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REGULATORY REFORM IN KAZAKHSTAN

A Spur to Economic Development

Martha Brill Olcott and Eli Keene

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Introduction

Kazakhstan both seeks and has the capacity to become one of the world's most competitive economies in the span of the next generation, a goal that President Nursultan Nazarbayev has set for the nation in the Kazakhstan-2050 long-term development strategy. The backbone of this strategy is Kazakhstan's innovative industrialization. Kazakhstan-2050 mandates, "In the next 10–15 years, [Kazakhstan must] develop a knowledge-intensive basis for its economy," and that this economy "must be founded on advanced science."[1]

Kazakhstan's development strategy rests upon the principle that its industrial output and workforce will become competitive internationally so that goods produced in Kazakhstan can be sold in the most competitive international markets and that foreign investors coming to Kazakhstan can buy and hire locally while simultaneously meeting the international standards that their companies are bound to adhere to.

In order to achieve the economic development laid out in the Kazakhstan-2050 Strategy, Kazakhstan must promote the use and manufacture of modern technologies within the country by maximizing the technological as well as the financial potential provided by foreign investment. Kazakhstan has the resources to attract this investment, most notably in its oil and gas industry. But while Kazakhstan has had success in attracting foreign capital, particularly in its hydrocarbon resources, it has not yet managed to convert that capital into competitive local industries and high technology innovation.

Kazakhstan has not yet managed to develop the type of innovative backbone necessary to meet the goals set forth in the Kazakhstan-2050 strategy. This remains true in spite of the fact that Kazakhstan's parliament has passed a large number of laws that set specific goals for the timing and pace of the country's economic transformation and the sectors of the economy that have been targeted for development, as well as offering various economic incentives to companies that seek to redirect their energies from the national to an international market.

The gap between desired and actual results is so great that it seems worth asking whether the government has been taking the right approach to try to stimulate technological innovation. While legislative reform has been dramatic in some areas, the chasm between the interest of foreign investors and the development of local capacity suggests that these reforms have been either incomplete or ineffectively directed. One important area where this is particularly apparent is in the regulatory regime that governs the implementation and operation of new technologies in Kazakhstan.

This paper argues that for Kazakhstan to promote the growth of high technology industry, it must modernize its regulatory regime, removing barriers to technology transfer and creating a regulatory system that can keep pace with rapidly advancing industrial innovation.

One major part of the problem has already been identified. As President Nazarbayev forcefully put it in his address at the 26th meeting of the Council of Foreign Investors in May 2013:

> We must simplify the regulation of innovation … And we must also resolve the problem of non-conformance of Kazakh technical and construction standards with international norms. Today, this remains a barrier to technology transfer. I am directing the government to revise all national standards and to prepare a plan to bring them in line with their best international equivalents before September 1, 2013. The complete transition must be accomplished by 2015.

As the paper details, Kazakhstan has been making steady progress in its efforts to harmonize the country's national standards with those produced by international standards development bodies, most particularly those of the ISO (International Organization for Standardization) which Kazakhstan joined in 1994 and has been actively participating in its technical committees since 2002. Kazakhstan has also, following the example of several developed economies, given industry the opportunity to develop standards for adoption. This was a major innovation for the country, as the development of standards was previously the sole responsibility of the government or government-nominated bodies.

These current efforts, though necessary, are not sufficient. While companies are free to develop their own standards, these standards must conform to all of Kazakhstan's numerous technical regulations and other applicable national or local laws and normative acts. This is by no means a simple task, given that many of these mandatory regulations are outdated, contradictory, or merely obscure. This dramatically increases the time and cost of developing a new standard. Worse yet, international standards may face modification in the face of this complex system of regulatory requirements, a process that can undermine the technology that the standard was designed to help support. And because many of the regulatory documents in Kazakhstan's system are outdated, they often contradict modern industry best practices or complicate the import of new technology.

Efforts to harmonize Kazakh and international standards are only a first step to stimulate technology transfer and development. Kazakhstan must reform the structure of its regulatory regime if it wishes to achieve its development goals, and these reforms need to be carried out at a pace that keeps up with the target dates of the country's economic reform programs. This will mean investing significant resources into developing a regulatory system that is based on widely recognized international best practices. Kazakhstan will need to closely follow models of developed, resource-rich countries, which drastically reduce prescriptive government control over industry regulation.

