

BRIEFING PAPER

SECURITY OF OIL SUPPLY IN CHINA

BY KYLE FERRIGGI



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AUTHOR

Kyle Ferriggi

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ADDRESS

Clingendael 12, 2597 VH The Hague, The Netherlands
P.O. Box 93080, 2509 AB The Hague, The Netherlands

TELEPHONE

+31 70 374 67 00

EMAIL

ciep@clingendaenergy.com

WEBSITE

www.clingendaenergy.com

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INTRODUCTION

For the first time in a decade, global oil demand is expected to contract due to oil demand disruption in the first quarter of 2020 in China, caused by the Covid-19 virus (also known as the coronavirus).¹ The virus has had a significant effect on China's oil use: due to the decreased mobility of Chinese citizens, demand for aviation fuel and gasoline has declined; demand also has decreased as a result of industrial shutdowns across the Hubei province. This has had knock-on effects on global markets, with the price of WTI dropping to levels of just above \$50 a barrel (bbl.) in the final week of February,² leading to failed discussions over additional production cuts to stabilise prices.³ This event—even if the impact on oil markets is only short-term—highlights the importance of Chinese oil demand to global oil markets, as China is the largest oil importer in the world and its second largest oil consumer.⁴

The corona virus strikes in an environment in which China's oil supply is already under increased risk of disruption. More than 70% of China's oil demand is met by foreign imports, which, in the medium term, are unlikely to decrease.⁵ Of that 70% (over 9 mb/d), some of China's traditional main oil suppliers, such as Venezuela and Iran, now export a fraction of what they used to, as international oil trade is increasingly subject to geopolitical actions. The risk of physical supply disruptions from the MENA region has also increased, in terms of both short-term disruption (shown, for example, by the September 2019 Abqaiq-Khurais attack)⁶ and long-term disruption (shown by the recent events in Libya).⁷ Furthermore, even though the

1 Robert Perkins, 'Oil demand to shrink for first time in a decade over virus impact: IEA,' (2020), S&P Global Platts, <https://www.spglobal.com/platts/en/market-insights/latest-news/oil/021320-iea-slashes-2020-oil-demand-forecast-by-480000-bd-on-coronavirus-impact>.

2 Once news had reached markets that Wuhan had effectively been placed under quarantine on 23.01.2020, WTI registered at \$ 55 bbl., dropping to \$45 bbl. by 28.02.2020. Since then, following the outcome of the OPEC/OPEC+ meeting on the 6th of March, the price of WTI dropped further, to around \$34 bbl. See EIA, 'Short-Term Energy Outlook (STEO),' (March 2020), U.S. Energy Information Administration, <https://www.eia.gov/outlooks/steo/>.

3 For a detailed analysis, see Michel Meidan, 'When China sneezes...' (2020), The Oxford Institute for Energy Studies.

4 EIA, 'China surpassed the United States as the world's largest crude oil importer in 2017,' (2018) [<https://www.eia.gov/todayinenergy/detail.php?id=34812>].

5 BP Statistical review of World Energy 2019 data.

6 For further information, see Thomas S. Warrick, 'What the Abqaiq attack should teach us about critical infrastructure,' (2019), Atlantic Council.

7 See for example: Benoit Faucon & Amira El-Fekki, 'Libya's Oil Output Halved by Port Blockade,' (2020), The Wall Street Journal, <https://www.wsj.com/articles/libyas-oil-output-halved-by-port-blockade-11579353234>.

US-China trade war seems to have reached a truce (at least temporarily), and China agreed to buy \$50 billion worth of energy goods from the US, Chinese tariffs on many US energy imports remain (granted that compliance is far from guaranteed, especially given the demand upsets from the coronavirus).⁸ All of these recent developments have provided the occasion to review China's security of oil supply strategy, by looking at the country's vulnerability to physical supply disruptions, given the present setting, and the measures in place to reduce these physical vulnerabilities.

With regard to context, Chapter 1 discusses the drivers behind China's oil demand. Chapter 2 analyses China's present oil supply strategy, showing that developing foreign oil resources has taken preference over domestic production, which has remained stagnant (c. 4 mb/d). The chapter also presents recent policy implementations aimed at increasing domestic production, sketching the opportunities and limitations for a domestic oil production increase in the mid-term future. In Chapter 3, the strategy of importing crude from different global regions to mitigate risk is highlighted, showing China's moderate success in the past years. The chapter then examines potential future disruption risks, given the current geopolitical climate, as China relies on a small group of potentially risky suppliers for the bulk of its oil imports. Finally, Chapter 4 discusses the various routes that China's crude imports take to arrive at domestic markets, highlighting the vulnerability of the country's oil supply to maritime choke points, such as the Malacca straits, and highlighting major internal choke points that may be present.

8 For further information on the 'phase one' trade deal, see: Ariel Cohen, 'Phase one Trade Deal: China Pledges to buy ambitious \$50 billion in US Energy Exports,' (2020) Forbes magazine, <https://www.forbes.com/sites/arielcohen/2020/01/15/phase-one-trade-deal-china-pledges-to-buy-ambitious-50-billion-in-us-energy-exports/#57b84fd215ba>.

CHAPTER 1: CHINA'S OIL DEMAND

From a meagre consumption of just over 3.5 mb/d in 1995, China now consumes four times as much oil, at almost 14 mb/d in 2018, as shown in Figure 1.⁹ Moreover, China accounted for more than 80% of global oil demand growth in 2019, and mid-term oil consumption growth was forecast up until the outbreak of the Covid-19 virus.¹⁰ This growth in demand occurs in parallel with substantial demand growth in other developing Asian economies, including India's, albeit on a smaller scale.¹¹ Asian demand, coupled by stagnant oil consumption in Europe, has contributed to the macroeconomic trend of larger volumes of oil being exported to East of Suez markets rather than to West of Suez markets. Given this setting, what are the drivers behind oil demand growth in China, and how is this reflected by various oil products?

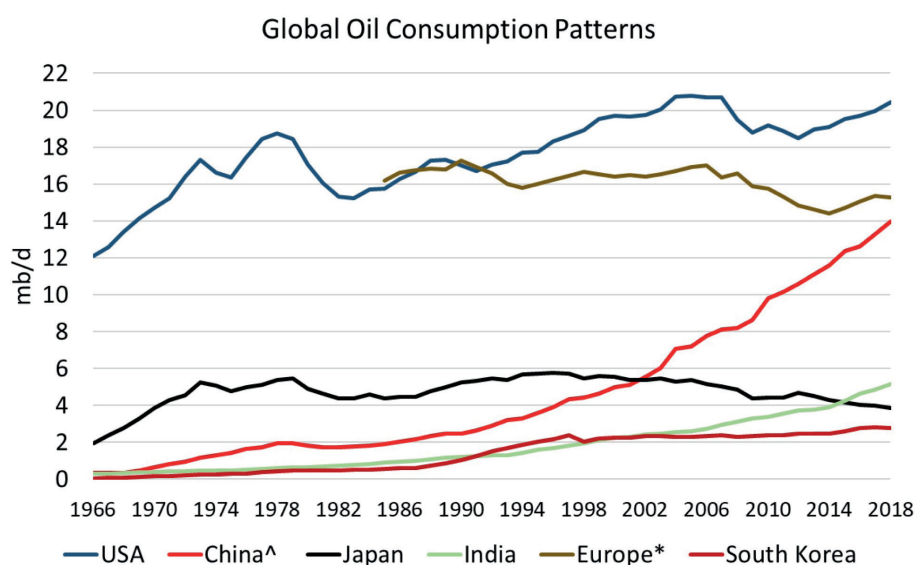


FIGURE 1: GLOBAL OIL CONSUMPTION: A HISTORIC OVERVIEW. TAKEN FROM A COLLECTION OF BP STATISTICAL REVIEWS OF WORLD ENERGY.

[^]DATA FOR CHINA INCLUDE HONG KONG.

^{*}EUROPE INCLUDES THE EU 28, EFTA COUNTRIES, GEORGIA, TURKEY, AND GREENLAND.

⁹ See Figure 1.

¹⁰ Fatih Birol, 'Global oil demand to decline in 2020 as coronavirus weighs heavily on markets,' (2020), IEA newsletter. The Covid-19 viral outbreak has significantly tanked oil demand, particularly in China, as quarantines and lockdowns reduced the demand for mobility fuels (gasoline, jet-fuel, and diesel) and industrial oil use due to closures as a result of the outbreak.

¹¹ See Figure 1.

