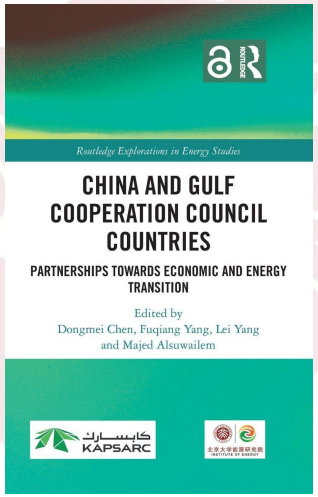
北京大学能源研究院
INSTITUTE OF ENERGY

气候变化与能源转型项目
CLIMATE CHANGE AND ENERGY TRANSITION PROGRAM



《中国-海合会国家基于能源转型和经济转型的合作伙伴关系》

China and Gulf Cooperation Council Countries: Partnerships Towards Economic and Energy Transition

---中国-海合会能源转型合作机遇研究课题成果发布

Release of the China-GCC energy transition cooperation opportunities research

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2026.10.29

中外联合研究形成全书的共同基础
A joint research effort behind the book

北京大学能源研究院和沙特阿卜杜拉国王石油研究中心（KAPSARC）联合主办

Jointly organized by Peking University Institute of Energy and King Abdullah Petroleum Studies and Research Center（KAPSARC）

自**2023年**启动，汇集**45位**中外作者

Launched in **2023,** bringing together **45 authors**

围绕**16**个专题开展联合写作

Joint authorship across **16 topics**

英文版由中文**Routledge** 负责发行

English edition published by **Routledge**

中文版即将出版，阿拉伯语版本正在推进

Chinese and Arabic editions are in preparation







研究背景
Research background

- 在过去的二十年间，GCC与中国的关系从以碳氢化合物贸易为主的伙伴关系，逐步发展为多层次的战略伙伴关系。尽管能源仍是这一关系的核心，但合作范围已扩展到包括工业基础设施、数字化、清洁技术和可持续金融等领域。

Over the past two decades, the relationship between the GCC and China has evolved from a partnership primarily focused on hydrocarbon trade to a multifaceted strategic partnership. While energy remains at the core of this relationship, cooperation has expanded to include industrial infrastructure, digitalization, clean technology, and sustainable finance.

- 当全球能源系统经历深刻变革，国际贸易和投资架构持续变化之际，GCC与中国的合作展示了一种互利共赢的前瞻性合作模式。

At a time when the global energy system is undergoing profound transformation and the international trade and investment architecture continues to shift, the China-GCC partnership demonstrates a forward-looking, mutually beneficial approach.

- 研究和深化伙伴关系不仅将加速能源转型，提升社会经济发展的可持续性，还有利于中国与GCC共同应对紧迫的区域和全球挑战，包括地缘政治紧张局势、经济不确定性和贸易复杂性。

Researching and deepening this partnership will not only accelerate energy transition and enhance the sustainability of socioeconomic development, but will also enable China and the GCC to jointly address pressing regional and global challenges, including geopolitical tensions, economic uncertainty, and trade complexities.

主要内容
Main contents

- 《中国-海合会基于能源转型和经济转型的伙伴关系》通过结构化、基于证据的分析，并辅以原创案例研究，描述了涵盖经济多元化、技术创新和能源安全合作的更广泛合作框架。

"China-GCC Countries: Partnerships Towards Economic and Energy Transition" uses structured, evidence-based analysis, supplemented by original case studies, to describe a broader framework for cooperation encompassing economic diversification, technological innovation, and energy security.

- **三大主题 Three Topics：**

传统能源及相关产业
Traditional energy and related industries

油气贸易、炼化经营与基础设施合作。
Oil and gas trade, refining and petrochemicals, and infrastructure cooperation.

低碳能源与转型技术
Low-carbon energy and transition technologies

可再生能源、能效、氢能及地热等领域的合作机会。
Cooperation in renewables, energy efficiency, hydrogen and geothermal energy.

支撑转型的政策与市场条件
Policy and market conditions that enable transition

气候政策、可持续融资、关键矿产与数字化。
Climate policy, sustainable finance, critical minerals and digitalization.

- **重要问题 key questions:**

什么因素和风险在塑造GCC与中国的能源关系?

What factors and risks are shaping the China-GCC energy relationship?

双方如何根据全球发展的变化调整各自的政策框架、产业战略和能源投资?

How can both sides adapt their respective policy frameworks, industrial strategies, and energy investments in response to changing global developments?

第四章聚焦炼油与石化战略伙伴关系
Chapter 4: Strategic partnerships in refining and petrochemicals

与中国石油和化学工业联合会持续开展合作
Ongoing cooperation with the China Petroleum and Chemical Industry Federation (CPCIF)

合作领域包括绿色“一带一路”、国际产能合作与能源转型、中国-海合会能源转型合作机遇研究。

Joint work covers the Green Belt and Road, industrial capacity cooperation and energy transition research, China-GCC energy transition cooperation opportunities.

Abdulwahab Al-Sadoun	海湾石化和化学品协会（GPCA） Gulf Petrochemicals and Chemicals Association
庞广廉 / Guanglian Pang	中国石油和化学工业联合会（CPCIF） China Petroleum and Chemical Industry Federation
汪爽 / Shuang Wang	中国石油和化学工业联合会（CPCIF） China Petroleum and Chemical Industry Federation

高层对接与双边协定支持产业合作

High-level dialogue and bilateral agreements support cooperation

……

2022.12 首届中国—海合会峰会
First China–GCC Summit

2023.10 广州“6+1”经贸部长会
Guangzhou 6+1 ministerial meeting

2024.05 厦门产业与投资合作论坛
Xiamen industry and investment forum

2025.05 东盟—中国—海合会峰会
ASEAN–China–GCC Summit

……

来源：外交部、商务部、国家税务总局。

Sources: China’ s MFA, MOFCOM and State Taxation Administration.

