IV Investors' Voice

The American Chamber of Commerce in Kazakhstan

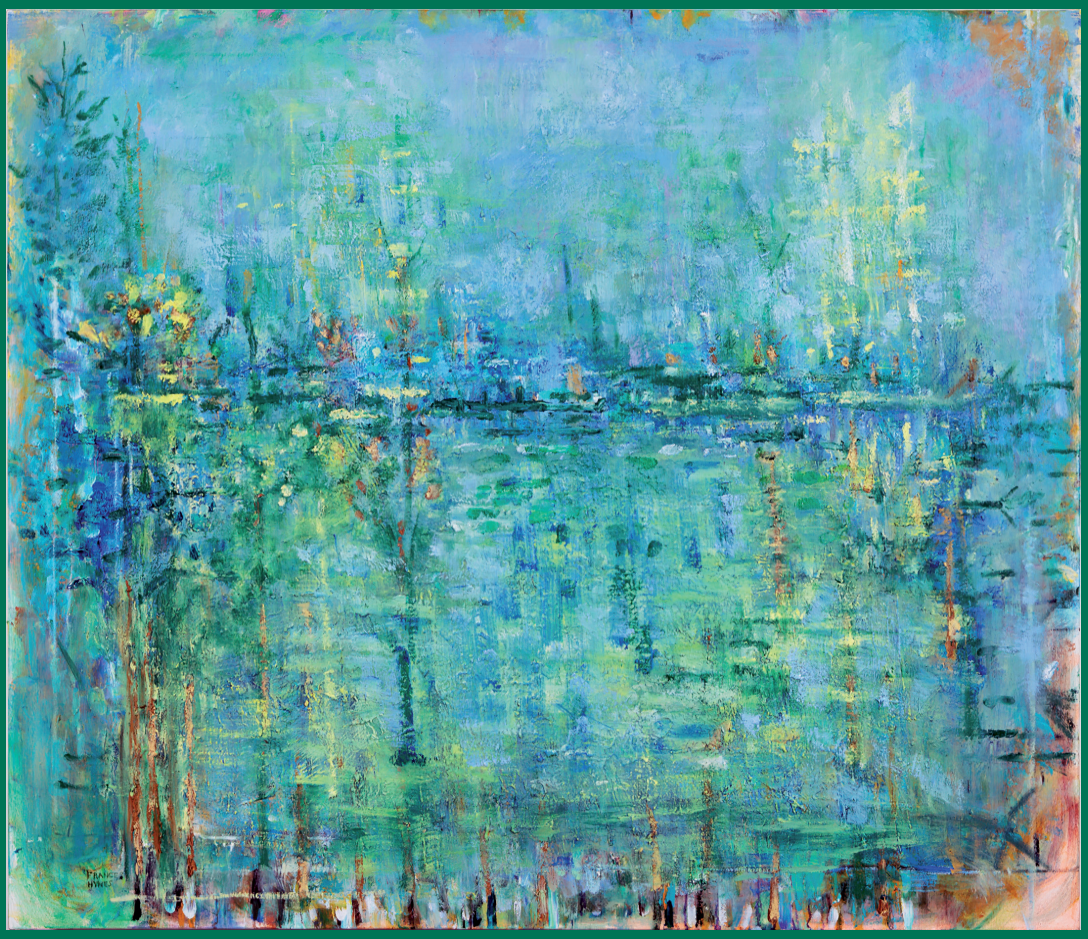
Kazakhstan's Leading International Business Association

April 2021
SPRING ISSUE

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#93

Caspian Spring Issue 2021
Oil and Gas/ Energy in the Future



- Energy Supply and Demand Trends
- Digitalization Accelerates at TCO
- ENI - Foreign Investor Opportunities in Kazakhstan
- GE Powers Forward for Climate Change
- BASF Drives Sustainable Solutions
- Bechtel - a Legacy for Kazakhstan
- Renewables and Potential Legislative Changes
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EDITOR'S NOTE



Dear Readers,

The *Caspian Spring Issue* of *Investors' Voice* is a regular AmCham publication in which the status of the oil and gas industry is examined at what might be seen as mid-point through the year, as winter melts away and summer approaches. This year's Spring Issue features an expanded range of reference through inclusion of the broader energy industry and enquiry into the changing nature of Kazakhstan's oil and gas industry after the pandemic, which is still with us as part of our everyday lives but beginning to fade.

With Covid-19 vaccinations being delivered globally, albeit by fits and starts, we are beginning to see the light at the end of the tunnel. The price of a barrel of oil has made a modest recovery and Kazakhstan's strategy for economic recovery is being actively debated in the corridors of power. The oil industry has made it clear to the Government of Kazakhstan that the price of oil is not expected to rise to its previous levels and that renewable energy is a major factor for the industry in planning for the future.

AmCham has therefore expanded its frame of reference in the current *Caspian Spring Issue* and invited commentary reflecting the 'new reality' from the authors of the magazine's twenty-five articles. Readers may find the diversity of opinions challenging. This is not a time in our history when complacency is possible in understanding the future.

Articles have been submitted from all of the major oil companies operating in Kazakhstan, the leading oilfield service companies, global electricity companies, the industrial conglomerates serving the energy sector in its many forms, and from lawyers who track legislative changes to interpret their impact on investors and the investment climate.

AmCham hopes the readers of the *Spring 2021 Investors' Voice* will find this potpourri of articles of interest in keeping up with our rapidly changing world and our hopes for the post-pandemic reality that we must prepare to understand and accept as 'our new reality'.

Doris Bradbury
Editor-in-Chief

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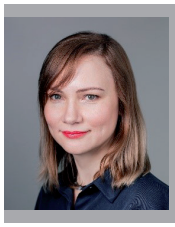


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BASF



Larisa Guro, Director, Business Development Russia and CIS Region, BASF

Larisa Guro is Director of BASF Business Development in Russia and the CIS region, and serves as Regional Sustainability Ambassador. Before joining BASF, she was a research chemist in the Russian company ChemRAR and the American company IRIX Pharmaceuticals in South Carolina. She joined BASF in 2008 and was appointed Head of the company's regional office in Sochi in 2010, overseeing BASF projects in preparation for the Olympic Games in 2014.

Larisa Guro graduated from the Faculty of Chemistry, Moscow State University in 1999.

Bechtel



Svetlana Ibrayeva, Business Development and Marketing, Bechtel Kazakhstan

Svetlana Ibrayeva is responsible for Business Development and Marketing for Kazakhstan at Bechtel Energy and also the acting Commercial Manager for the Bechtel KMGP. She has over 15 years' experience in commercial and contract management for oil and gas companies.

Svetlana Ibrayeva holds a Finance degree from Al-Farabi Kazakh National University.

Emerson



Konstantin Miller, Kazakhstan Country Manager/ General Director, Emerson Kazakhstan

Konstantin Miller joined Emerson Electric in 2003, starting as a Sales Engineer in the Flow Department and later serving in various positions and business units. In November 2019 he was appointed Kazakhstan Country Manager and today serves as Country Manager and General Director of Emerson Kazakhstan. He drives Emerson's Automation Solutions technologies and expertise for key industries and customers.

Konstantin Miller graduated from the Gubkin Oil and Gas Institute in Moscow with a degree in Engineering Construction.

ENI



Luciano Vasques, Head of Central Asia Region, Eni

Luciano Vasques was appointed Central Asia Regional Head for Eni on 1 August 2020. He joined Eni in 1991 as a Project Engineer, acquiring broad experience during his career at Eni in both development and operations. In 2000, he moved to London and then to Aksay as Project Director for the Karachaganak Phase II development which went on stream in 2004. He continued to participate in Kashagan, first in the Netherlands as Development Director and then in Atyrau as Director of the Kazakh branch of AgipKCO. In 2009 he was appointed President and CEO of Eni Petroleum, the North American E&P subsidiary of Eni. From 2012 to 2013 he was Senior Vice President for Business Development at Eni Gas & Power.

Luciano Vasques holds a MSc degree in Electronic Engineering from Politecnico in Milan.

Kinstellar

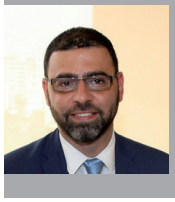


Almas Zhaiylgan, Counsel, Kinstellar

Almas Zhaiylgan is a Counsel based in Kinstellar's Almaty office and heads the firm's local Energy and Natural Resources practice. He has 20 years' experience advising companies in the oil and gas and mining industries in Kazakhstan. He assists clients with upstream exploration and production projects, including drafting and negotiating host government contracts, joint-venture agreements, farm-out agreements and joint operating agreements. He also has broad experience in mergers and acquisitions and regularly advises clients on corporate, regulatory and compliance matters.

Almas Zhaiylgan holds an LL.M. degree in Energy, Environment and Natural Resources Law from the University of Houston Law Centre, as well as a degree in International Law from Al-Farabi Kazakh National University and a B.S. in Business Law from Indiana University.

Lloyd's Register



Laurent Abou Gebrayel, Caspian Business Development Manager, Lloyd's Register

Laurent Abou Gebrayel is Business Development Manager for Lloyd's Register in the Middle East and Caspian Regions. He has extensive experience developing inspection and certification business for multinational companies that in turn provide technical and business services to major companies in the engineering, maritime, oil and gas industries, both onshore and offshore.

Laurent Abou Gebrayel graduated from the Lebanese University in 2006 and speaks English, French, Arabic and Russian.



Elena Prekopova, Director, Digital Innovation, Lloyd's Register

Elena Prekopova is Director for Digital Innovation in the Lloyd's Register Digital Innovation Solutions Department. She has over 15 years' experience in business development globally focused on big data, IOT and Analytics and AI solutions for clients in the Marine & Offshore, Energy, Construction and Inspection Services Industries.

Elena Prekopova holds an MBA from DePaul University, Chicago and a BSBA from City University, Seattle.

CONTRIBUTORS

Morgan Lewis



Aset Shyngyssov, Managing Partner, Morgan Lewis Kazakhstan

Aset Shyngyssov is Managing Partner of the Morgan Lewis Kazakhstan practice with offices in Almaty and Nur-Sultan. He has experience in complex transactions in a broad range of industries, including oil and gas, mining, energy, banking and real estate in Kazakhstan and throughout Central Asia. He has been consistently top-rated for over 10 years in *Chambers Global, Legal 500 EMEA,* and other law directories for his experience in natural resources, corporate and commercial law in Kazakhstan.

Aset Shyngyssov earned his LL.M. from Indiana University Law School - Bloomington in 1998, where he was an Edmund Muskie Fellow. He graduated *summa cum laude* from Kazakh State Law University in 1996 and earned his B.A. *summa cum laude* from Kazakh State University of International Relations and World Languages in 1993.



Karina Ilyussizova, Associate, Morgan Lewis Kazakhstan

Karina Ilyussizova focuses on mergers and acquisitions, legal structuring, private equity and general corporate matters. Karina represents clients that include public and private companies, renewable energy producers, private equity funds, and corporate investors. She advises on a variety of transactions, including cross-border and domestic acquisitions and foreign investments. Prior to joining Morgan Lewis, she worked as in-house counsel at a large Kazakhstani private equity fund and was a legal manager for one of the Big Four accounting firms.

Karina Illyussizova graduated from the Adilet Higher Law School, Almaty in 2002.

Muratov Partners



Ainur Akhmetova, Head of Legal Practice, Muratov Partners

Ainur Akhmetova was appointed Head of Legal Practice at Muratov Partners in June 2020. She previously served as Co-Managing Partner at Alatheya Law Firm and was Head of the Astana office of Integrites Law Firm Kazakhstan (December 2016 - December 2017). She began her career as an Associate at Alatheya in Almaty (June 2016 - December 2016).

Ainur Akhmetova holds a Bachelor's degree in International Law from Al-Farabi Kazakh National University (2001-2005), a Bachelor's degree in Finance from the Kazakh University of Economy, Finance and International Trade (2006-2008), and an LL.M degree in Banking and Financial Law from Boston University School of Law (2011-2012).

nVent



Ilya Krotikov, Director, nVent Thermal KZ

Ilya Krotikov serves as Director of the nVent Thermal Management office in Kazakhstan. He has been responsible for business development in Kazakhstan and the Caspian Region for the past ten years, providing customers with high quality service and engineering expertise in Raychem electrical heat tracing technology.

Ilya Krotikov graduated from Chelyabinsk State University with a degree in Mathematics.

Shell



Olivier Lazare, Country Chair, Shell Kazakhstan

Olivier Lazare was appointed Country Chair of Shell in Kazakhstan in September 2017. He joined Shell in 1985 in the Netherlands as a Junior Petroleum Engineer, working both onshore and offshore in the United Kingdom, Gabon, Brunei, and Oman. From 2003—2006 he led several New Business Development projects for Shell in the Far East, particularly in Australia, where he helped to establish a new heartland for Shell's LNG business. Between 2006 –2012 Olivier Lazare served as Vice President of New Ventures/ New Business for the Upstream Americas region of Shell's Exploration and Production based in Houston, and between 2013-2017 he was Shell Country Chair in Russia.

Olivier Lazare holds a PhD in Nuclear Physics and speaks Russian.

Signum



Gaukhar Kudaibergenova, Partner, Corporate and M&A, Signum Law Firm

Gaukhar Kudaibergenova's primary area of focus is on M&A, corporate, oil & gas and renewable energy. She is currently the lead partner at Signum Law Firm advising EBRD on development of Kazakhstan's historic first wind energy project auctions. Her advisory services are aimed at developing the regulatory framework, improving the auction (tender) process, and facilitating competitively tendered renewables projects in Kazakhstan.

Gaukhar Kudaibergenova holds a Bachelor's Degree in international law from Kazakh National University and an LLM from the University of Dundee, Scotland.

SOCIO-ECONOMIC IMPACT OF THE COCA-COLA SYSTEM IN KAZAKHSTAN

Global consulting company EY has conducted an independent study for the Coca-Cola System in Kazakhstan, to assess its contribution to sustainable development of the country during 7 years, between 2013 and 2019.
The Coca-Cola System in Kazakhstan consists of The Coca-Cola Company (Coca-Cola CIS Services Ltd.) and its bottling partner Coca-Cola Icecek (JV Coca-Cola Almaty Bottlers LLP), which produces, markets and sells non-alcoholic beverages in Kazakhstan. The report analyzes contribution to all three aspects of sustainable development: economic, environmental and social.



₸ 493 bln

total contribution to Gross Domestic Product of Kazakhstan



₸ 135 bln

paid taxes and other payments in the government's budget



7800 people

were provided with jobs in various sectors of economy, directly and indirectly*



₸ 110 bln

was the contribution to the labor income of the population of the Republic of Kazakhstan



1.6 bln liters

of water were returned to the nature every year through implementation of water supply rehabilitation projects. It is 2 times higher than the volume of water required for production of beverages by the Company in 2020.



1 %

of the cost of each bottle of the Company's products bought by our consumers is invested in environmental or social initiatives



$6 mln

was invested in implementation of social projects

(*) Contribution to employment is shown for 2019

Energy supply and demand trends

ExxonMobil

The Outlook for Energy is ExxonMobil's view of energy demand and supply through 2040 and helps inform ExxonMobil's long-term strategies, investment plans and research programs. Given the uncertainty around the near-term impacts of COVID-19 on economic growth, energy demand and energy supply, and lack of precedent, the Company is considering a range of recovery pathways to guide near-term plans. These pathways expect that energy demand will grow beyond 2019 levels post-2022 as COVID-19 impacts phase out and long-term drivers prevail.

Energy supports rising prosperity

Access to modern technologies and abundant energy – including oil and natural gas – enables substantial gains in living standards around the world.

Between now and 2040, the world population is expected to grow from 7.5 billion to well over 9 billion, and global gross domestic product (GDP) is expected to nearly double. Billions of people in developing economies are expected to see their incomes grow to levels considered middle class.

Given population growth and the linkage between energy use and living standards, energy demand is likely to rise over this same time period. Efficiency gains and a shift in the energy mix – including rising penetration of lower-carbon sources – enable a nearly 45 percent improvement in the carbon intensity of global GDP.

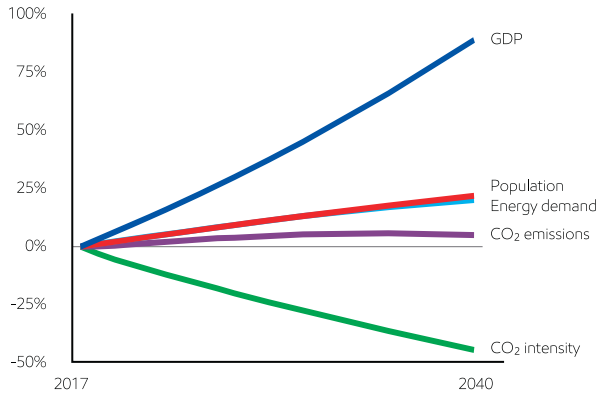
COVID-19 near-term impact

Government responses to COVID-19, resulting in lockdowns and severe travel restrictions, significantly reduced energy demand in the short term. However, it is widely expected that demand will recover in the years ahead. For example, energy demand in countries that are further along the recovery path, such as China, has started to return to pre-COVID-19 levels.

As society recovers and energy demand increases, the following trends are projected by the International Energy Agency (IEA) in its latest publication of the World Energy Outlook. This includes the IEA's assessment of the COVID-19 impact, both in its scenario based on stated policies, known as STEPS, as well as its Sustainable Development Scenario (SDS), which limits the rise in global average temperature to well below 2°C:

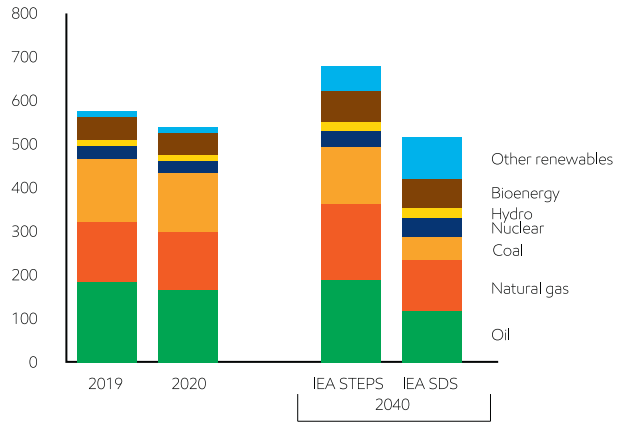
- Wind and solar (included in Other renewables) are projected to see strong growth.
- Coal's share in the energy mix will likely decrease as the world shifts to lower-emission energy sources.

Global fundamentals impact *Outlook for Energy*
(Percent change)



ExxonMobil 2019 Outlook for Energy

Oil and natural gas remain important
(Quads)



EM analysis; IEA World Energy Outlook (WEO) 2020

- Oil and natural gas will continue to play an important role in the world's energy mix (each making up more than 20 percent) as commercial transportation fuel (e.g., trucking, marine) and as feedstock for chemical products, which will continue to see demand growth.

The IEA's 2020 STEPS projects demand for oil and natural gas by 2040, approximately 2 to 3 percent lower than in its pre-COVID-19 2019 STEPS projection. In the IEA's 2020 SDS projection for 2040, oil demand is virtually unchanged and natural gas is estimated 7 percent lower than in the 2019 SDS projection.

The lockdown measures taken by many authorities in response to COVID-19 resulted in lower greenhouse gas emissions but also had significant economic impacts. The International Labour Organisation estimated that income declined 10.7 percent globally during the first three quarters of 2020 versus 2019, which amounts to US$3.5 trillion, or 5.5 percent of GDP, affecting middle-income countries and lower-middle-income countries more than upper-middle-income countries.

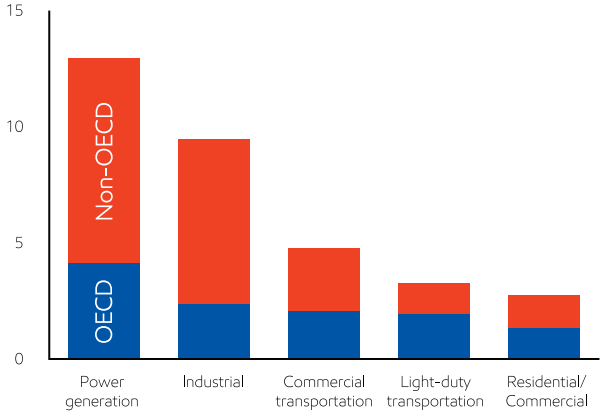
As the world recovers from COVID-19, a focus on addressing environmental risks, including the risks of climate change, while providing accessible and affordable energy for a post-pandemic world remains important. The chart on the upper right illustrates that emission reductions will be needed across all sectors, especially in developing economies.

Addressing the dual challenge

Consistent with third-party assessments, ExxonMobil expects the world to meet, in aggregate, the Nationally Determined Contributions of the Paris Agreement pledges by 2030. However, more effort is needed for the world to accelerate progress toward a 2°C pathway. Recent announcements by some governments further strengthen this effort. The IEA concludes that the full implementation of recent net-zero pledges by 2050 as well as the Chinese government's 2060 net-zero commitment, would cover around 50 percent of the energy-related CO_2 emission reductions required to move from its STEPS scenario to its well below 2°C scenario or SDS scenario.

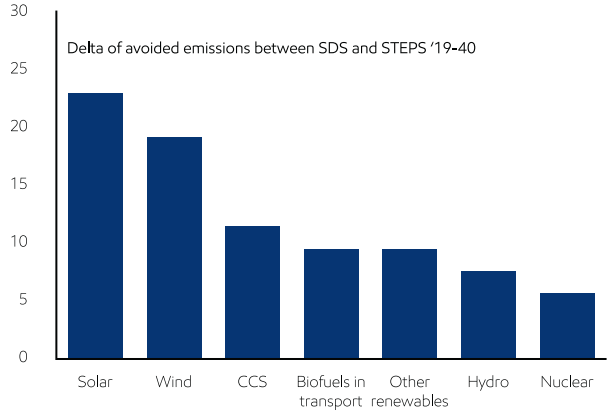
These net-zero announcements are often based on deployment of existing technologies, even though those governments acknowledge there are scale and cost limitations. Because of these limitations, further technology breakthroughs are expected to play a major role in accelerating progress toward 2°C and net-zero pathways. The IEA in 2020 estimated in its Tracking Clean Energy Progress analysis that only six of 46 technologies and sectors assessed are on track to help reach the Paris Agreement climate goal; therefore, further efforts will be required. When comparing the emissions of the IEA STEPS scenario with those of the IEA SDS scenario from 2019 to 2040, just over half of the emission reduction effort would be realized by efficiency improvements. Beyond reduced energy demand through efficiency improvements (97 billion tonnes), the chart on the bottom right demonstrates the crucial contribution of the wide range of low-emission technologies needed to reduce energy-related emissions.

2017 global energy-related CO_2 emissions by sector
(Billion tonnes)



ExxonMobil 2019 Outlook for Energy

Technology developments beyond efficiency improvement needed to further reduce emissions
(Billion tonnes)



IEA World Energy Outlook (WEO) 2020



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WE AGREE.

Chevron

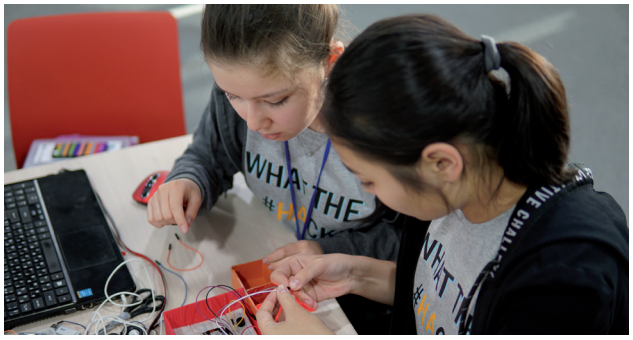
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CHEVRON - DEVELOPING THE NEXT GENERATION OF KAZAKHSTANIS

For over 28 years, Chevron's partnership with Kazakhstan has been developing affordable, reliable, and ever-cleaner energy that enables human progress. Guided by the vision, values and strategies of The Chevron Way, it's a journey that has been characterized by the belief that human ingenuity has the power to solve any challenge and overcome any obstacle.

