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AT THE SHOW

cippe 2022

China takes on dual energy challenge

National oil companies double-tasked to increase hydrocarbon production while decarbonising operations and investing in renewables Pages 2&3

中国石油公司目前面临双重任务——提高油气勘探和生产，同时践行国家的低碳承诺。难题在于如何合理把握两种责任，找到平衡点。在减少碳排放的同时，须着力保障能源安全，做到先立后破。

P2&3

Workers inspect a turbine at a wind farm in China's Gansu Province
Photo: REUTERS/ SCANPIX

China eyes carbon capture and storage to boost recovery at oldest field

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RENEWABLE ENERGY

China takes on the dual energy challenge

National oil companies double-tasked to increase hydrocarbon production while decarbonising operations and investing in renewables

XU YIHE
Singapore

CHINESE oil companies are facing a dual mission to increase exploration and production while also delivering on the country's low-carbon commitments.

The challenge is finding a balance between the two responsibilities.

In late January this year, Chinese President Xi Jinping admitted the energy transition is no easy task, and called on the country to keep in mind the big picture of meeting its carbon peaking and neutrality targets in 2030 and 2060, respectively.

While reducing carbon emissions, efforts should be made to safeguard energy security, he said, adding that a gradual exit of traditional energy sources should be based on the safe and reliable substitution of new energy sources.

Xi called for China to control its fossil-fuel consumption, regulate the growth of coal consumption in a strict and reasonable manner and maintain steady growth of crude and natural gas output.

In 2021, the country's primary energy consumption increased 3.4% year on year to 5.15 billion tonnes of coal equivalent.

However, domestic energy production only increased 2.5% year on year to 4.18 billion tonnes of coal equivalent, which means China relies on domestic energy production to meet 81% of its energy demand.

Coal accounts for about 66.8% of domestic energy production, with oil providing 6.9%, gas 5.6% and nuclear power 3.1%.

Renewable energy accounts for about 17.6%.

With production rising 4.7% to 4.07 billion tonnes, and imports rising 6.6% to 320 million tonnes, coal last year accounted for 55.1% of China's energy-demand mix, while oil took up 19.3%, natural gas 9.2% and renewables 16.4%.

A recent China National Petroleum Corporation (CNPC) report showed that industry upgrading coupled with efficiency improvements will check the growth of the country's primary energy demand.

CNPC says that by 2030, China's overall energy demand will peak at 6 billion tonnes of coal equivalent, which is about 4.2 billion tonnes, or 30.87 billion barrels, of oil.

By 2030 and 2060, the percentage of renewables in China's energy-demand mix is expected to reach about 26.9% and 80%, respectively, while coal's share will reduce to 42.8% and 5%, and oil and gas will only account for 30% and 15%.

China produced 198.98 million tonnes of crude in 2021 — about 3.98 million barrels per day — a 2.4% increase year on year.

Of that total, China's offshore oil production increased 5.8% year on year to 54.64 million tonnes, and offshore gas output increased by 5.4% to 19.6 billion cubic metres.

Offshore oil production is expected to increase by 5.4% this year to 57.6 million tonnes, while gas output is forecast to rise 6.7% to exceed 20 Bcm.

In 2021, crude imports dropped 5.4% to 512.98 million tonnes (about 10.26 million bpd), accounting for 73% of China's total oil demand.

Total gas demand last year increased 12.5% to 369 Bcm, including 205.3 Bcm from domestic production and 167.3 Bcm from imports — a 19.9% rise on 2020.

Liquefied natural gas accounted for about 65.9% of the gas imports, with pipeline gas accounting for 34.1%.

For 2022, China's crude-oil demand is expected to increase to between 736 million and 761 million tonnes, with imports accounting for 550 million tonnes of the figure, according to a recent report by the CNOOC Energy Economics Institute. Gas consumption is expected to increase 8.4% to 400 Bcm in 2022, with demand from the town gas sector to rise 12.9% to 129.2 Bcm.

Industrial operations will consume 160 Bcm, up 8.4%, while gas for power generation will increase 11.4% to 74 Bcm.

The remainder will be used as feedstock for chemical production.

Of the total gas consumption this year, 218.7 Bcm is forecast to come from domestic production, up 5.4% on last year.

Of this amount, 64.7 Bcm will be imported pipeline gas, up 11.6% on last year and including 15.8 Bcm from Russia.

LNG imports will account for 118.9 Bcm (84.96 million tonnes).

Natural gas demand is expected to peak at 650 Bcm by 2040, after which it will taper off to 410 Bcm by 2060. The major engines for gas demand growth include power generation, industry, utilities and construction.

Gas production is forecast to increase in line with demand growth, but less intensely. CNPC says domestic gas production will increase to 250 Bcm in 2030 and further to 350 Bcm in 2060, up from 2021's 205.3 Bcm.

Coal demand growth will maintain its current momentum until

CHINA'S ENERGY CONSUMPTION

Year	Energy Use*	Coal	Oil	Gas	Renewables
2011	3.87	70.2%	16.8%	4.6%	8.4%
2012	4.02	68.5%	17.0%	4.8%	9.7%
2013	4.17	67.4%	17.1%	5.3%	10.2%
2014	4.26	66.0%	17.1%	5.7%	11.2%
2015	4.21	63.8%	18.0%	5.9%	12.3%
2016	4.36	61.9%	18.3%	6.2%	13.5%
2017	4.49	60.4%	18.9%	7.8%	14.2%
2018	4.71	59.1%	18.9%	7.8%	14.2%
2019	4.79	57.9%	19.0%	8.3%	14.9%
2020	4.98	57.0%	19.0%	8.0%	16.0%
2021	5.15	55.1%	19.3%	9.2%	16.4%

** Billion tonnes of coal equivalent*
Sources: China Petroleum Economics & Technology Research Institute; CNOOC Energy Economics Institute

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Bright future: Renewable energy will account for 45% of China's total power generation by 2050 and 75% by 2060, up from 24% in 2020
Photo: AFP/SCANPIX

NATURAL GAS OUTPUT

Year	Output*
2013	121.0
2014	123.4
2015	127.1
2016	136.9
2017	147.4
2018	161.8
2019	173.6
2020	187.5
2021	205.3

** Billion cubic metres*

GAS CONSUMPTION MIX

	2016	2017	2018	2019	2020	2021
Residential use	40.3	37.6	36.0	37.2	38.5	31
Industry fuel	29.8	30.9	33.8	34.9	34.8	40
Power gen	15.6	19.9	21.9	17.8	16.8	18
Chemical feed	14.3	11.6	8.3	10.25	9.8	11

Figures as percentage.
Source: Chinese Customs; China Petroleum Economics & Technology Research Institute; CNOOC Energy Economics Institute

2030, when demand will fall to 3.6 Bcm per annum and further to 400 million tonnes by 2060, says CNPC.