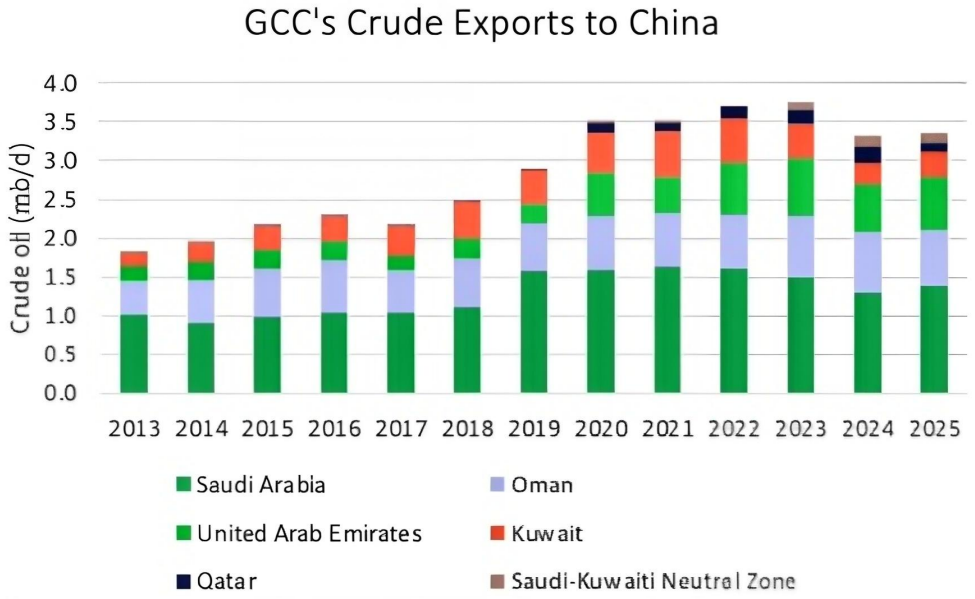
中国与GCC国家的主要双边政策里程碑时间表

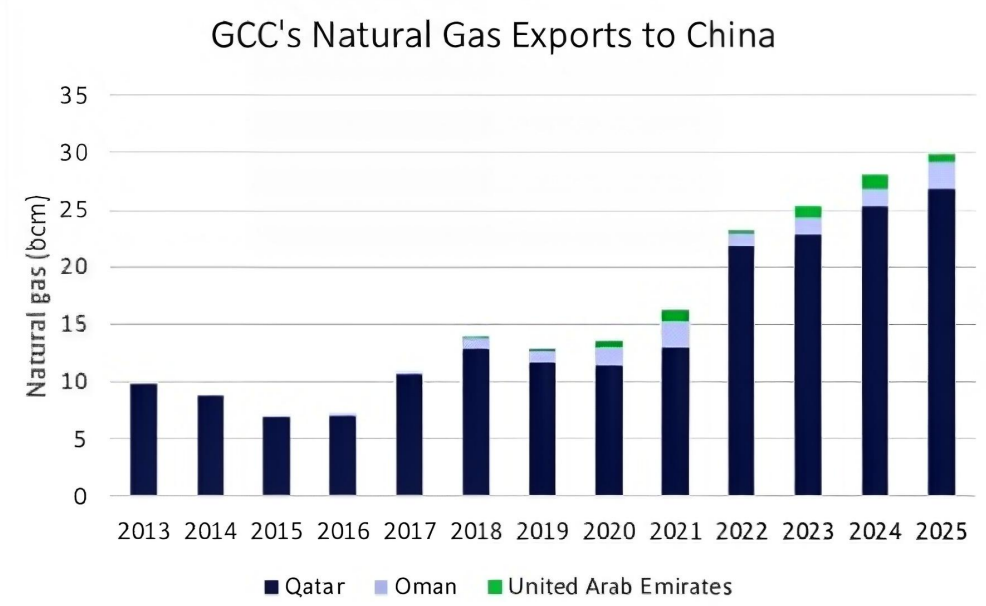
国家 Country	建交 Diplomatic ties	投资协定 BIT signed	税收协定 Tax treaty signed
巴林 Bahrain	1989	1999	2002
科威特 Kuwait	1971	1985	1989
阿曼 Oman	1978	1995	2002
卡塔尔 Qatar	1988	1999	2001
沙特 Saudi Arabia	1990	1996	2006
阿联酋 UAE	1984	1993	1993

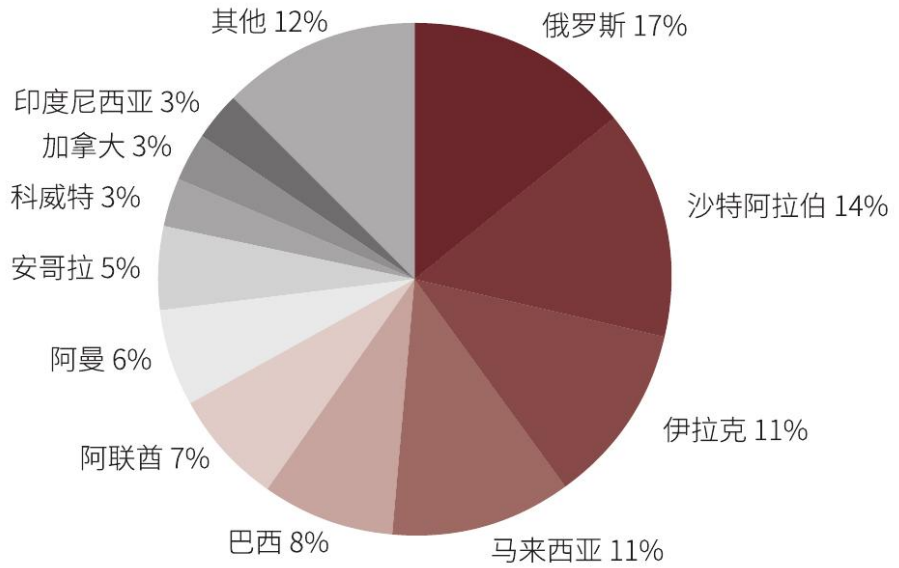
协定年份指签署年，不等同于生效年。

Treaty dates indicate signature, not entry into force.

海合会约占中国原油进口的三成
GCC suppliers in China’s crude oil imports







2025年中国原油进口来源
China’s Crude Oil Imports by Source in 2025

约1.8亿吨 / ~180 Mt

2025年中国自海合会进口原油

China’s crude imports from the GCC in 2025

占中国原油进口约31%

About 31% of total Chinese crude imports

石油合作置于更广泛的经贸关系之中

Energy cooperation sits within broader trade relations

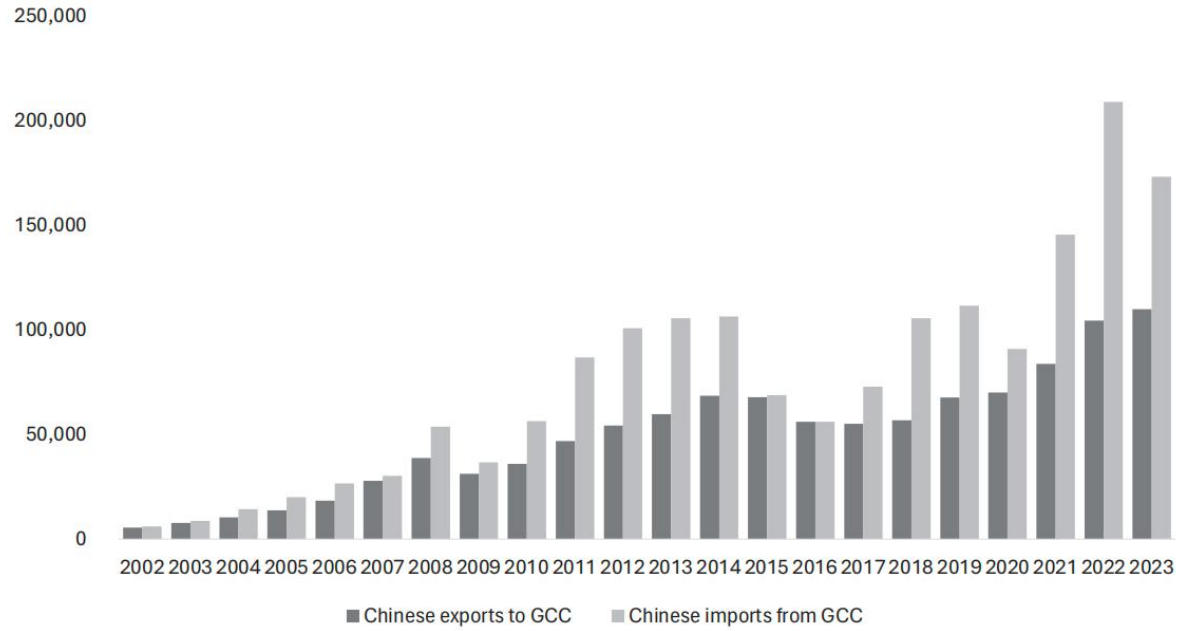


Figure 2.1 Trade flows between China and the GCC ($ million).