The cornerstone of these models has been the introduction of regulations that target a company's performance, not the methods it uses to achieve that performance. This is the case in much of the EU, as well as in several industries in other developed economies such as the United States and New Zealand. It is also true of Norway, whose example Kazakhstan has already begun to emulate.

Norway's standards and regulatory regime is based on maximizing the involvement of all potential stakeholders: industry, its work force and the government. These stakeholders all engage one another in dialog, with industry, not government, playing the leading role. The process is streamlined to eliminate duplication and contradiction of regulation. And, perhaps most importantly, the number of mandatory regulations is kept to a minimum and any such regulations are written in a coherent and accessible fashion.

This paper will explain how and why Kazakhstan should follow suit. It will outline the current problems facing Kazakhstan's regulatory regime, as well as the specific issues that these problems

pose for the oil and gas industry, providing recommendations for their resolution. While Kazakhstan has taken the first steps in moving away from its former Soviet-era system of regulation, further reforms are needed to allow the government to use the country's vast oil and gas wealth as a driver for its economic development.

Regulation and Development in Kazakhstan

STRUCTURE OF THE KAZAKH SYSTEM

The central device governing quality of production in Kazakhstan, as it is for industries across the world, is the **standard**. Since the passing of Kazakhstan's 2004 Law on Technical Regulation, standards have held the same general definition in Kazakhstan as in other developed countries. Standards are technical documents that provide guidelines on best practices, safety, quality, and information on compatibility. Industrial standards are voluntary and are, at least in theory, developed by a process of consensus building between all relevant stakeholders. In Kazakhstan, as in many developed countries, standards are sometimes cross-referenced by **technical regulations** or other mandatory legal codes, in which case their adoption becomes mandatory. Technical regulations are employed when governments believe that market forces alone cannot guarantee public or environmental safety and that some form of legal regulation is therefore necessary. The interaction between voluntary standards, government regulations, and the bodies that develop or enforce both form a country's regulatory environment. While standards both ensure safety and make up the backbone of what is known as national quality infrastructure (NQI),[2] mandatory government codes help provide additional support to a country's system of technical regulation. These components are described in detail in **Appendix A**.

Though the components of Kazakhstan's regulatory system resemble those found in advanced economies, Kazakhstan's system is in drastic need of simplification. While many developed economies employ technical regulations to support voluntary standards in guaranteeing safety, Kazakhstan employs a wide variety of mandatory codes such as SNiPs, VUPPs, NPBs, and others, which are often cross referenced to each other as well as to numerous laws, government orders, and technical regulations. The result is an interwoven array of national laws, ministerial decrees, technical regulations, and several other types of codes and regulations that create a system where the government sets mandatory requirements for nearly all upstream oil operations. Compliance with these regulations is enforced by private sector organizations through conformity assessment, but also at various stages by the Ministry of Emergency Situations and the Ministry of Industry and New Technologies.

Kazakhstan's legal basis for technical regulation relies very heavily on mandatory certifications, inspections, and technical regulations. Companies are, for example, required to certify technology and international standards in the oil and gas sector, even when these technologies are already in use by other companies or at other locations operated by the same company. This exacts an unnecessary burden on companies and unnecessarily swells the government bureaucracy. In this instance, the same goal could be accomplished by allowing for voluntary declaration of conformity in combination with mandatory government inspections.

Companies are required to go through a similar process for any equipment that could be deemed dangerous to workers or the environment. Imported equipment must undergo conformity assessment before it can be used, as well as periodically throughout its use. Similarly to registration of international standards, conformity assessment is company- and site-specific. The Ministry of Emergency Situations (MChS) is responsible for enforcing conformity of technology and equipment

and the technology and equipment that is subject to conformity assessment is established by the Law "on industrial safety" as well as "other laws and regulations."[3]

Companies wishing to implement new technology and equipment or to sponsor the development of a new national standard are required to hire an external company to provide expertise, which is then reviewed by the appropriate government regulatory body. A company providing expertise must be independent from the company applying to use a new technology and must have passed MChS attestation. Yet it is unclear how many of these companies exist and if there is a competitive internal market for this expertise. Several organizations appear to be accredited to give ISO 9000 certification, but it is unclear how many of them are accredited to do more than that. ISO 9000 is the major international standard for quality management, which the government has been pressing its enterprises to adopt since 2001.[4]

These examples demonstrate that while Kazakhstan has promoted the more liberal use of voluntary standards, the government has not yet recognized the need for it to cede some of its direct oversight functions to industry.

