

The Future of the Petrochemicals Industry and Sino-Saudi Cooperation

About KAPSARC

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Key Points

The global petrochemicals industry is facing challenges from slow economic growth, the increased price volatility of feedstocks, intensified geopolitics and trade barriers, and growing health, safety and environment requirements, and needs to enhance its resilience so that it can achieve future growth.

This enhancement may include flexible feedstock portfolio strategies, securing transport access, flexible product portfolios, and vertical integration along the supply chain. However, in the long run, innovation will be crucial for market participants to capitalize on the bigger margins available in the high-end product segments. Comprehensive digital solutions, information management and strategic planning will also help participants improve their competitiveness.

There is the potential for increasing Sino-Saudi trade and investment cooperation in the petrochemical sector, based on both countries' complementary strengths and development plans under the Belt and Road Initiative and Saudi Vision 2030, respectively. The Gulf Cooperation Council (GCC)-China free trade agreement (FTA) could also facilitate regulatory convergence and more liberal trade remedies. Reducing Chinese import tariffs on GCC products and alleviating non-tariff barriers could improve the financial performance and investment potential of the GCC's petrochemical sector. These measures could be mirrored by the GCC member countries for Chinese exports of downstream petrochemical products.

Summary

The Covid-19 pandemic and the responses to it have had a pronounced impact on the global economy. Major consuming sectors for petrochemicals, including cars and appliances, construction and textiles, have suffered a slump in demand. The production outputs of petrochemicals also vary across regions and countries, with the Gulf Cooperation Council (GCC) countries and China the least affected. Slowed economic growth, increased price volatility of feedstocks, intensified geopolitics and trade barriers, growing concern over health, safety and environment (HSE) standards, among other disrupters, are driving changes in the petrochemical industry.

How can petrochemical companies withstand the current macroeconomic and industrial turbulence? The primary response is to enhance financial discipline and operational efficiency to ensure sufficient liquidity and strong balance sheets. Agility and optionality emerged as beneficial strategies across the petrochemical value chain. In the upstream sector, this would enable producers to adjust their feedstock portfolio based on the prices and availability of competing feedstocks. In the midstream sector, the key priorities are securing access to petrochemicals feedstock extraction, pipeline and storage capacities, and the ability to reach target markets. In the downstream segment, flexible product portfolios can facilitate the efficient reallocation of sales across geographies. However, in the long run, the petrochemicals sector will have to prioritize innovation to be able to capitalize on the bigger margins available in the high-end product segments, such as electronic chemicals, high-end membranes and biodegradable materials.

China and Saudi Arabia play a critical role in the global petrochemical markets. Under the umbrella of China's Belt and Road Initiative (BRI) and Saudi Vision 2030, both countries can achieve closer cooperation along the petrochemical supply chain and strengthen the supporting ecosystem for industrial development. The total capital expenditure (capex) of Saudi-invested petrochemical projects in China amounts to \$35 billion, with a projected output of 21.7 million tonnes by 2025. The capex of Chinese-invested petrochemical projects in Saudi Arabia only amounts to \$12.5 billion, with 5 million tonnes of projected output by 2025. To break this discrepancy, it is crucial for both sides to lower the barriers to foreign direct investment, improve the transparency and equality of relevant policies, and facilitate specific projects through the use of incentives.

Besides the bilateral framework between Saudi Arabia and China, Saudi Arabia can play a more strategic role in fostering new economic zones between China and the Middle East and North Africa (MENA) region. The GCC-China free trade agreement (FTA) could be the first step toward this goal. Reducing Chinese import tariffs on GCC products and alleviating non-tariff barriers could improve the financial performance and investment potential of the GCC petrochemical sector. These measures could be mirrored by the GCC countries for Chinese exports of downstream petrochemical products. The GCC-China FTA framework could also facilitate regulatory convergence and more liberal trade, rebuilding confidence in global trade and investment cooperation.

Background to the Workshop

This is the fourth in the series of KAPSARC workshops that examine China's Belt and Road Initiative (BRI) from the perspective of Saudi Arabia and Saudi Vision 2030's strategic roadmap. The workshops aim to improve the understanding of key policies and driving forces around industrial development and energy transition in Saudi Arabia and China. Unlike previous workshops, this workshop was held as an online webinar due to the Covid-19 pandemic.

