4 bcm.⁵⁹

However, Qatar's strategy has not been set in stone. The shift from condensates exports to naphtha will probably not yield lucrative gains due to a softening in global demand and downward pressure on prices. Deeper usage of ethane, propane and butane as petrochemical feedstock for US and European petrochemical plants (crackers) will likely generate more unused naphtha, depressing the prices even further. Naphtha, kerosene, and gasoil margins in Asia have weakened, dragging down the value of condensate.⁶⁰ Already, Qatar's Tasweeq has sold deodorized field condensate (DFC) for loading in the first quarter of 2015 at the largest discount in two years.⁶¹

	2014 (Prov.)		2016 (Forecast)		2018 (Forecast)		
	Output	Export	Output	Export	Output	Export	
US	1.6	192	2.2	402	2.7	636	
Qatar	735	519	790	555	770	402	
Russia	510	117	595	125	590	170	

Table 3: Condensate production & exports (mb/d)

Source: Asia Pacific Energy Consulting (APEC)

Compounding the problem, naphtha production from Middle East refineries will grow sharply (especially in Saudi Arabia), by 16.7 percent during 2014-2018.⁶² Three new super-refineries—two in Saudi Arabia and one in the UAE—are leading a new wave of regional refinery construction which could see regional capacity rise by as much as a

Table 4: US Exports of LPG

	2014*	2013	2012	2011	2010	2009	2008
LPG Exports (1000	534	332	196	148	132	100	67
b/d)**							

* Primarily

** To convert barrels to tones (1 barrel = 0.086 tone, BP conversion calculator $\,)$ Source: EIA

third (around 3 mb/d) by 2019.⁶³ According to the IEA, an overall Middle East crude processing capacity is slated to increase by nearly 40 percent, to 10.3 m/b, against a global capacity surplus of more than 5 mb/d.⁶⁴

Furthermore, 500,000 b/d in new condensate splitter capacity is in the works for key Asian consumers such as China and South Korea, ultimately turning more condensates into naphtha which can be consumed locally over the next three years.⁶⁵ Additionally, as noted, the widening of the Panama canal will cut voyage times for U.S. exports to Asia almost in half, with massive effects on an already growing trade.⁶⁶

Together, these trends suggest that Asian markets will not remain a guaranteed outlet for Qatari exports for long, and that Doha's dominance of the condensate market is set to fade. In this context, the logic behind Qatar's decision to shelve both of its key petrochemical projects, totaling \$12.5 billion, becomes clearly understandable.⁶⁷

LIQUID PETROLEUM GAS

Qatar's LPG exports will also be exposed to a tough environment in the coming years. Global LPG production reached over 380 bcm in 2013, up by 2.3 percent from 2012, while LPG exports were around 128.7 bcm in 2013.⁶⁸ Total U.S. LPG exports have surged almost 800 percent since 2008 to around 23.1 bcm/y, surpassing Qatar's estimated 15 bcm exports for 2014.⁶⁹ Meanwhile, Saudi Arabia's LPG exports reached 9.2 bcm in 2014 and are expected to hold steady at around 9 bcm this year.⁷⁰

Though the United States only became a net exporter of LPG in 2012, its export capacity is projected to grow to 47.6 bcm/y by 2016, approximately 12 percent of global demand.⁷¹ The United States alone will likely be exporting more LPG than the entire Middle East before the end of the decade.⁷² According to some estimates, Texas alone will have LPG export capacity equal to that of Qatar and Saudi Arabia combined by 2016, and possibly this year.⁷³

In this context, it is clear that the United States has begun to break the monopoly of the Middle East exports. Japan, the world's largest importer, sourced just under 75 percent

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(11 bcm) of LPG imports from the Middle East in 2014, down from 84 percent in 2005.⁷⁴ Over the same period, the United States went from providing almost nothing to 1.9 bcm of Japanese imports, or 12.8 percent of the total. Japan's imports of U.S. LPG are expected to rise further to around 1.4 bcm by 2017, making up about one quarter of total imports.⁷⁵ US LPG export will be further boosted by the expansion of the Panama Canal. This has led key Asian buyers such as Japan and South Korea to push for a new pricing system which takes into consideration both Saudi Aramco Contract Prices and the typically lower-priced U.S. Mont Belvieu benchmarks.⁷⁶

Finally, the U.S. petrochemicals sector continues to expand, driven by growth in ethane availability as a result of the shale gas boom.⁷⁷ Over 215 new chemical production projects (valued at over \$135 billion altogether) had been announced as of early December 2014.⁷⁸ Looking forward, the American Chemistry Council projects that US. exports of chemicals (excluding Pharmaceuticals), could double over the next five years to about \$78 billion by 2019.⁷⁹ Consequently, U.S. petrochemicals products will compete directly with products from the Middle East, including Qatari exports. Qatari exports to the United States, like those of the Qatar Fertilizer Company (currently providing 12 percent of U.S. fertilizer requirements), will have a tough time in the next few years.⁸⁰

Other Contenders

Russian LNG: Challenging Times

Russia has only one operating LNG plant, located at Sakhalin in the Far East. The facility, operated by Gazprom with Royal Dutch Shell, exported almost 14 bcm of LNG in 2013, with plans to increase capacity to 20 bcm/y.⁸¹ Russia is looking at large scale LNG projects aimed at generating at least 68 bcm/y of additional liquefaction capacity by the early 2020s.⁸² Additionally, Moscow has long term ambitions to double its LNG market share by 2020 (currently at around 4.5 percent), and to hit 20 percent by the end of the next decade.⁸³

The Kremlin has introduced measures (including tax incentives, LNG export liberalization, and state investments into infrastructure) to encourage Russian companies to move forward with the LNG projects. Yamal LNG is already under construction and is expected to produce 22.4 bcm/y of LNG by the end of 2017, while four other planned projects are waiting in the wings (see figure 3).⁸⁴

If all of Russian LNG projects materialized, Russian exports would undoubtedly compete strongly with Qatar's LNG exports in European and Asian markets. However,

in light of the present geopolitical climate, Russian companies may have a hard time moving forward with these projects. Though Russia's economy is heavily dependent on the export of hydrocarbons, the sharp decline in oil prices raises questions about the economic viability of many of these projects.⁸⁵ As IEA Executive Director Maria van der Hoeven bluntly put it: "Russia, facing a perfect storm of collapsing prices, international sanctions and currency depreciation, will likely emerge as the industry's top loser."⁸⁶



Figure 3: Russian LNG Development

Russia's economy is projected by the IMF to contract by three percent over the course of this year and one percent in 2016.⁸⁷ Furthermore, the sanctions imposed by the United States and the European Union mean that virtually all Russian companies will have to seek alternative financing options for their ongoing LNG projects.⁸⁸ If the situation in Ukraine escalates further, more sanctions could ultimately lead to the delay, if not the cancellation, of at least some projects. For now, Yamal LNG is the only project under construction in Russia, though it will continue to receive strong financial support from the Russian government. As a result, buyers are unlikely to commit to Russian LNG in the current geopolitical climate. As a clear indicator of this, less than one-fifth of Russian LNG has been sold under firm contracts.⁸⁹

Canada: Still Dreaming

To date, over 30 LNG liquefaction facilities have been proposed to the Canadian National Energy Board (NEB), with nine approved (with a total capacity of 170 bcm/y).⁹⁰ However, no Canadian projects have moved forward or are currently under construction, (as of March 2015). Most of them are still awaiting actual development plans and/or final investment decision (FIDs). Despite Canada's hopes of entering the global LNG market, several factors are likely to frustrate Canada's LNG ambitions this decade.