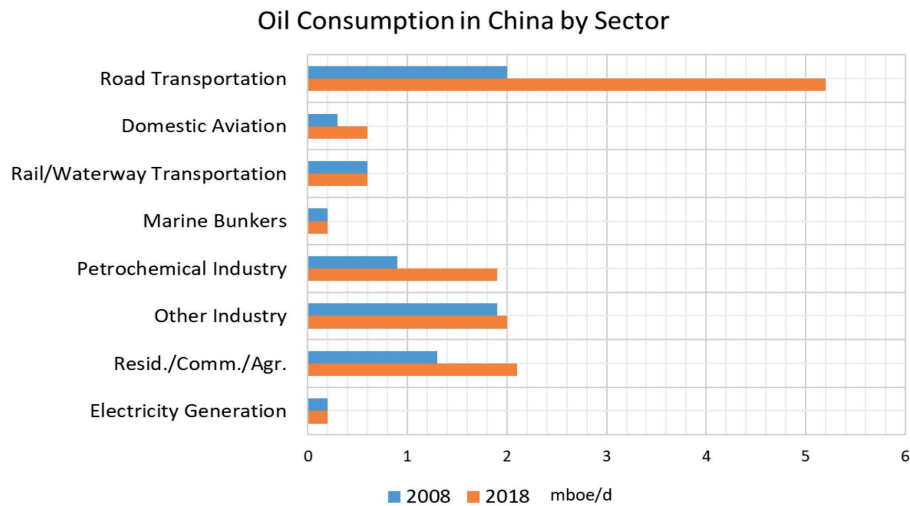


FIGURE 2: OIL CONSUMPTION PER ECONOMIC SECTOR IN CHINA. TAKEN FROM OPEC WOO 2019, & OPEC WOO 2010.

Figure 2 shows the economic sectors in which growth in oil consumption took place between 2008 and 2018. The largest growth in sectoral use of oil can be seen in road transportation, as demand for passenger cars and commercial vehicles increased significantly in the past decade.¹² This is set to peak sometime in the mid-2020s, when pollution-controlling measures and improvements in public transport materialise.¹³ Another significant oil-consuming sector in China is domestic aviation, which is projected to remain a growing industry well into the 2040s,¹⁴ with a 3.5% annual growth rate in passengers expected up to 2035 prior to the pandemic.¹⁵ The petrochemical industry has also grown significantly in China, with its oil consumption more than doubling in the last decade, as global demand for plastic products has grown.¹⁶ Finally, oil use in the residential, commercial, and agricultural sectors has

12 Even though China has seen the world's largest growth in New Energy Vehicles (NEVs) sales, the sheer growth in demand for personal vehicles has led to this increase in oil demand, both for gasoline and diesel. Projections by OPEC, however, argue that the pace of sales declined in 2019 due to stricter emission regulation. See OPEC 'World Oil Outlook 2019' (2019).

13 China has one of the strictest fuel emission standards in the world and a very restrictive internal combustion engine vehicle registration policy in major cities. CNPC projections estimate that peak gasoline demand will be reached in 2025, according to a podcast by Oxford Energy Institute, 'How will China meet its ambitious goals of delivering economic growth as well as environmental sustainability?' (2019). See, also, OPEC 'World Oil Outlook 2019' (2019).

14 According to a podcast by Oxford Energy Institute, 'How will China meet its ambitious goals of delivering economic growth as well as environmental sustainability?' (2019).

15 In the short term, due to demand reduction from the effects of the Covid-19 virus, aviation demand has significantly reduced. China currently has around 235 airports and is at the same time in the process of expanding this figure to 450 by 2035. See CNN (2020) [<https://edition.cnn.com/travel/article/china-new-airports/index.html>]

16 China aims to be the world's leading producer and exporter of 'intelligent plastic products' and synthetic textiles as part of the Made in China 2025 industrial policy. See for example Deligio, 'China Reimagines Its Manufacturing Industry,' (2016), *Plastics Technology* [<https://www.ptonline.com/blog/post/china-reimagines-its-manufacturing-industry>].

also grown significantly, reflecting the importance of oil use in agriculture in China, as well as the limitations in China's electrical grid, particularly in rural provinces.¹⁷

The observations made in Figure 2 can be directly translated to the growth in consumption of specific petroleum products, shown in Figure 3. Growth in demand for road transportation has led to increased consumption of both diesel and gasoline;¹⁸ growth in aviation demand has increased the demand for jet grade kerosene;¹⁹ growth of oil use in the petrochemical industry has led to a higher demand for both LPG²⁰ and Naphtha;²¹ and growth in oil demand for the residential, commercial, and agricultural sectors has resulted in strong diesel consumption.²² Changes in China's product demand are, at times, argued to be the result of the country's *gradual* shift from an economy focused on heavy industry (running on heavier oil products) to a service-based economy, which demands lighter oil products, as demand for fuel oil stagnates, and demand for aviation, personal vehicles, and petrochemical products increases.²³

17 Growth in this sector is attributed partially to farm machinery, but also to diesel generators, used as back-ups to grid power supply, particularly in rural communities, kerosene for heating in areas without alternatives, and LPG for cooking. Demand for oil in these sectors reflects the economic differences between rural and urban communities in China, and the country's low level of development.

18 Gasoline consumption has grown by 0.2 mb/d since 2015. Gasoline is produced in surplus in China, with volumes exported to regional markets.

19 Kerosene consumption has grown by 0.1 mb/d since 2015. Kerosene too is produced in surplus in China, with additional volumes exported to regional markets.

20 LPG consumption has grown by 0.6 mb/d since 2015. LPG production in China does not meet demand levels, and China is a net importer of LPG. This is mainly since refineries in China are set up to produce more profitable gasoline and diesel products, and since Chinese refineries have a heavier crude oil input, resulting in reduced volumes of LPG.

21 Naphtha consumption has grown by 0.2 mb/d since 2015. Naphtha production in China is also below demand in China, leading to imports, for the same reasons as LPG (see footnote 20). Furthermore, some of the 'other products', such as ethane, are also used in the petrochemical industry as feedstock.

22 Along with some volumes of LPG, and Kerosene. Diesel consumption in Figure 3 is stagnant as Diesel demand from road transportation and the residential, commercial, and agricultural sectors increases, while, due to a drive for electrification, and oil to gas switching, diesel demand in 'other industry' is in decline.

23 IEA Oil market report 2019, p.36.

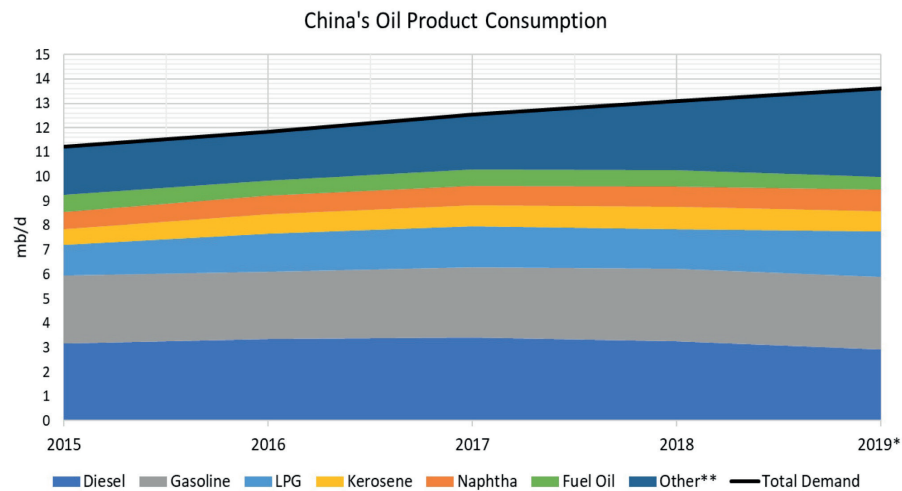


FIGURE 3: CHINA'S PETROLEUM PRODUCT CONSUMPTION. DATA TAKEN FROM JODI.

*2019 INCLUDES AN AVERAGE OF THE FIRST 10 MONTHS OF THE YEAR.

**OTHER PRODUCTS INCLUDE REFINERY GASES, ETHANE, PETROLEUM COKE, LUBRICANTS, WHITE SPIRIT & SPB, BITUMEN, PARAFFIN WAXES, AND DIRECT USE OF CRUDE OIL.

China has witnessed a remarkable growth in oil consumption since 1995. The main factors contributing to this growth since 2008 have been in the demand for mobility (road vehicles and domestic aviation) and feedstock for the petrochemical industry. This, in turn, has led to a large increase in consumption of petrochemical feedstocks (mainly LPG and Naptha), kerosene/jet fuel (for aviation), and diesel and gasoline (for road transportation). Rather than resorting to imports of refined products, China is, by and large, tackling the challenge of meeting this growth in petroleum product consumption through domestic refining.²⁴ Significant refinery additions and ramp-ups have taken place during recent years, giving the Chinese products market sufficient space to meet expected increases in product demand. Some of these newer units have a higher level of complexity than their older counterparts, allowing for a wider range of feedstock options. However, most refineries are designed to run on medium to heavy crude blends.²⁵ The question of meeting oil demand in China is, therefore, a question of crude oil feedstock for already installed domestic refining capacity, which is delineated in the next chapter, which looks at China's oil supply.

24 China imported around 1.6 mb/d of oil products in 2018; however, it also exported 1.1 mb/d of products, leading to around 0.5 mb/d of net imported volumes. Data according to BP Statistical Review of World Energy 2019.

25 Different refineries are set up to run on different API configurations. Older refineries have been set up to run on China's domestic crude (for example, Daqing [API 32.7, SO 0.1], or Shengli [API 24.0, SO 0.9]). However, newer units run on crude from imports [for example, PetroChina's Jieyang refinery has a JV with PVDSA and runs on extra heavy sour crude (Merey API 16.0, SO 2.45), or PetroChina's Tianjin refinery, which has a JV with Rosneft and runs on the ESPO blend (API 36, SO 0.5)].