To enable human progress and support those striving for a better future, Chevron fosters diversity and inclusion at all levels of the company. It is a cornerstone of our values of high performance, integrity, trust, partnership, and protecting people and the environment. We learn from and respect the cultures in which we operate. We create an inclusive work environment that values the uniqueness and diversity of individual talents, experiences and ideas. And in doing so, we offer opportunities for all employees to grow personally and professionally. This is what propels the innovation that drives our success.



To lead in the energy future, the Chevron commitment to shareholders, society, our people, and the environment can be summed up in four simple words: *Higher Returns, Lower Carbon.* To achieve these goals, we need every employee performing at their best and working collaborative as part of a One Team culture – where employees are encouraged to adopt an agile mindset and grow their capabilities to be better leaders.

Chevron's employee development programs in Kazakhstan are a source of pride. They are focused on promoting citizens of Kazakhstan to leadership and supervisory roles through the development of competencies and skills that enable them to compete with a highly skilled international workforce.

In addition, Chevron provides high-potential Kazakhstani employees with the opportunity to gain international work experience through overseas assignments where they can expand their professional development and horizons through exposure to business units around the world.

"My international assignment offered me a unique experience to live and work in a different country and culture, whilst enhancing my knowledge and skills. It helped me develop confidence, and widened my horizons," said Ardak Alimakanova, Strategy and Business Performance Advisor.



The same commitment to professional development can be seen through Chevron's affiliates, *Tengizchevroil (TCO)* and *Karachaganak Petroleum Operating (KPO).* Talent management programs enable TCO to meet current and future needs for critical roles and skills, through the implementation of several training and development initiatives that support the advancement of local employees to positions of increasing responsibility and seniority.

Wide-ranging in their approach, these programs support areas like succession planning, personnel nationalization, and development assignments – including international, domestic and cross-functional (between key TCO departments). And the results of these programs have been impressive. Since 2007, 375 Kazakhstani specialists have been appointed to the positions of managers, middle managers and key engineering and technical positions previously held be expatriates.

Currently, 31 TCO employees are on assignments in Kazakhstan and abroad, with a number of them leading projects and teams at the *Eurasia Business Unit* headquarters in Almaty.



In 1993, when Chevron became the first international oil company to enter Kazakhstan through its 50 percent participation in TCO, Kazakhstani citizens held 50 percent of TCO positions. But today, local employees hold 84 percent of positions in TCO's *Base Business and Future Growth Project-Wellhead Pressure Management Project (FGP-WPMP)* – the next phase of major expansion at the Tengiz Field, one of the world's deepest producing supergiant oil field and the largest single-trap producing reservoir in existence. Out of these, Kazakhstani managers and supervisors represent 75 percent of the TCO managerial workforce in *Base Business* and *FGP-WPMP.*

Chevron and its KPO partners are also committed to local workforce development as business success depends primarily on the professionalism and dedication of its people.



Through its *Program for Increased Local Content in Staff*, KPO is focused on maximizing job opportunities for local communities – including recruitment from West Kazakhstan and investment in employee professional development. At the end of 2020, local employees filled 97 percent of the skilled, clerical and professional positions at KPO – and 83 percent of managerial roles.

With a strong focus on professional competency, KPO implements tailored, individual development programs for employees, including professional training (in-house and external) and internship opportunities at the parent companies. Over the last decade, approximately 210 specialists from overseas were replaced by Kazakhstani employees and 185 expatriate positions were eliminated.



All over the world Chevron demonstrates strong commitment to the people's talent development through its social investment programs. In partnership with local organizations, we annually implement about 30 social projects in the areas of education, health and business development.

We support the next generation of Kazakhstani citizens by helping them gain new skills and knowledge that would help them grow into tomorrow's leaders. Our partners open computer labs, organize workshops and encourage citizens to discover new interests and talents, share ideas, and plan for the future of the region and the country.

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Travellers' Choice Tripadvisor

REGIONAL AIRLINE ASIA 2018-2020

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DIGITALIZATION ACCELERATES AT TENGIZCHEVROIL (TCO)

Over the past year, the global oil and gas industry has managed through a challenging period of external events, including pandemic response, a collapse in commodity markets and OPEC+ production constraints. Operators and investors in Kazakhstan have had to rapidly adjust to changing business conditions, and at Tengizchevroil (TCO), digital transformation has enabled the company to be agile and innovative in its efforts to advance change across the business, help turn challenges into opportunities and enable TCO to continue delivering on its commitments to Kazakhstan and TCO shareholders.

COVID-19 Pandemic Response

Since the start of the pandemic, TCO has applied a 'go digital' philosophy in all aspects of pandemic response, leveraging cross-functional Agile scrum teams to rapidly develop and deploy novel digital solutions designed to keep our workforce safe and healthy. When the pandemic emerged in March last year, TCO digitally enabled new workflows and tools – in a matter of weeks – to support emergency response teams in managing COVID-19 risks to the workforce.

Some of these digital tools serve as early indicators of potential viral outbreaks, enabling TCO to take timely actions to isolate impacted personnel or camps and prevent the spread of COVID-19 more broadly across TCO's operational zones. Digital dashboards monitor persons on board (*POB*), local hospital and medical clinic bed availability, daily infection rates, testing and isolation metrics and other signposts that create a clear view of local conditions and help leaders make informed decisions on workforce health, safety and operations.

In mid-April 2021, the crisis management team's digital dashboard reflected the more than 380,000 COVID-19 PCR tests conducted by TCO in partnership with Kazakhstan health authorities since the pandemic began.

Enabled by an integrated suite of digital solutions across the organization, TCO has worked together as One Team to adapt to rapidly changing pandemic response conditions and keep the business running and workforce safe. Although the threat of the COVID-19 virus remains, as the Kazakh saying goes, '*zhumyla kotergen zhuk zhenil'* – by uniting our efforts we can overcome the challenges ahead.

Maximizing Returns

In parallel to the pandemic, the oil and gas industry experienced an unprecedented drop in commodity markets, which were followed by OPEC+ production curtailments. Together with other operators in Kazakhstan, TCO felt the impact of these market events and, in response, formed cross-functional teams to identify ways to optimize revenues in areas outside of crude oil production.

Working across the value chain, teams from TCO's *Production Operations, Facilities Engineering, Reservoir Management*, and *Marketing and Transportation* departments have utilized digital tools to improve performance and enable TCO to continue to deliver exceptional results during a period of constrained production.

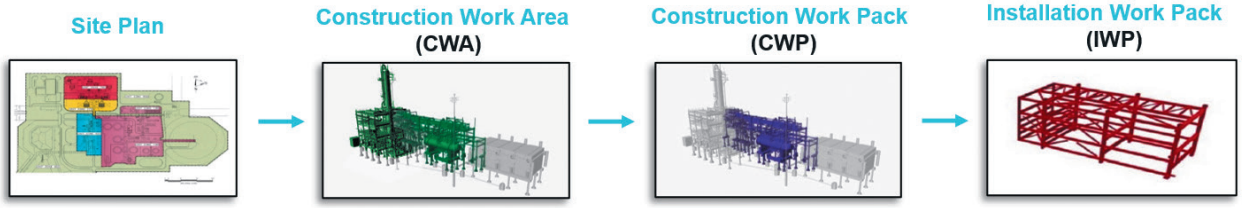
At TCO's *KTL* processing facility, *Liquified Petroleum Gas (LPG)* production was increased with the assistance of a digital tool called *Virtual Plant*. This tool combines real-time data from plant instrumentation and process simulation software where instruments in the plant do not exist. At TCO's *Second Generation Plant* processing facility, feed to the gas plant was increased using a digital controller designed to maximize butane blended into crude.

Ultimately, increases in LPG production at both plants through the use of digital technologies helped offset the impacts of crude production curtailments. This example is another demonstration of how TCO is turning challenges into opportunities, optimizing the value chain, and leveraging digital solutions to quickly respond to shifts in the marketplace.

Safely Executing TCO's *Future Growth Project-Wellhead Pressure Management Project* (*FGP-WPMP*)

FGP-WPMP is one the largest major capital projects in the global oil and gas industry. With this large-scale global project, planning, logistics and execution are complex.

To ensure safe execution of the project, TCO has deployed a digital solution to execute the right work at the right time. The solution, referred to as *SWIFT*, is an integrated forecasting software for systems completion and workface planning that improves the efficient management of *FGP-WPMP* critical path activities.



SWIFT helps project teams prepare and execute work efficiently and ensure that jobs are completed before moving to the next work package. *SWIFT* also provides TCO near real-time visibility into mechanical completion by integrating information across multiple management systems and aligning thousands of individual installation work packages. The software helps drive efficient and effective transition from bulk construction to systems-based construction. Having an integrated and holistic view of construction and systems completion status at the work package level allows enables a critical capability for the project to quickly respond to changes in operating conditions, identify risks and apply the appropriate mitigations at the right time.

Digital Culture

At TCO, there is recognition that 'going digital' is much more than just adopting technology; it's about creating a digital culture that enables continuous performance improvement and maximizes value. Building a digital culture starts with equipping the entire workforce with the right digital skills. Training and self-service platforms are enabling scalable solutions to be developed at TCO through a community of citizen developers. But nowhere is the culture of innovation more on display than in TCO's annual *Digital Yurt* event, where employees build digital skills through formal training and put those skills to the test in a daylong hack-a-thon to solve real business problems leveraging technology.

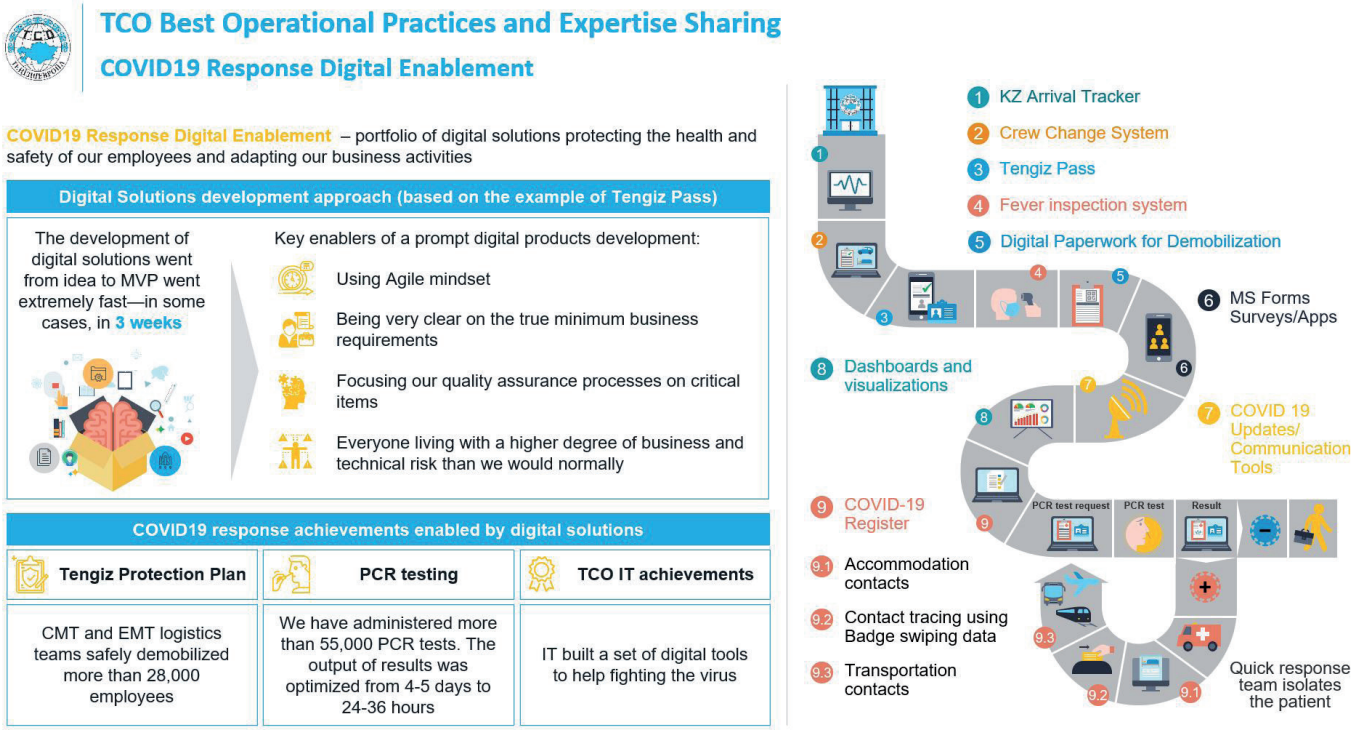
The theme of last year's *Digital Yurt* was artificial intelligence and machine learning. Fifty TCO employees prepared for the event by completing several instructor-led courses on data science and becoming familiar with a suite of tools to apply their newly acquired skills. On the day of the virtual event, contestants were presented with a real business problem and corresponding data sets and were given 6 hours to complete the full development cycle of a data science project, including presenting their recommendations to a panel of judges, members of TCO's leadership team.

The results were impressive and a testament to the innovative spirit at TCO. While only a few employees were formally recognized as winning the event, the entire TCO workforce was rewarded as these talented individuals applied their enhanced skills to solving complex issues related to TCO's operations. Building a digital culture through initiatives like *Digital Yurt* creates a way of capturing novel ideas from all levels of the organization and strengthening the spirit of innovation and teamwork at TCO. People are TCO's greatest asset, and it is our people who are leading digital transformation across the organization.

Digital Transformation Continues

After only a few years since its inception, TCO's digital transformation journey is still in its early phases. With an initial focus on expanding the company's ability to deliver agile digital projects that create incremental value for the organization, TCO's digital transformation has continued to advance through a period of significant industry challenges and disruption due to global events. There are exciting developments ahead, including plans to expand mobility across the entire Tengiz operation, launch a technologically advanced *Integrated Operations Control Center*, and expand the capabilities of the *Virtual Plant* solution to fully optimize operating parameters as *FGP-WPMP* facilities come online.

TCO's future is bright, with digital enablement playing a critical role in driving continuous improvement and strengthening the company's competitive performance. Digital transformation is a strategic imperative for TCO, and the company remains committed as a leader in Kazakhstan's energy industry to maximize value for the country and TCO shareholders through the adoption of digital technologies.





Karachaganak

on a journey to sustainable development

The history of Karachaganak is recorded forever in the chronicles of the Kazakhstan's oil and gas industry. Discovered in 1979, today's Karachaganak is associated with multibillion investments, record-setting production volumes, innovative technologies and thousands of jobs. Since 1998, Karachaganak has been operated by KPO, an international consortium comprising **Royal Dutch Shell, Eni, Chevron, LUKOIL and JSC NC KazMunaiGas**.

The best international practices introduced by top-class specialists in partnership with the Republic of Kazakhstan ensure KPO's strong production performance. The Venture is a world-class operation recognized as one of the flagships of the national oil and gas industry and a key driver of the economy of the West Kazakhstan region.

In its pursuit of excellence, KPO is guided by the principles of sustainable development and social responsibility. Apart from record production levels, the company's key priorities include health, safety and environment, development of human capital and support of Kazakhstani business. Karachaganak's success story is being written before our eyes with a lasting legacy for the future generations.

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KPO REPORTS 2020 PERFORMANCE RESULTS

On 23 February 2021, Karachaganak Petroleum Operating (KPO) announced its performance results for 2020. Over the last year KPO produced 10.9 million tons of stable liquid hydrocarbons, which is KPO's historical maximum. Total hydrocarbon production, including raw gas export and fuel gas production, was 143.9 million barrels of oil equivalent. In addition, 10.4 billion cubic metres of raw gas were re-injected into the reservoir, representing 51.3 per cent of total gas produced (with an additional 2 gas injection wells within the 5th gas injection trunk line project).

Despite the downturn experienced by the global oil and gas industry exacerbated by the COVID-19 pandemic, KPO production facilities operated in accordance with safety requirements and 2020 production targets. KPO has reached an important milestone in hydrocarbon liquid processing.

KPO General Director Edwin Blom noted: *"Last year we were ahead of budget on our liquids, and set new records in Annual Liquids Production, Gas Injection, and Total Gas Production volumes. So overall, with the structured approach we have been applying, we've achieved some truly remarkable results in production".*

As of today, the KPO Partners have invested more than $27 billion into development of the Karachaganak field. In December 2020, the Karachaganak Partners signed an agreement sanctioning the *Karachaganak Expansion Project-1A (KEP1A Project)*. Commenting on the event, Edwin Blom pointed out:

"The sanctioning of the KEP1A Project is an important milestone in the continued development of the Karachaganak field, building further on the achievements of the Karachaganak Gas Debottlenecking Project (KGDBN) and the Fourth Injection Compressor (4IC) Project. Both projects have progressed significantly during 2020 despite the pandemic and the associated travel restrictions and supply delays. Aimed at extending the duration of the liquid production plateau, the KEP1A Project, which includes the 5th Injection Compressor and other associated facilities, will make a significant contribution.

Despite the challenges of the coronavirus infection, KPO remains committed to maintaining safe operation of the giant Karachaganak field for continued revenue generation for Kazakhstan. Keeping the field running means thousands of jobs and ensuring the welfare of households across the region and beyond".

KPO continues to conduct full-scale monitoring of environmental components, including air, surface water, subsurface water and soil monitoring, as well as monitoring of emissions (air emissions, wastewater discharges). Particular focus is given to introducing "green" technologies, waste management and measures aimed at reduction of air emissions. Since 1998, KPO has invested $432 million into various environmental activities. KPO has achieved a gas utilisation rate of 99.92 per cent, a world-class achievement. Following the Certification Audit, KPO's environmental and energy management systems were recognized as effective and in compliance with international standards *ISO 14001: 2015 and ISO 50001:2018.*

Karachaganak

The health and safety of employees and the local community continues to be one of the key priorities for KPO. Despite the current challenging conditions, KPO intends to preserve jobs and maintain safe working conditions for both company and contractor personnel. In 2020, Kazakhstan employees accounted for 97 per cent of professional staff/ qualified workers, and 83 per cent of management. Overall, since signing the FPSA, more than $227 million has been invested in training and development of national personnel.

KPO has actively contributed to involving Kazakhstani suppliers and manufacturers of goods in development of the Karachaganak field. Intensive work towards implementation of this program has already yielded tangible results. In 2020, the share of Local Content in KPO contracts for the supply of goods, works and services stood at 59 per cent. Over the last few years KPO has made significant changes in the nature of procurement of goods from simple products to complex high-technology materials and equipment.

KPO also implements its major projects aimed at developing the social infrastructure of West Kazakhstan oblast. To date, KPO investment in development of social infrastructure in the West Kazakhstan region has totalled $427 million. In 2020, KPO provided significant support to the region's public health facilities in its fight against COVID-19 by procuring essential equipment and materials, including specialized equipment for ICUs. Edwin Blom noted:

"The current situation is obviously an unprecedented challenge for all of us and for the global economy. KPO is undertaking its best efforts to protect the health and safety of its employees and community. We will continue strengthening our long-lasting relations and collaboration with the Government of Kazakhstan in pursuit of our common goal to create maximum value and sustainable development for the residents of the West Kazakhstan region and Kazakhstan as a whole".

INVESTMENT IN KAZAKHSTAN'S OIL AND GAS INDUSTRY – NEW REALITIES FOR KAZAKHSTAN AND FOREIGN INVESTORS

by Olivier Lazare
Shell Kazakhstan Country Chair

Last year was dramatic for the global oil and gas industry as it was for many other sectors of Kazakhstan's economy. COVID-19 quarantine restrictions and the subsequent drop in demand for oil and oil products, as well as a lower price on hydrocarbons in global markets placed the industry in challenging situation, forcing operators to cut their investment programs, capital, and operating expenditures. However, 2020 was in general a rather successful year for Shell Kazakhstan. Both of Shell Kazakhstan's assets (*Karachaganak Petroleum Operating - KPO*, and the *North Caspian Operating Company - NCOC*) have demonstrated strong safety and operational performance despite challenges related to the global pandemic.

Despite the pandemic's many issues, KPO has recently successfully completed the *Karachaganak Gas Debottlenecking Project* which enables other key projects that will help extend the life of the Karachaganak field. Also on the positive side, FIDs on some of the important projects (both in KPO and NCOC) were also taken that have and will be creating more opportunities for local businesses and communities.

Over the past thirty years since Kazakhstan acquired independence, the country has achieved a great deal with support from private investors for development of oil and gas production. Kazakhstan is now a significant and a respected player in oil and gas on the world stage. The industry has had continuous investment inflow at the level of over $10bn per annum for the last 15-16 years. However, unless decisive action is taken jointly by the Government and investors alike, this level could drop substantially, potentially to around $3bn per annum starting in 2025.

The oil and gas business is now in a cycle of low oil prices that we believe is here to stay, even if current prices are relatively strong due to unprecedented supply cuts by OPEC+. This situation was triggered by the emergence of shales in the United States, exacerbated by last year's global pandemic which depressed economic activity and oil prices, forcing International Oil Companies (IOCs) and national oil companies (NOCs) alike to cut their capital investment plans by over $500bn in total over the next 5 years. Major project FIDs declined by 75% in 2020 compared to the previous 3 years, and delays in the following years are expected. Global competition for capital is fierce and is likely to stay fierce. Kazakhstan is forced to compete for investment dollars that are more than ever sought after today by many other countries.

The sector is also facing the existential challenge of the energy transition, and both Kazakhstan and IOC's need to adapt to a low-carbon future. Kazakhstan has set a target to be carbon neutral by 2060. Shell, too, has a target to be carbon neutral. This creates more opportunities for working together to help both parties achieve their targets that will benefit customers and citizens alike. At the same time, this intensifies competition for capital and a more stringent review of oil and gas projects' viability and competitiveness by the IOCs.

Costs of projects in Kazakhstan are typically higher than elsewhere, partly for technical and geographical reasons, but there is much that can be done to make them more competitive. As mentioned by the President during his *Address to the Nation,* we need to increase competition for the supply of goods and services. We also need to work further on local content. With Kazakhstan's guidance, enormous progress has been made in terms of local content over the last 20 years. Today there are more companies working in the oil and gas sector in Kazakhstan than ever before. Now we need to move on to the next stage, and further stimulate local content with a focus on maximizing the number of jobs in Kazakhstan while reducing costs. We need high quality local content where tools, systems, technologies, and ultimately competences are developed and remain in the country.



The second substantial area to be improved is fiscal terms. For example, global benchmarks show that Kazakhstan's current *Subsoil and Subsoil Use Code* terms do not compete well globally to attract scarce capital. We need to work on terms that will attract capital at the current low oil prices, while providing a fair share of the project returns to the country if prices revert to a substantially higher level.

In response to the challenges faced by the industry, major Oil and Gas companies - members of the *Foreign Investors' Council (FIC)* - have joined in an effort to provide Kazakhstan with a vision for what Kazakhstan could become as an Oil and Gas producer on the world stage, as well as concrete recommendations for realizing this ambition, particularly in the current extremely challenging context of low oil prices.



The eight IOCs - *Chevron, CNPC, Eni, ExxonMobil, INPEX, LukOil, Shell,* and *Total* – are also supported by Ernst & Young. The heads of the IOCs have formed a Steering Committee to manage the overall effort. In their initial discussions it became clear that the focus of this work would be around regulatory, legal, and supply chain issues, as well as ways of working between the investors and Kazakhstan Government bodies. Thus, in 2020, five thematic working groups were created to develop recommendations for gas market development, costs of supply chain and procurement, fiscal terms and approaches to working topics.

International consultants engaged by the IOCs offered independent expertise on Kazakhstan's upstream sector performance to date, future potential, and industry benchmark by comparison to its peer group elsewhere in the world. This work was contracted to substantiate the challenges raised by the investors.

Since beginning this work, and thanks to close engagement and support from the Government, much has already been achieved to address those issues in a collaborative way. On November 18, 2020, the major IOC CEOs and heads of upstream businesses were given the opportunity to engage with Kazakhstan's President in a virtual session dedicated to oil and gas industry issues under FIC auspices.

A joint industry presentation was delivered to the President outlining the case for change and the urgency of joint action. As a result of this session, a joint Government - Investors Working Group led by Deputy Prime Minister Sklyar was formed to develop specific proposals for the Government and President to further improve attractiveness of the oil and gas industry, the country's key economic sector.

On March 3, 2021, the President chaired a subsequent oil and gas issues meeting under the FIC umbrella, and Deputy Prime Minister Sklyar delivered a progress report on behalf of the joint working group. Joint proposals for the way forward by the Government and investors were supported by the President, as a result of which work has intensified on a number of areas, including improving fiscal terms for different project categories, project costs, local content and technology transfer, gas market development, a low carbon economy, environmental issues, and other areas.