Source: The Economist Intelligence Unit

Infrastructure capacity remains a primary constraint on the country's ability to accelerate LNG projects, given that all Canadian projects are greenfield projects (to be developed from scratch), requiring huge infrastructure investments.⁹¹ Development of export infrastructure has been repeatedly hampered by regulatory and environmental hurdles, while rising equipment and labor costs are ultimately challenging Canadian competitiveness.⁹² As almost all Canadian projects are oil-indexed, so plunging crude is undermining the economics of these projects. Even before the fall in oil prices, not a single planned Canadian LNG project had reached a FID.⁹³

This likely means the first Canadian LNG exports from a large project will be pushed beyond 2020. The British Colombian government believes the province remains on track to meet its goal of three LNG facilities in operation by 2020.⁹⁴ However, BMI believes it is increasingly unlikely that many of these projects will come online before 2023.⁹⁵ The same prediction is shared by Sanford C. Bernstein & Co., which believes that Canada may miss that target altogether.⁹⁶ Delays in Canadian projects may be in favor of the current producers, including Qatar. It will be some time before Canada emerges as a strong competitor in the global gas markets, if ever.

Iran: Hidden Potential

Iran is a potential competitor to Qatar in the field of natural gas, though current sanctions restrict Iran's oil sales to about 1-1.1 mb/d.⁹⁷ Iran has the world's largest gas reserves of 33.8 tcm, representing about 18.2 percent of global proven oil reserves.⁹⁸ The country also produces 158.5 bcm/y, making Iran the world's fourth largest gas producer, after the United States, Russia, and Qatar (see Table 1).⁹⁹ Iran's largest gas field is South Pars, opposite to Qatar's North Field, which accounts for approximately 40 percent of the country's total gas reserves.¹⁰⁰

Iran currently exports small quantities of piped gas to Turkey and modest volumes to Armenia and Azerbaijan in a gas-for-power swap.¹⁰¹ Iran also has two deals with Iraq and one memorandum of understanding (MoU) with Oman to export 60 million cubic meters (mcm) and 30 mcm per day of natural gas, respectively.¹⁰² Furthermore, Iran's media reported recently that National Iranian Gas Export Company (NIGEC) is currently engaged in talks with several GCC countries over Iran's gas exports.¹⁰³ Additionally, Pakistani Commerce Minister Khurram Dastgir Khan recently held that Pakistan will pursue an Iran-Pakistan gas pipeline project once international sanctions are removed.¹⁰⁴

Iran has ambitions to export natural gas and LNG to European and Asian markets in the foreseeable future. However, poor infrastructure, difficulties procuring liquefaction technology, and geopolitical limitations will probably keep the Iranian gas from reaching these markets in the short to medium term. Some industry experts say it would take at least five years to start exporting LNG to the European countries or Asian markets if sanctions were removed.¹⁰⁵ Having said that, if geopolitical issues are resolved then pipeline exports from Iran could prove a competitor to Qatari exports to the Middle East and even South Asia.¹⁰⁶

Theoretically, Iran has the capacity to become a major regional and global gas exporter. However, Western sanctions have had a crippling effect on its gas sector, restricting expansion in the short term.¹⁰⁷ However, in the long term and perhaps even the medium term, with the rehabilitation of Iran's gas sector, improved relations with Gulf countries and competitive prices, it is likely that Iran will compete strongly with Qatar in regional markets.

Iran is also a significant producer of condensates and NGLs, but the country's ability to expand its output is severely restricted by sanctions along with the absence of advanced technology and foreign investments. NGLs accounted for around 200,000 b/d of production, whilst South Pars, the field Iran shares with Qatar, currently yields about 500,000 b/d of condensate.¹⁰⁸ Still, the IEA estimates that exports of Iranian condensate production averaged about 190,000 b/d for 2014, nearly 105,000 b/d higher than the previous year.¹⁰⁹ Iranian condensate output and exports are set to increase in the next few years, with production possibly hitting over 1 mb/y by 2020.¹⁰⁰ As a result, Iran will eventually compete with Qatar's condensate exports in regional and global markets.

	2014	2017		2019	
	Total	Expansion	Total	Expansion	Total
Middle East (Gulf)	1.095	0.212	1.307	894	2.201
Qatar	0.200	0.143	0.343	-	0.343
Saudi Arabia	0.225	69	0.294	-	0.294
UAE	0.416	-	0.416	-	0.416
Iran	0.254	-	0.254	894	1.148
Asia Pacific	1.257	554	1.811	0.139	1.950

Table 5: Condensate splitter build-up (mb/d)

Source: Asia Pacific Energy Consulting (APEC)

Elsewhere

The first LNG shipment from Papua New Guinea's LNG project (operated by ExxonMobil) took place in May 2014, ahead of schedule, and will reach its full annual capacity of 9.4 bcm this year.¹¹¹ Currently, there is great interest from Asian companies, especially Japanese ones, to expand production here due to low projected cost of supplies compared with Australian, Russian, and even the United States, and the site's proximity to Asia.

In East Africa, Mozambique and Tanzania are proposing LNG plants that could support 10-20 bcm/y of annual LNG exports.¹¹² Both countries are of interest to buyers as a means of diversifying their global LNG portfolios. However, these projects are still at their infancy or planning stage, risking environmental or logistical delays.¹¹³ As a result, tactual LNG exportation from both countries will likely be delayed until the next decade.¹¹⁴

Still, if all of these plans ultimately materialize, they will undoubtedly play an important role in diversifying LNG supply sources and bringing more flexibility to markets. In the long term, they could compete with Qatar's exports in Europe, Asia, and even Latin America.

Global LNG Demand: Uncertain Markets

lobal LNG production reached 334.5 bcm in 2014, whilst LNG trade increased by 6.12 bcm to hit a record high of 331.3 bcm.¹¹⁵ This year, global LNG demand is set to increase by 9.8 percent to 364.5 bcm.¹¹⁶ Though predictions of future growth vary, most suggest annual demand of at least 476 bcm/y by 2020-2025.

- Bernstein: 482.8 bcm/y by 2020, 598.4 bcm/y by 2025¹¹⁷
- GDF Suez: 40 percent growth to 476 bcm/y by 2025
- BREE: 6.5 percent annual growth, reaching 505.9 bcm/y by 2020; slower growth to 560.3 bcm/y by 2030¹¹⁸

Asia will be a key market for global LNG demand. BMI expects the region's net LNG import demand to increase to 386.8 bcm/y by 2023, while BP also expects Asia to remain the largest destination for LNG, with its share in global demand remaining above 70 percent.¹¹⁹ Last year, for the second year in a row, the world's five largest importers—Japan, South Korea, China India and Taiwan—were all located in Asia, accounting for 75 percent of total LNG imports.¹²⁰ Total Asian LNG imports are forecast to grow to 255.7 bcm/y in 2015.¹²¹

Though Japan (36.7 percent of global LNG demand) and South Korea (15.5 percent) were the world's largest importers in 2014, the engine of demand growth is switching to China, India and Southeast Asia.¹²² These countries accounted for 15.5 percent of global LNG demand in 2014, up from 12.2 percent in 2013, and will be the driving forces of growth in the next 10 years.¹²³ Chinese demand grew by 1.9 bcm/y—the third largest gain globally—but this was just 38 percent of its incremental growth in 2013.¹²⁴ These countries are expected to import close to 150.1 bcm/y before the end of the current decade. Consequently, China could overtake South Korea as the world's second largest LNG importer as early as 2019.¹²⁵

However, a number of uncertainties could send demand in any direction. The sharp decline in crude prices and uncertainty over the direction of oil prices are making the picture more complex for the LNG industry. Furthermore, it is still unclear how the resumption of nuclear power will impact LNG imports in countries such as Japan and



Figure 4: 2014 Contracted LNG Supplies (%)

*U.S. contracts are largely landed elsewhere due to lack of demand.





