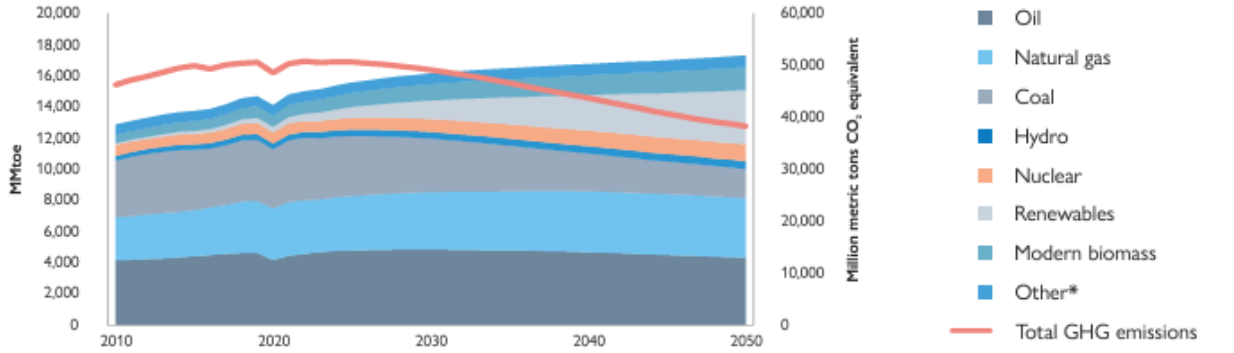
Crude Oil - Upward Trend

Executive Summary

Oil production and its forecasting have consistently been one of the major topics globally because of oil's dominant position in the global energy. According to the below chart from the National Energy Report 2023 by KAZENERGY, oil is still the primary source of energy. The below chart suggests that there is a steady growth in renewable energy, but the gap between traditional energy sources and the cleaner ones is still substantial.

Figure 1.1 Global primary energy demand and GHG emissions: Inflections

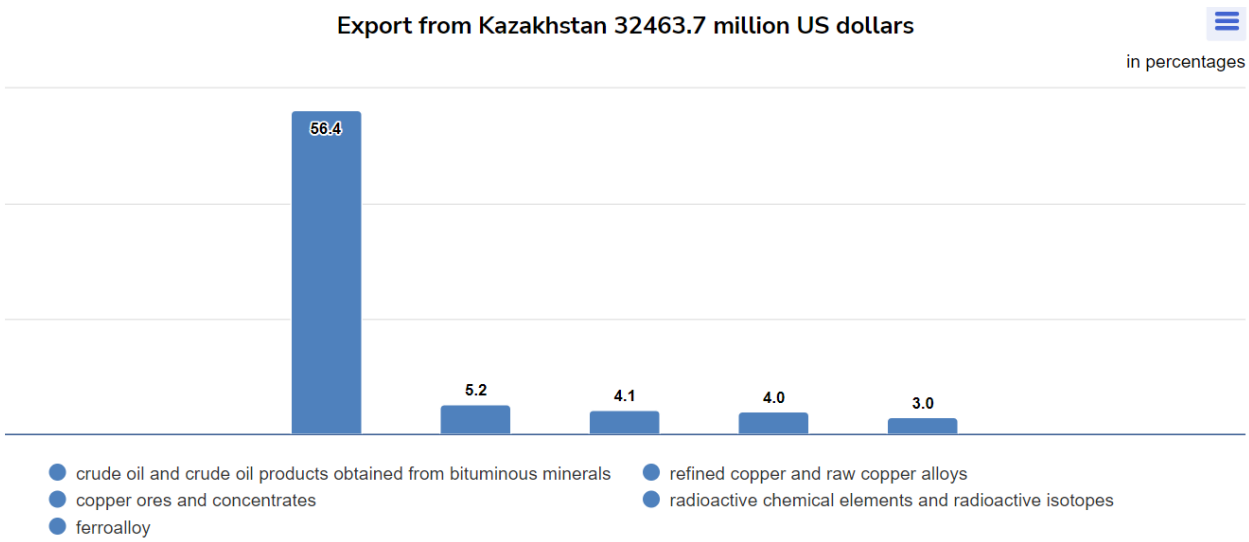


Notes: *Includes traditional biomass, solid waste, ambient heat, and net trade of electricity, hydrogen, and heat.
Source: S&P Global Commodity Insights.