CHAPTER 2: CHINA'S DOMESTIC CRUDE OIL PRODUCTION

The significant growth in China's oil demand, explained in the previous chapter, comes in an environment of stagnant domestic crude oil production in China. Chinese domestic oil production has been steady at around 4 mb/d for the past three decades, as shown in Figure 4. These levels of crude oil production satisfied domestic demand in the early 1990s, with China even being a net oil exporter as late as 1993.²⁶ However, due to the demand increases sketched in the previous chapter, production around the 4 mb/d mark has led to a dependence on crude oil imports for around 74% of China's oil demand, or just over of 9 mb/d of imports.²⁷ This chapter qualitatively explores China's domestic upstream production, highlighting policy choices that led China's National Oil Companies (NOCs) to purchase profitable acreage abroad (also known as the *going out policy*) rather than developing domestic reserves, as well as recent policy reforms enacted to mitigate against this.

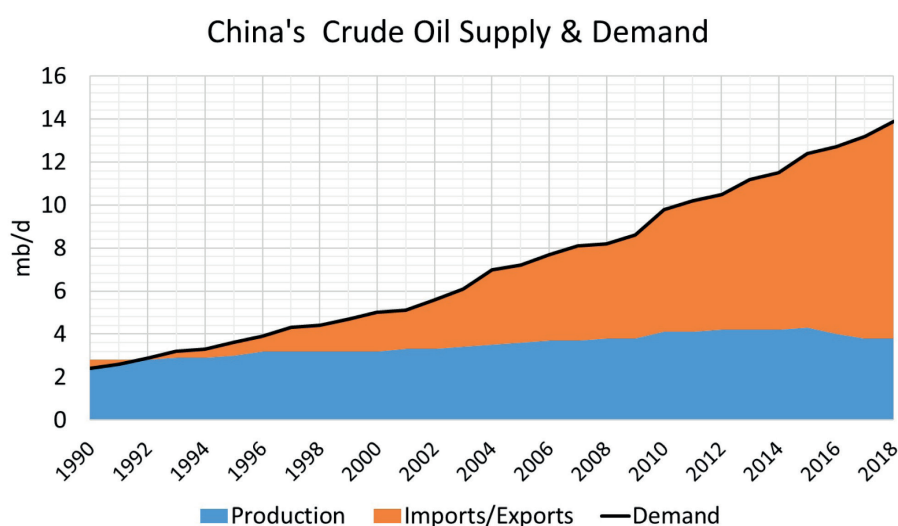


FIGURE 4: CHINA'S OIL PRODUCTION, IMPORTS, EXPORTS, AND DEMAND. TAKEN FROM A COLLECTION OF BP STATISTICAL REVIEW OF WORLD ENERGY SOURCES.

²⁶ Figure 4.

²⁷ In 2018. Taken from BP Statistical Review of World Energy 2019.

China's Crude Oil Production in 2016 [in mb/d]

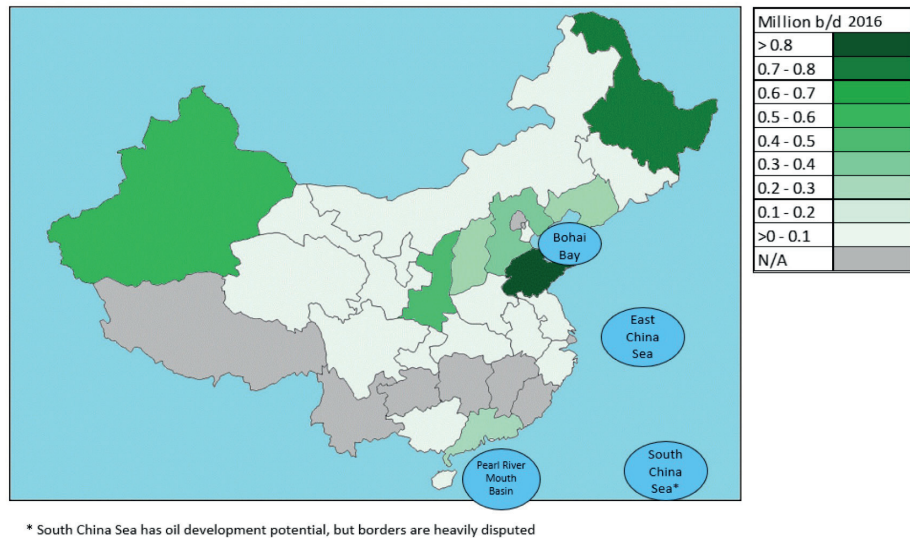


FIGURE 5: CHINESE OIL PRODUCTION PER PROVINCE IN 2016. DATA FROM: BERTRAND RIOUX, PHILIPP GALKIN, AND KANG WU, 'AN ECONOMIC ANALYSIS OF CHINA'S DOMESTIC CRUDE OIL SUPPLY POLICIES,' (2019) KAPSARC

Figure 5 shows China's oil production per province in 2016. Since the foundation of China's modern oil industry in the 1950s, most upstream production took place in conventional onshore fields, which today still account for almost 90% of China's total oil production.²⁸ China's distribution of onshore assets is concentrated in four areas; Manchuria;²⁹ in the provinces around Bohai Bay;³⁰ the central inland provinces;³¹ and China's far Western province of Xinjiang.³² Furthermore, China also has offshore oil-producing assets in the shallow Bohai Bay region and the Pearl River Mouth basin, along with deep-water assets across the East and disputed South China Sea.³³

28 IEA, WEO 2017, p.575 - 579.

29 Including Jilin and Liaoning provinces and Heilongjiang province, which boasts China's most famous oilfield legacy, Daqing.

30 Which includes the Liaohe, Dagang, and Shengli fields, along with most of China's legacy shallow water assets.

31 Shaanxi, Shanxi, Liaoning, Hebei, and Shandong, in and around the Ordos basin, containing the Changqing field, amongst others.

32 With oil basins such as Tarim and Junggar, each offering serious reserves of both conventional and unconventional deposits.

33 Bertrand Rioux, Philipp Galkin, and Kang Wu, 'An Economic Analysis of China's Domestic Crude Oil Supply Policies,' (2019) KAPSARC. See also: figure 5.

These areas have been maintaining China's domestic production level at around the 3 - 4 mb/d mark for the past 25 years.³⁴ Indeed, compared to China's huge oil demand, this may seem like a drop in the ocean. However, the ability to maintain a steady output of oil for three decades is quite impressive. In fact, in the 1960s, due to the large oil reserves discovered across China, the discourse of the day revolved around China's future as an oil exporter, with Chinese membership in OPEC envisaged.³⁵ Moreover, as recently as 2013, China was the world's fourth largest oil producer, and today, only a handful of countries produce more crude oil outside OPEC than China.³⁶ At the end of 2018 (with the average Brent oil price that year at \$71.31 bbl.), China had a total proven oil reserve of 25.9 billion bbl., with an R/P ratio of 18.7 years.³⁷

China maintained the production level of between 3 - 4 mb/d during the era of the *going out policy*, with a preference for cheaper, foreign imports as China's main oil strategy. In a nutshell, the *going out policy* involved China's NOCs investing in energy assets abroad, partially as a means to gain access to crude for China's domestic appetite.³⁸ This policy, encouraged by the Chinese government, is a means for China's NOCs to gain foreign market share, improve technological know-how (by means of partnerships with foreign companies), gain access to equity oil,³⁹ and build foreign relations with oil-producing countries.⁴⁰ However, the *going out policy*, in effect, led to foreign assets being more economically attractive for NOCs to develop than domestic reserves, as they could sell foreign oil in international markets, whereas developing domestic assets contributed to the restrictive, closed nature of China's domestic oil market.⁴¹

34 Many of the legacy assets upon which China's oil industry was founded (including Daqing and the Bohai Bay Basin) have existed even longer, spanning the entire history of post-war China.

35 This discourse may sound comic in hindsight; however, China's rapid industrialisation and oil consumption growth was far from foreseen at the time. Taken from: Michal Meidan, 'The structure of China's oil industry: Past trends and future prospects,' (2016), The Oxford Institute for Energy Studies, p 8.

36 Namely, the US, Canada, and Russia.

37 BP Statistical Review of World Energy 2019.

38 China's main NOCs include China National Petroleum Corporation [CNPC], China National Offshore Oil Corporation [CNOOC], and China Petroleum & Chemical Corporation [Sinopec].

39 By means of energy-backed loans, direct development of assets, or long-term contracts with major producers. See Michal Meidan, 'The structure of China's oil industry: Past trends and future prospects,' (2016), The Oxford Institute for Energy Studies p.44 – 46.

40 Michal Meidan, 'The structure of China's oil industry: Past trends and future prospects,' (2016), The Oxford Institute for Energy Studies.

