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The Further Potential of Turkmenistan to Export Natural Gas to China

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This paper aims to explore further potential of natural gas trade between Turkmenistan and China. Turkmenistan, having the fourth-largest natural gas reserves in the World, is in search of export its natural gas further and diversify its gas partners as much as possible. Besides China is the biggest customer of the Turkmen gas, China is the world's biggest energy consumer and increasingly leans towards natural gas for its domestic needs. Hence, China increases the import volumes of natural gas for its domestic needs. Due to the growing natural gas demand by China, Turkmenistan may be affected in terms of both economic and political dependence. However, having taken into consideration the fact that China's share on exported Turkmen gas volumes is the largest since 2011, this dependence is not new for Turkmenistan. In addition to the existing lines in between China and Turkmenistan, completion of Line-D will provide Turkmenistan with 65 bcm natural gas export capacity to China per year (see table 3). Hence, increasing the volume of natural gas export to China can change the natural gas dynamics in the region, and it could be an unmissable chance for Turkmenistan.

Turkmenistan produced approximately 81 bcm of natural gas in 2018, which left a spare production capacity of 18-19 bcm (see table 1 and 2). However, Turkmenistan utilizes the Central Asia-China Pipeline at almost full capacity. The Turkmen gas capacity in Central Asia – China pipeline was 40 bcm annually (see table 3). In October 2018, KazTransGas and PetroChina signed a five-year contract to increase Kazak gas capacity to 10 bcm starting from 2019[1]. Therefore, the Turkmen gas capacity is to drop 35 bcm per annum. Turkmenistan exported 33.3 bcm in 2018 to China via pipeline, hence there is a spare capacity of approximately 1.7 bcm if not more (see table 4). With the completion of Line-D[2] part of the pipeline, the Turkmen gas export capacity to China will increase up to 65 bcm, which will be ready to use the latest in 2023[3](see table 5). Furthermore, China's natural gas needs are linearly increasing in recent years. From 2017 to 2018, China increased its natural gas consumption by 34% (see table 6). They became the world's second-largest LNG importer in 2017, after Japan[4]. LNG met 60% of natural gas demand of China in 2018[5]. However, LNG price instability and China energy policy aiming a diversified and stable natural gas supply make Turkmenistan a non-negligible market for China.

There are several reasons that make China the only reliable market in the short and the medium term for Turkmenistan, and that make Turkmenistan a feasible supplier for China. In 2018, the share of China on Turkmenistan's total natural gas export was 85.1%, while Turkmenistan's share of Chinese natural gas import was 27.07% (see table 4). The reason behind the difference between percentages comes from the Chinese energy policy. China's energy policy built upon security and stability[6,7].

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[2]Miyamoto A., Ishiguro C. *"The Outlook for Natural Gas and LNG in China in teh War Against Air Pollution."* The Oxford İnstitute For Energy Studies, 2018.

[3] Sandalow D., Losz A., Yan S. *"A natural gas giant awakens: China's Quest for Blue Skies Shapes Global Markets."* Columbia |SIPA , 2018.

[4] Tsafos, Nikos. *How Is China Securing Its LNG Needs?*. Washington: CSIS, 2019. Web. Acessed 5 September 2019.

[5]O'Sullivan, Stephen. *China: Growing Import Volumes of LNG Highlight China's Rising Energy Import Dependency*. The Oxford Institute For Energy Studies, 2019. Web. 3 September 2019.

[6] Lizé C. "China's interest in the Central Asian Natural Gas Pipeline for its Energy Security and Diplomatic Strategy*" London School of Economics*.