Through the partnership between KAPSARC, Sinopec Economics and Development Research Institute and the Gulf Petrochemicals and Chemicals Association, this workshop, held on September 14, 2020, brought together over 40 petrochemical policy and industrial experts from Saudi Arabia, China and elsewhere. It aimed to outline the challenges and opportunities for the petrochemical industry and Sino-Saudi cooperation. Key discussions that emerged in this workshop included:

What is the short- and medium-term outlook for the petrochemical industry?

What are the best strategies to cope with the current market turbulence and mitigate future risks?

What are the most promising areas for Sino-Saudi cooperation? Which national, bilateral and multilateral policy frameworks can help facilitate this process?

How would amplified cooperation contribute to achieving the respective national strategic goals?

Growing Global Uncertainties

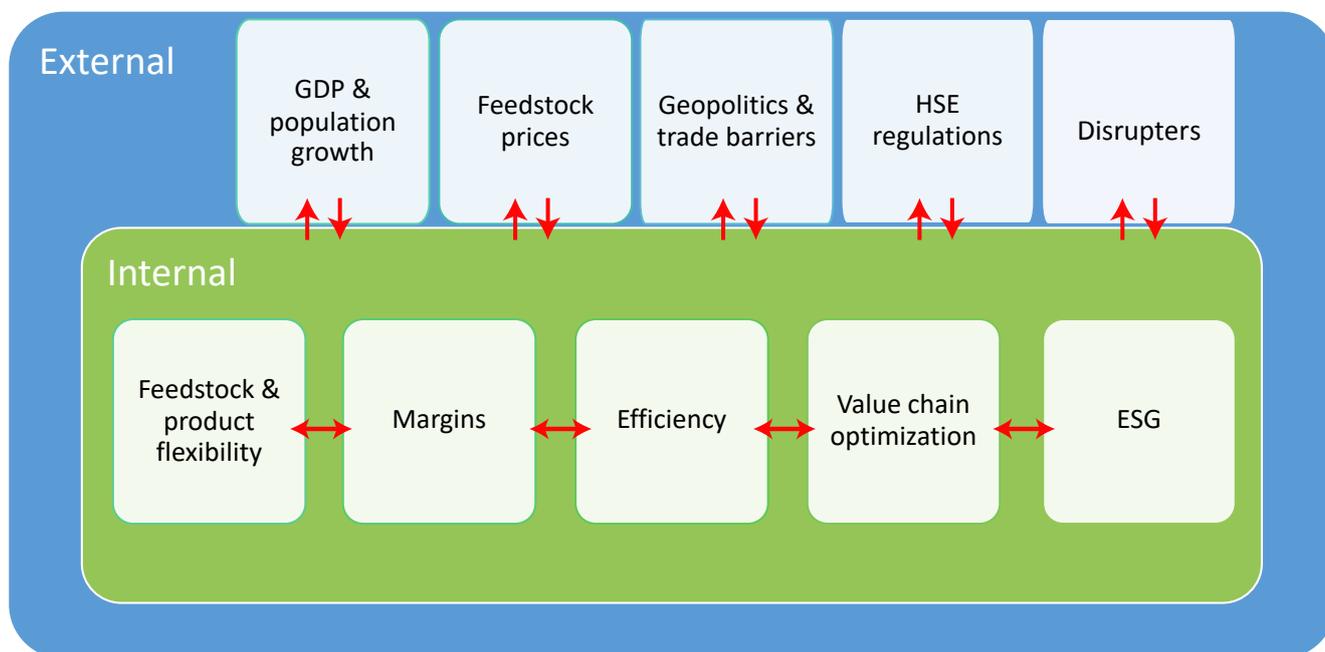
The Covid-19 pandemic and the policy responses to it have had a pronounced impact on the global economy. Some estimates projected global gross domestic product (GDP) shrinking by 2.5-3% in 2020. World exports fell by 15% in the second quarter of 2020. Other economic indicators, such as unemployment, manufacturing indices (i.e., the purchasing manager's index) and retail sales, have also been trending negatively. These challenging global economic indicators, however, vary significantly across regions and countries. India and the United Kingdom's GDP fell in the second quarter of 2020 by over 20%. Other countries, such as South Korea and Russia, experienced a much shallower quarterly contraction of -3.2%. Over the same period, total North American exports fell by 24.5%, compared with 5.1% in Asia.