Power demand will increase to 11.3 terawatt hours by 2030 and further to 14.6 TWh in 2060, when the total power production will exceed demand at 18.5 TWh.

Power throughput by renewables is expected to increase to 5 TWh in 2030 and 15.1 TWh in 2060.

Renewable energy will account for 45% of total power generation by 2050 and 75% by 2060, up from 24% in 2020.

Solar power and wind power generation capacity will increase to 1700 gigawatts in 2030 and 6130 GW by 2060. The promotion of renewable energy-based power generation and the application of carbon capture and storage technology are expected to help the power-generation industry achieve peak carbon dioxide emissions in 2025, five years ahead of the government's target for the country as a whole.

CO_2 emissions from power generation will peak at 4.7 billion tonnes between 2025 and 2030.

CNPC says the cost of fossil fuel-based CCS projects is falling and will provide better economics for operating projects.

It forecasts that costs will halve by 2060 because of new technologies.

By 2060, the offshore wind power tariff will drop to 0.3 yuan ($0.047) per kilowatt hour from 0.45 yuan per kWh at present, while the tariff for gas-based power generation will be reduced to 0.46 yuan per kWh from 0.63 yuan per kWh at present.

中国积极应对双重能源挑战

中国石油公司目前面临着双重任务——提高油气勘探和生产，同时践行国家的低碳承诺。

难题在于如何合理把握两种责任，找到平衡点。

今年 1 月下旬，中国国家主席习近平坦言道，实现能源转型并非易事，并称中国时刻谨记在 2030 年和 2060 年分别实现“碳达峰”和“碳中和”的宏伟目标。

习近平主席表示，在减少碳排放的同时，须着力保障能源安全，并补充说，逐步摒弃传统能源是大势所趋，但应当建立在拥有安全可靠的替代新能源的基础之上。

习近平主席要求中国控制化石燃料消耗，采取严格合理措施，控制煤炭消耗增长，保障原油和天然气产量稳步增加。

2021年，全国总体能源消耗量为51.5亿吨标准煤，同比增长3.4%。

然而，国内能源产量仅同比增长 2.5% ，至 41.8 亿吨标准煤，也就是说中国依靠国内能源产量满足了自身81% 的能源需求。

从国内能源产量结构来看，煤炭约占 66.8%，石油占 6.9%，天然气占 5.6%，核电占 3.1%。可再生能源约占17.6%。

煤炭去年增长 4.7% 至 40.7 亿吨，进口增长 6.6% 至 3.2 亿吨，占中国能源需求结构的 55.1%。而石油占 19.3%，天然气占 9.2%，可再生能源占 16.4%。

中国石油表示，到2030年，中国总体能源需求将达到60亿吨标准煤的峰值，约42亿吨或308.7亿桶石油。

到 2030 年和 2060 年，可再生能源在中国能源需求结构的占比预计将分别达到 26.9% 和 80% 左右，而煤炭占比将分别降至 42.8% 和 5%，石油和天然气仅占 30% 和 15%。

2021年，中国原油产量为1.9898亿吨，约398万桶/日，同比增长2.4%。其中，中国海上石油产量同比增长5.8%，至5464万吨，海上天然气产量同比增长5.4%，至196亿立方米。

预计今年海上石油产量将增长 5.4%，至 5760 万吨，而天然气产量预计将增长 6.7%，至 200 亿立方米以上。

2021年，原油进口量下降5.4%，至5.1298亿吨（约1026万桶/日），占中国石油总体需求量的73%。

去年，天然气总需求增长 12.5% 至 3690 亿立方米，其中 2053 亿立方米来自国内生产，1673 亿立方米来自进口，较 2020 年增长 19.9%。

液化天然气约占天然气进口总量的65.9%，管道天然气占34.1%。

中国海油集团能源经济研究院最近的一份报告指出，2022 年中国的原油需求预计将增至 7.36 亿–7.61 亿吨之间，其中进口占 5.5 亿吨。

到 2040 年，天然气需求量预计将达到 6500 亿立方米的峰值，之后到 2060 年逐步降低到 4100 亿立方米。

天然气需求量增长主要源自电力、工业、公用事业和建筑业。预计天然气产量将随着需求上扬而增加，但涨幅波动不会过于激烈。

可再生能源的发电量预计将在 2030 年增加到 5 太瓦时，到 2060 年增加到 15.1 太瓦时。可再生能源2020 年占总发电量的24%，到 2050年增加至45% ，到 2060 年占比75%。太阳能和风力发电装机量预计在 2030 年增加至 1700 吉瓦，到 2060 年增加至 6130 吉瓦。

积极推广可再生能源发电以及合理应用碳捕集与碳封存技术（CCS），有望助力电力行业在 2025 年实现碳达峰，比政府制定的全国目标提前5年之多。

对于电力行业而言，二氧化碳排放量将在 2025 年至 2030 年间，达到 47 亿吨的峰值。

中国石油表示，随着基于化石燃料的 CCS 项目的成本逐步下降，有望为运营项目提供更好的经济效益。它预测，随着新技术不断涌现，到 2060 年相关成本预计降低至目前的一半。

CARBON CAPTURE & STORAGE

Big plan: Shaanxi Yanchang Petroleum has ambitions for carbon capture

Photo: YANCHANG

China eyes CCS to boost recovery at oldest field

Initiatives involve building 5 million tonnes of CO2 capture capacity in northern China's Yanchang field in a two-phase programme

XU YIHE
Singapore

CHINESE exploration and production company Shaanxi Yanchang Petroleum has unveiled a major plan to reduce its carbon-emission footprint through carbon capture, utilisation and storage technology.

The initiative involves capturing carbon dioxide at its three coal-to-methanol projects in Yanan city, in northern China's Shaanxi province, to build up capacity to capture, store and utilise 5 million tonnes per annum of CO_2 in a two-phase programme involving three CO_2 capture units and 15 well pads for reinjection wells, a senior company official said.

The Xian-based onshore operator has just awarded a contract to Sinopec Oilfield Service Corporation, an engineering arm of Sinopec, to carry out front-end engineering and design for the project.

Company vice president and chief geologist Wang Xiangzeng told a recent webinar that the first phase will involve 2.4 million tonnes of CO_2 capture capacity with 1.6 million tonnes of capacity to be built at Yulin Energy Chemical and 800,000 tonnes built at Yanan Energy Chemical. During this phase, which ends in 2030, 676 reinjection wells will be drilled at eight drilling pads.

The second phase calls for adding 2.6 million tonnes of capacity at Yulin Coal Chemical by 2050.

A total of 678 wells will be drilled at seven drilling pads to reinject CO_2 back into the reservoirs.

