Global Megaprojects - Energy Pragmatism and Advantaged Barrels

Introduction

The global oil and gas industry is forced to change under pressure of ensuring energy security and (expected) energy transition. The era of sanctioning megaprojects at any cost is over. Instead, a new age of energy pragmatism has dawned, where capital expenditure is being channeled with precision into advantaged assets characterized by low costs, lower carbon intensity, and shorter cycle times. The shocks of the past few years (the pandemic-induced demand crash, the military conflict in Ukraine, and subsequent supply chain disruptions) have reshuffled global energy maps and firmly re-established security of supply as a top priority for nations worldwide.

This has catalyzed a new wave of megaprojects, but they look different from their predecessors. The focus has pivoted dramatically towards deepwater basins in the Americas, massive liquefied natural gas [LNG] capacity expansions in the Middle East and the USA, and the development of large-scale natural gas resources to (partly at least) displace coal and support industrial growth. According to Rystad Energy, global upstream investments are projected to increase, with a significant portion allocated to LNG and deepwater exploration and production, which are seen as crucial for meeting long-term demand.

This article serves as an overview of this new landscape, plotting the key upstream, midstream, and downstream megaprojects shaping the global scene. It will analyze the strategic drivers behind these investments and explore the critical implications for the Republic of Kazakhstan, a nation with world-class resources facing a unique set of geopolitical and logistical challenges in the evolving global market.

Key Trends of Global Oil & Gas Megaprojects

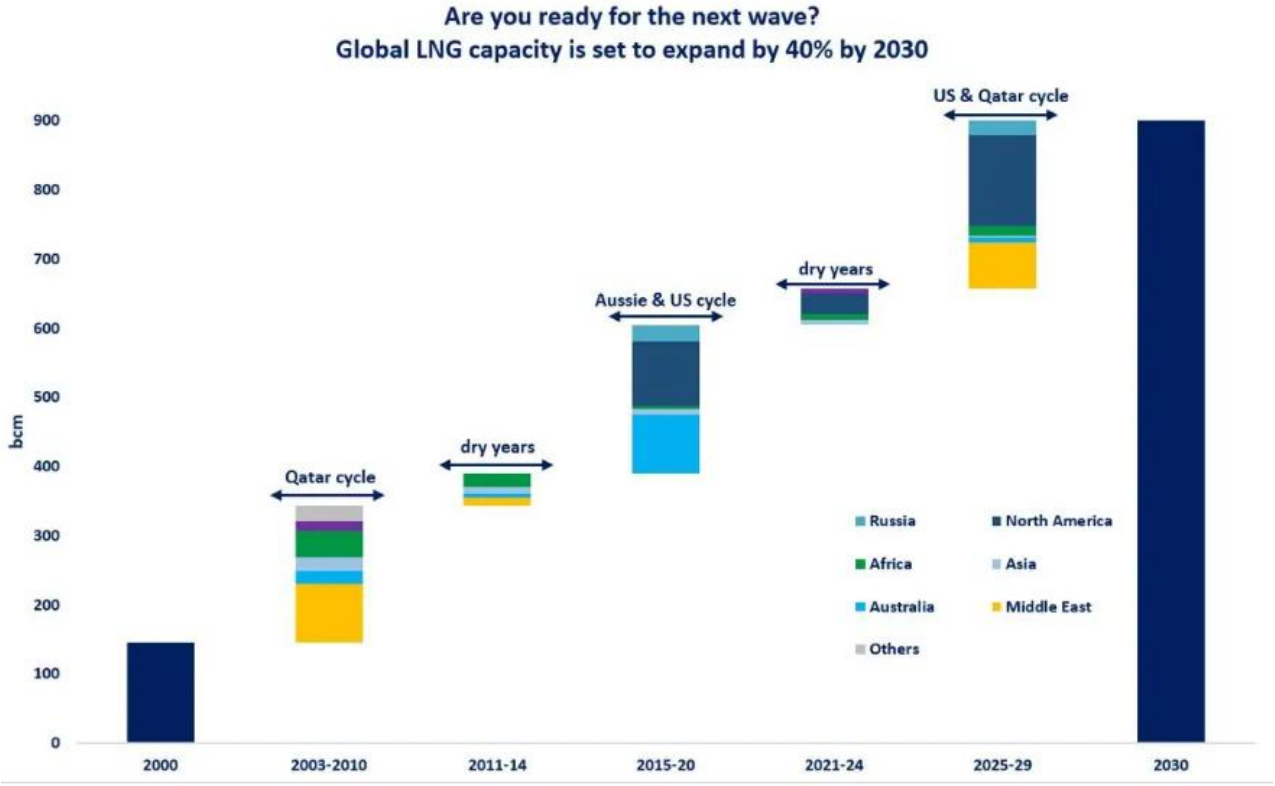
Before moving to specific megaprojects, it is essential to pinpoint the powerful trends governing today's investment decisions.

