An Overview on the China Oil and Gas Market

Grasu Stelian
ASE Bucharest

The article presents China's oil and gas market, outlining its legal framework regulatory authorities of the market transport and distribution entities. Furthermore, the article discusses the primary strengths of China's oil and gas sector, including extensive government support, rising domestic demand, and substantial investments in both strategic reserves and international partnerships. It also identifies areas of vulnerability, such as heavy reliance on imports, regulatory unpredictability, aging infrastructure, and environmental concerns, which challenge industry stability. Lastly, the SWOT analysis highlights key opportunities for growth in technology and innovation and market liberalization identifying external and internal risks.

Keywords: China oil and gas market, energy price evolution, China energy mix energy mix

INTRODUCTION

China's oil and gas sector is one of the principal components of the global energy landscape 2024. Conducted by its rapidly growing economy and population, China is the world's largest importer of crude oil and ranks among the top consumers of natural gas. This immense demand makes China's energy policies influential worldwide, with its market dynamics affecting energy security, pricing, and sustainability. Faced with the dual challenge of ensuring an adequate energy supply and pursuing energy independence, China's approach involves diversifying energy sources, boosting domestic production, and integrating renewable alternatives.

China's domestic energy consumption is powered mainly by its transportation, industrial, and residential sectors. Heavy industries, manufacturing, and urban growth generate high energy demand. To meet these needs, China relies on its major state-owned enterprises, known as NOC's, which oversee production, refining, and distribution within the country. These national oil companies (NOCs) have increased their efforts in order to develop the exploration of internal natural resources including the shale gas reserves from resource-rich areas such as Xinjiang and Sichuan. However, despite these efforts, China continues to rely on imports for over 70% of its oil requirements, which creates vulnerabilities tied to foreign energy markets. In response, the government has implemented policies to improve energy efficiency and minimize waste, while encouraging a shift to natural gas as a cleaner-burning fossil fuel that can serve as a transition resource.

Internationally, China's energy import strategy aimed to establishing trade routes across Asia, Africa, and Europe. China invests in energy infrastructure in oil- and gas-rich countries, which supports supply chain diversification and reduces China's reliance on any single region, especially in Middle East. Global outreach includes long-term import agreements with energy-rich nations like Saudi Arabia, Iran, and

Russia. Furthermore, China's investment in the Power of Siberia pipeline, a project with Russia, directly provides a steady flow of natural gas to China, strengthening its energy security by creating a reliable alternative to imported gas from other regions.

In addition to ensuring a secure supply China has committed to reducing its carbon footprint, adopting its "Dual Carbon Strategy" to obtain a carbon-neutral economy until 2060.

In line with this objective, the Chinese government has designated natural gas as a "transition fuel," allowing for a gradual move away from coal while supporting cleaner power generation. As a result, China has significantly expanded its liquefied natural gas (LNG) imports and domestic infrastructure for gas transport and storage. This transition aligns with policies encouraging the adoption of cleaner energy solutions in urban areas, power generation, and industrial operations, reducing the environmental impact of China's energy needs.

LITERATURE REVIEW

Taylor, M. in its 2012 "China's Oil Industry: 'Corporate Governance with Chinese Characteristics'" present the evolution of China's national oil companies (NOCs)—CNOOC, CNPC, and Sinopec. It presents the mid -1990 reforms and their effects which maintain the government's strong control in these companies.

Yijun Liu and Li Ma in "Impacts of low oil price on China and the World Natural Gas Industry Chain" publish in 2016, present the consequences of mid-2014 crude oil fall, which affected the global gas industry. It presents the impact of this fall in China, which lead to structural reforms and a reevaluation of growth strategies amid ongoing rapid industry development.

Liao, J. X. in 'The Chinese Government and the national oil companies (NOCs): who is the principal?" issued in 2016 asses that starting with 2012, China overtook the U.S. as the top energy consumer and, by 2013, became the world's largest oil importer, making energy security a primary concern. The government relies on national oil companies (NOCs) like Sinopec, CNPC, and CNOOC to ensure supply, boosting domestic production and global exploration. It is presented their monopolistic advantages and inefficiencies.

Liu, Q. et al.'s in their 2018 "China's Energy Revolution Strategy into 2030" present the official policy regarding the energy sector. The article suggests that with enhanced energy efficiency, China have the possibility to slow down its energy demand, peaking CO2 emissions by 2020. This shift could position China as a leader in this field and aid its transition to a low-carbon energy system.