The petrochemical industry has not been spared from the slowdown in economic growth. Major consuming sectors, including automotive and appliances, construction and textiles, suffered a slump in demand due to the global lockdowns. The appliances, textiles and construction sectors are expected to rebound in the short to medium term, while the reduction of demand for petrochemical products from the automotive and aviation industries may turn systemic.

The lockdowns also created regional differences in industrial production. In the first six months of 2020, global petrochemical output fell by 3.4% against the same period in 2019, while the 27 European Union countries' petrochemical production fell by 5.2%. The GCC countries' and China's industrial production have so far been the least impacted, falling by 3.0% and 2.1%, respectively, in the same period. China managed to reverse this fall with a monthly increase in production from April to June. While many other countries have postponed or canceled their capacity expansion plans, Chinese refinery and naphtha cracking projects are proceeding according to schedule.

Increased volatility in oil and gas prices negatively affects petrochemical producers' margins. Intensified geopolitics and rapidly changing foreign trade regulations add risks to global petrochemical supply chains. In addition, growing concerns around health, safety and environment (HSE) standards place additional requirements on the sustainability of petrochemical production. All these disruptions and uncertainties, as shown in Figure 1, among others, are driving the transformation of the petrochemical industry.

Figure 1. Future of petrochemicals – external and internal factors.



Source: KAPSARC.

Enhancing Resilience Through Flexibility and Innovation

As the second wave of the Covid-19 pandemic spreads across many countries, it is difficult to estimate the final magnitude of the impact it will have on the global economy and the petrochemicals sector. Virtually every industry participant has already been impacted by the disruptions. More challenges are likely forthcoming. How can petrochemical companies withstand this pressure and uncertainty?

The first and most obvious response to this macroeconomic and industry turbulence is for corporations to ensure they have sufficient liquidity and maintain strong balance sheets. Financial discipline and operational efficiency are essential tools in achieving these goals. For example, many industry players have already decided to cut their capital spending, which has resulted in a number of new projects being canceled or postponed. These include, among others, the canceled integrated ethane cracker and polyethylene project in Kazakhstan, the suspended Corunna cracker expansion, and postponed polyolefin projects in Texas and Louisiana.

Strong performing companies with solid balance sheets can exploit the current market turbulence to capture unique asset purchase and mergers and acquisition opportunities to further cement their competitive advantages. Depending on their existing structures and development strategies, companies can improve their global positioning by adding assets that can help them to penetrate markets with strong demand projections (e.g., in the Asia-Pacific), gain access to affordable feedstock (e.g., in the Middle East) or capitalize on reindustrialization trends in developed economies.

Vertical integration along the value chain has become a global trend in the petrochemical industry,

specifically in refining and chemical operations. Such integration offers increased flexibility in product offerings and the utilization of feedstock (Figure 2).

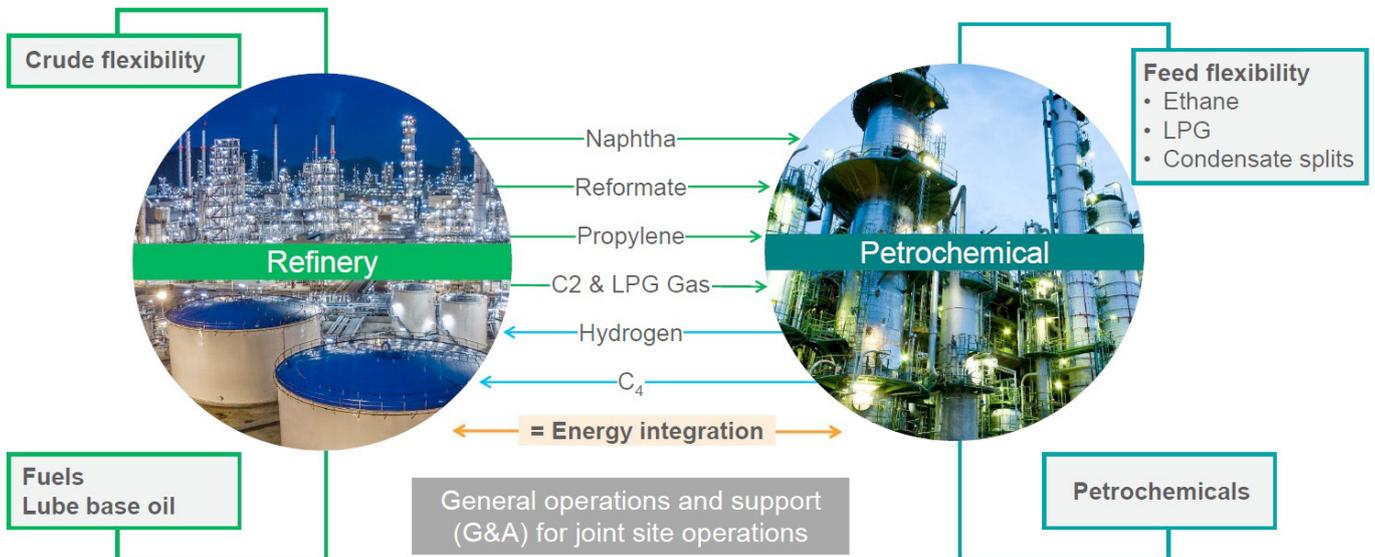
Companies can also develop and implement a variety of adaptation strategies specific to the petrochemicals industry. Every segment of the industry's value chain can be made more resilient to current and potential market disruptions.