The Primacy of Energy Security. Geopolitical risks that materialized in February 2022 with the outbreak of the Russia-Ukraine war have been a breakpoint moment, making energy security a vital concern for many governments as part of their overall national security

considerations. Governments in Europe and Asia are now willing to invest in diversification of their energy sources. This has been the single most significant tailwind for the new wave of LNG projects, particularly in the US and Qatar.

Focus on "Advantaged Barrels". In a carbon-constrained and volatile price world, not all geo resources are equal. Companies are prioritizing "advantaged" resources, which are low on the cost curve and have a lower-than-average emissions intensity. This is why deepwater basins like Guyana's Stabroek Block, with their high-quality reservoirs and prolific flow rates, are attracting massive investment while more complex, higher-carbon projects are being shelved.

LNG is the undisputed King of Growth. Natural gas, positioned as a transition fuel and a partner to (nonsteady) renewables, is the clear focus of midstream growth. The global LNG market is expected to grow by over 40% by 2030, driven by European efforts to displace Russian pipeline gas and surging demand across Asia as a cleaner alternative to coal. This has triggered a race to build liquefaction capacity.



Source: Global LNG Hub [February 2024]

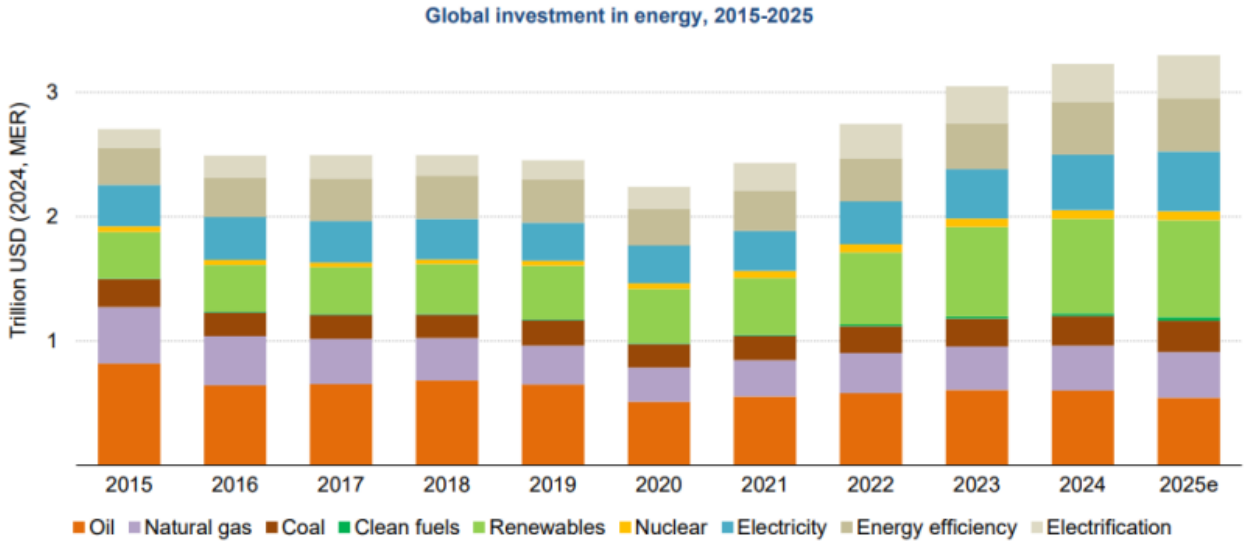
Decarbonization of Operations. International Oil Companies continue to face pressure from investors and regulators to reduce their Scope 1 and 2 emissions, although the momentum behind the "green" agenda has slowed for now particularly with recent political shifts in the USA. Nevertheless, many new projects are still being designed with decarbonization in mind, featuring elements such as platform electrification, advanced

methane leak detection, and integrated Carbon Capture, Utilization, and Storage [CCUS] systems. While decarbonization may no longer be the sole focus, it remains an important consideration for project sanctioning.