In their 2019 "Main Controlling Factors of Enrichment and High-Yield of Deep Shale Gas in the Luzhou Block, Southern Sichuan Basin" Yang and Liu investigate the environmental impact of deep shale gas extraction.

Pan, X. et al.'s in their 2020 "Analysis of China's oil and gas consumption under different scenarios toward 2050: An integrated modeling" examines China's oil and gas consumption through five scenarios leading to 2050. Under the National Development and Reform Commission scenario, oil consumption peaks by 2035, while gas use grows until 2050. In scenario targets, China's 2050 oil consumption decreases by 10–45% relative to NDC levels, but gas usage rises until 2040. While oil and gas will remain critical to China's energy mix, high import dependency for oil and gas continues to present energy security risks.

Wang, Z. et al., in "Status, trends and enlightenment of global oil and gas development in 2021" published in 2022, review the global gas and oil industry status and trends in 2021, examining field distribution, production changes, and untapped development potential. It is proposed certain recommendations for international cooperation focus on securing offshore development, concentrating assets in stable regions, expanding the full gas and oil distribution chain, and acquiring high-quality assets for sustainable growth and strategic long-term benefits.

Dou, L. et al.'s in their 2022 "Analysis of the world oil and gas exploration situation in 2021" present the status of global has and oil industry which faced reduced investment and drilling due to ongoing challenges, but success rates, particularly in deepwater areas, improved, leading to a slight increase in new reserve discoveries. The authors recommend that Chinese oil companies invest early in global deepwater

basins, enter emerging global basins, collaborate with national oil companies for deep onshore exploration, and engage strategically in shale opportunities.

JIA, A. et al., in "Forecast of natural gas supply and demand in China under the background of Dual Carbon Targets, published in 2023, highlights natural gas's vital role in China's carbon-neutral goals. Using an enhanced LEAP model with BP Neural Networks, it projects key data on future energy demand, carbon emissions, and natural gas use. Results indicate primary energy demand will peak by 2035, emissions by 2025, and natural gas consumption by 2040 with major growth in the power and industrial sectors. Peak gas production, expected between 2800–3400×10^8 m³, underscores significant expansion potential for China's natural gas industry.

ASSESSMENTS

China Oil and Gas Market Regulations

China's legal framework operates as a layered and structured system, with a hierarchy beginning at the national level and extending down to local authorities and corporate regulations. A unique feature of China's legislative approach consists in the use of "trial rules and procedures," which are applied on a provisional basis. This temporary application allows relevant stakeholders to evaluate these rules and provide feedback on their effectiveness and practical application.

National laws set the overarching legal foundation and are more challenging to modify, often governing the entire system at a high level. In contrast, the operation of various industrial sectors is shaped by secondary regulations. These national laws offer general guidance, but due to the difficulty of amending them, the secondary regulations and specific industry rules play a central role in driving sector-specific reforms and adaptations within the legal framework.

The exploration of mineral resources in China is regulated by **"The Mineral Resources Law**" adopted in 1986 and amended in 1996 and 2009. According to this law and China constitution, all mineral resources are state propriety, including all soil and subsoil resources, on continent or sea. The Chinese government established how the mineral resources are exploited. Seizing and damaging of these resources by anyone are prohibited by the law. Companies that intend to explore China mineral resources should apply to the government according the laws. The law gives exception of this obligation to existing mining companies, which already have this approval. The law promotes the development of state-owned mining companies and the mining companies belonging to local communities. The transfer of mining license is prohibited with two exceptions according the law. Soil and undersoil resources are exploited according centralized plan approved by State. The supervision and the administration of mineral resources is done by" department in charge of geology and mineral resources "under State Council authority. Establishing a mining company in China is subject to" department in charge of geology and mineral resources "approval, who verifies that all requirements stipulated by law are fulfilled and only after that issue the license. A special approval from State Council is needed to mine near harbors, airports defense locations, important industrial premises, railways, natural and historical places and other locations prohibited by law.

The Oil and Natural Gas Pipeline Protection Law adopted in 2010 regulate the design, construction and protection of national pipeline transport and distribution system. It does not regulate the pipelines which are located in cities and industrial facilities. The law has provisions regarding the development of the pipeline networks, their protection and repairs, and the sanctions involved.