In the upstream sector, fluctuating input prices give the most flexible producers a competitive advantage. Depending on the market situation, they can decide whether to extract natural gas liquids (NGLs) and/or strip out ethane from natural gas or keep it in the parent stream. They can also choose to convert crude oil to fuels or chemicals, and adjust the feedstock portfolio based on the prices of competing feedstocks such as ethane, natural gas, NGLs, propane and naphtha.

In the midstream/transportation sector, the key focus areas are ensuring the availability of supply – by securing access to sufficient feedstock extraction, pipeline and storage capacities – and the ability to reach target markets (which may shift rapidly) in a time- and cost-efficient way.

In the downstream segment, the flexibility of product offerings is essential due to fluctuations in demand and margin levels. As some of the major consuming industries, such as automotive or aviation, stall, the structure of demand for petrochemical products shifts. Flexible product portfolios can also facilitate the efficient reallocation of sales across geographies and distribution channels.

Figure 2. Enhanced flexibility of integrated petrochemical operations.



Source: Sinopec Economic and Development Research Institute.

In the long run, petrochemical companies will have to prioritize their innovations and research streams to capitalize on the bigger margins available in the high-end, new product market segments, such as electronic chemicals, high-end membranes and biodegradable materials. New technologies and processes, which are increasingly considered

in government regulations, can also improve the petrochemical industry's environmental sustainability. Innovations in comprehensive digital solutions, information management and strategic planning are critical, increasing the agility and optionality in this challenging market environment.

Boosting Prosperity Through Closer Sino-Saudi Cooperation

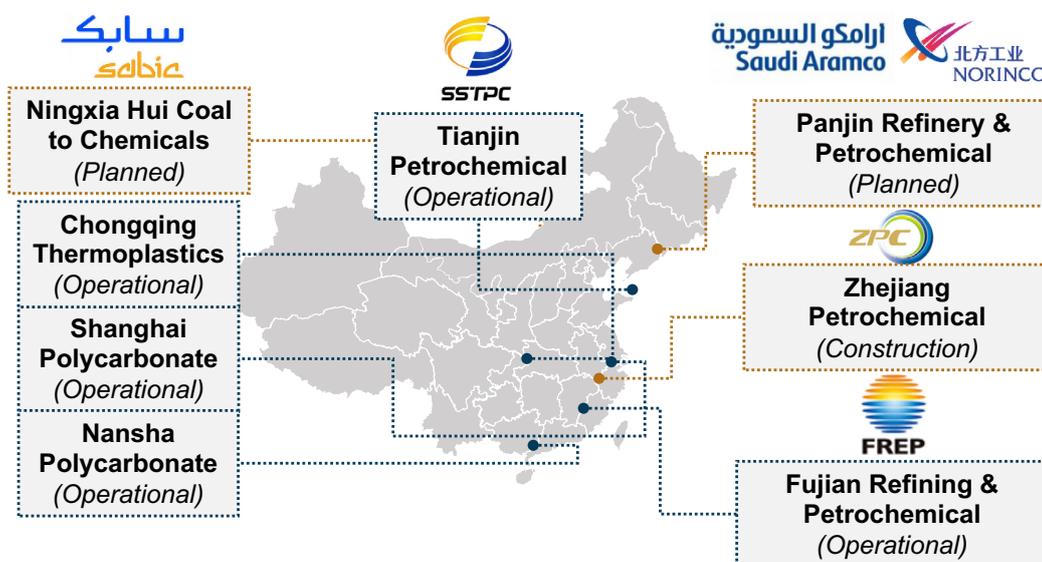
In recent decades, China and Saudi Arabia have made significant progress in developing bilateral economic relationships, with Sino-Saudi trade jumping from \$0.4 billion in 1990 to more than \$405 billion in 2019. Although the petrochemicals sector lags behind the fuel sector, it accounts for a substantial share in bilateral trade and investment flows. From 1998-2018, GCC chemical exports to China steadily increased twenty-fold, from less than 1 million tonnes to nearly 20 million tonnes. The value of chemical exports increased from \$300 million to over \$15.3 billion during the same period. This made China the largest market for the GCC's chemical industry, accounting for 24% of its total exports; Saudi Arabia accounts for over 60% of GCC chemical exports to China.