REFORMS AND THE CENTRAL ROLE OF GOVERNMENT

While continuing to place government, not industry, at the center of the country's regulatory regime, Kazakhstan has been steadily engaging with the international agencies that set industrial standards in recent years, joining the ISO in 1994 and beginning active participation in a steadily growing number of ISO committees since 2002.[5] The legislature has also introduced and continued to update the laws relating to standards and technical regulation in order to make Kazakh practices better conform to WTO recommendations, especially as they relate to information sharing about standards and regulations as well as setting stricter timetables for their development.[6] This legislation, though, has also ensured the continued role of multiple ministries and agencies in the development of standards and regulations, each charged with including industry and other nongovernmental experts in the membership of their respective technical committees.

All this notwithstanding, the basic relationship between government and industry has not been redefined. Kazakhstan's regulatory regime is still based on the skeleton of the prescriptive system put in place by the planned economy of the USSR. Such a system was quite logical in the highly centralized, uniform, and state owned economy of the Soviet Union. The Soviet regulatory system was in direct support of the paternalistic socialist ideology that government regulators strive to increase health and environmental safety by setting specific requirements that companies must follow, including types of materials used and technological processes followed, in pursuit of creating uniform production for a centrally planned economy.

But this system makes much less sense in a mixed economy such as Kazakhstan, where private enterprise is intended to be a major driver of economic development and a critical source of new technology. In this kind of economy such a prescriptive system, even though partially reformed, has left industry subject to a complex and overlapping system of laws, ministerial decrees, technical regulations, safety regulations, construction norms and rules, sanitary norms and rules, and national, regional, and international standards, some of which have been modified to meet Kazakhstan's legal requirements. Not only has this made high technology investment more difficult, it also provides

preference to companies that continue to follow the old style economy instead of providing stimulus for companies that adapt to meet the competitive demands of the modern, globalized system.

While Kazakhstan's legislation over the past decade is designed to help reduce the number of documents regulating industry and to encourage standardization with international standards, a deeper approach with more industry engagement is needed. Industries in Kazakhstan continue to confront conflicting rules and regulations and a high level of direct government oversight every time they try to bring in new technology or start a new project. In the Soviet Union all technological innovation came from some state entity, be it an enterprise or an institution, or was imported by the state itself. This of course is no longer the case, and the entire process of technology development is so dispersed in the current global economy that putting the state at the center as effectively the sole mediator is itself counterproductive. The modern state, which Kazakhstan is trying to evolve into, is itself more like a multi-tentacled octopus than the vertically integrated mid-twentieth century state that originally defined its Soviet system of regulation.

CONTRADICTORY, OUTDATED, AND BURDENSOME REGULATIONS

Because so much of the Kazakh regulatory regime is mandatory and government-enforced, it leaves companies in an impossible situation when laws and regulatory acts put out by different agencies conflict. In one such example, KMG PiM identified a contradiction between VUPP-88, which calls for electric motors for reservoir master valves to be installed outside the embankment, and SNiP 3.02-12-2003, which allows for their installation inside the embankment. In such instances, a company, and the standards the company is operating on, can be compliant with one government regulation while violating another regulation that is setting different requirements for the same process.

Such contradictions are largely a result of the broad dispersal of regulatory authority across Kazakh government agencies. Regulation in Kazakhstan relies on too many actors who employ too many kinds of regulatory documentation. Technical committees, the Ministry of Emergency Situations, the Ministry of Industry and New Technologies, the Ministry of Oil and Gas, and others all develop regulatory documents that take multiple forms including laws, decrees, technical regulations, VUPPs, SNiPs, and others. Despite the complexity of this system, the government provides no efficient mechanism for identifying contradictions and no permanent platform for companies to discuss contradictions with regulating agencies.

Because the structure of this regulatory system builds on itself, even Kazakhstan's newer technical regulations may quickly become obsolete. Take for example the 26-page long technical regulation on "Safety requirements for construction of offshore and land-based production facilities for oil operations," which was adopted in 2008.[7] Though the document was developed relatively recently, many of the regulatory documents it references are extremely outdated. In its "catalogue of harmonized standards," the list of standards which operators may adopt to be deemed in compliance with the technical regulation contains 42 regulatory documents. Of these, 15 documents (36 percent) were developed before the collapse of the Soviet Union and 25 documents (60 percent) are more than a decade old. Fifteen of the documents are standards, only one of which (ST RK ISO 14001-2006) has been harmonized to its ISO equivalent.