41 Up to the time of writing, China had end-user oil price controls for its domestic market, which are seen as the main cost deterrent to developing domestic assets vs. foreign ones (even though this has been reformed and has been arguably much less restrictive since 2013). This is particularly the case, as exporting oil (or products) from China to foreign markets is subject to state permission, which is not often granted. Hence, developing domestic reserves in China forces producers to refine it and sell it domestically. Other restrictive factors include infrastructure (which tended to be owned by individual NOCs before reforms in 2019); permission requirements from the State government for developing domestic E&P; and provincial permission requirements for developing midstream and downstream assets. Oil product exports also require provincial permission, even if exported between provinces, as a means to keep refined product local, even if it fetches a lower price.

Since the beginning of 2015, a number of policy changes have taken place, aimed at reducing barriers to investment in the domestic oil sector as a means to counter China's declining domestic crude oil production. First, one factor that had significantly limited investment in China's oil upstream was the distance of new discoveries from China's main centres of demand, particularly concerning resources in China's far western Xinjiang province.⁴² A unified, midstream, state-owned entity was created in December 2019 to ease this problem which has the effect of removing NOC-to-NOC competition and bankrolling additional infrastructural investments.⁴³ Second, another issue present is the difficulty for foreign oil companies to enter the Chinese market, which requires joint ventures with either of China's NOCs.⁴⁴ In 2019, some upstream areas became directly available as a means to encourage foreign investment (albeit technically challenging assets for now). Third, China faces challenges in developing offshore oil reserves, including gaps in technological expertise⁴⁵ and the fact that some deep-offshore assets lie in the disputed territorial waters of the South China Sea. However, reliance on western technology has become less of a hurdle due to the foreign experiences of NOCs (namely by CNOOC), which have now led to the beginnings of a 'Chinese built and operated oil rig era.'⁴⁶ Likewise, though still in its infancy, a policy shift of more-assertive E&P pushes in

42 Although pipelines connecting far-flung fields are numerous, and all pipelines have a third-party access clause, these often run at maximum capacity and are mostly used to connect NOC oil fields to NOC downstream assets, making it difficult for new independent or international players to fiscally develop marginal and far-flung fields. See Monica Sun et al. 'China enacts new measures for third-party access scheme,' (2019).

43 This new unified midstream actor combines infrastructure assets of all of China's state-owned energy majors into one central group, including certain international pipeline networks, such as the Myanmar-China pipeline. It opens up energy transportation to third-party entities, improving competition and decreasing the cost of developing distant domestic assets. This also has the effect of increasing efficiency by avoiding overlapping infrastructure by rival entities. The three NOCs will hold share in this entity, but, crucially, none will have a controlling share. See Muyu Xu et al. 'China sets up state oil, gas pipe firm to boost competition: Xinhua,' (2019), Reuters, [<https://www.reuters.com/article/us-china-energy-pipeline-reform/china-sets-up-national-oil-gas-pipe-firm-in-drive-to-boost-competition-xinhua-idUSKBN1YD06T>].

44 Amongst also having to negotiate other bureaucratic, regional, and state-based hurdles. This had resulted in limiting China's access to foreign capital, and foreign technology, making certain projects unfeasible from the start.

45 In the early 2000s, Chinese deep-water drillers relied mainly on western drilling and rigging technology, including the use of western built and operated offshore rigs. Today, Chinese NOCs are heavily involved in deep water projects around the globe, in markets that western majors deem too costly. Take, for example, Brazil, where in November 2017, three consortia involving CNPC, CPCC, and CNOOC won three major blocks. Similar Chinese NOC presence is found in Mexico, Guyana, USA GoM, Congo, Gabon, Senegal, and Canada. See Jin Huandong & Wu Mouyuan, 'History and Achievements of Chinese Oil Companies' Foreign Cooperation,' (2017), CNPC Economics & Technology Research Institute.

46 Hu Weijia, 'Drilling platform breakthrough in South China Sea,' (2019), Global Times, (<http://www.globaltimes.cn/content/1145871.shtml>).

disputed waters seems to be developing.⁴⁷ Fourth, upstreamers have begun to look into the production of unconventional oil resources since the shale revolution in the US, for which China has great potential on paper.⁴⁸ Expected shale oil production growth in China is limited due to the numerous challenges surrounding its development.⁴⁹ Finally, in order to encourage an increase in domestic production, the Chinese government has set the policy target of increasing domestic energy production by 50% in the next five years.⁵⁰ In response to this policy, each of China's main NOCs has made a series of pledges in order to meet this target. Most pledges from China's NOCs have taken the form of investment expenditure in domestic resources, rather than set production output targets, and have focused on brownfield expansions to *very mature* onshore resources or on risky semi-explored offshore greenfield assets.⁵¹

All things being equal, even though a number of policy decisions have led to more-favourable conditions for investment in China's domestic upstream oil sector, increased domestic output is far from guaranteed. Apart from the physical challenges of China's geology and the technical constraints in developing unconventional

47 With neighbouring countries reacting differently to this development. For example, Vietnam, a long-time critic of Chinese developments in disputed waters, clashed on numerous occasions with Chinese vessels entering the China/Vietnam disputed area. On the other hand, the Philippines recently signed an agreement with the Chinese government to develop offshore gas resources in the China/Philippines disputed area. See: Panos Mourdoukoutas, 'South China Sea: China Targets Vietnam, Again,' (2019), Forbes, [<https://www.forbes.com/sites/panosmourdoukoutas/2019/09/07/south-china-sea-china-targets-vietnam-again/#69c205f67572>]. See also: Prashanth Parameswaran, 'What's in the New China-Vietnam South China Sea Tensions?' (2019), The Diplomat, [<https://thediplomat.com/2019/07/whats-in-the-new-china-vietnam-south-china-sea-tensions/>]. Finally, see also: Panos Mourdoukoutas, 'China Wins the South China Sea Map War Against the Philippines,' (2019), Forbes, [<https://www.forbes.com/sites/panosmourdoukoutas/2019/11/03/china-wins-the-south-china-sea-map-war-against-the-philippines/#11450a0236ee>].

48 According to the IEA's 2017 WEO focusing on energy in China (starting on p.561), China has the third largest shale oil deposits, after the USA and Russia but before Argentina. The largest potential for shale oil development can be found in the Eastern Songliao, Shengli and Bohai basins; within the Ordos basin in North Central China; and in the Far Western Junggar & Tarim basins. As things stand today, however, shale oil developments have been slow to materialise, making up around 1% of all oil production in China. China has had better success with shale gas.

See: Chen Aizhu, 'Shell enters China's shale oil scene with joint study with Sinopec,' (2019), Reuters, [<https://www.reuters.com/article/us-sinopec-shell-shale-oil/shell-enters-chinas-shale-oil-scene-with-joint-study-with-sinopec-idUSKCN1RK146>].

49 Low shale oil output expectations are underpinned by complex geology (deposits are far deeper in the ground than in the US shale fields, and less proximity/concentration of resources), water stress (due to aridity, especially in Xinjiang), logistical constraints (which could potentially decrease with the new unified midstream actor), technological challenges (limited technological transfer from US shale producers), and cost constraints, leading to a general pessimistic outlook on the matter. See EIA WEO 2017 p.561. See also: Rioux et al. 'An Economic Analysis of China's Domestic Crude Oil Supply Policies,' (2019) KAPSARC.

50 Both for natural gas and crude oil production. This adds up to a target of an over-2 mb/d increase, involving an estimated \$77 billion injection of capital into domestic oil production. See: Ed Hirs, 'China is betting big on increasing oil production,' (2019), Forbes, [<https://www.forbes.com/sites/edhirs/2019/06/06/china-is-betting-big-on-increasing-oil-production/#26aa70c36371>].

51 These investment decisions have been taken exclusively to satisfy the state directive, rather than as pure capital ventures, leading to doubts over whether this increased capital expenditure will translate into a significant output increase.

assets, Chinese NOCs need to keep their balance sheets in check. Hence, as capital from NOCs would most likely generate more returns from foreign assets than from domestic ones (given the pre-2020 climate), NOCs prefer foreign assets. This factor needs to be managed by the Chinese state, and up to the point of this writing, the long-term oil volume results of such policy developments are *very* uncertain. That being said, the fact that the Chinese state is pursuing increased domestic production—whether for strategic or political reasons or both—means that NOCs will have little option but to comply. The rhetorical question on the lips of all analysts is: given the realities of the relationship between the Chinese state and the NOCs, how far could China’s domestic production be pushed if enough money were thrown at it? Making this question even more complex is the added layer of problems caused by the current low-oil-price environment triggered by the corona virus and exacerbated by the collapse of the OPEC/OPEC+ deal.

Attracting foreign investment, on the other hand, has also met with scepticism, as acreage that is currently open to foreign investment is technically and economically challenging to develop and, thus, attracts little attention. Even if China achieves success in boosting its domestic production of crude oil, it is *extremely* likely that this will not satisfy all of China’s demand in the mid-term future. Hence, the next chapter will look at the development of China’s oil imports.