The Downstream Pivot. The downstream sector is pivoting away from simply producing transportation fuels. The focus is now on integration with petrochemicals, which are forecast to be the largest driver of oil demand growth. Megaprojects in this segment now often involve building world-scale refineries and chemical crackers side-by-side to maximize value and resilience.

We have explored these trends in greater detail in our article summarizing events by S&P Global Commodity Insights such as CERAWeek2025 and Astana Market Briefing 2025.

Following is an overview of the remarkable global oil and gas projects, with a particular focus on the most rapidly emerging oil producers. Despite the (expected) long-term decline in investments in fossil fuel capital projects and a surge in funding for cleaner energy, several major flagship projects are still underway around the world.



Source: International Energy Agency, World Energy Investment 2025 [June 2025]

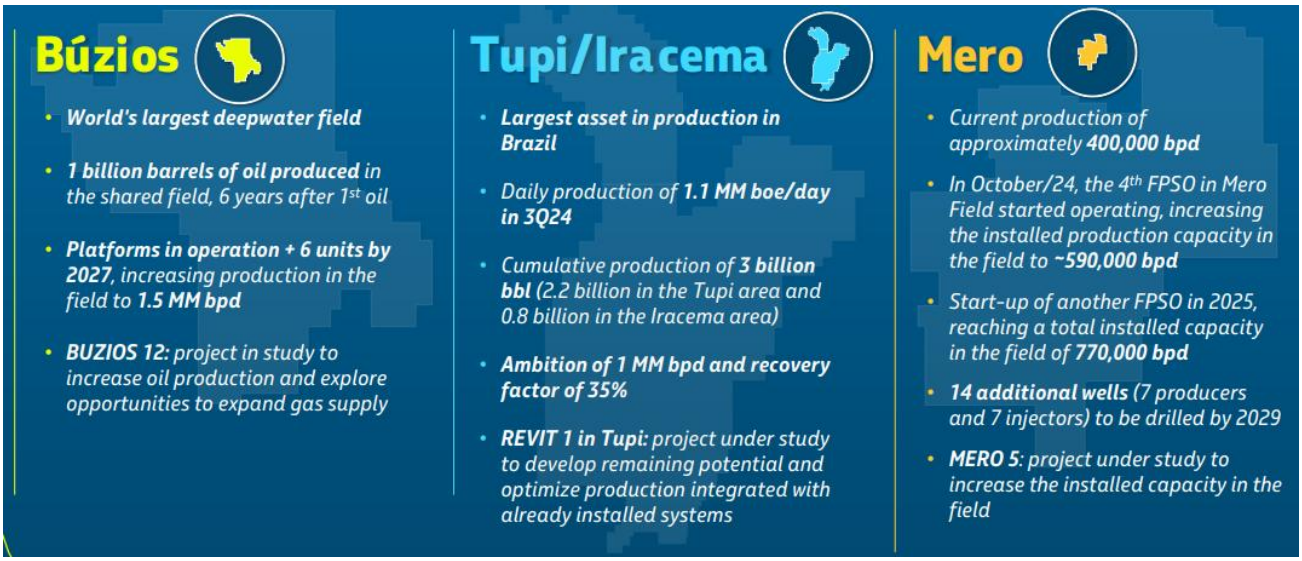
Upstream: The Hunt for Advantaged Barrels

The Americas - The New Growth Frontier

Guyana. The Stabroek Block, operated by ExxonMobil, is the world's most significant **new** oil province. With over 11 billion barrels of recoverable resources discovered, the project is a model of rapid, phased development. Major projects within the block such as Payara, Yellowtail, and Uaru represent substantial investments of $9 billion, $10 billion, and around

$13 billion, respectively. All these projects are already online or progressing, with production expected to exceed 1.2 million barrels per [mbpd] day before the end of the decade.