As mentioned in the previous section, Kazakhstan's regulatory legislation is also unnecessarily restrictive of the import and implementation of new technology and equipment. According to the law "On industrial safety at dangerous production facilities," the Ministry of Emergency Situations[8] must give permission for the use of technology and technological equipment at dangerous production facilities, including any facility related to oil and gas. Obtaining permission requires a company to submit an electronic notice to the Ministry with a short description of the technology and its use; and submit an electronic copy of the "expert conclusion" on the technology, with these expert conclusions to be issued by an independent company that has passed Ministry of Emergency Situations attestation for provision of expertise on production facility safety. The guidelines for expert conclusions are detailed in **Appendix B**.

REGULATION AND THE EURASIAN ECONOMIC COMMUNITY (EURASEC)

The Kazakh system of regulation will be significantly affected by the Eurasian Customs Union (ECU) and its planned successor organization, the Eurasian Economic Union (EaEU). One of the most significant agreements passed by the Eurasian Economic Commission on the creation of the EurAsEC Common Economic Space is the Agreement on Shared Principles of Technical Regulation. This agreement sets out 66 areas of production that will be subject to EurAsEC technical regulations. These areas include significant parts of the oil industry.

Customs Union technical regulations are still in the transitional phase, and legally ECU and national technical regulations are supposed to be interchangeable until May 15, 2015. Russia's regulatory regime is itself in transition, given Russia's recent entry into the WTO. As a result Russia is in the process of moving from the old Goststandards (GOST-R) to a new TR or Technical Regulation system.[9] Very few Customs Union technical regulations (labeled TR TS) have been authorized to date. The harmonization of regulations across the ECU is intended, in part, to promote the harmonization of GOST standards with international standards by using the newer TR TS regulations throughout what is intended to be a unified economic space.[10] But only a handful of harmonized TR TS documents are in effect, and none of these are primarily focused on the oil and gas industry. Moreover, the harmonized catalogues of standards for those TR TS regulations that have been developed are composed primarily of GOST standards, not their international equivalents.

Goods entering the Russian Federation from union members must also conform to all the same technical requirements that apply for goods produced in Russia itself, meaning that until harmonization is complete, the movement of goods and technology into Russia is likely to remain a time consuming and costly process. One operating company reported that they expect a 30 percent increase in equipment cost due to ECU regulation and certification procedures.

This type of highly prescriptive regulatory system is particularly problematic for technology-driven industries, as the need to meet detailed, mandatory requirements often slows the adoption of new technology, hinders innovation, and undermines the very safety goals the regulations set out to achieve.

The oil and gas industry relies on the rapid development and implementation of complex technologies. Advances in technology routinely enable new processes, make operations safer, and open new deposits for development by lowering risk and cost. These factors do not preclude the oil and gas industry from being regulated by prescriptive mandatory requirements, but the industry's regulation by such a system does detract from its full innovative potential and creates problems of inefficiency.

In recent years, as economies have globalized and multinational companies have come to the fore, quality infrastructure has begun to play a broader role in economic development. The structure of a regulatory regime may inhibit or slow the transfer of newer, more effective technologies. This is particularly true in high-risk, high-tech fields such as the oil and gas industry, where the rate of technology development far outstrips a government's ability to pass new regulations, not to mention its ability to employ a sufficient quantity of experts who fully understand these advances.

This is a particular challenge in the oil and gas industry, where the major international companies are under enormous pressure from their stock-holders to sustain their profitability. Profitability in this industry can only be achieved if companies retain an edge over their competitors, which means constantly seeking to develop or acquire new technology to build their reserves. In the twenty-first century, this means getting exploration and exploitation rights for technologically challenging oil and gas reservoirs.

Many of Kazakhstan's deposits fit precisely into this category. This is particularly the case for the fields that are being developed by international consortia. Older, more traditional fields, on the other hand, are owned in whole or in part by the KazMunaiGaz (KMG), Kazakhstan's national oil company. The technological needs of these older fields are met, in whole or in part, by local or CIS based firms, but even these fields will need more and more advanced technology (specifically, enhanced oil recovery technologies) if they are going to maximize output of wells that have already achieved peak production.

The two major problems with the Kazakh regulatory system as it applies to the oil and gas sector are that regulations are out of date and that the laws on regulation are too prescriptive and require too much mandatory government involvement. This not only creates disincentives for anyone interested in doing business in Kazakhstan, but it also keeps regulations and procedures in place that are counterproductive to the goal of increasing worker, consumer, and environmental safety.

