

IV Investors' Voice

The American Chamber of Commerce in Kazakhstan

Kazakhstan's Leading International Business Association



April 2020
SPRING ISSUE

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#88

The Oil and Gas Industry Confronts Global Challenges



- ▶ ExxonMobil – Developing Technology Solutions
- ▶ GE - Towards Digitally-Enhanced Gas Power Generation
- ▶ Bechtel – A Legacy for Kazakhstan
- ▶ NCOC – Kashagan's Dreams and Opportunities
- ▶ Ericsson – Private Networks for Industries
- ▶ Honeywell – Behind the Scenes with an O&G Worker
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EDITOR'S NOTE



Dear Readers,

Since the February Issue of *Investors' Voice*, it seems as though the world has turned upside down. The coronavirus, now known as COVID-19 and termed a pandemic by the World Health Organization, has rolled across the world, paralyzing countries and entire continents and wreaking economic havoc. The oil industry has been hard hit and Kazakhstan has been impelled to devalue its national currency by 20%, to declare a state of emergency, to announce a nation-wide quarantine, and to shut down all businesses, apart from those labelled essential businesses for daily functions.

No country was prepared for this and it has become the world's most urgent task to mobilize medical resources, design a strategy to combat an unknown virus for which there is neither a cure nor a preventative vaccine, and care for over one million infected patients world-wide. By the time the *April Investors' Voice* reaches our readers' desks, this figure will have surged much higher and reached many more countries.

This year's *April Issue* devoted to the Caspian oil industry is focused on the industry's achievements, but there is another story that is still unfolding – the industry's response to Kazakhstan's hour of need. Among the many AmCham companies contributing to the Kazakhstan effort, the oil industry has led the way in designing and spearheading initiatives in each of the country's regions where it operates or is based – in Almaty, Nur-Sultan, Atyrau and Aktau, Aksai, and Uralsk – to supply the country's hospitals with the most urgently needed medical equipment and support. First and foremost, this means ventilators that will save the lives of the most seriously-ill patients, but each region's initiative, although a common effort, has its own specifics, among which the need for COVID-19 testing is also desperately needed.

This is a many-pronged initiative by the oil industry – including companies featured in the present *April Issue* and many other companies operating across Kazakhstan – a story that will be told in the future by *Investors' Voice*. The corporate response by the foreign investment community with its diverse expertise and powerful financial resources has been unanimous in supporting Kazakhstan's still nascent post-Soviet healthcare system.

Kazakhstan's oil industry has not hesitated to give its all to a country whose economic development over the past thirty years has been propelled by its very rich natural resources. At a time when the industry is facing its own economic challenges as a result of the pandemic and economic tensions within OPEC, it has not hesitated to mobilize its corporate resources and international status to aid Kazakhstan and its population. AmCham takes pride in presenting this April's *Investors' Voice* dedicated to Kazakhstan's oil and gas industry.

Doris Bradbury
Editor-in-Chief, *Investors' Voice*

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by Paul Stone

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Ruslan Utegenov is Ericsson's current Head of Networks and Managed Services for Central Asia. He has over 12 years of experience in telecommunications, the last six of them with Ericsson. In his current position, he specializes in developing and optimizing business plans and relations, managing large-scale projects, and administering technological and engagement activities.

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Mikhail Abdulov is a lawyer in GRATA's Subsoil Use Department, specializing in mining and oil and gas. He advises international clients on issues related to subsoil use, acquisition of subsoil use assets, and regulated procurement. Prior to joining GRATA in 2015, Mikhail gained experience as a paralegal in a Kazakhstani second-tier bank, at the Adilet Mediation Centre, and in a Kazakhstani law firm. He is a member of the Kazakhstan Bar Association.

Mikhail Abdulov received his degree in Jurisprudence from Adilet Law School.



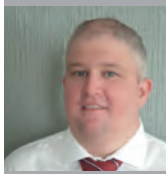
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Yerbolat Yerkebulanov is a partner in charge of the oil and gas and mining practice at the Almaty office of GRATA Law Firm. With 18 years of experience in law, he has advised on petroleum and mining projects, which include inward investments, M&A, and other regulatory issues. His clients include NCOC, KNOC, MIE Holding, MOL, Mubadala, Pertamina, and Repsol. Yerbolat Yerkebulanov has also been engaged in the audit of assets belonging to KPO, Maersk, and Maten Petroleum.

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George Walker is Integrated Well Intervention Manager covering the Caspian East area at Halliburton. A mechanical engineer with 20 years of experience in the oil and gas industry, he started in mechanical lifting systems before moving into well intervention with Halliburton. In over 18 years of well intervention and decommissioning, George has been involved in field operations through project coordination and management, engineering, and the development of collaborative commercial models applied to the well plug and abandonment and well intervention markets today.

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Dr. Maurizio Piliu is a technology executive with over 25 years' experience in the digital sector: science, R&D, strategy, innovation, strategic investment and commercial. As VP Digital Innovation at Lloyd's Register, his current role is focused on Industry 4.0 and encompasses global strategy, capability building, innovation, partnerships, acceleration, and market strategies. Dr. Piliu has regularly advised the UK Government and the European Commission on major strategic initiatives.

Dr. Piliu holds an Engineering degree from the Politecnico di Milano, a Ph.D. in AI from Edinburgh University and an Executive MBA from Bath School of Management.



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Laurent Abou Gebrayel is Business Development Manager for Lloyd's Register, based in Kazakhstan and in charge of the Caspian Region. 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.

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Inpex North Caspian Sea



Hiroshi Ikeda, Director and Head of Kazakhstan Branch, Inpex North Caspian Sea

Hiroshi Ikeda joined the Japan National Oil Corporation in 1984. In 2003 he joined the INPEX Corporation, where he spent 8 years in finance and corporate strategy. He worked on the INPEX IPO on the Tokyo Stock Exchange in 2014 and the corporate merger between Inpex and Teikoku Oil in 2006, served as Investor Relations Manager for 3 years, and raised 50 billion USD in equity capital for the Australia Ichthys LNG Project in 2010. He is a member of the NCOC Shareholders Committee and has been Chairperson of the Human Resources & Talent Committee since 2018.

North Caspian Operating Company (NCOC)



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Ainash Chengelbayeva has worked in Public Relations and Media Relations at the North Caspian Project for eight years. Before joining NCOC, she worked for over seven years as a reporter at Khabar, Kazakhstan's national broadcasting company (Almaty and Nur-Sultan) and as a special reporter for Khabar in Russia (Moscow).

She graduated from Moscow State University with a Master's degree and from Al-Farabi Kazakh State University with a Bachelor's degree, both specializing in journalism.

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Gaukhar Kudaibergenova is Of Counsel at Signum Law Firm specializing in mergers and acquisitions, corporate affairs, oil & gas, and renewable energy. She has completed a number of M&A deals and was a member of the team preparing and implementing the largest IPO in the history of the Kazakhstan Stock Exchange (KASE) involving structuring an M&A transaction for the 100% share sale of a public E&P company.

Gaukhar Kudaibergenova received a BA in International Law from Al-Farabi Kazakh National University and an LLM with Honors in International Commercial Law from the University of Dundee (UK). She is a member of KazBar and fluent in Kazakh, English and Russian.



Sofiya Zhylkaidarova, Partner, SIGNUM Law Firm

Sofiya Zhylkaidarova has over 20 years of experience advising international oil and gas and mining companies on various subsoil use issues, including strategic acquisitions, transfer pricing, regulatory compliance, customs and tax exemptions, and labor issues. She is an arbitrator of the Kazakhstan International Arbitration Center, the International Commercial Arbitration Court of the Eurasian Mediation Center, and the International Chamber of Commerce (ICC). She is also a member of the KazBar Managing Council and a member of the Kazakhstan Petroleum Lawyers Association (KPLA).

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The Coca-Cola Company, our bottling partners and The Coca-Cola Foundation are donating over 120 Million dollars to support COVID-19 relief efforts in the affected communities.

Our immediate support is directed towards the provision of protective equipment and beverages for health workers and the delivery of food supplies to vulnerable groups also in Kazakhstan.

We're doing this because it's the right thing to do, but also because we know that by working together we can make a difference.





Cumulative spend on 2004 - 2019

695 MILLION US\$

Social programs

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Local Content



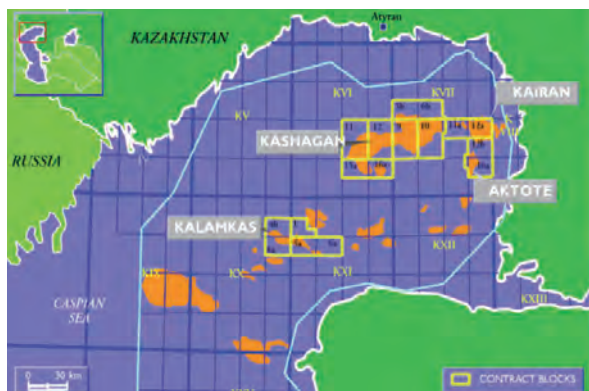
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NCOC - KASHAGAN'S DREAMS AND OPPORTUNITIES

Kazakhstan has more than a century of oil production history and is one of the oldest oil-producing countries in the world. The oil and gas industry has played a special role over the years of Kazakhstan's independence, and became a driving force behind the effective growth of the young state's economy. In late 1992, the decision to start development of the Kazakhstan sector of the Caspian Sea wrote a completely new page in the history of national oil production. With the beginning of offshore operations in the North Caspian Sea, Kazakhstan became a fully fledged member of the world's "Offshore Oil Club."



The *North Caspian Sea Project* is developed under the *North Caspian Sea Production Sharing Agreement (NCSPSA)*, originally signed by Kazakhstan and an international consortium in 1997. The NCSPSA paved the way for the largest foreign direct investment project in the history of the independent state. Four new offshore fields were discovered in the North Caspian sector of Kazakhstan: *Kashagan*, still one of the largest in the world, *Kairan*, *Aktote*, and *Kashagan South West*.

The Operator of these fields, the *North Caspian Operating Company (NCOC)*, is organized by a Consortium of seven of the world's largest and most experienced energy companies: *KazMunaiGas*, *Eni*, *ExxonMobil*, *Shell*, *Total*, *CNPC* and *Inpex*. Each shareholder is independently responsible for transporting and marketing its own share of production, as well as for reporting and sharing that production with the government according to the NCSPSA.

With approximate reserves of 9-13 billion barrels of recoverable oil, the Kashagan field is ranked as the first major offshore oil and gas development in Kazakhstan. The combined safety, engineering and logistics challenges in the harsh environment around Kashagan made its development one of the largest and most complex industrial projects anywhere in the world.

At one time, construction involved more than 42,000 people on location. To date more than \$14.7 billion has been paid to local suppliers for goods, works and services. Thanks to this foreign direct investment, an entirely new offshore oil and gas service industry was created in western Kazakhstan.

As Kazakhstan's largest direct foreign investment project, celebrating this year its 27th anniversary, the North Caspian project has a powerful multiplier effect on the economy, creating employment opportunities for the Kazakh people and opportunities for local companies. NCOC is committed to developing a world-class project that maximizes the use of local goods, works, and services. The NCOC approach to local content development is focused in three main areas: *growing local industry capability*; *job skills training and knowledge transfer*; and *enhancing local infrastructure*.

As for NCOC future plans - we believe in progressing a "pipeline of projects," with attractive new projects for our investors. To keep this pipeline filled, we are working toward development of the Aktote and Kairan fields, including possible synergistic approaches to enhance the development of Kashagan future phases.

Finally, and most important, NCOC is working to propose options for the development of future phases of Kashagan.

NCOC is ready to contribute its best effort to the Ministry of Energy's plan for broad-based regulatory reform, because we share the same goal – to attract investment and grow the economy while protecting the environment. The management of NCOC truly believes that the Company can contribute positively to these reforms.

Looking ahead, the Kashagan project will have a production life of decades. Over that period, NCOC's shareholders will contribute billions of dollars in future revenue to Kazakhstan in terms of taxes and share of production.



Looking back on the past twenty-seven years of history, one can conclude that the project likely would not have happened without a PSA and without the strategic foresight and steady commitment from the government at the highest levels. This proves the value of stability of terms and sanctity of contracts over the long run – a key role of government.

The best hope in driving development of the nascent offshore oil and gas service industry in Kazakhstan is to promote an attractive investment climate and favorable conditions for investors in new projects in the Caspian Sea, including future phases of the North Caspian project.

INPEX ENERGY INITIATIVES IN KAZAKHSTAN AND EAST ASIA

by Hiroshi Ikeda
Director and Head of Branch
INPEX North Caspian Sea

INPEX North Caspian Sea (INCS) has been participating in the *North Caspian Sea Production Sharing Agreement* over the past 22 years, and opened the INCS Nur-Sultan office in October 2015. The Kashagan Oil Field is now the second largest oil-producing field in Kazakhstan. The Kashagan Operator, the *North Caspian Operating Company (NCOC)* continues to lead stable and reliable operations prioritizing safety to contribute to Kazakhstan's economic development and future growth. In the Caspian Sea region, INPEX has held participating interests in the *Azeri-Chirag-Gunashli (ACG) Oil Fields* in Azerbaijan since 2003, as well as the *Baku-Tbilisi-Ceyhan (BTC) Pipeline* consortium.

Although distant from Japan, the Caspian Sea region is a key operational area for INPEX for several reasons. Firstly, the region's huge oil and gas reserves play an important role in supporting the company's business targets outlined in its *Vision 2040*. Secondly, projects in this region contribute to INPEX's well-balanced portfolio of projects from a geographical standpoint, allowing the company to contribute to global economic growth and social development as a stable supplier of energy. And finally, we at INPEX have grown fond of the sheer size of the region's landscape and the hearts of its people.

INPEX CORPORATION is Japan's largest oil and gas exploration and production (E&P) company and a mid-tier E&P player just behind the world's oil majors. INPEX is currently involved in oil and natural gas projects across more than twenty countries worldwide including Kazakhstan and Azerbaijan in the Caspian Sea region. The INPEX mission is to contribute to the creation of a brighter future for society through its efforts to develop, produce, and deliver energy in a sustainable way. Its goal is to become a leading energy company serving an essential role in global society by meeting the energy needs of Japan and countries around the world.

The following is a list of updates on the INPEX renewable energy initiatives, as well as our LNG projects in Australia, another major geographic area for the company's focus.

Renewable Energy

With the goal of becoming an integrated energy company that contributes to a stable energy supply for broader communities, INPEX is engaged in efforts to commercialize renewable energies and reinforce Research and Development (R&D) activities for the next generation. INPEX will continue to explore the business potential of various types of renewable energy such as geothermal, which has synergies with conventional oil and gas development, as well as wind power and photovoltaic power generation.

Geothermal Energy Development

Geothermal power generation is achieved through the rotation of turbines using steam extracted at the surface from groundwater heated by underground magma. Geothermal has been touted as a precious, clean energy source because of its low CO₂ emissions and stability as well as lack of influence from the weather or seasons compared with other types of renewable energy.

Since 2011, INPEX has been participating in joint geothermal development studies in Japan in the Oyasu area of Akita Prefecture and the Amemasu area in Hokkaido. As part of these studies, seven exploratory wells were drilled in the Oyasu area while six were drilled in the Amemasu area between 2013 and 2017. In 2018, flow tests were conducted at the exploratory wells in the Amemasu area and at the pilot wells in the Oyasu area. Meanwhile, an environmental impact assessment was initiated as a step toward commencing commercial operations in the Oyasu area.

INPEX will also strengthen its geothermal energy development initiatives outside of Japan. In June 2015, INPEX joined the *Sarulla Geothermal Independent Power Producer (IPP) Project*, the world's largest single-contract geothermal power project located in the Sarulla area of Indonesia's North Sumatra Province. The project commenced commercial operations of the first unit in March 2017, followed by that of the second unit in October 2017 and that of the third and final unit in May 2018. The three units generate a combined power output of approximately 330MW. The power generated from the project is contracted to be sold to *Perusahaan Listrik Negara*, Indonesia's government-owned electricity company over a period of 30 years.



Photovoltaic Power Generation

In photovoltaic power generation, large-scale systems with a power generating capacity of 1 megawatt (MW) or more are called Mega Solar facilities. Since the Great East Japan

Earthquake of 2011 and the ensuing tsunami, expectations for greater photovoltaic power generation capabilities have grown in the hope of mitigating concerns about power supply shortages. The construction of Mega Solar facilities comprising ranks of numerous photovoltaic panels installed over a wide area is being promoted throughout Japan.

In 2013, INPEX began generating and supplying electricity at its first photovoltaic power generation system with a maximum output of 2 megawatts, located in Joetsu, Niigata Prefecture. In July 2015, the company began operating its second photovoltaic power generation system also with a maximum output of 2 megawatts located adjacent to the first system, through INPEX's wholly owned subsidiary, INPEX Logistics Company. The INPEX Group collectively refers to the two photovoltaic power generation systems as *INPEX Mega Solar Joetsu*. The photovoltaic power generation systems combined are expected to generate around 5,330,000kW of electricity per year, which is the equivalent of the annual power consumption of approximately 1,600 households.



Wind Power Generation Business

INPEX is currently pursuing the development of an onshore wind power generation business in Japan. In the future, the company will leverage its experience in the exploration and development of offshore oil and gas fields to proactively pursue business development opportunities in the offshore wind power generation sector both in Japan and in other parts of the world, including partnership strategies on making inroads into the sector.

Artificial Photosynthetic Chemical Process

In recent years, hydrogen has come to be widely considered to hold tremendous potential as the ultimate renewable energy resource. This is because when combusted, hydrogen produces only water. Hydrogen can also be made into hydrocarbon fuels and chemicals by mixing them with carbon dioxide gas, making hydrogen an exceedingly clean source of energy.