[7] Owen C. "Chinese Expansion in Central Asia: Problems and Perspectives." *The Foreign Policy Centre*, *2016.*

Diversified import routes are clear implementations of that approach. Therefore, given China being the operator of the two biggest natural gas field in Turkmenistan, already existing pipelines and agreements between two countries, China stands out as a potential long-term customer for Turkmenistan[8]. Moreover, the fact that other potential natural gas export routes, such as Trans Caspian Pipeline (TCP) and Turkmenistan-Afghanistan-Pakistan-India Pipeline (TAPI)[9], seems unlikely to be realized due to the regional, political and economic dynamics raises China as the only possible option to increase export volumes of Turkmen gas. Yet, there is a growing concern for Turkmenistan regarding significant dependence on China in terms of the gas export [10,11]. Hence, this economic dependence causes further dependence on other areas, such as political dependence. Moreover, the profits from China's purchase is lower than expected. The reason stems from the long-term agreement with China on development over the fields, investment in infrastructure and, exploration and production (E&P) investments (see table 2). Turkmenistan repays loans from China again with a portion of the gas fee from China[12]. Thus, economic dependence may deepen with the heavy debt burden put by China on Turkmenistan.

On the other hand, there seem no crucial obstacles to the Chinese side in terms of increasing Turkman gas imports. Since China's natural gas imports by countries are diversified (see figure 1) and the share of Turkmen gas is 27.07% in the total volume of China's gas import, there is no such a case of dependence on Turkmen gas when compared to Turkmen dependence to China[13] (See table 4). In fact, Turkmenistan is more stable and secure, in terms of energy supply, than the other countries that export LNG to China by maritime, such as Qatar and Indonesia (see fig. 2). Transportation and price volatility risk of LNG from Qatar is an important issue (see fig. 1). Besides, Australian LNG carries resource and transportation risks, and there is troubling political risk in Malaysia (see fig. 1). Transportation risk of LNG supplier countries is caused by unsafe status of the Strait of Malacca (see fig. 3). Contrary to the given facts regarding LNG suppliers of China, Turkmen gas price draws more stable graph over the years. For instance, the price of Australian LNG was $114.8 per thousand cubic meters (mcm) in 2009 and prices are almost doubled in 2015 with $222.4 per mcm, besides that the price of Turkmen PNG was $272.6 per mcm in 2010 and $308.5 per mcm in 2015 (see table 7).

Overall, further export of Turkmen gas to China seems the only viable option in the short and medium term for Turkmenistan. Having the fourth largest gas reserves in the world, Turkmenistan targets to export its natural gas to the foreign markets. Nonetheless, Turkmenistan runs into difficulties in the path of export its gas because various projects Turkmenistan involved, like TAPI, seems unlikely to come true. On the other hand, China as a country being the biggest consumer of energy needs to satisfy its increasing gas demands. Central Asia – China pipeline, as the basis of Turkmenistan-China gas trade, encompasses three pipelines (Line A, Line B, and Line C) delivering Turkmen gas via Uzbekistan and

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Kazakhstan. Another pipeline between the countries (Line D) will provide additional 30 bcm to China, following a different route compared to other pipelines. Intersection of policies and mutual benefits push both countries to cooperate on natural gas trade.

Table 1: Turkmenistan Natural Gas Statistics between 2014 - 2018

(in BCM)	2014	2015	2016	2017	2018
Production	80	83.7	79.7	80.5	80.7
Consumption	35	43.4	42	41.7	41.2
Export	45	40.3	37.7	38.8	39.1

Source: OPEC Annual Statistical Bulletin, 2019.

Table 2: Turkmenistan Natural Gas Fields

Gas Field		Operator	Partners	Production Capacity (in BCM)	Estimated Gas in Place	Connected Pipeline
Onshore	Bagtyyarlyk	CNPC	Turkmengas	13	1.7 Tcm	Turkmenistan-China Gas Pipeline
	Dauletabad	Turkmengas	-	35-38	1.4 Tcm	TAPI Pipeline
	Galkynysh	CNPC	Turkmengas	40	19 Tcm	TAPI Pipeline Turkmenistan-China Gas Pipeline
	Malai	Turkmengas	CNPC	6-7	-	Turkmenistan-China Gas Pipeline
	Shatlyk	Turkmengas	-	3	1 Tcm	East-West Pipeline Central Asia Centre (CAC)
Offshore	Block-1	Petronas Carigali	-	12	538 Bcm	-
	Cheleken	Dragon Oil	-			-
TOTAL				109	23,64 Tcm	