The problem of outdated technical requirements can force companies to work with old, less efficient technology. For example, there have been technological advancements in the global oil production industry in cement production and cementing techniques in recent years. However, new cementing

techniques cannot be implemented in Kazakhstan as the requirements of technical regulations for cementing have not changed. Even more problematic are instances when no regulatory basis exists for essential technologies or processes. As an example of one such instance, Kazakhstan has not developed any regulatory documents for drill cuttings re-injection, which means that this process simply cannot be employed in the country's oil projects.

For all Kazakhstan's progress in harmonizing national standards to modern international standards, many of its mandatory regulations that relate to the oil and gas sector still have not been updated since the collapse of the Soviet Union, and not all of them were current even then. This means that many of Kazakhstan's regulations are based on technologies and processes that are over two decades old. Technology in the oil and gas industry, by contrast, can induce extensive changes in just a few years.

Technological innovation can lead to dramatic increases in the profitability of industries and even the overall structure of economies. For example, technological improvements in horizontal drilling and hydraulic fracturing (fracking) helped spark the "Shale Revolution" in America. According to a Marcellus Shale operator, employing these advances dropped the cost per frac stage by 50 percent in a single year, between 2008 and 2009.[11] These effects were reflected in U.S. shale gas production, which grew by over 600 percent from 2007 to 2011, allowing the United States to become the number one producer of natural gas in the world.[12] While the United States has faced its own difficulties in effectively implementing fracking regulation, the example demonstrates the importance of building adaptation into a country's regulatory regime. When a technological advance transforms an economic sector, government regulators must be prepared and trained to work with industry in order to quickly set safety goals for using the technology, otherwise their economy may miss important opportunities for development.

Both KMG and the government of Kazakhstan recognize this, but translating this recognition—which is partially enshrined in legislation, to a changed way of doing business in Kazakhstan's bureaucracies and enterprises is quite another thing. This is particularly true because the government of Kazakhstan is in fact advancing two important, but ultimately conflicting goals—developing new technology-based enterprises, and keeping old industries functioning so as to not increase unemployment.

Developing Local Industry

Kazakhstan is uniquely positioned to become a regional leader for oil and gas technology. An investment in a modern regulatory regime will lead to wider adoption of modern technologies, thereby reducing the cost of developing and applying new standards, and in the process knocking down a major barrier to the creation of high technology economic clusters. By harmonizing its standards to international norms and modernizing the way its system of regulation functions as a whole, Kazakhstan stands to benefit from both the safety aspects and the quality assurance aspects of an efficient regulatory regime. These benefits will encourage the growth of internationally competitive local businesses to service the country's oil and gas industry, and overarching changes to its NQI and system of technical regulation will encourage the development of internationally competitive goods and services across a range of high technology sectors.

One of the major challenges that Kazakhstan faces is trying to get Kazakh companies to integrate international standards into their work. This is particularly important in developing Kazakh suppliers for complex oil projects operated by multinational consortia, as international firms working in Kazakhstan are generally required by their own companies' practices to only engage with internationally compliant businesses.

Current policies seek to incentivize Kazakh businesses to move toward ISO 9000 quality standards and to harmonize their enterprise practices with international standards, but the tax relief and other offerings have failed to convince even a significant minority of Kazakh business owners to make the substantial investments that modernizing their production lines to make them ISO compliant would entail.

The majority of Kazakh companies don't see the benefit of this investment; they view the local market as sufficient and do not see past the difficulty of international trade and the cost of compliance with international standards under the current regulatory regime. They prefer producing according to GOST standards or Kazakh national standards that are not harmonized with the requirements of international purchasers, continuing to use production lines that were developed according to older standards.

While local markets may support these companies in the short-term, Kazakhstan must strive to produce internationally competitive goods in order to ensure long-term growth.

The overall structure of Kazakhstan's regulatory regime also limits the growth of competitive local industry. Namely, innovation is impossible in a system that is dominated by prescriptive government controls. Kazakhstan must work to develop a system that not only encourages the use of international quality standards, but that also requires less direct government involvement in the approval of new equipment and processes. This is a fundamental step in encouraging industries to innovate on their own and not simply import technology from abroad. In this way, Kazakhstan can ensure that it is developing local content not only for the market of today, but for the market of tomorrow as well.