Source: Wood Mackenzie

		2014	2013	2012	2011	2010	2009	2008
Japan	Qatar	21.9	21.8	21.3	16.1	10.4	10.5	11.2
	World	120.4	119.0	118.7	106.8	95.2	87.8	94.2
S. Korea	Qatar	17.5	18.2	14.0	11.1	10.1	9.5	11.9
	World	50.5	54.2	49.2	49.9	44.3	35.1	37.1
India	Qatar	16.6 (*)	15.3	14.7	13.2	10.4	9.4	8.3
	World	19.7 (*)	17.7	18.8	17.4	11.9	13.2	11.0
China	Qatar	9.2	9.2	6.8	3.2	1.6	0.5	0.0
	World	27.1	24.5	20.0	16.6	12.7	7.5	4.5

Table 6: LNG imports from Qatar (bcm)

(*) Estimate

Sources: Complied from UN COMTRADE, ICIS, Energy Intelligence

South Korea, or how Chinese shale gas production and competition from pipeline supplies will affect markets. Above all, the IEA estimates that cumulative projected spending on LNG amounts to \$736 billion, including \$640 billion on facilities and around \$90 billion on LNG tankers, yet it is far from clear whether all of these projects will ultimately deliver.¹²⁶

OIL PRICES: UNCERTAIN DIRECTION

The sharp decline of oil prices since June 2014, combined with greater supplies, will have serious repercussions for the LNG industry. The IEA has warned repeatedly that the rapid decline in oil prices will deter investment in the LNG sector needed to meet future demand.¹²⁷ Wood Mackenzie estimates that over \$60 billion in 2015 cash-flow will be affected due to the decline in oil prices.¹²⁸ Sustained lower prices are likely to be put on hold for a total investment worth more than \$100 billion.

In this context, uncertainty with the future of oil prices is discouraging LNG buyers from signing long-term contracts. They are also pushing to end restrictions such as destination clauses and asking for price mechanisms to be more flexible.¹²⁹ The dramatic drop in global oil prices has been dragging down prices for many commodities and has prompted some end-users to switch from LNG to cheaper oil-based alternatives or coal.¹³⁰

In this climate of uncertainty, many proposed LNG export projects will be delayed - if not cancelled—as companies struggle with rising financial costs. In the longer term, a combination of delays and rising demand may push the market from its current surplus into deficit early in the next decade. Woodside Energy's chief executive Peter Coleman recently summarized the situation: "Today's newspaper headlines suggest an abundant supply of LNG going into the Asian market in the future. However, I actually see we are starting to build the conditions for a supply crunch."¹³¹

JAPAN AND SOUTH KOREA: NUCLEAR POWER VS. LNG

Prior to the Fukushima disaster, Japan's nuclear power accounted for almost one-third of Japan's electricity generation.¹³² Since 2011, though, the gap left by the shutdown of nuclear plants has been filled mainly by LNG imports. As a result, Japan's overall LNG imports rose by over 26 percent between 2010 and 2014.¹³³

However, nuclear reactor restarts could begin as soon as May 2015. Two units in south western Japan received approval to restart from the Japan's Nuclear Regulatory Agency (NRA) and local authorities in November 2014.¹³⁴ According to projections by Bloomberg New Energy Finance (BNEF), Japan will restart 25 of 48 reactors by 2018.¹³⁵ Logically, Japan is therefore less likely to increase LNG imports, and this in turn could undermine prices in Asia in general.¹³⁶ The huge financial burden is also weighing on the minds of Japanese policymakers: Japan paid almost \$263 billion in 2014 for its energy imports, with over a quarter of the total bill paid going to LNG imports.¹³⁷





This is bad news for Qatar. Despite having most LNG exports locked up in longterm deal, Qatar also remains the largest swing producer and has been key to covering increased demand in Japan since 2011. Qatar has increased its LNG exports to Japan by around 8.3 bcm above contracted quantities.¹³⁸ This trend is likely to continue this year and maybe the next, when newly contracted LNG supplies (mainly from Australia and Papua New Guinea) will cover Japanese demand.

As a result, Qatar may lose significant volumes of non-long-term contracts. Volumes of contracted LNG may decrease sharply from 2020 onwards, reflecting the increase of nuclear power generation and the expiration of some long-term contracts.¹³⁹ Qatar's position will increasingly come under pressure as projects in the United States, Australia and Papua New Guinea will boost their respective export volumes. Japanese companies

have been among the most active in signing up to U.S. Henry Hub-indexed deals. Altogether, Japanese companies have signed around 28.6 bcm in long-term contracts from new U.S. terminals—the first U.S. deliveries to Japan could start as early as 2017.¹⁴⁰ In addition, further LNG supplies could come from Russia, Canada and East Africa, consequently reducing Qatar's currently dominant position.¹⁴¹

On the other hand, South Korea is the world's second largest LNG buyer after Japan.¹⁴² South Korea imported 50.5 bcm of LNG in 2014, down nearly 7 percent from 2013, as its overall gas demand declined due to rising power supply from other sources and slow economic growth.¹⁴³ South Korea boosted its coal use while seven out of eight nuclear power plants were returned to work earlier than expected.¹⁴⁴ In the medium term, South Korea's LNG demand is expected to rise to over 53 bcm/y by 2019.¹⁴⁵ BMI noted in a recent report that: "South Korea's dependence on LNG will weaken more significantly than in Japan. Unlike Japan, social and political resistance against nuclear is weaker and regulatory checks needed to restart plants are more quickly completed."¹⁴⁶

Qatar's was South Korea's top supplier in 2014, with three long-term contracts for a total of 12.2 bcm/y (see Appendix 4). Qatar was the source of over 34.6 percent of South Korean total LNG imports last year (see Table 6). Qatar supplied South Korea with around 5.2 bcm on top of quantities for long-term contracts. With a flat outlook for LNG imports in South Korea, Qatar may lose some, if not all, of these quantities as Seoul could replace them with LNG imports from Australia, Papua New Guinea, or even the United States. In the long term, two Qatari contracts will expire by 2024 (for 6.7 bcm/y) and 2026 (2.9 bcm/y), at which point both deals will be exposed to stiff competition from other suppliers (see Appendix 4).

CHINA: A PUZZLE

China's LNG imports increased 10.3 percent to 27.1 bcm last year, a pace of growth that was less than half of what was recorded in 2013.¹⁴⁷ LNG imports rose by 22.72 percent from 2012 to 2013 and 20.26 percent between 2011 and 2012.¹⁴⁸ For this year, China's implied natural gas consumption is expected to expand 9.3 percent to 200 bcm/y, while imports of piped gas and LNG are likely to rise by 10.2 percent to 65 bcm/y.¹⁴⁹

China's strategy has been to diversify its LNG sources in order to hedge against geopolitical and transportation risks.¹⁵⁰ To be sure, the country imported LNG from 17 countries in 2014, compared with 13 in 2013 and 12 in 2012. Qatar was by far the largest LNG exporter to China, but the volumes decline slightly year-on-year. Qatar shipped 9.15 bcm in 2014, down from 9.19 bcm the year before (see Table 6).¹⁵¹

As for the future, the outlook for China's LNG imports varies considerably as a result of uncertainty surrounding the country's future demands. BMI calculations, based on existing LNG import terminals, planned capacity expansion and its long-term supply contracts, projects Chinese LNG imports to be around 51.7 bcm/y of LNG by 2018.¹⁵² Other estimates are more optimistic, suggesting imports of LNG will hit more than 81.6 bcm/y by 2020.¹⁵³ As noted previously, China is slated to overtake South Korea as the world's second largest LNG importer after Japan within a few years.

Currently, Qatar is China's most important long-term supplier of LNG, with three contracts totaling 8.95 bcm/y.¹⁵⁴ In 2014, Qatar was the source of almost 34 percent of China's total LNG imports, (see Table 6). For Qatar, China is currently their fourth largest market after Japan, South Korea, and India for exports, accounting for nearly 6.5 percent of its global exports and more than 9 percent of Doha's LNG total exports.¹⁵⁵ As for the future, even with the most conservative outlook for China's LNG imports, there is scope for Qatar to increase its LNG exports to the Chinese market. Unlike Japan and South Korea, China will continue in aggressively pursuing its diversification Strategy. Also, Beijing does not want to rely heavily on Australia or even Russian LNG supplies.