Source: Stanford University[14]; Hydrocarbons Technology[15]; Oil&Gas Industry of Turkmenistan, RPI, 2009[16]; Oil&Gas Journal[17]; CNPC[18]; Petrofac[19]; Eurasian Research Institute[20]

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Table 3: China's Existing and Proposed Natural Gas Import Pipelines

		Current (in bcm)	Future imports (in bcm)	Remarks
Central Asia-China Pipeline	A line and B line	30	30	Turkmenistan gas, began operation in December 2009 and October 2010 respectively
	C line	25	25	Turkmenistan(5 bcm), Uzbekistan(10 bcm) and Kazakhstan(10 bcm), began operation in June 2014
	D line	-	30	Expected to begin operation in 2020-2023
Myanmar		12	12	Began operation in August 2013
Russia		-	38	Power of Siberia Pipeline, expected to begin operation at the end of 2019.
TOTAL		67	135	

Source: China's Gas Development Strategies, SHELL DRC

Table 4: Turkmenistan China Gas Outlook

	2017	**2018**
Turkmenistan's total gas export	38.8	39.13
Turkmenistan's gas export to China	31.7	33.3
China's total gas import	92	123.4
China's Share on Turkmenistan's Export	81.70%	85.10%
Turkmenistan's Share on China's Gas Imports	34.4%	27.07%

Source: Ceic Data[21], CNPC[22]

[21] *Turkmenistan Natural Gas: Exports,* CEIC, 2019. Web. 29 August 2019.

Table 5: Natural Gas Contracts of Turkmenistan with Other Countries

Countries	Year of Start	End Year	Planned Longevity	Annual Export (in bcm)	
Russia	2003	2016	25	2003-2008	40
				2008-2015	10
				2015-2016	4
	2019	2024	5	2019-2024	5.5
China	2009	2039	30	2009-2010	13
				2010-2014	30
				2014-2020	55
				2020-2027	65*
Afghanistan-Pakistan-India	2020	2050	30	2020-2027	33
Iran	1997	2016	N/A	1997-2007	4-6
Kazakhstan	N/A	2015	N/A	-	-

*Pipeline capacity is expected to be increased by 10bcm in 2020. (Petroleum-economist)

Source: The Diplomat[23]; Ups and Downs of the Russia-Turkmenistan Relationship[24]; The Guardian[25]; EIA; HydrocarbonsTechnology

Table 6: China Natural Gas Statistics between 2014-2018

(in BCM)	2014	2015	2016	2017	2018
Production	126.8	130.5	132.7	144	150.1
Imports	57.6	59.6	72.8	92	123.3
Consumption	184.5	190.1	205.5	236	276.3

Source: OPEC Annual Statistical Bulletin, 2019.

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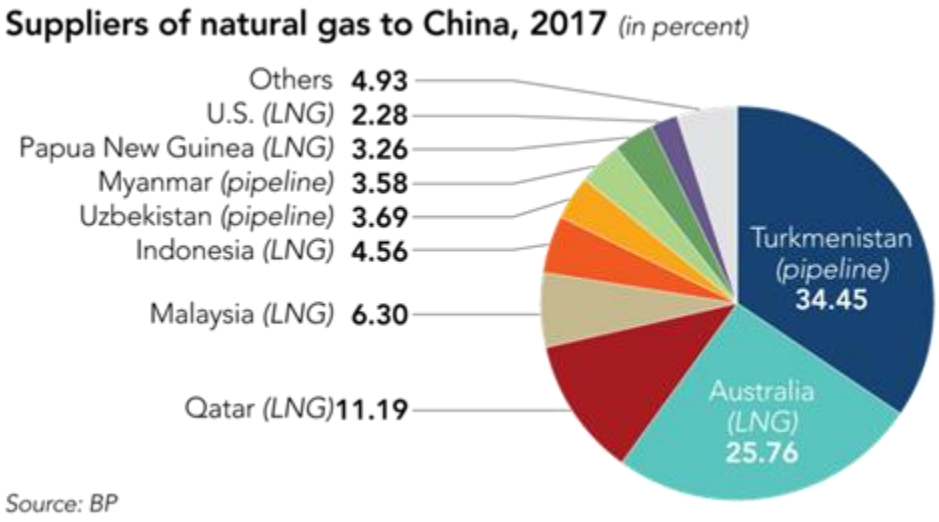
Table 7: The Imported Gas Price ($/thousand cubic meter(mcm))