Some progress in engineered goods production has been made in recent years, in large part thanks to international joint ventures and cooperation in modernizing older factories. The North Caspian

Operating Company, for example, has provided technical and financial assistance for several Kazakh producers to adopt ASME standards, including the Petropavlovsk Heavy Machine Building Plant and the Western Kazakhstan Machine Building Company.[13] But overall, the growth in Kazakhstan's industrial manufacturing industry has been slow. In 2011, 92.1 percent of engineered goods purchased in Kazakhstan were imports. This translated to a negative trade balance of $13.2 billion in the engineered goods sector.[14] Similar numbers prevailed in the oil and gas industry, where only 12 percent of engineered goods, worth $168 million, came from Kazakh producers in 2008.[15] Although the value of Kazakh produced goods increased to $320 million in 2012, they represented virtually the same percentage, 12.2 percent, of the goods purchased.[16]

While it is clear that demand for these goods is high in Kazakhstan, more needs to be done to develop local production and innovation. An essential component of encouraging long-term, robust growth in this sector will be the transition to a regulatory system that gives greater freedom to industry engineers and places less responsibility on government bureaucrats.

As the older Soviet-era oil and gas fields steadily work down their deposits, it will become harder and harder for Kazakh companies producing for the oil and gas sector to avoid investment in new production lines that conform to international standards. As they reach the end of their life, even these older wells will be worked with new technology designed to maximize remaining production.

Moreover, without more widespread implementation of modern technologies and processes, Kazakhstan will simply fail in efforts to develop those new sectors of the oil and gas industry that the government has targeted. One of these is the establishment of internationally competitive laboratories. Currently, Kazakhstan outsources much of the laboratory analysis that is essential to the oil and gas industry. Kazakhstan is making efforts to inaugurate new labs to bring some of this testing home, but in order for these labs to compete with their international equivalents and to stay competitive for years to come, they must be provided a simpler regulatory environment. Moving toward performance-based regulations is a step that Kazakhstan must take if it wants these laboratories to be successful not only for specific Kazakh projects, but for a wide range of oil and gas fields across the region.

Kazakhstan will need to operate laboratories in order to become an economy that is based on innovation, but successfully operating laboratories is particularly difficult under the country's current regulatory regime. Laboratories face overlapping problems in both regulation and related technical education. These include a lack of workers qualified to staff them as well as the absence of a constant inflow of educated cadres who can successfully sustain transfer of technology. Moreover given that this laboratory will need to function under the current regulatory regime, laboratories will face similar burdens to operating companies in importing and upgrading new equipment. It is also unclear that the existing cohort of government regulators, who are responsible for establishing mandatory compliance with prescriptive regulations, will be adequately trained in the processes at work in new laboratories.

Kazakhstan is working now to develop is first internationally competitive laboratories, including by cooperating with international corporate partners. One such laboratory, announced in 2013, will be established in cooperation with Shell to provide advanced geochemical analysis on the basis of the Kazakh Institute of Oil and Gas (KING). The success of these first laboratories is critical for Kazakhstan, as they will lay the groundwork for the creation of others. Kazakhstan is, in some senses, uniquely positioned to become a hub for geological laboratory services, as the prevalence of

hydrogen sulfide gas (sour gas) in deposits on Kazakh territory[17] provides a focal point for the development of new technologies and expertise. The difficulty of working with sour gas opens up opportunities for Kazakhstan to develop a variety of laboratory testing facilities, sulfur management and storage technologies, new equipment for withstanding corrosive elements, and new technology for increasing worker and environmental safety. These innovations would not only find a market in the domestic oil and gas market, but could be employed by similar projects throughout the region.

The growth of high technology services in Kazakhstan will also encourage the growth of high technology goods production. But none of this is possible without the introduction of a modernized regulatory regime to reduce the bureaucratic burden on companies that need to import and produce new technologies for manufacturing so that their goods are competitive with those that originate in Europe, Japan, or other established producers. The strengthening of Kazakhstan's manufacturing reputation and growth of engineering expertise in one sector, such as oil and gas, will encourage growth across other industries as well.

Toward Performance-Based Regulations: The Case of Norway

A similar command and control style system to that still in effect in Kazakhstan was employed for offshore drilling operations in Norway until 1985, when two major offshore accidents caused the government to drastically reduce its reliance on prescriptive regulations. Prescriptive regulations were replaced with "performance-based objectives", which establish requirements to meet safety objectives for construction and operations, but leave the decision as to how those objectives will be met up to the operator. This fundamental shift in the structure of Norway's regulatory regime has been credited with transforming the country into a hub for technological innovation and has made North Sea operations some of the safest offshore projects in the world.