Some of the shorter-term issues addressed by the working group included elimination of discriminatory treatment of the oil and gas industry in terms of emission penalties, as well as addressing criminal liability for tax violations.

During the months ahead, it is planned to jointly work and present to the President a package of proposals on the above issues with the intention of amending existing legislation to attract more investment into oil and gas projects in Kazakhstan as soon as possible, as well as providing more transparency and stability of the legal and fiscal regimes for the industry's entire investment cycle.



In Conclusion, the significant progress made so far is a great example of successful cooperation that Kazakhstan and investors can achieve by working together to create more value for all parties involved. There is, of course, still much work to do: laws to be passed, exact terms to be established, more to be done on reducing project costs, natural gas development and overall investment landscape improvement.

But together we have accepted the challenge of making projects in Kazakhstan globally competitive. This is critical for Kazakhstan, for the oil and gas companies working in Kazakhstan, and for the many stakeholders who rely on our industry to provide jobs and stimulate economic activity.

OPPORTUNITIES FOR FOREIGN INVESTORS IN KAZAKHSTAN – ENI'S EXPERIENCE

The following interview with Luciano Vasques, Head of the Central Asia Region for Eni SpA, relates the Eni experience as one of the first companies to enter Kazakhstan's oil and gas sector in the early 1990s through its participation in the Kashagan and Karachaganak projects, and its support for Kazakhstan's efforts in offshore exploration with the licenses of Abay and Isatay.



Mr. Vasques, you have extensive global experience in Eni, and in Kazakhstan you worked on two of the three largest upstream projects – Kashagan and Karachaganak. It's been several months since you were appointed Central Asia Regional Head for Eni, could you please share your vision of Kazakhstan's current investment climate?

Eni has been present in Kazakhstan since Kazakhstan acquired its independence and has followed the transformation of its investment climate from its inception. By and large, we see Kazakhstan continuing to represent a country of opportunities. Furthermore, it is actively engaged in improving conditions to promote and stimulate investment in this period of harsh competition for capital. Kazakhstan therefore has excellent potential to continue its leadership in Upstream and Green projects worldwide.

Notwithstanding the unprecedented global economic and health crisis, both business and the state continue operating progressively to minimize the drastic effect of the pandemic on investment attractiveness in Kazakhstan. As a member of the *Foreign Investors' Council (FIC)* chaired by Kazakhstan's President, together with the Heads of the Kazakhstan's major foreign investors, Eni continues to collaborate in an efficient manner on the country's development towards attracting future investment.

In recent months Eni has begun active engagement, explicitly supported by the President through the *FIC*, to review the energy sector's regulatory and fiscal framework. The first progress report was shared with the President on March 3, 2021. The current plan is to complete this review process by June 2021. The new terms should stimulate investors to participate in future exploration and developments, hence new energy projects may be expected in upcoming years.

Could you please expand on the results of the March FIC meeting?

On March 3, 2021, Eni took part in a video conference Working Meeting chaired by President Tokayev with the Heads of O&G companies that are *FIC* members. The meeting was devoted to increasing the investment attractiveness of the country's oil and gas sector through legal protection and stability of investments, and if necessary, by providing investment incentives.

The President instructed the Government to improve the model subsoil use contract, develop a modern and flexible mechanism for regulating investment in deep processing of hydrocarbons, and increase local content. He instructed the Government, together with the companies, to develop a *Roadmap for Technology Transfer and Localization* and to report on this at the next meeting.

The President also spoke about creating a Front Office to solve investor problems with minimum bureaucracy in a professional manner. We welcome this initiative that will bring these issues to the Oil and Gas Council under the Prime Minister.

In addition, the President urged investors to take decisive action to improve the environment in regions where they operate and to reduce the carbon footprint.

Referring to the carbon footprint, at the December 12 2020 Climate Ambitions Summit President Tokayev announced Kazakhstan's target to achieve carbon neutrality by 2060, marking 5 years since adoption of the Paris Climate Agreement. We know Eni is actively pursuing this goal. Is it true that Eni plans to reach net zero emissions by 2050?

Yes, it's true. On February 19, 2021, during Eni's announcement of its new *2021-2024 Strategy* that will improve and accelerate the company's transformation, reinforcing the *2050 Roadmap*, Eni reaffirmed its commitment to decarbonise operations and products, and to reach net zero emissions by 2050.

Eni's mission is inspired by the *Sustainable Development Goals (SDGs)* and demonstrates the journey the company has taken to address the energy sector's main challenge: to ensure access to efficient and sustainable energy for all while reducing climate-changing emissions, to combat climate change in support of the objectives of the *Paris Agreement.* At Eni we regard today's challenges as an opportunity to accelerate the transformation to a more sustainable energy mix, redirecting major capital investments to projects based on an enhanced commitment to energy transition, reduction of the carbon footprint towards net zero emissions, a circular economy, and technological innovation.

Notably, Kazakhstan became the world's first country where Eni launched its first renewables wind project in March 2020 through the commercial operation of the 48 MW *Badamsha Wind Farm* in Aktobe Oblast, with an annual power generation of 195 GWh and overall CO_2 saving of 172,000 tons per year. Eni is now executing the project's second phase with 48 MW of additional capacity. In March 2021, Eni also inaugurated construction of a 50 MW photovoltaic plant in *Shaulder Village, Turkestan Oblast*.



Ribbon cutting ceremony by Pasquale D'Avino, Ambassador of Italy in Kazakhstan, Meirzhan Myrzaliyev, Deputy Akim of Turkestan Region, and Alex Stillavato, Managing Director of Arm Wind (100% Eni Renewables' Subsidiary) inaugurating construction of a 50 MW photovoltaic plant in southern Kazakhstan (Shaulder village, Turkestan Region).

Kazakhstan's Government has been very efficient in creating favorable conditions for renewable energy projects. New capacities awarded at renewables auctions make it possible to expand Kazakhstan's renewables portfolio with the most efficient and technologically advanced projects. As Priority Investment Projects, they enjoy tax preferences that make renewables projects economically more viable for investors, both foreign and domestic.

Can you please highlight a few areas for the Oil & Gas Industry that will improve future investment conditions?

Based on the long-standing relationship between Eni and the Government of Kazakhstan, in particular in developing Karachaganak and Kashagan, two of the country's three largest Oil and Gas fields, we believe it is crucial to continue enhancing development and stimulating investment in the O&G industry.

The fiscal terms currently offered by Kazakhstan for exploration and production do not appear competitive in the current oil price scenario. Enhancement of the industry's growth requires revision and improvement of fiscal terms for subsoil use. In order to create sustainable growth opportunities, Kazakhstan and the oil industry are working to improve the industry's investment climate by developing the terms and conditions in the country's subsoil use contracts that will entail greater protection for new projects with low profitability and high risks (offshore, deep-seated onshore fields). This includes contract stability, fiscal incentives and transparency, and other improvements.

Eni fully supports the Government's recognition of the increasingly important role played by natural gas in the energy transition, both in terms of directly reducing carbon emissions and complementing renewable energy. Although Kazakhstan has vast gas reserves, investment in gas developments has been limited, mostly due to the impossibility for foreign companies to export gas and the low domestic gas price compared to the gas project's breakeven price.

Kazakhstan is aware that gas can play a very important role as a bridge fuel for its Energy Transition to low carbon content resources complementing coal and is therefore engaged, within FIC and with the participation of the major O&G players, in studying options to allow for a quota of gas to be exported and to adjust domestic gas prices so as to complement the export netback price, thus offering more attractive opportunities for development. This price review is expected to represent a substantial incentive in promoting investment in Gas projects across the country.



After International Petroleum Week, the mass media reported that some of Europe's largest oil companies were considering fundamental shifts to their strategy. The media claimed that Eni said massive oil projects are now off the table.

Eni's strategy to look more at incremental projects, to develop discovered resources, is a perfect fit with our asset base in Kazakhstan. Both in Karachaganak and Kashagan we look forward to developing expansion projects, which have a much shorter time-to-market and a lower capital intensity than what you typically experience with the large investment intensive green fields that are no longer at the core of our strategy.

Near-field exploration plays a central role in the Eni strategy, where lower risk and infrastructure synergy can play a crucial role in attaining efficient and investable projects, as we expect to achieve in other Caspian prospects.

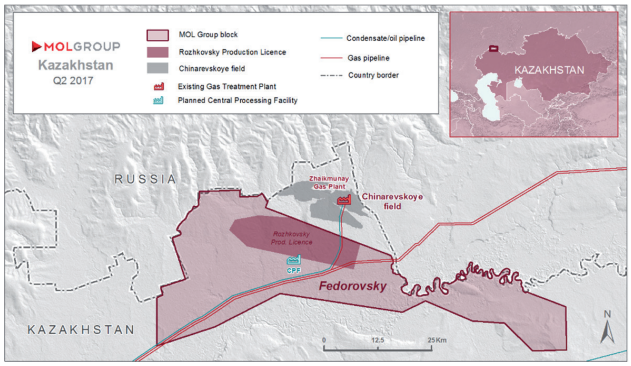
Overall, building upon the Eni historical presence and with a view towards the transformation that the O&G industry is facing, we intend to continue steadily playing a substantial role in Kazakhstan, further contributing to the development, growth and diversification of the Kazakhstan O&G industry and the prosperity of the country's future generations.

THE MOL GROUP – AN INTEGRATED CENTRAL/EASTERN EUROPEAN OIL AND GAS LEADER OPERATING IN KAZAKHSTAN

Founded in 1991, **the MOL Group CEE** is a leading integrated Central and Eastern European oil and gas corporation headquartered in Budapest. With operations in over 30 countries and more than 26,000 employees worldwide, MOL's exploration and production activities are supported by 80 years of experience in the hydrocarbon field.

MOL has been present in Kazakhstan since 2008, holding a 27.5%-license share in *Rozhkovskoye Field* in the *Federovsky Block* in northern Kazakhstan, approximately 70 km North-East of *Uralsk* near the village of *Petrovo*. MOL has been conducting a hydrocarbon exploration project with partners *KazMunaiGas* (owning 50% of the shares in the field), and FIOC (owning 22.5% shares in the field).

The company's strategic goal is to deliver the project by end of 2023 according to the best international practice and in full compliance with Kazakh legislation.



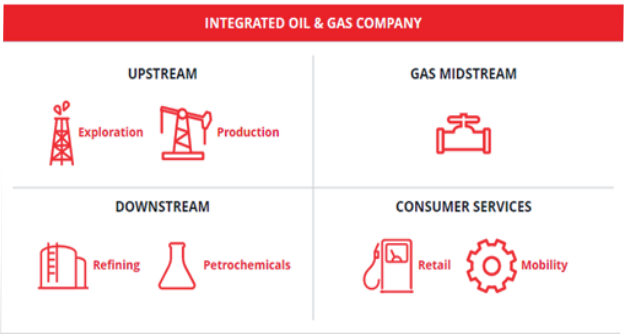
MOL Group's Integrated Business Model

Since 1999, MOL Group has been successfully implementing its integrated business model, consolidating the oil & gas industry in Central and Eastern Europe. This business model has provided stability in the fluctuating external environment and is expected to continue doing so in the forthcoming 10-15 years.

The external environment in oil & gas sector is changing rapidly, carrying new risks such as decreasing demand for fossil fuels in the long-term, while customers' habits and needs are rapidly changing at the same time. With its integrated business model, MOL Group has the capability, financial means, and professional know-how to use the momentum, leverage previous successes, and build on the opportunities provided by the changing environment.

In February 2021, MOL Group updated the company's long-term *MOL Group 2030 ENTER TOMORROW Strategy*, originally announced in October 2016, by integrating a new sustainability strategy and a complementary longer-term vision and ambitions beyond 2030.

According to the *SHAPE TOMORROW" MOL Group 2030+ Strategy*, the company's vision for 2050 is to become a key player of the low carbon circular economy in CEE – a highly efficient company, providing sustainable materials for the economy, low carbon fuels for mobility, and convenient products and services for people on the move. The updated long-term business strategy aligns MOL's future with the European Union's *Green Deal* ambitions to become a net-zero CO2 emitter by 2050 in all scopes.



OPERATIONS

UPSTREAM

With more than 80 years of experience and a diverse international portfolio consisting of oil and gas exploration and production assets in 14 countries and production activity in 9 countries, MOL is one of the leading oil & gas companies in Central Eastern Europe.

Beyond its core region, Central Eastern Europe, MOL has a well-established presence and thriving partnership in the CIS region, the Middle East, Africa and Asia. In 2014, MOL Group also entered the United Kingdom, and later Norway, to increase its reserves and enhance its offshore experience.

The newest asset of the MOL Group portfolio is in Azerbaijan. In 2019, MOL Group entered the market by acquiring a 9.57% stake in the *Azeri-Chirag-Gunashli (ACG)* oil field, and an effective 8.9% stake in the *Baku-Tbilisi-Ceyhan (BTC)* pipeline that transports the crude to the Mediterranean port of Ceyhan. The deal was closed in April 2020 and thus MOL became the third largest field partner in ACG.

In Upstream, MOL aims to become net carbon neutral in Scope 1 and 2 by 2030 on a portfolio level by exploring *CCUS (Carbon Capture, Utilisation and Storage)* opportunities to leverage geological knowledge of the Pannonian basin and become a leading player in CEE, together with Downstream.

DOWNSTREAM

MOL Group's Downstream division consists of different business activities that are part of an integrated value chain. This value chain turns crude oil into a range of refined products, which are moved and marketed for household, industrial and transport use. The products include, among others, gasoline, diesel, heating oil, aviation fuel, lubricants, bitumen, sulphur and liquefied petroleum gas (LPG). In addition, the company produces and sells petrochemicals worldwide and holds a leading position in the CEE region's petrochemical sector.

MOL is continuously expanding its petrochemical value chain from oil to raw materials for the chemical and plastic industry. As its largest ever organic investment of EUR 1.2bn, MOL started to build a new polyol complex in Tiszaújváros, Hungary. Polyol is an important and highly sought-after plastic raw material that is used in numerous industries, for example in the automotive manufacturing, construction, furniture production and in the clothing industry.

MOL aims to become a leader in plastic recycling in the CEE region. In October 2019, MOL acquired 100% shareholding in Aurora, a German based plastic compounder company. As a result of the acquisition, MOL is strengthening its presence in the recycled, sustainable compounding segment and in the automotive supplier industry. The updated strategy aims to transform the division into a highly efficient, more sustainable, chemical-focused leading business.

CONSUMER SERVICES

MOL Group currently owns a network of nearly 2,000 service stations under six well-established brands across nine countries in Central Eastern Europe. *MOL, Slovnaft, INA, Tifon, Energopetrol* and *PapOil* are all brands within the MOL Group. They are market leaders in the Croatian, Hungarian, Slovakian and Bosnian retail markets and represent the premium segment in the Czech Republic, Romania and Slovenia. In addition, the company has a retail presence in Serbia and Montenegro.

Despite healthy growth of fuel consumption in Central Eastern Europe in the past several years, advancements in technology and new consumer habits have fundamentally changed what has so far been considered fuel retailing. Looking at the next five years, fuel consumption is still expected to grow in CEE, but the Group's long-term outlook is that fossil fuels will lose their monopolistic dominance by the end of the next decade.

According to the Group's updated strategy, MOL aims to become a best in class digitally-driven consumer goods retailer and an integrated, complex mobility service provider by 2030 with significantly higher revenues, earnings and free cash flow.

GAS MIDSTREAM

MOL Group's *FGSZ Földgázszállító Zrt.* (*FGSZ*) is the largest transmission system operator in Hungary. It performs its activities under regulated market conditions. Aside from natural gas transmission in Hungary, *FGSZ* also has transmission activities in Serbia and Bosnia-Herzegovina, as well as in Romania, Croatia, Ukraine, and through the network of *MGT Zrt.*, in Slovakia.

By international comparison, *FGSZ* grid operates according to the highest technological standards. *FGSZ* ranks among the companies of strategic importance within the region. Its dynamism and efficiency make the company one of Europe's most significant natural gas TSOs.





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megawatts

80+
airports

4.2+
mtpa aluminum smelter capacity

10,000
kilometers of railroads

40+
major copper projects

150+
nuclear projects

F20210-004

ENGINEERING A LEGACY FOR KAZAKHSTAN

by Svetlana Ibrayeva
Business Development and Marketing
Bechtel Kazakhstan

The article Bechtel published in the April 2020 *Investors' Voice*, "*Bechtel - Building a Legacy for Kazakhstan*", stressed the importance of developing skilled professionals and craft workers in Kazakhstan and showcased the long-term investments in this activity through Bechtel's ownership in *Senimdi Kurylys*. This year Bechtel is focusing on how building engineering capability in Kazakhstan is critical to the nation's continued development, maximizing utilization of abundant natural resources while meeting forward-leaning carbon reduction targets.

The Bechtel-KMGPJV

Historically, most of the conceptual engineering for the Kazakh oilfields has been performed outside Kazakhstan due to a lack of qualified and experienced engineering personnel available locally. This is changing rapidly as the number of Kazakh engineers graduating from universities has increased over the last 30 years and interest in developing localized capability has grown as these engineers have progressed in their professions.

Bechtel has a long history of engineering projects around the world, supporting multiple national and international oil and gas companies with their conceptual, feasibility, *Front-End Engineering Design (FEED)*, and detailed engineering services. In many cases, Bechtel continues to support customers throughout the Engineering, Procurement and Construction lifecycle.

To support and encourage this transition in Kazakhstan, Bechtel has partnered with *KMGP*, an established engineering company in Atyrau, to form a joint venture that will draw on local engineering expertise and supplemented with experienced engineers so that more of the full range of engineering services can be performed in Kazakhstan in the years ahead.



Baktygali Nyssangaliyev (KMGP) and Shashank Parulkar (Bechtel)) signing the Bechtel-KMGPJV Agreement, January 2020

Engineering core competencies focused on delivering a clean energy future

Kazakhstan has abundant oil and gas resources providing significant contributions to the economy. The approach to engineering a safe, operable plant that maximizes return on investment for the customer is of critical importance, as is decreasing carbon emissions. Our Kazakh and global engineering teams are focused on creating value at every point of the project lifecycle, including:

- *Technology assessment and license selection* – analyzing the process technologies available to maximize a customer's return on investment, collaborating with the customer to select the best-fit option to meet their goals, and considering energy efficiency, carbon capture, water reuse and plastics circularity at the earliest phases of project conception.

- *Process engineering, process technologies, dynamic simulation, analysis, and optimization* – evaluating how to efficiently and effectively meet the customer's needs, including incorporation of novel technologies to lower carbon emissions.

- *Detailed design and specification* – where we use our 100+ years of knowledge to design, specify, and procure the equipment and systems needed to meet customer expectations.

- *Safety in Design* – ensuring that safety is designed into every aspect of the project and the appropriate controls are put in place to ensure construction teams, operators, and the assets remain safe.

- *Constructability* – ensuring safe and efficient production in the field is a key focus area and achieved through strategic advanced work packaging, modularization versus stick-built analysis, and input from the Construction team during the project's earliest phases.

- *Managing contracts and shop fabrication* – where we ensure the design requirements are present in the working equipment/systems.

- *Support to field/construction/commissioning/ startup* – where we help ensure the finished project meets or exceeds the customers' requirements.

- *Plant Support Services* - our competencies include continuing plant support services and retrofits to increase the efficiency of their plant and reduce carbon emissions.

To support a holistic engineering approach, the use of advanced technologies is becoming more and more critical to accelerate schedules, lower costs, and ensure consistency and quality. Bechtel's colleagues in Kazakhstan perform increasingly complex design work, and technology enables them to work collaboratively in virtual environments with subject matter experts around the world.

The Energy Transition



Engineers play a key role in accelerating the energy transition to a lower carbon future in Kazakhstan

Energy efficiency has driven the oil and gas industry forward. Thirty years ago, gas from wells was released to the atmosphere at the well site. Now this gas is seen as a valuable resource that is captured and processed and can be monetized directly or used to enhance oil recovery.

The next phase of this transition is the minimization of emissions, something all engineers should embrace as part of Bechtel's professional services ultimately leading to a net zero carbon future for Kazakhstan.

Speaking at the *Climate Ambition Summit* in December 2020, Kassym-Jomart Tokayev, the President of Kazakhstan said, "Over the past 30 years, we have made great progress in terms of development. However, our economy relies on fossil fuels. Therefore, Kazakhstan has no other choice but to simultaneously solve two problems: move the economy away from fossil fuels and at the same time fight against climate change". He then announced that Kazakhstan would achieve a carbon neutral position in 2060.

This forward-looking approach to carbon emissions provides a significant opportunity to both invest in innovations and technologies to decrease carbon emissions from existing assets and operations, as well as diversifying future projects to include carbon capture, use, and sequestration, hydrogen production, advanced fuels and plastics circularity in order to maximize return on investment while increasing sustainability.

Bechtel shares its customers' commitment to achieving their decarbonization targets and is providing focused engineering solutions through the *Bechtel-KMGP JV* engineering team.

About Bechtel:

Bechtel is a trusted engineering, construction and project management partner to industry and government. Since 1898, Bechtel has helped customers complete more than 25,000 projects in 160 countries that have created jobs, grown economies, improved the resiliency of the world's infrastructure, increased access to energy, resources, and vital services. The company serves the Infrastructure, Nuclear, Security & Environmental, Oil, Gas & Chemicals, Mining & Metals markets. Bechtel has participated continuously in Engineering and Construction of Oil and Gas Projects in Kazakhstan since 1993. **www.bechtel.com**

About KMGP:

KMGP is an engineering company with extensive experience in design of plant facilities for clients from the oil and gas sector. The company has been actively present on the market since 2008. To date, KMGP has completed more than 200 projects mostly for the oil and gas industry. Amongst its clients are the largest oil producers in Kazakhstan. KMGP engineering services are mainly to develop studies, work packages and drawings during Concept, Pre-FEED, FEED and Detailed Design, involving other project phases during lifecycle. **www.kmgp.kz**

USING AI TO UNLEASH THE POWER OF UNSTRUCTURED HSE DATA

by Laurent Abou Gabrayel, Client Relationship Manager Middle East/Caspian Region, Lloyd's Register
Elena Prekopova, Digital Innovation Director Lloyd's Register

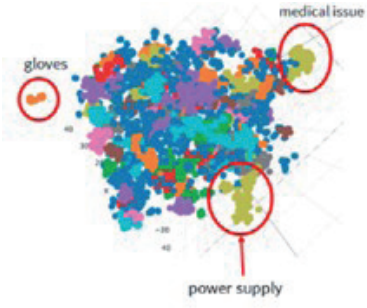
Too Much (HSE) Information

Analysts working in *Health, Safety and Environment (HSE)* departments of big corporations spend a significant amount of time collecting and processing massive amounts of data from a variety of sources - incident reports, near misses, observations, insurance claims and audits - with the goal of prioritising potential campaigns to yield improvements to HSE performance. Yet extracting knowledge and actionable insight from this data remains a challenge.

Typically, organisations have different systems holding different pieces of the 'big HSE picture' in a variety of different formats, making every attempt to derive data-backed insight a serious undertaking and a daunting prospect. Furthermore, even if this data is brought together successfully, what happens to all the new information that is collected from that point on? What happens when a new system is brought in, or different businesses are merged?

Moreover, analysts are typically only able to see the 'tagged' data (or structured data) such as business entity, incident dates and type of incident. What happens to all the richness that 'hides' within the descriptive or free text sections of reports? Are there themes or topics that tell a story? Our research shows that between 20%-40% of the HSE data organisations hold is tagged as 'Other' (ie. no clear type of hazard). This leaves the organisation blind to a large portion of the insight which can hold the key to mitigating risk and yielding improvements to HSE performance.

'Listening' at scale (just add AI)



Topic modelling clusters

Lloyd's Register's mission was to open a door to deep, actionable HSE insight and this is where *Artificial Intelligence (AI)* and *Natural Language Processing (NLP)* come in. *LR SafetyScanner* utilises these technologies to analyse written text (incident descriptions, audit reports and insurance claims descriptions), parsing it for themes/ topics and hazards. This can then be used for further analysis.