Source: National Energy Report 2023

Being the primary source of energy means that it is difficult to overestimate the importance of oil production forecasts. The oil supply-demand equilibrium is crucial for the global economy as it directly affects energy prices, which is a vital component of any product or service. It is important not to forget that the supply-demand balance is not only influenced by purely economic factors, but also by geopolitical and environmental factors. In this report, we would like to review forecasts for oil production from reputable sources and share insights on which factors can disrupt these forecasts.

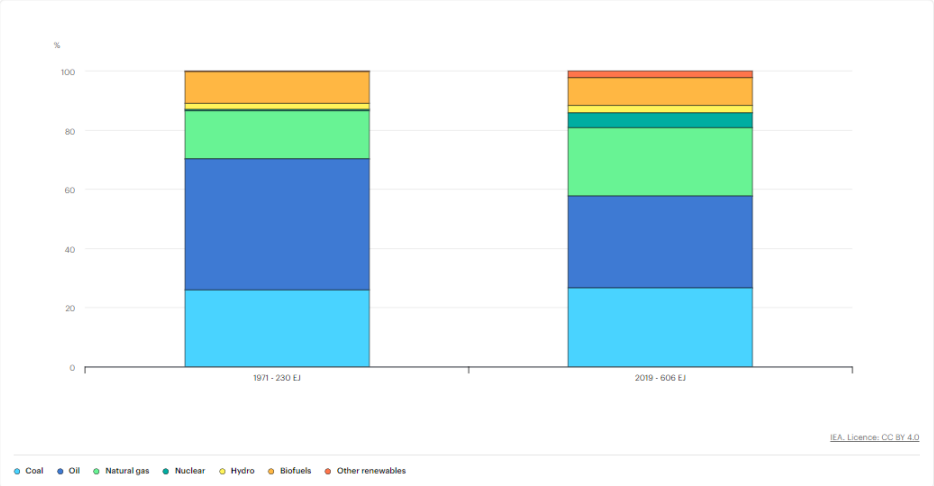
The report is especially interesting for our country as oil export is one of the key drivers of Kazakhstan's economy. According to Kazakhstan's Bureau of National Statistics, oil is by far the largest contributor to our country's total export. In January–May 2024 crude oil and crude oil products obtained from bituminous minerals contributed 56.4% to Kazakhstan's total export. That said, understanding key trends and risks for the global supply-demand equilibrium is one of the key strategic issues for our country.