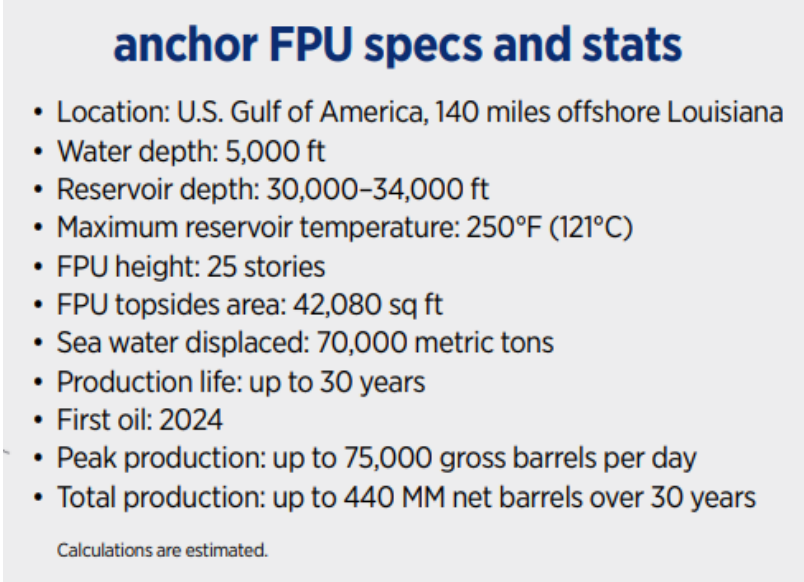
Brazil. State-owned Petrobras is leading a massive investment campaign in the country's pre-salt deepwater fields. Its 2024-2028 strategic plan earmarks over $70 billion for exploration and production, focusing on developing giant fields like Búzios, Tupi/Iracema and Merom with new, high-capacity Floating Production, Storage and Offloading [FPSO] units designed for lower emissions.



Source: Petrobras, Strategic Plan 2050 [November 2024]

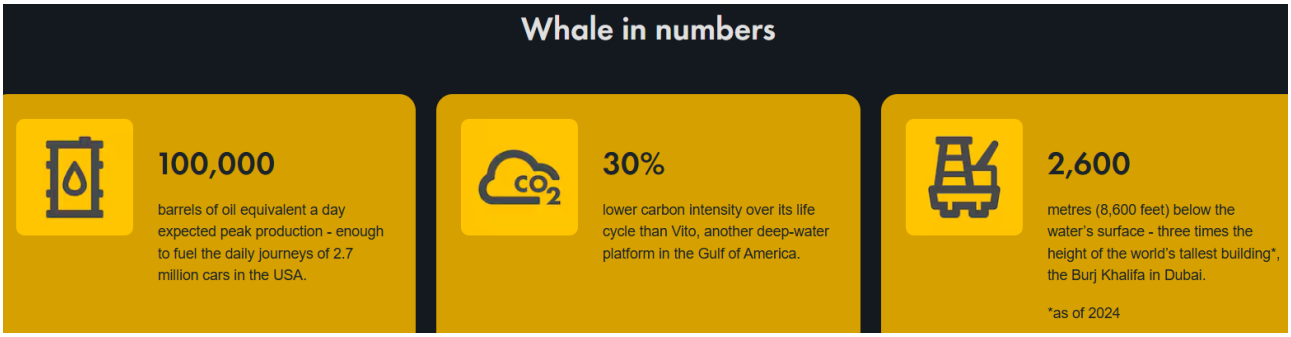
USA. While shale remains a powerhouse, the deepwater Gulf of America [Mexico] is seeing a renaissance. Projects like Chevron's Anchor and Shell's Whale are leveraging existing infrastructure and advanced technology to unlock new reserves, demonstrating the continued viability of this mature basin.

Chevron's Anchor is the company's first ultra-high-pressure project in the region, targeting the Wilcox formation at 20,000 psi. With a $5.7 billion investment, it's designed to produce up to 0.075 mbpd and showcases cutting-edge HPHT [High Pressure High Temperature] technology.



Source: Chevron website

Shell's Whale project began production in January 2025 and is designed to reach a peak output of up to 0.1 mbpd. Situated in the Alaminos Canyon Block 773 in the US part of Gulf of America, the facility leverages a standardized semi-submersible platform design enabling cost savings, reduced time to first oil, and approximately 30% lower greenhouse gas emissions. The Whale field is estimated to contain around 480 million barrels of recoverable resources and is being developed with 15 wells tied back via subsea infrastructure. Shell operates the project with a 60% stake, while Chevron holds 40%. Since the project was put into operation relatively recently, Shell has not yet reported the final cost of investments in it.