The Regulation on Registration of Exploitation of Mineral Resources adopted in 1998 and amended in 2014 establish he rules which must by respected by companies which intend to exploit natural resources from state-planned mining areas and territorial waters, both for national and foreign investments.

The Regulation on Sino-foreign Cooperation in the Exploitation of Onshore and Offshore Petroleum Resources, which was amended in 2013, stipulates the rules, the operation and the involved tax which should be paid by companies involved in on-shore and off-shore exploitation of petroleum resources. The investment is protected by state expropriation which can appear only on the circumstances expressly provided by law. China National Offshore Oil Company is the state company involved in off-

shore foreign investment and China National Petroleum Corporation and China National Petrochemical Corporation are the two state companies involved in foreign investment cooperation on -shore.

The Measures for Regulation of Fair and Open Access to Oil and Gas Pipeline Facilities adopted in 2014 as trial for 5 years and become definitive in 2019 establish the rules for the third parties into national pipeline network. The trial scheme establishes that the access to the national pipeline networks can be granted to third parties only if it is a ***surplus capacity,*** on basis of first solicitant. This method give place to a lot of interpretation and abuses. The new legislation adopted in 2019 intend to assure open and undiscriminated access national pipeline.

The Environmental Impact Assessment Law states the country's strategy for protecting the environment against the effects of the economic and social activities. According to the law, effects on environments must be evaluated in a professional, impartial and scientific manner.

China Energy Market Regulatory Authorities

In China, the National Development and Reform Commission (NDRC) adopts and implements laws and regulations in oil and gas. This Commission also have competence to establish the investment and tariffs policy. In fact, NDRC is the policy and decision maker in energy sector as per people party instructions. Among its main tasks we can mention:

- Establish the social and economic strategy through national and reginal planning system.
- Oversee the implementation of establish strategies and implement the needed changes if it is necessary.
- To establish strategies of cooperation with foreign investments
- Supervise entire economy investments
- Make and implement reginal development strategies
- Establish industrial development strategies
- Promote innovation as an important factor of economic growth
- Promote economic growth in accordance with environment protection strategies

The exploration of gas and oil is under surveillance and administration of Ministry of Natural Resources (MNR). The licensing and production -sharing contract is under Ministry of Commerce administration.

China Energy Market Transport and System Operators Distribution System

China oil and gas transport and distribution system belong to the State and is organized in five National Oil Companies (NOCs).

China National Petroleum Corporation (CNPC), established in 1988 is the largest producing company on physical and revenue volume with about USD 483 billion, being classified by Fortune Global companies list as forth company.

The company area of activity starts from exploitation and goes to retail business, employing over 1 mil people worldwide.

Most company activation is organized under its Hong Kong Stock Exchange listed company Petro China, founded in 1994. In 2007 it was listed in Shanghai Stock Exchange.

China Petroleum and Chemical Corp. aka Sinopec, founded in 1983 in Beijing, with revenue of about USD 471 billion, being the fifth Fortune Global company's list ranked company, is considered the biggest oil supplier and the second oil producer. Employing over 500.000 people worldwide, company activity covers the entire production and delivery chain. The company is listed both on Hong Kong Stock Exchange and Shanghai Stock Exchange.

Sinochem Group founded in 1950 in Beijing, was formed during the reorganization of China's largest international trading firm, **China National Chemicals Import and Export Corporation.**

Sinochem Group is considered today as the biggest country's chemical company that has expanded its operations with new fields of activity like real estate, financial services, agriculture and energy. Being ranked in Fortune Global companies list on 38th place, with about USD 172 billion revenue, company have about 300 subsidiaries among we can mention Sinochem International, China Jinmao and Sinofert.

China National Offshore Oil Corporation aka CNOOC, founded in 1982 in Beijing, is specialized in offshore gas and oil exploration. Besides China's offshore waters company's activity is develop in 20 countries all over the world. With USD 164 billion revenue the company is ranked 42nd position in Fortune Global companies list. The company is listed on the Hang Seng Index and its activities include also refinery, power production, engineering and retail business. Majority of company's activities are organized under its subsidiary CNOOC Limited.