INPEX has been participating in the *Japan Technological Research Association of Artificial Photosynthetic Chemical Process* commissioned by NEDO (*New Energy and Industrial Technology Development Organization*) and is engaged in an R&D project aimed at producing chemical products like plastics and hydrocarbon fuel from hydrogen obtained by decomposing water with the use of catalysts using solar energy and CO₂.

CO₂ Methanation

INPEX is currently involved in the development of methanation technology as one of the company's core technologies. The company strives to create technologies transforming electricity into hydrogen, hydrogen into methane and methane into electricity, as well as build an "electricity-hydrogen-methane value chain" that incorporates INPEX's existing methane production and transportation system.

Methanation is a technology to convert carbon dioxide into a valuable resource like methane. INPEX has been participating as a contractor in a project sanctioned by NEDO to develop technologies to effectively utilize CO₂. As part of this initiative, INPEX is involved in the evaluation of the technological development and production sequence of a carbon capture and utilization (CCU) technology that produces and effectively utilizes methane using a high concentration of CO₂ emitted from thermal power plants and hydrogen produced using electricity from renewable energy sources.

High-capacity lithium-ion battery

INPEX has been supporting *ELIY Power Company*, which is engaged in the development, manufacture and sales of lithium-ion batteries. The company's high-capacity lithium-ion batteries, which are now widespread, can store electricity generated from renewable sources such as solar and wind energy, and provide access to this electricity at any given time. It is expected to contribute to the conservation of the global environment through a more effective use of renewable energy.

Ichthys LNG Project

In 1998, INPEX acquired an exploration permit in the block where the INPEX-operated *Ichthys LNG Project* is located, and following development studies including exploration, evaluation and FEED work, the company announced its final investment decision (FID) in January 2012. Following the completion and commissioning of the facilities for production, the company commenced gas production from the wellhead in July 2018. In October of the same year, the project commenced condensate shipments from the *Floating Production, Storage and Offloading (FPSO)* facility

and shipments of LNG from the onshore gas liquefaction plant. The project also commenced LPG shipments in November 2018 and plant condensate shipments from December. As of December 2019, the Project had shipped 115 LNG cargoes.



Prelude FLNG Project

In June 2012, INPEX acquired a 17.5% interest in the *Prelude FLNG Project* from Shell. The project is located approximately 475 km north-northeast of Broome, off the coast of Western Australia. The project primarily involves the production, liquefaction and shipment of natural gas using FLNG technology from the Prelude and Concerto gas fields. The project will produce approximately 3.6 million tons per year of LNG, 400,000 tons per year of LPG at peak and approximately 36,000 barrels of condensate per day at peak.

Shell (the operator) made the FID on the *Prelude FLNG Project* in May 2011. The FLNG facility sailed away from its construction site in Geoje, South Korea, in June 2017 and arrived in Australian waters in July 2017. After hook-up and commissioning, the initial phase of production commenced in December 2018. The FLNG facility shipped the project's first condensate cargo in March 2019, and first LNG cargo in June 2019.



Thus, INPEX is engaged in a broad range of energy projects across the energy spectrum in geographically disparate regions of the world. These projects are critical in meeting the increasing demands for energy that underpin global development and innovation in the future. INPEX continues to investigate new projects to complete its portfolio and to fulfill its mandate. We take pride in the North Caspian Kashagan project that is crucial to Kazakhstan's future development.

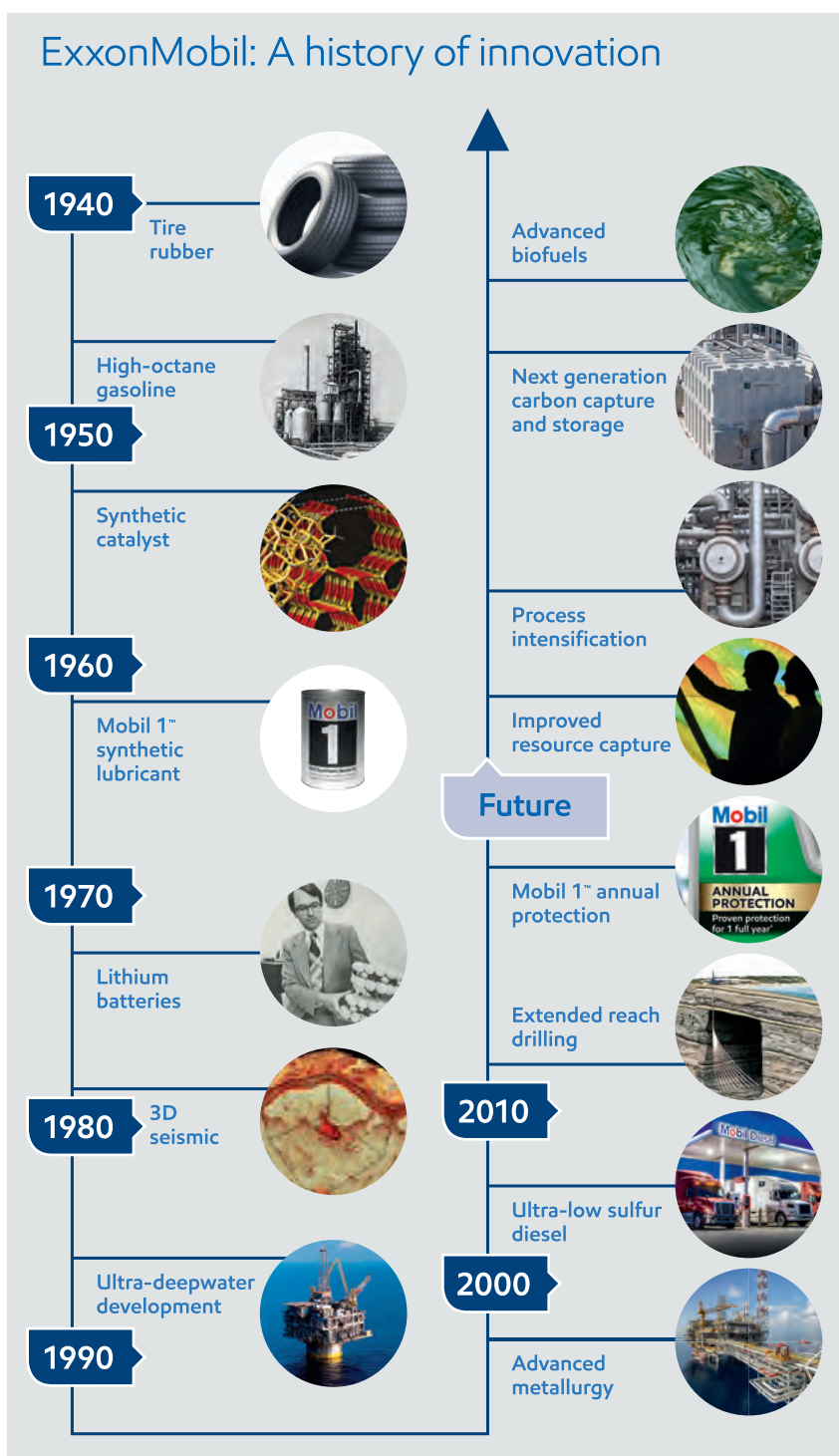


Developing scalable technology solutions

ExxonMobil

ExxonMobil has been at the forefront of many technologies that have enabled energy to be produced and delivered in a safe, affordable and sustainable manner. Our ability to reliably provide for society's energy needs today were unimaginable when the industry first emerged. Over the past century, we have seen firsthand how technology has enabled us to respond to the ever-changing energy landscape (see our innovation timeline below, noting significant innovation by our scientists and engineers). As the world demands more energy and fewer emissions, we are well-positioned to develop scalable, high-impact solutions to reduce emissions in power generation, industry and transportation. Our work with university energy centers enables us to extend the technical capabilities of our 2,200 scientists and 5,000 employees working in our R&D organizations around the world to potentially accelerate the delivery of new technologies.

We are advancing fundamental science and applying technologies in a number of areas that could lead to breakthroughs, redefining our manufacturing processes and products. We have ongoing work in advanced biofuels, catalysts, materials and manufacturing processes. Successful developments here could change our future and our impact on the environment.



KPO ANNOUNCES 2019 PERFORMANCE RESULTS

AKSAI, West Kazakhstan Oblast

On 6 February 2020, Karachaganak Petroleum Operating (KPO) announced its 2019 performance results. General Director Edwin Blom introduced Karachaganak's achievements for 2019 as follows:

"2019 was a tremendously successful and exciting year in many ways. For KPO 2019 was marked by many important milestones and achievements that have been truly remarkable. Last year KPO celebrated the 40th Anniversary of the Karachaganak field discovery. The partners in the Karachaganak project have signed the agreement for the Fourth Injection Compressor (4IC) Project. This is a significant achievement marking an important milestone in the continued development of the Karachaganak field."

KPO also started up the 5th Trunk Line Project. Implementation of this Project will help maintain maximum production levels at Karachaganak while maximizing local content during its execution. KPO has a proven track record of successfully delivering large capital projects."



The successful implementation of this first plateau extension project has created a high level of confidence for delivery of two large current capital projects: the *Karachaganak Gas Debottlenecking (KGDBN)* and *Fourth Injection Compressor (4IC) Projects* are meeting the highest expectations.

Last year, the company also successfully completed the largest Turnaround ever executed at KPO with nearly 3 million man hours recorded. Edwin Blom outlined the Turnaround, stressing: *"All of the planned scope of work was achieved, ensuring improved asset integrity and plant reliability, and completing mechanical tie-ins for our new projects. The Turnaround was completed ahead of schedule."*

KPO launched several initiatives to improve Safety Culture within the Company and all of its Stakeholders, leading to very promising results in 2019, despite the increase in man-hours (approximately 35 million) due to the projects in the execution phase and the Major Turnaround completion.

In 2019, KPO produced 138 million barrels of oil equivalent of stabilized and unstabilized liquid hydrocarbons, raw and fuel gas. In addition, 8.7 billion cubic metres of sour

gas were re-injected to maintain the reservoir pressure, a volume equivalent to approximately 47 per cent of total gas produced. To date, the KPO Partners have invested more than \$26 billion into the development of Karachaganak.

2019 was also marked by significant achievements in environmental protection. One of the Company's primary targets is a high production rate with minimal environmental impact. Last year, gas utilization reached 99.91 per cent. Total gas flaring volume made up 0.68 tons per thousand tons of produced liquids. As of today, KPO investment in environmental activities has amounted to \$405 million.

KPO participates actively in Kazakhstan's environmental ratings and contests. As part of Kazakhstan's participation in the international cooperation initiative to create a green economy, KPO received a special *Program Award* from the *Green Bridge Partnership*. Edwin Blom noted, *"KPO will need to adapt its environmental management system to the new legislative requirements. In 2020, a long-term plan will be developed to reduce GHG emissions and improve energy performance."*

KPO is an active promoter of local suppliers of goods and services through a large number of projects aimed at building local manufacturing capacities. In 2019 the proportion of local content in KPO contracts for goods and services reached 57 per cent or \$684 million in monetary terms.

Since the signing of the *FPSA*, the Project partners have committed to increasing national content in personnel. KPO is currently executing the fourth formal program of workforce nationalization. In 2019, local staff at KPO made up 96 per cent of total engineering and professional positions and 79 per cent of all managerial positions. In May 2019, KPO launched the *Women's Network* that serves as a platform for exchanging experiences, encouraging development, and acquiring knowledge through interaction and cooperation to enhance the internal capacities of KPO female professionals.

KPO also implements a significant number of large social infrastructure projects in West Kazakhstan Oblast. Overall, KPO has invested \$400 million in development of the region's social infrastructure to date.

Summarising KPO's 2019 results, Edwin Blom concluded: *"KPO's operational base is as strong as ever thanks to the teamwork, professionalism, and constant aspiration of the entire KPO team to achieve new milestones. Looking forward to next year, our priorities will remain meeting the challenges involved in reaching the highest levels of industrial safety and production. We shall continue to foster our long-standing relationship with Kazakhstan's authorities based on our common desire to generate maximum value and to pursue sustainable development goals for the benefit of the West Kazakhstan residents and for Kazakhstan as a whole."*



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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The world is changing at an incredible pace, with global growth in cross-border trade and global competition being a catalyst for companies to explore new ways to increase operating profit and competitiveness by implementing increasingly advanced technologies. The transformation brought about by innovations impacts entire industries, business strategies and approaches.

For 125+ years, GE has been delivering innovative products and services that create significant value for power generation and industrial customers. Advancing an industry is no easy feat; it takes commitment, knowledge, and above all, an intimate understanding of what customers want and need.

Bela Ferenczi, CEO GE Central Asia and Azerbaijan says:

"GE believes that innovations are at the heart of economic growth and social prosperity. We bring innovations with us everywhere we do business around the world. They are the key to unleashing the huge economic potential of Kazakhstan, by leveling up the industrial efficiency of the country's core sectors".

In Kazakhstan, the contribution of the fuel and energy sector to the state budget is a vital driver of socio-economic development and key to the country's integration into the global economy. Reliable power generation is essential for seamless oil & gas production. Any unplanned shutdown could result in severe financial loss due to an interruption in hydrocarbon production. There is where innovation and new gas power technologies come to the rescue.

GE has the world's largest installed base of over 7,500 gas turbines with more than 200 million operating hours. Along with renewables, gas will be at the heart of power generation in the future. GE is constantly improving its gas power technologies and implementing innovations, to help our customers enhance power plant performance and drive environmental sustainability.

GE in Kazakhstan: partnerships to drive the modernization of industry

With more than a hundred customers and partners, GE is one of the largest foreign companies operating in Kazakhstan. The company's history in Central Asia dates back to the 1940s, with the first delivery of GE alternating current generators to Kazakhstan.

Today, GE has active partnerships and projects with leading companies in Kazakhstan's power, oil & gas, aviation and healthcare industries, including Tengizchevroil, North Caspian Operating Company, Karachaganak Petroleum Operating, Air Astana, as well as state-owned companies such as the Samruk-Kazyna Sovereign Wealth Fund.

GE actively supports the development of the energy sector in Kazakhstan, providing technology solutions for power generation facilities and transmission infrastructure, as well as industrial customers. The company helps to build and modernize thermal power plants, enhances the efficiency and reliability of power transmission and distribution, delivers seamless power generation to support oil & gas production, and taps into new sources of renewable energy.

In Kazakhstan, GE gas power installed base is around 1 gigawatt (GW) and ensures reliable power supply to key production sites in the fuel and energy sector, including oil & gas fields in Tengiz, Kashagan and Karachaganak. Together with local generating companies like *Samruk-Energy*, GE is modernizing power plants with major projects located in Almaty and Nur-Sultan. GE air quality control systems help reduce emissions at power facilities with a combined generating capacity of 5 GW, including units at *Ekibastuz SDPP-1*.

In renewable energy, GE together with its Italian partner Eni have completed construction of the 48 MW *Badamsha Wind Farm* featuring thirteen 3.8-130 onshore GE wind turbines.



The project will deliver a 25% increase in Kazakhstan's wind capacity, driving the country toward its goal of increasing the share of renewables in the energy mix to 50% by 2050.

GE has also completed several projects to modernize grid infrastructure in Kazakhstan through advanced technologies, including upgrades of switchgear at the Pavlodar, *Ekibastuz SDPP-1*, and *Ekibastuz SDPP-2 power plants*. Through GE's partnership with KEGOK, GE grid equipment was delivered to 15 projects, including the 500 kV *MNES-1*, North-South, and North-West power line projects.

GE's service solutions to boost reliability of power generating facilities

It is rare to find a gas-fired power plant that operates the same way it did the day it was commissioned. Fluctuations in demand, fuel, and operating envelope require different load factors and characteristics. This ability to rapidly adapt to changing dynamics is often key to long-term sustainability.

Regardless of plant type, composition, or asset mix, GE offers total plant **and** fleet-level solutions. While delivering tailored solutions for all major power plant components, our broadened understanding of system-wide operation is applied to unleash better performance, lower risk, and to generate greater value across customer power generation operations and facilities.

With support from GE's global network of 40 service centers, the company has proven processes for repair solutions that keep power facilities up and running and enhance plant performance. GE opened the *Energy Technology Center* in Kaluga (Russia) in 2011, currently the largest GE service facility in Europe in terms of gas turbine repairs' volume. The center's Eurasian Customs Union location ensures GE's partners across the region have world-class service on their doorstep, which brings benefits including time and cost savings.

The *Energy Technology Center* provides services for GE's own fleet, as well as the SGT-800 turbine manufactured by Siemens. In addition to advanced solutions for maintenance, inspection and repair of gas turbines, the center also provides maintenance and repair of non-destructive testing equipment for the oil & gas industry. The annual capacity of the site, which operates according to a quality management system in accordance with ISO 9001, is in excess of 55,000 hours of repairs.

Services for power generation include gas turbine upgrades to boost existing power plant output. For example, GE's innovative *Advanced Hot Gas Path (AGP)* technology can be applied to 6FA, 7FA, 9F (A&B) and 9E gas turbine models to deliver improved combined cycle gas turbine output by up to 4.2% and drive combined cycle gas turbine heat rate up by 1.2%. Increased availability and lower maintenance costs due to 32,000 factored fired hour (FFH) and 900 factored fired start (FFS) intervals, as well as increased per megawatt

fuel efficiency resulting in reduced emissions, help optimize lifecycle operating costs and meet environmental standards.

GE's AGP technology has been installed on 435 units in 39 countries on five continents since 2010. It has delivered significant economic benefits for customers around the globe, including generating savings close to \$1 billion a year and providing around 7 GW of additional power capacity.

Digital solutions can improve the performance of gas turbines even further, in both performance and economic terms.

Digitalization of power infrastructure to further enhance reliability

The Information Age has impacted every industry, from retail to healthcare. Power generation has been no exception.