Source: Shell website

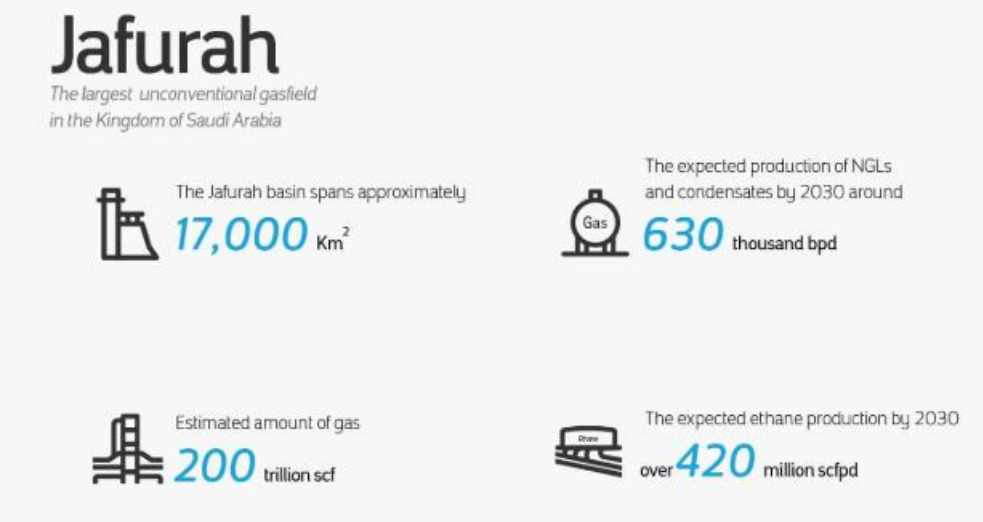
The Middle East - Pivoting to Gas

Qatar. The single largest energy project in the world is Qatar's North Field Expansion. This two-phase project will raise Qatar's LNG production capacity from 77 million tonnes per annum [MTPA] to 126 MTPA by 2027, and further to 142 MTPA by 2030. This is a direct play

to capture future global gas demand and cement Qatar's position as the world's leading LNG supplier. The two expansion phases are expected to cost up to $50 billion.

United Arab Emirates. Abu Dhabi's national oil company, ADNOC, is executing a multi-billion-dollar strategy to increase its oil production capacity while simultaneously developing its large gas reserves. The Hail and Ghasha sour gas project is a centerpiece of this, a technically complex undertaking that will contribute significantly to the UAE's gas self-sufficiency and includes a major integrated CCUS component. These projects represent a total investment of approximately $17 billion, including around $8.2 billion allocated to offshore facilities (such as artificial islands and subsea pipelines) and $8.7 billion dedicated to onshore gas processing, carbon capture, and sulfur recovery.

Saudi Arabia. While maintaining its (almost) supreme position in crude oil, Saudi Aramco is making a massive bet on natural gas. The $100+ billion Jafurah unconventional gas project is one of the largest investments in the Kingdom's history and is critical for diversify liquid fuels in its power sector and providing feedstock for a growing petrochemical industry.



Source: Saudi Aramco website

Africa - The Emerging LNG and Deepwater Frontier

Namibia. The Orange Basin offshore Namibia has become the world's hottest exploration frontier following major deepwater discoveries by TotalEnergies [Venus]. While still in the appraisal phase [published value of issued subsea contracts for the project already exceeds $2.5 billion], these discoveries are believed to hold billions of barrels of oil and could transform Namibia into a significant new producer, mirroring Guyana's success.

Mozambique. Despite security setbacks, the potential for Mozambique to become a global LNG hub remains immense. TotalEnergies' Mozambique LNG $20 billion project is poised for

a restart, and Eni's Coral Sul FLNG with investments of $7 billion is already in operation, tapping into the massive gas reserves of the Rovuma Basin.

Midstream: The Global LNG Race

The upstream gas developments are directly linked to a boom in midstream liquefaction projects.