Against this backdrop, there are many factors which could put downward pressure on China LNG imports. The main constraint on China's LNG import growth is the pipeline gas competition. The increase in pipeline supplies from Russia, Central Asia and Myanmar will soften demand for LNG. The growth of domestic gas production (conventional and shale) and the introduction of cleaner coal technologies will also have a negative impact on LNG imports.¹⁵⁶

India: Great Potential

India imported almost 19.7 bcm in 2014, and is the world's fourth largest LNG importer.¹⁵⁷ India has great potential for growth in LNG imports, which may double by the end of the decade. According to BNEF, India's total LNG imports may increase by 7 percent to 20.4 bcm/y in 2015 and then 51.7 bcm/y in 2020.¹⁵⁸

Qatar's is India's sole long-term supplier of natural gas, with two contracts for a total of 10.2 bcm/y (see Appendix 4). In 2014, Qatar was the source of around 87 percent of India's total LNG imports. Last year, India imported 9.79 bcm of LNG (more than half of its total imports) through spot markets and short-term contracts.¹⁵⁹ Qatar supplied India with 65 percent of these supplies.¹⁶⁰

Yet the competition from other producers is looming. The importance of countries such as Australia and the US is expected to increase in the coming years after Indian

companies actively sought to diversify their LNG sources (US, Australia, Russia and global LNG suppliers such as BG, GDF Suez, Gas Natural Fenosa) and signed several short- and long-term contract in the past few years.¹⁶¹ In the long term, Iran and East African LNG supplies may also compete with Qatar's LNG exports to India.

India still faces uncertainties similar to those of China regarding future indigenous gas production, both conventional and shale. Another major constraint for India's future imports is LNG regasification capacity. The country's present LNG import capacity is around 31.28 bcm/y, although the country is expecting LNG demand to increase by around 5-6 percent through 2020.¹⁶² Above all, the biggest issue remains the regulated prices and the possibility of marketing gas downstream.¹⁶³

Europe: Opportunities Still Exist

The European Union is the world's largest energy importer, with imports supplying 53 percent of its energy needs.¹⁶⁴ Europe's gas imports currently account for around half of its total gas demand.¹⁶⁵ Over 85 percent of these imports are transported via pipeline, mainly from Russia.¹⁶⁶ According to Erogas's "Statistical Report 2014," Russia supplied the EU with 27 percent of its total gas imports, Norway with 21 percent, and Algeria with 8 percent in 2013.¹⁶⁷ The share of gas from Qatar in EU supplies decreased from 6 percent in 2012 to 5 percent in 2013.¹⁶⁸

In 2013, 14 percent of the EU's net imports were made up of LNG, as Qatar remained Europe's leading LNG provider with a share of 51 percent.¹⁶⁹ In 2012, Europe imported around 30 percent of Qatar's LNG exports, yet this fell sharply in 2013 to almost 22 percent.¹⁷⁰ Factors such as cheaper pipeline gas supplies, high LNG prices in Asia, a mild winter in Europe and weak economic growth led to a decrease in EU LNG imports in 2013.¹⁷¹ The United Kingdom is the largest market in Europe for Qatar's LNG exports (36.8 percent), followed by Italy (23.6 percent) and Spain (14.3 percent).¹⁷²



Figure 8: Sources of EU Gas (% of total, 2013)

During 2014, the crisis in Ukraine threatened gas supplies to Europe and brought the issue of energy security to the forefront, as roughly 15 percent of EU gas imports arrive through Ukraine.¹⁷³ In response to the crisis, the European Commission adopted the "European Energy Security" which includes diversifying gas imports and building new LNG terminals.¹⁷⁴ The European Commission even went further in early 2015, proposing a new "energy union package" plan based on five pillars:

- Security of supply
- Integration of national markets
- Reduction of energy demand
- Cutting carbon dioxide emissions
- Promoting research and innovation¹⁷⁵

Regarding LNG imports, the European Commission stated that it "will prepare a comprehensive LNG strategy, which will also look into the necessary transport infrastructure linking LNG access points with the internal market (...) The Commission will also work to remove obstacles to LNG imports from the US and other LNG producers."¹⁷⁶



Figure 9: Sources of EU LNG imports (% of total, 2013)

In this context, the IEA argues that the LNG remains the most credible diversification option, next to new gas supplies from Central Asia through the Southern gas corridor.¹⁷⁷ The IEA put it clearly: "LNG imports are essential for the European Union to ensure diversified gas supplies. By enhancing gas market integration, the European Union can ensure the efficient use of current LNG import capacities."¹⁷⁸ Currently, Europe has enough LNG import capacity to meet over a third of its annual demand.¹⁷⁹ If new European plans go ahead, however, they could undoubtedly open the door for more Qatari LNG exports to European countries.

Looking ahead, the IEA forecasts that if Europe were to seek to re-balance its gas imports away from the pipelines, the EU would need an additional 68-82 bcm/y (at a minimum) of LNG imports by 2020.¹⁸⁰ In the long term, Cedigaz projects natural gas production in Europe to fall by 2 percent per year to 170 bcm/y by 2035, while demand is forecasted to rise 0.6 percent over the same period.¹⁸¹ As a result, Europe is expected to import 71 percent of its projected gas demand in 2035, compared with 47 percent in 2013, both via pipelines and LNG.¹⁸² BP expects Europe's share of global LNG imports to rise from 16 percent in 2013 to 19 percent over the next two decades, with an additional 104.7 bcm/y of LNG demand.¹⁸³

The outlook for LNG demand in Europe remains uncertain though, and depends on a number of factors, including the renewal of the transit agreement between Russia and Ukraine and LNG prices in Asia.¹⁸⁴ Above all, Russia may still seek to make use of its cost advantage to keep competitors out of European markets. Société Générale bank pointed out in a recent report that Russia and Norway, (together holding more than 50 percent market share for gas in Europe) could sell their gas as low as \$5/mmBTU, while their new competitors such as piped gas from central Asia or U.S. LNG need between \$9-10/mmBTU to be profitable.¹⁸⁵

CHANGING LNG DYNAMICS IMPLICATIONS FOR QATAR

The issues that have been discussed previously could have a far-reaching repercussions on Qatar's position globally in the medium and long term. Although it is difficult to predict the status of the LNG industry after a decade or two from now, initial indications underscore that Qatar will not be the only key player as competition in the LNG market intensifies on the back of strong growth in LNG supplies.

Consequently, Qatar will be affected on several fronts. First, the price mechanisms favored by Doha will come under enormous pressure due to the concerns of LNG consumers. Meanwhile, Qatar's export revenues will shrink sharply on the back of depressed energy prices. Above all, Qatar may lose its status as a "swing producer," a position that has given Doha strategic importance at the global level.