The first oil and gas drilling operations in the Norwegian North Sea were conducted in 1966, and the industry's first years were dominated by foreign operators, who introduced high technology equipment that had initially been designed for drilling in the Gulf of Mexico. Within three years, Philips announced the discovery of the Ekofisk field, one of the largest offshore oil fields in the world, estimated to remain in production until 2050. Another major deposit, the Statfjord field, was discovered in 1974.

As Norwegian officials became cognizant of the size of their country's reserves, the Norwegian government decided to take more direct ownership and control over the country's oil wealth in order to use it to create a new economic future for Norway's citizens. In 1972 the Norwegian State Oil Company, Statoil, was formed. The company has been publicly traded since 2001, with two thirds of the stock held by the state, and has continued to expand its role in the exploration and exploitation of Norway's oil assets. Statoil first became an operator in 1981, acquiring rights to the Gullfaks deposit. Over the years, Statoil has continued to expand its role in the Norwegian oil and gas sector. In 2007 Statoil took over and integrated Norsk Hydro's oil and gas division, which gave it much greater capacity to play a key role in the international oil and gas industry.

In Statoil's own words, Norway has sought to turn itself into "a test lab" for technology development in the oil and gas industry.[18] Statoil is subject to the same legal regime as any other oil company operating in the Norwegian continental shelf.

The Norwegian government's participation in the oil industry is not limited to the role of its national oil company. In 1985 the Norwegian government also introduced the State's Direct Financial Interest (SDFI) in petroleum operations, which managed the Norwegian state share of oil and gas fields, pipelines and onshore facilities, a share which is decided when the production license is awarded, and is field-specific. The state, as stakeholder, pays its share of investments and costs, and receives a corresponding share of the income from the production license. Up to 21.5 percent of SDFI's assets can be sold, and the rest are managed by a state run holding company (Petoro).[19]

The government of Norway has also had a learning curve with regard to industrial regulation. With little institutional experience in the petroleum industry, the Norwegian government assumed a visibly active role in regulation only in 1972, with the establishment of the Norwegian Petroleum Directorate (NPD). The NPD's first regulations were prescriptive, and the directorate actively exercised its regulatory authority.

However Norwegian operations soon suffered two major industrial accidents that forced the government to reexamine and then change its regulatory system. In 1977, an improperly installed safety valve led to a blowout at the Ekofisk Bravo platform, resulting in up to 200,000 barrels of oil being spilled into the North Sea. Three years later, the Alexander Kielland "flotel" capsized in severe weather, killing 123 people.

The subsequent inquiry reports for these two disasters pointed not only to technical issues, but also to underlying systemic failures. The report for the Bravo incident noted several violations of safety regulations, a work culture that was inadequately dedicated to worker safety, and a conflict of interest in the regulatory agency itself.[20]

The aftermath of these accidents led Norway to conduct a sweeping reform of its offshore regulatory regime. A single regulatory body—the Petroleum Safety Authority—was created to administer the regime. Prescriptive regulations were replaced by performance-based ones, where companies were given flexibility to meet the goals established by regulations. Operators were required to develop "internal control systems" to evaluate and regulate risks and were required to allow participation of employee safety representatives in all activities of these systems.

While the PSA offers guidelines for every provision of its core offshore oil and gas regulations the country's performance-based regulatory approach means that its regulations contain very few mandatory technical requirements. Instead, they establish requirements to manage operations and build facilities to meet certain objectives, often performance requirements for identifying and reducing risk, along with requirements for management systems to ensure performance attainment.

The end result is a regulatory system that has transferred responsibility for safety from overextended government regulators to the operating companies themselves, and where safety guidelines are developed through cooperation between government, industry, and workers. In developing this system, the regulatory administration was itself overhauled. Today Norway's PSA has a 4 to 1 ratio of technical to non-technical personnel, and a wide range of engineering disciplines are common, including a mix of petroleum industry and non-petroleum industry engineering subfields represented as well as chemists, biologists, physiologists, and social scientists. No less important, wage levels are kept well above the average for public servants so that these jobs remain desirable for the most highly qualified engineers.

Norway's Petroleum Safety Authority regularly publishes guidelines for how companies may meet its "performance-based objectives." These guidelines often reference international standards, as well as domestically-developed NORSOK standards. However, these guidelines differ from technical regulations, as they are not legally binding.