US Gulf Coast. A bunch of new LNG export terminals are under construction. Venture Global's Plaquemines LNG and ExxonMobil & QatarEnergy's Golden Pass LNG are two of the largest, set to add tens of millions of tonnes of new capacity to the global market. Plaquemines LNG has a total investment of approximately $24 billion for its initial phases and is set to deliver an export capacity of 27.2 MTPA with further expansion planned. Golden Pass LNG has a total project investment of about $10 billion, adding an additional 18 MTPA of capacity.

Global Infrastructure. Beyond liquefaction, major investments are being made in regasification terminals across Europe and Asia. Furthermore, a new class of midstream projects is emerging around CO2 transport, with plans for pipeline networks in regions like the US Gulf Coast and Europe's North Sea to service industrial CCUS hubs.

Downstream: Integration and Future Fuels

Asia – Scale and Diversification

China. Saudi Aramco and Sinopec in 2024 launched a $10 billion complex in Fujian, China, combining a 16 MTPA refinery with major petrochemical units. The site is anticipated to be fully operational by the end of 2030.

India. Reliance Industries' Jamnagar site, already the world's largest refining complex [1.24 mbpd], is turning into a sustainable fuels and chemicals hub. Plans include $10 billion+ in investments into biofuels, integrated chemical recycling, and a 5 MTPA renewable hydrogen program by 2030.

Middle East – Future Fuels at Scale

Saudi Arabia. Saudi Aramco is pairing its upstream dominance with one of the world's largest downstream pushes. The $11 billion Amiral petrochemicals complex at Jubail, in

partnership with TotalEnergies, will integrate a 1.65 MTPA ethylene cracker directly with Saudi Aramco's SATORP refinery.

United Arab Emirates. ADNOC is executing a downstream projects at Ruwais, where a $15 billion transformation program includes expansion of petrochemicals, blue ammonia [1 MTPA by 2027], and aviation fuels tailored to SAF [sustainable aviation fuel].

There are numerous megaprojects spanning the entire oil and gas supply chain. Since these projects are highly capital-intensive and require vast technical expertise, they are all operated by the world's largest players. These are either state-owned companies or the world's largest public oil and gas conglomerates. Clearly, these giants are ready to invest across the entire value chain and around the globe, including in emerging economies. This landscape looks favorable for Kazakhstan, as there is no exclusive focus on lower-risk projects in developed countries or solely on «green» energy. Therefore, from the perspective of new megaprojects' initiation, global trends appear promising.

Megaprojects and Kazakhstan

Kazakhstan's energy sector is dominated by three upstream megaprojects, which are the lifeblood of its economy.

The "Big Three" Megaprojects of Kazakhstan[1]

Tengiz. Operated by Chevron, the Tengiz field is one of the world's largest. Its Future Growth Project-Wellhead Pressure Management Project [FGP-WPMP] is a $47 billion expansion aimed at increasing production by over 0.26 mbpd. The project has been completed and is vital for raising and then sustaining the country's output levels.

Kashagan. The massive offshore field in the Caspian Sea, operated by the NCOC consortium, has faced significant technical challenges but holds enormous potential. Phased development plans are in place to steadily ramp up production towards its long-term potential of over 1 mbpd.

Karachaganak. This giant gas-condensate field, operated by the KPO consortium, is undergoing its own capital projects to sustain production level of liquid hydrocarbons, while an increase of gas processing capacity is under consideration.

[1] These megaprojects were covered in deep detail by ENERGY Insights & Analytics earlier.

The Government's Comprehensive Plan for 2023–2027 highlighting a series of large-scale upstream, midstream, and downstream projects. The most capital-intensive initiative remains Tengiz, where FGP-WPMP [now complete] representing a total investment of $46.7 billion. At Karachaganak, ongoing expansion works are split into two stages: the 1A project, budgeted at $970 million, and the 1B phase, estimated at $734 million. The full-scale development of Kashagan is projected to double output by the 2030s, though the cost framework for this multi-decade plan is still under discussion. On the natural gas side, Kazakhstan is preparing new transportation and processing infrastructure, including 3.1 trillion tenge [~$5.7 billion] extension of Beineu-Bozoy-Shymkent gas pipeline (2nd line), $492 billion tenge [~$0.9 billion] 1 bcma facility at Kashagan, while further projects (such as a 2.5 bcma plant at Kashagan's Stage 2A and a 4 bcma expansion at Karachaganak) remain subject to final investment decisions. Downstream represents another priority: a $7.7 billion polyethylene complex, alongside a $900 million butadiene production project. Importantly, while some ventures carry defined budgets, many others are still in the pre-investment phase, with feasibility, financing, and timelines yet to be finalized.