CHAPTER 3: CHINA'S OIL IMPORTS

In 2018, China imported just over 9 mb/d of crude oil, making it the world's largest crude oil importer.⁵² More remarkably still, in November 2019, China officially imported more crude oil (on a monthly basis) than the U.S did at its historic peak.⁵³ The *going out* policy described in the previous chapter followed the logic that if China were to source the majority of its crude from abroad, it should actively diversify suppliers as much as possible in order to avoid overdependence on a particular supplier or geographic region. This strategy provides the crucial layer of depth in understanding the extent to which China relies on a particular geographical region, or individual country, to meet its oil consumption growth.⁵⁴

Figure 6 shows China's crude oil imports by region of origin, since 2001. It is clear from the start that, in terms of sheer volume, each region exports more oil to China than it has ever historically done, underpinned by China's growth in oil demand discussed in the previous chapter. With that in mind, even though the largest regional provider of crude oil to China is the Middle East (supplying 4.1 mb/d of crude imports in 2018), proportionally, the region has rarely supplied more than half of China's crude import demand.⁵⁵ This relatively low level of dependence on the Middle East for crude oil imports is a far cry from that of other large Asian economies, which import the majority of their crude oil from the region.⁵⁶ Actively avoiding oil import dependence on the Middle East is a strategy implemented by the Chinese government as a means to avoid regional entanglements, in case of a disruption or crisis.

52 Overtaking the USA in 2017. EIA, 'China surpassed the United States as the world's largest crude oil importer in 2017,' (2018) [<https://www.eia.gov/todayinenergy/detail.php?id=34812>].

53 China's November 2019 Oil Imports: 11.18 mb/d, U.S. historic high import volume: 10.77 mb/d set in June 2005. In the U.S, this event had led to heavy debate, with articles claiming that 'America is addicted to oil'; meanwhile, oil imports in China were not expected to stop growing, until the outbreak of the Covid-19 virus impacted demand. See: Bloomberg news, 'China's Oil Imports are Most World's ever seen and still growing,' (2019), [<https://www.bloomberg.com/news/articles/2019-12-17/china-s-oil-imports-are-most-world-s-ever-seen-and-still-growing>].

54 This paper divides the world into regions in accordance with BP's Statistical Review of World Energy 2019 outline.

55 Between 43% and 56% of China's oil imports originated from the Middle East since 2001. Crucially, the trend since 2016 points to the Middle East exporting less than 50% of China's oil import needs.

56 Consider, for example, that in 2018, India imported 65% of its crude oil Imports from the Middle East, and Japan imported 88% of its crude Imports from the same region that same year. Taiwan and South Korea (74%) fall in between these two figures. Middle Eastern oil dependence for these Asian countries is worse off still, considering that Japan, Taiwan, and South Korea have little to no domestic oil production, with India having very limited output (0.87 mb/d in 2018).

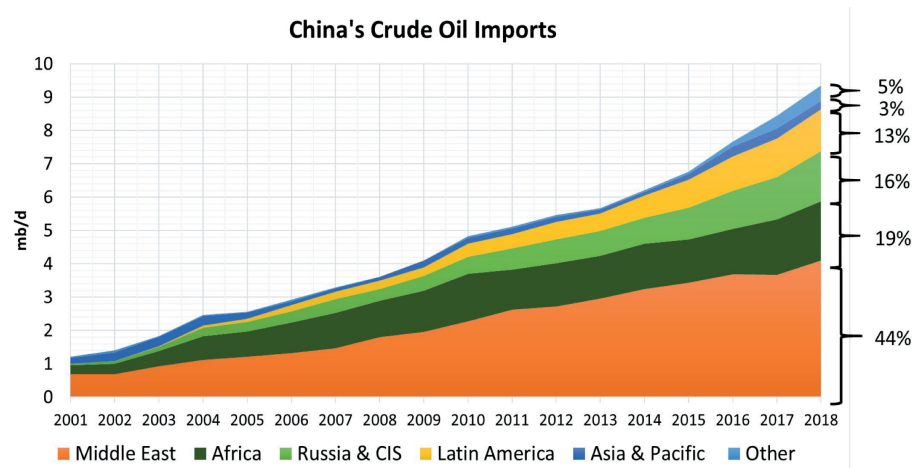


FIGURE 6: CHINA'S CRUDE OIL IMPORTS BY REGION OF ORIGIN. DATA TAKEN FROM A COLLECTION OF BP STATISTICAL REVIEWS OF WORLD ENERGY

China has actively maintained crude oil import diversification, mainly by increasing imports from Africa, the CIS, and Latin America.⁵⁷ In the case of Africa, the majority of these volumes originate from Angola, while Russia provides the bulk of CIS volumes. Remarkable growth in crude import share from Latin America is also clearly visible in Figure 6, as the region now provides 16% of China's import needs, increasingly from Brazil and (although in decreasing volumes) Venezuela. From a regional perspective, therefore, proportionally, the Middle East plays a less prominent role than expected, based on the importance of Middle Eastern supplies to world markets. To put it another way, the entire Middle East supplied China with near-equivalent volumes of Chinese domestic oil output, both around 4 mb/d. Imports from geographical regions do not show the whole picture, however. Therefore, Table 1 highlights the recent changes in China's top 8 crude oil suppliers.

57 Figure 6.

China's Main Oil Supplying Countries

Country	2013	2014	2015	2016	2017	2018 ^{*58}	2019 [*]
Saudi Arabia	1.09	1.00	1.02	1.03	1.05	1.22	1.59
Russia	0.49	0.67	0.85	1.06	1.20	1.47	1.56
Angola	0.81	0.82	0.78	0.88	1.02	1.01	1.02
Brazil	0.11	0.14	0.28	0.39	0.47	0.68	0.90
Iraq	0.47	0.58	0.65	0.73	0.74	0.88	0.97
Iran	0.43	0.55	0.54	0.63	0.63	0.56	0.49
Oman	0.51	0.60	0.65	0.71	0.62	0.67	0.66
Venezuela	0.31	0.28	0.32	0.41	0.44	0.33	0.32

TABLE 1: CHINA'S MAIN OIL SUPPLYING COUNTRIES. USES A COMBINATION OF UN COMTRADE DATA & ENERGY INTELLIGENCE DATA, IN MB/D.

Combined, these eight producers supplied China with almost 7 mb/d of 9 mb/d of crude oil imports in 2018.⁵⁹ Off the bat, then, these eight suppliers are more important to China's oil supply than either China's domestic production or imports from the Middle East. Thus, maintaining favourable conditions to import from these eight producers is critical for China's oil demand. The top spot for China's largest foreign supplier of crude has recently become a tight competition between Saudi Arabia and Russia, the latter of which saw significant increases of exports to China in the past five years.⁶⁰ Most Russian volumes are transported via overland routes, relying less on maritime chokepoints and, hence, have no transit issues, an important security of supply factor for China.⁶¹ The third largest, and most consistent, supplier of crude oil to China is Angola. The oil trade relationship between Angola and China is significant, with Angola providing significant volumes of crude to China since the

58 Collection of Energy Intelligence data from 2018 and 2019. Data are an average of monthly data gathered that year and may differ to official annual import data.

59 Table 1. If one had to calculate further and look at China's top-four crude oil suppliers in that same year, then these four countries provide China with around half of her total imports for the year.

60 In part due to oil pipeline expansions and the subsequent long-term contracts between Rosneft and PetroChina. See Chen Aizhu & Olga Yagova, 'Russia set to pipe more oil to China, stepping up race with Saudis,' (2017), Reuters.

61 Both by means of two major oil pipelines, one as an extension to Russia's Eastern Siberian-Pacific Ocean (ESPO) pipeline, and the other overland across Kazakhstan, entering the Chinese province of Xinjiang, or via overland rail networks. The ESPO pipeline connects Russia's Eastern Siberian fields to the Pacific port of Kozmino. Two spurs off of this pipeline also connect directly to the Chinese market, carrying around 0.6 mb/d from Skovorodino in Eastern Russia to the Daqing oil infrastructure hub. The Kazakhstan-China oil pipeline has a capacity of 0.4 mb/d. However, Kazakh exports of crude oil to China are limited, with most of the pipeline used to transport Russian North Caspian crude oil. Additional volumes are exported from Russia's far eastern port of Kozmino, which lies at the end of the ESPO pipeline. The Northern Sea passage is, at times, cited as a potential future route; however, developments in this route have been thus far limited.

end of the Angolan Civil war in 2002.⁶² Next comes Brazil, which has in recent years become a major supplier of crude to China, due to ramp-ups in its deep offshore.⁶³ Although Middle Eastern countries provided less than half of China's oil import needs collectively, the countries that did provide these volumes were overwhelmingly Saudi Arabia,⁶⁴ Iran,⁶⁵ Oman,⁶⁶ and Iraq.⁶⁷ Finally, Venezuela is China's eighth largest provider of crude oil imports, with volumes seeing a steady decline in recent years due to US sanctions.⁶⁸

On the surface, from a regional perspective, it is argued that China's import dependence on the Middle East has, thus far, been managed, at least in proportional terms. Focus on mitigating dependence on the Middle East does not show the whole picture and is arguably too simple an approach to understanding the risks of dependence on China's oil import partners. Most of China's top- eight oil suppliers, which provide the backbone of China's crude oil supply, have in the last year been subject to the workings of geopolitics, with their volumes increasingly under risk of disruption.