Source: International Trade Centre (2024).

中国与GCC国家之间的贸易（百万美元）

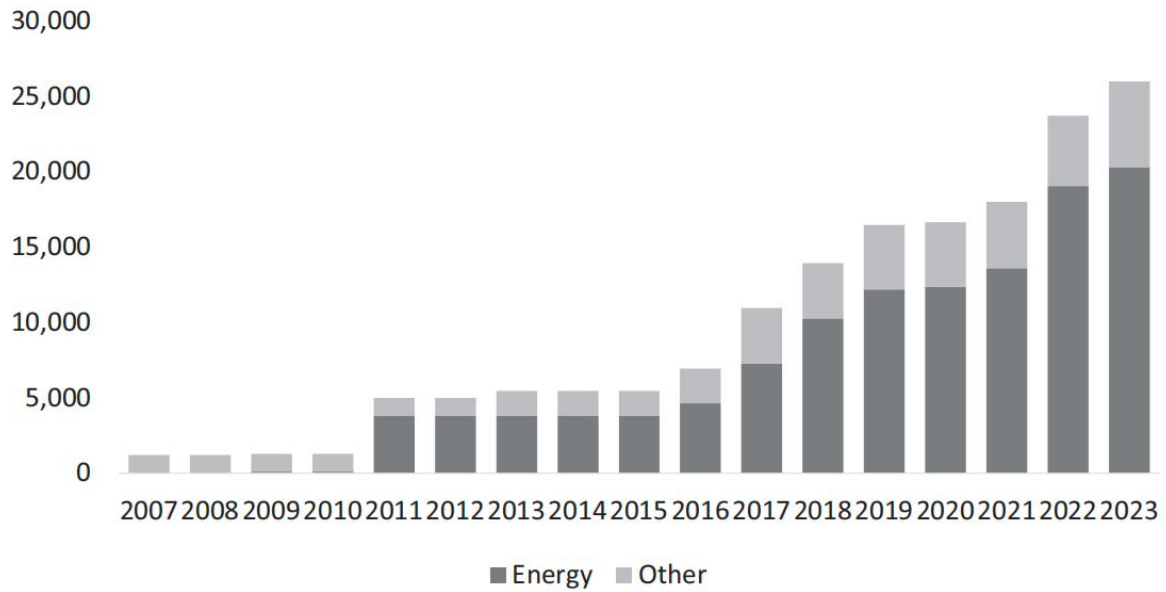


Figure 2.4 Chinese investment stocks in the GCC's major projects by sector ($ million).

Source: AEI (2024).

中国对GCC国家主要行业的投资存量（百万美元）

2933.4 亿美元

USD 293.34 billion

2025年中国与海合会贸易总额

China–GCC merchandise trade in 2025

能源贸易与产业投资相互支撑

Energy trade and industrial investment reinforce each other

油气合作和石化价值链整合是中国-海合会能源转型合作的基石

Oil and gas cooperation and petrochemical value chain integration are the cornerstones of China-GCC energy transition cooperation

截至2024年底的海合会（GCC）海外石油炼化厂
GCC's overseas oil refiners as of year-end 2024

Overseas Refineries	Capacity (bpd)	Start-up	Location (Country)	Ownership
Saudi Aramco's Affiliates				
Motiva	630,000	1903	USA	Aramco (100%)
S-Oil	650,000	1980	S. Korea	Aramco (63.45%)
Showa Shell	445,000	1976	Japan	Aramco (14.96%)
Fujan (China)	280,000	1993	China	Aramco (25%)
RAPID	300,000	2019	Malysia	Aramco (50%); Petronas (50%)
Abu Dhabi – Mubadala Investment Affiliates				
CEPSA Gibraltar-San Roque	240,000	Spain	1967	Mubadala (63%), Carlyle Group (37%)
OMV Schwechat	200,000	Austria	1960	ADNOC (24.9% stake in OMV)
OMV Burghausen	70,000	Germany	1967	ADNOC (24.9% stake in OMV)
OMV Petrobrazi	90,000	Romania	1934	ADNOC (24.9% stake in OMV)
Kuwait Petroleum Affiliates				
Milazzo Refinery	200,000	Italy	1961	Kuwait Petroleum (50%) Eni (50%)
Nghi Son Refinery (NSRP)	200,000	2018	Vietnam	Kuwait Petroleum (35.1%) Idemitsu Kosan (35.1%) PetroVietnam (25.1%) Mitsui Chemicals (4.7%)
Zhanjiang	300,000	China	2020	Kuwait Petroleum (50%) Sinopec (50%)

Source: GPCA research, 2024.

中国和海合会在这一转型过程中展现了各自独特但又互补的模式：

- 中国强调石化产品的自给自足，并大力投资于一体化炼油厂
- 相较而言，海合作会国家通过在国内外扩大炼油和石化产业，以及投资原油制化学品（COTC）工艺和碳捕获与封存（CCS）等先进技术，追求经济多元化，这也是沙特“2030愿景”等倡议的一部分

China-GCC have each demonstrated distinct yet complementary approaches to this transformation:

- China emphasizes self-sufficiency in petrochemicals and has invested heavily in integrated refineries.
- In contrast, GCC countries are pursuing economic diversification by expanding their refining and petrochemical industries both domestically and internationally, and investing in advanced technologies such as crude oil-to-chemicals (COTC) and carbon capture and storage (CCS), as part of initiatives such as Saudi Arabia's Vision 2030.

资源开发与炼化投资深化产业链合作
Upstream development and refining investment deepen cooperation

中国企业参与海湾开发与工程服务
Chinese participation in Gulf development and services

Belbazem：2024年3月宣布开始产油。
4.5万桶/日为逐步提升的目标产量。

Belbazem announced first oil in March 2024.
45 kb/d is a ramp-up target, not verified steady output.

科威特：中石化石油工程开展钻井服务。

Kuwait: Sinopec Oilfield Service provides drilling services.

海湾企业投资中国炼化项目
Gulf investment in Chinese refining

华锦阿美：北方华锦51%、盘锦鑫诚19%、
沙特阿美30%。规划炼油30万桶/日。

HAPCO: North Huajin 51%, Panjin Xincheng 19%,
Aramco 30%. Planned refining capacity: 300 kb/d.

拟供油最高21万桶/日。2026年10月收到
首批阿拉伯原油，处于投产准备阶段。

Planned Aramco supply: up to 210 kb/d. First Arabian crude arrived in October 2026, ahead of commercial start-up.

长期贸易关系进一步延伸为资源开发、下游服务、炼化投资与产业运营
trade relations have expanded to encompass resource development, downstream services, refining and petrochemical investments, and industrial operations.