Despite the pipeline of projects, Kazakhstan should steer several critical issues to remain competitive and secure its future in the new energy world.

Kazakhstan's primary export route (about 80% of its crude oil) relies on the Caspian Pipeline Consortium [CPC] pipeline, ending at the Russian port of Novorossiysk on the Black Sea. However, this dependence has exposed the country to repeated, politically tinged disruptions since 2022, underscoring a pressing vulnerability. As a result, the stimuli to diversify export routes has never been stronger. In response, Kazakhstan is turning its attention to the Trans-Caspian International Transport Route [TITR], or "Middle Corridor". This alternative involves shipping oil across the Caspian Sea to Azerbaijan, where it can then enter the Baku-Tbilisi-Ceyhan [BTC] pipeline to the Mediterranean. Although current volumes remain modest, Kazakhstan is actively work together with international partners and investing in its Caspian port infrastructure to expand this flow. The success of the Middle Corridor is therefore not only a commercial objective but also a matter of national strategic security.

Yet, export diversification alone will not guarantee Kazakhstan's long-term competitiveness. In a global landscape where capital increasingly favors advantaged deepwater basins, landlocked Kazakhstan should work harder to attract new investments. With its legacy fields maturing, the country faces challenges of securing substantial funding for enhanced oil recovery and decarbonization. To draw the necessary capital from international oil companies, Kazakhstan needs to offer stable and competitive fiscal terms, foster a transparent regulatory environment, and provide a clear, co-invested pathway for emissions control. We have covered this crucial domain in deep detail in our joint article with Rystad Energy.

The ongoing trend toward decarbonization should not be overlooked, even if this agenda is currently receiving less attention in the present geopolitical climate. Ultimately, minimizing

the harmful impacts of fossil fuels is in the nation's best interest, as it is essential for public health and the preservation of Kazakhstan's natural environment. Therefore, the "green factor" remains a vital consideration for the country's long-term well-being.

Finally, to secure greater value from its vast resources, Kazakhstan should look beyond raw material exports and focus on developing its domestic downstream sector. This involves building more sophisticated processing plants to produce value-added products such as petrochemicals, as well as modernizing refineries to meet demand for high grade refining products. By doing so, Kazakhstan can reduce its reliance on product imports from elsewhere else (including Russia) and capture more value within its own borders.

The Bottom Line

The global oil and gas industry has entered a new chapter defined by a pragmatic, security-conscious, and increasingly carbon-aware approach to capital allocation. Megaprojects are back, but they are concentrated in specific geographies and segments (LNG, advantaged deepwater oil, and integrated downstream assets) that align with this new reality.

Kazakhstan's world-class resource base, anchored by the Tengiz, Karachaganak, and Kashagan megaprojects, provides a powerful foundation. Peak investment in these fields is already behind. If Kazakhstan aspires to drive sustainable economic growth, attracting new large-scale oil and gas projects is essential.

Several major projects are emerging globally, including in countries that are newcomers to the oil and gas landscape. To secure continued capital inflows for large-scale developments, Kazakhstan should provide clear, stable, and predictable regulations that foster investor confidence and avoid frequent/sudden changes that could deter long-term commitments.

In balancing national economic interests, it is important to recognize that Kazakhstan operate in a highly competitive world, where technological giants are delivering exponential returns to investors. This means that Kazakhstan should ensure that prospective large projects offer attractive returns, reassuring investors of the country's commitment to a stable and rewarding investment environment.

ENERGY Insights & Analytics

Analytical center "ENERGY" LLP (ENERGY Insight & Analytics) is a joint venture between the KAZENERGY Association and IT company AppStream. The company aims to become a priority source of data, analytical information, and recommendations for Kazakhstan's oil, gas, and electric power industries, allowing decision-makers to analyze and predict the most significant industry indicators with details on leading market players. Activities of ENERGY Insight & Analytics incorporate the whole analytics cycle with consequent stages: Descriptive, Diagnostic, Predictive, and Prescriptive analytics.

The key tool and product of ENERGY Insight & Analytics is internally developed software - the Analytical Platform EXia, aimed to identify, localize, format, and present data most efficiently for the specified use cases.

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