China and Saudi Arabia's staggering growth led to significant changes in their market shares of the global petrochemical industry. China more than tripled its share from around 10% in 2000 to 35% in

2019, making it the largest chemicals producer in the world. Likewise, the GCC has doubled its market share over the same period, from 3.2% in 2000 to 7.9% in 2019, with Saudi Arabia contributing more than two-thirds of this growth.

Investment flows and joint projects have followed the expansion of bilateral trade. Saudi Arabia was keen to capture the growth of the Chinese domestic petrochemicals market as it continuously expanded. It did so through joint ventures with Chinese producers. The first project was an integrated refinery-petrochemicals plant – Fujian Refining and Petrochemicals – aided by the participation of Saudi Aramco and operating on imported Saudi crude. Several purely chemical projects followed, aided by the participation of SABIC, with more in the pipeline (see Figure 3). The total capex of these projects amounts to \$35 billion, with a projected output of 21.7 million tonnes by 2025.

Figure 3. Petrochemical projects between Saudi Arabia and China.



Source: Gulf Petrochemicals and Chemicals Association.

By contrast, joint ventures between Saudi Arabia and China in the Saudi market remain relatively moderate in terms of both the number of projects and their projected outputs. At present, Yanbu refinery is the only operational project, with Jazan Petrochemical plant – the first joint manufacturing venture – projected to come online in three phases. These projects will total \$12.5 billion in capex and produce 5 million tonnes of output by 2025.

In the era of global value chains, such a discrepancy cannot be explained by Saudi Arabia's smaller domestic market. Some of the impediments to further joint ventures in Saudi Arabia identified by workshop participants include increasing labor costs, high competition levels, and a lack of manufacturing clusters. However, these factors are balanced by the enduring advantages of the Saudi industrial ecosystem, such as low feedstock costs, low export and import taxes, sound infrastructure, and close proximity to the European, African and Asian markets.

China's critical role in the global value chain lies in its comprehensive manufacturing system. It has the largest production capacity, the greatest product variety, and well-equipped upstream and downstream clusters. This system can reduce costs along the chain and open up opportunities through efficient cross-industry and cross-sector collaboration. The Chinese government has decided to foster 'dual circulation' for future economic growth, focusing more on stimulating domestic production, distribution and consumption while maintaining investment, trade and technology cooperation with other countries. Under this new strategy, the further opening up of China's domestic market and global industrial cooperation will continue to be priorities.

The complementary advantages of the relationship between Saudi Arabia and China could boost trade and investment activities in the petrochemicals sector. The interconnection between the BRI and Vision 2030 also entails collaboration in the domains of infrastructure, finance, policy and culture, which can strengthen the supporting ecosystem for the petrochemical industry value chain. Meanwhile, a focus on lowering the barriers to foreign direct investment (FDI), and ensuring relevant policies are transparent and efficient, remains crucial. Domestic policies and tactical measures aimed at facilitating specific projects can also contribute to increased FDI. Such measures may include specific tax and duty exemptions (or reductions), favorable financing terms (e.g., loan rates and guarantees), developing logistical infrastructure and accelerated approval processes. Finally, Saudi Arabia and China, as leading producers, can both form strategies and long-term partnerships that can be mutually beneficial, adding value and going beyond the traditional buyer-seller relationship. This long-term partnership can help prepare both countries for their next phases of development.