来源：ADNOC、中石化石油工程、沙特阿美。钻井属于上游工程服务。

Sources: ADNOC, Sinopec Oilfield Service and Aramco. Drilling is an upstream service.

中国炼化产业转型带来新的合作机遇

China’s refining transition creates new cooperation opportunities

需求结构变化要求提升产品竞争力

Changing demand raises the need for product competitiveness

成品油需求承压，低端过剩与高端短缺并存。
IEA估计2024、2025年石化原料需求各增约20万桶/日。

Fuel demand is under pressure; chemical capacity is uneven.
IEA: feedstock demand grew ~200 kb/d in both 2024 and 2025.

用能低碳化与原料多元化共同推进

Cleaner energy and more diverse feedstocks support transition

推动绿电、绿氢、生物基原料与循环利用，
统筹能源安全、产业安全及减排目标。

Expand renewable power, green hydrogen, bio-feedstocks and recycling, while balancing energy security, industrial security and emissions.

技术、标准与市场对接拓展合作空间

Technology, standards and market links broaden cooperation

联合开展低碳技术示范、认证与标准合作，
加强绿色燃料和低碳材料的供需对接。

Develop low-carbon demonstrations and standards cooperation, and connect markets for green fuels and low-carbon materials.



北大能源研究院
2026年10月

PKU Institute of Energy
October 2026

来源：北大能源研究院《中国石化行业绿色高质量转型研究》；IEA。20万桶/日为需求增量估计。

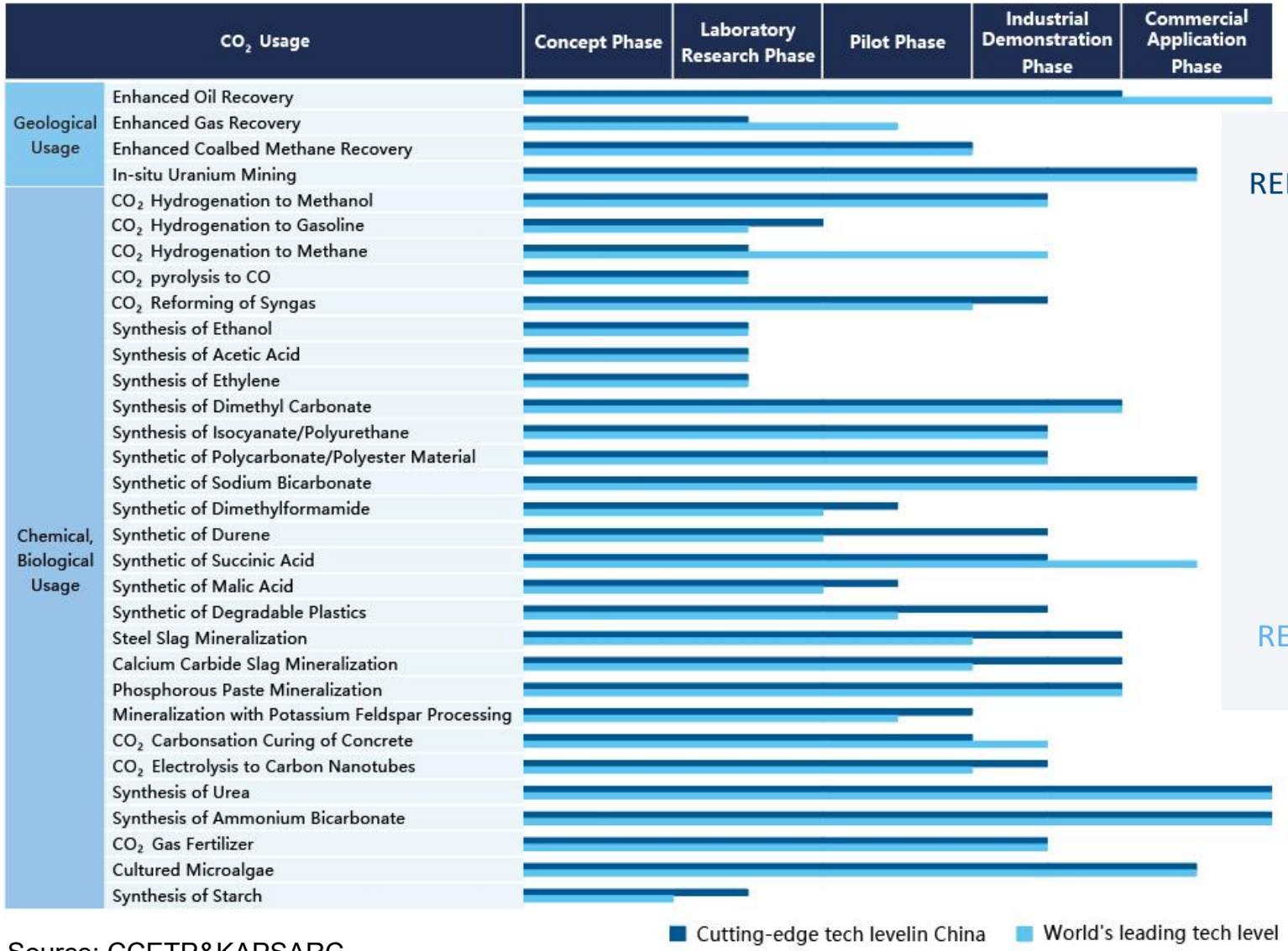
能源转型和经济转型：全球脱碳趋势为中海未来能源合作锚定了新方向

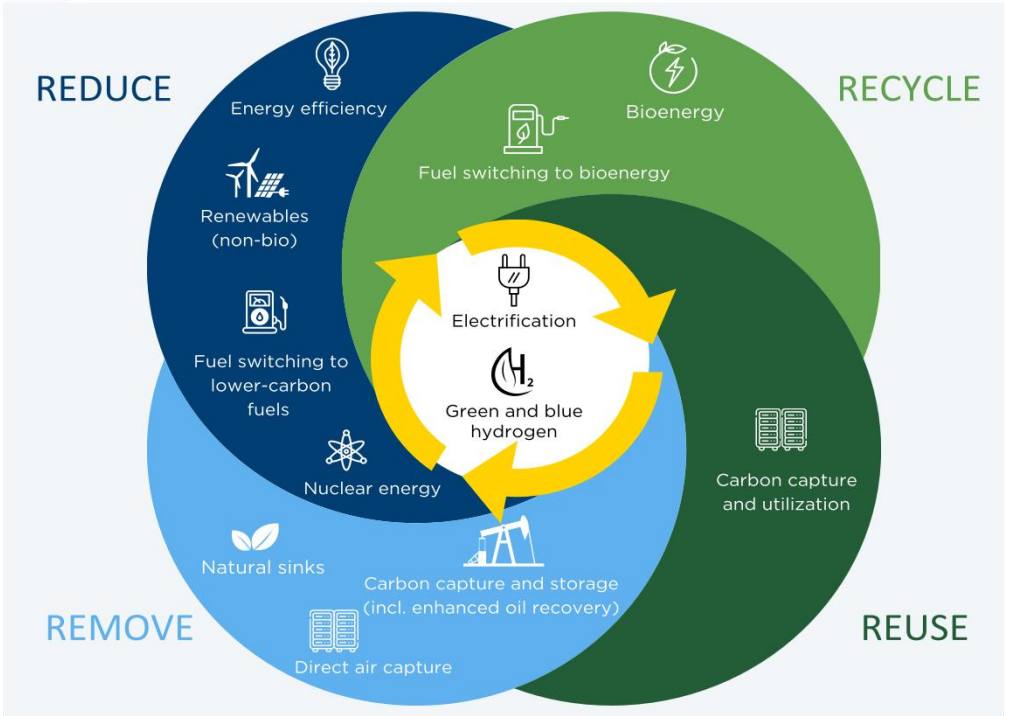
Energy and economic transition: Global decarbonization trend has anchored a new direction for China-GCC future energy cooperation