The CO_2 will be compressed before being reinjected into reservoirs in order to enhance oil recovery, Wang said, adding that Yanchang will also build CO_2 pipelines spanning 895 kilometres from three CO_2 capture units to the well pads.

At Yulin Coal Chemical, Yanchang is already doubling the capacity to capture 300,000 tonnes of CO_2.

Yanchang embarked on the CCUS-based EOR application in 2009 at three oil prospects it operates in Shaanxi. The CO_2 is now transported by truck to the reinjection wells 150 kilometres away.

At the Wuqi and Jingbian well pads — with total rejection capacity of 50,000 tpa — Yanchang has reinjected 216,000 tonnes of CO_2 back into reservoirs since 2009, lifting single-well output by 50%.

Another CO_2 reinjection project based at Ansai well pad with capacity of 100,000 tpa was put into operation in August last year.

Yanchang will further expand the three facilities to 1 million tonnes of CO_2 capture capacity by 2025, Wang said.

The CCUS project at Yulin Coal Chemical was recognised by the Carbon Sequestration Leadership Forum, a ministerial-level international climate-change initiative, in 2015 and was listed in the US-China Joint Presidential Statement on Climate Change.

One of China's oldest oil producers, Yanchang last year produced 11.2 million tonnes of oil (224,000 barrels per day) and 8 billion cubic metres of natural gas.

The International Energy Agency said in a recent report that without CCUS it is impossible to reach international climate goals.

The agency said CCUS will be accountable for 15% of CO_2 emissions reduction.

Data from the Global CCS Institute shows that by the end of 2020 there were 65 commercial CCS projects worldwide, which are able to capture and permanently store 40 million tpa of CO_2.

Of the total, 26 have started operation, three are under construction, two have suspended operations, 13 are under FEED studies and 21 are in the early stages of development.

In addition, another 34 are under pilot development as CCS demonstration projects.

China now operates about 40 CCS projects in 19 provinces, with a CO_2 capture capacity of 3 million tpa.

Of the total, 13 are related to power generation and cement production, with CO_2 capture capacity of 860,000 tpa, 11 are involved with oil and gas production, with annual capacity of 1.82 million tonnes including 1.54 million tonnes involved in EOR projects.

Most of these projects capture CO_2 from industrial sources such as plants producing gas-fired power, petrochemicals, coal-based chemicals or iron and steel.

Wang said that it costs 117 yuan ($18.39) to capture one tonne of CO_2 at Yanchang, which is considered low.

中国推动碳捕集和碳封存，提高老油田石油采收率

中国勘探生产公司陕西延长石油公布了一项重大计划，旨在通过碳捕集、碳利用和碳封存技术（CCUS）减少碳排放足迹。

一位公司高级官员表示，这项计划包括在其位于中国北部陕西省延安市的三个煤制甲醇项目中实现捕集二氧化碳，旨在将CCUS产能提升至500 万吨/年，计划分为两期项目，涉及三个二氧化碳捕集装置和 15 个用于回注井的井场。

这家总部位于西安的陆上运营商刚刚与中石化石油工程技术服务股份有限公司签订了一份合同，为该项目进行前端工程设计（FEED）工作。

公司副总裁兼首席地质师王香增先生在最近的一次网络研讨会上表示，一期项目计划建设240 万吨二氧化碳捕集产能，其中榆林能源化工承担160 万吨产量，延安能源化工承担80 万吨产能。

一期项目于 2030 年结束，期间将在 8 个钻井场钻探 676 口回注井。二期项目计划到 2050 年，榆林煤化工新增产能 260 万吨。总共将在 7 个钻井场钻探 678 口井，将二氧化碳回注至储层。

国际能源署在最近的一份报告中表示，缺乏CCUS技术支持，就不可能实现国际气候目标。该机构表示，CCUS 项目将贡献15% 的二氧化碳减排。

全球碳捕集封存研究所（Global CCS Institute）的数据表明，截至 2020 年底，全球共有 65 个CCS 商业项目，可捕集和永久封存二氧化碳4000 万吨/年。

目前，中国在19个省开展了约 40 个 CCS 项目，二氧化碳捕集产能为 300 万吨/年。其中，13个项目涉及发电和水泥生产，二氧化碳捕集产能达到860,000 吨/年；11个用于油气生产，年产能182万吨，其中154万吨用于EOR项目。

cippe 振威石油展

Thursday 28 July 2022

The editorial content of this section, pages 5 to 8, is the sole responsibility of cippe's organisers

The curtain rises for cippe2022 in Shenzhen

The world's annual leading event for the oil and gas industry — The 22nd China International Petroleum & Petrochemical Technology and Equipment Exhibition (cippe2022), is launched today at Shenzhen World Exhibition & Convention Center.

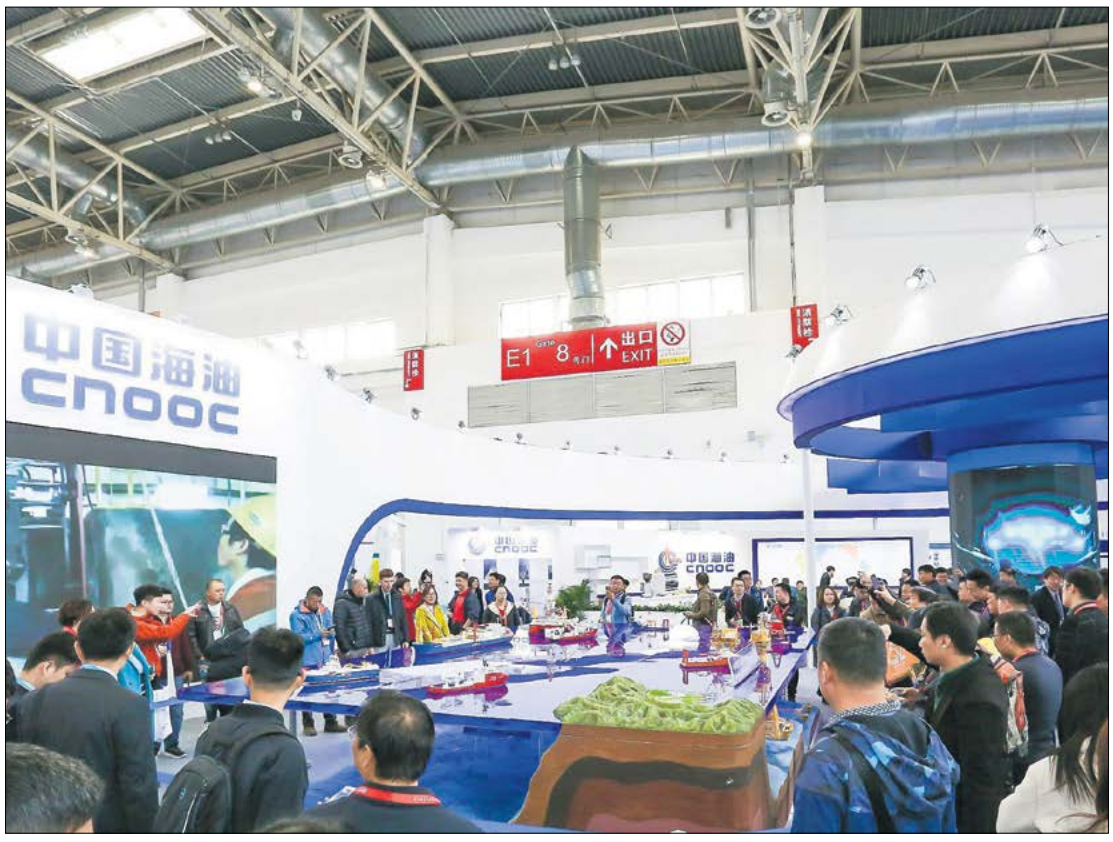
The event covers an exhibition space of 50,000 square metres and gathers about 1,000 exhibitors from petroleum, petrochemical, natural gas, pipeline, offshore engineering, city gas, hydrogen energy, shale gas, trenchless, explosion-proof electric, safety protection, automation & instrumentation and other relevant sectors, showcasing frontier innovation and application, and providing a high-quality and efficient docking platform for technical exchange and trade cooperation.