The AI works by turning the natural language text into rich mathematical data or 'vectors'. With data analytics techniques, similar incidents can then be clustered into groups of hazards or topics. The system's ability to spot patterns across different phrasing and context used in the text enables the application to easily cluster, filter and visualise what is really going on around the organisation, no matter the variety of units inputting incident data or the formats in which it is stored. In simple terms AI and NLP are allowing machines to have a human-level understanding of natural language text.

What this means for organisations and analysts is that they can now get a single version of the truth, without having to collect, cleanse & organise large volumes of data, or train personnel to change their behaviour when inputting data into a system - they can simply use natural language. Organisations can therefore gain immediate insight into a variety of HSE indicators. *SafetyScanner* was designed to be system agnostic, so no matter what tool an organisation may be using they don't need to embark on a big IT project to derive value.

So how does this work in practice? The following examples show how applying AI and NLP through *SafetyScanner* can uncover different levels of insight.

Global Incident Hazard Themes

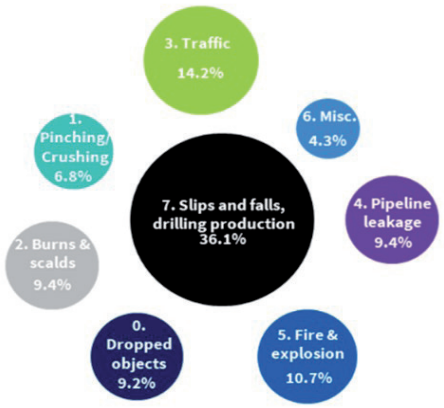


Figure 1: O&G client incident hazards

A Fortune 500 oil & gas client was collecting vast amounts of HSE data. However, the sheer volume of data coupled with the variety of systems they used in-house made it difficult to analyse at scale. As a result, the majority of analysis was performed manually which produced limited insight.

SafetyScanner was able to read through the entire database and produce a clear picture of their main hazard themes globally, at the heart of which was the hazard category of slips and falls, within their drilling production operation (36.1%)

Hazard Direct Causes

The next level of insight is to generate correlations between topics and the causes commonly associated with them. Once the core hazard theme was identified, the company was then able to drill down to identify the direct causes of this hazard and take preventive action.

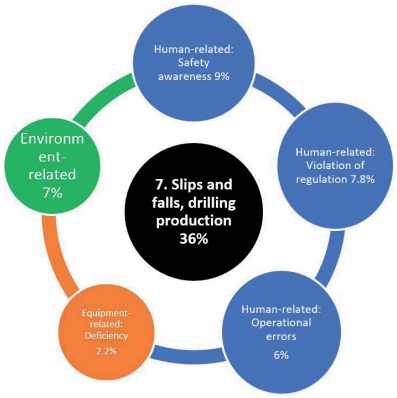


Figure 2: O&G client direct causes

What do people 'say'?

Similarly, a top tier marine operator had collected a large amount of observation data in natural language which had been sitting unused. *SafetyScanner* was able to identify that the biggest portion of HSE observations collected across their container yards were 'driving related'(24%).

Within this the operator could then identify, by volume, the related topics such as 'unsafe driving behaviours', 'external drivers' and 'traffic issues'. Drill down a level further and they could uncover the key phrases hiding within the cluster of reports ('unsafe speed', 'smoking', 'opposite direction' and 'running stop signs').

As a result the terminal operator's HSE management can now benchmark internally, initiate education campaigns and measure performance based on the newly uncovered risk indicators.

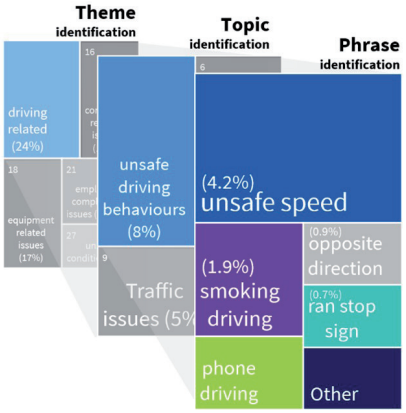
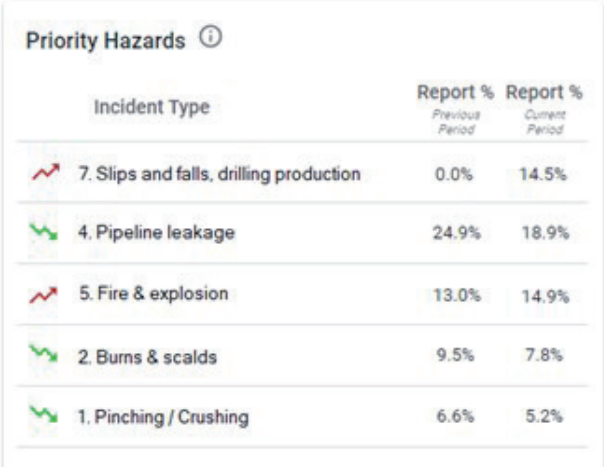


Figure 3: Global Marine Terminal Operator - uncovering insights from observations

Identifying trends

Trend information can also be generated by the AI engine, flagging increases or reductions related to specific incident types and topics to the HSE manager, allowing them to take corrective action to address issues that are on the increase.



Priority Hazards

Incident Type	Report % Previous Period	Report % Current Period
7. Slips and falls, drilling production	0.0%	14.5%
4. Pipeline leakage	24.9%	18.9%
5. Fire & explosion	13.0%	14.9%
2. Burns & scalds	9.5%	7.8%
1. Pinching / Crushing	6.6%	5.2%

Collaboration for the future of HSE Tech

So what's next on the horizon for AI and NLP technology and its application to HSE? One example is how to assess incident 'severity' from text, which is even more challenging than analysing the topic and hazard. To this end Lloyd's Register is collaborating on a project with the *UK Government Health and Safety Executive* program *'Discovering Safety'* to develop a new dimension of analytics – severity scanning – that will further map an organisation's data and identify the severity of incidents at the click of a button. We are also working to extend the technology capability into root cause analytics and incident prediction.

It seems we are only just starting to unlock the power of NLP technology and its application to improve health and safety outcomes. The future is bright.



CAC KAZAKHSTAN – SAFETY FIRST AND CLIENT SATISFACTION: DRIVERS FOR HIGH QUALITY SERVICES

CAC Kazakhstan is your reliable partner in the energy industry. CAC has been operating across Kazakhstan for 28 years with the first contract signed back in 1993.

From deep water platforms to remote oilfields, Oil and Gas companies are subject to a number of risks, which makes safety their major concern. The distance from dry land, extreme weather conditions and limited physical space make offshore operations particularly difficult. When hundreds of people live and work on an offshore base, the isolation, intense workload and lack of privacy can make living conditions complicated if proper organisation and strict safety rules are not applied at all times.

Being committed to providing appropriate solutions to Oil and Gas clients in a safe, sustainable and cost-effective manner while respecting the local environment and the highest ethical standards, is CAC Kazakhstan's driver as an integrated services company.

In December 2018, CAC Kazakhstan was awarded the NCOC turnaround contract to provide catering services for 5,000 meals a day and to manage 4 equipped restaurants/ tents. In addition, CAC Kazakhstan supplied 400 office stations in 100 containers to meet the needs of this operation.

"Thanks to our extended experience in the Oil&Gas and Mining sectors, our teams are capable of providing our clients with high-quality services, delivered safely and under the best conditions possible. Our services are not limited to offshore sites alone: we also provide logistics and supply solutions, as well as services throughout the towing of offshore units from the shipyards to their final destination.

We make a point of respecting and integrating the security procedures put in place by our clients so that they can manage their operations safely and reliably." - **Saman Hamidi, Director of CAC Kazakhstan**

Increasing productivity and delivering high-quality services at the best price while improving quality of life for on-site residents is a real challenge for all the players in the Energy industry. Calling on a partner that offers value-added solutions can make the difference on major projects.

Smart solutions for remote sites

Improving management processes and enhancing the quality of life of residents is possible through innovation. Below are some examples of how CAC brings value to operations.

Menu Engineering to optimize the supply chain

Menu Engineering is a fully automated recipe and menu management system designed to optimize the supply chain by combining standardized recipes and menu planning.

- Menu engineering helps **anticipate purchase volumes and avoid supply shortages**, based on the number of people onboard (POB). It gives access to an effective menu planning and purchasing forecast, as well as an estimation of weekly cost, amount of preparation and amount of waste per meal to consume more responsibly.

- Menu engineering gives **access to a complete recipe dictionary** containing more that 500 international recipes, customizable according to the local culture. Each recipe includes a fully detailed nutritional report with the energetic value of each meal.

- **Allow residents to be fully aware of what they are eating:** thanks to color-coded labels and recipes that include details about allergens, the residents can efficiently choose the meal that fits their diet best or be encouraged to have a better one.

Connected scales for better food waste management

Imagine a smart tool dedicated to better food waste management: connected scales and bins make it possible to define the nature and weight of food waste in the kitchen and in restaurants in order to limit this waste and recover it.

- The connected scale tracks the site's food waste from its creation to its destination. This smart scale makes it possible to collect data such as the nature of the waste, the value, the location on-site, and the way it could be treated (landfill, compost…).

- A daily detailed report of the site's waste consumption provides information about the weight of the discarded waste and its value (in dollars). The platform gives a complete follow-up and clear vision of the site's waste in the long term.

- Data drives clear decision-making and helps the projects implement a sustainable waste management plan. This can either be used as a prevention method to show the quantity of food waste and encourage residents to consume more responsibly, or as a tool to start sustainable segregation and food waste management.

WorkForce Management to manage human resources

The HR module of the global Workforce Management solution offers all of the human administrative management modules enabling best practices to administer, mobilize and develop the organization's resources. The specific functionalities are planning activities, roster management, staff request, scheduling, attendance management, overtime, task management (medical check, induction), talent promotion, disciplinary tracking.

- **FORECAST AND BUDGETING:** Forecasting is knowing how many and what type of staff resources are needed for a particular project at a certain time of the year such as increased seasonal or holiday demand. Budgeting is knowing how much staff the company can afford to have on hand. WFM uses calculated forecasts to optimize staff deployment and balance workload as labor changes.
- **FLEXIBLE SCHEDULING:** Automated staffing based on all business variables, such as vacations, availability, workload and absences
- **TIME & ATTENDANCE:** Tracking time and attendance using WFM tools and processes reveal attendance patterns and helps companies better predict changes in demand and manage planned and unplanned staff absences and/or leaves.
- **PERFORMANCE MANAGEMENT:** Understanding how individual staff members work helps employers reward employees who exceed expectations in a manner that aligns with what they value most.
- **EMPLOYEE PRODUCTIVITY:** Provide daily and monthly reports detailing resident registration records, room occupation charts, camp occupancy forecast.

In addition to quality catering and Facility Management services, CAC provides innovative solutions to meet the expectations of Mining and Oil & Gas clients safety, wellbeing, performance, and efficiency, supporting daily site management and improving quality of life.

CAC Kazakhstan is part of the CIS Group that supports major players in the hydrocarbon, mining, construction, and defence sectors at every stage of their projects, either in urban, industrial, offshore and onshore isolated environments. CIS is present worldwide in more than 20 countries and 220 operating sites.

Today, CAC Kazakhstan is operating on 21 sites in the country and accounts for 2,000 people. CAC is committed to building with their partners a mutual relationship based on trust and solid growth over time.

The only camp management services provider covering 12 regions in Kazakhstan

CAC Kazakhstan has been supporting the major players in the **hydrocarbon, mining, construction and armed forces sectors** at every stage of their projects, in the most isolated urban, industrial, **offshore and onshore environments**.



Around its core business, Catering and Facility Management, CAC has developed **smart4you**, a complete range of **smart solutions for remote sites to bring comfort and safety** to residents, and contribute to the **performance** of its clients through the daily management of their sites.

20
Operating sites

2 400
Employees

99.5%
Local employment

28 years
of operations in Kazakhstan in onshore and offshore sectors

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A HEATED STORY: A BRIEF HISTORY OF HEAT TRACING TECHNOLOGY IN OIL AND GAS APPLICATIONS

by Ilya Krotikov
General Director, nVent Thermal KZ

Despite being an essential function that keeps the world moving, heat tracing remains undervalued in many industries. As the process by which heat is applied to a vessel to replace energy lost to the ambient environment, heat tracing technology is both vital for preventing pipes and equipment from freezing and maintaining a range of fluids at the optimal temperature for manufacture, transportation or storage. As such, there are few industries which rely on heat tracing more than the oil, gas and petrochemical sectors.

Advancements in heat tracing technology have helped drive significant growth in the petrochemical industry over the decades. The evolution of this technology has so far spanned a century, and each point of technological innovation has been spurred on by experimentation and innovation born of vital need.

Safety and efficiency first

In today's oil and gas industry, heat tracing has a wide variety of uses. A major application is freeze protection of water lines, including water supply and steam condensation pipes, wastewater lines and water supply for both fire sprinklers and eyewash/safety shower stations.

Heat tracing is further critical for maintaining the flow assurance of hydrocarbons in pipelines and process equipment. It does so by preventing the formation of solid deposits, such as wax, hydrates and paraffins, which may reduce or block flow entirely. Similarly, heat tracing ensures process fluids such as sulfur, bitumen, acetic acids, biodiesel, phenol and other chemicals are maintained at the correct temperature for optimum viscosity and to prevent a change of state.

The technology is also vital for ensuring winterization of onshore production sites, as well as offshore vessels and platforms. The systems help enforce anti-icing and de-icing of walkways, stairs, and handrails, and can keep a wide variety of critical equipment free of ice, including navigational tools, pumps and antennas.

Heat tracing technology is therefore essential for the safe and efficient operation of many critical processes, undertaken in unusually harsh environments: maximizing industrial productivity by reducing the risk of downtime and ensuring better management of health and safety issues in high-risk settings.

The history behind this technology is long, with electrical heating cables having been around in some shape or form since the 1930s. While the core principals have remained fairly consistent since the early days, heat tracing technology has likewise completely transformed to adapt with the times. To chart the history of this shift, it is important to consider how the industry functioned before these cables ever existed, when steam was the driving force behind heat tracing.

Early 1900s: Steam heat tracing

Steam had been used for heat tracing since the early 20th century. As a by-product of numerous manufacturing techniques, steam had long been seen as a readily available source of heat that cost nothing to derive: working by circulating steam around process pipes to dissipate latent heat.

This is heat tracing at its most rudimentary. Yet steam is still frequently used today, particularly in settings where it is available as a by-product of the core process, for example in power industries. In the petrochemical industry, however, its use has been reduced over time, due to its inherent limitations.

Two major drawbacks of steam tracing are its inaccuracy and poor energy efficiency. The lack of a reliable control method makes the use of steam ill-advised for applications where tight process control is essential, whilst the fact that steam systems remain at a constant temperature (pressure-dependant) often means excessive heat is transferred to a pipeline. Steam tracing systems can also be costly to install and require regular maintenance to prevent abrasion or blockage in steam condensate traps, corrosion and pipe leakages. It became clear that a more effective solution was needed.

1930s: Electric heat tracing

The urgent need for more efficient solutions is what drove the development of *electric heat tracing (EHT).* It was an inventive start, with industry professionals beginning by experimenting with what was available. At this point, mineral insulated cables arrived on the scene. Mineral insulated cables contain copper wires, packed in a sheath alongside powdered minerals, such as magnesium oxide, which provide insulation. Their unique composition ensures the cables have a low flammability, even when used in extreme temperatures and conditions.

However, in the early days of their use, mineral insulated cables could only be controlled in simplistic ways with controllers that were opportunistically adapted from other equipment, making them less than optimal in terms of safety and accuracy.

There was only one potential safety issue – mineral insulated cables were tough in many senses, but could also be susceptible to failure. Their termination points could be damaged by fire or moisture and they were unsuitable

for use with heavy vibrating machinery, which could cause them to crack. Furthermore, the magnesium oxide insulation was hygroscopic, with a tendency to draw in moisture which could cause electrical leakage.

1950s: Enter mineral insulated resistance heating cable

While the name may be only marginally different, mineral insulated resistance heating cables offered major advantages over their predecessors and are still widely used today. These specialised cables are more effective due to their conductors, which are made of a high-resistance alloy. As such, they are able to meet the oil and gas industry's need for specific temperature conditions.

Today, mineral insulated resistance cables remain the most effective solution for applications with high exposure temperatures or where high-power output is required, such as bitumen production, molten salt applications for solar power transfer and preventing condensation in incinerators.

While mineral insulated resistance heating cables may offer more advantages, they also share some of the same limitations as their previous iterations. They remain hygroscopic, due to the use of magnesium oxide insulation and must further be prefabricated and terminated at the factory, which prevents anticipation of onsite conditions and makes it extremely difficult to deploy any last-minute changes. In addition, they cannot be overlapped, which means installation of complex piping systems is a challenge.



Figure 1. *Electrical heat tracing (EHT) cables offer an efficient alternative to steam tracing*

1960s: Skin-effect speciality heaters

The next decade brought the arrival of specialised heaters for long-line pipelines. These heating systems are composed of a current-carrying conductor, which is energised at a high voltage and sealed within a ferromagnetic tube. Magnetic inductance then causes resistance heating within the tube, while the charge in the conductor induces a small current, creating the phenomenon known as 'skin-effect' heating. While highly efficient, the skin-effect strategy is only effective in long-line unbranched pipelines that run for 1 – 25 km (1 – 15 miles), unsuitable for smaller circuits.



Figure 2. *Heat tracing has always been a vital operational and safety consideration for petrochemical applications*

1972: Invention of the conductive polymer self-regulating heat tracing cable

In 1972, radiation chemistry was a young field, and its potential was still being fully explored. The Raychem Corp. (now a part of nVent) was amongst those experimenting with the chemical effects of radiation on various materials, which led to the invention of the self-regulating heat tracing cable. These cables were polymer based, constructed from crosslinked polymers that offered previously unseen toughness, chemical resistance and high-temperature performance.

Inside the core of a self-regulating heat tracing cable, polymer and conductive carbon black create pathways between conductors. As a pipe cools, this conductive core contracts, making room for a higher number of conductive pathways. Conversely, as a pipe heats up, the core expands and limits the number of conductive pathways. As such, there is a lower flow of current between conductors and the cable transmits less power, and therefore less heat, to the pipe.

For the petrochemical industry, this invention became a key milestone, as a result of the major challenges it could overcome. Self-regulating heat tracing cables could be cut to length in the field, as the wattage or metre of the cable was not affected by its total length. When combined with advanced controllers, these cables could also substantially increase energy efficiency.

Self-regulating cables also offered higher levels of safety in hazardous areas as they did not overheat or burn out, were highly resistant to damage and could be crossed over on pipe fittings. Thus, self-regulating heat tracing cables became the first and, at times, only choice in a variety of critical settings within the oil and gas industry and continue to be the most versatile option for many projects today.

1990s: Zone heater developments

A more recent development is the constant wattage zone heater – also known as a parallel circuit trace heating cable

– which is a cost-effective solution offering a selection of the benefits of self-regulating heat tracing cables. Within these cables, a constant wattage alloy is helically wound around an insulating core, which shortens the deployed length of resistance wire.

This is then wrapped around two parallel insulated bus wires which have alternating nodes at regular intervals, constituting a zone of 1 – 5 m (3 – 6 ft). As a result, these zones allow constant wattage cables to be cut-to-length in the field and overlapped, thereby overcoming some of the drawbacks associated with standard constant wattage applications.



1970 – 2000: Controller innovation

The essential technology behind EHT has stayed relatively consistent since 1972, but the controller technology behind it has made significant progress.While self-regulating heat tracing cables can be operated without any kind of external control mechanism, installing a control system enables more precise temperature measurement and higher energy efficiency – which is essential in advanced oil and gas applications.

Heat tracing controllers range from the most basic devices through to highly advanced systems which require expert installation. As the petrochemical industry expands, it has driven a need for ever-more sophisticated control systems that can manage more complex and wide-ranging heat tracing processes. The 1990s for instance, saw the first use of networked computerised controls.

These systems enabled the integration of EHT controllers into distributed control systems (DCS) onsite. For the first time, process engineers had full central visibility of heat tracing processes in real-time, meaning they could react more quickly to problems and adopt a more agile, proactive approach towards maintenance.

Though there have been many stages of controller technology since the 1970s, one particularly noteworthy development is the proportional ambient sensing controller (PASC). PASCs use an intelligent algorithm to measure ambient temperature and run or shut off heating power in response. As such, the level of heat energy transferred is directly proportional to predicted heat loss, thereby maximising both energy and cost-efficiency.

2000 – Today: heat tracing gets smart

Powered by the digital revolution, the world is becoming increasingly connected through smart technology and the Internet of Things (IoT): not only in homes and offices, but also out onsite, where intelligent, responsive control systems are arguably needed most. The latest smart controllers offer insight into heat tracing systems through highly sophisticated, yet safe, remote monitoring. They can be integrated with DCS systems for seamless, intuitive operability, even in the largest, most complex systems.

Smart controllers can calculate required power levels in a variety of contexts with an extremely high degree of accuracy, thereby reducing total operating costs (TOC) and offsetting total installed costs (TIC). Any faults are immediately visible, easy to locate and can be targeted specifically based on severity level, without a blanket need for system shutdown. As such, smart systems enable the highest degree of safety, efficiency and quality – all essential requirements for the petrochemical industry.

2020 and beyond: The future of heat tracing

So, with the history of the technology briefly explored, the question becomes what is next for heat tracing systems? Smart controllers are expected to get smarter as the potential of Big Data and machine learning allow for ever greater levels of assessment and control.

Process engineers can anticipate gaining even greater levels of insight into EHT systems, driven by greater accuracy and increased connectivity. For the oil and gas industry, these developments promise a safer, more dynamic future ahead.

• • • • • • • • • • •

The Raychem brand of mineral insulated heating cables and wiring have led the industry for more than 75 years. Able to withstand extreme, harsh environments, Raychem heat-tracing cables provide the most reliable solution for high-temperature applications.

The nVent entity has been operating in Kazakhstan and the Caspian region since 2004. Local offices in Atyrau, Aksai and Almaty enable nVent Raychem to work closely with the key Oil & Gas operators in the region, providing superior design & engineering solutions as well as project management and procurement. Aiming at the developing of local content, nVent cooperates with local producers and invests in local personnel to deliver premier EHT services to customers.

GE POWERS FORWARD AND IMPACTS THE TRAJECTORY ON CLIMATE CHANGE

Reliable access to electricity is a vital human need, enabling education, healthcare, manufacturing, and transportation. It helps alleviate poverty, extend life expectancy, and improves the quality of our lives immeasurably. Over the past century governments and the energy sector have made huge progress toward the global sustainable development goal of universal access to electricity. However today an estimated 770 million people still lack reliable access, while emissions from combustion of fossil fuels like coal have increased by over 600% and are yet to peak.

With population and consumption growth expected to drive a further 50% increase in demand by 2040, decisive global action is needed to solve the energy 'trilemma' - delivering affordable, reliable, and sustainable energy. The global economic downturn made 2020 an anomaly - power consumption contracted by 5% and emissions by 7%. Smog receded over major cities and nature rebounded, a clear sign of the potential of accelerating low-carbon agendas, echoed in a heightened focus on decarbonization in national energy strategies.

A time for change

Only a structural change in global energy can rapidly impact the trajectory on climate change. Shoulder to shoulder with major energy producers like Kazakhstan, GE stands at the forefront of this energy transition, taking action to help the world decarbonize, and developing and deploying advanced technologies to secure a pathway to a sustainable energy future. This future will be forged by blending highly efficient gas power with zero carbon renewable energy, harnessed by advanced grid and digital solutions.



Leading by example

With 125 years on the leading edge of power engineering and innovation, GE technologies help generate one third of the world's electricity, equip 90% of utilities, while 40% of electricity is touched by our software. This size, scale and expertise uniquely positions the company to drive meaningful change. We lead by example through a commitment to reach carbon neutrality of own-operations by 2030, portfolio evolution including an exit from new-build coal power, and sustained investment in energy transition technologies and project financing, including over $15 billion funding for complex renewable energy projects.

Kazakhstan has announced the concept that will lead the country through its energy transition, including an ambitious decarbonization target of 40% emissions reduction by 2050, and a pathway to 30% penetration of renewable energy by 2030 increasing to 50% by 2050. As the country's long-term partner, with power equipment already deployed in Karachaganak, Kashagan, Aktobe and Tengiz regions, we are ready to rise to the challenge and help build the future of energy in Kazakhstan.