加速碳循环经济合作: 以沙特为代表的海合会国家脱碳关键路径

Accelerating carbon circular economy cooperation : The key path to decarbonization for GCC countries, represented by Saudi Arabia





沙特阿拉伯的碳循环经济（CCE）框架

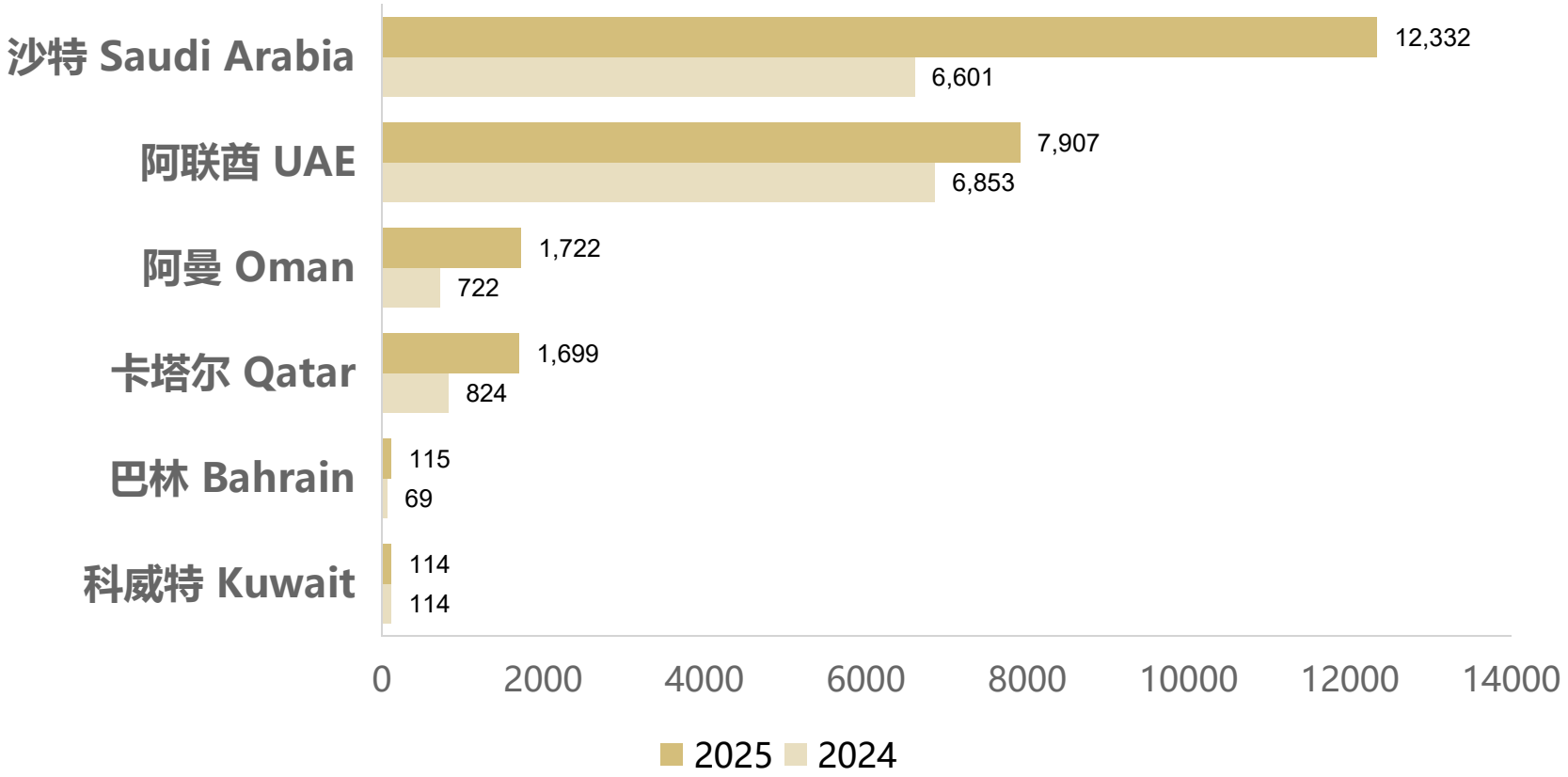
Saudi Arabia's Carbon Circular Economy (CCE) framework

Source: CCETP&KAPSARC

海合会可再生能源装机增长，产业合作空间扩大

Growing GCC renewable capacity expands cooperation opportunities

年末装机 / Year-end capacity（MW）



23.89 GW

2025年六国装机合计

GCC total capacity in 2025

同比增长约57.3%

Growth of about 57.3% from 2024

约66%的新增装机来自沙特

Saudi Arabia contributed about 66% of additions

装机扩张为项目开发、设备供应和运维合作提供更大市场空间。

The expansion of installed capacity creates greater market opportunities for project development, equipment supply, and operations and maintenance (O&M) cooperation.

Source: IRENA, Renewable capacity statistics 2026. Year-end installed capacity; excludes planned projects. © IRENA 2026.

新能源投资形成双向合作的新联系
Renewable investment creates new

中国企业参与海湾项目
Chinese investment in Gulf projects



Al Dhafra：2 GW，2023年11月落成

Al Dhafra: 2 GW, inaugurated in November 2023

TAQA、Masdar、EDF与晶科电力共同开发。

Developed by TAQA, Masdar, EDF Renewables and JinkoPower.

海湾企业进入中国市场
Gulf investment in China



ACWA与阳光新能源签约，2025年1月

ACWA–Sungrow Renewables signing, January 2025

333 MW已纳入运营组合；另签约250 MW运营风电及1000 MW在建资产，含附条件交割。

333 MW operational. Further agreements cover 250 MW operating wind and 1,000 MW under construction, with conditions.

来源：Masdar、ACWA Power、Saudi Exchange。资产进展按2025年12月公告；右图不是电站实景。

Sources: Masdar, ACWA Power and Saudi Exchange. Portfolio status: December 2025. Right photo shows a signing ceremony.