Vendors at international pavilions such as the United States, Germany, the United Kingdom and Canada are seeking cooperation opportunities at cippe2022.

Well-known enterprises including CNOOC, XCMG, Dongfeng Motor, Weichai, Petro-king, Baowu, Daye Special Steel, MOON-TECH, DEEPBIT, Heli Tech Energy, Wuhua Energy, Guizhou Wire Rope, DALIPAL, Sevnce Technology, AEET, SF Intelligent Motor, VVLAI, OKTECH, Grand Oilfield, Huangshan Huaneng, Schneider, Jinwang Intelligent, Chengchuang Intelligence, HAILOONG, Warom, CDSR, Alkali Pump, QYSEA, CHASING, Ouming, Rochiev, Matorly, AILIPU, BASKA, Neway, Himile and Leistrit are displaying their new exhibits and technology.

Concurrently held at the show are the 14th International Petroleum & Natural Gas Summit, API Standards and Certification, cippe Discoveries Livestream and other seminars, which will gather academicians and experts and representatives from industrial enterprises to discuss the development trends and opportunities of oil, gas and energy industry.

Welcome to cippe2022 to explore more opportunities.



cippe2022 is building on the success of previous events Photo: cippe

一年一度的世界石油天然气大会 今日在深圳盛大开幕！

7月28日，一年一度的世界石油天然气大会——第二十二届中国国际石油石化技术装备展览会（cippe2022石油石化展）在深圳国际会展中心（宝安）开幕。来自国内外的近千家企业精彩亮相。

展会聚焦油气行业高质量发展，总展览面积5万平方米，以石油、石化、天然气、燃气、管道、非开挖、海工、氢能8大主题，盛邀石油石化、天然气、油气管道、油气数字化、海洋工程、海洋石油、页岩气、燃气、氢能、非开挖、防爆电气、安全防护、自动化仪器仪表、土壤修复14大产业板块行业企业集中亮相，展示全产业链上下游前沿创新与应用，为油气行业技术交流与贸易合作搭建高质高效对接平台。

现场，美国展团、德国展团、英国展团、加拿大展团等国际展团携油气领域重点实力企业，共寻全球合作商机。中海油、徐工集团、东风集团、潍柴集团、百勤油服、宝武钢铁、大冶特殊钢、冰轮环境、成都迪普、合力能源、物化能源、贵州钢绳、达力普、七腾科技、安泰环境、山防电驱、未来机器人、海洋王、新疆格瑞迪斯、黄山华能、施耐德、金旺智能、诚创智能、海油发展工程技术、华荣防爆、西沙科技、杭州碱泵、深圳鳍源、潜行创新、瓯明流体、融成智能、海跃龙腾、维特力、爱力浦等国内外知名企业重磅亮相，新产品新技术齐登场。

同期，cippe2022国际石油天然气产业高峰论坛以“数智化转型驱动油气产业绿色低碳发展”为主题站位油气高质量发展；“探馆直播”为展商提供线上线下多渠道品牌推广展示。

7月28日–30日，欢迎参展参观cippe2022，了解全球前沿资讯，见证油气行业高质量转型，共寻未来合作商机！

cippe2022 Satellite events

同期展会

cippe 振威石化展
第十四届深圳国际石油和化工技术装备展览会

CING
第十二届深圳国际天然气技术装备展览会

CIPE
第二十二届深圳国际石油天然气管道与储运技术装备展览会

CM
第十二届深圳国际海洋工程技术与装备展览会

ciooe
第二十二届深圳国际海洋石油天然气展览会

cisge
第十二届深圳国际页岩气技术与装备展览会

GAS
2022深圳国际燃气应用与技术装备展览会

HEIE
深圳国际氢能技术装备展览会

No-Dig CITTE
2022深圳国际地下工程建设及非开挖技术装备展览会

Expec
第二十二届深圳国际防爆电气技术设备展览会

cieca
深圳国际石油和化工自动化技术装备及仪器仪表展览会

cipse
深圳国际石油和化工安全防护技术及设备展览会

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cippe2022
Concurrent Events Schedule