Shandong Energy Group, founded in 2020 in Jinan, Shandong merged with Yankuang Group is focus mainly in coal exploitation, electric power, manufacturing and logistic. It also involves in shale oil production. The company is ranked in 72nd position on Fortune Global companies list with USD 124 billion revenue, employing over 232.000 people. In China it has over 20 subsidiaries and owns 10 different global and national companies worldwide.

Starting with 2019 China *implements "Measures for Regulation of Fair and Open Access to Oil and Gas Pipeline Facilities".* These determine the gas and oil network operators to give access on "fair and open "premises to third-party users. It is also stipulating the access conditions, price and metering involved. In order to ensure fair and open access in 2019 was founded Pipe China which operates long-distance gas and oil networks which were assigned from NOC's. This newly founded company will play the central role on gas transportation sector.

Today Market

In today's world, energy markets play a vital role globally in strengthening energy supply security, ensuring fair pricing, and supporting the collective commitment to reducing CO2 and greenhouse gas emissions.

As the world's largest energy consumer, China remains net importer for carborne -based fuels, despite its leading production capacity driven by major state-owned companies.

China is advancing to achieve carbon neutrality by 2060, with decentralization and provincial decision-making as key strategies alongside efforts construct sole national market. Declared "energy revolution" focuses on reducing pollution and promoting electricity and natural gas from clean technologies. Despite strides in renewable energy, coal demand remains high due to logistical challenges: mines are primarily NW and N regions while major consumers are in the east and south. In 2011-2020, coal transport covers about 80% of energy logistics followed by electricity transmission.

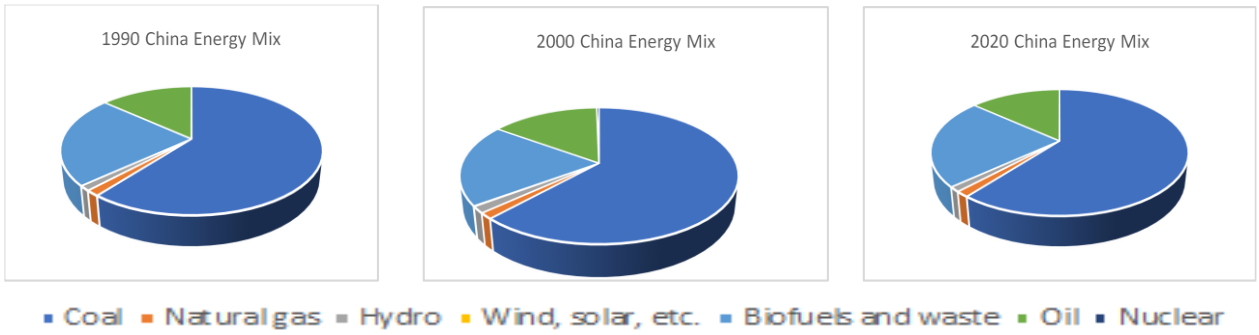
TABLE 1
1990-2020 CHINA ENERGY SOURCES

Year	Coal		Natural gas		Hydro		Wind, solar, etc.		Biofuels and waste		Oil		Nuclear		TOTAL
	Production	**%**	**Production**	**%**	**Production**	**%**	**Production**	**%**	**Production**	**%**	**Production**	**%**	**Production**	**%**	
1990	22,211,650	60.74	536,080	1.47	456,192	1.25	1,388	0.004	8,392,235	22.95	4,973,396	13.60		-	**36,570,941**
1995	27,131,803	62.02	627,918	1.44	686,077	1.57	54,157	0.124	8,573,514	19.60	6,534,880	14.94	139,996	0.32	**43,748,345**
2000	27,970,456	58.92	869,018	1.83	800,690	1.69	110,795	0.233	8,297,043	17.48	9,244,890	19.47	182,585	0.38	**47,475,477**
2005	50,392,934	67.55	1,624,042	2.18	1,429,261	1.92	221,166	0.296	7,050,149	9.45	13,306,545	17.84	579,142	0.78	**74,603,239**
2010	74,961,358	70.56	3,742,244	3.52	2,560,979	2.41	665,155	0.626	5,580,688	5.25	17,917,681	16.87	805,964	0.76	**106,234,069**
2015	83,697,393	66.65	6,639,779	5.29	4,012,092	3.19	2,056,636	1.638	4,758,105	3.79	22,555,622	17.96	1,863,153	1.48	**125,582,780**
2020	88,963,268	60.69	11,101,199	7.57	4,758,344	3.25	4,474,057	3.052	5,603,192	3.82	27,682,038	18.89	3,995,509	2.73	**146,577,607**

International Energy Agency published China Energy Sources for the period 1990-2020.