Digital transformation of the world's power sector has the potential to generate more than €1.3 trillion in gains over the next years. The industry is increasingly employing advanced data analytics to help predict and eliminate unplanned downtime while improving plant reliability, availability and flexibility. As data is collected and analyzed, we can expect to see utilities and industrial operators of the future become ever more predictive and prescriptive by tracking the performance of gas turbines and other equipment in real time as units are in operation.

Digital technologies enable power plant operators to maximize the plant flexibility on an individual basis. Ranging from software add-ons to fully digital networks and controls, fossil fuel-fired power plants can benefit immensely from GE's vast portfolio of digital offerings.

ENEL, Europe's largest power utility by market capitalization, adopted GE's predictive diagnostic software solutions to support the digitalization process of 14 thermal power plants in Europe and Latin America. GE and Enel deployed and optimized GE's *Predix* Asset Performance Management (APM)* solution at 13 gas-fired power plants and 1 coal-fired power plant, with a total installed capacity of 7 GW, in order to monitor, predict and enhance the reliability of the facilities.

Much closer to Kazakhstan, in Tatarstan (Russia), GE is successfully implementing several digital projects to boost power equipment efficiency. In particular, GE's *APM* package is supporting operation of the 405.6 MW 9HA gas turbine, by far the most powerful and efficient class-leading GE gas turbine operating in the Russia/CIS region, installed at TAIF's modernized Kazan TPP-3. Thanks to the early detection of deviations provided by APM, the risk of equipment failure and expensive repairs has been significantly reduced.

GE's *OpFlex* software solution is controlling the operation of two combined cycle power units at Kazan TPP-2, based on 6F.03 gas turbines with a single capacity of 77 MW. Dozens of

sensors installed on the turbines help collect data and provide analysis that allows real-time insights into unit performance. Automatic setting of the optimal combustion mode helps to increase overhaul intervals from 24,000 to 32,000 hours. The *OpFlex* system also features the Cold Day Performance function, which enables GE gas turbines to successfully operate under increased load at low ambient temperature.

In power transmission, GE's pilot deployment of a *Unified Automated Control System* for Tatarstan's Grid Company, which operates the local power network, is the first step towards the creation of a digital twin of the country's power grid, which will be the first of its kind in Russia.

In Kazakhstan, GE has begun unleashing the potential of digital solutions for its customers in the country's power sector by supplying an advanced system for operational monitoring of synchronized vector measurements (*Wide Area Monitoring System, WAMS*) for the 500 kV North-South power corridor. This pilot project has been implemented as part of the strategic

partnership agreement on digitalization with *Samruk-Kazyna Holding*, that was signed in 2018. The *WAMS* will enable the optimization of the transmission capacity of the Kazakhstan power system and reliability of operations through enhanced situational awareness, more accurate risk assessment of possible instabilities and greater efficiency in the management of emergency events.

Digital transformation is underway around the globe, helping bring industrial efficiency to new heights. Considering the strategic importance of the energy sector for Kazakhstan, including both the oil & gas and power industries, the time has arrived for the country to drive further economic growth by deploying innovative technologies in key industrial sectors. GE's advanced integrated solutions based on the company's broad industrial experience, global manufacturing base and expertise in digital technologies, can maximize economic benefits, ensuring the reliability and efficiency of power equipment and supporting Kazakhstan in achieving the country's economic development goals.

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HALLIBURTON INTEGRATED WELL INTERVENTION – THE KEY TO MAXIMIZING ASSET VALUE

by George Walker

Caspian East Integrated Well Intervention Manager
Halliburton

Halliburton has been present in Kazakhstan since 1993, a long-term commitment to the country and its oil industry. The company performs well interventions onshore and offshore including well diagnosis, well repair and production improvements through the lifecycle of the well.

Halliburton collaborates and engineers solutions to maximize asset value for its customers, which in the well intervention market means optimizing production as efficiently as possible, extending well production, and providing an effective plug and abandonment solution at the end of the economically productive life of the well.

Historically, in the oil industry, well intervention has been split into various small specialist workgroups such as slickline, electric line, coiled tubing, hydraulic workover, stimulation, pressure pumping and well testing. Each group provided an engineered solution for the individual work scope that they performed on the well. These components required individual crews and equipment packages, which created opportunities to make the well intervention process more efficient.

Halliburton's goal is to have these specialist workgroups collaborate in a single cross-discipline unit, and so the company implemented a local integrated well interventions (IWI) team to drive greater efficiency across operations. This is not only important because of rig time and equipment spread costs, but more importantly the significant cost of delayed production revenue caused by shutting in the well.

A typical well intervention and stimulation campaign involves up to six individual specialist work groups and their equipment, all working concurrently. In the offshore environment where the equipment is skid-based, the swap over between services involves multiple crane lifts, and is all weather dependent. Through cross-training of personnel across multiple disciplines, the team reduces wellsite personnel by 25 percent.

Additionally, the separate workgroup approach can lead to the well not producing for 12 days. This affects the operator and partners who base their investment decisions on asset payback, and it affects shareholders focused on financial performance.

In 2017, Halliburton started well interventions with an operator in the Caspian Sea and, using the Halliburton business mainstay of listen and respond, the company built a local IWI team to minimize deferred production and reduce the amount of time to shut-in wells for intervention operations. By doing this, Halliburton saved up to 40 percent of the time required to perform the well intervention against the AFE and reduced the time to complete the operation from 12 days to seven. Overall, this reduced the deferred production revenue by over 35 percent.

Halliburton continues to work with the customer to implement new technologies for improved diagnostics and to increase efficiencies. The current plan includes running Halliburton's *Electromagnetic Pipe Xaminer® V (EPX™ V)* pipe inspection system that will allow the operator to quantify metal loss in up to five concentric strings of pipe. This is a significant step forward in quantifying well integrity in the aggressive high H2S environment in the Caspian and Western Kazakhstan.

The team is also working with the customer to deploy Halliburton's *RELAY™ Digital Slickline* and *Spectrum Fusion™* technologies. *RELAY™ Digital Slickline* increases the efficiency of wireline and slickline operations. In a typical well intervention operation, the mechanical slickline and electric line logging operations are concurrent with, depending on the specific task, multiple equipment changes at the wellhead connection along with various crew changes.

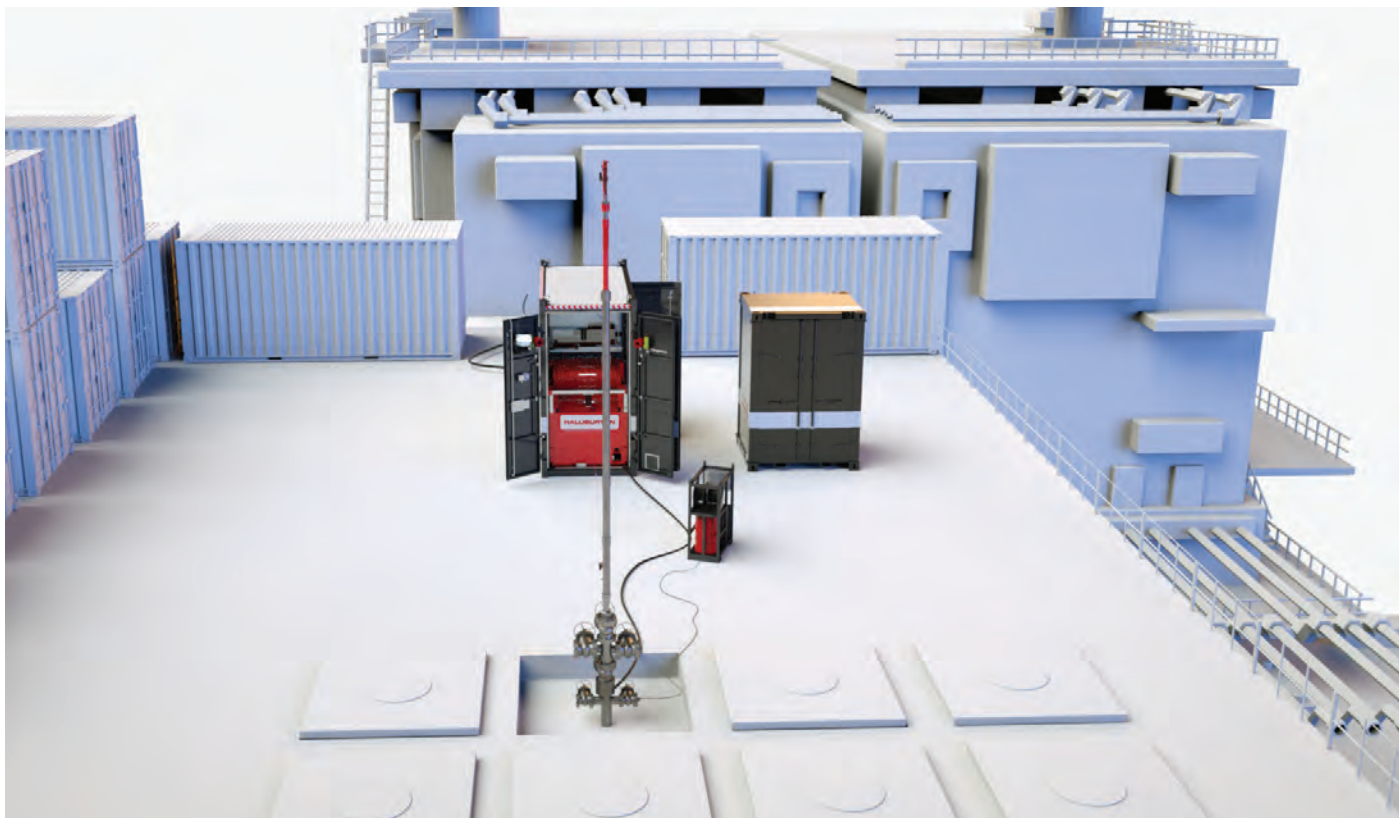
With *RELAY™ DSL*, Halliburton can eliminate crew and equipment change over. All initial slickline mechanical work, such as gauge cutting, pulling locks and shifting sleeves, are completed with surface readout casing collar locator, pressure, temperature, inclination, relative bearing and downhole stress sensor data. All typical e-line services that require precision depth control for plug setting, perforating, pipe recovery, production logging, cement bond logging and pulse neutron services also can be completed during this rig up with the same crew.

The value to the operator is increased efficiency, reduced deferred production, and less equipment and personnel required during this phase of the intervention.

Halliburton's *Spectrum Fusion™* real-time coiled tubing system allows the company to perform many of the same tasks on coiled tubing without the need to swap between slickline, electric line and coiled tubing. The technology's real-time depth control with an integrated gamma ray and casing collar locator avoids the need for dummy runs and electric line depth setting of plugs and packers or other depth critical devices in the well.

The fiber optic telemetry system provides real-time bottom hole pressure and temperature data to refine the operation based on the reservoir data collected at surface. This technology enables a step change in efficiency while providing data to ensure the treatment is targeted to maximize reservoir performance.

Over the last three years, Halliburton has worked with its customers to optimize and increase production in a more efficient way than historically possible through implementation of the IWI model and our new technologies. The result is less deferred production revenue and increased well intervention efficiency, which means the operator can do more to maximize their asset value by increasing production in less time. This has a substantial impact in the Caspian Sea where there are seasonal work constraints.



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The Halliburton RELAY™ digital slickline system's real-time depth correlation and on-command triggering allow E&P operators to complete well work, using a smaller unit with fewer rig ups to maximize efficiency. The RELAY digital slickline system minimizes intervention and environmental risk by combining the versatility and efficiency of traditional slickline with the real-time data-streaming capability of electric line.

Additionally, downhole sensors allow mechanical interventions, such as shifting sleeves and pulling plugs, to be confirmed in real time, providing confidence that the planned work has been completed before pulling out of the hole with service tools.

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GATHERING GREATER INSIGHT FROM COMBINED ASSET-PROCESS DIGITAL TWINS

by Murali Mandi
Chief Operating Officer
Honeywell Connected Enterprise, Industrial

In asset-intensive production environments – from offshore platforms to refineries, pit mines to pulp and paper mills – business leaders face unrelenting pressure to compete through maximized uptime and efficiency of their industrial operations. In response, they are investing heavily in software technologies that help drive continuous improvement and greater overall equipment effectiveness (OEE) across their enterprise.



To this end, the integration of rich data sources – from both plant machinery and the processes served by the machinery – is a key element in the application of modern predictive analytics and digital twins. By harnessing the right data and leveraging domain knowledge throughout the evolution of industrial equipment design, plant operations leaders will set the stage to reveal opportunities for greater process optimization, increased asset reliability, and overall productivity gains over and above improvements achieved already.

Process and assets have always had a synergistic relationship, in both operation and evolution. From a historic perspective, for decades process engineers worked directly with original equipment manufacturers (OEM) to maximize that synergy by pushing asset designs to best align with process quality and other operational needs. Through these interactive relationships, OEMs evolved plant process equipment and rotating machinery designs to address industry's need for a balance of throughput, energy efficiency, and asset reliability and longevity.

Maximized designs were achieved through continuous application of advanced metallurgies, precision manufacturing methods, and refinement by finite-element performance modeling methods – just to name a few. However, as machine designs matured, incremental improvement through successive design iterations became increasingly difficult to capture.

Instead, acceleration of subsequent improvement was found through utilization of advancing technologies in specialized monitoring and optimization solutions, such as machine condition monitoring systems, process modeling software, and

advanced process control methods. Today, these advanced or “expert” systems synergize data collection with data processing for specific needs, for example, specifically for process or asset health.

The data derived from these independent systems (process historians and advanced process control) serves personnel operating the plant delivered to maintenance teams and rotating equipment groups (machine diagnostic systems), and to process engineering teams tasked with controlling quality while maximizing throughput (process modeling systems).

Given such history, all would seem well, but there is at least one major caveat. Throughout the evolution of “expert” systems, the experts and their trusted tools matured relatively independent of one another. They did not naturally grow to work as collectively as they should – at least within the level of harmony that we now know is required to accelerate continuous improvement to next-level productivity gains.

The problem is not the people, of course; the issue is that distinct plant groups typically own the responsibilities of asset management and process management. Accordingly, both their tools and their data reside siloed within respective groups. Likewise, each group conducts its own complex and time-consuming analysis within the backdrop of a just-in-time production environment. And while each group appreciates the importance of each team's domain experience and organizational role, they are simply too challenged to undertake the arduous task of manually collating data sources, synchronising data collection times, and interpreting anomalies represented in a combined dataset to reveal new improvement opportunities.



It is within this setting that a confluence of process and asset domain experts and their systems' data should resonate, but in practice often fail to align. Accordingly, this is where asset-process digital twins are most poised to provide a similar synergistic foundation as that underpinning plant technology's evolution throughout history.

Digital twins are not new. The term may be new, but performance models built by OEMs for their engineering needs represent the archetype of digital twins. Where OEM models

are not available, models may be created by independent companies or the end-users themselves, using engineering first principles. Whether OEM engineered or created by others, often such models are run as calculations in a special offline program, within a simple spreadsheet, or run in process simulation programs (the overall process digital twin).

For machine asset health, the twin is not nearly as obvious, but in many vibration-based condition monitoring and diagnostic software packages, the twin is effectively represented in graphical form. Each graphic or plot is generated from time-based waveform data. A simple example of this is the use of displacement type sensors on fluid-film bearing machines to determine, with high precision, the location of the rotating shaft within the bearing journals. It is a digital twin of the shaft's position, which serves a highly useful purpose in determining machine unbalance, misalignment, and provides overall insight to the various forces acting on the rotating shaft, including forces from the lubricating oil itself.

Similarly, in the case of roller-element bearing type machines, time waveforms are converted to frequency spectrums that may serve as a primary digital twin. Among other things, the twin represents the bearing's elements (e.g. the balls in a ball bearing) and helps identify both general forces as well as deterioration affecting bearing surfaces. No matter how accurate the digital twin, the operation of the same piece of equipment can be quite diverse. The actual performance of the asset is a combination of machine design and operational environment, which is where the process with which the machine interacts becomes critical.

Rarely does the process digital twin operate in unison with the asset health digital twin. Typically, these two analysis methods only come together when the respective domain experts come together to reactively troubleshoot a major issue. An example may be when a process upset drives a centrifugal compressor into severe surge, causing costly downtime and damage. Another example may include unbalance attributed to non-uniform blade fouling from process changes, or unbalance and other issues arising when that same compressor ingests liquids produced by the process or by liquids ineffectively removed by dedicated upstream separation processes.

Often the precursors to such events are identifiable from the combined expert system data presentations. However, since process historians typically do not hold such rich data and are incapable of sophisticated data processing, and the process and asset expert systems are unintegrated, instances of unplanned events are more frequent. The reality of this disconnect between the asset and process groups is for both machine and process parameter settings to be more conservative – and therefore inefficient.

Ultimately, an effective asset-process digital twin combines data from expert systems and provides automated delivery of key processed data. The latter point being most applicable to an asset health twin, which in its current graphical form requires a person to view and interpret key aspects of machine condition. The combined asset-process digital twin addresses this and provides the foundation for predictive analytics methods that far exceed analytics performed on historian data alone.



PRIVATE NETWORKS FOR INDUSTRIES: ERICSSON PRIVATE NETWORKS SOLUTIONS

by Ruslan Utegenov

Head of Networks and Managed Services, Central Asia
Ericsson

Since the first industrial revolution, mankind has constantly pushed the boundaries of innovation. The next step is *Industry 4.0*, leading to the digitalization of Kazakhstan's economy, and a necessity for the country's future economy. In early 2017, President Nazarbayev set the country on the path towards digitalization with the *Digital Kazakhstan Program*. Until 2022, over 141 billion tenge (not including private sector investment) will be allocated to this project from the national budget.

Digitalization in the *Fourth Industrial Revolution* requires widespread use of automation, robotics, artificial intelligence, and big data. To achieve this, the government will take measures to overhaul Kazakhstan's industries by 2025. However, this revolution isn't fueled by technology alone. Highly skilled workers are required to support this transformation, and for this purpose the government has developed a training program to prepare 10,000 specialists in key industries.