Technology today, a cleaner tomorrow

While 27% of the global energy mix is already produced from renewable sources, green energy technologies have immense untapped potential to help solve the energy trilemma and are expected to account for more than three quarters of capacity additions by 2040. With the sun shining brightly over Kazakhstan for 3,000 hours every year, areas blessed with average wind speeds of 8-10 meters per second, and the natural power of rivers coursing the four corners of the country, Kazakhstan has extraordinary potential in renewable and hybrid energy.



To help realize this potential, GE can offer one of the broadest, most advanced renewable and hybrid energy technology portfolios, including leading solutions for small and large hydropower projects and the world's most advanced onshore and offshore wind turbines.

A driving force of nature

Hydropower is expected to remain the world's largest renewable energy source in the near-term. Centered around the Irtysh River along the Republic's eastern flank, hydropower accounts for the majority of Kazakhstan's renewable power generation today. Studies show opportunities to more than triple this capacity through new projects and rehabilitations of existing facilities. We look forward to participating in these projects, channeling GE's unrivalled expertise from the largest global installed base and experience across Central Asia in rehabilitations of 1.5 GW of hydropower plants.

We are building successful partnerships with countries championing the limitless potential of renewable energy, with a leadership position in US onshore wind and deployments of our highly efficient Cypress onshore wind turbines at projects in Northern Europe and Asia. Offshore, our breathtaking Haliade-X technology will power Dogger Bank Wind Farm – set to be the world's largest and deliver enough power to supply 5 million UK homes.



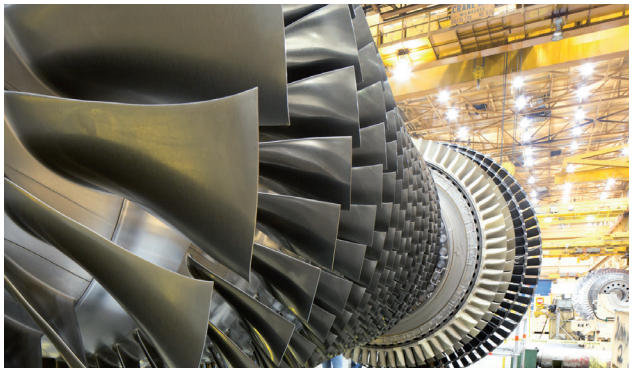
GE is supplying the wind turbines powering the 100 MW Badamsha Wind farm in Kazakhstan's Aktobe region, to cut carbon emissions into the skies over the country and increase its wind power capacity by 25%. Having helped Ukraine, which has similar wind properties, to almost triple wind capacities to 1.2 GW in just five years, GE technologies and expertise can help Kazakhstan build on its early wind success to generate affordable and sustainable power while slashing emissions.

Some renewable energy is intermittent by nature - solar plants only generate power during sunlight hours while wind farms need the wind to blow. As renewable capacities increase, grid balancing solutions like Hybrid Power Plants with integrated energy storage and Peaking Power Plants with aeroderivative gas turbines are needed, to ensure stability and efficiency when dispatching renewable power alongside baseload generation. Innovative GE Reservoir energy storage systems, based on affordable lithium-ion battery technology (BESS), are an ideal solution to offset intermittency and enable greater utilization of renewable sources with grid resilience. In hydropower, we are delivering our leading Pumped Storage solutions for time-flexible energy storage at major hybrid hydropower plants under construction in the USA, Israel, Australia and India. GE's Peaker and energy storage solutions can be deployed throughout Kazakhstan's energy system to great effect.



Step on the gas

Switching carbon-intensive coal power plants to highly efficient gas technologies is another key driver of the energy transition. With less than half the emissions of coal, natural gas is the key energy source for flexible and dependable baseload generation. GE has helped cut the US power industry's carbon footprint by 33% since 2007 through coal-to-gas switching. As the largest consumer of energy in Central Asia with mainly carbon-intensive coal-based power generation, switching to highly efficient gas technologies is a critical step if Kazakhstan is to meet its energy transition and decarbonization targets.



GE is the global leader in gas power technology. Our 9HA.02 heavy duty gas turbine is one of the world's most powerful at ≤838 MW, delivering record-breaking efficiency while driving down emissions at power plants across the globe. We are ready to help Kazakhstan leverage its natural gas reserves and rapidly decarbonize using GE's advanced HA and FA technologies. They serve at key generating facilities in the region today, including a 9HA.01 gas turbine with advanced digital capabilities at Kazan TPP-3 in Tatarstan, where construction of Zainskaya power plant based on the latest 9HA.02 turbine is also underway, and combined cycle equipment for Tashkent TPP in Uzbekistan which features an advanced 9FA gas turbine.

A spark for progress

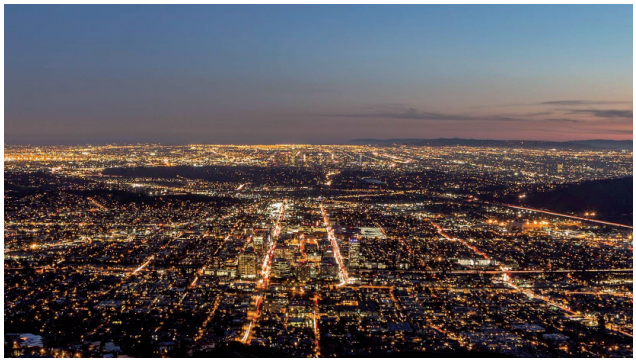
Hydrogen is critical to securing the 2°C pathway on climate change, with green hydrogen production able to deliver carbon abatement of 10 gigatons by 2050. GE is the world leader in combustion technology, with 30 years' experience and over six million operating hours using blends of natural gas and ≤95% hydrogen, and our technologies will play a leading role in making clean, cost-effective production and consumption of green and blue hydrogen a reality. Thousands of fuel flexible GE heavy-duty and aeroderivative gas turbines can already be powered by a hydrogen blend, and we can adapt turbine combustion and other plant systems even after extended service. The latest combustion system for our HA turbine technology can operate on ≤50% hydrogen today, with a pathway to pure hydrogen by 2030.



Leveraging our technologies and Kazakhstan's gas reserves, energy sector infrastructure and expertise, and renewable energy potential can empower the country to become a contender in the emerging hydrogen fuel market, to help meet its own energy needs and for export.

It's all in the mix

For any national power system - it's all in the mix. By way of comparison, the combined power of the most advanced hybrid car engine won't get you to your destination if horsepower is not properly harnessed, or the driver lacks a steering wheel and gearbox. The key tools that provide connectivity and control in power systems are grid equipment and advanced digital solutions for power transmission, distribution & management. This includes physical infrastructure, as well as digital grid and power plant technologies, such as digital substations and digital twins. These technologies are vital to maintaining a stable, balanced grid, and building an efficient and sustainable mix of generating sources.



Today Kazakhstan's thermal plants are mainly located near coal mines in the North, with hydropower concentrated in the East, leading to significant transmission losses. This creates huge potential for efficiency enhancements by deploying advanced grid and digital solutions to help shift the Republic's energy system fully into gear. GE has already supplied grid technologies for Pavlodar, Ekibastuz SDPP-1, and Ekibastuz SDPP-2 power plants and the MNES-1, North-South, and North-West power line projects, and is ready to help Kazakhstan build a lower carbon power system designed to meet the varied needs of a 47% rural population, the industrial North, and residents of major cities like Almaty.

Leading the transition

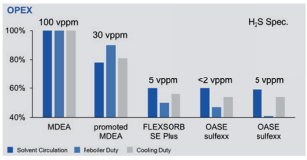
Strong potential in zero carbon renewable energy and highly efficient gas power gives Kazakhstan a solid foundation to accelerate its decarbonization and meet growing energy demand. Early renewable energy successes and regulatory reform send out a strong statement of intent. GE is on hand today with the vision and full portfolio of energy technologies Kazakhstan needs to leverage its potential in pursuit of the laudable targets of decarbonizing by 40% and reaching 50% renewable energy penetration by 2050.

It's now all in the mix for Kazakhstan to become a leader of the energy transition in Central Asia and build an affordable, reliable, and sustainable energy future for its people. Decarbonization and solving the energy trilemma are perhaps the greatest legacy we can build for our future generations.



BASF DRIVES SUSTAINABLE SOLUTIONS

by Larisa Guro
Business Development Director
BASF Russia/ CIS



In line with global trends, Kazakhstan is taking action to address climate change at the government and business levels. On December 12, 2020, on the anniversary of the *Paris Agreement* signing, at the virtual *Summit of Climate Ambitions* organized by the UN Secretary General, Kazakhstan's President, Kassym-Jomart Tokayev said:

"*Over the past 30 years, we have greatly advanced in terms of development. However, our economy relies on fossil energy, and so Kazakhstan has no other choice but to concurrently solve two tasks: shifting the economy from fossil fuel and combatting climate change at the same time*."

In line with this statement, President Tokayev announced that Kazakhstan would achieve carbon neutrality in 2060.

This target will require adoption of a long-term strategy to decrease emissions and decarbonize Kazakhstan's economy, which should drive the country towards carbon neutrality. Kazakhstan is the only country in Eastern Europe, the Caucasus, and Central Asia where the emission trading system has been launched. The next step is adopting an emissions monitoring, reporting and verification system with an emissions tax.

Kazakhstan strives to be true to the key factor of modern development - sustainable development based on harmonization of environmental, social, and economic components. That is why Kazakhstan has adopted its new *Environmental Code* which will enter into force on July 1, 2021 and is aimed at applying the best practices from the *Organization for Economic Cooperation and Development (OECD)* countries.

The need for environmental law reform was substantiated by an in-depth analysis conducted by OECD experts, where one of the four key factors for successful mid-term development of Kazakhstan is improving environmental regulation effectiveness, bringing current legislation into line with OECD approach criteria, and implementing best practices of the Organization's member countries. An important point in the Code is stresses that Kazakhstan's enterprises will shift to a complex environmental permit based on using the best available technologies.

Such state initiatives, as well as increasing awareness among consumers and access to the best global practices, promote sustainable business development in practice in Kazakhstan. A growing number of companies are introducing ecofriendly principles into their strategies with varying success. Since sustainable development ideally covers all aspects of business activities, successful introduction of related practices requires a systematic approach. BASF treats sustainable development as the basis of its strategy, formulating its basic principle as "*We create chemistry for a sustainable future*". BASF not only produces as many environmentally friendly products as possible but is also ready to share its expertise with business.



The BASF commitment to creating a sustainable future and improving the quality of people's lives is embodied by projects to harmonize the economy and the environment and is just one of the tools of an integrated approach to climate protection implemented by the group. The success of this approach will be aided by a special carbon footprint management program comprised of three key areas: *improving energy efficiency of production facilities, developing new technological processes,* and *increasing the scope of using renewable raw materials*.

Thus, in March 2021, BASF announced even more ambitious goals on its way to climate neutrality and adopted a decision to achieve zero emissions by 2050. Relying on the latest developments in low-carbon and carbon-free technologies, the company has also significantly reinforced its mid-term goal to reduce greenhouse gas emissions by 2030. To achieve the new climate goal, BASF plans to invest up to 1 billion euros by 2025 and an additional 2-3 billion euros by 2030.

In 2018, BASF's global emissions were 21.9 million metric tons of CO2 equivalent. In 1990, this figure was around twice as high. Thus, the new target for emissions in 2030 implies their cut by about 60% as compared to 1990 level, which exceeds the EU's target of minus 55%.

"*The new climate goals emphasize BASF's commitment to the Paris Climate Agreement. Climate change is the greatest challenge of the 21st century. We need to adapt our business processes and product portfolio, a transformation that needs to be accelerated. We will*

focus on the first, rather than the final steps of this path: the group will more actively utilize renewable energy sources. We will also accelerate the development and implementation of new carbon-free processes for the chemicals production. Thanks to transparent processes that enable systematic and consistent reduction of the carbon footprint of BASF products throughout our value chain, we help our customers reduce the carbon footprint of their own products," Martin Brudermueller, BASF Board Chairman.

When speaking about increasing the process and energy efficiency of production cycles, we should note that chemical production is very energy intensive. However, BASF manages to cover more than 70% of its own electricity needs by means of 25 gas turbine plants operating in heat and power mode. Unlike standard thermal power plants generating electricity and steam, such cogeneration plants are extremely efficient and successfully used on industrial scale, saving almost half of the steam and fossil fuels consumed.

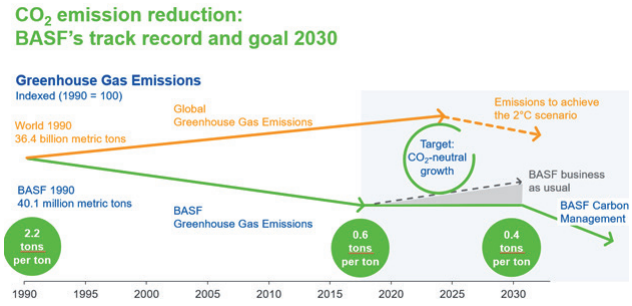


Fig. 1. Absolute greenhouse gases emissions

BASF contributes to reduction of greenhouse gas emissions by improving its own energy generation processes and creating specialized solutions in the field of catalysts. One such example is highly effective additives to cracking catalysts for reducing the nitrogen oxide emissions, a process used in many oil refineries, including in Kazakhstan. Also, BASF's sour gas treatment technology *OASE®* is utilized in natural gas projects, contributing to energy efficiency and reducing emissions.

The second element of the program is designing fundamentally new production processes with a low level of CO_2 emissions. In the chemical industry, nearly 70% of the greenhouse gas emissions are from production of two substances: hydrogen and methanol, crucial intermediary products for many chemical value chains. At BASF, hydrogen serves as a raw material for ammonia production. Moreover, hydrogen is increasingly in demand for innovative methods of safe energy transfer and storage.

Supported by the *German Federal Ministry of Education and Research*, BASF and its partners are working on a new process of CO2 emission-free hydrogen production from natural gas. The project's technical feasibility has already been confirmed at the laboratory level with pilot testing to start before the end of the year. The new technology produces granular carbon, which is not in the list of hazardous substances and can be stored for a long time, instead of unwanted CO_2 emissions. It has many applications, especially a high-purity solid carbon. The aluminum, steelmaking, tire and construction industries are among the possible consumers.

An environmentally safe methanol production process is another promising technology that BASF is currently working on. The goal is not just to reduce CO_2 emissions, but to eliminate them throughout the process. For this to occur, the conventional synthesis gas production as part of steam and autothermal reforming is replaced with partial oxidation of natural gas. A fundamentally new solution has been found for work with effluent gas flows.

The BASF method assumes burning them with pure oxygen with further removal of CO_2 from the stack gases using gas purification processes developed by the group. Moreover, an application has been found even for the captured CO_2: carbon contained in it will be used for methanol synthesis. The project's industrial implementation, according to the developer team, is a matter of the next decade; however, the key elements of the process are already being tested.

Another highly promising area is creating methods for emission-free production of olefins, the main intermediate petrochemical products. Using methane instead of naphtha as a raw feedstock can ensure a significantly lesser environmental impact. It has a higher specific heat and contains more hydrogen, hence the methane combustion products are less harmful.

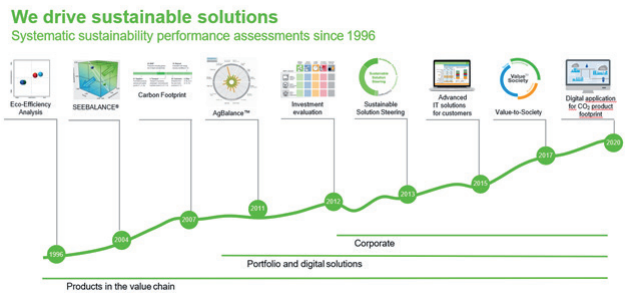


Fig. 2. BASF's sustainable solutions since 1996

The third component of the emissions management program is raising the share of renewable energy sources. The olefin production process can become CO_2-neutral if a reformer is powered by electricity generated by renewable sources. A team of BASF specialists is working on a concept of an electric-heated steam cracker, which will allow to reduce carbon emissions by 90%.

As mentioned above, thanks to its efforts, BASF has already managed to reduce CO_2 emissions by 50% in the period from 1990 to 2018, and that with almost 400 production sites around the globe at the time and with doubling the product output. The company aims to be able to know the carbon footprint of each of its 45,000 product items and work to minimize it. The solutions described above demonstrate how the sustainable development principles help the chemical company to create solutions relevant for the global market and harmonizing the economy and ecology of wide-range production cycles.

Companies that are the first to firmly pursue this path will draw attention to their initiatives and gather like-minded allies, laying a solid foundation for further business success combined with environmental care and social accountability. Kazakhstan's companies have access to the best practices from global leaders in the field of sustainable development, which have already proven their effectiveness. BASF experts are also ready to share their experience with customers and partners in our country.



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SUMMARY

BASF and ExxonMobil have jointly developed OASE sulfexx solvent technology in order to efficiently remove hydrogen sulfide and meet tighter emissions regulations. The lower energy requirements may help refiners and gas processors to reduce their carbon footprint. In the field of selective H_2S gas treatment, the technology is suitable for low and high pressure applications. The solvent shows superior performance characteristics over generic and promoted MDEA formulations, as well as sterically hindered amines such as FLEXSORB SE and SE Plus.

After extensive lab and pilot plant tests at multiple sites, OASE sulfexx was deployed in a commercial TGT unit. Initial results from the commercial trial confirms the selectivity and energy advantages over FLEXSORB SE. BASF and ExxonMobil are continuing efforts to test and improve the technology.

OASE® sulfexx™ is a highly energy efficient gas treating technology jointly developed by BASF and ExxonMobil to help refiners & gas processors achieve sulfur removal targets while reducing their carbon footprint. The key to the technology is a new proprietary amine that can achieve high selective removal of H_2S while minimizing the co-absorption of CO_2. Selective treating permits full utilization of the solvent for greater H_2S absorption, thereby reducing circulation rate and increasing energy efficiency.

This article will compare the performance of this new solvent technology with other solutions currently available on the market today, including MDEA formulations and FLEXSORB™ SE/SE Plus.

*** Internal BASF study using OASE Connect design and simulation tool.**

OASE is a registered trademark of BASF
FLEXSORB is a trademark of ExxonMobil
Sulfexx is a trademark of BASF



INTRODUCTION: THE CHALLENGE

The world needs energy to support growing population and rising living standards. The removal of H_2S is an essential processing step in the production of clean fuels to satisfy future energy demands. As new fuel sources are being explored, more stringent regulations on SO_2 emissions are being implemented around the world. Many countries are intensifying efforts to lower carbon dioxide emissions to meet Paris Climate Accord commitments. One way to reduce carbon footprint is to reduce energy consumption and to use more sustainable technologies.

Regulations such as IMO-2020, as mandated by the International Maritime Organization, have resulted in the largest sulfur content reduction of a transportation fuel taken at any one time. Some refiners will revamp their facilities to meet these new regulations, while others will look toward processing less costly sour crudes in order to increase profitability. Improved technologies are needed to handle the increased sulfur loads on existing sulfur complexes.

Natural gas fields with compositions that were once deemed uneconomical or technically challenging to develop are now being re-evaluated as potential new sources of supply. Obviously, processing gas with extremely high levels of H_2S would necessitate the need for higher capacity solvents. At the other end of the spectrum, processing gas streams containing low concentrations of H_2S relative to CO_2 will require advanced solvent technology to enrich the acid gas feed to the sulfur recovery unit. High quality acid gas feed enables stable operation of the sulfur recovery unit and reduces the fuel consumption of the process.

Industry can expand to meet future demands and changing regulations by adding more equipment. However, this is expensive and may not lead to a reduction in emissions. Older technologies such as generic MDEA are less efficient for highly selective H_2S removal because of the capacity limitations of the solvent molecule.

A better alternative is to use a more advanced energy efficient solvent to minimize modification of the existing equipment. For grassroots projects, the new technology will lower initial capital investments due to smaller equipment size and lower operating costs.

BENEFITS OF SELECTIVE TREATMENT

OASE sulfexx exhibits superior performance characteristics over generic and promoted MDEA formulations, as well as sterically hindered amines such as FLEXSORB SE and SE Plus. The solvent is suitable for low pressure applications and even for selective high-pressure applications. The technology is suitable for use in Claus tail gas treating (TGT), acid gas enrichment (AGE), and high pressure acid gas removal (AGR) units where selective removal is required.

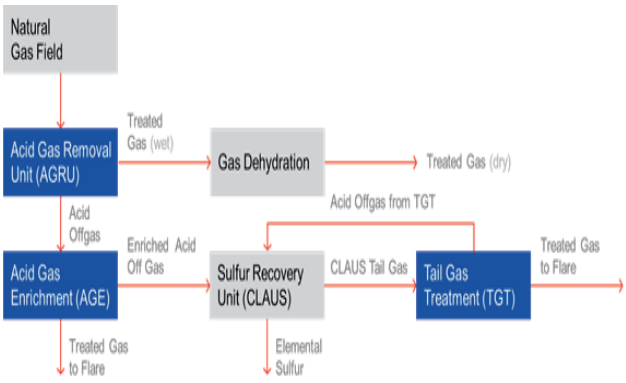


Figure 1. *Selective treatment in gas processing*

The new proprietary amine is specifically tailored to maximize H_2S absorption in the presence of CO_2. This property allows the solvent to achieve high H_2S cleanup and selectivity at low solvent circulation rates. In grassroots units, this leads to substantial savings in investment and operating costs. In retrofit situations, the technology may be used to debottleneck the unit and achieve lower sulfur emission targets or allow the unit to achieve higher throughput with minimum hardware modifications.

In both cases, the solvent improves the quality of the acid gas. Figure 2 highlights the areas of the amine unit where the technology can provide benefits.

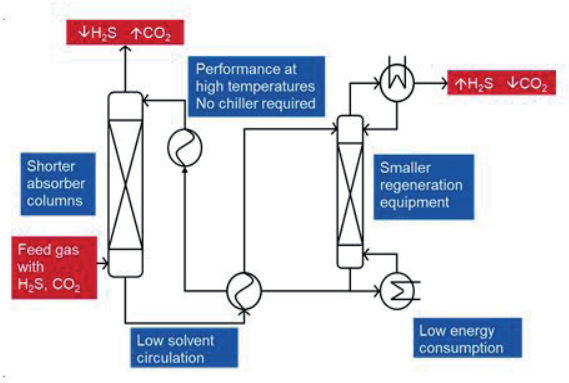


Figure 2. *Benefits of selective H_2S treatment*

To illustrate the benefits of the new solvent, Figures 3 and 4 compare the performance of generic MDEA, promoted MDEA, and FLEXSORB SE Plus against OASE sulfexx in a typical TGT unit. These results were calculated using the OASE Connect design and simulation tool developed by BASF.

The feed gas to the TGT unit contains 2 vol% H_2S and 10 vol% of CO_2 at slightly above atmospheric pressure. The lean amine temperature is set at 113°F (45°C). The feed gas flow is the same for all four cases. The results are normalized against generic MDEA. At these conditions, OASE sulfexx exhibited high H_2S absorption capacity and selectivity relative to the alternative amine solvents. These features translate into lower operating and capital expenditures (OPEX and CAPEX). For example, compared to MDEA, the new solvent reduced the circulation rate by 40% and the energy consumption by over 50%. (Figure 3)

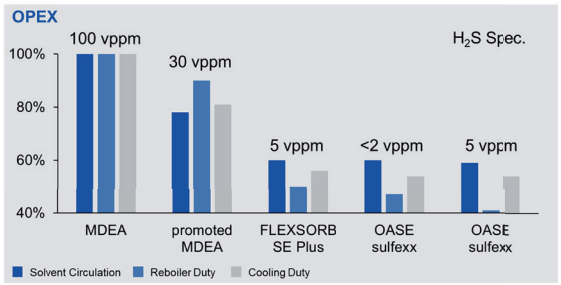


Figure 3. *Comparison of relative operating costs*

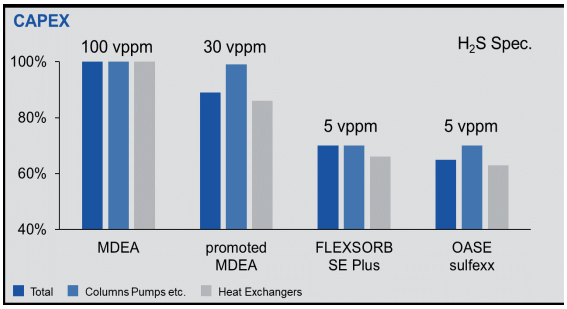


Figure 4. *Comparison of relative capital costs for equipment*

Figure 4 shows the relative equipment costs for the TGT unit. The total estimated CAPEX for OASE sulfexx is about 30% less than MDEA. The cost of cooling is particularly important to gas processing facilities located in hot, arid regions of the world. For instance, an increase in lean amine temperature will impact CAPEX and OPEX significantly depending on the cooling medium. In locations where access to cooling water is limited, the use of air coolers will require higher CAPEX in exchange for lower OPEX. However, once additional propane chilling of the solvent becomes necessary, OPEX and CAPEX can easily rise by 3 to 5 folds. OASE sulfexx technology can be operated with lean amine temperatures that exceeds 131 °F (55 °C). The inherent heat tolerant properties of the solvent avoid costly investment and operational expenses associated with additional chillers.