During last 30 years electric plants based on coal maintain their share of about 60% of the electricity production. Biofuels, however, saw a sharp decline, dropping from 23% in 1990 to 3.8% in 2020. This decrease was offset by rises in other energy sources: natural gas increased from 1.47% in 1990 to 7.57% in 2020, renewables grew from 0.004% to 3.5%, oil from 13.6% to 18.89%, and nuclear energy from 0% to 2.73%.

FIGURE 1
CHINA ENERGY MIX EVOLUTION ON DECADE BASIS



China's traditionally centralized and regulated energy market aimed to ensure fair resource access and stable prices through planned power generation and consumption. Since 2015, local power markets were promoted to improve efficiency, with Document No. 9 as a pilot. By 2022, around 61% of electricity was traded on market principles which represent a growth of about 39% comparing with 2021. Today bilateral wholesale contracts make up about 79% of the energy market.

China plans to transform its regional pilot markets into national internal spot markets, improve energy distribution, and preserve local autonomy. In this framework, law stipulates priority access to certain renewable producers and residential users, while others must trade energy directly. Starting with 2018, electric-coal plants launched post-2015 are required to sell using the free market system. In 2021, commercial and industrial users began sourcing power directly from producers or the grid, eliminating the standard pricing system.

The NRDC's 2020 "*General Rules for Medium- and Long-Term Power Trading Outline"* contract models between generation companies, grid operators, and users. Medium- and long-term contract prices are negotiated with limitations; coal-produced energy, for instance, is capped at ±20% of the set indicative price, while renewables have no cap. Additional fees, including transmission and subsidies, also apply.

Despite local regulation of energy markets, Document No. 118 establishes a roadmap for centralized coordination to begin in 2025 and complete by 2030, with the state aiming for streamlined national oversight.

Starting with 2019, at NDRC decision, China opens to foreign investment the access to upstream gas and oil networks. It is regulated that foreign companies can hold up to 100% of networks companies shares involved in this field.

The foreign companies with investment in this sector usually close production sharing contracts (known as PSC) where they agree to sell NOC's gas and oil production at the prices established in market conditions for long-term contracts with the corrections involved by transport, delivery, quality and payments terms.

The price for extracted oil and gas are not subject to regulation in China but the refined products prices are. The government fixes the price for State reserves and Xinjiang Production and Construction Corps whereas the wholesale and retail prices for transport and business are only guided.

Every ten-business day, diesel and benzine prices are adapted to international quotations. For LNG the price is still strictly regulated by State in spite of the lately steps toward liberalization. As an exception is the price for unconventional gas, national offshore extraction and LNG.

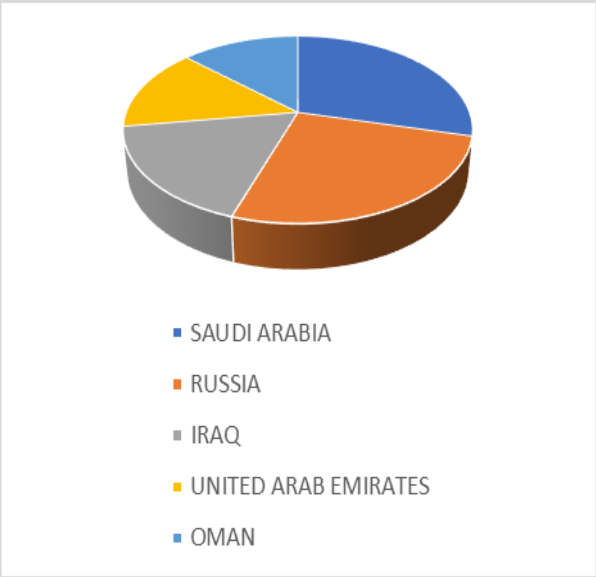
The price for gas extracted from national onshore facilities and delivered to the population is still regulated presently but some changes is expected to be shown in future, according to Catalogue of Pricing Control by Central Government adopted in 2020.

Bellow table presents the major sources of China's crude oil on 2022 information.