Source: Kazakhstan's Bureau of National Statistics

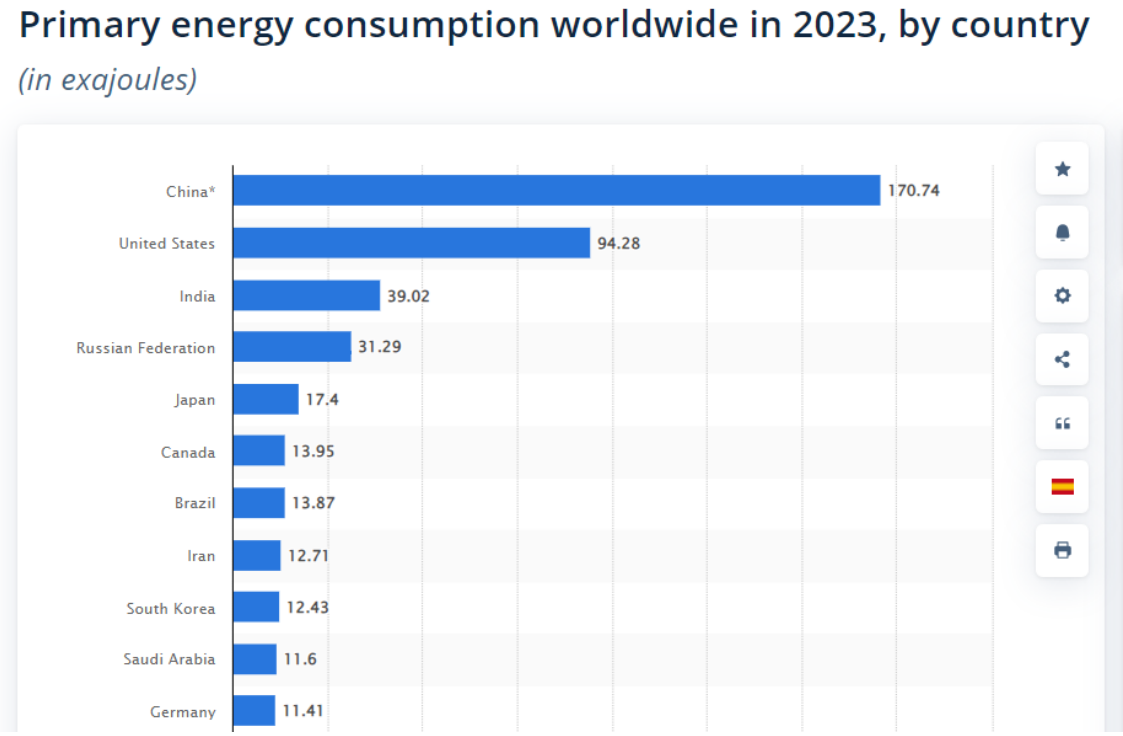
Global trends and forecasts

Despite oil is still the largest source of energy in the global balance in absolute terms, there are indications suggesting that oil's dominance in global energy is poised to deteriorate. According to the International Energy Agency, between 1971 and 2019 world total energy supply [TES] increased 2.6 times [from 230 EJ to 606 EJ] and its structure changed markedly. Oil's share fell from 44% to 31% of TES between 1971 and 2010. This trend is explained by concerns about the adverse environmental impact of fossil fuels. As a result, developed countries [China is the only emerging economy that is a prominent clean energy investor] started betting big on developing sources of cleaner energy. Global spending on clean energy technologies and infrastructure are expected to hit $2 trillion in 2024, which is twice the amount going to fossil fuels.



Source: iea.org

The United States and China are the world's two largest economies and two leading energy consumers. The cumulative consumption of these two superpowers totaled 265 exajoules in 2023, which represents almost 43% of the total global consumption. Both countries recognize energy mix diversification as crucial strategic priorities. The U.S. Inflation Reduction Act signed by Joseph Biden on August 16, 2022, created various tax incentives for clean energy and also included clean energy financing program. Renewable energy capacity in China has grown exponentially since 2011, and this leap was also supported by various governmental incentives. The fact that the world's two by far largest energy consumers are shifting towards cleaner energy sources is a secular headwind for maintaining oil's dominance in the global energy balance. Therefore, it is highly likely that oil's share in the global energy mix is poised to continue its secular decline over the next decade.



Source: statista.com

On the other hand, losing a relative portion of the world's energy balance does not mean that it will not grow in absolute terms. Despite efforts of the developed world and China to diversify the world's energy mix, the global oil production expanded from around 73 million barrels per day in 1998 to 96.4 million by 2023, observing a 1.12% compound annual growth rate [CAGR]. Over the same period the global GDP grew from around $31.8 trillion to $100.9 trillion, which equates to a 4.73% CAGR.

Given that over the last quarter century the global oil output has significantly lagged behind the global GDP growth and accelerating investments in cleaner energy, it is extremely unlikely that oil production will be close to the real GDP growth in the long-term. Therefore,

using a global GDP projection for the next few decades might not be an appropriate base for projecting global oil production.

There are two primary drivers of the GDP growth which are population growth and productivity growth. The global population grew from approximately 6 billion to 8 billion between 1998 and 2023, which represents a 1.16% CAGR. It looks like there is a strong correlation between the world population growth and global oil production, which is sound. According to the United Nations, the world population is projected to reach 9.8 billion in 2050. With this information, we can figure out that the projected population CAGR for the next quarter-century is approximately 0.75%. Therefore, it is sound to expect that crude oil output will compound at approximately the same pace. This is a simplistic approach, because there are numerous variables and constraints that affect the global energy balance. On the other hand, a few past decades have shown that all these headwinds and tailwinds offset each other leaving a strong correlation between oil production and population growth.

We also think that the global population growth will highly likely drive oil demand further because the pace of penetration of clean energy across the world will be uneven. As we mentioned above, mostly only developed countries are aggressively investing in clean energy sources. Apart from China, developing countries are betting less on clean energy. According to the World Economic Forum, developed economies account for 93% of total government spending in clean energy. Furthermore, population growth in developing countries is notably faster compared to developed ones.

Additional catalysts for the oil production dynamics

Apart from the most obvious driver, population growth, there are also factors that will also likely be a tailwind for oil production. The emergence of generative artificial intelligence [AI] capabilities in the last few years has initiated a true technological war between the largest U.S. giant corporations like Amazon, Microsoft, Google, Tesla, and Meta. These corporations plan to pour hundreds of billions of dollars over the next decade to build data centers across the world to expand their computing capacity to train large language models. According to Bloomberg, Amazon plans to invest up to $150 billion in the coming 15 years in data centers. Amazon's rivals in the AI battle are not willing to lag behind, so several other corporations also have aggressive plans to expand their data center infrastructure over the next couple of decades. According to Goldman Sachs, AI is poised to drive 160% increase in data center power demand. That said, the trend is secular and the AI revolution in data centers is an apparent solid tailwind that will boost energy demand as well as oil demand.