QATAR'S PRICING MECHANISMS UNDER PRESSURE

The principal model for Qatar's long-term is oil-linked pricing based around the JCC (Japanese Customs-cleared Crude or Japan Crude Cocktail) price. LNG is sold at a price which is a proportion of the JCC price on a sliding scale referred to as a slope - usually between 14-15 percent of JCC price. As LNG contract prices are typically based on the average of the preceding six to nine months, it will be mid-2015 before suppliers feel the full effects of the low oil prices on their LNG revenues.¹⁸⁶ Doha's logic behind its support for oil-indexed gas prices was spelled out recently by Minister al-Sada: "Qatar has always supported the view that long-term contracts based on oil indexation are a more predictable and reliable mechanism for all concerned in the industry. What the industry needs is a stable and fair price to justify the level of investment needed to meet future demand."¹⁸⁷

Since 2011, crude prices have escalated to very high levels, and Qatar's oil-indexed contracts have further skyrocketed compared to other prices, as shown in Table 7. This situation raised two main issues for buyers in Asia. On the one hand, oil-indexed gas prices will become very expensive and their financial burden intolerable. On the other hand, the inflexibility of the contracts that support the LNG supply chain give the

buyers extra ammunition to criticize the oil-indexation model.¹⁸⁸ As a result, Asian LNG consumers have become increasingly forceful in demanding lower outright contract prices, a greater diversity of price indexation and flexibility on final destination clauses (restrictions on buyers' right to resell gas abroad).¹⁸⁹ Consequently, LNG buyers have been actively looking for cheaper alternatives for their gas supplies. Qatar has been facing mounting pressure to alter its pricing mechanism and elements of contracts in any upcoming negotiations.¹⁹⁰

	Japan				South Korea				China			
	Qatar	Japan	Total LN	IG bill	Qatari	Korea	Korea Total LNG bill		fotal LNG bill Qatar		Total LN	IG bill
	Price	Avg.	(\$ bn), f	rom:	Price	Avg.	(\$ bn), f	rom:	Price	Avg.	(\$ bn), f	rom:
	(\$)		World	Qatar	(\$)		World	Qatar	(\$)		World	Qatar
2014	16.77 ²	16.15 ²	74.2	14.04	17.78^{2}	16.32 ²	31.42	11.86	17.842	11.662	12.18	-
2013	16.74	15.95	72.35	13.94	17.76	14.77	30.65	12.02	17.76	11.10	10.65	6.27
2012	17.28	16.56	75.22	14.08	18.69	14.64	27.36	9.69	18.69	10.68	8.28	4.87
2011	15.44	14.66	60.12	9.63	16.02	12.63	23.86	6.77	15.62	8.97	5.76	2.05

Table 7: Qatar's average¹ price to Asian LNG major markets (\$/mmBTU)

(1) Average January-December

(2) Average January-November

Source: Calculated by the author from UN COMTRADE and Energy Intelligence data

However, Qatar is not the only LNG producer that has linked LNG prices to oil; nearly 73 percent of the global LNG trade is based on oil indexation.¹⁹¹ Ironically, the sharp fall in global crude prices since the June 2014 could change these dynamics. With the prospect of weak oil prices in the short and medium term, the argument may work in the other direction, reducing the desire for Asian consumers to look for alternate mechanisms.¹⁹²

Regardless, the issue of pricing will not go away, and Qatar has to adapt to prolonged periods of moderate (if not low) price and flexible indexation mechanisms, unless there is a major supply shock that pushes prices higher. Above all, final destination clauses on contracts for LNG supplies will soon be a thing of the past. As Jerome Ferrier, president of the IGU, noted: "It will be more and more difficult to maintain destination clauses, based on the recent experience with the reverse of the U.S. market."¹⁹³

KING OF LNG? NOT ANY MORE

Since increasing its export capacity to over 104.6 bcm/y in 2011, Qatar has ruled the LNG market unchallenged for the past four years. Qatar derives much of its current power from its important role as "swing producer" or the "central bank" of the global LNG market. With this LNG superpower status comes the bargaining power that Doha enjoys in the international arena. In a recent report, the IMF acknowledged that "as the world's largest exporter of LNG, Qatar plays a systemic role in the global natural

gas market. Qatar accounts for about 1/3 of global LNG trade and has become the key supplier for Japan, South Korea, India, China and the United Kingdom."¹⁹⁴

However, Doha is facing emerging competition which could have significant impact on its position as a leader in the global oil market. New Australian supplies this year and onwards are expected to change the dynamics of the LNG market and pose a serious challenge to Qatar's dominance. Australia is on its way to overtaking Qatar in 2018, while the United States is expected to contest the top spot by 2020.¹⁹⁵ In the long term, BP projects that Qatar will not only lose the "throne" of the LNG markets, but its importance may decline drastically as it expected to be the fourth LNG supplier after Australia, Africa and the United States.¹⁹⁶ This, translated into geopolitical terms, means that the strategic importance of Qatar will be diminished gradually.

Nevertheless, it seems that Qatari officials are not worried about losing the first spot. Ibrahim Ibrahim, former economic advisor to the Emir of Qatar and architect of Qatar's National Vision 2030, plays down the importance of this issue. "We expect gas to remain important, and in this context it is therefore important for us to stay competitive... fighting to maintain the position of number one exporter is a waste of time and energy: sometimes it has negative consequences to be at the top of the pile. What Qatar should aim for is the optimal exploitation of the gas that it has."¹⁹⁷

QATAR FISCAL BALANCE: LOSING BILLIONS OF DOLLARS

The slump of energy prices is expected to lead to significant declines in the fiscal balances of Qatar. The country has run sizeable fiscal surpluses every year since 2000, but this year the current account balance will shrink drastically to 1 percent and 3.6 percent in



Figure 10: Qatar's Exports of Goods and Services

Source: IMF

2016.¹⁹⁸ Qatar's export revenues are shrinking on the back of depressed crude, NGLs, condensate, and LNG prices. IMF calculations project Qatari losses of around \$52 billion (around \$4.3 billion each month) in revenues from energy exports this year. Although the revenues are expected to rebound in 2016, this is forecasted to be below peak revenues of 2013.

The outlook of energy markets remains uncertain in the coming years. However, gas prices are expected to stay low; European natural gas and Japanese LNG price benchmarks are projected to decline 15 and 35 percent, respectively, in 2015.¹⁹⁹ According to BNEF, LNG costs in Asia this year will average below \$10 mmBTU for the first time in four years, as new terminals in Australia and the U.S. come on-stream by 2016.²⁰⁰ Over the medium term, both the World Bank and IMF have warned that the decline in oil prices could prove to be "persistent".²⁰¹ Consequently, Qatar's revenues from hydrocarbon exports will remain volatile.

If crude prices remain low for a prolonged period, there is no question that this may prove more problematic for Qatar. Low hydrocarbon prices combined with higher government spending, a fast expanding population, and growing domestic demand will result in mounting upward pressure on the Qatari government to prioritize its spending plans. The Economist Intelligence Unit (EIU) noted in a recent report that "Qatar has the fiscal space to maintain large-scale spending and keep up a healthy pace of economic growth in the medium term. However, oil and gas prices look set to trend down steadily over the forecast horizon, suggesting that fiscal discipline will be needed over the longterm." To be sure, Qatar's fiscal breakeven for oil price will rise significantly next year. The IMF projects Qatar's breakeven price to rise by 30 percent in 2016.

Geopolitical Benefits at Stake

To date, most LNG supplies have been traded under long-term contracts. However, in the last few years the proportion of LNG traded on spot or short-term contracts has risen considerably. According to the IGU, the non-long-term market refers to cargoes not supported by a long-term (5+ years) Sales and Purchase Agreements (SPA). Meanwhile, the International Group of Liquefied Natural Gas Importers (GIIGNL), considers short-term deals as trades under contract with a duration of four years or less. Nevertheless, if we consider both definitions, the LNG trade on spot and the short-term contracts have risen significantly over the last decade.