COMMERCIAL DEMONSTRATION

The sulfur train at a North American refinery consists of two Claus sulfur recovery units with one common TGT unit. The TGT unit is an original FLEXSORB SE design by ExxonMobil that was commissioned in 2010. Assuming 93% overall end-of-run recovery in the upstream SRUs, the FLEXSORB SE TGT unit was designed to achieve less than 250 ppm H_2S in the absorber overhead under all operating scenarios. The combined tail gas from the SRUs is sent to a hydrogenation step followed by a quench tower and then the FLEXSORB SE TGT unit. The feed to the TGT unit contains approximately 2 vol% of H_2S and up to 7 vol% of CO_2. Just prior to the solvent swap to OASE sulfexx, the absorber outlet had an average of around 10 vppm of H_2S.

OASE sulfexx fits into the refinery's strategic plan to reduce their carbon footprint. The goal of the field trial was to improve the energy efficiency of the site by reducing the regenerator reboiler steam consumption.

The FLEXSORB SE solvent was swapped to OASE sulfexx solvent during a very short three day turnaround. The system was drained and refilled with the new solvent. Prior to the swap, detailed gas analysis was performed by a third party testing service. Baseline data were obtained on the feed, treated and stripper acid gas streams to confirm the material balance. The gas analysis also served to confirm online analyzer measurements. The analyses were then repeated during the OASE sulfexx performance test. The baseline data showed a very good fit and reproducibility.

During the initial days of the trial, the unit was run at different circulation rates and reboiler duties. As the trial progressed, solvent circulation and steam rates were adjusted to ensure that the performance was acceptable throughout the entire operating envelop. During these adjustments, the H_2S level was well below the 50 vppm maximum limit set by the test plan. These changes to the flowrates are reflected in the far left quadrant of Figures 5 and 6.

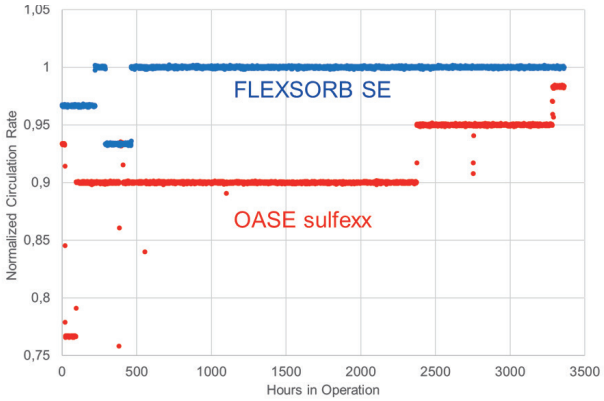


Figure 5. *Normalized* solvent circulation rate*

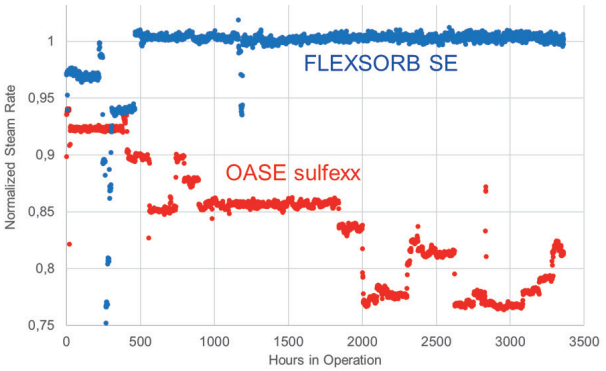


Figure 6. *Normalized* reboiler steam rate*

*(Normalized by dividing both FLEXSORB SE and OASE sulfexx rates by typical FLEXSORB SE rate)

As a reference, performance data of FLEXSORB SE operating under similar feed gas conditions were overlaid in Figures 5 and 6. These figures show that OASE sulfexx can operate at 90 to 95% of the circulation rate of FLEXSORB SE, and approximately 75 to 85% of the steam rate of FLEXSORB SE.

Similarly, the solvent performance in the absorber was also evaluated. The average results of the tests are summarized in Table 1. With the absorber operating at less than 10 vppm H_2S in the overhead, OASE sulfexx showed improved selectivity over FLEXSORB SE. Tests showed CO_2 slip improvement of 6% above the baseline on average. The high selectivity also reduced the amount of CO_2 in the gas recycled back to the SRU.

	FLEXSORB SE	OASE sulfexx
H_2S absorber treated gas	< 10 vppm	< 10 vppm
CO_2 slip absorber treated gas	~ 85 %	~ 92 %
H_2S in stripper off gas	~ 67 %	~ 81%

Table 1. *Analytical results of the gas streams*

As a next step, BASF and Exxon Mobil are conducting additional tests to further improve and refine the technology.

AUTOMATION TECHNOLOGIES ESSENTIAL IN OIL & GAS DECARBONIZATION

by Konstantin Miller
General Manager, Emerson Kazakhstan

Environmental sustainability is one of the biggest challenges facing our world today. The oil and gas industry has a big part to play in helping to ensure that future generations will inherit a healthy planet, by incorporating environmental sustainability strategies into its business models. According to the *IEA (International Energy Agency)*, indirect greenhouse gas (*GHG*) emissions specifically from oil and gas operations are approximately 5200 million tonnes of carbon-dioxide equivalent, which amounts to around 15% of the energy sector's total GHG emissions.

Oil and gas industry executives are under increasing pressure to make a strategic shift in their environmental sustainability. That pressure is primarily coming from activist investors, increasingly conscious of environmental issues, who are challenging major companies on their climate policies and decarbonization targets. As a result, many majors have already announced plans to achieve net-zero emissions by 2050, relating specifically to emissions from producing, refining and processing oil and gas.



To achieve those targets, the industry must consider a range of options, but changes to processes and minor adjustments that help companies reduce their energy consumption and emissions offer the lowest cost and maximum benefit. Equipment performance and reliability are two key areas that can be addressed.

Gas flaring

Gas flaring to relieve pressure during normal operations is a significant source of GHG, and this can be exacerbated by non-routine flaring caused by the poor reliability of devices such as control valves or compressors. To prevent this, organizations can implement predictive maintenance strategies and condition monitoring solutions that prevent unexpected failures.

Increasing vibration indicates problems, such as blade, bearing, shaft, or coupling issues that can lead to compressor failure and a potential unit shutdown. Online compressor health monitoring solutions provide early warning alerts of excessive vibration and bearing wear, allowing technicians to perform scheduled repairs or adjustments that can prevent unexpected downtime that leads to excessive flaring.

These solutions are enabled by wireless sensors and networks that instantly interpret key asset health data, with pre-built analytics giving operators the information they need to make faster and more informed decisions. Similarly, tools such as *Emerson's Plantweb™ Insight* software applications help to eliminate the guesswork for pressure relief valve monitoring. This application provides indication of pressure relief valve releases, including start and end time and production and emissions loss. This continuous monitoring can reduce unplanned shutdowns that impact production, minimize emergency flaring and reduce emissions.



Plantweb Insight applications can instantly interpret key asset health data with pre-built analytics that give operators the data they need to make decisions that impact energy efficiency. The *Plantweb Insight Steam Trap* application determines the online health status of steam traps, helping to reduce loss steam and energy waste, whilst the heat exchanger application provides in-depth monitoring of shell and tube heat exchangers by analyzing plant sensor data and delivering predictive diagnostics that help operators maintain optimum performance and energy efficiency.

These analytics tools extend to pipework corrosion and erosion monitoring, with non-intrusive online applications monitoring the metal thickness, which is a major factor in determining the heath of piping. Changes can be detected in minutes, enabling corrective actions to be performed before damage occurs that otherwise would impact the health of the asset and create the possibility of emissions due to leaks.

Leak detection

Earlier detection of leaks is another area where significant improvements can be made. Ultrasonic gas leak detection devices enable the rapid detection of gas leaks in high

pressure processes, such as pipeline monitoring or gas compressor stations. These innovative solutions use acoustic sensors to identify fluctuations in noise that are imperceptible to human hearing within a process environment.



Unlike traditional gas detectors that measure accumulated gas, ultrasonic gas detectors "hear" the leak, triggering an early warning system. These solutions provide rapid detection response times and can be applied to air cooled heat exchangers, compressor stations, generators, gas metering skids, well bay areas and separators.

Energy monitoring

The deployment of advanced measurement technology and monitoring systems helps manufacturers to not only understand equipment health and performance, but also its environmental impact. Using wired and wireless plantwide digital networks to collect data, real-time energy management information systems can then automate the process of mapping and managing energy consumption across a site, as it is being consumed.

With energy usage measured, operators can receive real-time alerts via user dashboards or emails notifying when energy consumption is above what is expected, actions may be taken to reduce energy costs. Operators know which pieces of equipment are the major consumers of energy in their plant, but using analytics and trending tools to identify reduction in efficiency and increases in consumption over time ensures that the necessary maintenance and improvement programs are put in place.

Energy efficiency

Efficiency is a factor in every part of the industry, of course, but new downstream-specific technologies can make a big difference. Medium-temperature heat pumps in refineries, for example, reduce the amount of primary energy used in distillation. Another area in which major energy efficiency improvements can be achieved for a low initial cost is optimizing the performance of process control loops.

Control schemes are generally designed to keep the process stable and minimize variability, but in many cases this does not happen. In a typical plant, almost two-thirds of control loops are underperforming, which can be due to many reasons, including poor valve performance, incorrect loop tuning and inappropriate control strategy. As a result, huge amounts of energy are wasted because of suboptimal control.

Poor tuning leads to greater process variability. In turn, this leads operators to run the plant away from the most efficient regions, which are typically close to operating constraints, such as quality limits, to allow for a greater margin of error. Despite this, many facilities do not have a formal, consistent approach to troubleshooting, and the root causes of issues can therefore go undetected for weeks, months or even years.

Emerson is addressing this issue by providing a range of tools and services that can help achieve significantly better control performance. Among these is the *DeltaV Loop Service*, which is designed to optimize system reliability and performance. The performance of every control loop is measured and a control performance score indicates how many control loops have limited control, high variability, uncertain inputs, or are not in the normal operating mode.

Control performance experts, working remotely, provide monthly reviews of control performance, identify issues, make recommendations for corrective actions and establish a control performance roadmap with prioritization as to the control loops that have the greatest impact on the bottom line. This aims to maximize the number of automatic and well-performing control loops, leading to greater product quality and throughput, fewer operator interventions on-site, and increased energy efficiency.

Where there are issues that require more than *PID (proportional integral derivative)* control, Emerson provides advanced control technologies that automatically account for process interactions and difficult process dynamics, and easily handle issues such as excessive deadtime and loop interactions. Employing these advanced control techniques improves product quality by dramatically reducing key process variabilities, increases profitability by operating closer to process constraints and limits, and further increases energy efficiency.

Conclusion

Reducing energy consumption and emissions can be challenging, but the digital transformation of operations can deliver step change improvements. Knowing how to begin this transformation is key, and an approach that begins with a digital maturity model roadmap can help companies get started. This type of assessment enables companies to evaluate their operations against others in their industry as well as determine what operational areas are likely to yield the greatest return on investment.

SCHNEIDER ELECTRIC INCREASES LOCAL CONTENT IN KAZAKHSTAN'S ECONOMY

Schneider Electric, the world's leader in providing digital solutions for energy management and process automation fields explains why the company is interested in increasing Kazakhstan's industrial and export potential of Kazakhstan.

Increasing Kazakhstani content in various sectors of the economy remains one of the most pressing issues on the government's agenda. In early February, the Minister of Industry and Infrastructure Development, Beibut Atamkulov, announced the next verification of tender documents confirming the use of domestic goods, works and services.

The increase in local content should take place in various industries, but oil and gas is one of the most important and capital-intensive sectors of the economy. In a recent speech, Kazakhstan's President, Kassym-Jomart Tokayev, noted that the oil and gas industry is a driving force in attracting foreign investment to Kazakhstan, contributing to the rise of such industries as oil refining, petrochemicals, oilfield services, pipeline and sea transport. Increasing local content in oil and gas projects is also vital. In the President's opinion, the time has come to move from quantitative to qualitative indicators, and for this purpose a *Local Content Development Fund* will be created in Kazakhstan.

The importance of the oil and gas industry is confirmed by the numbers. Following the results of 9 months of 2020, subsoil users in the oil and gas sector purchased goods, works and services for 4.4 trillion tenge. 53% of this total, or 2.3 trillion tenge, goes to Kazakhstani companies.

Schneider Electric, an international leader in energy management, electronic and digital products, and process automation operates in 115 countries of the world with 135 thousand staff. The Schneider global turnover in 2019 amounted to € 27.2 billion. In Kazakhstan, the global brand is represented in 3 offices in Almaty, Nur-Sultan, Atyrau, and a subsidiary of KMG Automation, a warehouse and a training center. In total, over 120 employees work in the Kazakhstan representative offices, 97% of whom are Kazakhstanis.

Within the framework of joint cooperation, Tengizchevroil (TCO) and Schneider Electric have implemented several large projects in the last two-three years. Increasing the share of Kazakhstani content was a priority in almost all of them. Moreover, the plan to increase the level of local content could be implemented either with the transfer of partial or full rights to the production of installed Schneider Electric products to a Kazakhstani enterprise, or preparation of the necessary infrastructure by a domestic company for the project's successful launch.

For instance, during construction of the IOR Korolev Large Scale Pilot (IOR KLSP) project at the *Korolevskoye* field, Schneider Electric supplied 5 substations: 10 kV *MCSet* switchgear, 0.4 kV and 0.69 kV *Okken* switchgears and 2 *Minera* transformers. All buildings and infrastructure for substations were erected by the domestic company *NJSC Energy*.

Similar work was carried out with the participation in the TCO *Future Growth Project (FGP)*. Schneider Electric supplied and installed 2 modular substations, a 35 kV *GHA* switchgear, a 10 kV *GMA* switchgear and a *Trihal* transformer. The Kazakhstani company *PSI* has erected substation buildings and infrastructure.

There are other successful projects as well. In 2020, Schneider Electric localized the production of frequency drives of the *Altivar Process* type in Ust-Kamenogorsk, transferring the license for their production to *Dim-Stroy*. Production capacity - 280 drives with the possibility of expansion.

When replacing the *DMK* oil line, 8 columns of the 0.4 kV *Okken* type switchgear and 8 columns of the 0.69 kV *Okken* type switchgear produced by the Almaty *PF Electroservice* company were used. The license to manufacture this equipment was also awarded by Schneider Electric, whose management understands that knowledge transfer and localization of production supports development of local entrepreneurs and creates jobs.

In July 2019, as part of the project to remove production restrictions on gas (*LPOG*) for Karachaganak Petroleum Operating (KPO), Schneider Electric supplied 5 modular substations to the Karachaganak oilfield (medium voltage switchboard, low voltage switchboard, battery room, HVAC buildings and instrumentation / control room buildings), produced by the *Karasai Machine-Building Plant (PSI Engineering)*. Previously similar modular substations were exclusively produced abroad.

The joint project between *KazMunayGas* and Schneider Electric is noteworthy. In 2015, the two companies created a joint venture - *KMG Automation*. The new joint venture uses local personnel, develops and implements projects for automation of world-class technological processes for various industries in Kazakhstan. First and foremost, this means the oil and gas complex.

In 2018, *KMG Automation* opened a shop for production of Foxboro series pressure transmitters in Atyrau. These are devices that measure pressure, level, and flow rate of any medium in the different industrial and climatic conditions found in the oil industry. The estimated volume of production at stage 1 is up to 2000 units per year. The degree of localization of manufactured products is 60%. In general, *KMG Automation* ensures implementation of projects on a full cycle basis (turnkey) from pre-project survey to post-warranty support.



There are examples of longer cooperation between Schneider Electric and a domestic manufacturer. In 2005, a license agreement was signed with Schneider Electric and *Infraenergo* for production of withdrawable-type primary distribution cells for currents up to *2500A - NEX17kV*.

In 2008, the partner companies signed a licensing agreement for production of a compact cell of secondary distribution *SM6_24kV* at *Infraenergo.* After that, all the necessary documentation was transferred for the purchase of necessary equipment for production of body parts, busbars, checks, and so forth. Training was also organized for specialists from a Kazakhstani company to take place at a plant in Grenoble, France where Schneider Electric produces the same cells for Europe that are exported worldwide.

Schneider Electric across the globe is also committed to create opportunities for development of local personnel and for technology transfer. In November 2019, Schneider Electric launched an educational and training center in Atyrau where TCO employees undergo training. The center's curriculum simulates the operation of the company's equipment used in the oil and gas and other industries in Kazakhstan. This makes it possible to train specialists without sending them abroad. Education in this center is also available for students of local universities. In April 2021, Schneider Electric specialists conducted training for 2nd and 3rd-year students of the Atyrau University of Oil and Gas. They talked about the peculiarities of operating 0.4 kV equipment.

As representatives of Schneider Electric have repeatedly emphasized, education and training of high-quality employees is one of the company's strategic tasks. It is beneficial for competent engineers and specialists to work on high-quality, up-to-date equipment. Moreover, these specialists often become future employees at Schneider Electric itself.

The development of Kazakhstani human resources takes place not only in the training center in Atyrau, but also in three Schneider Electric competence centers, where employees of partner enterprises take courses. The company also cooperates closely with leading Kazakhstan universities*: Nazarbayev University, Nazarbayev Intellectual Schools, Satbayev University, Narxoz, Almaty University of Energy and Communications,* and *Karaganda State Technical University*, because highly qualified specialists are needed not only in the oil and gas industry, but also in many other industries - after all, Schneider Electric cooperates with banks (*Halyk Bank* and *Kaspi Bank*), construction companies (*BI Group*), development (*MEGA*), metallurgy (*ArcelorMittal*) and others.

Schneider Electric specialists have found an integrated approach for organizing the activities of the company's Service Department. Service maintenance of the supplied equipment, its commissioning, including fulfilling warranty obligations, as well as installation supervision and commissioning, are carried out by the best specialists using modern equipment with the latest software.

A considerable part of this work is carried out by Kazakhstani staff who have completed courses of local competencies to improve the knowledge / qualifications of the customer's operational personnel at the Atyrau training center, where highly qualified masters share knowledge and skills by using real equipment and parameterizing systems, thereby allowing the client to effectively use the full potential of Schneider Electric high-class equipment.

Having a strong service ethic focused on continuous development of the competencies of both employees and customers is the company’s important distinguishing feature allowing Schneider Electric to be the most local company among the global ones.

Conclusion

In this way, it can be seen that Schneider Electric in Kazakhstan is not based solely on efforts to develop their own business. The company's management understands Kazakhstan’s goal to increase Kazakhstani content in manufactured products. Schneider management takes this into account at all stages of its activities, each year increasing the share of local content in various areas of production, as well as raising the professional skills of Kazakhstan’s people to work on modern technological processes.

BORUSAN CAT RESPONDS TO COMPLEX ENERGY CHALLENGES

Borusan Cat, the market leader in its operating territories since its establishment, represents Caterpillar® in Azerbaijan, Turkey, Georgia, Kazakhstan, Kyrgyzstan, and Far East Russia with close to 3,000 employees. Borusan Cat is known as one of the world's leading Caterpillar dealers.



Borusan Cat is its customer's solution partner and reliable consultant with its business model. It offers new diesel and gas generator sets, industrial engines, marine propulsion engines, and machinery. The company aims to ensure high customer loyalty by offering solutions tailored to the needs of its business partners with a broad aftersales service network and value-added engineering for turnkey projects in the energy, maritime, and oil & gas industries.

Unique expertise gained in different territories and segments allowed Borusan Cat to complete complex diesel, gas, and petroleum projects in the Kazakhstan region. Strong engineering capabilities, project management skills, and turnkey solutions have been the key elements in Borusan success.

The company is dedicated to creating value for all its stakeholders through solution provider-focused strategic initiatives by offering:

- Co-generation & Tri-generation systems
- Diesel Generator applications
- Control systems
- Drilling rigs power pack supply
- Mechanical drive trains
- Transmission supply and service solutions

These systems support on-shore / off-shore oil and gas facilities, energy facilities, data centers, hospitals, hotels, residential and commercial buildings with an experienced and dynamic team. Borusan will continue investing in advanced technology and digitalization along with a focus on boosting operations efficiency.

Borusan Kazakhstan Energy and transportation department is the only supplier offering wide range Cat customized solutions on electrical power supply and delivering other auxiliary equipment both for primary and backup electricity systems. Additionally, Borusan Kazakhstan provides its customers with highly professional technical support throughout the power unit exploitation.

The company has an extensive network of more than 500 service specialists, 150 engineers and 21 service centers across Kazakhstan with possibility of connection to Cat worldwide service net. Those facilities allow the company to offer its customers comprehensive package of services and effective solutions on electrical power supply based on Caterpillar engines providing reliable source of electricity.

Borusan Cat's Sustainable Path from Biogas to Hybrid Systems

Borusan Cat's installed capacity of the biogas power plant reached 105 MW in Turkey, meeting the electicity needs of 257,000 households annually. All these biogas energy projects are part of our turnkey solutions generated from our extensive engineering capabilities. The projects reached the maximum efficiency and availability level demanded by the customers successfully.

During biogas applications, dangerous methane gas converts into renewable electrical energy with Cat Gas Gensets. To be aligned with our motto, *"We create solutions for a better world.",* the Borusan Cat team is ready to share technical information as well as specific experiences gained from multiple references for Kazakhstan customers to increase environmental awareness and investments.



Increasing the Applications of Hybrid Systems

Hybrid solutions are systems that create energy from diversified renewable energy sources. In such systems, the investor can benefit from solar, wind, and biogas sources simultaneously. Nowadays, renewable systems reached a level that can compete with other fossil fuel power plants. Governments now see hybrid systems as a significant part of their energy strategy.

Borusan Cat focuses on diversifying the sources of renewable energies by integrating solar systems into biogas plants to increase efficiency. The Borusan Cat team, aims to go beyond the expectations in energy solutions parallel with Borusan sustainability goals.

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SUBSOIL USE RIGHTS: LICENSE, CONTRACT OR BOTH?

by Almas Zhaiylgan
Counsel, Kinstellar

Kazakhstan's legislation on subsoil use operations was formed in the mid-90's when the*1995 Petroleum Law* and *1996 Subsoil Law* were adopted. Since then, legislation on subsoil use in Kazakhstan has continuously evolved. Under the above-mentioned laws, to obtain subsoil use rights for extraction of useful minerals, one first needed to obtain a license. Then, on the basis of a license, the license holder had the right to negotiate and enter into a contract with the competent authority.

In 1999 the government decided to simplify this process by cancelling the requirement for a license prior to entering into a contract. In 2018, the Subsoil Code further reformed the subsoil use regime in Kazakhstan by re-introducing the licensing regime (however, this time without the necessity to subsequently enter into a contract) for certain types of subsoil use operations.

Considering all these changes, this article offers a brief historical review of the legislative developments in the sphere of subsoil use. In addition, the article provides an overview of what documents are currently needed to obtain subsoil use rights for various types of operations and how the *2018 Subsoil Code* impacts, if any, the subsoil users who had obtained their rights prior to the code's coming into force.

PRE-1999 REGIME

To date, there are still many entities that operate under subsoil use licenses issued and contracts signed before the license requirement was eliminated in 1999. According to the law in force at that time, provisions of a contract could not contradict the provisions of a license. This meant that terms of a license had priority over the terms of a contract.