Moreover, it is vital to understand that clean energy adoption is not an overnight process. As we have seen in one of the first charts, the share of renewable energy in the global energy balance is expanding slowly. The history of traditional energy like oil and gas traces back more than a century ago, which means that industry is mature, and the global supply-chain is highly efficient. On the other hand, clean energy is much younger and faces

substantial headwinds like sourcing of materials and supply chain inefficiencies. For some niches of clean energy industry, like the Electric Vehicles [EVs] there is still a substantial level of uncertainty regarding the longevity of batteries and their replacement costs for consumers. For example, analysts from Bank of America recently shared their downward revision for the U.S. EV penetration rates by 2030.

Geopolitical factors are also crucial when we speak about oil production levels. Developments of a few last years with escalating geopolitical tensions including oil-rich countries like Russia, Iran, and Venezuela are also significantly affecting oil prices and the output level as well. Sanctions and conflicts have constrained these nations' output, creating supply uncertainties that drive price volatility and shift global trade patterns. As these tensions persist, they continue to influence oil markets, underscoring the deep connection between geopolitics and energy production.

Last but not least, there is an important theoretical aspect called "The Peak Oil Theory". The peak oil theory suggests that global oil production will eventually reach a maximum rate, after which production will decline. As this concept gains traction, concerns about future oil scarcity can drive continued demand. Even as alternative energy sources grow, the idea of approaching or surpassing peak oil could prompt countries and companies to secure oil supplies while they are still available. This perceived scarcity can maintain or even increase the demand for oil in the short to medium term, as industries and governments stockpile reserves and invest in extraction technologies to extend the life of existing oil fields.

Oil demand forecasts from reputable sources

The global oil demand from OPEC's report confirms the assertion that strong secular oil demand in developing countries will offset the clean energy effect generated by developed countries, classified as OECD in the below table. Overall, OPEC expects the global oil demand to grow from 90.7 million barrels per day [mb/d] in 2020 to 109.1 mb/d by 2045, observing a 0.74% CAGR. This closely aligns with the projected population CAGR over the next decades which was mentioned above.

Long-term oil demand by region *mb/d*

	2019	2020	2025	2030	2035	2040	2045	Growth 2019–2045
OECD Americas	25.6	23.3	25.7	24.8	23.1	21.2	19.3	-6.3
OECD Europe	14.3	12.6	13.7	12.9	12.0	11.1	10.2	-4.1
OECD Asia Oceania	7.9	7.1	7.4	6.9	6.4	5.8	5.2	-2.7
OECD	**47.9**	**43.0**	**46.8**	**44.6**	**41.5**	**38.0**	**34.8**	**-13.1**
Latin America	6.2	5.8	6.6	7.1	7.4	7.6	7.9	1.6
Middle East & Africa	4.3	3.9	4.8	5.5	6.2	6.9	7.6	3.3
India	4.8	4.3	5.8	7.2	8.6	9.9	11.1	6.3
China	13.1	12.1	14.4	15.5	16.2	16.7	17.1	4.0
Other Asia	9.0	8.5	9.9	10.9	11.7	12.4	13.0	3.9
OPEC	8.7	8.2	9.5	10.5	11.3	11.7	11.7	3.0
Russia	3.6	3.2	3.7	3.8	3.8	3.8	3.7	0.1
Other Eurasia	2.0	1.8	2.1	2.2	2.3	2.3	2.3	0.2
Non-OECD	**51.8**	**47.8**	**56.9**	**62.6**	**67.4**	**71.2**	**74.3**	**22.5**
World	**99.7**	**90.7**	**103.7**	**107.2**	**108.9**	**109.3**	**109.1**	**9.4**

Source: OPEC

Another reputable source, S&P Global is slightly more conservative than OPEC, but it also projects a steady growth in the global oil demand. The source forecasts the global demand to peak at 109.6 mb/d by 2030 and continue remaining firmly above 100 mb/d up to 2050. This projection was shared in the National Energy Report 2023 from KAZENERGY.

Kazakhstan's oil industry

As we mentioned in the introductory part of the article, crude oil production and its further export is the cornerstone of our country's economy. Our country produced nearly 90 million tons of oil in 2023. Out of this volume, 70.5 million tons of oil were exported, while the rest were supplied to the domestic market.