氢能合作：中国与海合会国家发展潜力巨大

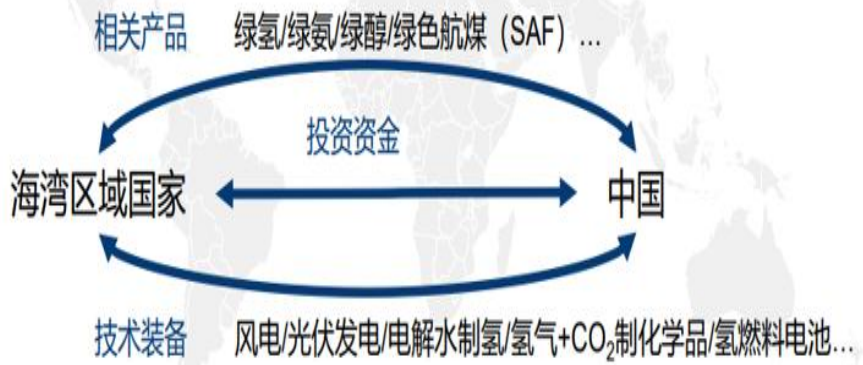
Hydrogen Energy Cooperation: China and GCC Countries Hold Tremendous Development Potential

海湾合作委员会氢能价值链中国际企业的关键增长机遇

Key growth opportunities for international businesses in the GCC hydrogen value chain

Production and processing	Low-cost renewable hydrogen projects, grid expansion, battery storage, alternative storage technologies (molten salt), electrolyzer manufacturing, pipeline development, low-water electrolysis solutions.
Transportation	Pipeline expansion and retrofitting, materials compatibility for hydrogen transport, advanced steel tubes, welding technology, and high-efficiency hydrogen transport solutions.
Storage and distribution	Compressed air energy storage, localized manufacturing of alternative storage solutions, large-scale hydrogen storage pilots, high-pressure tube trailer manufacturing.
End use	Industrial applications (steel, aluminumc, cement, fertilizers), power generation, long-haul transport, refueling stations, and hydrogen infrastructure development.

- 中国和海湾国家有巨大的绿氢及衍生产品合作潜力。



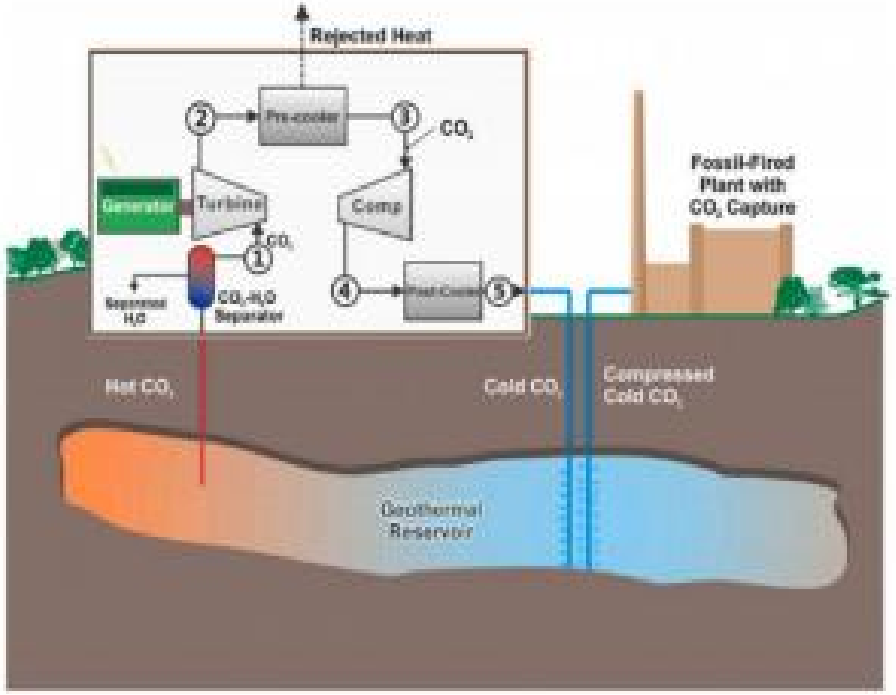
氢能合作需要贯通生产、储运与工业需求

Hydrogen cooperation must connect production, logistics and demand

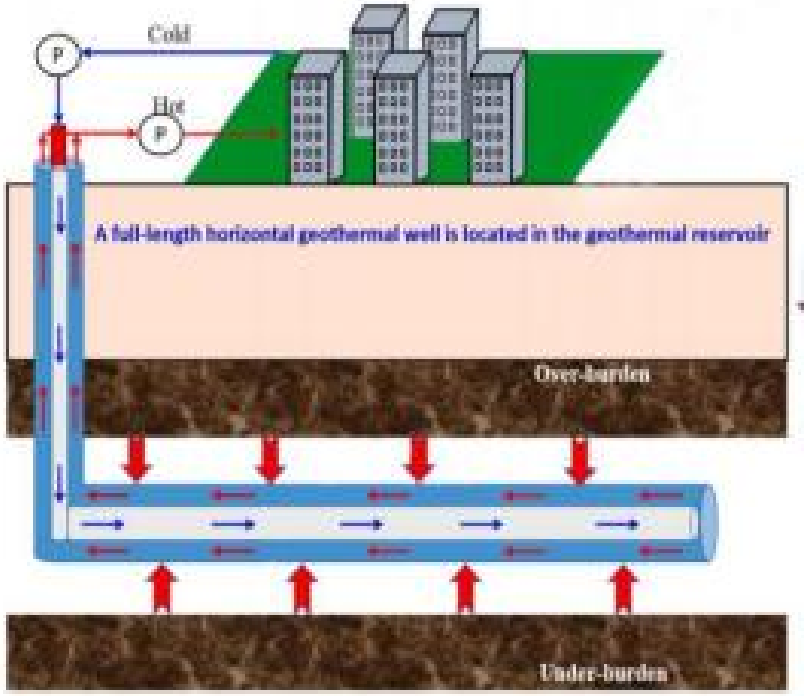
地热能合作：规划和研发先行
Geothermal Energy Cooperation: Planning and R&D First

在海合会国家中，沙特阿拉伯、阿联酋和阿曼等国制定了强有力的地热计划。
Among the GCC countries, Saudi Arabia, the United Arab Emirates, and Oman have established robust geothermal programs

地热能可以与石油生产一起产生
Geothermal energy can be produced alongside oil production



The infrastructure required for CO2 injection and production in an open-loop system