Data from IGU shows that non-long-term trade has almost doubled between 2007 and 2013, now accounting for 33 percent of total LNG trade.²⁰² Qatar and Nigeria remained the dominant spot exporters, accounting for 44 percent of total non-long-

Country	Quantities in bcm
Europe	1.6
Americas	2.2
Asia	28.4
Middle East	1.8
Total	34.1
	(Over 1/3 of Qatar's total LNG exports)

Table 8: Qatar's LNG exports based on spot & short-term* volumes in 2013

(*) Less than 4 years

Source: Compiled by the author from GIIGNL

term volumes.²⁰³ GIIGNL figures furthermore indicate that spot and short-term imports jumped from only 5 percent in 2000 to 16.3 percent in 2009, hitting 88.4 bcm/y or 27.4 percent of total LNG trade at the end of 2013.²⁰⁴ Qatar was the dominant exporter accounting for 38 percent of spot and short-term deals.²⁰⁵ This situation gives Qatar significant strategic advantages, which translate into political and economic benefits. A recent study by Harvard University noted that "Qatar gains geopolitical benefits from its broader LNG export customers... Qatar's global position is enhanced because of its capability to serve as a swing supplier to important industrialized countries."²⁰⁶

Looking forward, the volumes of spot and short-term trade will grow steadily by the end of current decade. In the United States, over 15 bcm/y from 5 terminals (Sabine Pass, Cameron, Cove Point, Corpus Christi and Freeport) are still un-contracted (see Table 2). This number may rise significantly in the coming years as new projects come onstream. By 2017, up to 6.8 bcm/y of LNG could be available for the spot market from Australia alone.²⁰⁷ Wood Mackenzie's analysis suggests that by 2020, Malaysia has the potential to be the one of the largest supplier (if not largest) of flexible LNG portfolio or un-contracted LNG to the global market.²⁰⁸ The supply capacity of Malaysia's Petroliam Nasional Berhad (PETRONAS) flexible LNG volume will grow from 3.4 bcm in 2013 to 35.36 bcm in 2022.²⁰⁹ This is all in addition to possible new supplies from Papua New Guinea, East Africa, Russia, and Canada.

Importantly, by 2020 Qatar's spot and short term volumes could increase to almost 42.2 bcm/y, according to GIIGNL statistics. Most of Qatar's long-term contracts are due to expire between 2024 and 2035, (see appendixes 3 and 4). However, 6 contracts with a total export capacity of 17.1 bcm/y (in Japan and Europe) are expected to expire between 2018 and 2021, with renewal likely but not set in stone. Australia, Papua New Guinea, Russia, and even the United States are strong contenders to replace Qatar supplies in Japan, whilst the Russian and American companies will compete with Qatar's LNG exports in Europe.

As a result, U.S. supplies combined with Qatari, Australian, Malaysian exports and other producers mean there could be a global glut of LNG by 2020, challenging Doha's position as the sole swing producer and pushing downward the already depressed LNG prices even further.²¹⁰ This will increase supply options to buyers in Asia, Europe and other LNG consumers. Most importantly, it will give them even more leverage in future negotiations with Qatar and other key LNG exporters. To underline the importance of U.S. supplies, Howard Rogers, recently noted in a Qatari English-language daily that "the U.S. LNG export is likely to become a major source of destination flexible LNG, able to arbitrage between Asian, European and South American markets... the United States may well displace Qatar as the primary destination swing supplier."²¹¹

Predicting the future is risky business. Markets will be strongly dependent on new projects coming on-stream and the rate of growth of LNG demand in Asia - China India and Japan in particular. Above all, unforeseen factors may change the whole dynamic. The recent disaster in Japan and the surge in the country's LNG imports post-Fukushima demonstrate how volatile the LNG market can be. Or as Hamad Rashid al-Mohannadi, CEO of Qatar's RasGas, eloquently summarized it, "the greatest risks to ensuring timely supply of new LNG to meet growing global demand are the delay in development of new supply and the associated LNG value chain, escalating development costs and indecision or inability of customers and suppliers to agree mutually on acceptable contract terms."²¹²

Conclusion: The Developing Qatari Response

atar has imposed a moratorium on increasing natural gas production from its North Field that will last until 2015.²¹³ Apart from the \$ 10.3bn Barzan gas project, (the last permitted North Field development under the current moratorium), which will largely feed growing domestic demand, no further gas projects have been sanctioned.²¹⁴ Qatar has also not announced plans to expand its LNG export capacity beyond the existing facilities. Consequently, in the short and medium term, it is clear that Qatar's gas strategy will remain stagnant. Qatar's government says that the moratorium on new natural gas developments at the North Field, put in place in 2005, is vital to develop gas production without damaging the reservoir and to ensure the long-term efficient production.²¹⁵

Ibrahim Ibrahim explained Doha's logic behind implementing the moratorium: "Unlike other countries, which have their gas reserves located in multiple reservoirs across different geographies and geologies, Qatar has the vast majority of its gas in one large reservoir, which is an extremely high-risk situation (...) Qatar's production could be seriously affected by rushed exploitation."²¹⁶ Even if the moratorium is lifted, it will take years and billions of dollars for new plants to be built.²¹⁷ However, Qatar has indicated that it may increase its LNG production by 13.6 bcm/y through improvements in the efficiency of its LNG production plants.²¹⁸

In the long term, Qatar may expand its production capacity of gas-to-liquids (GTL) and LNG fuel for the shipping industry. Qatar is an industry leader in GTL technologies, which produce liquid fuels such as low-sulfur diesel and naphtha from natural gas.²¹⁹ Qatar has two facilities to produce GTL: the world's largest GTL plant, Pearl, with capacity of 140,000 b/d, and ORYX GTL with capacity of 32,000 b/d.²²⁰ EIA forecasts Qatar's GTL production to double over the next decade. ²²¹ Doha is also looking to lead the way in building a supply chain that uses LNG as marine fuel. Market outlook is encouraging as EU strategy aims to increase the use of LNG in marine fuel, with the shipping industry running its fleet on LNG from 2025.²²² Lloyd's Register projects LNG's share of the marine fuel market could reach 7 percent by 2025 to jump to 11 percent by 2030.²²³

Developments in world oil markets could also benefit Doha in the long term. With the sharp fall in oil prices, several LNG projects may be delayed, if not cancelled. However, even without these developments, Qatari officials are bullish about future gas demand. Qatargas CEO Khalid Bin Khalifa Al Thani forecasts that LNG demand in Asian markets will rise to well over 612 bcm by 2025. "Based on our projections, another 204 bcm of additional... LNG supply capacity is needed to meet global demand by 2025."²²⁴

Qatar also pursued the option of buying up the competition. One of Qatar's strategic investments overseas is a joint venture with ExxonMobil: the Golden Pass LNG terminal in Texas. This investment is expected to reach over \$10 billion with a 20.9 bcm/y export capacity. Qatar Petroleum International (QPI) will have a 70 percent stake in the terminal, and is seeking final permission from the US DOE to export LNG from US to non-FTA.²²⁵ The company is expected to take the final investment decision for the project this year.

If the project gets the green light, the terminal will add almost 15 bcm/y of export capacity to Qatar's overall LNG portfolio. Although the decline in oil and LNG prices make the project look less economically attractive, but Total's Senior LNG Advisor Guy Broggi recently told MEES that he thinks Qatar will go ahead with the project because of its strategic importance: "This project has a strategic importance and Qatar and ExxonMobil will go for it: short-term prices have no relevance when you talk strategy... This future LNG could easily go to the UK and the west coast of Europe, while new markets like Pakistan, Bangladesh, Egypt and Jordan will be supplied by quantities diverted from the current UK or European contracts."²²⁶

There are also emerging LNG exports opportunities in the MENA region. The demand in MENA is projected to jump from 5.44 bcm in 2015 to reach 12.2 bcm by 2020, hitting 31.2 bcm by 2025 (see figure 5). Additionally, planned regasification terminals in the UAE and Kuwait will be able to process 12.2 bcm/y and 15.2 bcm/y, respectively.²²⁷ Above all, if GCC states overcome their political differences and agree on a price mechanism that is satisfactory to everyone, Qatar—via the Dolphin pipeline — could meet most, if not all, projected gas demand in the UAE, Oman and Kuwait. BMI projects that these three countries will need to import almost 50 bcm/y of natural gas by 2020, with 75 percent of that from the UAE alone.²²⁸

The Dolphin pipeline could certainly see investment in new infrastructure to deliver additional exports, as it could theoretically carry about 33.2 bcm/y yet only delivers about 22.6 bcm/y.²²⁹ Under current plans, a new compression facility at Ras Laffan (in Qatar) would increase volumes closer to full capacity in 2015.²³⁰ However, any additional quantities will likely be dependent upon the costs, as Qatar is unhappy with

the current price which is below market prices. Indeed, gas is sold well below the market price, with customers in the UAE and Oman reportedly paying just \$1.30/mmBTU, compared to the \$16-17/mmBTU Qatari gas prices in Asia,²³¹ (see Table 7). However, Qatar should work tirelessly to secure a considerable market share in the Gulf region and the Middle East in general.