TABLE 2
CHINA CRUDE OIL IMPORT PARTNERS 2022

COUNTRIES	%	VALUE USD BIL
SAUDI ARABIA	17.8	65
RUSSIA	16	58.4
IRAQ	10.7	39.1
UNITED ARAB EMIRATES	8.8	32.2
OMAN	8	29.2

FIGURE 2
CRUDE OIL IMPORT SHARE



The above five exporters of crude oil cover about 61.2 %. Besides this, China imports smaller exporters like Albania, Algeria, Bolivia, Brunei and Ivory Coast.

The rise of the COVID 19 restrictions restarted China's economy, which generates the increase of refined oil consumption, leading to an important increase in imports. In first half of 2023 China experienced an increase of the crude oil imports of 12 % comparing with 2022 reaching to 11.4 million barrels /day, according to information publish by General Administration of Customs. Speaking about the import sources in the first half of 2023, the imports from Russia rose 23%, from Saudi Arabia about 7%, from Brazil 49%.

The biggest monthly imports of crude oil were received from Russia, reaching to 2.6 barrels /day in June 2023.

In spite of political divergencies the crude imported from US in first half of 2023 doubled from first half of 2022.

China's imports from Malaysia experienced an increase of 46% compared to the first half of 2022, reaching about 1 million. Experts suspect that part of this crude oil is coming from Iran and is re-branded as coming from Malaysia with the scope of overpass the sanction.

The new Shenghong Petrochimical Refinery which starts production at the end of year 2022 in Lianyungang with designed capacity of the 320.000 barrel/day and Petro China Jieyang with a capacity of 400.000 barrels/day (in trials since February 2023) is stimulating also crude oil imports to satisfy an increased domestic demand.

SWOT ANALYSIS ON CHINA OIL AND GAS MARKET

TABLE 3
CHINA ENERGY MARKET SWOT ANALYSIS

STRENGTHS	**OPPORTUNITIES**
Broad Market Presence: Being world leading consumers and importers of oil and gas, China offers significant growth opportunities for both local producers and global energy firms.	**Incorporation of Advanced Technologies:** Significant growth potential exists through the adoption of new technologies, which can transform processes from exploration to distribution while also reducing environmental impacts.
Strong Government Support: The industry enjoys considerable governmental support, including financial incentives, strategic policy initiatives, and large-scale investments in infrastructure, fostering sector growth and resilience.	**Market Liberalization:** The gradual opening gas and oil industry to foreign competition has the potential to improve service quality and to increase efficiency and implementation of innovation.
Growing Energy Demand: Driven by rapid industrial growth, urbanization, and increased vehicle ownership, China's energy needs are expected to continue rising steadily.	**Increased Role for Natural Gas:** With the global shift towards cleaner energy, natural gas can become a central component in China's energy transition, presenting substantial growth opportunities.
Strategic Reserves and Global Investments: China has heavily invested in strategic oil reserves and strengthened its energy security through international partnerships and investments in foreign energy assets.	**Enhancing Global Partnerships:** Strengthening international trade relationships and collaborations can help ensure more stable energy supplies for China while reducing risks related to geopolitical conflicts.
WEAKNESSES	**THREATS**
Dependency on Energy Imports: China's strong carbone -based fuels expose the sector to international price fluctuation and external political and economic factors.	**Geopolitical Instability:** International trade tensions and strained relations could disrupt energy provisioning and involve price fluctuations, which can be potential risks to market stability.
Aging Infrastructure: Some parts are outdated and inefficient, requiring upgrades or replacements to boost operational performance and meet environmental standards.	**Economic Uncertainty:** Economic downturns in China or globally could reduce gas and oil requirement adversely affecting the industry.

Unstable Regulatory Landscape: The gas and oil industry frequently encounter unpredictable regulatory changes, which can discourage investment and disrupt market stability.	**Transition to Renewable Energy:** The rapid global move toward renewables can lead to a long -term reduction of fossils fuels demand.
Environmental Challenges: Having its important role in environment degradation, China's industry has led to increasing pressure to adopt more sustainable and eco-friendly practices.	**Changing Regulations and Regulatory Costs:** New environmental and safety regulations may raise operational costs and impose stricter compliance requirements, potentially affecting industry profitability.