Strengthening Economic Integration Through a Regional Framework

Besides the bilateral framework between Saudi Arabia and China, Saudi Arabia can play a strategic and crucial role in fostering new economic zones between China and the MENA region, given its geographic location and preferential tax regime with most of its neighbors.

The GCC-China free trade agreement (FTA) could be the first step to moving toward this goal. Reducing the Chinese import tariffs on GCC products and alleviating non-tariff barriers could improve the financial performance and investment potential of the GCC's petrochemicals sector. These measures could be mirrored by the GCC countries for Chinese exports of downstream petrochemical products. The GCC-China FTA framework can also facilitate regulatory convergence and more liberal trade – further enhancing economic cooperation.

In this regard, the industrial and trade collaboration between China and the Association of Southeast Nations (ASEAN) has set a great example. The trade between China and ASEAN members has grown rapidly, accounting for 50% of these two parties' total global trade. Sixty percent of the trade between the two parties is in intermediate products and components, reflecting a highly integrated collaboration along the industrial supply chain. This growth can be largely attributed to the framework established by the ASEAN-China Free Trade Area. Jointly established industrial parks are also an effective strategy for regional market expansion. These include the Thai-Chinese Rayong Industrial Zone and Indonesia Morowali Industrial Park.

Initiated in 2002, the Regional Comprehensive Economic Partnership (RCEP) between China, Japan and South Korea is another example of multilateral cooperation. These countries agreed to promote the rules and standards of the RCEP to a wider group to enhance international cooperation on trade and investment. Webinar participants suggested that the RCEP could improve mutual trust and economic integration in the region, alleviating the impact of the Covid-19 pandemic and the retreat of globalization. On November 15, five regional partners (China, Japan, South Korea, Australia and New Zealand) and ten ASEAN members officially signed the RCEP, making it the largest free trade agreement in history.

For Saudi Arabia and other GCC producers, their price-competitiveness and relatively light domestic regulatory regime on petrochemicals may come under pressure as GCC countries face increasing fiscal stress. However, their abundance of feedstock and proximity to consumption centers continue to be their fundamental advantages. China's vulnerabilities in the petrochemical sector are primarily rooted in its dependency on feedstock and certain basic petrochemical imports. Although China's GDP growth is expected to slow in the 2020s compared to the 2010s, its development of new industries, such as electric vehicles, 5G communications, electronics and membranes, will continue to drive its demand for petrochemical products. The GCC-China FTA could enhance the flexibility of the global petrochemicals supply chain and create new economic growth in the region. Its potential impact on economic and social integration could be even deeper, rebuilding confidence in industrial supply chain cooperation at regional and global levels.

About the Workshop

This workshop was co-organized by KAPSARC, Sinopec Economics and Development Research Institute and the Gulf Petrochemicals and Chemicals Association. Held on September 14, 2020, as a webinar, it brought together over 40 experts from the GCC countries, China and other regions. During the sessions, the petrochemical industry and think tank representatives discussed the outlook of global petrochemical markets, the opportunities and challenges faced by China and Saudi Arabia, and the prospects for bilateral and regional cooperation.

List of participants from GCC countries and other regions

Ali Al Asiri – CEO, Chemanol Company, Saudi Arabia

Aseel Al Bassam – Research Specialist, Gulf Petrochemicals and Chemicals Association, United Arab Emirates

Faisal Al Faqeer – CEO, Sadara Chemical Company, Saudi Arabia

Abdulrahman Al Ismail – CEO, National Petrochemical Company (Petrochem), Saudi Arabia

Abdulaziz Al Jarbou – Former Chairman, SABIC, Saudi Arabia

Fahad Al Matrafi – CEO, Advanced Petrochemical Company, Saudi Arabia

Raed Al Mestneer – Research Associate, KAPSARC, Saudi Arabia

Majid Al Moneef – Secretary General, Supreme Committee of Hydrocarbons, Saudi Arabia

Mutlaq Al Morished – CEO, TASNEE, Saudi Arabia

Imtenan Al Mubarak – Acting Head of Research Strategy Management Office, KAPSARC, Saudi Arabia