Starting with the most obvious cases, both Iran and Venezuela face US oil sanctions, which has resulted in both countries producing significantly less volumes and, thus, reduced volumes have reached China's shores.⁶⁹ Even though China has applied its

62 Most oil shipments from Angola to China form part of a series of 'loans for energy' deals. Even though the majority of oil drilling in Angola is done by Western majors, the Chinese market still gains over 1 mb/d of crude via loan repayments. Recent discussions point to the fact that Angolan output is declining, leading to potential trouble paying off debt to China in equity oil. See: Begu et al. 'China-Angola Investment Model,' (2018) *Sustainability*, 10, 2936. See also: Yigal Chazan Alaco, 'Angola's debt reliance on China may leave it short-changed,' (2018), *Financial Times*, [<https://www.ft.com/content/fb9f8528-6f03-11e8-92d3-6c13e5c92914>].

63 Many of these barrels also arrived at the Chinese market via 'oil for loan' deals, but also via acreage developed by Chinese NOCs in the area—namely, CNOOC, and CNPC. Brazil became a net oil exporter only in 2011, with increased production from its pre-salt offshore deposits. Recent ramp-ups in the area are also earmarked for the Chinese market. Taken from: PIW 14.06.2019. See also PIW 9.8.2019.

64 Saudi Arabia has a number of long-term supply contracts with Chinese refineries, including a Joint Venture refinery in Fujian [Sinopec owned] and Yunnan's Kunming refinery [with volumes to be exported via the China-Myanmar pipeline].

65 Volumes from Iran have been key for the Chinese economy, due to their composition and grade, which are in high demand from China's refiners. Since the US reimposition of sanctions in 2018, flows from Iran to China have reduced significantly and come under mounting scrutiny, as the US follows its policy of 'maximum security' on Iran.

66 China's oil import relationship with Oman has a long history, with the country steadily exporting over half a million barrels of crude to the Chinese market in the past seven years. This results in Oman exporting over 78% of its crude oil to China, an export dependency figure that has increased in the past number of years. [UN Comtrade Data].

67 Volumes from Iraq have been on the rise in the past number of years, in large part due to Chinese NOC involvement in Iraq's upstream oil sector. Iraq, however, is plagued by midstream pipeline constraints and is finding it difficult to increase exports.

68 That being said, at the time of this writing, China is still the largest taker of Venezuelan crude oil, mainly as direct barrel exchange for Venezuela's debt to China via 'loans for oil' deals, which falls outside of the dollar payment system. Taken from: PIW 14.06.2019.

69 Using the latest available figures, China imported around 0.3 mb/d from Iran towards the end of 2019, and less than 0.1 mb/d from Venezuela towards the end of 2019. see PIW 28.02.2020, and PIW 29.11.2019.

political and economic weight to try to circumvent sanctions, the trend for now points towards compliance.⁷⁰ Second, in the case of Oman and Angola, both countries already export the majority of their crude to China, and both are limited in their outlook for increasing crude oil production.⁷¹ Third, Iraqi crude, although recovering in output in recent years, is plagued with transportation issues; in addition, its location in the heart of the Middle East adds to risks of disruption, given the present geopolitical climate. Relatedly, the recent rise in political uncertainty in the Middle East, including the risk of oil flow disruption, has placed flows from this area under an increased risk of disruption, as was witnessed during the September 14 Abqaiq-Khuras attacks.⁷² All of these geo-political factors are further complicated by the density of crude oil refined in China. As mentioned in Chapter 1, China's refineries are set up to process mainly medium to heavy grades of oil, many of which originate in countries that are under threat of disruption. Granted, although a lot can be done with blending, crude imports from, say, the US, are still limited in their use from the perspective of Chinese refiners.⁷³ This is made even more difficult by the 5% tariff still in place for Chinese refiners importing US crude. The result of all these factors is that, in order to meet oil demand in the medium term,⁷⁴ China may have to rely on a smaller, more concentrated group of suppliers, including Saudi Arabia, Russia, and Brazil. Another concern of China's oil security strategists is the route by which such supplies enter the market. This is analysed in the next chapter.

70 Some Chinese companies circumvent sanctions by strategically using the grey market; by tactical ship-to-ship transfers (which avoids detection from ship trackers); by using Malaysia as a transshipment area for Iranian crude; by establishing banks/companies that have no dealings in US Dollars; and, crucially, crude volumes (particularly from Venezuela) are sometimes direct transfers used to pay off debt from earlier 'oil for loans' schemes, which do not fall under US sanctions. For a more detailed background, see Dan Katz, 'Despite sanctions, China is still doing (some) business with Iran,' (2019), Atlantic Council. [<https://atlanticcouncil.org/blogs/iransource/despite-sanctions-china-is-still-doing-some-business-with-iran/>], & Esfandiyar Batmanghelidj, 'China's Declared Imports of Iranian Oil Hit a (Deceptive) New Low,' (2019), Bourse & Bazaar [<https://www.bourseandbazaar.com/articles/2019/10/23/chinas-declared-imports-of-iranian-oil-hit-new-low-but-dont-believe-it>].

71 Angola exported 60% of its crude oil to China in 2019, with China being the main reciprocate of Omani crude in 2019, too. See Fotios Katsoulas, 'Crude Oil Trade: Angola exports more to China, but overall volumes are down,' (2019), HIS Markit, and Kate Dourian, 'Oman: A Small Oil Player with Big Ambitions,' (2019), The Arab Gulf States institute Washington.

72 Also due to mounting tensions between Iran and Saudi Arabia, and Iran and the USA, along with geo-political uncertainties in many crude oil producing states in the region (such as Libya and Iraq). This has led to a higher level of threat for the disruption of trade flows, particularly oil and gas (LNG) flows through the strait of Hormuz, with potential for disruption in the Bad el Mandab also moderately present.

73 Which naturally leads to the skepticism as to the feasibility of the phase-1 agreement signed between the USA and China in January 2020. Indeed, the US does not only produce light sweet crude (as a product of the shale revolution), but also heavier blends, such as Mars, which has been imported by Chinese refiners before. That being said, most exports from the US are light crude exports.

74 Assuming that the effects of demand destruction caused by the Covid-19 virus stabilize in the short term.

CHAPTER 4: IMPORT ROUTE DIVERSIFICATION

All things considered, no matter which country China imports crude from, the means by which this oil arrives to the Chinese market may also pose a security of supply risk for the country. Due mainly to the geographical constraints of East Asia, the vast majority of imported oil enters China by sea. From a security of supply perspective, diversification of import routes is often favoured in order to reduce the risk of disruption. This chapter will look at the level of success in implementing alternative crude oil trade routes, including the opportunities and challenges faced in pushing this further.

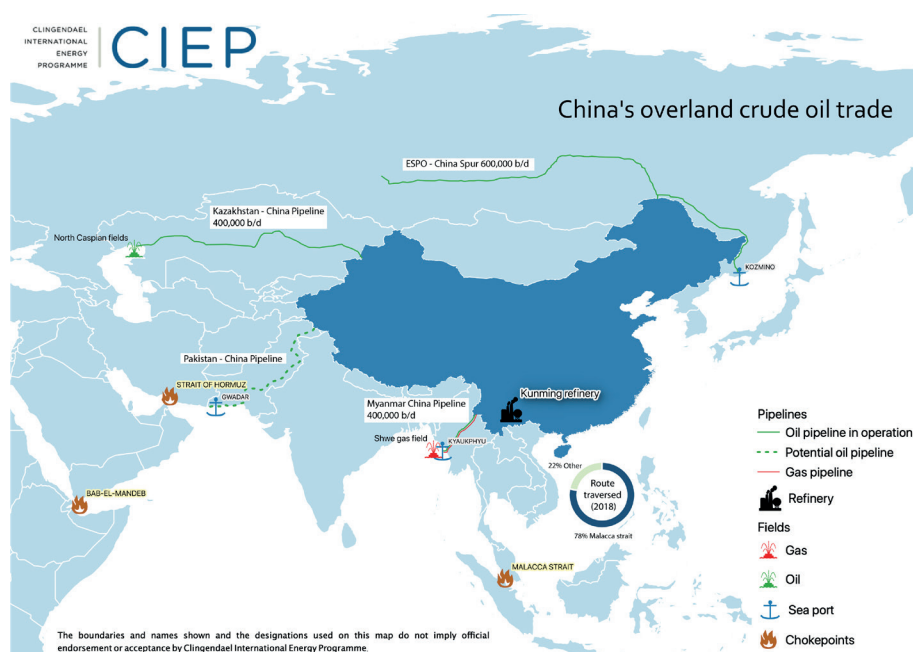


FIGURE 7: CHINA'S INTERNATIONAL CRUDE OIL INFRASTRUCTURE. MAP CREATED BY CIEP USING DATA FROM BP STATISTICAL REVIEW OF WORLD ENERGY (2019)

To begin with, in 2018, from just over 9 mb/d of crude oil imported by China, around 8 mb/d (87%), entered the country by sea.⁷⁵ While this percentage may seem high, consider that as early as 2003, almost all crude oil imports to China came by ship.⁷⁶ Since 2003, in an effort to diversify oil imports away from the South China Sea and Straits of Malacca, three international pipeline networks were constructed (and expanded), bringing around 1.2 mb/d of crude to China by land.⁷⁷ The three international oil pipelines, shown in Figure 7, include the Kazakhstan-China pipeline,⁷⁸ the Mohe-Daqing spur of the East Siberia – Pacific Ocean (ESPO) pipeline,⁷⁹ and the Myanmar-China pipeline.⁸⁰ This, of course, is just a drop in the bucket compared to China's oil demand, meaning that as things stand today, China is dependent upon sea shipping for most its crude oil imports.