Qatar has also started to show flexibility in signing new contracts. In 2013, Qatar signed three medium-term (Appendix 3) deals targeting European customers; all of them are "ex-ship" contracts, with the seller responsible for transporting the goods to their destination. UK Centrica signed a £4.4bn (\$7.1 bn) gas agreement with Qatargas to import 4.1 bcm/y of LNG supplies for 4 ¹/₂ years,²³² from June 2014 to December 2018.²³³ The price quoted means an average of \$10/mmBTU and the contract is based on NBP prices.²³⁴ Qatargas has also signed another 1.6 bcm/y five-year SPA with Malaysia's Petronas starting in 2014. Petronas will import LNG from Qatargas into Britain's Dragon terminal in Wales (where Petronas holds shares).²³⁵

The IEA noted that "these contracts are not a fundamental change in terms of pricing, as Qatar was already selling LNG to the United Kingdom at prices close to NBP prices."²³⁶ However Qatargas has signed a five-year flexible SPA with Germany's E.ON for around 2 bcm/y of LNG. The deal break with Qatar's traditional oil-link contracts as it has a pricing mechanism based on continental European gas prices as the LNG will be delivered at the Dutch Gate terminal.²³⁷ In this regard Qatar should continue to show more flexibility in the European markets. There significant scope for increasing Doha's LNG exports, especially if it goes in the EU go ahead with its plan to reduce its dependence on Russian gas.

Most importantly, with Qatar's already established infrastructure, low production cost, and strategic location, it is in a much stronger position than its competitors.²³⁸ For example, the IEA estimates that the development costs, ranging from those of Qatar are well below \$1/mmBTU, Russia about \$2/mmBTU to more than \$3/mmBTU in Australia.²³⁹ Qatar has also a fleet of 65 vessels, including 27 long-term chartered vessels, with a Q-Max vessel and a variety of conventional and Q-Flex vessels, representing some 20 percent of the world's total LNG fleet.²⁴⁰ While it is not in the interest of Qatar to declare a price war, Doha should use these advantages in a smart way.

Above all, Qatar needs to continue its economic diversification strategy at home and abroad. Qatar should work hard to encourage and strengthening institutional joint action within the Gulf Cooperation Council (GCC). Although some might dismiss this as a wishful thinking, the future of GCC states lies in their collective policies and accelerating the process of reinforcing the union. If GCC leaders spoke with one voice

in any future economic negotiations with Asian countries or the European Union, Qatar along with the rest of the Gulf states would reap great benefits.

Against this strategic backdrop, the LNG market is heading towards profound changes which could eventually break Qatar's dominance. Doha has to learn from its own experience, as the shale boom is the obvious example. While Qatar was aiming to send 20-27 bcm/y of its LNG exports to the United States, the new drilling technologies of fracking changed the whole situation drastically. Within a few years the United States switched from a country which was expecting to import large quantities of natural gas to a potential exporter with great capabilities of becoming a major player in the LNG market, if not the top one.

While Qatar will remain a major player in the foreseeable future, there are developments that may occur in the long-term which may again alter the market dynamics. Firstly, the rapid technological advances in energy exploration, drilling and production. Though it's difficult to replicate the experience of the United States on a global scale, but constantly improving technology shows that it is still possible. The scope for innovation is unlimited, or as energy historian Daniel Yergin puts it eloquently: "When it comes to energy, the rule of the game is to expect the unexpected...10 years from now we may well see the next game changer."²⁴¹

Secondly, there is a strong desire among many of the energy-consuming countries, especially in Asia, to reduce dependence on Middle Eastern energy imports. Measures such as energy efficiency, promoting research and innovation, increased investments in alternative energy may limit the increase in future demand. Finally, US policy in the Middle East is still evolving, so all possibilities could be on the table, including signing a final nuclear agreement with Iran, withdrawal from Afghanistan and reaching a political solution in Iraq and Syria. Together, these factors could, in the long term, gradually erode the strategic importance of Qatar (and the Gulf in general) to the United States and its allies. As such, Qatar and the Gulf states need a common strategy that takes into account all scenarios.

Appendices

	2014	2015	2016	2017	2018	2019	2020
Saudi Arabia	12.38	12.34	12.42	12.49	12.46	12.41	12.39
Iraq	3.66	3.90	4.10	4.22	4.33	4.52	4.73
Iran	3.60	3.60	3.60	3.60	3.60	3.60	3.60
UAE	2.90	2.94	2.98	3.03	3.10	3.15	3.21
Kuwait	2.86	2.82	2.84	2.84	2.83	2.80	2.76
Venezuela	2.56	2.49	2.45	2.40	2.45	2.51	2.56
Nigeria	1.98	1.92	1.91	1.90	1.89	1.89	1.89
Angola	1.77	1.80	1.80	1.84	1.86	1.86	1.86
Algeria	1.17	1.14	1.10	1.06	1.02	0.98	0.95
Libya	0.85	0.50	0.65	0.75	0.81	0.87	0.98
Qatar	0.73	0.70	0.70	0.71	0.72	0.73	0.73
Ecuador	0.57	0.57	0.57	0.58	0.59	0.59	0.59
OPEC	35.03	34.73	35.12	35.41	35.65	35.91	36.24

Appendix 1: OPEC Sustainable Crude Output Capacity, (mb/d)

Source: IEA, medium-term oil market report 2015

Appendix 2: Qatar's Economic Indicators, (2000-2016)

			Projections			
	Average 2000-11	2012	2013	2014	2015	2016
Real GDP Growth, (Annual change; %)	12.8	6.0	6.3	6.2	7.1	6.6
Nominal GDP, (Billions of U.S. dollars)	66.9	190.3	203.2	208.7	179.4	202.9
Non-Oil Real GDP Growth, (Annual change; %)	14.6	10.0	11.0	11.6	10.6	9.5
Oil Real GDP Growth, (Annual change; %)	11.2	1.3	0.2	-2.1	1.0	1.0
Crude Oil Production, (mboe/d)	0.75	0.73	0.70	0.64	0.60	0.59
Natural Gas Production, (mboe/d)	1.43	3.89	4.00	4.00	4.12	4.24
Crude Oil Exports, (mb/d)	0.69	0.64	0.63	0.56	0.52	0.50
Natural Gas Exports, (mboe/d)	0.99	2.64	2.72	2.70	2.71	2.71
Fiscal Breakeven Oil Price (U.S. dollars per barrel) ¹	35.3	69.0	48.4	56.2	64.1	89.4
External Breakeven Oil Price ²	-	56.3	55.1	57.5	56.9	60.0
General Government Fiscal Balance (% of GDP)	8.2	9.5	14.4	9.2	- 1.5	- 5.3
General Government Total Revenue, Excluding Grants (% of GDP)	37.1	40.4	45.8	42.8	36.0	29.2
General Government Non-Oil Fiscal Balance (% of non-oil GDP)	-35.9	-35.8	-25.2	-23.0	-25.9	-31.4
General Government Non-Oil Revenue (% of non-oil GDP)	29.0	34.7	41.8	39.1	30.9	21.0
Total Government Gross Debt (% of GDP)	31.2	36.0	32.2	30.6	30.5	24.9
Total Government Net Debt (% of GDP)	25.2	27.5	17.5	17.1	17.0	12.3
Exports of Goods and Services (Billions of U.S. dollars)	42.1	142.9	148.1	139.5	87.7	98.1
Imports of Goods and Services (Billions of U.S. dollars)	19.0	54.7	59.0	63.1	64.0	68.5
Current Account Balance (Billions of U.S. dollars)	13.6	62.0	62.6	47.9	1.8	7.4
Current Account Balance (% of GDP)	20.1	32.6	30.8	23.0	1.0	3.6
Gross Official Reserves (\$ Billions)	8.9	33.1	42.2	46.9	33.1	32.9
Total Gross External Debt (% of GDP) ³	62.5	84.8	82.0	78.5	87.5	83.1

(1) The oil price at which the fiscal balance is zero.