Ayed Al Mutairi – Vice President Corporate Strategy and Development, Maaden, Saudi Arabia

Manea Al Qarni – SABIC, Saudi Arabia

Abdulwahab Al Sadoun – Secretary General, Gulf Petrochemicals and Chemicals Association, United Arab Emirates

Ahmad Al Saleh – Global Business Director-Ethylene Glycol, EQUATE Petrochemical Company, Kuwait

Abdullah Al Salem – CEO, Nama Chemical, Saudi Arabia

Abdel Hadi Al Suhaimi – Executive President, S-Chem, Saudi Arabia

Fahad Al Turki – Vice President Research, KAPSARC, Saudi Arabia

Mohammed Al Wadaey – President, Farabi Petrochemicals Company, Saudi Arabia

Udit Arora – Head of Committees Affairs & Economic Research, Gulf Petrochemicals and Chemicals Association, United Arab Emirates

Saleh Bahamdan – CEO, Sipchem, Saudi Arabia

Dongmei Chen – Research Fellow, KAPSARC, Saudi Arabia

Anida D'Costa – Conference Producer, Gulf Petrochemicals and Chemicals Association, United Arab Emirates

Kaushik Deb – Program Director, KAPSARC, Saudi Arabia

Florence Eid-Oakden – CEO and Chief Economist, Research and Strategy, Arabia Monitor, Saudi Arabia

Philipp Galkin – Visiting Researcher, KAPSARC, Russian Federation

About the Workshop

Hisham Jamal Aldin – Sales Manager, National Petrochemical Industrial Company, United States

Leila Lajevardi – Research Analyst, Arabia Monitor, United Kingdom

David Lines – General Manager GCC, Astra Polymers, Saudi Arabia

Jamal Malaikah – President and COO, National Petrochemical Industrial Company, United States

Aslam Moola – Managing Director, Vopak, United Arab Emirates

Douglas Ng – GM Strategy and Market Intelligence, Borouge, Singapore

Malik Faisal Selemankhel – Senior Research Associate, KAPSARC, Saudi Arabia

Adam Sieminski – President, KAPSARC, Saudi Arabia

Colin Ward – Visiting Researcher, KAPSARC, South Africa

List of participants from China

Jiao Yu – Vice President, Sinopec EDRI, China

Yi Bai – Vice President, China National Petroleum and Chemical Planning Institute, China

Guanglian Pang – Secretary General of International Cooperation and Foreign Enterprises Committee, China Petroleum and Chemical Industry Federation, China

Xiaoming Ke – Director General of Marketing Institute, Sinopec Economics and Development Research Institute, China

Chen Guo – Deputy Director, Department for Investment and Financing, China International Engineering Consulting Corporation, China

Jiantao Yan – Chief Strategy Officer, Oilchem, China

Mingzhi Gao – Deputy Division Chief for Petrochemicals Department, Sinopec, China

Ling Yang – Division Chief, Development Planning Department, Sinopec, China

Qiang Huang – Staff, Development Planning Department, Sinopec, China

Siming Wang – Coordinator for International Cooperation Department, Sinopec, China

Xiaoxiao Liu – Division Chief, Industrial Development Research Department, Sinopec Economics and Development Research Institute, China

Notes

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About the Team



Abdulwahab Al-Sadoun

Dr. Abdulwahab Al-Sadoun is a senior chemicals executive with three decades of experience acquired through various positions across the public and private sector in Saudi Arabia and the GCC states. He currently serves as the Secretary General of the Gulf Petrochemicals and Chemicals Association (GPCA), a position he has held since 2009. Dr. Al-Sadoun served as the B20 Sherpa, Saudi Arabia, where he led the Knowledge and Network Partners' engagement on policy development and advocacy and steered B20 strategy by working closely with the B20 Chair. Dr. Al Sadoun is a Ph.D. graduate in Industrial Chemistry from the University of London. He completed the General Management Program (GMP3) at Harvard Business School (HBS), Harvard University. He is the author of two books, *Molecules, Mind and Matter: How the Arabian Gulf Became a Global Petrochemical Hub* (published in English) and *A Voyage to Leadership: How the Arabian Gulf Became a Global Petrochemical Hub* (published in Arabic).