Digital transformation has long remained at the top of the agenda for many businesses. *Industry 4.0* calls on all industries to collect and utilize data to develop new *IoT (Internet of Things)* revenue streams and to optimize expenditures and savings. According to the Arthur D. Little report, 5G and private networks to increase 86% from 2020 to 2030. Additionally, ABI Research forecasts that the smart manufacturing market will grow by up to one trillion USD with 4.3 billion wireless connections by 2030.

Practically all industry sectors are pursuing operating models that improve security and productivity through analytics, automation, and machine or device communications. Examples include factory-floor automation, autonomous automobiles, "smart grid" solutions, high-definition video surveillance, and patient monitoring in healthcare. All these applications require high performance and reliable wireless network solutions.

Both public and private sectors have increasing demands for network coverage, performance, security, and reliability to support critical communications. For many businesses, leveraging an existing mobile operator's public network is adequate to cover the basic needs for connectivity and communication.

However, in many situations, the services provided by public networks are not sufficient to satisfy all of a business's requirements as demand increases for enhanced mobile coverage, capacity, and internal control. In these situations a private network can better accommodate a business's specific needs.

What is a Private Network? What are the Key Benefits?

A private network comprises of *3rd Generation Partnership Project* (3GPP)* products, using the same technologies developed for public networks. Private networks are scaled down to be deployable on the premises (public or private sector) for their industry-specific data and communication needs. A private network offers dedicated resources, which are completely under the enterprise's control. Only authorized devices and users can use the network's resources. Private networks also fulfill critical capabilities to interconnect people with machines, vehicles, sensors, and other devices.

The advantages of a private network – low latency, high data capacity, security, coverage, seamless mobility, survivability, interoperability, local control, and optimization – enable its usage across a wide variety of industries, functions, and value chains. Private networks can be deployed for a variety of industries such as mining, utilities, seaports, and healthcare. They may either be deployed broadly across industries (horizontally) or specifically for a particular industry (vertically).

Some of the use cases typically discussed are as follows:

- *Factory-floor automation*
- *Real-time situational awareness*
- *Preventive maintenance*
- *Workforce management*
- *Machine utilization optimization*
- *Risk management*
- *Remote asset control*
- *Worker health and safety (with AR/VR or push-to-talk voice)*

These cases require high levels of network performance combined with data management capacity, reliability, quality of service (QoS), latency, security, and flexible coverage. Business-critical cellular connectivity solutions are well-suited to provide the different characteristics necessary for each of these cases. *Figure A* illustrates the potential components of a private network.

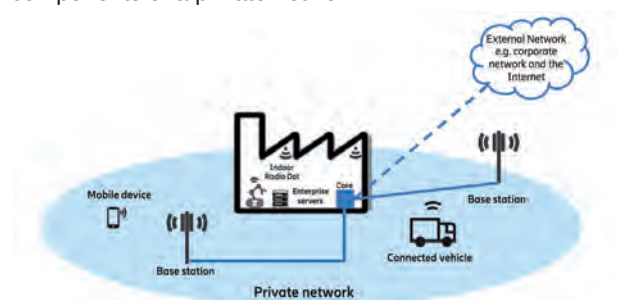


Figure A. Illustration of a private network

* The 3rd Generation Partnership Project is a standards organization that develops protocols for mobile telephony. It covers cellular telecommunications technologies, including radio access, core network, and service capabilities, which provides a complete system description for mobile telecommunications.

Private networks are currently based on 5G compatible LTE networks. LTE technology delivers the best performance and speeds available today. With 5G, there will be further enhancements: higher bandwidth (both uplink and downlink), shorter latency, and flexible resource allocation. Private networks provide several advantages over competing technologies and applications. The competition includes mobile operator public networks, fiber, ethernet, Wi-Fi, Bluetooth, and WiMAX. For some organizations (police, fire, ambulance, and emergency services) the main communication services used today are based on *Land Mobile Radio (LMR)* technologies compliant with standards such as *TETRA* and *Project 25 (P25)*.

Private networks include all the components required to operate an independent mobile network: dedicated radio equipment in a *Radio Access Network (RAN)*; connected *User Equipment (UE)* such as mobile devices and equipment with SIM cards; and the functionality of a *Core Network*, *Transport Network*, and *Operations Support System (OSS)* to manage network functions. Additional features such as voice functionality can be added as needed. It is also possible to add industry-specific functions and connect the private network to external systems.

A private network always includes mobile broadband data capabilities and can additionally include voice, video, messaging, IoT, and *Machine-to-Machine (M2M)* features. *Figure B* showcases an overview of the generic building blocks of a private network.

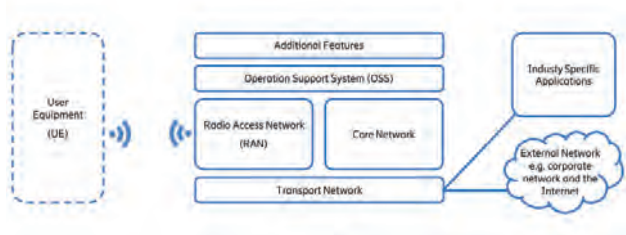


Figure B. Overview of generic building blocks in a private network

Through *3GPP*, *5G/LTE* is intended to co-exist and be compatible with all legacy standards such as *2G* and *3G*. This is accomplished either by operating in the already allocated frequency spectrum or in new portions of the spectrum not yet dedicated to an owner or user.

As a *3GPP* technology, *LTE* benefits from interoperability, multi-device availability, and multi-application capabilities provided by the standard. The standard enables the broad compatibility and availability of commercial devices for embedded communication. This makes the business prospects of using *3GPP* very appealing because private networks are suited for the total, cost-efficient evolution

of critical communications services. This is crucial since network evolution will be limited for enterprises using proprietary, non-standard solutions in this constantly evolving “ecosystem.”

A private network offers end-to-end security with immunity from illegal intrusion. As a part of the *3GPP*-specified security architecture, it would also make use of multiple security mechanisms to protect devices, data, interfaces, and other elements of the network. This architecture ensures secure authentication for users, secure encryption, the integrity of signaling, and the integrity of user data and privacy. Purpose-built firewalls and additional security appliances can be integrated with private networks to ensure compliance with national security requirements.

As more use cases are consolidated within the same network, enterprises will be more dependent on the network’s service. To ensure *QoS* over a wireless medium, private networks operate on a licensed spectrum. Access to the licensed spectrum is achieved through mobile communications service providers. Additionally, several countries are currently considering directly licensing *4G* and *5G* spectrums to enterprises and governments. The US and Germany are among those announcing licensed spectrum allocation for mission-critical and industrial use.

There are three different ways for enterprises to gain access to a spectrum required for the deployment of their private networks, and, in each case, Ericsson works with its partners to provide this service.

- Firstly, through mobile network operators (*MNOs*), who have access to the licensed spectrum and offer private network services.
- Secondly, through the use of a segment-specific spectrum, which the regulator allocates directly to users. This arrangement is found in applications such as public safety, rail, peacekeeping, and defense.
- Lastly, through the use of a shared spectrum, not tied to mobile operators, that is made locally available - as with *Citizen’s Broadband Radio Service (CBRS)*.

Among Ericsson’s deployed private networks, the dominant industries are public safety, rail, utilities, defense, and oil and gas. Ericsson is also working to expand its focus to cover seaports, airports, hospitals, stadiums, campuses, and mines while developing its healthcare, manufacturing, and warehousing applications.

One example of a successful industrial digital transformation is *Tampnet*. *Tampnet* is a telecommunications operator for subsea fiber-based data communication and *LTE*-based mobile broadband services for the offshore oil and

gas industry. *Tampnet* operates large-scale offshore high capacity communication networks in the Gulf of Mexico and the North Sea, serving more than 240 oil and gas platforms; floating production, storage, and offloading units; and exploration rigs. As a result, premium LTE coverage covers both regions' oil and gas industries, its resellers, and its roaming partners through *Tampnet's* secure, high-performance, and next-generation compatible networks.

Another example is *Telenor Maritime* in Norway. The offshore oil and gas industry faces difficult times, and improving operational efficiency is key to adapting to these conditions. Consumers expect to have access to the same services wherever they are: on land, onboard a supply vessel, on a rig, or on an oil platform. Ericsson supports *Telenor Maritime* in developing 4G coverage for the oil and gas industry to improve, standardize, and simplify communications between platforms, rigs, and vessels.

Why Choose Ericsson's Private Network Solution?

For over 140 years, Ericsson has been a trusted partner in the telecommunications industry. Always on the "cutting edge" and providing high-quality service, Ericsson is trusted the world over. It is a global leader when it comes to building, maintaining, and operating mobile networks, and its services can support enterprises world-wide. It is also compliant with all regulatory standards and is trusted to deliver critical solutions and services in both the public and private sectors.



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BECHTEL – BUILDING A LEGACY FOR KAZAKHSTAN

by George Whittaker
Regional Business Development Manager
Bechtel

The availability of skilled professionals and laborers is the backbone of any sustainable industry. This is no different for Kazakhstan's oil and gas industry. According to the *Organisation for Economic Co-operation and Development (OECD)*, investing in skills and human capital is crucial to tackle Kazakhstan's strong dependence on natural resources and embark on a path of economic diversification.

The OECD further states that investing in skills is also crucial to improve labor market prospects and job quality for Kazakhstan's population. That is why Bechtel recognizes the importance of utilizing our projects as a means of improving the skill-levels of the local population, improving the supply chain in the areas in which we operate, and introducing technology solutions to optimize cost, schedule, and performance.



Figure 1 Electrician Training

Bechtel has more than 25 years' experience in Kazakhstan as a trusted engineering, construction and project management partner to the oil, gas and chemical industries and government. With over 120 years of company history to stand behind, Bechtel is known for both its technical excellence and track record of ethical project practices. In 2000, as a sign of our commitment to Kazakhstan, Bechtel with ENKA formed *Senimdi Kurylys*, a wholly Kazakh incorporated company.

As a result of our involvement in projects across the globe, Bechtel has been able to develop processes that maximize the benefit to local communities. Our local workforce development programs promote inclusivity, modernizes the construction sector, and prepares people for opportunities beyond the projects where we work.

Developing a legacy for the future

For Bechtel, before construction on a project begins, we launch local content and sustainability programs. Community and Governing Authority engagement is key to ensuring a successful program and any sustainability plan should be developed with the input from these key stakeholders in mind. Two areas of focus for Bechtel's programs are increasing the capabilities of local suppliers and developing the workforce for the future. We focus on long-term employment and market opportunities, offering training and support that helps workers and local businesses take advantage of opportunities beyond the construction phase of the project.

Previous experience has shown that a staged approach, coupled with early engagement, sets a solid foundation for a successful supplier capacity development program. As part of the process of increasing local supplier capacity, Bechtel will often develop a schedule to conduct group and one-on-one workshops for suppliers to educate them on the process to become a supplier to the project.

Topics will be dependent on individual needs but may include contracts, pricing, invoicing, HSE, quality, ethics, and human rights compliance. Additionally, the development of support mechanisms to build the capacity of suppliers and partnerships or joint ventures between companies of different sizes, resources, and experience has proven successful.

Bechtel's Supplier Enhancement Program (SEP) is specifically designed to help local suppliers overcome their existing limitations by supplying capacity-building and other support mechanisms specifically designed to close any gaps.

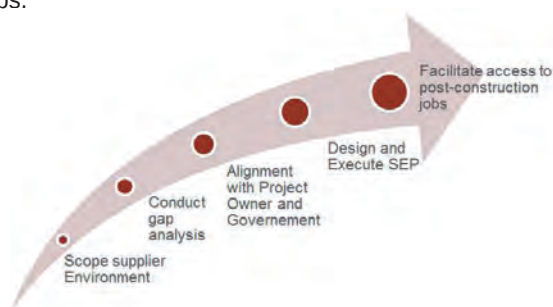


Figure 2 Supplier Enhancement Program

Workforce training and development is key to regional success. Bechtel first performs a labor assessment and gap analysis. We then compare the results of scoping and gap analysis to project workforce needs and to identify the most promising job types for local people. We design worker enhancement programs, including recruitment and hiring processes, works contractor support, skills training, work culture training, on-the-job training, safety training,

and supervisor training and awareness. For the workforce, Bechtel's training syllabus is typically split into three parts: *classroom*, *basic hand-tool skills*, and *on-the-job training*.

Technology transfer

Technology and knowledge transfer remain one of the key areas of contribution that can be provided as an ongoing legacy during the execution of oil and gas industry projects. Since 1898, Bechtel has been a pioneer of innovation in the industry. In addition to completing thousands of one-of-a-kind projects, it has led advances that changed the industry forever.



Figure 3 Manlift Virtual Reality Training

Conclusion

Looking towards the future in Kazakhstan, Bechtel and *Senimdi Kurylys* are working to make technologies available such as e-procurement and virtual reality training. Bechtel knows that its customers value collaboration toward developing design solutions that optimize cost, schedule, and performance. Improving construction productivity in the field is a major contributor to both cost and time to market. Bechtel currently has over 150 deployments for 47 projects around the world, utilizing innovations that were discovered, developed, and deployed by its people.

Bechtel's goal is to transform the business by evolving, integrating, and digitizing its work processes and management systems – making lean execution and instantaneous mobile access to accurate digital information its “new currency.” It is through these processes that Bechtel believes it will deliver improved efficiency to the industry. These new innovations are shared with Bechtel's clients and employees so that the legacy of the benefits they bring remains long after the project is concluded.



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SUBSOIL USERS' CONTRACTUAL OBLIGATIONS: RECENT TRENDS IN KAZAKHSTAN'S COURTS

by Sofiya Zhylkaidarova
Managing Partner, Signum Law Firm
Nelli Baltabayeva
Associate, Signum Law Firm

For readers' convenience, the following article divides subsoil users' court disputes into 4 groups: tax, customs, ecological, and contractual. The vast majority of these cases involve disputes between investors and government agencies in the course of investment activity. The article analyzes court practice in recent years to identify trends in resolving disputes over contractual obligations.

Contractual Disputes: When and Where?

According to the Civil Procedure Code¹, the Nur-Sultan Court has exclusive competence over investment disputes as a court of the first instance, and the Supreme Court has exclusive competence over disputes with major investors. A major investment is determined to exceed 2 million times the monthly index (roughly 14 million USD). This figure is based on the planned investment as opposed to the actual investment.

The judgments of the Nur-Sultan Court enter into force according to the general rule and may be appealed to the Specialized Division of the Supreme Court. Supreme Court judgments enter into force on the day they are issued and can be appealed to the Court's Special Civil Cases Division.



Contractual Disputes: Parties and Claims

The parties to contractual disputes are typically the Ministry of Energy (the Competent Authority) and subsoil users. Review of cases over the last three years show that most were initiated by the Ministry of Energy. Claims initiated by subsoil users against the Competent Authority are virtually non-existent.

Most claims are based on violations of contractual obligations and the resulting penalties. These obligations include:

- Financial commitments;
- Local content requirements in procurement;
- Local content requirements in human resources;
- Training, professional development, and re-training of Kazakh employees;
- Contributions to local social and economic development projects;

- Contributions to research and development projects;
- Contributions to the Liquidation Fund.

Critical Issues

Ministry of Energy: Friend or Foe?

In relationships with subsoil users, the Ministry of Energy performs a dual role as the Competent Authority and as a party to the contract and as the plaintiff in court. This dual function causes a disparity in the position of the parties. According to the legal and contractual requirements, the subsoil user must submit quarterly reports (LKU) on fulfillment of contractual obligations to the Competent Authority. In this instance, the Ministry of Energy is the Competent Authority.



However, further down the road, the Ministry of Energy can use this information in court to support its claims against the subsoil users. The subsoil users thus submit important evidence later used against them in court, therefore alleviating the burden of proof for their opponent. This infringes on fundamental principles of civil procedure like the adversarial system and equality of parties. The explicit alliance and support of the Ministry's claims by the prosecution cannot come as a surprise.

Contract Performance: Financial or Physical?

The work program attached to the contract specifies the subsoil user's obligations on volume and type of work, as well financial obligations for each year. The Ministry of Energy has the exclusive competence to not only check on the investments, but to verify the physical performance of the contractual obligations.

The Ministry sometimes files complaints against the subsoil user demanding fulfillment of its financial obligations plus penalties for contractual violations without checking on physical performance, ignoring the fact that the scope of work was in fact performed with financial savings. In these cases, the claims should not be resolved in the Ministry's favor.

Support of Local Content at Investors' Expense

In cases concerning local content requirements in procurement contracts, the courts exclude costs they regard as violating procedures for purchasing goods, works and services (such as no registration number in the registry) or for purchases made outside Kazakhstan from the calculation of expenses required to meet financial obligations. Once these expenses

¹ Civil Procedure Code, Clause 4 Article 27.

are excluded, the courts conclude that the subsoil user has failed to meet its contractual obligations, entailing a penalty of 30% of the 'non-performance' amount. This shows that the government agencies and state courts care more about formalities than substance.

Calculating Penalties: A Fair Rate or For-Profit?

Violating contractual obligations entails penalties as high as 30% of the 'non-performance' amount for subsoil user. Although the 2015 Ministry of Energy Order² reduced the rate to 1% in favor of the investors, this is ignored by judges who claim it does not apply retroactively.

Pretrial Procedures: Last Minute Claims

The courts reject subsoil users' arguments related to failure to observe pretrial procedures under the contract and rules of civil procedure. In most cases, the Ministry of Energy sends a notice about violations within a year following the violation. After the Competent Authority receives the subsoil user's response, the violation and response are "forgotten" for several years. Then the Competent Authority suddenly remembers the violation and jumps into action a few weeks before the statute of limitations expires, leaving the subsoil users without enough time to settle the issue before trial.