CONCLUSION

China's energy market based on gas and oil represent a key role on international energy market, characterized by significant demands, strategic complexities, and ambitious objectives. With a continuously growing economy and escalating energy needs, China has become the largest global importer natural gas and crude oil. To cover these needs, China has developed a multifaceted approach that seeks to secure a stable energy supply by diversifying sources, enhancing domestic production, and aligning its strategy with long-term environmental goals. Through its state-owned enterprises, extensive international partnerships, and robust investments in infrastructure, China has become a critical influencer in global energy dynamics, impacting market prices and shaping supply chains.

At the core of the gas and oil sector are its major state-owned enterprises (SOEs), like China National Petroleum Corporation, Sinopec, China National Offshore Oil Corpotation. Above mentioned entities control exploration, refining, and distribution within China and work closely with government policies to drive market objectives, such as increasing domestic production, expanding refining capacities, and decreasing reliance on imports. Yet, despite substantial initiatives, China continues to import over 70% of its crude oil, primarily from suppliers like Saudi Arabia, Russia, Iraq, and the UAE. This heavy reliance on imports exposes China to the volatility of global markets, underscoring its susceptibility to geopolitical and economic shifts that could disrupt its energy supply.

China has embarked on significant initiatives to diversify its sources and safeguard its supply chains to mitigate these risks. A central element of this strategy is the Belt and Road Initiative (BRI), a vast international infrastructure project aimed at fostering long-term partnerships in energy-rich regions across Asia, Africa, and Europe. The BRI includes substantial investments in energy infrastructure—pipelines, ports, and storage facilities—in countries with abundant carbon-based fuel reserves. For instance, Russia's Power of Siberia pipeline delivers natural gas directly to China, offering a reliable supplement to Middle Eastern imports and buffering against global market fluctuations. These strategic collaborations enhance China's energy security and consolidate its position in the international energy market.

China's policy regarding gas and oil industry emphasized environmental sustainability, aligning with the nation's "Dual Carbon" goals to peak carbon emissions by 2030 and reach carbon neutrality by 2060. As part of this initiative, China has promoted natural gas as a "transition fuel" to facilitate a gradual shift from coal. In response, China has rapidly scaled up its LNG and expanded gas storage and transport infrastructure. This shift supports cleaner energy consumption in urban areas, power generation, and industrial sectors, aligning with policies aimed at reducing China's overall environmental footprint. However, logistical challenges, including transporting resources to high-demand regions, keep coal an integral part of China's energy portfolio.

While renewable energy infrastructure has seen rapid development in China, gas and oil remain essential for industry and transportation sectors' high energy demands. Now China have installed largest solar, wind, and hydrogen systems, establishing itself as a leader in renewable energy. However, technical

hurdles, such as energy storage limitations and the scale of needs, mean that fossil fuels shall be very important to China's energy system in the short to medium term.

Consequently, China's energy policy prioritizes stability and phased transition, using renewables to complement rather than replace fossil fuels, promoting a balanced approach to meeting its energy needs.

Regulatory reforms prove to be very important for gas and oil market. The government has introduced policies to encourage foreign investment in sector, increasing competition and enabling technology sharing. Recent liberalization measures have also opened access to national pipeline networks and LNG imports, fostering a more competitive market landscape. Despite these advancements, China's regulatory environment remains complex, with varying degrees of control that can sometimes limit market predictability and deter certain foreign investments. The additional environmental compliance pressures also encourage domestic and foreign operators to adopt sustainable practices.

In conclusion, China's gas and oil market is characterized by its strategic focus on securing energy supplies, regulatory evolution, and commitment to long-term environmental goals. Supported by extensive government involvement, major SOEs, and relying on international partnerships, China strives to address its energy needs while managing import provocations. 2000. It was obvious that whether the credit card debt crisis or the dual-card crisis, it was inseparable from the 1997 Asian financial crisis. Therefore, if the causes of Taiwan's dual-card crisis needed to be explored, it was necessary to understand the Asian financial crisis in 1997.

REFERENCES

Chen, G., & Kim, S. (2018). Environmental Challenges of China's Oil and Gas Sector and Strategic Responses. *Environmental Science & Technology.*

Dou, L., Wen, Z., Wang, J., Wang, Z., He, Z., Liu, X., & Zhang, N. (2022). Analysis of the world oil and gas exploration situation in 2021. *Petroleum Exploration and Development*, *49*(5). https://doi.org/10.1016/s1876-3804(22)60343-4

Fu, X., & Zhang, L. (2022). Economic Effects of Market Structure in China's Oil and Gas Industry. *Journal of Energy Economics*.