Dongmei Chen

Dongmei is a research fellow with more than 20 years of professional experience in China's energy and climate change policy development. At KAPSARC, she carries out research on global oil trade, investment under the Belt and Road Initiative, industrial energy productivity in Saudi Arabia, and China's energy governance. She previously worked in a state-owned company, and in governmental and non-governmental agencies. As a senior adviser and head of IIP's China office, she engaged with Chinese industrial stakeholders in best practice development and dissemination. As director of the WWF China Climate Change and Energy Program, she designed the Low Carbon City Initiative in partnership with local governments and international networks.



Kaushik Deb

Kaushik is an applied economist and a research fellow at KAPSARC. He is currently responsible for defining and operationalizing the research agenda for KAPSARC's Markets and Industrial Development team. Kaushik was previously the head of global gas markets in the Group Economics team at BP, where he oversaw the analysis that formed the basis for BP's natural gas investment and trading strategy. Before BP, Kaushik worked at IDFC Bank, where his portfolio included policy research and advocacy on infrastructure and environmental economics issues. These issues included low carbon infrastructure, decentralized electricity services in rural areas, and organized intermediate public transport systems for small towns. Kaushik holds a doctor of sciences (D.Sc.) degree from ETH Zurich. He has also guided and implemented research in applied economics at TERI University, India, where he was also the program director of its two MBA programs.



Philipp Galkin

Philipp is a visiting researcher at KAPSARC, working on the economic and policy aspects of energy supply and trade. He holds a Ph.D. in International Economic Relations from the Saint Petersburg State University of Economics and an MBA from the University of Southern California. Philipp's work at KAPSARC includes evaluating the effect of preferential trade agreements on energy flows, analyses of OPEC energy policy and deriving insights related to China's energy policy and its impact on global markets through modeling energy supply sectors.



Xiaoming Ke

Xiaoming is Deputy Chief Engineer and Director of the Marketing Research Division at SINOPEC EDRI. He has 29 years' market research experience in China's petrochemical industry, international oil market analysis, and refinery and petrochemical company optimization consulting. He was the program manager responsible for China's long-term energy demand research, refining industry developing planning, the draft plan for upgrading the quality of gasoline and diesel in China, and research on peak oil demand in China. He was also responsible for market research and the optimization of refinery production and logistics, and marketing strategy analyses of refining products for SINOPEC's business plan. He is the deputy general secretary of the oil and gas committee of the China Petroleum and Chemical Industry Association (CPCIA) and a council member of the China Energy Research Association.



Malik Faisal Selemankhel

Malik is a senior research associate in the Markets and Industrial Development team at KAPSARC, focused on downstream refining and petrochemicals value chains. He is a licensed professional engineer in Canada (APEGA) and Saudi Arabia (SCE) with over 10 years of engineering and oil business experience, both office and field based. Malik has experience in the upstream, midstream and downstream sectors of North America's oil and gas industry. He has a keen interest in integrated hydrocarbon value chain optimization to help oil and gas companies maximize their profits. Malik's research interests include the optimization of integrated value chains driven by regional and international regulations on fuels and emissions, and economic growth, among others. In Canada, Malik developed the concept of using data analytics tools, such as machine learning, to improve plant availability during shutdowns.



Jiao Yu

Yu Jiao is the Vice President of Sinopec Economics and Development Research Institute (EDRI) and the Vice-President of the China Petrochemical Consulting Company, responsible for strategic planning and research for SINOPEC's important projects. She is a professor-level senior economist with more than 20 years' experience in energy and petrochemical strategy and marketing research. In 2011, she studied western planning theory and the market prediction method as a visiting scholar at the Stanford Research Institute. She has participated in preparing the five-year plans of SINOPEC since 2000, and has worked as key organizer and main drafter for SINOPEC's 13th Five-Year Plan and SINOPEC Action Plan 2050.

About the Project

China's evolving Belt and Road Initiative (BRI) was first raised by Chinese President Xi Jinping in 2013 and officially launched by the Chinese government in March 2015 as The Vision and Actions on Jointly Building the Silk Road Economic Belt and 21st Century Maritime Silk Road. It has been a subject of great interest when analyzing the impact of Chinese policies on the international community.

This project focuses on assessing the overall progress of bilateral collaboration, analyzing the changing role of energy-focused outward direct investment and mapping the potential of the energy services market. It aims to help facilitate integration between China's BRI and Saudi Vision 2030.



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