The Ministry of Energy is also exempt from paying the fee for filing a claim, but if the court decides in favor of the plaintiff, the fee is collected from the subsoil users. Thus, the subsoil users carry the burden for expenses that could have been easily avoided.

Statute of Limitations: The Main Obligation and Additional Obligations

Subsoil users question the statute of limitations because most cases are based on claims from 2014-2015, after expiry of the three-year statute of limitations. However, even then, the courts rule against the subsoil users. The courts rule that the penalty is a new additional obligation with an indefinite due term. They hold that the penalty dates from the moment the subsoil user receives the notice from the Competent Authority,

not from the moment of the contractual violation. On this basis, the courts hold that the three-year statute of limitations for imposing penalties through the court should be calculated from the expiry date of the term for its voluntary execution.

According to the Civil Code³, expiry of the statute of limitations for the main claim means expiry of the statute of limitations for additional claims such as collecting penalties. At dispute is the main claim by the plaintiff (Ministry of Energy) against the subsoil user regarding its contractual obligations. Therefore, the penalty is an additional claim arising from the contractual obligations. Expiry of the statute of limitations for contractual obligations thus means expiry of the statute of limitations for penalties.



It is the general rule that the statute of limitations begins on the day when a person learns or should have learned about the violation of his rights⁴. We therefore believe that the statute of limitations begins on the day the Ministry of Energy receives the subsoil users' annual report (normally January of the following year). The courts, however, take the date of the notice as a starting point, and this is a mistake.

Summary

This brief analysis of recent court practice for disputes about subsoil users' contractual obligations leads us to the following conclusion. In the vast majority of cases, the dual role of the Ministry of Energy as a controlling government agency (the competent authority), as well as party to the contract predetermines the courts' outcomes in favor of the state. Unfortunately, investor interests and a favorable investment climate remain only declarations.

Creating a balance of interests is essential. Regulation of an important industry such as the oil industry should not be repressive. Subsoil users have an interest in conducting a project successfully and the state has an interest in managing its natural resources with maximum profitability. It is crucial to find a common meeting ground for these interests and channel Kazakhstan's natural resources in a way that will stimulate development of this industry and the national economy.

² Order of the Ministry of Energy No. 260 dated 31 March 2015.

³ Civil Code, Part 2 Clause 3 Article 179.

⁴ Civil Code, Clause 1 Article 180.

BEHIND THE SCENES WITH AN OIL AND GAS CONNECTED WORKER

by Vincent Higgins, General Manager
Honeywell Connected Worker / Workforce Competency
Veronica Turner, Business Development Leader
Honeywell Process Solutions

These days, a guest to an oil-producing installation who hasn't visited such installation for a long time would be shocked by how much the work has evolved. That's because, having arranged for the shift from baby boomers to a millennial staff over the past decade, we're now in the middle of the workforce handover. Indeed, many of the boomers who have largely shaped the current oil and gas sector have already stepped down, with the youngest currently carrying on in their mid-fifties.

Millennials are markedly different from the generation they are replacing. Cultured, technology confident, and determined, they appreciate spare time and the freedom to travel, and they often choose to live in big cities. Economic rewards are far less important to them than having a rewarding, fulfilling job.

According to Pew Research, millennials represent the prevailing generation in the American workforce today, and consequently, industrial corporations are modifying their working practices and philosophies. One of the main differences between millennials and baby boomers is that millennials, having fully grown up with technology, are accustomed to getting the information they require in one click—and not by running through technical handbooks.

If you were to visit any modern oil and gas installation today, you'd spot evident differences in how staff is onboarded and how they execute their daily tasks.

Training the 21st-century oil and gas production plant worker

While baby boomers regularly worked for a single company for decades or were "lifers," millennial employees usually stay with a company for just two years before they switch jobs. This reality required a complete reflection of the industry's established 6 to 12 month training period.

An investigation established that millennials respond better to experiential learning than passive approaches such as listening to lectures or observing presentations. Therefore, conventional training exercises have been brought into the 21st century by filling them with Augmented Reality (AR), Virtual Reality (VR), and data analytics.

Experiential learning provides millennials what they crave: the chance to be trained by doing – without the real-life security hazards. Today's training programs combine AR (in which computer-generated visuals are infused into real-world settings) and VR, which switches reality with a digital

world in which apprentices can operate or explore oil and gas locations. These virtual surroundings are accessible by trainees furnished with the latest lightweight intelligent headsets or smart glasses.

By manipulating VR, an apprentice might go for a walk at a simulated oil production site to find or do maintenance on a controller cabinet or flow meter, while with AR they can work on the same cabinet or meter projected onto the training room desk.

This approach to hands-on training has been demonstrated to be as much as eight times more effective than standard techniques. That's because AR and VR enable trainees to develop skills remarkably fast, especially increasing the speed of comprehension. Real-life experience can be recreated in a virtual world, allowing the student to rehearse many "real world" events in a safe 3D environment such as executing an emergency shut down of a unit or dealing with a fire or gas leak.

In addition, experiential learning can decrease training timetables to only two months, allowing employers to onboard workers quicker and close the skills gap left behind by retiring baby boomers.

The consumerization of daily rounds

Working procedures within oil and gas facilities are progressively including technologies usually found in homes from the voice control prevalent in *Amazon's Alexa*, *Apple's Siri*, and *Google Home* devices to intelligent wearables that integrate GPS, useful apps, alerts, and biometric data capture. These technologies are changing the on-the-job experience for everyone from field technicians and maintenance employees to plant-floor supervisors.

Here are a few scenarios that explain the dramatic changes.

Ivan, the experienced oil refinery worker

Ivan is a veteran refinery worker who does his rounds with a hands-free, wearable headset computer. It's very different from how he used to work when he joined the facility in the 1980s, but he likes the gadget and is a supporter of technological development. As Ivan goes around the refinery, he retrieves workflows and standard operating procedures on the helmet's display and revises them using voice commands to reflect best practices.

One morning, the central control room gets in touch with Ivan on his headset and asks him to test a device situated several meters away. By means of GPS built into the headset, the fieldworker guides him quickly and directly to the equipment in question. Standing in front of the device, Ivan uses voice command to get diagnostic

information, instruction manuals, and diagrams, as well as real-time process information to correct the issue *in situ*. Self-assured, he spots the solution, works on the repair, and records the process via his headset camera along with step-by-step comments for others to follow in the future.

After completing his job, Ivan saves the video file to the cloud to be retrieved and reviewed later and compared with approved practices. Then he goes on with his rounds, ready to be guided to his next assignment by the control room. Soon Ivan will retire, and as a veteran operator, he will have captured a best practice that others can use in the future just by pulling up Ivan's video with a voice command.

Sophia, the millennial trainee

Having just completed basic safety and practical drills, Sophia—a new member and recent graduate—is ready to start her first-ever round at an oil field. While making her way to her first task, she makes a wrong turn and wanders into a zone in which she's not trained to work. Geo-fencing automatically raises a warning signal on her headset display and at the same time sends another to the control room. An operator contacts her straightaway via her headset to guide her back on the right track.

Later that day, Sophia stumbles upon an unusual task. After calling up the working procedures on her headset, she is still hesitant about how to proceed. Using voice commands, Sophia retrieves a video tutorial and begins work, pausing it to finish each step. When ending the task, however, she gets a sudden device reading.

Unsure what to do, Sophia calls the control room and is connected to Laura, a senior expert working at an oil field in another country. Laura watches the video from Sophia's headset, evaluates the situation and advises her. With Laura's help, Sophia can finish the job and continue her rounds while being supervised by the control room.

One of the advantages of connected technologies is that entry workers such as Sophia can profit from the know-how of experienced workers like Laura—who is in a control room hundreds of kilometers away—regardless of her location in the world.

At the end of Sophia's shift, she uploads the digital workflow from her rounds to a shared repository with just one click, ready to be checked by supervisors for examination or incorporated into broader reporting.

If she had been doing the same work five years earlier, Sophia would have spent substantial time registering her shift comments and discoveries in a notebook attached to a clipboard and moving that information to a central data bank. Without that administrative load, she can make the most of her time on-site, completing tasks that contribute to uptime and operational efficiency.

Tackling abnormal or emergency situations

Another emerging use of connected technology is the management of abnormal or emergency situations. Here are some examples.

Oscar

Through thermal imaging capabilities in his headset, Oscar spots corrosion in high-pressure lines hidden by cladding at a gas condensate field. He is very alarmed because it's in a heavily trafficked zone. Oscar immediately contacts the central control room, which sends an emergency response team to cordon off the area and examine and change the line to eliminate the safety risk.

Later that afternoon, Oscar gets an emergency signal via his headset about an electrical fire in the vicinity. It's minor but could intensify. Using the GPS in his headset, Oscar guides people to the nearest gathering point while the central control room sends the emergency response team to contain and extinguish the fire.

While performing his work, Oscar feels relieved by the biometric technology incorporated into his headset, which detects signs of tiredness, ill health, or injury. He knows that the central control room will be alerted should he fall, or to any change in his sensory capabilities. Using GPS data, central operators can direct an emergency response team directly to him. Similarly, Oscar knows the control room will be warned about gas leaks or lengthy gas exposure through sensors in his headset. Having back-up support gives Oscar confidence as he completes his tasks.

Conclusion

The past five years have seen a transformation in how daily work is executed at oil and gas installations, overlapping with the entrance of millennials into the workforce. The advanced use of connected devices at oil and gas facilities isn't just gathering the specific needs and requests of this new generation—it's also changing the work experience of the baby boomers that continue in the field. As connected technologies continue to develop, oil and gas plant-wide applications will continue to grow, allowing workers to do their jobs in a more safe and efficient way and with greater satisfaction than ever before.



INNOVATION AND COLLABORATION: THE KEY TO REALISING VALUE FROM ARTIFICIAL INTELLIGENCE (AI)

by Dr. Maurizio Pili
Vice-President, Digital Innovation
Lloyd's Register

AI (Artificial Intelligence) is at the top of the agenda for most organisations these days. It encompasses everything from analysing big data to machine learning as well as deep learning and autonomy. AI is one of the disruptive technologies underpinning Industry 4.0 transformation. While it's hard to predict how deeply or quickly AI will go in the industries we serve, at present for now much of the interest in AI derives from the business imperatives of enabling organisations to derive efficiency and risk reduction from large quantities of data.



AI technologies can increase operational efficiency by using large amounts of historical performance data, modelling the risk of complex systems using real-time information, build predictive failure models, optimise supply chain performance, and analyse maintenance records to capture organisational knowledge.

Significant amounts of technology are available as investors and corporations invest billions of dollars into AI firms. The OECD reports that between 2011 and mid-2018 more than \$50b was invested globally in AI start-ups, and this is in addition to multi-billion dollar R&D investments by major tech players such as Google, Amazon, Microsoft, and IBM.¹

However, it is in *applying* AI to business problems where challenges arise. A Deloitte survey found that the primary obstacle to successful AI deployment is the difficulty of integrating "cognitive systems projects" into existing processes and systems.² Shortage of AI and AI-usage skills is another major problem hampering adoption, with the OECD estimating that jobs requiring AI skills have grown 4.5-fold since 2013 without a corresponding increase in available talent.

Moreover, AI presents highly complex challenges in terms of technology choices, requiring extensive collaboration between domain experts and AI specialists, which is never a simple, straightforward task. Adopting AI in critical infrastructure industries such as energy and shipping faces additional hurdles with requirements such as interpretability, verification, and auditability.

This is one of the reasons Lloyd's Register formed *LR Aurora*, Lloyd's dedicated industry 4.0 innovation practice. Through the Lloyd's Register renowned subject matter experts in safety, risk and performance of critical assets, technology partnerships, and Lloyd's own growing AI capabilities, Lloyd's Register experts help clients use specific AI approaches to solve critical business challenges. We also set up the LR Safety Accelerator to help clients pilot cutting-edge AI from innovative early stage technology firms to solving tough critical safety challenges.

Over the past year *LR Aurora* has engaged in a number of business-focused AI projects with clients and technology partners.

In natural language processing (NLP), with machine-learning based techniques, Lloyd's Register is working with clients to extract insight from vast quantities of historical data, such as safety reports and maintenance reports. One of the most notable examples is the *LR SafetyScanner* and our work in maintenance analytics with shipping and oil and gas clients as part of LR maintenance optimisation services. LR is also working with partners with innovative approaches based on natural language processing for specific problems, such as London-based Ohalo for automatic anonymisation of documents to allow better and more secure analysis of historical records.

NLP is a particularly interesting and impactful class of technologies because it bridges the traditional world and the increasingly pervasive digital world. In the industries LR serves, operational knowledge and information captured by subject matter experts (such as maintenance engineers or health and safety professionals) is mainly in textual format (often on paper). Moreover, increasing number of experienced subject matter experts are retiring, depleting invaluable operational expertise for vast quantities of historical, unstructured data. Through technologies such as NLP, this knowledge can be extracted and used for training new staff, creating greater insight and the ability to apply the knowledge to risk and performance models.

Computer vision is another technology that can offer a breakthrough for safety applications. This vision is beginning to be adopted in sectors such as construction. More and more solutions are now also addressing the privacy angle in work environments. Through our *LR Safety Accelerator*, LR is working on several pilots addressing client challenges in partnerships with AI start-ups using vision technologies.

LR is working in areas such as detection of human errors in maintaining electricity networks with the deep learning specialist *NumberBoost* and in ship engine rooms with *Invision AI*. LR is also working on detection of eye movement patterns with Denver-based *Senseye* to identify worker fatigue in safety-critical industries, and we are working with the advanced human emotion sensing specialist *Sensing Feeling*, using strong privacy-by-design principles.

¹ <https://www.oecd.org/going-digital/ai/private-equity-investment-in-artificial-intelligence.pdf>

² <https://www2.deloitte.com/content/dam/Deloitte/us/Documents/deloitte-analytics/us-da-2017-deloitte-state-of-cognitive-survey.pdf>

LR is also active in building digital twins, which use detailed models of asset risk and/or behaviours created by combining traditional models with machine-learning from historical sensor and other contextual data. LR has recently performed work in failure analysis for wind farms, fuel consumption modelling in shipping, and optimisation and root-cause analysis for chemical plants.

We are also starting to use state-of-the-art *Auto Machine Learning technologies (AutoML)*, giving the power of these advanced modelling technologies to engineers and practitioners. At the research level LR collaborates with the *Alan Turing Institute*, the UK's national centre for AI and data science, which is working on digital twin projects in applications such as gas turbines, 3D printed bridges and energy distribution.

One final aspect of AI that is key to safety critical industries is assurance. This is a hot topic for many industries, governments and regulators and it is one that will take some time to unfold. LR is active in this space with breakthrough work in creating an assurance framework for digital twins and collaborating with GE to apply this assurance framework to a twin of gas turbines. LR is also at the forefront of technology research with the £10m *LR Foundation's Assurance of Autonomy International Programme* in collaboration with York University.

The potential is very great. Industry is at the cusp of adopting these technologies, and LR believes the two key ingredients are collaboration and innovation. We recommend collaboration with organisations you trust that have the right expertise and capabilities. Start from clear articulation of a business challenge that is hard to solve with conventional methods, define what success looks like, and learn through small but scalable proof-of-value projects.



Business

SMS with no miss

NEW SUBSOIL INVESTOR OPPORTUNITIES THROUGH AUCTIONS

by Mikhail Abdulov
Lawyer, Subsoil Use Department
GRATA Law Firm

Introduction

If an investor wants to engage in oil and gas exploration or production in Kazakhstan, the first step is to obtain a subsoil use right (**SUR**) through a contract (**SUC**). An investor may obtain a SUR either directly (acquiring it from a current subsoil user or from the state) or indirectly (by buying shares in a subsoil user or its direct or indirect parent company ("objects linked to SUR" - **Objects**)).

Another option is to work in cooperation with a national company that has the right to obtain a SUR from the state through direct negotiations. Otherwise the SUR can be obtained from the state only at auction (**Auction**). The last option is to obtain a SUR or Objects through a public sale by a pledgeholder or bankruptcy manager during an enforcement process.

Kazakhstan's *Subsoil and Subsoil Use Code* dated 27 December 2017 (**Code**), which came into force on 29 June 2018, did not substantially change any of the above options except for acquisition of a SUR at auction. The following article below outlines how an investor may obtain a SUR from the state at auction.

Auction Procedures

Territory

An Auction may be held only for subsoil sites included on the map of territories available for hydrocarbons subsoil use in Enclosure 3 of the *State Subsoil Fund Management Program* (**Program**). The latest version of the map may be viewed at <https://gis.geology.gov.kz/geo>.

If the site of interest is not in the Program, then the *Ministry of Industry and Infrastructure Development* (**MIID**) may be asked to include it in the Program. The formal request should contain the coordinates of corner points, type of operation (*i.e.*, exploration or production), type of mineral (*e.g.*, hydrocarbons), as well as the site's administrative location. MIID will request the opinion of the *Ministry of Energy* (**MoE**) and, after consideration, either adopt an amendment to the Program (including the new land plots) or refuse to do so, explaining the grounds for refusal.

Requirements to Participate in an Auction

An investor wishing to acquire a SUR (**Applicant**) must meet the following criteria (**Criteria**):

- The investor must not be undergoing liquidation, corporate restructuring, or bankruptcy;
- The investor must not be in arrears on taxes or other obligatory payments to the state;
- The investor must possess financial assets adequate to fulfill minimal requirements for the volume and type of work required on the site during the exploration period.

If an Applicant applies for an offshore SUR, then in addition to the above Criteria, the Applicant must possess professional experience in conducting subsoil use operations on Kazakhstan's continental shelf or inland waters, or in the sea outside the territory of Kazakhstan (**Offshore Experience**). Relevant professional experience by the Applicant's shareholder can also be considered Offshore Experience if the shareholder owns at least 25% of shares in the Applicant.