	2009	2010	2011	2012	2013	2014	2015
Australia	114.8	136.3	129.1	129.1	129.1	136.3	222.4
Indonesia	186.5	165.0	150.6	157.8	143.5	236.7	330.0
Qatar	373.0	480.6	631.3	695.8	660.0	667.1	466.3
Malaysia	236.7	243.9	315.6	301.3	301.3	315.6	351.5
Yemen	–	394.5	423.2	516.5	538.0	645.6	473.5
Turkmenistan	–	272.6	322.8	387.4	358.7	358.7	308.5
Uzbekistan	–	–	–	344.3	330.0	322.8	251.1

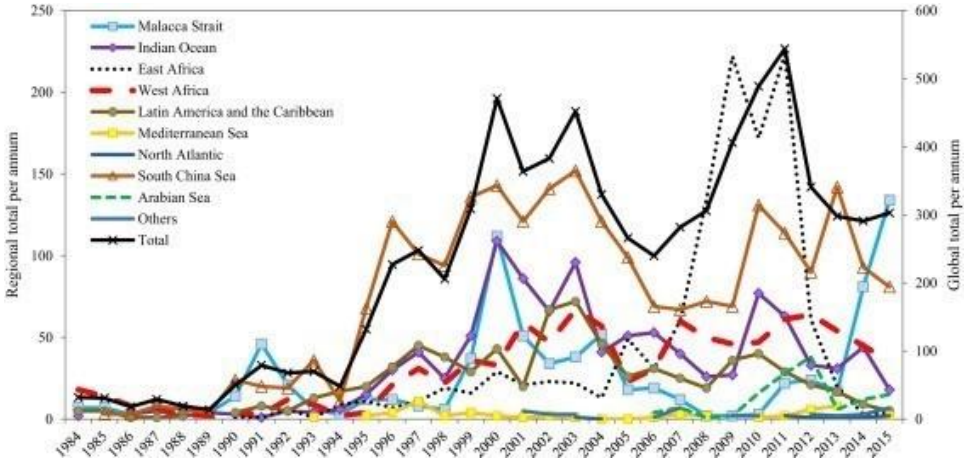
Source: Kong, Z., Lu X., Dong X., Jiang Q., Elbot N. "Re-evaluation of Energy Return on Investment (EROI) for China's Natural Gas Imports Using an Integrative Approach." 2018 [26]