	时间 TIME	会议室 MEETING ROOM	主题 EVENT TOPICS	主讲公司及主讲人 SPEAKERS
28 July	09:20-16:30	17号馆会议区 Hall 17 Conference Zone	第十四届国际石油天然气产业高峰论坛 The 14th International Petroleum & Natural Gas Summit	中国国际石油石化技术装备展览会 (cippe) 组委会 cippe Organizing Committee
	14:35-15:00	17号馆会议区 Hall 17 Conference Zone	防爆产品国际认证解析和转证 Analysis and Translation of Global Explosion Protection Certification	德国莱茵 TÜV TÜV Rheinland
	15:00-15:25	17号馆会议区 Hall 17 Conference Zone	新规新挑战——防爆电气产品全球市场准入 New Regulations and Challenges — Global Market Access for Explosion-proof Electrical Products	上海仪器仪表自控系统检测测试所有限公司 Shanghai Inspection and Testing Institute of Instruments and Automation Systems Co., Ltd.
29 July	09:30-11:20	17号馆会议区 Hall 17 Conference Zone	API 研讨会 API Standards and Certification Updates	美国石油学会 (API) Americian Petroleum Insititute (API)
	09:30-16:30	展馆 Exhibition Area	探馆直播 cippe Discoveries Livestream	中国国际石油石化技术装备展览会 (cippe) 组委会 cippe Organizing Committee
	09:30-11:00	17号馆会议区 Hall 17 Conference Zone	ECF 第七届页岩油气技术装备研讨会（深圳） The 7th ECF Shale Technology Showcase	上海联合非常规能源研究中心 Shanghai United Institute for Unconventional Resources (SUI)
	11:10-12:00	17号馆会议区 Hall 17 Conference Zone	新型压裂暂堵及水平井找水堵水系列产品 Series Products of New Fracturing Temporary Plugging and Water Finding and Water Shut-off Technology in Horizontal Wells	深圳凤皇能源发展有限公司 Shenzhen PHENIX Energy Development Co., Ltd.
	11:30-12:00	17号馆会议区 Hall 17 Conference Zone	重构想象— 水下可重构分布式混合智能平台 暨鳍源水下机器人新品发布会 Reshape Your Imagination — Introducing a Reconfigurable, Combinable, and Distributed Intelligent Underwater Platform New Product Announcement in the FIFISH Underwater Robot Series	深圳鳍源科技有限公司 QYSEA Technology
	14:00-16:30	17号馆会议区 Hall 17 Conference Zone	中国石化海工锻件技术发展与供需对接会 China Forgings Supply and Demand Fair for Petroleum, Petrochemical and Ocean Engineering	中国锻造进出口联盟 China Forging Alliance for Import & Export 北京立基文化传播有限责任公司 Beijing Leegn Culture Co., Ltd.
		注: 以上活动日程或有调整, 以展会现场公布为准。 Note: The final agenda will be announced by the Organizing Committee on-site		

Digital intelligence transformation drives green and low-carbon development of the oil and gas industry

China is gearing up for the energy transition amid China's commitment to achieve peak carbon emissions in 2030 and carbon neutrality in 2060, pushing the oil and gas industry to establish a clean, low-carbon, safe and efficient energy production and consumption system.

With the rapid development of emerging technologies represented by cloud computing, big data and artificial intelligence, the digital economy has become the most active, fastest-growing, and most influential industrial segment in economic development.

To grasp the window of opportunity in this decade, oil and gas companies need to re-examine their accumulated experience and competitive advantages in the industry, explore new sustainable development paths, adjust product structure, and reconstruct business chains, so as to achieve long-term low-carbon transformation.

The 14th International Petroleum & Natural Gas Summit is launched today in Hall 17 of the Conference Zone.

It is co-hosted by cippe Organizing Committee and China University of Petroleum (Beijing); organized by Beijing Zhenwei Exhibition Co., Ltd., College of Carbon Neutrality Future Technology of China University of Petroleum (Beijing) and Cubic Oil, supported by media outlets.

With the theme of Digital Intelligence Transformation Drives Green and Low-Carbon Development of Oil & Gas, the summit focuses on technologies for clean and efficient utilization of energy, carbon-negative and energy digital transformation, aiming to accelerate the integration of energy technology and digital technology, upgrading of technology and equipment, and industrial transformation, and provides a professional platform for industry-university-research-application integration for industry insiders at home and abroad.

A previous cippe event

数智化转型驱动油气产业绿色低碳发展

双碳目标的提出，标志着中国能源发展进入转型加速期。2022年，国内油气行业正在逐步构建清洁低碳、安全高效的能源生产和消费体系。

随着以云计算、大数据、人工智能等为代表的新兴技术快速发展，数字经济已成为经济发展中最活跃、增长最快速、影响最广泛的产业领域。油气企业想要把握住这十年的增长窗口期，就需要重新审视已经积累的行业经验和竞争优势，探寻新的可持续发展路径，调整产品架构，重构业务链，从而实现长效低碳转型。

今日，第十四届国际石油天然气产业高峰论坛在17号馆会议区隆重开幕。论坛由中国国际石油石化技术装备展览会组委会、中国石油大学（北京）主办，北京振威展览有限公司、中国石油大学（北京）碳中和未来技术学院、立方石油承办，得到各界媒体的大力支持。

XCMG Foundation makes debut at cippe2022

XCMG Foundation is one of the core enterprises of XCMG, focusing on the research and development, manufacturing and sales of piling machinery, trenchless machinery, coal mining machinery, mining and tunnel machinery, and drilling machinery, as well as construction technical support, engineering, etc., providing customers with comprehensive solutions.

Its rotary drilling rigs and horizontal directional drilling rigs have ranked first in the domestic market for years.

Trenchless machinery ranks first in the world and piling machinery ranks among the world's first class.

Roadheaders, drilling jumbos, and deep well drilling rigs are among the forefront of the domestic market.

With technological advantages in super large tonnage, super deep hole, hard formation, intelligence, specialization, etc., XCMG leads the development of the industry.

With more than 10 overseas support teams and spare parts centers, its products have been exported to more than 80 countries and regions. **Booth: E1250**

徐工基础首次亮相cippe

徐工基础（展位号：E1250），是徐工核心企业之一，聚焦桩工机械、非开挖机械、煤矿机械、矿隧机械、资源钻采机械的研发制造销售以及工法技术支持、工程施工等全价值链活动，为客户提供综合解决方案。

旋挖钻机、水平定向钻机等产品连续多年稳居国内市场第一，非开挖机械位居全球第一，桩工机械位居全球第一阵营；掘进机、凿岩台车、深井钻机等产品跃居国内市场前列。产品先后形成了超大吨位、超深孔、硬地层、智能化、特种化等技术领先优势，引领行业发展。

目前，已在海外建立了10余个海外支持组以及服务备件中心，多类产品已出口至80多个国家和地区。

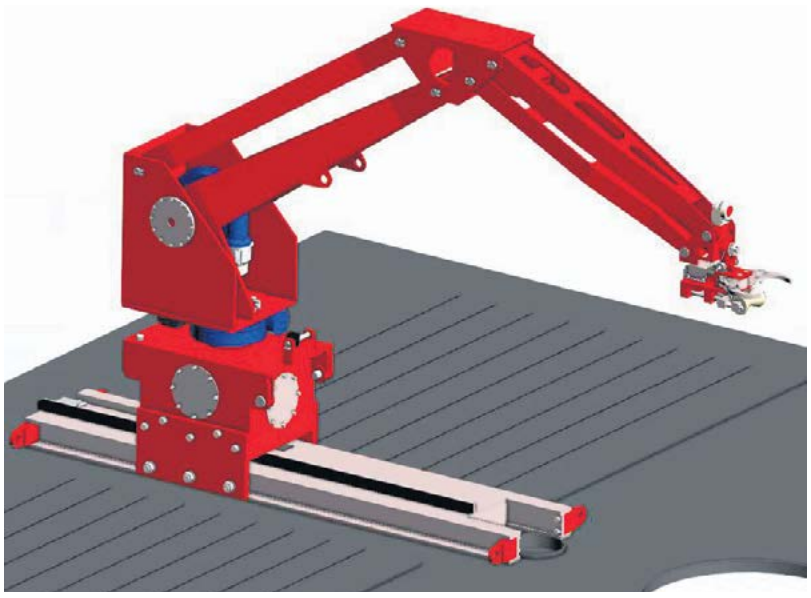
Chengchuang Intelligence — Automation and Intelligence of Wellheads

Jiangsu Chengchuang Intelligence Equipment Co., Ltd. is long committed to the R&D, production, sales and service of equipment in the field of automation and intelligent drilling wellheads.