International Energy Agency. (2023). *Building a Unified National Power Market System in China Pathways for spot power markets*.

Jia, A., Cheng, G., Chen, W., & Li, Y. (2023). Forecast of natural gas supply and demand in China under the background of "Dual Carbon Targets." *Petroleum Exploration and Development*, *50*(2), 492–504. https://doi.org/10.1016/s1876-3804(23)60404-5

Kahrl, F., & Wang, X. (2014). *Integrating Renewables into Power Systems in China: A Technical Primer—Power System Operations*. Beijing, China: Regulatory Assistance Project. Retrieved from http://www.raponline.org/document/download/id/7459.

Kahrl, F., Dupuy, M., & Wang, X., (2016). Issues in China Power Sector Reform: Generation Dispatch. *Discussion paper*. Beijing, China: Regulatory Assistance Project. Retrieved from http:// www.raponline.org/wp-content/uploads/2016/07/rap-kahrl-dupuy-wang-china-generator-dispatch-reform-july-2016.pdf

Levine, M.D., Liu, F., & Sinto, J.E. (1992). China's energy system: Historical evolution, current Issues, and prospects. *Annual Review of Environment and Resources*, *17*, 405–435.

Li, H., & Cheng, S. (2020). The Impact of International Trade on China's Oil and Gas Market. *International Journal of Energy Research*.

Liao, J.X. (2014). The Chinese government and the national oil companies (NOCs): Who is the principal? *Asia Pacific Business Review*. doi.org/10.1080/13602381.2014.939893

Liu, F., Zhang, X., & Wei, Y. (2019). Foreign Direct Investment and China's Oil and Gas Industry: A Risk Assessment. *International Business Review*.

Liu, Q., Lei, Q., Xu, H., & Jia-hai, Y. (2018). China's energy revolution strategy into 2030. *Resources, Conservation and Recycling*, *128*, 78–89. Doi:10.1016/j.resconrec.2017.09.028.

Pan, X., Wang, L., Dai, J., Zhang, Q., Peng, T., & Chen, W. (2020). Analysis of China's oil and gas consumption under different scenarios toward 2050: An integrated modeling. *Energy, 195*, 116991. https://doi.org/10.1016/j.energy.2020.116991

Sun, Y., & Zhu, X. (2021). Regulatory Policies and Their Implications on China's Oil and Gas Sector. *Energy Policy Journal*.

Taylor, M. (2012). *China's Oil Industry: Corporate Governance with Chinese Characteristics*. DOI:10.1057/9781137271655_4

Wang, B., & Zhao, L. (2020). Impact of Government Policies on the Oil and Gas Industry in China. *Journal of Energy Markets*.

Wang, Z., Fan, Z., Zhang, X., Liu, B., & Chen, X. (2022). Status, trends and enlightenment of global oil and gas development in 2021. *Petroleum Exploration and Development*, *49*(5). https://doi.org/10.1016/s1876-3804(22)60344-6

Xu, J., & Cao, X. (2022). *Regulatory institutional reform on the power sector in China*. https://doi.org/10.1016/j.egycc.2022.100082

Yang, D., & Liu, Z. (2019). Environmental Regulations and Their Impact on the Oil and Gas Sector in China. *Environmental Management Journal*.

Yang, H.Z., et al. (2019). *Main Controlling Factors of Enrichment and High-Yield of Deep Shale Gas in the Luzhou Block, Southern Sichuan Basin*. Natural Gas Industry.

Yijun, L., & Ma, L. (2016). Impacts of low oil price on China and the world natural gas industry chain, *Natural Gas Industry B, 3*(5). https://doi.org/10.1016/j.ngib.2017.02.010.

Zhang, Y., & Chen, H. (2021). Energy Security and Economic Growth in China: A Comprehensive Analysis of the Oil and Gas Sector. *Energy Policy Journal*.

Zhao, D., & Lee, J. (2022). Technological Innovation in the Oil and Gas Industry: (maritimeawarenessproject.org) The Case of China. *Energy Innovation Journal*.

Zhao, D., & Wang, F. (2023). Technological Innovations in China's Oil and Gas Industry: Prospects and Challenges. *Technology in Society*.