Under Article 154.6 of the Code, if a SUR is granted for a land plot at sea, KazMunaiGas must hold at least 50% of the SUR.

Preliminary Stage

If the Applicant meets the Criteria, two types of filings may be made with the MoE, either:

- an application to hold an Auction, if the Auction has not been yet announced (**Initiation Application**); or
- an application to participate in the announced Auction (**Participation Application**).

The MoE considers the Initiation Application within 20 business days and the Participation Application within 10 business days from the date of their receipt.

Auction Arrangements

If the MoE responds positively to the Initiation Application, then it must publish an Auction Announcement (**Announcement**) on its website in Kazakh and Russian. The Announcement must contain information outlined in Article 95.2 of the Code. If the Auction is for a subsoil site for which a SUC was terminated, the Announcement should also contain information set forth in Article 95.3 of the Code.

Due to the latest amendments¹ to the Code, in case of the Announcement, the applicant that has filed the Initiation Application must additionally file the Participation Application with the MoE to participate in the Auction.

The deadline for filing a Participation Application is two months from the date of the Announcement's publication (**Filing Period**).

¹ Amendments to the Code dated 30 December 2019.

The Auction date must be no later than two months from the last day of the Filing Period deadline. Anyone interested in participating in the Auction may obtain information about the Auction during the Filing Period.

Payment to participate in an Auction is determined by the MoE based on the cost of preparing, conducting, and summarizing the Auction results. The payment is non-refundable.

Conducting the Auction

If no applications to participate in an Auction are received or if no Applicant is accepted to take part in the Auction (excluding the person who filed the Initiation Application)² within the filing period, the Commission³ may cancel the Auction within three business days from the final filing deadline. If this happens, the SUC is drawn up with the Applicant who initiated the Auction.⁴ The SUC will follow the procedure outlined in Article 100 of the Code for a contract with the Auction winner, provided the Applicant has paid the first instalment of the signing bonus.

The Auction cancellation will be announced on the MoE website in Kazakh and Russian within three business days from the date of the Commission's decision to cancel.

Until 1 September 2020, Auctions will be held in a standard format, meaning personal participation is required. After this date, Auctions will be conducted in electronic format on the MoE website.

The participant who offers the largest signature bonus wins the Auction. Within twenty business days after announcing the Auction results, the Auction winner must:

- pay the signing bonus set by the Auction or, if there was only one registered participant – the first instalment of the signing bonus;
- send confirmation of the signing bonus payment and the countersigned SUC to the MoE.

The Auction winner must also develop a work program outlining the work's scope, description, and deadlines during the exploration period and attach the program as an integral part of the SUC.

The SUC must contain an annex confirming the site on which the subsoil user has the right to conduct hydrocarbon exploration and/or production.

² The lawmaker appears to presume that the person who has filed the Initiation Application will automatically file the **Participation Application**.

³ The **Auction Commission** (from 1 September 2020, the **Commission for Granting Hydrocarbon Subsoil Use Rights**) (**Commission**).

⁴ The Code does not address whether the SUC can be signed if the person who filed the **Initiation Application** did not file the **Participation Application**.

Within twenty business days from the date of receipt of the signed SUC and payment confirmation from the Auction winner, the MoE signs the SUC and sends a signed copy to the winner.

If the Auction winner fails to pay the signing bonus and/or fails to submit the countersigned copy of the SUC to the MoE by the payment deadline, this person loses the right to sign the SUC and the subsoil site will again be put up for auction.

Grounds for Voiding the Auction Results

An Auction can be declared invalid by the court upon request by a participant or by the MoE for either of the following reasons:

- violation of the Auction procedures in the Code, thereby affecting selection of the winner; or
- submission of misleading information by the person who has signed the SUC, thus affecting the MoE decision to admit this person to the Auction.

Auction participants are entitled to appeal the Auction results in court on the grounds of the first clause above (violation of Auction procedures) within three months of the date of publication of the Auction results.

If the Auction's validity is challenged before the SUC is signed, the signing will be suspended until the court issues a decision on the challenge.

If the Auction is declared invalid, then the SUC signed on the basis of the Auction results is also invalid. If the Auction is declared invalid on the grounds set forth in the first clause above, the Auction winner is entitled to demand return of the signing bonus.

Conclusion

By comparison with previous subsoil use legislative acts, the new Code sets out a more transparent procedure for obtaining SUR by Auction. The major positive developments are: the opportunity to see the territory of all potential Auctions and to include the subsoil site of interest in the Program, a detailed list of restrictions for potential Applicants, and the opportunity to conclude SUCs for exploration and production (by comparison with earlier legislation where exploration and production SUCs generally would have been separate).

And last, but not least, after 1 September 2020 Auctions will be conducted in electronic format.

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DRAFT AMENDMENTS TO PROCUREMENT RULES FOR PETROLEUM COMPANIES

by Yerbolat Yerkebulanov
Partner, GRATA Law Firm

The Procurement Rules¹ play an important role in the day-to-day activities of the petroleum companies operating in Kazakhstan, considering that requests to clarify procurement issues constitute 55% of all requests for clarification of subsoil use issues sent to the Minister of Energy's blog in 2019. This article reviews how the Procurement Rules are applied and the proposed amendments that will change or facilitate the procurement process.

Background

According to the *Ministry of Energy (MoE)*, as of January 1st 2020, there were 235 subsoil use contracts (*SUC*) for hydrocarbons, including 54 exploration contracts, 74 production contracts, 96 combined exploration and production contracts, and 11 production sharing agreements.

The majority of subsoil users must procure goods, works, and services (*GWS*) under the Procurement Rules. However, these Rules do not apply to the so-called “stabilized contracts” for the Tengiz, Karachaganak, Kashagan, and Dunga fields, nor do they apply to subsoil users for which 50% of the voting shares (stakes) directly or indirectly belong to the *Samruk-Kazyna Sovereign Wealth Fund* (*KazMunayGas* and some of its affiliates).

What Happens if GWS Procurement Does Not Comply with the Procurement Rules?

If GWS procurement does not comply with the Procurement Rules, the holders of SUCs signed prior to 29 June 2018² risk having their related expenses disallowed by the MoE as expenses related to their financial obligations under the SUCs. If this occurs and leads to underperformance of financial obligations, it will be regarded as non-compliance with the SUC work program, which entitles the MoE to:

- impose a penalty established by the SUC (depending on the SUC, this may range from 1% to 30% of the unfulfilled obligations); and/or
- unilaterally terminate the SUC if the subsoil user's fulfillment of its financial obligations is less than 30% over two subsequent years.

1 *Rules for Procurement of Goods, Works, and Services for Exploration and Production of Hydrocarbons and Production of Uranium by Subsoil Users and their Contractors*, were approved by the Ministry of Energy's Order dated 18 May 2018 No. 196 and amended as of 31 December 2019 (the “*Procurement Rules*” / “*Rules*”). <http://adilet.zan.kz/rus/docs/V1800017122#z3> (Rus).

2 The date when the *Code for Subsoil and Subsoil Use* dated 27 December 2017 (the “*Subsoil Code*”) entered into force.

Holders of SUCs signed after 29 June 2018, including subsoil users that transitioned to a new SUC model, risk penalties by the MoE in accordance with their contracts – 5% of the expenses related to the procurement that are not in compliance with the Rules.

The MoE has prepared amendments to the Procurement Rules, the first draft of which was circulated among members of expert councils in June 2019. The latest updated draft – the **Draft Amendments** – was published with some minor changes on legalacts.egov.kz³ with the expiry date for public discussion on 24 February 2020.

When this article was written, the amendments had not yet entered into force. Before that, approvals are required from the related ministries, and the Justice authority must register and publish the amendments. It is likely that the amendments will be approved soon without further changes.

How the Rules are Applied

When a subsoil user intends to procure a specific type of GWS, it uses the following algorithm (a negative result for one stage leads to the next stage):

- First, the subsoil user checks whether this type of GWS is listed in Annex 1 to the Rules, referencing GWS that may be purchased without other types of procurement.
- Second, the subsoil user checks whether a sole-source procurement is possible (clauses 84-85 of the Rules).
- Third, the user checks whether the goods to be procured are named and correspond to the minimum supply volumes set forth in the *List of Commodity Goods* approved by the *Minister of the National Economy's Order No. 142*, dated 26 February 2015. The *Commodities List* is very short and de facto this option is not used.
- If the previous options do not apply, the subsoil user may procure GWS either through an open tender (with confidential bids) or an open tender for price reduction (electronic trades) in which all bids can be viewed by the participants. Either of these two methods will be referred to below as the “tender”.

If the tender results are not successful, the subsoil user is entitled either to conduct a new tender or to procure the GWS under sole-source rules.

The following sections outline stages of the procurement process and the anticipated amendments to this process in more detail.

3 <https://legalacts.egov.kz/npa/view?id=3094660> (Rus).

Impact of the Amendments on the Procurement Process

GWS procurement without other types of procurement

There are currently 40 clauses in Annex 1 of the Rules allowing subsoil users, *inter alia*, to bear expenses related to employee training, seminars, conferences, cleaning and catering services, rental of real estate, arbitration and court proceedings, communications (telephone, cellular, and internet), office supplies, medical services, and so forth. Subsoil users may also procure a specific type of GWS if its cost does not exceed 500 monthly calculation indexes (MCI) per year equivalent to ₸ 1,325,500 in 2020.

Subsoil users' contractors are allowed to procure works or services for an amount not exceeding 100,000 MCIs (₸ 265,100,000 in 2020) per year. In addition to minor amendments to the current clauses in Annex 1, the Draft Amendments provide four additional clauses allowing subsoil users to:

- purchase railway and air tickets;
- purchase fuel and lubricants;
- reimburse a new subsoil user's expenses for acquisition of infrastructure facilities, equipment, and other goods during transfer of the subsoil use right from a previous subsoil user; and
- purchase GWS for joint development under Article 150 of the Subsoil Code (*Joint Development of Fields at Different Subsoil Plots*) if the subsoil user participates in joint development with a user holding a stabilized contract.

Sole-source procurement

Sole-source procurement is allowed if either:

- a tender is unsuccessful or the winner (or a 2nd-place bidder) fails to sign the contract or, after signing the contract, does not provide the required performance security (clause 84); or
- the GWS is listed in clause 85 of the Rules.

In addition to the current 10 types of GWS that may be sole-sourced, the Draft Amendments provide for 3 additional types:

- goods of Kazakhstani origin if economically feasible for subsoil users;
- amending pre-project and project documentation by the initial project design company;
- GWS for technical maintenance during the guarantee period for technical support of licensed software.

In addition, research and development may be procured during the production phase as well as during exploration.

Procurement through a tender

What are the major anticipated amendments to an open tender procedure? These amendments also apply to open tenders for price reduction (electronic trades) as both types of tenders are generally equal, differing only in the procedures for submitting price proposals and selecting the winner.

Document matching

The Draft Amendments introduce a new chapter for the document matching procedure, which is similar to some extent to the previous document verification procedure. This is not mandatory, but a tender commission may require that the winner provide original documents or notarized copies of certain documents within 5 business days (7 business days for non-residents).

Within 5 business days after receipt of the documents, the commission reviews them and, on the following business day, issues the document-matching Minutes. With document matching, the total timeframe for executing the procurement contract after the tender results is extended from 25 to 40 business days from the date of either the Minutes of the results or the document-matching Minutes.



New threshold

Under the Rules, if a subsoil user procures work or services in an amount exceeding 14,000 MCIs (₸37,114,000 in 2020) per year, potential suppliers may be required to provide evidence of their related work experience for the past 5 years. The Draft Amendments provide for an additional threshold equal to 30,000 MCIs (₸79,530,000 in 2020). The documents proving work experience for the last year may be either for the current or previous fiscal year.

Other amendments

Other significant changes in the Draft Amendments include the following 10 items:

- The composition of a tender commission may be changed only before summarizing the tender results or the document-matching results (if available).
- Bidders may submit their bids in Kazakh and/or in Russian (previously both in Kazakh and Russian).

- A potential supplier's failure to upload or update relevant foundation documents to the register (*reestr.nadloc.kz*) or other e-procurement systems synchronized with the register may serve as grounds to reject the supplier's tender bid.

(In practice some potential suppliers either do not provide their foundational documents (clean white sheets are uploaded) or they provide an incomplete package of documents (e.g., members of consortia).

- If a tender is cancelled due to the tender's non-compliance with the Procurement Rules or Kazakhstan law, in order to conduct a new tender, the original tender documentation may be changed only in the section where the defects were removed, along with extending deadlines for supplying goods and performing work and services (if necessary).

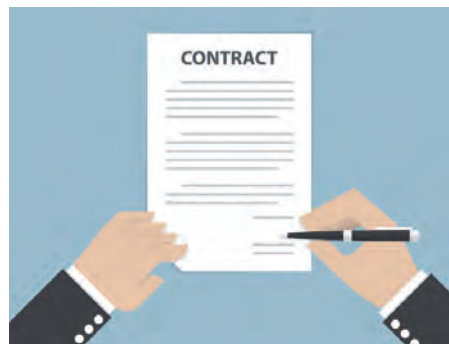


(This amendment aims to prevent the following practice. If a subsoil user discovers a violation of the Rules, before signing the contract the user may request that the tender be cancelled and a new tender be held within one month. In practice, some subsoil users, after opening and reviewing the bid proposals, cancelled the tender, tightened tender requirements for competing contractors, and requested a new tender.)

- To confirm compliance of works and services with their functional, technical, qualitative, and operational requirements, potential suppliers may, *inter alia*, provide copies of lease agreements. Any third party referred to by a potential supplier may act only as a co-member of the consortium and not as the potential supplier's subcontractor.
- A non-resident winner may provide their counter-signed contract within 7 business days (residents have only 5 business days).
- If the winner does not sign the contract, the subsoil user, in addition to the current option of signing it with the 2nd-place bidder (if available), has the right to conduct a new tender.

(There are cases where affiliated suppliers took advantage of the current provision obliging subsoil users to conclude contracts with the 2nd-place bidders.

How did this occur? The winner, having proposed a lower amount, refused to sign the contract, and the 2nd-place bidder then offered a higher price equal to the initial budget amount. Accordingly, the subsoil user had no choice but to sign the contract with the 2nd-place bidder).



- Kazakhstani manufacturers must be paid for goods of Kazakhstani origin within 30 calendar days from signing the acceptance acts (all other suppliers are paid within 60 calendar days).
- The subsoil user and the tender winner may refuse to sign a contract if, between the date when bids are opened and the date when the contract is signed, the official exchange rate changes by more than 10 % – unless both parties agree to change the contract price accordingly.
- If the cost of fuel and lubricants increases or decreases, the price of a signed contract for vehicle services may be amended accordingly.

Conclusion

The Draft Amendments appear to effectively close major loopholes used by some subsoil users or potential suppliers acting in bad faith. Moreover, the amendments will remove unnecessary procurement obstacles and expand the range of GWS that may be procured relatively easily by subsoil users. Kazakhstani manufacturers are given certain preferences. Finally, after the amendments enter into force, there will be less ambiguity about the Procurement Rules.



EMERSON – DIGITAL TRANSFORMATION IS MORE THAN THE FUTURE, IT'S TODAY

by Stuart Harris
Group President, Digital Transformation
Emerson Electric

For many, digital transformation is an ambiguous idea or a lofty goal to reach in the years to come. There's no question that digital transformation is critical to the future of industry and business. But digital transformation is not just the future; it is the present, and currently it is driving the oil and gas industry forward along with other sectors around the world.

Broadly defined, digital transformation involves the application of advanced technologies to improve business outcomes and drive best-in-class work behaviors. The scope of digital transformation is vast – ranging from deploying wireless sensing technologies to using advanced analytics that leverage machine learning and artificial intelligence capabilities. Above all, digital transformation can positively impact nearly any business process and enable new ways of working.

Emerson's Digital Transformation Journey

Emerson is a century-old company built on innovation. Our business has been bringing new technologies to our customers long before the term “digital transformation” was coined. While our technologies have advanced, the objective of digital transformation for our business has remained: deliver the best solutions to our customers to help them solve their most pressing challenges.



Today, customers are looking for the right partner in digital transformation: a partner who provides a combination of detailed industry knowledge and domain expertise, proven technology, and a practical approach to the rapidly changing world of software and analytics. That's why Emerson has been investing internally and through acquisitions to expand our offerings in innovative technologies and solutions.

Take Emerson's *Plantweb*TM digital ecosystem, for example. Harnessing the power of industrial Internet of Things (IIoT) technologies, *Plantweb* is a portfolio of leading technologies, software and services designed to deliver actionable

insights and measurable performance improvements in production, reliability, safety and emissions. In 2019, we created a new business dedicated to helping customers navigate their digital transformation journeys and achieve measurable impact on their business results.



In addition to smart sensors and asset monitoring devices, *Plantweb* includes expert consulting and the industry's most comprehensive portfolio of operational analytics – software with embedded industry expertise that makes sense of data to improve operations. With its proven success, *Plantweb* will continue to evolve as we uncover new opportunities to help our customers unlock the power of the *Industrial Internet of Things (IIoT)*.

As an industry leader, Emerson is proud to have been recognized for the progress our company has made in helping our customers achieve Top Quartile performance – or operational excellence – by guiding them through their digital transformation. Our *Plantweb* digital ecosystem is a finalist for a 2020 *Edison Award* in the *Innovative Services* category. Named after Thomas Edison, the awards recognize and honor the world's best innovations and innovators.

For the third year in a row, Emerson was also named *IoT Breakthrough's "Industrial IoT Company of the Year"* in 2020. This award recognizes excellence in IoT technologies, services, companies and products.

Digital Transformation in Kazakhstan

Digital transformation, also known as Industry 4.0, is underway in every part of the world, and we're seeing great progress in Kazakhstan. Emerson has operated in the Kazakhstan region since 1996, serving state, independent and international oil and gas companies, offering automation technologies and services to help them optimize performance and reduce operating costs.