It mainly provides products and services for the five major drilling companies of CNPC, the six major engineering companies of Sinopec, big rig plants and overseas customers.

The company is a national high-tech and new-tech enterprise, a Jiangsu enterprise postgraduate workstation and engineering technology research center for petroleum drilling, and has obtained ISO9001, ISO14001, ISO45001 and API Q1/7K/8C certifications.

In 2022, Chengchuang Intelligence will promote hydraulic slips, one key control derrick floor manipulator, quadruple stroke bop lifting transport device and loop chain bop lifting transport device. **Booth: E1038**



诚创智能–专注井口自动化、智能化装备

江苏诚创智能装备有限公司（展位号：E1038）长期专注井口自动化、智能化装备的研发、生产与销售，主要服务于中石油五大钻探公司、中石化六大工程公司和各大钻机厂以及海外客户。

公司是国家高新技术企业、国家科技型中小企业、江苏省民营科技企业、江苏省股权交易中心科创版挂牌企业、专精特新中小企业、瞪羚企业；公司获批设立了江苏省企业研究生工作站和石油钻井自动化装备工程技术研究中心。

Letone brings 20,000 psi frac hose to cippe2022

Letone is an industry-recognized high-quality rubber hose manufacturing and services company, devoted to the research and development, production and sales of polymer alloys, modified polymer materials, hydraulic hoses, frac hoses, rubber-plastic composite hoses, ultra-high pressure thermoplastic hoses, fittings, hose assemblies and rubber-plastic seals.

Letone has been developing and manufacturing super abrasion-resistant frac hose since 2016, which makes technological breakthroughs in unconventional oil and gas exploitation and transfer.

The three-inch 20,000 psi, four-inch 15,000 psi, and five-inch 15,000 psi Letone LT301F Super Abrasion Resistant Frac Hose has become the quality choice for fracturing projects due to its advantages of full flow, abrasion resistance, acid and alkali corrosion resistance, high-pressure resistance and light weight.

Letone has obtained API, ABS, DNV, GOST and Lloyd's Fire Test certifications. **Booth: E1183**

利通科技展示酸化压裂软管

利通科技（展位号：E1183）专注于高分子材料共混，高分子材料改性、液压软管、压裂软管、橡塑复合软管、超高压树脂软管、流体连接件、软硬管总成及橡塑密封制品的生产、研发与销售。

其3"20000psi、4"15000psi、5"15000psi LT301F超耐磨酸化压裂管线凭借全流量、超耐磨、耐酸碱腐蚀、耐超高压、轻量化等优势成为了酸化压裂工程的品质之选。其中，3”138MPa（20000psi）LT301F超耐磨酸化压裂软管的技术和性能赶超国外对标企业。

Rochiev leads in hazardous chemicals filling industry

Rochiev Intelligent Equipment Co., Ltd. is engaged in providing customized solutions integrating high-end equipment manufacturing, software and hardware development, production, sales and maintenance for the hazardous chemicals filling sector.

Rochiev's main products cover four sections: digital filling workshops, automatic filling lines, intelligent warehouse systems and workshop logistics transfer systems.

Its independently invented automatic filling system with vision positioning technology is the preferred choice of large and medium-sized chemical enterprises.

With a 90% share of the domestic market, Rochiev has cooperated with well-known chemical groups such as Wanhua Chemical, BASF, CNOOC-Shell, Vopak, Luxi Chemical, Juhua Group and Elkem Silicones, and has completed hundreds of automatic filling production line projects.

Rochiev has an annual production capacity of 100 sets of automatic filling production lines, and has obtained ISO9001, ISO14001, OHSAS 18001 and Explosion-proof certifications.

Booth: 9T260

融成智造参展cippe2022

长春融成智能设备制造股份有限公司（展位号：9T260），专注为危化品灌装行业提供集高端装备制造、软硬件开发、生产、销售、维保于一体的定制化解决方案集成商。公司主营四个版块的产品：数字化灌装车间、全自动灌装机器人生产线、立体智能仓储系统及车间物流转运系统。公司自主发明的视觉寻址全自动灌装系统是大中型化工企业灌装生产的首选设备。目前，已与万华化学、巴斯夫、中海壳牌、孚宝、鲁西化工、巨化集团、埃肯有机硅等知名化工集团合作，并已完成数百个自动灌装生产线项目，在该领域占据国内90%的市场份额。

TDCL showcases hot tapping and plugging in pipeline experience

Taitat Changlin Pipeline Technology (Jiangxi) Co., Ltd. (TDCL) is a manufacturer of hot tapping and plugging equipment for pipelines under pressure.

It has been engaged in the design, manufacture and construction of pipeline non-stop transmission and plugging series products for 35 years, and has a number of national pioneering technologies leaders in the industry.

With advanced manufacturing equipment and inspection system, TDCL owns a NDT centre and NDT qualifications.

TDCL has obtained ISO9001, ISO14001, and OHSAS18001 certifications, as well as China pressure piping components manufacturing license and long distance (oil and gas) pipeline with pressure plugging qualification.

It is a member of first-class suppliers of Sinopec, and a natural gas pipeline repair and guarantee unit in Jiangxi province.

Booth: E3018

泰达长林——35年管路不停输开孔封堵经验

泰达长林管道科技（江西）股份有限公司是带压管道不停输开孔封堵设备专业制造企业，从事管路不停输开孔、封堵系列产品设计、制造、施工35年，多项全国首创技术引领行业，公司占地面积约7万平方米，全面实施6S现场管理。公司装备先进，检测系统完善，拥有无损检测中心及资质，设有武汉分公司和新疆分公司。

泰达长林（展位号：E3018）拥有30余项国家技术专利，通过了 ISO9001、ISO14001、OHSAS18001三大体系认证；取得中国压力管道元件制造许可证及长输管道带压封堵甲级资质，系中国石化物资资源市场成员单位、一级供应网络成员单位。

OFFSHORE ENGINEERING

Cylindrical vessel: The Liuhua 11-1 redevelopment is using a similar cylindrical FPSO concept to the one in this image

Photo: ZENHUA LOGISTICS

China in $3bn boost for offshore engineering

The new investment will help improve the offshore engineering, as China is working hard to reduce reliance on foreign engineering expertise for offshore projects

XU YIHE
Singapore

CHINA has decided to invest billions of dollars to improve its offshore engineering research and development capabilities, a sector which has relied heavily on foreign technology to support the nation's offshore engineering, procurement and construction projects.