For example, if a subsoil user had to extend the term of an exploration period under its contract, it had to first make a corresponding amendment to its license. Only after amendment of the license (which required a government decree), could the subsoil user then formally extend/amend its contract.

This was a cumbersome and time-consuming process. Considering this, the government decided to abolish the licensing regime for subsoil use as of 1 September 1999. According to the law which abolished the licensing regime, all licenses issued prior to that law remained in effect until expiration of their terms, including periods of their extension, and continued to be regulated by the subsoil use legislation in effect prior to abolition of the licensing regime in 1999.

Post-1999 Regime

However, following cancellation of the licensing regime in 1999, many subsoil users faced practical difficulties with keeping their licenses in effect. On the one hand, the law clearly stated that all licenses issued prior to abolition of the licensing regime remained in effect until expiration of their terms. On the other hand, the competent authority refused to acknowledge the existence and validity of licenses. To complicate things further, their position with respect to licenses was inconsistent, as in some cases they agreed to amend licenses but, in most cases, they refused to do so.

Unfortunately, this led many subsoil users to uncertainty with respect to the status of their licenses issued prior to 1999. Even if they wanted to comply with the law (which said that earlier issued licenses were still valid) and wanted to keep their licenses updated, in practice, with few exceptions, it was not possible. Thus, nowadays, those subsoil users mostly rely on their contracts as their primary document to conduct their operations.

2010 Subsoil Law

In 2010 a new Subsoil Law was adopted. The *2010 Subsoil Law* retained the Post-1999 regime, whereby to obtain subsoil use rights it was sufficient to enter into a subsoil use contract. The key difference was that there was no longer a special petroleum law. As such, unlike the prior regime where the *1995 Petroleum Law* regulated oil and gas operations and the *1996 Subsoil Law* generally regulated all subsoil use operations, the *2010 Subsoil Law* became a comprehensive law which regulated all types of subsoil use operations under one general regime regardless of the type of useful mineral.

In practice this meant that, for example, both a company exploring for oil and gas and a company exploring for gold had to comply with generally the same requirements (save for industry specific obligations) and had to operate on the basis of a similar exploration contract.

2018 Subsoil Code

Unlike the 2010 Subsoil Law which regulated all subsoil use operations under one legal regime, the Subsoil Code introduced a completely new regulatory framework. It provided for separate regulatory regimes for different types of minerals, i.e. it established separate norms for subsoil use operations related to extraction of hydrocarbons, hard minerals, uranium as well as commonly occurring minerals. Another new element introduced by the Subsoil Code was a licensing regime for certain types of operations such as geological study of the subsoil, exploration of hard minerals, production of hard minerals, production of commonly occurring minerals, and some other types of activities.

Exploration and production of hydrocarbons as well as production of uranium continue to be regulated through execution of a contract with the competent authority. Below is a brief outline of each regime.

Hydrocarbons

The Subsoil Code no longer stipulates execution of exploration contracts for hydrocarbons but, rather, provides for execution of combined exploration and production contracts (**E&P**) which may contain separate periods, i.e. exploration period, preparatory period (if necessary) and production period. An exploration period may last for up to 6 years, and in case of offshore contracts and complex projects, - for up to 9 years. These periods may be extended for appraisal of a discovery for up to three years and six years respectively.

In addition, at the request of a subsoil user, a preparatory period, which may last for up to 3 years, may be provided. A production period, which will be reduced for the length of the preparatory period, may last up to 25 years, and in case of a large and unique fields, - for up to 45 years. The term of the production period may be further extended for up to an additional 25 years. Importantly, any new contract must be executed on the basis of a standard contract approved by the competent authority.

Subsoil users operating under exploration, E&P, and production contracts, concluded prior to coming into force of the Subsoil Code, had an option to transfer (convert) to the new subsoil use regime introduced by the code. Such options were possible through execution of new E&P contracts based on a standard contract, provided the subsoil users also complied with a number of other conditions stipulated by the Subsoil Code. Any extension of the term of a contract, concluded prior to coming into force of the Subsoil Code is possible only through transfer (conversion) to the new subsoil use regime by execution of a new contract on the basis of a standard contract approved by the competent authority.

As for production sharing agreements (**PSAs**), most of the important new elements introduced by the *2018 Subsoil Code* with respect to previously concluded hydrocarbon contracts do not apply to PSAs due to specific exemptions contemplated by the code. Although a number of PSAs were signed in Kazakhstan in the nineties, under the current legislation it is no longer possible to enter into new PSAs. Previously signed PSAs continue to be in effect.

Uranium

Subsoil use contracts for uranium may only be concluded for production of uranium. However, a production period will be preceded by a period for pilot production, which may last for up to 4 years. The maximum period of a production

Type of Useful Mineral	Document/s Required under Pre-1999 Regime	Document/s Required under Post-1999 Regime	Document/s Required under 2018 Subsoil Code
Hydrocarbons (Oil, Gas, Condensate)	**License** and **Contract** • Exploration License and Exploration Contract; • E&P License and E&P Contract/ PSA • Production License and Production Contract	**Contract** • Exploration Contract; • E&P Contract[1]/PSA • Production Contract	**Contract** • E&P Contract; • Production Contract
Uranium	**License** and **Contract** • Exploration License and Exploration Contract; • E&P License and E&P Contract • Production License and Production Contract	**Contract** • Exploration Contract; • E&P Contract • Production Contract	**Contract** • Production Contract
Hard Minerals	**License** and **Contract** • Exploration License and Exploration Contract; • E&P License and E&P Contract • Production License and Production Contract	**Contract** • Exploration Contract; • E&P Contract • Production Contract	**License** • Exploration License • Production License
Commonly Occurring Minerals	**License** and **Contract** • Exploration License and Exploration Contract; • Production License and Production Contract	**Contract** • Exploration Contract; • Production Contract	**License** • Production License

contract for uranium may be for 25 years, including the period of pilot production. The term may be extended for up to an additional 25 years. Subsoil use rights for production of uranium may only be granted to a national company in the sphere of uranium on the basis of direct negotiations.

Moreover, rights under such uranium contracts may be transferred only to a legal entity in which the national company in the sphere of uranium owns at least a 50% interest. There was no such restriction under the prior legislation. Subsoil users operating under contracts for exploration of uranium, concluded prior to coming into force of the Subsoil Code, have the right to extend the terms of their exploration contracts for purposes of appraisal of a discovery.

Subsoil users operating under contracts for exploration of uranium, concluded prior to coming into force of the Subsoil Code, also have the right to carry out pilot production of uranium subject to the presence of a project of pilot production approved in accordance with the terms of the Subsoil Code.

Hard minerals

In the case of hard minerals (natural mineral formations, organic substances and their mixtures, contained in solid state in the subsoil or above ground), an exploration license is granted for 6 years with a possibility to extend once for up to 5 years. A production licence is issued for a period of up to 25 years with the possibility to extend for up to the same period.

Under the Code, if extraction of a particular hard mineral is not economic or if there are other reasons (e.g. absence of technology or an event of *force majeure*), a holder of a production license has the right to apply for 'retention status' which may last for up to 5 years with the possibility to extend for up to the same period. During such retention period, the subsoil user has the right to not commence or to suspend production operations.

Subsoil users operating under contracts for exploration of hard minerals concluded prior to the Subsoil Code entering into force have the right to extend the terms of their exploration contracts for purposes of appraisal of a discovery or have the right to apply for a production license.

Subsoil users operating under E&P contracts or contracts for production of hard minerals concluded prior to the Subsoil Code coming into force have the right to either extend the terms of their contracts (if such right was stipulated by their contracts) or (if no such right is provided for in their contracts) have the right to apply for a production license.

Conclusion

In the last quarter of a century, Kazakhstan's legislation on subsoil use has gone through significant changes. Thus, to fully understand the nature and status of each license/ contract, it is important to know when and how the subsoil use rights were obtained. The table below summarizes the different regimes that existed before as well as the description of the current regimes. We hope this article will be helpful to anyone planning to obtain subsoil use rights from an existing subsoil user or directly from the state.

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KAZAKHSTAN DEVELOPS A REGULATORY AND LEGAL FRAMEWORK FOR INVESTMENT IN RENEWABLES

by Aset Shyngyssov, Managing Partner
Karina Ilyussizova, Associate
Morgan Lewis Kazakhstan

Kazakhstan continues to develop a regulatory and legal framework to support investments in renewable energy in line with ambitious targets set by the government based on the *Concept for Transition to the Green Economy* dated 30 May, 2013. As a result, the first target of a 3% share of renewable energy in Kazakhstan's total electricity production was successfully met in 2020, and the government confirmed its intention to achieve a 6% share of renewable energy in total electricity production by 2025.

While Kazakhstan already has a relatively developed legal framework for renewables, there are issues that pose challenges for investors and lenders when entering into Kazakhstan's renewable energy sector, some of which are summarized in this article.

The single off-taker

The single off-taker of renewable energy generation is the *Financial Settlement Center of Renewable Energy (FSC),* a subsidiary of the *Kazakhstan Electricity Grid Operating Company (KEGOC).* Given that renewables projects require significant financial resources, investors' main concern relates to a potential delayed payment from the FSC, the solvency and creditworthiness of which highly depends on:

- payments received from the sale of energy to conventional consumers; and
- sufficiency of funds in its reserve account limited to 3% from the amount of the FSC's annual expenses for the purchase of energy from renewable energy producers.

In response to investors' concerns, the *Renewable Energy Law* was amended on December 7, 2020 to provide for financial support by the Kazakhstan government to the FSC if the latter is unable to perform its obligations to pay the renewable energy producers. However, the rules determining the procedure and conditions for state financial support have not yet been approved by the government. The key prerequisites for the state to step in and provide financial support to the FSC as proposed by the *Draft Rules* (currently under public discussion) are as follows *(note: all of these conditions must be met):*

- overdue payment by the FSC of no less than the highest 3-month FSC obligation for previous year;
- lack of funds in FSC reserve account
- failure and/or inability to execute a court judgment on enforcement of debt against conditional and qualified conditional consumers for more than six consecutive months.

It is not yet clear in what form the Draft Rules will be finally adopted and whether the above conditions will remain intact. It appears, however, that the process for receiving funds from the state in support of the FSC could be time-consuming and may result in delayed payments to investors.

Bankability of PPA

Kazakhstan approved the model form of a *power purchase agreement (PPA)* for projects implemented under auction prices. To increase PPA bankability, the Ministry of Energy introduced the following positive developments to the PPA model form:

- *Step-in rights for creditors.* A renewable energy producer that has obtained financing for construction of a renewable energy project from financial institutions secured by a pledge of receivables under PPA must notify the off-taker.

  Serving notice to the off-taker is considered the off-taker's irrevocable and unconditional consent to make payments under PPA directly to a financial institution (lender), to replace the seller (investor) under PPA based on the request of the financial institution (subject to subsequent replacement on the *List of Renewable Energy Producing Organizations),* and to provide information to the financial institution on the renewable energy producer's non-performance of obligations that may lead to termination or suspension of the PPA.

- *IAC as a dispute resolution forum.* Based on a general rule, disputes under PPA are settled by Kazakhstan courts at the off-taker's location, except in cases when a plaintiff decides to take disputes to the *AIFC International Arbitration Centre (IAC).* However, the resolution of disputes in the IAC remains subject to prior consent from an authorized body *(Ministry of Energy)* for execution of an arbitration agreement, which may negate the parties' ability to resolve disputes in the IAC.

Although the PPA model form was improved, investors unfortunately do not have the flexibility to negotiate any provisions not reflected in the model form, including additional protections for changes in law, guarantees and compensations for breach or termination of the PPA, and the possibility of selecting foreign arbitration to settle disputes. These drawbacks make PPA less bankable.

Is the PPA term sufficient to cover investors' costs?

According to recent amendments to the *Renewable Energy Law* on December 7, 2020, the PPA term was extended from 15 to 20 years. Previously, investors raised reasonable concerns that a 15-year PPA is not long enough for the project's viability vis-à-vis costs recovery. However, it is worth mentioning that a 20-year PPA applies only to renewable energy projects for which the PPA is signed as a result of auctions conducted after January 1, 2021 and do not apply to a previously signed PPA.

Are the deadlines set by law sufficient for implementing renewable energy projects? Deadlines for construction and commissioning of renewable energy projects are fixed by law:

- construction must commence and respective notification must be provided to the off-taker within *12 months* (for solar power plants), *18 months* (for wind and biogas power plants), and *24 months* (for hydro power plants) from the date of the PPA signing; and
- power plants must be commissioned and notification must be provided to the off-taker within *24 months* (for solar power plants), *36 months* (for biogas and wind power plants), and *60 months* (for hydro power plants) from the date of PPA signing, with a possible one-year extension if no less than 70% of construction has been completed.

Meeting the above statutory deadlines is very important. Failure to provide notification on commencement of construction within six months upon expiration of the deadline will lead to a loss of 30% of financial security (KZT 10,000/US$24 per kW), while failure to meet the deadline for commissioning of a power plant will lead to the termination of PPA and a loss of 100% of financial security.

Even though the government tends to support investors and has routinely extended deadlines for construction and commissioning of power plants (i.e., initial deadlines were shorter), it is still challenging for most investors to meet deadlines. This is mainly due to the requirement for investors to meet different permitting procedures, which depend on cooperation with the state and tend to be tied up in red tape.

Bottom Line

It is fair to say that Kazakhstan has made significant progress in developing the renewables sector. Local and foreign investor interest to develop and finance renewable energy projects in Kazakhstan is increasing. However, additional improvement of the regulatory conditions will further increase investment in the renewables sector.

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RENEWABLES PROJECTS IN KAZAKHSTAN: ANY GUARANTEES AGAINST ADVERSE CHANGES IN LEGISLATION?

Gaukhar Kudaibergenova
Partner, Signum Law Firm

Countries with stable, clear, and predictable legislative framework have been always in the investors' top list. Best international practices demonstrate that such countries are usually granted a high investment climate rating as there is no notion of the "retroactive effect of the law" in these countries. Their governments secure any significant changes to the law to be first discussed in detail with interested parties and the business community prior to their adoption.

The presence of guarantees of stability and the absence of the so-called "grandfather clauses" in the newly adopted regulatory legal acts give the right signal to the investor. We have all witnessed the positive effect of the legislation stability guarantees in Kazakhstan subsoil use sector. These guarantees helped to attract significant investment in the country's raw materials industry.

The following article analyses adverse changes in legislation regulating renewable energy in Kazakhstan. This industry sector has been developing dynamically and the likelihood of amendments to key regulatory acts in this area is quite high, as are changes in the country's tax or foreign currency regimes. The participant in an RES auction offers a certain auction price based on the corresponding financial model and a project business plan developed on the basis of legal requirements in force at that time.

This article considers the above issue from different angles - the retroactive effect of civil legislation, the stability of legislation, and the correlation of contract provisions and legislation.

Retroactive Law

The Civil Code provides for the general rule of no retroactive effect in acts of civil legislation.[1] This rule covers several scenarios at once:

- Adoption of a new legal act regulating relations that were not previously regulated;
- Adoption of a legal act canceling regulation of certain relations or eliminating previously existing legislative requirements;
- Adoption of a normative legal act changing pre-existing relationships.

At the same time, the Code provides for the legal act's regulation of the relations that arose before its entry into force if the legal act expressly states this to be the case. This approach was taken in article 43 of the *Law on Legal Acts*[2]. Thus, current renewable energy producers would be affected by new or changed legislative requirements only when this is expressly provided for in the regulatory act itself.

Granting a new law with retroactive effect may affect regulatory documents of different areas of action.These changes are not always predictable and unambiguous. The stability of Kazakhstan's investment environment can be significantly shaken when Kazakhstan adopts regulatory legal acts with amended requirements to be implemented both at the construction stage and during operation of renewable energy facilities.

There is a vast number of examples of granting new regulatory legal acts by retroactive effect in Kazakhstan. Such situations raise questions in practice and very often lead to court or arbitration proceedings.

Stability – Only Partial and Selective?

As of today, legal entities implementing priority investment projects as well as strategic investment projects[3] under investment contracts concluded before 1 January 2015, are guaranteed stability if there should be changes in Kazakhstan tax legislation.[4] Accordingly, the renewable energy projects that fall under the definition of a 'priority investment project' concluded before 1 January 2015, can rely on tax stability. It is noteworthy though that not all renewable energy projects meet the criteria of priority investment projects. Moreover, stability is also subject to certain time frames. Hence, tax stability is of a limited and partial nature.

Correlation Between the Contract and the Law. Purchase Agreement with the Financial Settlement Center

The Civil Code establishes a general rule whereby a new legal act applies only to rights and obligations that arose after its entry into force. The relations of the parties under an agreement concluded before the civil act enters into force are regulated in accordance with the Civil Code.

The latter stipulates that the agreement must comply with the rules binding on the parties and in force at the time of concluding the agreement. If revised or newly binding rules on the parties enter into force after they conclude their contract, the legislation recognizes the contract's validity unless a new law extends its effect to relations arising from previous contracts.

1 Article 4 of the *Civil Code of Kazakhstan* dated 27 December 1994.

2 The *Law of Kazakhstan* dated 6 April 2016.

3 See/Article 284 of the *Entrepreneurial Code* dated 29 October 2015, for definition of priority investment projects

4 Article 289 of the Entrepreneurial Code dated 29 October 2015.

The implementation of RES project in Kazakhstan by an investor is governed mainly by the electric energy purchase agreement with the *Financial Settlement Center.* The Agreement with the FSC establishes, among other things, the auction price, and is valid for a period of 15 years. Clause 35 of the Agreement's Article 9 establishes that "all terms of the Agreement are stable and are not affected by changes in Kazakhstan's legislation, and can be changed only by agreement with the Buyer."

Due to the lack of practice on this issue, and the fact that new legislation can in principle establish that its effect extends to relations arising from previous agreements, this wording in the standard form of the Agreement cannot guarantee complete stability.

Conclusion

Problems related to the relationship between law and contract have always been relevant in the energy sector of Kazakhstan due to their practical importance. Developing market practice has shown that considerable importance should be given to the correlation between civil relations and legislative regulation, taking into account details that are not noticeable or have not been noticed before.

Kazakhstan's current legislation cannot provide a full guarantee against adverse changes in legislation to developers of renewable energy projects:

- The law is retroactive if the retroactive effect of a normative legal act or its part is provided by it or by the act on its entry into force.
- Stability at the legislative level is selective. The Entrepreneurial Code provides only a partial and selective tax guarantee. To award such stability, the project must meet two criteria simultaneously: a) fall within an investment priority project; and b) be concluded before January 1, 2015.
- Stability provisions under the Agreement with the FSC are not a guarantee

The wording of the standard form of the Agreement with the FSC that "all the terms of the Agreement are stable, do not depend on changes in Kazakhstan's legislation, and can be changed only by agreement with the Buyer" will not guarantee stability of the provisions of the Agreement with the FSC due to the following:

- new regulatory legal acts may establish that their effect extends to previously concluded agreements and, in this case, the stability provided under the Agreement with the FSC does not apply;
- All standard forms of agreements for RES projects, including the Agreement with the FSC, have been approved by the Minister of Energy. These orders constitute secondary legislation and can be easily overturned by higher normative legal acts.

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Muratov Partners is a law firm with considerable experience and well-established principles of legal practice since 2014. Today Muratov Partners provides a wide range of legal services and is skillful in supporting business activities. Qualified lawyers advise on domestic and cross-border corporate, capital markets, finance, M&A, bankruptcy and rehabilitation procedures, licensing, tax matters and commercial mediation as well as litigation and arbitration.

Muratov Partners law firm has a deep knowledge of Kazakhstan's investment environment and investment issues across all industry sectors.

The firm successfully advises on complex transactions and high-profile matters involving major local and international companies. The key principles guiding the work of Muratov Partners are the best qualifications and reliability.

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KAZAKHSTAN'S LEGAL FRAMEWORK FOR OIL PRODUCTS AND GREEN ENERGY

by Ainur Akhmetova
Head of Legal Practice
Muratov Partners

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It is generally recognized that oil products and green energy are a global commodity and the energy market, together with the oil and gas industry, constitute one of Kazakhstan's main platforms for activity in various markets. Many local and foreign players are interested in this activity and, as a matter of course, this platform has its own rules and regulations.

Kazakhstan has more than 250 oil and gas fields and approximately 204 subsoil use contracts for raw hydrocarbons. There are currently over 2,000 companies in the oil and gas industry in Kazakhstan. Each country globally regulates its activities through its own unique legal framework. Participants in oil and gas projects are commonly foreign companies that need support, particularly in international legislation.

The success of any O&G deal for all its participants, whether it is exploration, production, or oil search depends on the specialists involved in its execution. They start with strategy and tactics for the company's actions in terms of laws and legal regulatory provisions. Experienced consulting firms that specialize in international legislation can also provide legal support for a transnational project. Muratov Partners is among such companies.

Muratov Partners has been in business representing clients successfully for seven years. The company has a regional presence through its branches in three cities: Nur-Sultan, Almaty and Atyrau. It represents high-profile clients in various fields, including oil, gas and energy. The firm's legal team has extensive experience in consulting and resolving legal cases and is in daily contact with many different companies for this purpose. The firm's legal specialists are versatile and highly experienced in many areas of law.

A recent case handled by Muratov Partners involved a high-profile client project considering an oil product purchase. The legal team's main task was an expert analysis of the product and clarification of the client's rights and obligations if the client purchased the product and its further use. The major goal in such projects is to help the client understand the process and essence of the product. In order to achieve these goals, the firm's lawyers studied regulations, All-Union State Standards (GOSTs), and other documents, and conducted extensive research on the basis of which a final memorandum was prepared for the client. By virtue of this work the client company was fully prepared for the product and understood all the legal aspects of working with it. The client then understood the regulatory background, the product's requirements, taxation obligations, risks entailed, and other crucial issues.

At the last stage of the deal, the client requested to go directly to the site and evaluate the product on the spot to verify the authenticity of contracts that were previously signed by him in view of the acquisition process, and so forth. These full turnkey support services bringing the project to a successful conclusion constitute a professional principle and reflect the values of Muratov Partners.

This intensive level of legal support requires the participation of highly qualified specialists and lawyers. The oil and gas industry is one of the most promising and challenging legal areas in Kazakhstan. The firm's senior lawyer has extensive experience handling legal matters for large local and international companies. One such company desined a *Global Share Purchase Program*, by which the company offers its shares to employees who have worked for a certain number of years. They developed this financial instrument and introduced it into the Kazakh legal framework.

Another recent case involved a company client whose interests were protected and, as a result, multimillion-dollar fines were canceled.



Muratov Partners has worked on a large number of projects for exploration, production, development of contracts, purchase and sale of shares in the oil and gas industry. These legal matters involved both the license and agreement with the *Anti-Monopoly Committee*, as well as mandatory consideration of the pre-emptive right of the state. The lawyer's representation of his client's interests here involved obtaining approval in all these instances and the effective settlement of these legal documents amongst themselves. These nuances distinguish the oil and gas industry from other industries, making it difficult but at the same time exciting.

Muratov Partners also actively works with clients in the energy market. Renewable energy sources are strictly regulated and subject to laws that have their own characteristics. Muratov Partners represented the largest

renewable energy project in Central Asia, handling legal documentation for foreign investors and representing one of the parties to the project, which also involved the EBRD, foreign partners, and the Kazakh side.

This project was implemented in the city of Shu. In more detail, it provided full support for the M&A deal for the purchase and sale of an equity stake. Within the project framework, Due Diligence required serious effort, as did preparation of the company for sale and its launch. The *PPA (Power Purchase Agreement)* was amended with the Ministry of Energy's participation. The project's peculiarity lay in the PPA document.

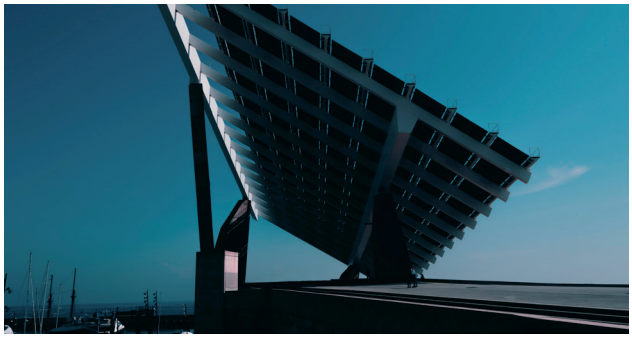
Participation in green energy projects is a bonus for energy companies. The *PPA* confirms work with the country's Government, and the state guarantees to buy electricity from the company. This is attractive for foreign investors, as they are confident of the project's stability and the PPA serves to guarantee that the state will purchase electricity from the company for a certain time. Not all large law firms in Kazakhstan have the necessary qualifications to conduct such cases.