In 2021, Emerson plans to expand its footprint in Kazakhstan to meet our customers' needs in the oil and gas sector. We will increase local production of smart measurement solutions by 40 percent, enabling local customers to scale their digital transformation projects quickly and with confidence.

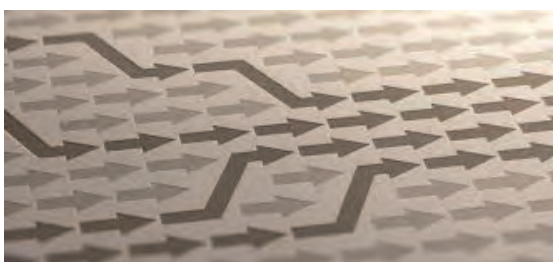
The Emerson Approach to Digital Transformation

Emerson works with customers to identify practical, proven approaches that focus on specific challenges or performance improvement opportunities. We enable our customers to make their digital transformation initiatives achievable, scalable and driven by a clear, identified business case.

As the industry continues to invest in digital transformation, it is critical that these solutions deliver a timely return on investment and achieve the expected business benefits. To ensure those results, we can start with answering the following questions:

What is the end goal? Effective programs begin with a clear business goal. Many digital transformation initiatives chase the latest and greatest technologies. However, beginning with the end in mind will create alignment on what the initiative is seeking to accomplish. Our Plantweb digital ecosystem empowers companies to build incrementally, with targeted solutions to overcome known issues.

Who should lead implementation? Digital transformation is most effective with a “top down, bottom up” approach, where corporate and operating teams are aligned and integrated. In our work, Emerson has found that bringing together corporate- and field-level IT and OT (operational technology), engineering and business leaders to prioritize and implement initiatives has been critical in driving secure and successful digital transformation. Every business is different, but building the right team is equally important to all. Additionally, identifying “champions” in facilities to lead projects and share their experiences with other facilities creates support in the face of change.



Can we use data better? Most companies have plenty of data; far fewer are effectively using that data to inform impactful business decisions. Emerson's operational analytics portfolio makes sense of data, equipping businesses with the information they need to optimize their operations. Solutions can range from easy-to-deploy analytics to comprehensive software platforms that combine AI (artificial intelligence) and machine learning. For example, Emerson's digital twin solutions enable companies to simulate operations of plants, pipelines and oil fields to optimize production, safely upskill personnel and even predict the future of operations.

What is the role of our workforce? Today, the manufacturing industry has expanded expectations of its workforce. It requires a convergence of knowledge in technology, engineering and data science to drive operational success. *Plantweb's* technologies, software and services empower the workforce, foster optimal work processes and drive technology adoption, and ultimately provide insights to teams to make more effective decisions.



How can we repeat success? Digital transformation projects solving a single, specific problem should not end once that problem is solved. Companies undergoing digital transformation projects should consider how to scale solutions across their facility or enterprise. When solutions are scaled and replicated, companies see big gains.

For example, a \$50,000 annual benefit on an individual piece of equipment can be replicated to 1,000 assets across the enterprise to realize a \$50 million annual benefit. This approach builds return on investment, maintains momentum and keeps digital transformation investments on track.

Helping our customers ask – and answer – the right questions has been key to Emerson's success in delivering solutions that enable effective digital transformation. Moving forward, we will continue to collaborate with manufacturers across industries to ensure they adopt proven, practical approaches to digital transformation that drive both immediate and long-term benefits for their businesses.





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RENEWABLE ENERGY IN KAZAKHSTAN: THE SKY'S THE LIMIT!

Gaukhar Kudaibergenova
Of Counsel, Signum Law Firm

The world is undergoing a transformation in its power resources. With the negative impact of climate change, there is a need for renewables-reliant countries across the globe. This article discusses some aspects of the renewables regulatory framework, of which there are many more to consider to improve the legal framework affecting renewables in Kazakhstan. National and local governments worldwide are creating regulatory and commercial environments to encourage developers, lenders, and investors to build, finance, and invest in the renewable energy sector. We strongly believe that policies for promoting renewable energy must play a crucial role in accelerating the deployment of these technologies.

Status Quo

As part of the country's Going Green initiative, Kazakhstan announced the following renewable energy (RE) targets in 2013:

- 3% share of RE in total electricity production by 2020;
- 10% share of RE in total electricity production by 2030; and
- 50% share of low-carbon alternative and renewable energy sources (RES) by 2050.

The total installed capacity of renewable energy facilities in 2020 is 1700 MW distributed as follows:

- Wind power plants - 933 MW;
- Solar power plants, using solar PV energy converters – 467 MW;
- Hydropower plants – 290 MW;
- Biogas power plants – 10 MW.

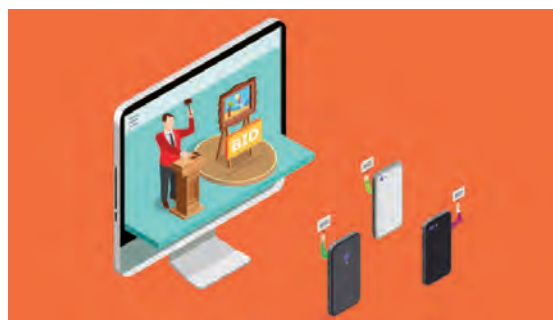
Needless to say, renewables get the job done despite skepticism in Kazakhstan. Financial institutions have shown a high degree of interest in funding renewables, as well as oil and gas giants such as ENI that are launching large wind and solar power projects in the country. As lawyers, we are incredibly excited about all the positive activity in the renewables sector. Signum Law Firm is currently engaged in the market's major law-making project aimed at developing detailed recommendations on bankability and risk allocation for renewables in Kazakhstan.



This article will focus on key legal aspects that we believe should be enhanced as part of Kazakhstan's current regulatory framework. Changing the country's laws in this respect will reassure investors and ultimately increase their interest in supporting development of renewables.

Auctions: Price or Quality?

Auction mechanisms were initially introduced in Kazakhstan in 2017. Auctions are intended to determine auction prices for RE projects under consideration. The guaranteed purchasing price for RE producers determined at such auctions is an additional guarantee to secure their sales. These auctions are run by an auction organizer through an electronic platform.



Based on a review of current procurement programs across other emerging markets, we would like to highlight several major considerations to improve Kazakhstan's current framework.

First and foremost, Kazakhstan's RE Auction Rules do not set any prequalification criteria for potential bidders, only price criteria. However, the global practice is that potential bidders are required to pass certain minimal prequalification criteria before they can participate in the auction. The minimal prequalification criteria are a critical factor in auctions where the lowest price is the sole evaluation criteria to determine the winning bidder. That is the case today in Kazakhstan auctions.

Second, prequalification criteria typically depend on the size of the project, but generally they focus on a proven track record for construction or operation of similar projects. The threshold for a track record should be carefully calibrated to ensure healthy competition.

Land Reform is Critical

The initial stage in a renewable energy project is choosing the site where the facility will be built. Land plot selection is a critical factor determining a project's success. The site determines how optimally an RES will be used and thus influences the project's economic feasibility.

If the land belongs to the state, the investor must either obtain the right to use the land or acquire the land from the local authorities. Most of the land allocated for renewables in Kazakhstan is designated as agricultural land and therefore

requires a change of designation under the country's land regulations. Once the winning bid is selected, the winner needs to spend significant time on resolving land-related issues such as changing the plot's designated use. This is a complex, time-consuming task involving many stakeholders. Changing designated land use from agricultural to industrial is a process that can only be carried out once a company owns the land.

All parties involved in RES in Kazakhstan see one option for streamlining this approach as creation of a separate government entity or a special company by the government prior to the auction. This entity or company can either purchase the land or enter into a long-term lease for the land, thereby allowing the government to change the land's designation prior to the auction. The auction would then offer developers either a long-term lease or the option to purchase the land from the holding company. This approach would demonstrate the state's direct participation in RE land usage and reduce bureaucracy, which would save investment time and costs.

Is Arbitration an Illusion?

Renewable energy projects run through different phases involving multiple stakeholders and often multiple jurisdictions, hence potential disputes may be full of twists and turns. The *Kazakh Power Purchase Agreement* sets out a general rule requiring all disputes to be settled in Kazakhstan's courts,

unless the claimant elects to refer disputes to the *International Arbitration Centre* in the *Astana International Financial Centre*, with the contract's governing law being Kazakhstan law.

Given that *Arbitration Centre of the Astana International Financial Centre* is a newly-created arbitration center in Kazakhstan, international developers and lenders may prefer the arbitration to be handled by a neutral international organization with a track record of dealing with complex disputes such as the LCIA, ICC, DIFC-LCIA, or SIAC. Further, arbitration is often conducted in a neutral venue with an established system of law for arbitration procedures and enforcement such as London, Paris, Singapore, or the DIFC in Dubai.

Moreover, Kazakhstan law dictates that any dispute referred to arbitration with the involvement of a local company vs a state entity (including legal entities directly or indirectly controlled by the state) must first obtain consent from the appropriate regulatory authority (Ministry of Energy)¹. This would not be beneficial to investors as the government's consent is given on a case-by-case basis, and there is a high probability of refusal. If Kazakhstan law grants investors the right to seek consent for arbitration concerning a dispute over renewables to a neutral international organization, and consent is given, then arbitration will be more robust in practice.

¹ Pursuant to the Arbitration Law of the Republic of Kazakhstan No. 488-V dated 8 April 2016 (as amended).

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AMCHAM ADVOCACY UPDATE FEBRUARY – APRIL 2020

Given the turmoil since February over the global health crisis and Kazakhstan's response to what has now been officially recognized by the World Health Organization as the COVID-19 (coronavirus) pandemic, AmCham advocacy through the monthly sessions of the *Prime Minister's Council to Improve the Investment Climate* and in additional meetings with Ministers between Council sessions, has been interrupted. The sudden collapse of the price of oil resulting from tensions between Russia and Saudi Arabia has intensified the pandemic's global economic impact, and Kazakhstan's devaluation of the Tenge in early March has contributed to the sense of turmoil and uncertainty.



AmCham had originally chosen a series of topics relevant to Kazakhstan's *World Trade Organization (WTO)* membership that would have served to prepare the Government for the *WTO Ministerials* scheduled to be hosted by Kazakhstan and held in Nur-Sultan in early June. The topics would have also served to highlight WTO policy issues that Kazakhstan committed to observe when it acceded to WTO in 2015, commitments that have not been fully met and which present obstacles to the robust investment climate that WTO seeks to promote. These topics – *Tax Policy and Its Implementation*, *Foreign Labor and Migration Rights*, *Intellectual Property Rights (TRIPS)*, and *Banking Policy* – were intended to determine the Council Agenda between February-May.

In light of the pandemic, the June *WTO Ministerials* have been postponed and it remains to be seen whether they will be rescheduled later in the year. Nonetheless, AmCham intends to continue with its agenda of WTO issues, which are of great importance to investors, when Council sessions with the Prime Minister resume. These issues represent obstacles that need to be removed to facilitate intensified investment in Kazakhstan.

Although the next Council session was scheduled in March, and is now scheduled in April, it is unlikely that the Council will meet until the current State of Emergency and quarantine are lifted. AmCham is in regular contact with the Prime Minister's Office but, although Council dates are scheduled in the spring, we will respect the government's

priorities to guide Kazakhstan through a very difficult time. As soon as it is possible to convene the Council – most likely in late spring or early summer – the Council will continue.

On 21 February, the Council met with Prime Minister Mamin and the Council Panel of Ministers (*Ministers of the National Economy, Finance, Trade and Integration, Energy, Justice*) to discuss *Tax Policy*, a topic normally presented early in each year, given the frequent changes in Kazakhstan's tax legislation. Tax policy and its implementation is of vital importance in its effect on the country's investment climate, which suffers from on-going tax disputes between investors and the government over interpretation and implementation.

21 February Council Session: *Tax Policy and Its Implementation – Impact on Kazakhstan's Investment Climate*

- To coincide with the February Tax Council session, AmCham also prepared the **February Investors Voice** as a special Tax Issue (**Title: Finance.Tax. Law Underpinning the Investment Climate**) containing 16 articles by tax experts and lawyers among the AmCham membership. The February Issue was presented to the Prime Minister, the Finance Minister, and the National Economy Minister, at the Council session.

Given the nature of Kazakhstan's frequently changing tax legislation, each year AmCham schedules a tax review and tax reform session of the *Council to Improve the Investment Climate*. The constant flux in the legislation is in itself a problem that investors have often raised to the Government as an obstacle to stable financial operations.



Kazakhstan's tax legislation contains intractable problems such as criminalization of tax disputes which, although the monetary threshold triggering an assumption of criminality (unjustified in the vast majority of cases) is increased year after year, never removes the basic problem. The threat of criminal prosecution is clearly a disincentive to new investment, which has been pointed out to the Government

at Council sessions in the past. The need to remove criminalization from tax disputes in which there is neither intention nor proof of fraud or deliberate tax evasion was raised in the Council Introduction on 21 February, although the main Council agenda focused on other issues.

The Council Ambassadors (U.S., U.K., E.U., and Canada) presented their countries' views on the purposes that may be served by tax policy – increased foreign direct investment, economic growth, and economic diversification – rather than solely as a source of government income through tax receipts. Reference was also made to the *OECD Model Tax Convention* with the recommendation that Kazakhstan study the principles of the Convention as a step towards its goal of joining the OECD.

The Council corporate speakers consisted mainly of tax experts from the Big Four to discuss policy, rather than inviting companies to report on their own tax disputes, which are often highly sensitive and may already be before the courts. Thus the speakers focused on policy issues and problems in the legislation itself. Some of the topics presented with recommendations for legislative reform were:

- *Kazakhstan's approach to double tax treaties and double taxation*
- *transfer pricing (an eternal problem in the legislation and in practice)*
- *customs taxes*
- *new trends in taxation - horizontal monitoring*
- *tax incentives to promote development of renewable energy*



The AmCham Council speakers at this session – *Anthony Mahon (Deloitte)*, *Erlan Dosymbekov (EY)*, *Michael Ahern (PwC)*, and *Richard Bregonje (PwC)* – had published articles in the February Investors' Voice on the same tax issues that they raised at the Council.

Thoughtful and knowledgeable responses were delivered by the two Ministers with whom the speakers had met in the morning (*Finance Minister Alikhan Smailov* and *National Economy Minister Ruslan Dalenov*), demonstrating that the open exchange of views between speakers and Ministers in advance of the meeting is helpful preparation for the afternoon Council.

AmCham looks forward to resuming Council sessions once the pandemic has abated and the Government is again able to discuss economic and investment priorities with the AmCham community.

The first Council session will aim to highlight the many initiatives undertaken by foreign companies in Kazakhstan to supply the country's hospitals and medical facilities with much-needed medical equipment for critically ill COVID-19 patients in intensive care, as well as other forms of healthcare support during the global health crisis.



The oil industry in Kazakhstan has been especially active in its support for Kazakhstan's medical facilities, each industry leader actively designing and implementing multi-million dollar projects in its own region. Their commitment and achievements will be highlighted to the Government as a unique story in combatting the pandemic that serves to highlight the partnership of the foreign investment community with Kazakhstan in its time of need.

AmCham takes pride in its members pro-active response to the pandemic, demonstrating their commitment to Kazakhstan's well-being as an integral part of the decades spent supporting the country's economic and social development.

AMCHAM WORKING GROUP UPDATES FEBRUARY - APRIL 2020

Almaty Working Groups

Almaty Human Resources Working Group

January On 30 January, The Human Resources Working Group chaired by *Anar Khassenova of PwC* convened to discuss proposed changes to Kazakhstan's Labour Code for 2020. These include creation of a unified accounting system for employee contracts; development of professional unions; clarification of the "trial period" for employees (how to transition from a trial period to a staff position) clarification of employer responsibilities for work-related injuries; clarification of the employer's obligation to provide pregnancy leave; the employer's responsibilities for employees undertaking compulsory military service; and, finally, the circumstances and employer obligations for an employee's paid and unpaid leave.

Almaty Healthcare Reform Working Group

February On 26 February, the Healthcare Reform Working Group chaired by *Ksenia Babushkina of EY* convened to discuss the 2020 WG agenda and to continue the effort to amend pricing regulations. The meeting opened with a general discussion about recent government-led Healthcare roundtables in Almaty that unfortunately have not included the pharmaceutical industry or other private-sector professionals.

A major topic was e-passports for medical use and patient data concerns. While "medical data belongs to the patient," the data is rarely controlled directly by the patient, and with the new e-passport system, this information is increasingly controlled by third parties.



Pharmaceutical pricing and other Health Code issues were raised. One such issue is a 10% "re-investment" of drug sales into R&D in Kazakhstan – especially for companies with no R&D teams in Kazakhstan. Additional concerns surround Article 8, which prohibits advertising for certain drugs, and new restrictions for nutritional health companies. The Working Group will continue its advocacy efforts on these concerns.

Almaty Corporate and Social Responsibility Working Group

January On 28 January, the Corporate and Social Responsibility Working Group chaired by *Asad Shirinov of Coca Cola* convened to discuss the 2020 Group agenda. The meeting began with a presentation from *Alexandra Akkirman* on general trends that affect CSR policies. Noteworthy trends include a rise in instability throughout the world, a general "retreat of the middle class," a changing dynamic in the global economy (away from the US and focused towards Asia as a market), and a reliance on the private sector to drive global sustainability agendas.

The presentation then evolved into an open discussion of CSR activities for 2020. Coca Cola began by outlining its *3,2,1 Start program*. Following Coca Cola, the Mars representative shared the company's general plans, which include continuing its work with charities and foundations like *ДАРА* and the Red Crescent.