In terms of shipping routes, in 2018, about 78% of oil imports passed through the Straits of Malacca.⁸¹ The so-called "Malacca Dilemma," central to Hu Jintao's thinking in 2003, is concerned with the importance of maritime trade for China's economy, particularly transit through the narrow straits of Malacca. A disruption along those straits could have serious, direct destabilising economic consequences

75 Author's calculations based on pipeline capacity that year.

76 With the exception of flows traversing over international rail and road networks. Granted, back in 2003, only around 1.7 mb/d of crude oil was imported, so in absolute terms, this issue was less salient at the time. Volumes of oil imported by rail from Russia are quoted by Henderson and Mitrova to be around three million tonnes in 2016 (c. 0.06 mb/d) [latest data available]. See James Henderson & Tatiana Mitrova, 'Energy relations between Russia and China: Playing Chess with the Dragon,' (2016), The Oxford Institute for Energy Studies.

77 Excluding additional barrels flowing in via international railway networks and highways. In order to compare these volumes imported overland, 1.2 mb/d of crude imports, for 2003's standards, would have included almost all of China's crude imports for that year.

78 Bringing oil from Kazakh and Russian fields, with a capacity of 0.4 mb/d. All things considered, in 2017, China imported a meagre 0.05 mb/d from Kazakhstan, with the rest of this pipeline's capacity, 0.35 mb/d, transporting Russian crude. [UN Comtrade data, 2017]. Initial capacity stood at 240,000 b/d before an expansion to 400,000 b/d in 2013, and the pipeline operates with limited spare capacity. The pipeline runs from the Kazakh Caspian oil fields, to Xinjiang province in Western China, then further into Central and Eastern China, home to China's main refineries. See: EIA, 'China: International energy data and analysis,' (2015), U.S. Energy Information Administration, [https://www.eia.gov/international/content/analysis/countries_long/China/china.pdf].

79 Which has a capacity of 0.6 mb/d, running from Skovorodino in Central Russia to Mohe in China, ending up in the city of Daqing in China's far Eastern Heilongjiang province. The first branch of the ESPO-China spur had a capacity of 300,000 b/d and started operation in 2011, which was later doubled to c. 600,000 b/d, beginning operations by 2018.

80 This pipeline runs from the port on Madé Island, in Kyaukpyu, Myanmar to China's inland Yunnan province. It runs in parallel to a natural gas pipeline; however, unlike the natural gas pipeline, which is used to import offshore Burmese gas deposits, the Myanmar-China oil pipeline has been built solely to bypass the maritime chokepoints of Malacca. Although the oil pipeline has a capacity of 0.44 mb/d, around 0.04 mb/d of capacity is contractually obliged to serve the Burmese market, leaving a maximum capacity of 0.4 mb/d to the Chinese market. See: Eurasian Times, 'Chinese Thirst for Crude Oil Growing; Nearly Equals the Total Production of Saudi Arabia,' (2019), Hellenic Shipping News, [<https://www.hellenicshippingnews.com/chinese-thirst-for-crude-oil-growing-nearly-equals-the-total-production-of-saudi-arabia/>].

81 Eurasian Times, 'Chinese Thirst for Crude Oil Growing; Nearly Equals the Total Production of Saudi Arabia,' (2019), Hellenic Shipping News, [<https://www.hellenicshippingnews.com/chinese-thirst-for-crude-oil-growing-nearly-equals-the-total-production-of-saudi-arabia/>].

for China and, hence, is seen as a vulnerability that China's enemies could target. During the Hu Jintao period, concern over the Malacca straits revolved mainly around preventing actions from non-state actors, which is of less concern in the 2020s. As China's economy keeps growing, however, so does its dependence upon vital sea lanes, whether for resource imports (in this case, crude oil) or for exports of manufactured goods. For this reason, reducing flows transiting from the straits is actively encouraged as a diversification measure to diffuse disruption risk. In the short-medium term, it seems likely that China will witness an increased dependence on this maritime choke point for oil imports. That being said, what are the options under discussion for oil imports to bypass this choke point?

One strategy is to increase overland pipeline routes, which, barring an expansion in capacity of existing networks, is limited. This is due mainly to vast distances to oil sources surrounding China, adding to the cost of developing capacity expansions or greenfield pipeline development. Furthermore, neighbouring states' geo-political concerns about Chinese overreach, as well as the challenging nature of dealing with Chinese NOCs, have often made the idea of increasing pipeline expansion unpopular with China's neighbours, leading to years of negotiation before pipelines see first oil.⁸² That being said, as part of the China-Pakistan Economic Corridor, China announced its ambitions, in April 2015, to connect the port of Gwadar to inland China, with the idea of constructing an overland crude oil pipeline along the same corridor. Although this pipeline may have political backing from both states, some estimates put the cost of bypassing the Malacca choke points via Pakistan at 16.6x higher than traditional overseas routes, complicating the business case for the project.⁸³

Another strategy may be to import oil from alternative sources and to ship the oil using alternate shipping lanes, bypassing the Malacca chokepoint. However, the difficulty in avoiding the Malacca straits lies in the fact that any shipments to China from Europe, the Middle East, or Africa have no alternative but to navigate the

82 This was the case for all three international crude import pipelines. See: Michal Meidan, 'The structure of China's oil industry: Past trends and future prospects,' (2016), The Oxford Institute for Energy Studies.

83 For an analysis on the potential route and cost of this pipeline, see Faheemullah Shaikh, Qiang Ji, and Ying Fan, 'Prospects of Pakistan-China Energy and Economic Corridor,' (2016), Renewable and Sustainable Energy Reviews. Traversing the Himalayas via oil pipeline would require additional infrastructure to keep the crude from freezing, pumping it over some of the highest mountain passes in the world and surviving a highly seismic zone, adding to the cost and engineering challenges. Furthermore, the border between Pakistan and China is heavily disputed by India, which has already expressed concerns over Chinese encirclement in the past, further adding to the geo-political risk. In terms of non-state actors active along the proposed distance of the pipeline, Taliban loyal tribes, East Turkestani separatist groups, and Baluchi separatists all lay claim to significant parts of territory along the proposed route. See also: Jeremy Garlick, 'Deconstructing the China-Pakistan Economic Corridor: Pipe Dreams Versus Geopolitical Realities,' (2018), Journal of Contemporary China.

Malacca straits, without lengthening routes.⁸⁴ Further still, shipments of crude oil arriving at China's shores from across the Pacific, from the US, face two major challenges. First, as discussed earlier, oil produced in the US (which is the main oil supplier that could potentially avoid the Malacca straits) is mostly light and sweet in nature (shale oil) and less desirable for Chinese refineries.⁸⁵ Second, as mentioned earlier China has a 5% tariff in place for crude oil imports from the US, which makes US crude uncompetitive.

All things considered, route diversification efforts in China have had limited success in reducing China's dependence upon the Malacca Straits, at least for oil imports. Undeniably, greater volumes of oil are being transported overland, via pipelines, and over rail and road networks. However, due to the increased volumes of crude oil imported to China, and the logistical difficulty in avoiding maritime choke points, China depends heavily on the Malacca straits and is likely to keep doing so in the medium term. Given the present ease and lack of disruption in overseas trade globally, concerns over Malacca passage for China's energy demand could be argued to be somewhat overstated in the short term.⁸⁶ However, given the increasingly geopolitical nature of energy trade, the issue of developing alternative routes may become more salient.

84 Many of these volumes may even have to navigate other maritime chokepoints, such as the geopolitically risky Strait of Hormuz, or the Bad al-Mandab Strait, and the Suez Canal.

85 As light sweet crude is used mainly in blends in China, competing directly with West African crude, and some North Sea volumes.

86 In a scenario of a blocked passage in the Malacca straits, alternative passage is potentially manageable, affecting time to reach market but reaching the market, nonetheless. For example, certain geo-political thinkers highlight the Sunda Strait and Lombok Strait as alternatives to the Malacca Strait. Alternatively, in a scenario in which both those straits are under blockade, passage via the Timor Sea, or even around the Southern Coast of Australia, are all feasible, albeit at higher costs both financially and in terms of time. Only in a total blockade of China's Eastern Seaboard, could maritime flows be completely halted. See: EIA, 'World Oil Transit Chokepoints,' (2017), [https://www.eia.gov/beta/international/analysis_includes/special_topics/World_Oil_Transit_Chokepoints/wotc.pdf].

CONCLUSION

Since becoming a net oil importer in 1993, China's strategy for crude oil acquisition has been to prioritise investments overseas, rather than to focus on exploiting domestic reserves, for a multitude of reasons. These include more-favourable economic conditions abroad; the acquisition of foreign technology; and as a political measure to support certain oil producing countries. This policy has prioritised a strategy of importing oil from diversified geographical regions and a diversified group of supplier countries, all aiming to mitigate the risk of dependence on specific oil exporters and regions, particularly the Middle East.