From the experience of Muratov Partners, the appeal to external lawyers occurs when the client is faced with a matter requiring representation by well-qualified legal experts. When the legal team becomes involved, it often discovers the problem voiced by the client is only the "tip of the iceberg". In handling one issue, other equally important parallel topics are revealed and, as a result, work is carried out in several directions simultaneously.

When a complex situation of this nature arises, Muratov Partners offers to conduct a legal audit. Due Diligence is carried out both to prepare the company for sale and to improve its operational activities. Specialists study all aspects of the client company's work from a legal point of view, ranging from labor relations to external contractors. This may identify weaknesses in the client's activities. A full report on the results of the legal audit is delivered and the client is made aware of the gaps and areas that need improvement.

After approval of the audit results by the client, full-time lawyers are introduced into the process to conduct "gap analysis". The client, when making a single request to a



consulting company, receives a full analysis of the "weak points", most often related to tax and anti-monopoly law. This is often the case with subsurface user companies.

Muratov Partners has a huge potential for successful work on projects in the oil, gas and energy industries, constantly improving the company's internal procedures.

An important aspect of Muratov Partners' recognition in the international arena is the presence of certain certificates. In January 2021, Muratov Partners successfully passed the international quality management certification ISO 9001. It has 21,000 international standards covering almost all aspects of business and technology. They are developed and implemented by the *International Standardization Organization*, which includes partners from 165 countries. The ISO 9001 certificate officially confirms that the company has a long-term development strategy, as well as a systematic approach to fulfilling its obligations to customers. The document gives the company the opportunity to participate in international ratings of consulting firms.

One of the main strategic goals of Muratov Partners is to enter the international legal rating embodied by the *Legal 500*. *The Law Asia* rating is also highly respected, and being ranked in *Law Asia* enables a firm to work with Islamic finance, where Muratov Partners also has handled interesting cases, thus gaining impressive experience.

With the firm's team of experienced and well-qualified specialists, its solid experience in various sectors of the economy, and its ambitious goals, Muratov Partners can represent a client at any level with almost any legal request.





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MEMBER NEWS



Tengizchevroil Announces Appointment of General Director Kevin Lyon

Effective February 1, 2021, Kevin Lyon was appointed Tengizchevroil (TCO) General Director, succeeding Eimear Bonner, who served as General Director since 2018.

Over his 32-year career with Chevron, Kevin Lyon has held numerous engineering and leadership positions in the United States, Nigeria, Philippines, Indonesia, the Netherlands, and Bangladesh. Prior to joining TCO, he served as Managing Director of Chevron's IndoAsia Business Unit in Jakarta, Indonesia, where he was responsible for upstream operations at Chevron's assets across the Philippines and Indonesia, including the largest waterflood and heavy oil steamflood operations in the Asia-Pacific region. In that role, he managed an organization of over 3,800 direct employees and a total workforce exceeding 30,000.

Upon starting his role at TCO, Kevin Lyon noted: *"I look forward to leading TCO for the benefit of Kazakhstan and all of TCO's shareholders. TCO is an example of a very strong partnership and I am excited to make a contribution to the further success of the joint venture."*



Luciano Vasques – New Eni Head of Central Asia Region

Luciano Vasques was appointed Head of the Central Asia Region for Eni SpA on 1 August 2020. He joined Eni as a Project Engineer in 1991 and during his career developed extensive experience with the full range of the Oil & Gas business, both development and operations of multibillion assets, leading several Eni upstream subsidiaries worldwide.

From 1995 to 1999, Luciano Vasques was in charge of a project to deliver gas to Nigeria LNG. In 2000, he moved to London and then to Aksay as Project Director for the Karachaganak Phase II development, which went on stream in 2004. He then participated in Kashagan: first in the Netherlands as Development Director and then again in Kazakhstan, as Director of the Kazakh branch of AgipKCO in Atyrau. His contribution to development of Kazakh resources earned him the *Dostyk Award* from the First President of Kazakhstan.

In 2009 Luciano Vasques was appointed President and CEO of Eni Petroleum, the North American E&P subsidiary of Eni, where he brought several fields in the Gulf of Mexico and the first Eni operated field in Alaska to production. From 2012 to 2013 he served as Senior Vice-President for Business Development in Eni Gas & Power. In Moscow from 2013 to 2014, he served as General Director of Eni Energhia, the Russian Exploration and Production subsidiary of Eni. From 2014 to 2015 he was Managing Director of E&P and General Manager of Eni North Africa before joining *Tecnomare*, which he led until the incorporation of EniProgetti, created to execute Engineering for Eni projects worldwide, which he ran as CEO for its first 3 years.



Asian Development Bank Appoints Nariman Mannapbekov to Head Kazakhstan Resident Mission

Nariman Mannapbekov is a national of Uzbekistan who joined the Asian Development Bank in May 2006 as Economist. He was promoted to Senior Economist in February 2010, and in September 2010 he became Head of the Project Administration Unit (Energy Division) at ADB Headquarters in Manila. In April 2016 he was appointed ADB's Head of Mission at the Azerbaijan Resident Mission in Baku.

Mr. Mannapbekov is an economist with more than thirty years of broad experience in investment banking, government, the World Bank, and now with ADB. He has a special connection with Central and West Asia, given his instrumental role in establishing ADB's new resident missions in these regions. He has led numerous ADB missions, including to Kazakhstan, and has profound knowledge and understanding of the country and the region in general. His background and managerial experience, familiarity with ADB policies and operations, and outstanding ability to interact with government officials will also add value to his new role in Kazakhstan.



Parker Drilling Announces Appointment of Caspian General Manager Sergey Buben

Parker Drilling is pleased to announce the appointment of new Caspian and commercial regional General Manager, Sergey Buben, who will be based in Atyrau. Sergey Buben has a 20+ year career in Parker Drilling and has served in administrative management, marketing and business development. His roles have led him across CIS, Europe, and North America.

The Parker Drilling Executive Team is confident that Sergey Buben is the right leader to drive the strategic goals for the growth of the Parker Drilling Caspian Division, which besides Kazakhstan includes Ukraine and has the objective to explore opportunities in other regional markets. His projects and roles include construction and deployment of the then biggest ERD land rig for Sakhalin 1; The Sunkar Arctic Barge Rig operating for NCOC; Parker Drilling land rigs for KPO's Karachaganak project and O&M services for ExxonMobil offshore platforms in North America. Sergey Buben has spent more than fifteen years supporting Parker Drilling operations in Kazakhstan, where he has developed close relationships with many of Parker's most valued customers and business partners.

MEMBER NEWS



Microsoft Appoints New Kazakhstan Country Manager – Sergey Leschenko

Microsoft announces the appointment of Sergey Leschenko, who has more than 20 years' experience in the field of telecommunications, mobile products, and innovative technologies, as the company's Kazakhstan Country Manager. As Country Manager, he will be engaged in the company's strategic development, the digital transformation of Kazakhstani customers and partners, and will be responsible for country digitalization projects, a Microsoft priority in the local market.

Microsoft introduces innovative solutions in security, AI, and machine learning that contribute to the digital transformation of business and optimizing workflows efficiently. Over the past year, Microsoft in Kazakhstan has launched several important projects for its customers, including in partnership with the government, especially in education. Last year the Almaty Department of Education and Microsoft signed a Memorandum of Understanding and Cooperation for digital transformation of education.

At the same time, the Kazakh language became available to all users of the Microsoft Teams online collaboration and education platform. This is the first platform for the Kazakhstani market that enables use of the state language. In addition, Microsoft has introduced innovative technologies and AI tools in several Kazakhstani post-secondary institutions in collaboration with a partner that will help students learning remotely handle learning and exams honestly and transparently.

Sergey Leschenko graduated from Kiev National Economic University with a degree in International Economics and is currently completing an MBA program at Plekhanov Russian Economics University.



Nestle Appoints Maxim Shchetin as General Director for the Eurasia Region

Maxim Shchetin has been appointed General Director of Nestle in the Eurasia region and will be responsible for managing Nestle's business in 9 countries of the region, including Kazakhstan, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan, Mongolia, and the Caucasus. He has worked at Nestlé since 2014. For two and a half years he headed the Retail Sales Directorate of the Russian division of Purina PetCare, after which he was appointed Business Director of the Purina PetCare specialty channel at Nestlé Russia, where he was also responsible for Purina's e-commerce business.

Maxim Schetin comments on his new appointment: "It is a great honor and responsibility for me to lead Nestlé's business in Eurasia. This region is one of the fastest growing and makes a significant contribution to the overall growth of Nestlé's business in Russia and Eurasia. I am inspired by the prospect of working with a strong and enthusiastic team of professionals determined to succeed."

MEMBER NEWS

KPMG in Kazakhstan Celebrates its 25th Anniversary

The first KPMG office in Central Asia opened in Almaty on 22 February 1996. Back then, the KPMG practice had only started introducing the local market to international standards and implementing the company's corporate culture principles and values.

Today KPMG in Kazakhstan has a team of more than 620 talented, creative and ambitious professionals. Over the past 25 years the firm has actively adapted to the local market, the local mindset, and business specifics, winning new clients. KPMG today holds leading positions in the Central Asian market, continuously expanding the range of its services and helping its clients improve their efficiency.

> *"High quality and trust have always been and always will be at the core of our business. Today it also includes innovations. These attributes make us a clear choice for our clients and an Employer of Choice for the younger generation. On the occasion of our 25th Anniversary, we have written only the first chapter of KPMG history in Central Asia. There will be many more chapters and achievements ahead. We know what we want and where to go in the near future," –* **Saken Zhumashev, KPMG Managing Partner in Central Asia.**

Lufthansa Resumes Regular Flights to Kazakhstan

As of May 01, 2021, Lufthansa will resume regular flights to Almaty and Nur-Sultan after a long break due to the coronavirus pandemic. Flight LH646 from Frankfurt am Main to Almaty will operate on Mondays and Saturdays with a landing at Nur-Sultan airport, and on Thursdays there will be a direct nonstop flight under the flight number LH648. From Almaty to Frankfurt am Main Lufthansa we will offer direct flights on LH647 on Tuesdays and Sundays. On Fridays, flight LH649 will operate with a landing in Nur-Sultan.

The aircraft type remains unchanged - Airbus A330-300 with three service classes: business, premium economy, and intercontinental economy class. In all compartments, meal-drinks, a personal monitor with an extensive entertainment program, including a childrens program, and FlyNet internet access are offered. Lufthansa and other Lufthansa Group partners will take all necessary measures to ensure the safety of passengers throughout their journey.

Air Astana launches direct flights to Batumi from Almaty from 15 May 2021

Flights will operate three times weekly on Mondays, Wednesdays, and Saturdays.

Batumi – bathed in sunshine – is a city that craves for freedom and is always ready to impress, as if encouraging you to seize the moment. Batumi is not a destination you plan to travel to months ahead. The more spontaneous your decision, the more emotional and impressive experience will be. It is a rather small city, stretching for 20 kilometres along the Black Sea, 6 kilometres of which are occupied by beaches.

Batumi Beach is modern and fully equipped for all types of leisure activities, whether you are seeking relaxation or recreation. The beach is for a daytime, but what's available in the evening? At the end of the day you should visit Batumi's Old Town with its buildings mingling into the mosaic of the past. The streets of the Old Town will take you to Batumi Boulevard, the true heart of the city where you can feed pelicans and peacocks accompanied by the songful tunes of the singing fountains.

If you are in Georgia but haven't yet tried the local wine, this is the best time to relax with a glass of wine. The air seems to be filled with a variety of wine notes, as if appealing to your senses. Add traditional Georgian hospitality and you will have memories to cherish for years.

Passengers travelling to Georgia must present a negative PCR test result certificate. The certificate is considered valid for 72 hours from the moment of taking the test till the scheduled flight arrival time. Vaccinated travelers do not have to present a PCR test certificate, provided they have a proof of a full course (two doses) of any COVID-19 vaccine.

ADVOCACY UPDATE
MARCH - APRIL 2021

The Council to Improve the Investment Climate
April 2021 (Virtual Platform)

AmCham's Premier Advocacy Platform

The *Council to Improve the Investment Climate* is AmCham's major advocacy platform for its members to engage in dialogue with the Government of Kazakhstan through the Prime Minister, who chairs the Council together with the AmCham Executive Director, and a panel of Cabinet Ministers responsible for economic policy. The Council has existed for over ten years since its creation by *Prime Minister Karim Massimov* in 2010. The Council exists exclusively for AmCham and its members, although Council attendance includes invited speakers such as ambassadors and international financial institutions.

The Council is highly structured with a focus on a single topic for each meeting with ten speakers who deliver presentations on the the topic, and a ten-member AmCham Council Panel of corporate CEOs. On the Government side, in addition to the *Prime Minister,* the core Cabinet Ministers are the *Ministers of the National Economy, Finance, Trade/ Integration, Justice, Foreign Affairs*, and others as required. These have included the *Ministers of Energy, Ecology, Healthcare, Labor, Digitalization,* and the *National Bank Governor.*

All Council meetings are closed sessions with attendance by invitation only.

Council Resumption in October 2020

The Council resumed in October after a hiatus due to the Covid-19 pandemic globally acknowledged in March, leading to a full lockdown in Kazakhstan in the spring and stringent quarantines during the summer. Following President Tokayev's *September Address to the Nation* outlining the Government's roadmap for Economic Recovery, the first Council was *Kazakhstan's Economic Recovery and Future Development.*

Kazakhstan's Parliamentary Elections in early January followed by appointment of a new Government in January-February postponed further Council sessions until March.

March 2021 Council Session
Topic: Pharmaceutical Security - Preparing for the Future

AmCham's first Council in early March 2021 shifted attention to *Pharmaceutical Security: Preparing for the Future*. The topic was updated to include Covid-19 vaccines and the companies that had brought approved vaccines to the market since December: *Pfizer* and *Johnson & Johnson*. A noteworthy presentation in March was an overview of *Operation Warp Speed (OWS),* the U.S. Government initiative to hasten development of Covid-19 vaccines.



April 2021 Council Session
Topic: Tax Policy and Tax Reform: Essential to Kazakhstan's Economic Recovery Strategy

Returning to the Kazakhstan Government's intensive debate over reforms that would underpin the country's economic recovery, the April Council took up *Taxation Policy* and *Taxation Reform*, a topic traditionally slated for the Council in the early part of each year. This year the taxation enquiry was geared to the Government's Economic Recovery agenda.

The investment community has expressed its concerns over the Government's efforts to design and introduce new taxes that risk negative impact on existing investment operations and discouraging new investment. In that the Government is proclaiming its eagerness to attract new investment that will help rebuild the country's economic base, the impact of additional taxation is seen as a disincentive to achieving this goal.

A major video-presentation at the April Council was delivered by a prominent Canadian tax expert and international tax litigator from EY based in Calgary who has twice delivered in-person taxation presentations when the Government was considering tax changes potentially detrimental to Kazakhstan. His presentation to Prime Minister Massimov when the Government was preparing to abolish VAT resulted in the Government's decision immediately after the Council session to retain VAT – a momentous decision for Kazakhstan.

The Canadian presentation hinged on the over-riding message that long-term goals should take precedence over short-term goals. Kazakhstan should not attempt to recoup its national budgetary losses from the 2020 pandemic year but should concentrate on creating a positive investment climate based on a well-considered taxation policy to bring in new investors who could rebuild Kazakhstan's economy.

This was reinforced by a presentation from the oil industry warning that, new investment from the major oil companies in the future could not be a foregone conclusion.

The industry stated that there was no expectation the price of oil would return to its previous levels.

given the post-pandemic environment with its stress on renewable energy to combat climate change, the oil industry would not replicate its previous investment strategies. Renewable energy would form part of in their future investment plans.



AmCham Spring Weekly Webinar Series
Kazakhstan's Economic Recovery and Future Development
Twelve Friday Afternoon Webinars: February – April 2021

In early 2021, AmCham felt there was a need to bring the advocacy topics discussed in closed session at the Council into a public forum. Referring to President Tokayev's *September 2020 Address to the Nation*, the *Spring Webinar Series* was created around twelve areas requiring fundamental reform that would change the country's economy and the drivers behind this economy.

The purpose of the Series was to encourage reflection and discussion of the reforms required to drive the complex Economic Recovery process that will depend on both internal and foreign investment in areas of the economy ripe for economic development. Socio-economic change was not forgotten, as the economy affects all aspects of people's lives, in many cases damaged by the pandemic.

The *Webinar Series,* completed at the end of April, was conceived as a three-month weekly event – a one-hour webinar on one reform topic each Friday afternoon with prominent speakers from the AmCham membership (CEOs and Managing Partners), the diplomatic community (Ambassadors and General Consuls), and International Financial Institutions *(OECD, EBRD, IFC, ADB, World Bank, UN Agencies).* Each webinar was interactive with two speakers delivering presentations, after which participants asked questions and engaged in dialogue with the speakers.

Each of the three months between February and April had a particular focus in terms of the topics for discussion. Thus, February was devoted to policy and 'big picture' topics, March was focused on industry-specific topics, and April had a socio-economic trend. The list of twelve Webinar topics and speakers follows.

Registration for the webinars showed an attendance of between 120-140 high-profile participants for each event. In addition to registrations from within Kazakhstan, there were also a number of viewers from major institutions abroad (Washington, New York, London, Berlin, Geneva, Amsterdam).

Each of the webinars was recorded and can be accessed on the AmCham website for those members who may have missed some of the Webinars.

AmCham is grateful to the sponsors who supported each of the Webinars and whose enthusiasm was an important element in the decision to design and deliver this ambitious three-month overview of Kazakhstan's challenges as the President maps out the country's future entailing significant change.

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AMCHAM SPRING WEBINAR SERIES
KAZAKHSTAN'S ECONOMIC RECOVERY AND FUTURE DEVELOPMENT
FEBRUARY - APRIL 2021

FEBRUARY

FEBRUARY 5 — **Kazakhstan's Economic Perspective 2021: Looking Ahead**
Speakers: *William Tompson, Director, Eurasia Division, OECD (Paris)*
Erlan Dosymbekov, Managing Partner, EY Kazakhstan

FEBRUARY 12 — **Anti-Corruption: A Necessity for Economic Recovery**
Speakers: *Eric Meyer, Consul-General, US Embassy in Almaty*
Olga Savran, Director, Anti-Corruption Network, OECD (Paris)
Drago Kos, Chairman, Anti-Bribery Working Group, OECD (Paris)

FEBRUARY 19 — **Fair Competition: Creating a Level Playing Field**
Speakers: *Sabine Zigelski, Senior Competition Expert, OECD (Paris)*
Aset Shyngyssov, Managing Partner, Morgan Lewis

FEBRUARY 26 — **Rule of Law/Judicial Reform: Protecting Investment Commitments**
Speakers: *Aigoul Kenjebayeva, Managing Partner, Dentons*
Anthony Mahon, Partner, Cross-Border Tax, Deloitte

MARCH

MARCH 5 — **Renewable Energy: Future Benefits and Employment Growth**
Speakers: *Agris Preimanis, Kazakhstan Country Director, EBRD*
Andre Carstens, Ambassador of the Netherlands to Kazakhstan

MARCH 12 — **Agricultural Development: Can Kazakhstan Be Self-Sustaining**
Speakers: *Raimbek Batalov, Founder/ President, Raimbek Group*
Anton van Gorp, General Director, Metro Cash & Carry

MARCH 19 — **Trade and Customs: Expanding Kazakhstan's Trade Links**
Speakers: *Siddique Khan, Founder/ President, Globalink Logistics*
Kristian Rosbach, Economist, Asian Development Bank (CAREC)

MARCH 26 — **Digitalization: Objectives for Government and Business**
Speakers: *Aidyn Abjanbekov, General Director, Ericsson*
Evgeniy Nastradin, CEO, Beeline Kazakhstan

APRIL

APRIL 2 — **Small and Medium Business: Supporting Entrepreneurship**
Speakers: *Agris Preimanis, Kazakhstan Country Director, EBRD*
Cassandra Colbert, Regional Director, IFC

APRIL 9 — **Healthcare Reform: Before and After the Pandemic**
Speakers: *Ksenia Babushkina, Partner/ Healthcare Lead, Advisory, EY*
Susanna Hayrapetyan, Lead Health Specialist, World Bank CAR

APRIL 16 — **Social Welfare: Creating a Durable Social Safety Net**
Speakers: *Nariman Manapbekov, Resident Regional Representative, ADB*
Jamila Asanova, Chief Executive Officer, ARGO

APRIL 23 — **Child Rights: Protection and Support for the Most Vulnerable**
Speakers: *Arthur van Diesen, Kazakhstan Representative, UNICEF*
Maria Dotsenko, Kazakhstan Representative, UN Women

AMCHAM WORKING GROUP UPDATES MARCH – APRIL 2021

Almaty/ Nur-Sultan CSR Working Group
April 23 2021

The *Almaty/Nur-Sultan Corporate Social Responsibility (CSR) Working Group* met on a virtual platform on April 23 under chairmanship of *Thomas Jose, Eurasia General Director at Beiersdorf*. The meeting's topic was *The StopMusor Social Eco-Campaign: Key Learnings and Results*, and the invited Speaker was *Assel Akhmetova, External Affairs Manager at Philip Moris Kazakhstan*.

The *StopMusor Campaign* raises awareness about environmental damage caused by littering by increasing the sense of social responsibility and fostering a culture of responsible disposal of household waste. The *Kazakhstan Association of Ecological Organizations* organized of the campaign with the support of Philip Morris Kazakhstan.

The initial goal was to reach 500,000 people through 15 events and 30 published articles. However, the campaign reached 1.2 million people by way of 25 events and publication of 40 articles. Over a nine-month period, *StopMusor* reached more than one million people through environmental events, campaigns and youth competitions aimed at encouraging and improving the population's eco-culture through direct interaction with different target groups.

Almaty Technology and Innovation Working Group
April 27 2021

On April 27, the *Almaty Technology and Innovation Working Group* members met on a virtual platform under chairmanship of the newly-arrived *Microsoft Country Manager, Sergey Leschenko*. Together with *Volodymyr Dmytrenko, Microsoft Senior Azure Professional for the CEE*, Sergey Leschenko delivered a presentation on "*Harnessing the Power of Artificial Intelligence in Kazakhstan".*

The speakers began by describing the prospects for digital transformation using the power of *Artificial Intelligence (AI)*. Three steps were outlined:

1) *Data: Capture digital signal across business*
2) *Intelligence: Connect and synthesize data*
3) *Action: Improve business outcomes*.

This process improves and automizes the processes by engaging with customers, optimizing operations, empowering employees, and transforming products.

Microsoft showed the example of Azure AI. This is an AI-powered cloud search service for mobile and web app



development. It is a proven, safe and reliable artificial intelligence platform that allows the creation of critical solutions for image analysis, speech understanding, data-driven prediction, and other human intelligence.

Microsoft Azure is used in the aviation and automobile transportation, where it enables online checking of the conditions of aircraft jet turbines, as well as checking tire pressure in heavy trucks on construction and mining sites. It collects data for insight into improving future operations.

Microsoft and Nuance companies also integrated a speech recognition machine that enables AI to understand what you say and transfer it onto documents. Text recognition also makes it possible to locate any text easily. Finally, the aim of the platform is to bring value to end customers, make companies more productive, empower employees, generate new sources of revenue, and improve business processes.

Human Resources Working Group
April 28 2021

On April 28, a joint meeting of the Human Resources Working Groups in four cities: Almaty/ Nur-Sultan/ Atyrau/ Aktau was held on a virtual platform chaired by *Maxim Gubashev, General Director of the Fircroft Group,* with Speakers *Assel Dussumova and Aliya Ismukhamedova, People and Organisation, PricewaterhouseCoopers (PwC)*. The meeting's topic was "*Agency Labour: What an Employer Should Know*".

Aliya Ismukhamedova explained that a new law regulating agency work was introduced into the Kazakhstan's Labor Code and became effective from December 31, 2020. Changes in accident insurance also formed part of the presentation.

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