The country, which today accounts for almost 70% of construction work for the global floater market, has been formulating a response to bottlenecking problems faced by its offshore engineering and construction industries, and the R&D initiative forms part of this.

China recently unveiled a new offshore engineering entity, China Offshore Engineering Technology Company (COET), with 20 billion yuan (US$3.2 billion) worth of backing.

The company will be responsible for engineering and integration of offshore projects, as well as research and the development of software related to offshore engineering.

COET is a joint venture among China's 10 offshore engineering giants and investment entities, led by China State Shipbuilding Corporation (CSSC), which has relocated its headquarters to Shanghai from Beijing.

In the new technology company, CSSC has invested 3.8 billion yuan for a 19% stake, with the other nine companies each investing 1.8 billion yuan for 9% stakes apiece.

The other nine companies are China International Marine Containers (Group) Ltd (CIMC) — which is represented by its offshore engineering arm CIMC Offshore Engineering — China National Petroleum Corporation (CNPC), Sinopec, China National Offshore Oil Corporation (CNOOC), China COSCO Shipping Corporation (COSCO), China Merchants (represented by China Merchants Investment & Development), China Communications Construction Corporation (CCCC), CRRC Corporation Ltd (CRRC) and Shanghai State-owned Capital Investment.

The COET chairman will be nominated by CSSC, while each stakeholder will be represented on the board.

Foreign engineering houses currently provide basic and detailed engineering for most of the hulls and modules for floating production, storage and offloading vessels being built by Chinese yards for international floater owners.

China aims to become a strong competitor in the engineering field, both domestically and internationally.

Bomesc Offshore Engineering executive vice president Peter Wu said recently that this yard is among those hardest hit by a shortage of engineering expertise, ultimately undermining the company's own capacity for procurement and logistics.

Such problems have been greatly exacerbated during the Covid-19 pandemic, Wu pointed out.

投资30亿美元！中国大力发展海洋工程领域

中国已决定投资数十亿美元，用于提高海洋工程研发能力。中国在这一领域严重依赖外国技术来支持国内海上设计、采购和施工（EPC）项目。

中国目前拥有全球浮式装备建造领域的近70%份额，并正在积极应对海洋工程和施工方面的“卡脖子”难题，包括研发领域。

中国最近成立了一家新的海洋工程实体，即中国海洋工程装备技术发展有限公司（以下简称“中国海工技术”），总计投资200亿元人民币（32亿美元）。

这家公司计划负责海上项目的整体设计和装备总装，以及海工装备的相关软件研究和开发。

中国海工技术是一家由中国船舶集团有限公司（以下简称“中船集团”）领衔的中国10家海工巨头和投资实体联合成立的合资企业，总部从北京迁至上海。

其中中船集团出资38亿元，持股19%，其他9家公司各出资18亿元，分别持股9%。

其他九家公司包括：中国国际海运集装箱（集团）有限公司旗下中集海洋工程有限公司、中国石油天然气集团公司、中国石油化工集团有限公司、中国海洋石油集团有限公司、中国远洋海运集团有限公司、招商局投资发展有限公司、中国交通建设集团有限公司、中国中车集团有限公司和上海国有资本投资有限公司。

中国海工技术董事长将由中船集团提名，而每家利益相关者均在董事会拥有席位。

目前，国际浮式装备船东所订造的浮式生产储卸油船（FPSO）的大部分船体和模块，由中国船企承建，外国工程设计公司提供基础和详尽的工程设计方案。

SHALE

China targets an unconventional approach to transition

Nation wants tight gas, shale gas and CBM resources to supply 60% of gas demand by 2026

XU YIHE
Singapore

CHINESE energy officials are targeting a pivotal role for natural gas and unconventional resources in the country's endeavour to reach carbon neutrality by 2060.

As a lower-emission option to coal and oil, natural gas will be the only fossil fuel that will see production increase under the carbon emission peak and carbon neutrality scenario — with a key role for unconventional gas resources, despite its high carbon footprint reputation.

A recent report from China's leading gas producer, PetroChina, says the country's gas demand will peak at 650 billion cubic metres per annum by 2040 before leveling off to 410 Bcm per annum in 2060, up from 369 Bcm last year.

Of the total demand last year, 114.4 Bcm was used as transportation fuel and for household and commercial purposes, 147.6 Bcm for the industrial sector, 66.4 Bcm for power generation and the rest for chemical production.

PetroChina says that by 2026, 60% of China's gas demand will be met by unconventional resources — tight gas, shale gas and coalbed methane.

But the company must overcome technical, cost and management challenges as development scales up, says Li Guoxin, an official with PetroChina Exploration & Production Branch Company.

Li says in a published paper that complex geological and reservoir conditions make the selection of sweet-spot intervals in shale oil reservoirs particularly challenging.

Drilling efficiency needs to be improved by shortening drilling cycles for horizontal wells.

In addition, China must improve the economics for unconventional resources development by lowering costs. Complex geology makes unconventional resource development in China less profitable than that in the US, Li says.

In China, the per-barrel cost for shale oil is $60 to $90, compared with a US average of $30.

Sinopec and PetroChina lead China's shale drive, with the two companies accounting for almost all of the country's shale oil and shale gas production.

Shale gas output reached 22.1 Bcm last year, up 10.4% over 2020.

Drilling at the Sichuan basin Jinqiu tight gas field, formerly operated by Shell, helped PetroChina boost gas throughput at the field to 340 million cubic metres in 2021, a seven-fold increase over 2020.

The company drilled 93 production wells at 30 well pads last year in the Jinhua block. In 2009, Shell signed a 30-year production sharing agreement with PetroChina to explore and develop the 4000-square-kilometre Jinqiu tight gas play and committed to financing the exploration period as operator.

By 2012, Shell had mobilised five land rigs for appraisal work at Jinqiu covering 21 drilling locations in 19 villages.

However, as the appraisal work failed to meet Shell's criteria for development, in 2018 the company withdrew from Jinqiu and other Sichuan basin unconventional gas activities to focus more on the Ordos basin's Changbei tight gas play it is developing with PetroChina.

PetroChina also drilled a successful tight gas well, Jinqian 511-6-H1, which flowed 987,400 cubic metres per day of tight gas in late December 2021 during tests, with open flow capacity registering at 2.93 million cubic metres per day.