This energy brief has shown that China's oil consumption in the past two-and-a-half decades has witnessed significant growth, specifically as the result of oil demand growth for mobility, the petrochemical industry, and the residential, industrial, and agricultural sectors. Energy consumption growth is expected to maintain its trajectory in the medium term, after recovery from the current short-term disruptions caused by the Covid-19 virus. In the short term, these disruptions are mainly the result of China's oil demand freeze in the weeks following the Chinese New Year, as the effects of economic lockdowns have hurt demand for aviation, overland mobility, and oil use in industry. Sources estimate that China's oil demand could shrink by around 1.8 mb/d or more in the first quarter of 2020, just from the direct effects of the decline in mobility demand and the industrial slowdown.⁸⁷ Depending on the duration of the effects in Europe and the rest of the world, knock-on effects to Chinese oil demand will be felt since demand for Chinese products will decrease in the short term in Europe and other economies which will have a reduced demand for Chinese manufactured goods. Beyond affecting the economics of China's domestic oil industry, the drop in demand and the subsequent shock to global oil markets emphasize the importance of China's oil market to its main oil suppliers, many of which depend on China to sell their crude. This is indirectly shown by the knock-on OPEC/OPEC+ disagreement on the 5th of March, with demand reduction in China causing a crisis in oil-supplying countries, effectively leading to a price race to the bottom.⁸⁸

87 Hanna Ziady, 'Oil demand will fall for the first time since 2009 because of the coronavirus, IEA says,' (March 2020), CNN Business, [<https://edition.cnn.com/2020/03/09/business/oil-demand-coronavirus/index.html>].

88 In a nutshell, agreements between OPEC countries and the so called 'OPEC+' members to coordinate production as a cushion against oil price volatility collapsed on the 5th of March, as both Saudi Arabia and Russia ramp up production, in an environment of reduced oil demand. This has, in effect, pushed prices to the low \$30s.

Unlike oil consumption, domestic production of crude oil in China has experienced a long period of stagnation, as oil reserves mature, and upstream investment targets more cost-effective barrels abroad, in line with China's *going out* policy. This, in turn, has led to China becoming the world's largest oil importer. Furthermore, China's oil product demand is met mostly by domestic refining capacity, reducing the need for more-costly oil product imports. China's refining capacity is also geared towards future growth, aiming to become a regional exporter of certain products in the medium term. Hence, safeguarding China's security of oil supply entails sourcing crude oil to feed domestic refineries, rather than sourcing oil products from the international market.

This paper has also shown that China has increased imports of crude oil from the Middle East in terms of volume. However, proportionally, the Middle East has, in the past decade, supplied China with less than half of its crude oil imports. China's crude oil imports have been shown to be diversified from a regional perspective. Nevertheless, China is clearly reliant on a small group of eight suppliers for the bulk of the country's imports, a factor that has the potential to be exacerbated in the future. Simply put, without oil supplies from Russia and Saudi Arabia, China would face serious security of supply trouble, as over 3 mb/d of crude are supplied from these two important, irreplaceable, producers. Furthermore, attempts at oil import route diversification, away from major maritime choke points—particularly away from the Malacca straits—have been shown to be more difficult to implement and, ultimately, have been unsuccessful.

More recently, however, due to risks associated with changes in geopolitics, China's *going out* strategy appears to be under duress. Globalisation is now being discussed in the context of *reaching its peak*,⁸⁹ and '*Mercantilism*,' a term previously reserved for pre-modern European history books, is now making a new appearance in political jargon.⁹⁰ The relationship between China and the US has taken a shift towards the more confrontational in the last years, with the US now officially classifying China as a 'strategic threat.' The ongoing trade war between the two nations has resulted in cross-border energy tariffs, with imports of coal, LNG, petroleum products, and crude oil from the US all subject to this regimen. The resultant *phase-1* agreement reached by the two parties has temporarily halted this conflict; however, it seems

89 See for example Neil Shearing, 'The end of globalisation,' (2019), Capital Economics, [<https://www.capitaleconomics.com/blog/the-end-of-globalisation/>].

90 See as examples: The Economist, 'Why is free trade good?' (2018), The Economist explains. See also: Michael Hirsh, 'Economists on the Run,' (2019), Foreign Policy Magazine.

unlikely that the terms of the *phase-1* agreement will be met, especially given the damaging oil demand effects of the Covid-19 pandemic.⁹¹

In the same vein, the US is increasingly comfortable in implementing economic sanctions against oil exports from regimes deemed unfavourable. Such sanctions directly affect some of China's most important crude oil suppliers, further complicating diversification options for the country. Although China has used its political and economic clout to try to circumvent sanctions, the trend so far points towards compliance. Additionally, a recent rise in potential supply disruptions from the Middle East— clearly highlighted during the September 14 Abqaiq-Khuras attacks and subsequent retaliatory measures—have placed flows from this area under an increased threat of physical disruption.

These mounting global changes have raised the level of doubt over the applicability of China's oil disruption prevention strategies—in particular, the *going out policy* and import source diversification policies, both of which rely on low-risk access to foreign oil producers and a lack of disruption to major sea routes. Given this background, it is clear why Chinese policy makers, especially at the higher levels of government, have been rethinking the country's energy grand strategy, by trying to promote investment and, thus, increased output domestically. On the whole, the success of increasing domestic oil output in China is far from guaranteed at this time, particularly if the oil-price environment remains the same.

The diversity of China's crude oil imports, which, up to this point, has been shown to be actively managed, is now under pressure. Going forward, China will likely see increased dependence on a smaller, more concentrated, and riskier group of crude oil suppliers, a scenario which the Chinese state has been actively (and successfully) trying to avoid in the past two-and-a-half decades. Saudi Arabia and Russia are likely to play an increased role in China's oil supply, given increased flexibility in capacity for both countries and the favourable crude grade produced in both countries. Aside from Saudi Arabia and Russia, very few countries have the capability to meet China's growing demand for the appropriate crude oil grades, resulting in a high potential for increased dependence on these two countries in the medium term. Looking ahead, the geo-political significance of increased imports from both Saudi Arabia and Russia is something to also take into consideration. One likely outcome, once

91 In January 2020, a 'phase one' deal between the two countries was signed, effectively leading to a promise that China will buy \$50 billion of energy goods from the USA in the next 2 years. That being said, China has not removed energy tariffs on US crude oil, LNG, or most oil product imports. See Reuters 2020 [<https://www.reuters.com/article/us-usa-trade-china-commodities/tariffs-fa/factbox-how-china-tariffs-on-us-commodities-energy-stand-after-phase-1-trade-deal-idUSKBN1ZF0C9>]

the effects of the virus have come under control, is that China will quickly recover from the production collapse thanks to the low oil price environment created indirectly by its oil partners Saudi Arabia and Russia, thanks to their ongoing oil-price war. This works to the benefit of all three powers: China gets access to cheap oil, giving it an advantage in rebooting its manufacturing sector, while Saudi Arabia and Russia gain increased oil market share in China, the beacon of oil demand growth in the near-term future.

Daring to go one step further, the era of US foreign interventionism, particularly in the Middle East, has become increasingly unpopular. It seems probable that US non-interventionism will prevail, particularly when keeping in mind public opinion and collective memory in the US. This may create further incentive for China to “fill the void” in the region, potentially resulting in increased political, economic and, perhaps, even military engagements in the Middle Eastern region. This scenario will accelerate if oil transit in the region becomes increasingly threatened, which, due to China’s growing reliance on the region, is an incentive to safeguard oil tanker passage. Of course, this is only one possibility, and, as things stand today, China is a minor actor in the region. Alternatively, as a result of the observed mercantilist actions in the global economy, and especially if trends intensify down a more de-globalised path, the Chinese state might increasingly rely less on the open market to source crude for its domestic demand due to its potential disruption to the Chinese economy. Instead, the Chinese state may opt for a more traditional mercantilist “point-to-point” approach to trade, built on politically guaranteed long-term contracts with high-level political engagement.⁹²

All things considered, from today’s standpoint, China’s security of oil supply seems increasingly challenged from its concentration on specific suppliers. The current geopolitical climate only shows signs of intensifying, both in its mercantilist and its isolationist practices, with China placed at the centre of it all. China’s policy choice to encourage increased domestic production of crude oil will likely take a number of years to develop (if it develops at all), while reduced access to a wide range of crude oil exporters is a reality that has already materialised. It seems increasingly likely that China will rely further on the Middle East for its oil imports, increasing traffic through choke points of the Straits of Hormuz and Malacca. These factors will undoubtedly put pressure on top-level Chinese policy makers to find alternatives for improving the country’s security of oil supply.

92 China used this tactic during its oil import expansion period in the early 2000s, with countries such as Sudan, Kazakhstan, Venezuela, Ecuador, Angola, etc. See for a detailed overview: Michal Meidan, ‘The structure of China’s oil industry: Past trends and future prospects,’ (2016), The Oxford Institute for Energy Studies.



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VISITING ADDRESS
Clingendael 12
2597 VH The Hague
The Netherlands

POSTAL ADDRESS
P.O. Box 93080
2509 AB The Hague
The Netherlands

TEL +31 (0)70-374 67 00
www.clingendaelenergy.com
ciep@clingendaelenergy.com