CO2 injection in a horizontal well

绿色产业链合作需要结合双方能力与条件

Green value-chain cooperation depends on complementary capabilities

完整解决方案
Integrated solutions

设备、工程和运维协同

Combine equipment, engineering and operations

合作开发
Joint development

匹配项目需求与风险分担

Align project demand and risk allocation

产业链共建
Joint value-chain development

以可行项目带动本地产业

Use viable projects to support local industry

资源优势
Resource advantages

结合能源资源、资本与市场

Connect energy resources, capital and markets

经验互鉴
Shared learning

借鉴工程及项目管理经验

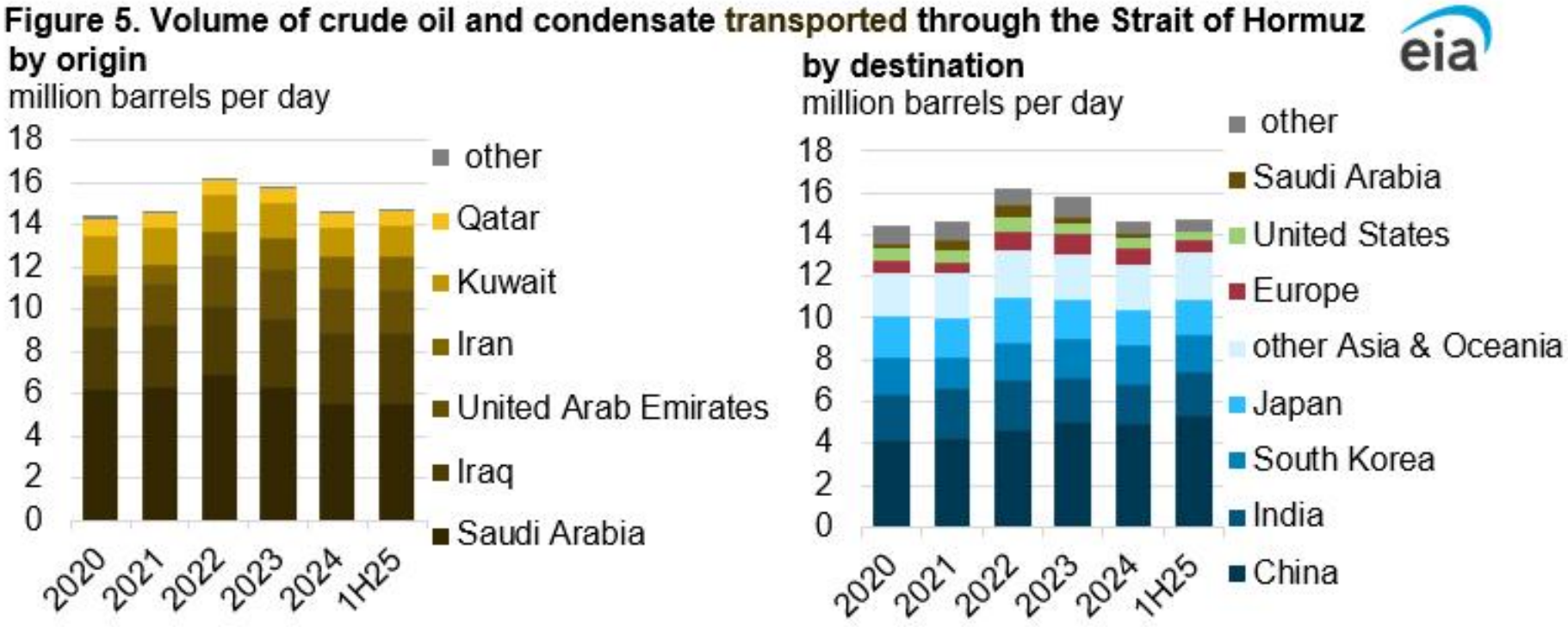
Exchange engineering and project-management experience

产业集群
Industrial clusters

结合本地供应链与人才条件

Build on local suppliers and workforce capabilities

霍尔木兹海峡连接海湾供应与亚洲市场
The Strait of Hormuz connects Gulf supply with Asian markets



Data source: U.S. Energy Information Administration analysis based on Vortexa
Notes: 1H25= first half 2025. Dates are based on loading date.

2024年经海峡的石油及相关液体产品约2070万桶/日，相当于全球石油消费约五分之一

Oil and petroleum liquids transiting the strait in 2024，Equivalent to roughly one-fifth of global petroleum consumption

Source: EIA. Includes crude oil, condensate and petroleum products; broader than crude and condensate alone.

季度流量显示运输通道风险
Quarterly oil flows through the Strait of Hormuz

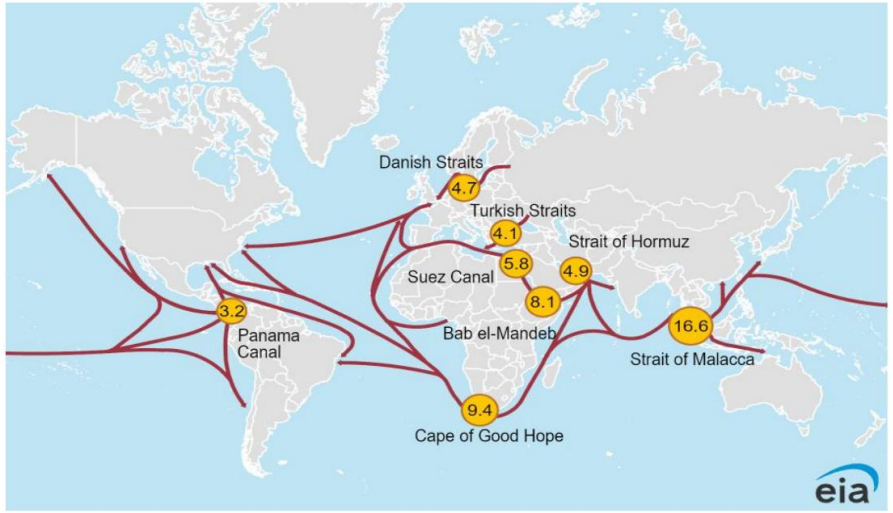
Table 4. Volume of crude oil, condensate, petroleum products, and liquefied natural gas transported through the Strait of Hormuz, 1Q25–2Q26

million barrels per day

	1Q25	2Q25	3Q25	4Q25	1Q26	2Q26
Total oil flows through the Strait of Hormuz	**20.9**	**21.0**	**21.3**	**21.6**	**14.9**	**4.9**
Crude oil and condensate	14.8	14.9	15.0	15.9	10.9	3.7
Petroleum products	6.2	6.2	6.3	5.7	4.0	1.1
LNG flows through the Strait of Hormuz (billion cubic feet per day)	**11.7**	**11.0**	**10.9**	**10.5**	**7.4**	**0.8**

Data source: U.S. Energy Information Administration analysis based on Vortexa tanker tracking data
Note: LNG=liquefied natural gas; 1Q25=first quarter of 2025.

Map of daily transit volumes of petroleum and other liquids through world maritime oil chokepoints, 2Q26
million barrels per day



Data source: U.S. Energy Information Administration (EIA) analysis, based on Vortexa tanker tracking; World Bank; and Panama Canal Authority data, using EIA conversion factors and calculations
Note: 2Q26=second quarter of 2026.

石油总流量：2025年第四季度2160万桶/日，2026年第二季度490万桶/日
From 21.6 to 4.9 million b/d，From Q4 2025 to Q2 2026

产业联系越紧密，越需要将通道风险纳入共同经营和应急安排
As industrial ties deepen, it becomes increasingly important to integrate transit route risks into joint operational management and emergency response planning.