The company claims the Sichuan basin holds 6.9 trillion cubic metres of tight gas in place and has pinned down an 18,200-square-kilometre area in the central part of the basin for future exploration and development.

Sinopec has also reported several shale oil discoveries at the Subei basin in Jiangsu province, with three exploration wells drilled there last year all flowing shale oil with commercial value.

The company has pegged the basin's Zhentong trough as holding 256 billion barrels of shale oil in place in an area covering 420 square kilometres.

Sinopec admits that shale oil at the Subei basin is trapped in reservoirs as deep as 3000 metres, a challenge it finds difficult to overcome during drilling and fracking operations.

Shale push: fracking trucks at a Sinopec facility in Chongqing, China
Photo: REUTERS/SCANPIX

However, the company's success with mud shale reservoir reconstruction is making it possible to identify blocks favourable for development.

Sinopec has had successes in shale oil exploration and development, with its latest discovery at the mature Shengli oilfield estimated to hold 4 billion tonnes (approximately 29.4 million barrels) of shale oil in place.

The Fanyeping-1 discovery well at Shengli's Yangye shale oil play flowed at a rate of 171 tonnes per day (1250 barrels per day) — the highest single well production record in China.

The company has drilled and fracked four horizontal wells at the Yangye shale project, leading to the discovery of 458 million tonnes of proven reserves.

Sinopec has submitted the reserve size to China's Ministry of Natural Resources for confirmation. Sinopec Shengli chief geologist Liu Huiming said his company aims to build up a shale oil production capacity of 1 million tonnes per annum by 2025.

Shale oil exploration started at Shengli in 2007. Early exploration achieved limited success, with 40 wells cumulatively producing just 120,000 tonnes of shale oil by the end of 2018.

In 2019, Sinopec invited Shell to join it in studying the geology of Shengli's Dongying trough.

At Fuling, Sinopec's largest shale gas field in the Sichuan basin, the Taiye-1 well drilled in early 2021, flowed 204 million barrels of shale oil.

China talks up its coalbed methane potential, but production has always fallen short of targets.

Production last year increased 14.8% on 2020 to 9.5 Bcm, but still lags behind earlier projections.

The top CBM-producing province, Shanxi in central China, is working on a master plan for CBM development over the next five years, aiming to add 800 Bcm of CBM reserves to boost the total to 2 trillion cubic metres by 2025.

The plan aims to increase CBM production by between 6.6 Bcm and 11.5 Bcm per annum to 25 Bcm per annum with new drilling.

CBM throughput from coalmining, meanwhile, will reach 10 Bcm by 2025, when local authorities will build nine CBM production bases, each with annual production ranging from 500 million cubic metres to 5 Bcm.

The Shanxi government is putting 33 CBM blocks out for tender, up from 16 blocks currently under

中国能源转型，瞄准非常规油气

中国能源官员计划让天然气和非常规资源发挥关键作用，助力中国到 2060 年实现碳中和目标。

作为煤炭和石油的低排放替代品，天然气在碳达峰和碳中和的大背景下，将是唯一一种增产的化石燃料。尽管碳足迹很高，但天然气在非常规气体资源中至关重要。

中国石油最近的一份报告表示，到2040年，中国的天然气需求有望达到每年6500亿立方米的峰值，然后到2060年稳定在每年4100亿立方米，高于去年的 3690亿立方米。

去年，1144亿立方米天然气用于运输燃料以及家庭和商业用途，1476 亿立方米用于工业领域，664亿立方米用于发电，其余用于化工生产。

中国石油表示，到 2026 年，中国 60% 的天然气需求将由非常规资源提供，如致密气、页岩气和煤层气。

中国石油勘探生产分公司官员李国欣在一篇发表的论文中说，鉴于中国地质和储层条件复杂，如何选择页岩油储层中的甜点层段颇具挑战性。

通过缩短水平井的钻井周期，可有效提高钻井效率。此外，中国必须通过降低成本，提高非常规资源开发的经济效益。

李国欣说，由于地质条件复杂，中国非常规资源开发的利润低于美国。在中国，页岩油的每桶成本为 60 至 90 美元，而美国的平均成本仅为 30 美元。

中国石化和中国石油引领中国页岩气开发进程，两家公司几乎占据了中国页岩油和页岩气产量的全部份额。

去年，中国页岩气产量达到221亿立方米，比 2020 年增长 10.4%。

借助钻探四川盆地金秋致密气田（此前由壳牌公司运营），中国石油在 2021 年将这里的天然气产量提高到 3.4 亿立方米，比 2020 年增加了 7 倍。

2009年，壳牌与中石油签署了为期30年的产量分成协议，共同勘探开发 4000平方公里的金秋致密气区，并承诺作为运营商为勘探期提供资金支持。到 2012 年，壳牌派遣 5 台陆地钻机在金秋气田进行评估作业，覆盖 19 个村庄的 21 个钻井位置。

不过，由于评估结果未能达到开发标准，壳牌于2018年退出了金秋等四川盆地非常规天然气业务，将更多精力放在与中国石油合作开发的鄂尔多斯盆地昌北致密气区。

中国石油还成功钻探了一口致密气井金浅 511–6–H1，在 2021 年 12 月下旬进行的测试期间，致密气产量987,400立方米/日，开放流量达到 293 万立方米/日。

中国石油声称，四川盆地拥有 6.9 万亿立方米的致密气储量，并在盆地中部规划了 18,200 平方公里的区域，用于进一步勘探和开发。

中国石化在江苏省苏北盆地获得数个页岩油发现，去年钻了三口探井，其页岩油均具备商业开发价值。该公司表示，该盆地的溱潼凹陷在 420 平方公里的区域内，拥有 2560 亿桶页岩油。

中国石化在页岩油勘探开发方面已经取得了成功，在胜利油田的最新发现估计拥有 40 亿吨（约 2940 万桶）页岩油储量。

在中石化四川盆地最大的页岩气田涪陵区块，2021年初钻探的泰页1井已经生产页岩油2.04亿桶。

尽管中国对自身煤层气潜力颇为看好，但实际产量始终未达到设定目标。去年的产量比2020年增长了 14.8%，达到95亿立方米，但仍落后于此前预期。

作为中国最大煤层气生产省，山西正在制定未来五年煤层气开发总体规划，目标是增加 800 亿立方米的煤层气储量，到 2025 年将总储量提高到 2 万亿立方米。

该计划旨在通过新钻探，将煤层气产量每年增加 66 亿立方米至115立方米，至每年250亿立方米。

同时，到2025年，通过煤炭开采的煤层气产量将达到 100亿立方米，届时山西将建设 9 个煤层气生产基地，每个基地的年产量从 5 亿立方米到 50亿立方米不等。

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