Tengizchevroil [TCO] dominates the industry in Kazakhstan with its total 2023 production comprising 32% of the country's total oil output. Apart from TCO, there are two other prominent players operating under production sharing agreements [PSAs] like North Caspian Operating Company [NCOC] and Karachaganak Petroleum Operating [KPO]. The cumulative share of these three giants in the country's total output is 66%. The state-owned KazMunaiGas [KMG] JSC company is a vital player not only holding stakes in the above-mentioned PSAs, but also holding 100% stake in one of the largest producers like OzenMunayGas [OMG] and Embamunaigas [EMG]. KMG also holds large stakes in several other companies from the top-10 producers like Mangistaumunaigas [MMG], Karazhanbasmunai [KBM], and Kazgermunai.

Upstream			Midstream			Downstream		
Producer	KMG stake, %	2022 production, MMt (KMG share)	Asset	KMG stake, %	2022 transportation, MMt (KMG share)	Refinery	KMG stake, %	2022 throughput, MMt (KMG share)
Operating assets			Pipeline			Major plants		
OzenMunayGaz	100	5.1	KTO	90	40.7	Atyrau	100	5.2
Embamunaigas	100	2.6	KCP	50	9.6	Pavlodar	100	5.5
Mangistaumunaigaz	50	3.0	MunayTas	51	2.9	PKOP	50	3.1
Kazgermunai	50	0.7	CPC	21	12.2	Mini-refineries		
Karazhanbasmunai	50	1.1	Marine fleet			Caspi Bitum	50	0.5
PetroKazakhstan	33	0.6	Kazmortransflot	100				
Kazakhoil Aktobe	50	0.3	Caspian Sea		0.6			
Kazakhturkmunay	100	0.4						
Urikhtau Operating	100	0.04						
Mega projects								
Tengizchevroil	20	5.8						
KMG Kashagan	17	1.4						
KMG Karachaganak	10	1.0						

Source: National Energy Report 2023

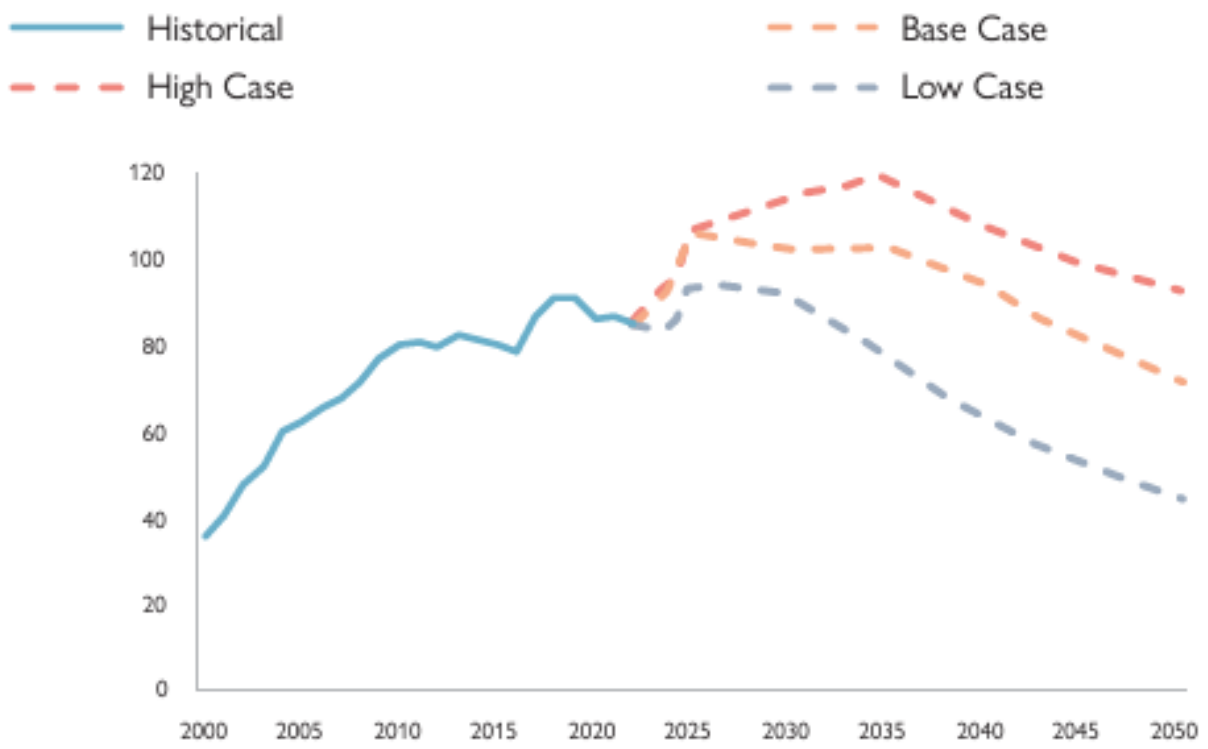
From the below table we can see that oil production is expected to decline by 2035 with around -0.8% CAGR, which is a warning sign. TCO is the only player out of the top-10 who is likely to deliver growth in production levels. This looks unsurprising as the company invests heavily in growth by implementing the Future Growth Project / Wellhead Pressure Management Project [FGP/WPMP] worth $46.7 billion. The project will increase TCO's production by 12 million tons per year.