Figure 1: Suppliers of Natural Gas to China



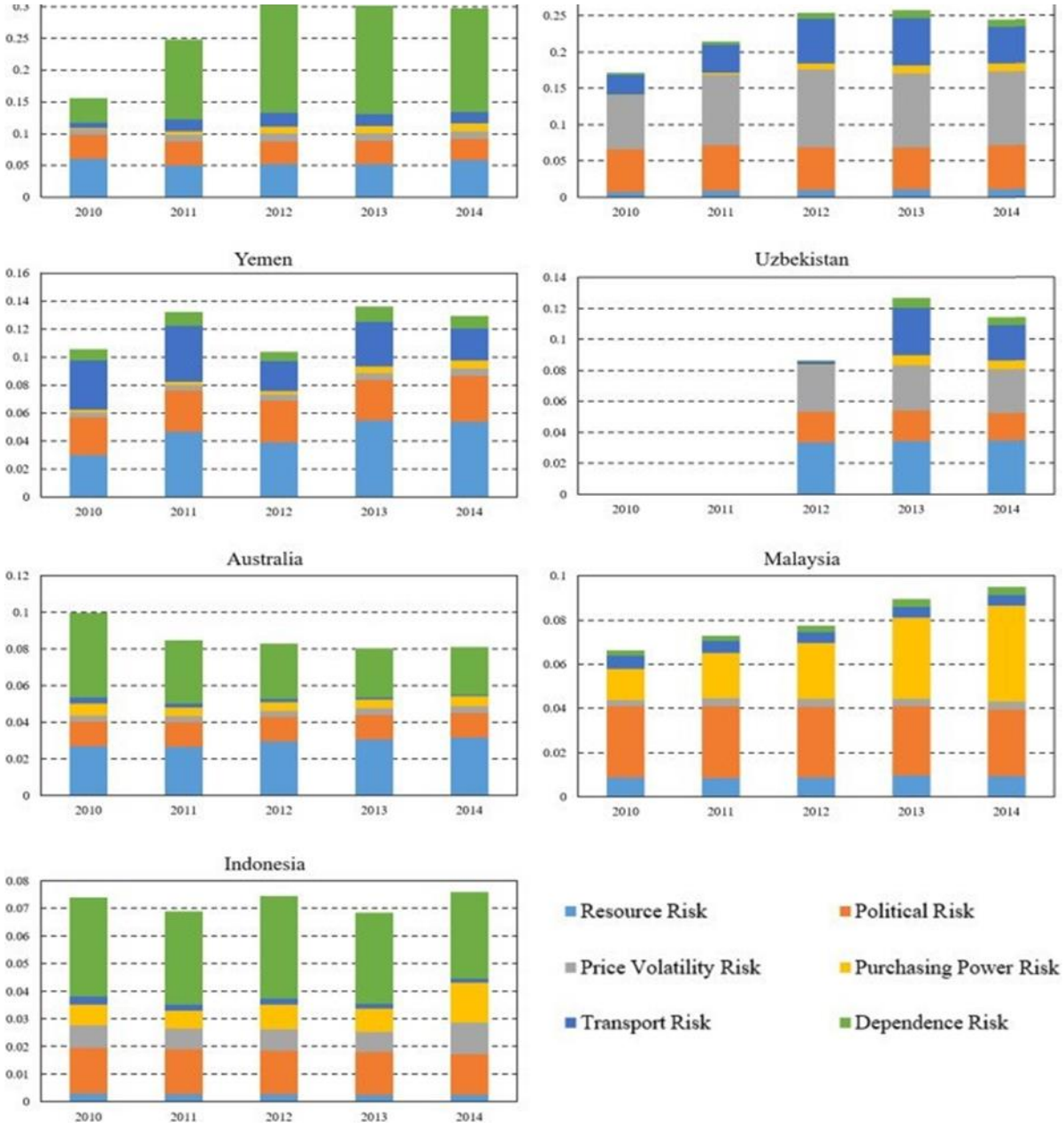
[26] Kong, Z., Lu X., Dong X., Jiang Q., Elbot N. "Re-evaluation of Energy Return on Investment (EROI) for China's Natural Gas Imports Using an Integrative Approach." *Energy Strategy Reviews*, vol. 22, 2018, pp. 179-187.

Figure 2: Global Piracy Attacks by Regions in 1984–2015



Source: IMO 2018

Figure 3: Risk Outlook of China's Natural Gas Suppliers



Source: Kong Z., Lu X., Jiang Q., Dong X., Liu G., Elbot N., Zhang Z., Chen S. "Assessment of Import Risks for Natural Gas and Its Implication for Optimal Importing Strategies: A Case Study of China." *2019* [27]

[27]Kong Z., Lu X., Jiang Q., Dong X., Liu G., Elbot N., Zhang Z., Chen S. "Assessment of Import Risks for Natural Gas and Its Implication for Optimal Importing Strategies: A Case Study of China." *Energy Policy*, vol. 127, 2019, pp. 11-18.