来源：EIA《Global Energy Security Data》，2026年8月12日，原表4。石油单位百万桶/日，LNG末行单位另列。

合作升级需要兼顾供应韧性与项目经营

Cooperation needs resilient supply and sound project operations

运输与应急安排

Transport and contingency planning

明确通道受扰时的交付责任，评估港口、管道和储备的可用能力。

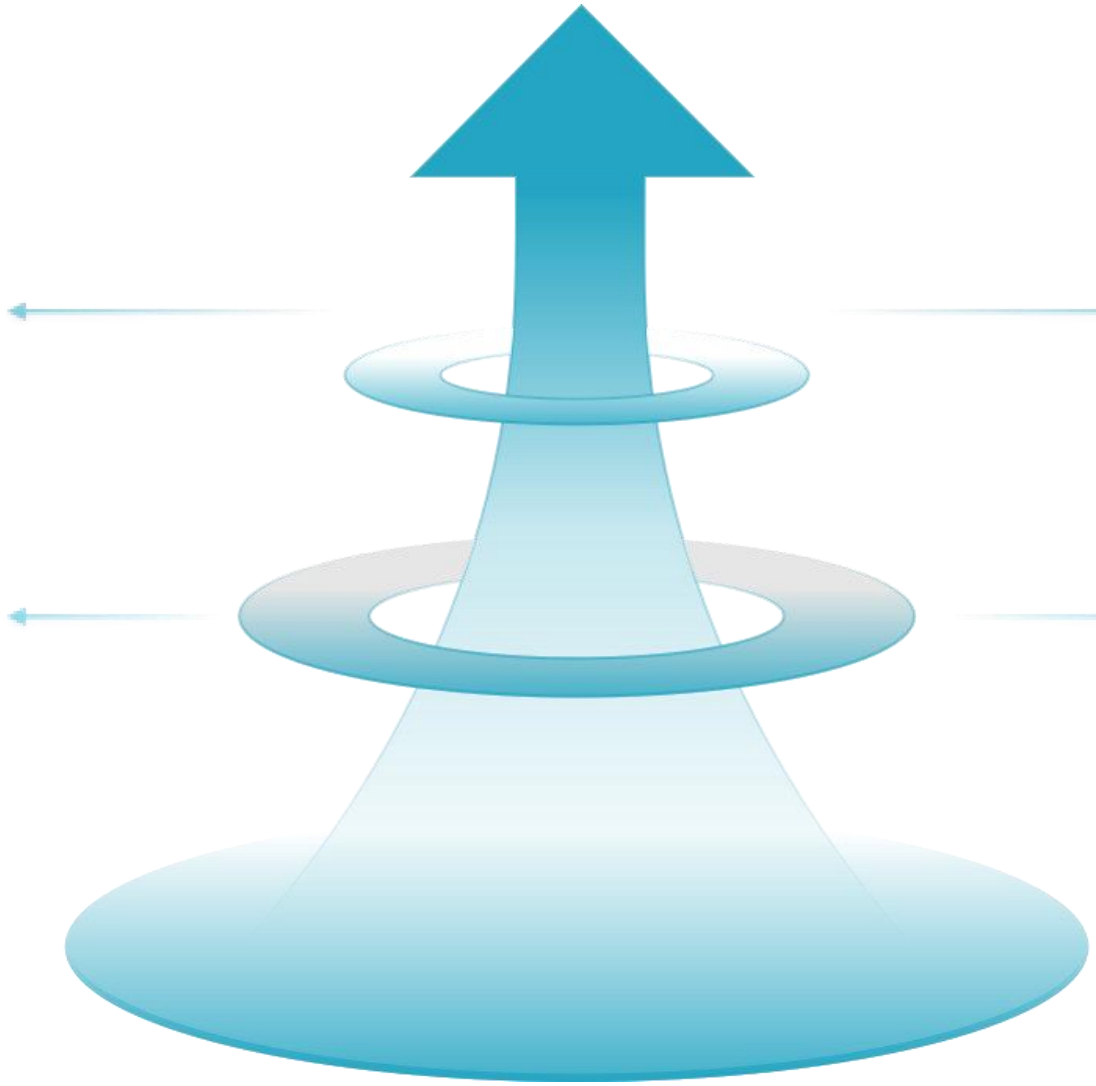
Define delivery obligations during disruptions and assess available port, pipeline and storage capacity.

按项目阶段管理

Manage projects by stage

运营项目关注履约和现金流，在建项目关注融资与进度，框架项目关注投资决策。

Focus on delivery and cash flow in operation, financing and schedules during construction, and investment decisions for framework projects.



按国别和环节合作

Tailor cooperation by country and activity

分别设计资源开发、炼化投资和工程服务的技术要求及风险分担。

Tailor technical requirements and risk sharing to resource development, refining investment and engineering services.

政策与企业执行衔接

Link policy with business execution

利用现有对话平台完善信息沟通，企业落实采购、治理和争议处理安排。

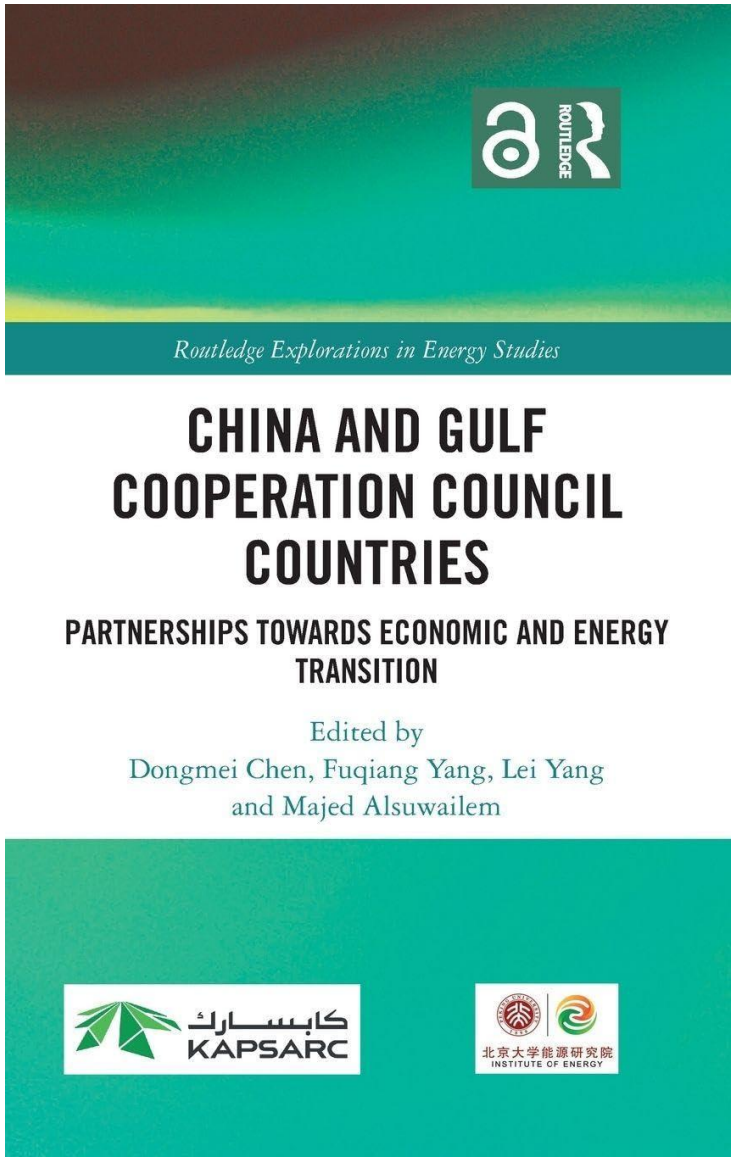
Use existing dialogue platforms to improve information exchange; companies implement procurement, governance and dispute-resolution arrangements.

本书为政策对话与产业合作提供研究参考

The book informs policy dialogue and industrial cooperation

本书在全球变革的一个关键时刻完成，旨在成为全球范围内学术研究人员、政策分析师、决策者、智库、政府和私营企业及投资者关于转型合作的重要资源。

This book, completed at a critical moment in global transformation, aims to serve as a vital resource for academic researchers, policy analysts, decision-makers, think tanks, governments, private enterprises, and investors worldwide on transformative collaboration.





Thank you!

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