	Projection		
Company name	2024, mln tons	2035, mln tons	CAGR
TCO	29.0	36.3	2.1%
NCOC*	19.4	16.5	-1.5%
KPO	10.9	9.3	-1.4%
MMG	6.2	4.1	-3.7%
OMG	5.3	4.8	-0.9%
CNPC-Aktobemunaigas	2.9	1.5	-5.5%
EMG	2.8	2.0	-2.8%
KBM	2.2	1.2	-5.4%
Kazgermunai	1.0	0.0	-100.0%
Kaspiy Neft	0.8	0.3	-9.7%
Other companies	9.2	5.7	-4.2%
Total	**89.6**	**81.7**	**-0.8%**
**Oil production from 1 bcma and Phase 2 projects only*			

Source: Compiled based on data from Analytical platform EXia

Another warning sign is the forecast from S&P Global Commodity Insights shared in the National Energy Report 2023 forecasting a sharp decline in Kazakhstan's oil production after 2035 even in the high case scenario. As we saw from the earlier paragraphs of the analysis, the global demand for oil is highly likely to demonstrate growth over the next few decades. In case Kazakhstan's oil production goes in the opposite direction it will mean that our country is losing its competitive edge in the global energy industry, which is a warning trend.

Figure 5.3 Outlook for Kazakhstan's oil production by case (MMt)



Source: National Energy Report 2023

Several years of low oil prices between 2014 and 2021 was a global problem for oil exporting countries which has led to decreased investments in exploration of new fields. However, since oil prices are demonstrating positive dynamics due to geopolitical developments and the global economy recovering after the COVID-19 pandemic, we believe that elevated oil prices position oil-rich states like Kazakhstan well to accumulate resources to invest in exploration and development.

Apart from efficiently absorbing the current favorable oil prices, the industry will also highly likely thrive if proper incentives are introduced. Supportive policies from the government will inevitably improve Kazakhstan's attractiveness for oil and gas investments. This could include tax incentives, streamlined regulatory processes, and stable legal frameworks that provide certainty for long-term investments. Among factors that depend on the government, predictability and stability in the country's tax regulation are vital for investors. When tax policies are predictable and consistent over the long term, investors are likely to have greater confidence that the risk of unforeseen costs or regulatory changes is low.

Investing in technology to maximize efficiency of exploration and production is a cornerstone to maximize returns from invested capital [ROIC]. Without demonstrating strong record of ensuring maximum returns on invested capital it will be difficult to raise capital on favorable terms. Capital is a scarce resource and all businesses in the world are competing for this

resource. We live in a world where companies like Google generate a staggering 35% ROIC, which means that oil companies must be extremely lean and efficient to be able to compete for the capital.

Therefore, a disciplined approach to allocating resources is vital. Moreover, to ensure that the most efficient technologies are in place, our key oil industry's players should have technological partnerships and joint projects with the most technologically advanced companies of the world.

Bottom line

Despite the strong secular shift of the world shifting to cleaner energy sources decreasing oil's share in the global energy balance, global oil demand is expected to continue increasing in absolute terms. The growth is expected to be approximately in line with the global population's expansion.

Kazakhstan is one of the prominent players in the global oil industry, and it has solid position to capitalize on this favorable trend. However, supporting growth in production capacity needs substantial investments in the industry. In a highly competitive world of scarce financial resources, returns on investment in oil industry should be competitive which is impossible without investments in R&D, technological partnerships with the most advanced companies, and proper incentives to attract more investments in the industry.

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 in a kind of Software-as-a-Service.