Asad Shirinov proposed widening the scope of the CSR Working Group to include Sustainability with future meetings under "CSR & Sustainability." This would aim to create greater interaction between the FMCG companies operating in Kazakhstan. On Sustainability, Coca Cola introduced potential recycling projects for trash separation and reusing plastic material.

March On 3 March, the Corporate Social Responsibility & Sustainability Working Group chaired by *Asad Shirinov of Coca Cola* convened to discuss a CSR program from the International Organization for Migration (IOM). The presentation was led by *Victoria Kasabyan from the IOM Mission in Kazakhstan and Central Asia*.

Kazakhstan is important for IOM as it is at the forefront of many migration concerns with approximately 1.2 million registered migrants and a larger number of unregistered migrants. IOM works closely with the government to develop capacities to manage migrant issues. It is also involved in the *Almaty Process*, which connects NGOs and governments to effectively manage migration issues across Central Asia.

Victoria Kasabyan presented the *CREST Program in Kazakhstan – Corporate Responsibility in Eliminating Slavery and Trafficking*. CREST not only relies on the government but also on the private sector to identify signs of "modern slavery" and trafficking along the supply chain. This project is open to members interested in partnering with IOM.

Nur-Sultan Working Groups

Nur-Sultan Trade and Customs Working Group

February On 14 February, the Human Resources Working Group chaired by *Damir Deminov of EY* convened to discuss changes in immigration law and changes to the labor code. The meeting began with a presentation by *Assiya Abraimova of EY*. Changes include most importantly a decrease of 40% in the overall quota of work permits for foreign labor. The decrease in foreign labor will be compensated by obliging employers to replace foreign workers with skilled Kazakhstani labor.

In addition, Kazakhstan's visa-free regime will be amended. A foreigner with this type of visa can remain for 30 days as before, but re-entries will be limited to a total of 90 calendar days within a period of 180 calendar days. Another change involves registration for foreigners temporarily in Kazakhstan. The burden for registration rests on the inviting party to notify the Internal Ministry within 3 calendar days of arrival.



The second presentation by *Nargiz Abilpeissova* focused on specific changes to the Labor Code. There were changes to the duration of maternity leave; amendments to liability in corruption cases – specifically the statute of limitations for disciplinary sanctions; open questions concerning the unified system of employment agreements (“USLA”); concerns over wage discrimination; and, lastly, new safety regulations.

Nur-Sultan Trade and Customs Working Group

February On 14 February, the Trade and Customs Working Group chaired by *Samat Karmys of EY* convened to discuss the application of customs laws and changes to customs regulations. The meeting began with *Sholpan Dossymkhanova of Deloitte* who discussed Kazakhstan's customs legislation. First, there was a change in attitude towards the *World Customs Organization*. In the past, WCO documents and advice were disregarded as they are non-binding. Now, there is a drive to align Kazakhstan's customs policy with international standards. The declarant will have more power to appeal the customs decisions, and the burden of proof lies with the government.



WORLD CUSTOMS ORGANIZATION

The topic then changed to highlight customs regulations in 2020. Customs inspections were previously executed arbitrarily with non-standardized paperwork and repeat inspections. Now, a notice must be sent to the declarant prior to the inspection, the documentation is standardized, and there can be no repeat inspections. There were also changes regarding classification of goods, risks for importers, and adjustments to customs pricing.

Nur-Sultan Tax Working Group

February On 14 February, the Tax Working Group chaired by *Anthony Mahon of Deloitte* convened to discuss changes to the Tax Code and SNT concerns. The meeting began with a presentation from *Karina Kalimzhanova of Deloitte* on the topic of changes to the Tax Code in 2020. A major point of contention is Article 666 which relates to double taxation. Another major issue is an anticipated change in the statute of limitations. From 1 January 2020, the statute is three years. There will likely be a change to the statute to cover the past five years.

Atyrau Working Groups

Atyrau Trade and Customs Working Group

February On February 25, the Atyrau Trade and Customs Working Group met in the Bertling Kazakh Logistics Office under Co-Chair *Dauren Rakhymgozhin, EY Senior Associate*. *Deloitte Manager Sholpan Dossymkhanova* delivered a presentation on customs law as applied by the Kazakhstan courts with a focus on the *Eurasian Economic Union (EAEU)*, international treaties, customs valuation methods, recommendations and clarifications by the *World Customs Organization (WCO)*, and product classification.

Dauren Rakhymgozhin then delivered an update on trade and customs legislation for 2020 and recent trends in customs audits, namely reclassification of goods, adjustment of customs value due to affiliation of trading parties, cameral customs checks, temporary customs declarations, and customs value.

Atyrau Tax Working Group

February On February 25, the Atyrau Tax Working Group met in the Bertling Kazakh Logistics Office under chairmanship of *Karina Kalimzhanova, Deloitte Tax and*

Law Manager, substituting for *Deloitte Cross-Border Tax Expert Anthony Mahon*. Ms. Kalimzhanova delivered a presentation on permanent establishment, proposed changes to the Tax Code, and the effect of these changes. Also under discussion were residency certificates and their tax implications, and double tax treaties.



Three Guest Speakers then covered a range of recent issues. *Deloitte Manager Sholpan Dossymkhanova* reviewed new rulings and implementation of waybills for goods. *Assel Assubayeva* spoke about recent changes to the Migration Law. *Rinata Zhulayeva* reviewed recent judicial rulings on in-house control.

Aktau Working Groups

Aktau Trade and Customs Working Group

February On February 26, the Aktau Trade and Customs Working Group met in the OMV Petrom Office under Co-Chair *Dauren Rakhymgozhin, EY Senior Associate*, who delivered a trade and customs legislation update for 2020. He then discussed recent trends in customs audits, namely reclassification of goods and adjustment of the customs value due to affiliation of trading parties, cameral customs checks, temporary customs declaration, and customs value.

Deloitte Manager Sholpan Dossymkhanova spoke about the application of customs law in Kazakhstan's courts with reference to the *Eurasian Economic Union (EAEU)*, international treaties, customs valuation methods, product classification, and recommendations and clarifications by the *World Customs Organization (WCO)*.

Aktau Tax Working Group

February On February 26, the Aktau Tax Working Group met in the OMV Petrom Office under chairmanship of *Karina Kalimzhanova, Deloitte Tax and Law Manager*, substituting for *Deloitte Cross-Border Tax Expert Anthony Mahon*. Ms. Kalimzhanova delivered a presentation on permanent establishment, proposed changes to the Tax Code, and the effect of these changes. Also under discussion were residency certificates and their tax implications, and double tax treaties.

Three Guest Speakers then covered a range of recent issues. *Deloitte Manager Sholpan Dossymkhanova* reviewed new rulings and implementation of waybills for goods. *Assel Assubayeva* spoke about recent changes to the Migration Law. *Rinata Zhulayeva* reviewed recent judicial rulings on in-house control.

Aktau Human Resources Working Group

February On February 26, the Aktau Human Resources Working Group met in the OMV Petrom Office under Group Chair *Saule Sharipova, OMV Petrom HR Manager*. The Chair introduced Guest Speakers from *PwC Kazakhstan*.

The first Speaker was *PwC Senior Associate Aliya Ismukhamedova*, who delivered a presentation on labor relations focused on draft amendments to the Labor Code for 2020, the Law on Trade Unions, and the integrated electronic registration system for employment contracts.



The second Speaker, *PwC Immigration Association Viktoriya Karabassova*, focused on migration issues, outlining amendments to the migration legislation, namely changes in the rules for foreign citizens to enter and work in Kazakhstan.



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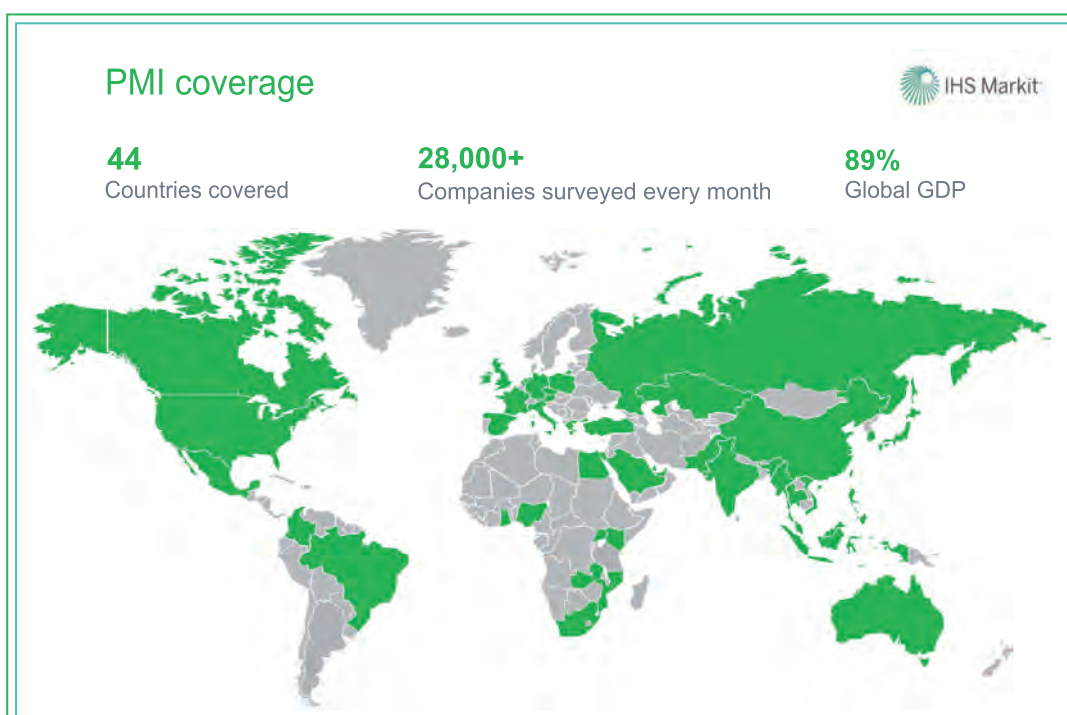
Tengri Partners Sponsors New Purchasing Managers' Index™ Surveys for Kazakhstan Compiled by IHS Markit

"We are delighted to announce the launch of Kazakhstan's first ever PMI™ survey in partnership with IHS Markit, which provides some of the most closely-watched reports of business activity globally," said Anuar Ushbayev, Tengri Partners Managing Partner and Chief Investment Officer. "Our new PMI indices will be a valuable and important source of monthly data and analytical information providing insight into the health of Kazakhstan's economy."

Richard Willis, IHS Markit Executive Director, added, *"The Kazakhstan PMI data will enable economists, policy-makers and investors to track the economy's performance in near real-time and assess the local economy in a global context using directly comparable data."*

The first *Tengri Partners Kazakhstan Manufacturing and Services PMI Survey* reports were issued on Wednesday, 29 January. The *Tengri Partners Kazakhstan Manufacturing PMI* will be released at 12:00 ALMT on the first working day of each month, and the *Tengri Partners Kazakhstan Services PMI* (including *Composite PMI*) will follow at 12:00 ALMT (06:00 UTC) on the third working day of each month.

The PMI series, produced by IHS Markit, is one of the most closely-watched signals of business activity and is valued worldwide by central banks, financial markets and business decision makers for providing timely and often unique monthly indicators of economic trends.



NEW MEMBER PROFILES



LINDSAY CORPORATION

CORPORATE A

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Lindsay Corporation has been a leader in the manufacture and distribution of agricultural equipment for over 65 years. The company is headquartered in Omaha, Nebraska. Specializing in irrigation and infrastructure, the company has irrigation systems operating in more than 90 countries, which translates to approximately 32% global market share. Lindsay Corporation is a public company listed on the New York Stock Exchange (LNN) since 1997.

Lindsay Corporation has manufacturing facilities in the USA, China, Turkey, Brazil, France, and South Africa. Lindsay has been selling its products to Kazakhstan for almost 10 years and is currently bidding on several projects in-country. In light of the government program to bring more land into irrigated production, Kazakhstan is seen as an emerging opportunity for the agriculture industry.

Lindsay Corporation is represented in Kazakhstan by Eurasia Group, which acts as the company's official distributor.



Osquared Capital Holding

CORPORATE B

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Osquared Capital Holdings is an independent U.S. financial advisory and merchant banking firm focusing on the emerging markets of Kazakhstan, Central Asia, Georgia and Russia. The firm prides itself in having the most agile and competent investment banking team in Central Asia providing financial advisory services across four major practice areas: *Strategic Consulting, Investment Management, Mergers and Acquisitions, Financing and Restructuring.*

Osquared Capital tailors its advisory services and business development support to the needs of each client. For well over a decade, the firm's experts have been working with clients across multiple industries, including metals and mining, financial institutions, oil and gas, retail, food, telecom, media and technology sectors. Client investments are structured independently of other projects in our portfolio, and are developed according to their own tailored strategy, situation and opportunities.

Osquared Capital invests in business projects with strong cash flows, solid positions in attractive markets and substantial value creation potential.



AG TECH

CORPORATE B

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AG TECH is a technology company, founded in 2008 in Nur-Sultan, providing custom and off-the-shelf hardware and software solutions, as well as vendor/supplier services. It specializes in digitization of processes and systems, production automation systems, document management and business/data analytics, and supply of advanced radio navigation systems, as well as other technologies.

AG Tech is an official partner of many leading global manufacturers of IT solutions and radio navigation equipment. It has deep experience in successful IT projects, specifically ones of national importance for Kazakhstan, including construction of national data processing centers and projects for the supply, installation, and maintenance of radar systems.

AG TECH clients include both private companies and government bodies: Tengizchevroil, Kazakhmys, Kazzinc, Kaspi Bank, National Information Technologies (NIT), Mine Radio Systems, RSE Kazaeronavigatsiya, and Arctic Group International (AGI).



AMERICAN CHAMBER OF COMMERCE IN KAZAKHSTAN

MEMBERSHIP APPLICATION

ABOUT AMCHAM

Registered in Kazakhstan as a non-profit organization in March of 1999 with 36 charter members, the American Chamber of Commerce in Kazakhstan currently represents over 200 member companies including US, multinational, and local businesses in 30 industry sectors. Their collective investment in Kazakhstan's economy is several billion USD. The American Chamber in Kazakhstan is a member of the US American Chamber of Commerce in Washington D.C. and has working relationships with many regional business associations.

BENEFITS OF MEMBERSHIP

- ✓ AmCham members participate in an organization existing solely to serve members
- ✓ AmCham actively advocates for reform of the business environment with Kazakhstan Government at senior levels
- ✓ AmCham Members may attend 19 Working Groups in 5 cities plus Inter-Ministerial Working Groups
- ✓ Monthly speaker luncheons with senior government and business leaders are reserved for AmCham members
- ✓ Seminars, conferences, and monthly social networking events are organized for AmCham members
- ✓ AmCham membership contact lists are available exclusively to AmCham members
- ✓ Economic, political, legal, social, and business development information is distributed to members
- ✓ Member companies provide exclusive discounts on products and services to other AmCham members
- ✓ Access to the Members' Only section on the AmCham Website
- ✓ Publishing opportunities are available in *Investors' Voice*, the *Annual Membership Directory*, and *Special Publications*

MEMBERSHIP APPLICATION

Company Name:

Industry Area:

CEO Name, Signature, Email:

Contact Individual:

Title(s):

Address:

Tel.: Fax: E-mail:

Please include us in the following Working Groups:

Almaty (7)

- ☐ Foreign Investment
- ☐ Human Resources
- ☐ Tax
- ☐ Technology and Innovation
- ☐ Corporate Social Responsibility
- ☐ Healthcare Reform
- ☐ Trade and Customs

Atyrau (4)

- ☐ Tax
- ☐ Human Resources
- ☐ Trade and Customs
- ☐ Corporate Social Responsibility

Aktau (3)

- ☐ Human Resources
- ☐ Tax
- ☐ Trade and Customs

Nur-Sultan (4)

- ☐ Foreign Investment
- ☐ Tax
- ☐ Trade and Customs
- ☐ Human Resources

Shymkent (1)

- ☐ Foreign Investment

AMCHAM WORKING GROUPS

Working Groups made up of representatives from Amcham member companies provide comment, discussion and submission of positions and represent the united interests of the business community in Kazakhstan by identifying challenges faced by investors and proactively addressing them. Each group meets regularly, providing a forum for networking and the exchange of information. Groups are formed on an as-needed basis at the request of the AmCham membership.

GOVERNANCE

The AmCham is governed by a Board of Directors elected annually from and by the membership. Directors currently and in the past have included individuals from the following company members:

AES	HSBC
AIG Insurance	Hyatt Hotel
Baker & McKenzie	Honeywell
BASF Central Asia	Intercontinental Hotel
BG Group	KIMEP
Bracewell and Giuliani	KPMG
Capital Bank	LeBoeuf, Lamb, Greene
Chevron	Nestle
Citibank	Philip Morris Kazakhstan
Conoco Phillips	Philips Kazakhstan
Coca-Cola	PricewaterhouseCoopers
Dechert	Procter & Gamble
Deloitte	Raytheon
EBRD	Scot Holland CBRE
Ernst & Young	Tengizchevroil
GE International	Visor Capital
Halliburton	White & Case

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MEMBERSHIP CATEGORIES AND ANNUAL FEES

Corporate A	(Worldwide revenues in excess of 100 million USD)	\$5,000 USD
Corporate B	(Worldwide revenues between 2-100 million USD)	\$3,800 USD
Corporate C	(Worldwide revenues not exceeding 2 million USD)	\$2,700 USD
Non-Profit		\$1,500 USD
Individual**		\$500 USD

***Individual memberships are available only under special circumstances for persons not associated with a company.*

Corporate membership entitles a company to delegate 3 individuals as AmCham voting members. The number of persons from each company participating in working groups, forums, and business roundtables is usually not limited.

All applications for membership must be approved by the Board of Directors of the American Chamber of Commerce in Kazakhstan. For further information about membership benefits, the application process, or Investors' Voice magazine, please contact: info@amcham.kz

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