(2) The oil price at which the current account balance is zero.
(3) Nominal GDP is converted to U.S. dollars using period average exchange rate.
Source: Compiled from IMF, Middle East Economic Outlook , 21 January 2015

Appendix 3: Qatar's Long	g, Medium & Short Term Sales	& Purchase Agreements	\$ (2006-2013))			
	Purchaser	Import country	Amount (bcm/y)	Duration (Vears)	Extra Years	Start	Delivery
	CONT	RACTS CONCLUDED IN 20	13	(Tears)	<u>l</u>		Format
Long & medium term	E ON Global Commodities	Netherlands	2.0	5	1	2014	DES
Sales & Purchase	Centrica	UK (Dragon)	1.5	5		2014	DES
Agreements (> 4 vrs)	Petronas I NG UK	UK (Isle of Grain)	4.1	4.5		2014	DES
	CONT	RACTS CONCLUDED IN 20	12	1.0		2011	D.11.0
Long & medium term	EDF Trading	Belgium	4.6	15		2012	DES
Sales & Purchase	The Tokyo Electric Power Co	Japan	14	10		2012	DES
Agreements	Chubu Electric	Japan	14	15		2013	DES
0	chubu Elecule	bupun	(2013-2017)	15		2015	D.D.0
			1.0				
			(2018-2028)				
	Kansai Electric	Japan	0.7	15		2013	D.E.S
	KOGAS	South Korea	2.7	21		2012	D.E.S
	PTT	Thailand	2.7	20		2015	D.E.S
	CONT	RACTS CONCLUDED IN 20)11				
Long & medium term	CHU BU ELECTRI C/SHI ZUOKA	Japan	0.4	6		2014	D.E.S
Sales & Purchase		^					
Agreements							
Short term contracts (< 4 yrs)	Centrica	UK	3.3	3		June 2011	D.E.S
Memorandum of	ENARS A	Argentina	6.8	20		2014	
understanding (M.O.U.)							
	CONT	RACTS CONCLUDED IN 20	010				
Long & medium term	Repsol Energy Canada	Canada	> 2.7			Dec. 2010	D.E.S.
Sales & Purchase							
Agreements				-			
Short term contracts	Eni	U.S.A.	0-1.8	2+		June 2010	D.E.S.
	CONT	RACTS CONCLUDED IN 20	09	116	1	2000	1
Short-term contracts	Sempra LNG Marketing	USA	0-4.8**	1.5		2009	
	Edison Spa	Italy	0.18	<1 year		2009	Ex-ship
	Statoil	USA	Up to 2.1	1.5 year		2009	
	CONT	RACTS CONCLUDED IN 20	008	1	1	ı —	1
Long & medium term	Shell	China	4.1	25			
Sales & Purchase	PetroChina	China	4.1	25			
Agreements	Shell	UAE					
	DUSUP	UAE					
	CONT	RACTS CONCLUDED IN 20	007				
Long & medium term	Korea Gas Corporation	South Korea	2.9	20		2007	S.P.A
Sales & Purchase							
Agreements	CONT	DACTS CONCLUDED IN 20					
Long & modium toum	CONT	LIK USA Franco Maria	7 1	25		End 2009	
Salas & Purchasa	Total	OK, OSA, Flance, Mexico	7.1	23		End 2008	
Agroomonts							
Agreements							

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*10 cargoes ** Option agreement. None of the volumes are firm *Source:* Compiled from GIIGNL

Emeret	Qatar S Long		Distances	Mania 1	II 2013 ()	T • • •	Commente
Export	Loading	Seller	Duyer	nominal	Duration	1 ype 01	Comments
Country	1 Unit			ACO		contract	
				bcm			
Qatar	Ras Laffan	Qatargas I	Chubu Electric	5.4	1997/2021	D.E.S.	
			Tohoku Electric, Tokyo	2.7	1998/2021	D.E.S.	
			Gas, Osaka Gas, The				
			Kansai				
			Electric, The Tokyo				
			Power co Tobo Gas				
			The Chugoku Electric				
			Gas Natural sdg	1.0	2005/2024	D.E.S.	
			Gas Natural sdg	1.0	2006/2025	F.O.B.	
			The Tokyo Electric	1.4	2012/2021	D.E.S.	
			Power co.				
		Qatargas II T1	ExxonMobil	10.6	2009/2034	D.E.S.	
		Qatargas II	CNOOC	2.7	2009/2034	D.E.S.	
		T2	Total	2.5	2009/2034	D.E.S.	
			Total	2.0	2009/2034	D.E.S.	
			Total	1.6	2009/2034	D.E.S.	
			Total	1.0	2009/2034	D.E.S.	
			ExxonMobil	0.8	2009/2033	D.E.S.	
		Qatargas III	ConocoPhillips	10.6	2010/2035	D.E.S.	
			Chubu Electric	1.4	2013/2028	D.E.S.	Nominal quantity
							(ACQ)
							2013/2017 : 1 mmtpa; 2018/2028 : 0.7
							2018/2028 . 0.7 mmtpa
			The Kansai Electric	0.7	2013/2027	D.E.S.	
		Qatargas IV	Shell	5.2	2011/2041	D.E.S.	
		- U	PetroChina	4.1	2011/2036	D.E.S.	
			Marubeni	1.4	2011/2031	D.E.S.	
		RasGas I	KOGAS	6.7	1999/2024	F.O.B.	
		RasGas II T1	Petronet LNG	6.8	2004/2028	F.O.B.	
		RasGas II	Edison	6.3	2009/2034	D.E.S.	
		T2	Endesa	1.0	2005/2025	D.E.S.	
		RasGas II	EDF Trading	4.6	2007/2012	D.E.S.	Extended to 2027
		T3	CPC	4.2	2008/2032	F.O.B.	
			ENI	2.8	2007/2027	D.E.S.	Former Distrigas
		D 0 1-			a 0.00 / a 0.5 ·	DEA	contract
		RasGas III	ExxonMobil	10.6	2009/2034	D.E.S.	
			Petronet LNG	3.4	2009/2029	F.O.B.	
			KOGAS	2.9	2007/2026	D.E.S.	Nous I Transford
		Dec III	KUGAS	2.7	2012/2032	D.E.S.	New L1 contract
		T2	EXXON/VIODII	10.6	2010/2035	D.E.5.	
		RasGas III	CPC	2.0	2013/2032	D.E.S.	

Appendix 4: Oatar's	Long-term and	medium-term	contracts in	force in	2013	(*)	
The second secon				101 00 111		• •	

	2008	2009	2010	2011	2012	2013
Japan	23223.08	15473.47	21484.40	29867.86	36890.90	39923.22
S. Korea	13609.41	6891.87	12030.29	20135.85	24675.83	24550.67
India	3204.39	4036.05	6438.92	10851.63	14629.78	14303.21
China	770.21	923.17	2225.22	4494.95	6814.14	8864.57
Singapore	7352.37	3365.34	5818.92	8180.80	7037.95	6963.11
UAE	3366.01	2666.34	4278.95	4357.59	5957.99	5824.49
Taiwan	1075.57	515.68	1907.98	3702.01	5283.88	5754.13
UK	104.02	1337.25	3535.52	8008.17	4571.69	3855.69
Thailand	1971.37	1356.11	2174.87	2413.44	2630.34	3568.25
Italy	5.27	51.20	93.67	121.41	263.39	2641.58

Appendix 5: Qatar's Top 10 Export Partners in 2013 (\$ millions)

Source: IMF, Direction of Trade Statistics (DOTS)

Endnotes

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