Companies that wish to meet their objectives through other means than provided in the guidelines must be able to document that their solution fulfills the regulatory requirements and be prepared to show regulatory authorities these documents during periodic audits or in an investigation should there be an accident.[21] The legislation does not specify how this must be documented, both introducing flexibility and leaving the burden of proof on the operator. However, it does note that certificates issued by domestic or foreign authorities may be used as a basis for this documentation.[22]

The audits and investigations are intended to be non-adversarial, but to foster the culture of shared goals and values to create safe and environmentally friendly work environments that are intended to

be at the core of the regulatory system. At an audit's conclusion, the site team, having met with a variety of types of employees during the audit process, holds a briefing session at which the auditors share their impressions and representatives of the management of the company are invited to share their views. A written audit report follows, to which companies can respond, and either accept or press for further engagement with the auditors. When consensus is finally reached, the company will be expected to implement the auditors' recommendations, and the auditors generally rely on the company to follow through, accepting written confirmation rather than scheduling another inspection, although it is within the auditors' rights to hold follow-up spot checks.[23]

Norway used audits and investigations to retain a level of what they see as balanced government supervision, with fines being assessed after industrial accidents or near misses. This presumes a shared culture across industry and government, and retains authority on the side of the government to discharge their responsibility and punish offending concerns. But it is intentionally less confrontational than a prescriptive system. It relies on an understanding that if an accident does happen, the system must adapt to ensure that the mistakes that led to it are not repeated. One example of the way this culture operates can be found in the 2004 gas blow-out at the Snorre oil field, which, though it had no fatalities, was viewed as a potential catastrophe. A major investigation followed the accident, with well-publicized results and discussion throughout the industry to try and understand how and why so much had gone wrong at the site.[24] The end result was fines for the company, but also a lot of soul searching on the part of the PSA as well, for the accident at Snorre was seen as a shared failure of the regulatory system which required greater vigilance in the future from all sides. The conduct of the investigation itself was handled in a way that was designed to create incentives for modifying behavior in the oil industry.

The Norwegian regulatory system assumes that there is or can be developed a shared culture on safety between government and business, and this is presumed to be true whether or not the PSA is dealing with a Norwegian firm or a foreign investor. Moreover the system is designed to both encourage the use of the best technology available, as well as to try and stimulate improvements in this technology.

Much like Kazakhstan, Norway has a limited number of operating companies that are the potential subjects of regulation. And like Norway, Kazakhstan stands to benefit from reducing its reliance on prescriptive governmental regulations, creating a shared culture of industrial safety, and shifting the primary responsibility for regulation onto industry itself. By establishing clear, long-term safety goals it can free up companies' abilities to innovate while increasing the effectiveness and efficiency of the country's safety measures.

Recommendations

The Kazakh government is quickly reaching a decision point. Since Karim Massimov returned to the post of prime minister in April 2014 the government has begun redoubling its efforts to attract foreign direct investment, especially in high tech industries, and offering new incentives for this, including increased harmonization of Kazakh and international standards. But none of the proposals under consideration presume changing the current structure for developing or harmonizing standards. More importantly, none have addressed the current hyper detailed and often conflicting regulatory structure that frequently forces modification of international standards and complicates introduction of new technology.[25]

Kazakhstan would clearly benefit from moving to a regulatory system that incorporates a minimum number of mandatory regulations that are based on international and industry standards and focus on providing guidelines for meeting performance goals. The country needs a system that is characterized by less government interference in specific aspects of projects including technology, equipment, and planned processes and the shift of responsibility for worker and environmental safety away from regulatory agencies and onto companies.

Simply put, the Kazakhs need to delve deeper into their regulatory reforms to make their system more like the Norwegian one. This would make the country more attractive to foreign investors, simplifying the task of introducing new technology, and generally reducing the cost of doing business in the country.

Changing its regulatory regime and reorienting to international standards bodies would also facilitate Kazakh businesses moving their production to meet international standards. This development is critical if the country is to meet current economic development goals. Kazakhstan's businesses that have been oriented toward a domestic or CIS market for so long must become more forward looking, or not only will Kazakhstan not become a producer of high technology but its current industry will atrophy. This is a real and immediate threat, as Kazakhstan's membership in the ECU will make Russian goods more competitive in the country, and its accession to the WTO, likely in the next year, will introduce competition from a broader market.

Though necessary, the task of transition from Kazakhstan's current regulatory system to a Norwegian style one will not be a simple one. For that reason it would be much better if in the early stages of reform Kazakh authorities concentrate on making the transition in one sector only, namely in oil and gas, and possibly starting with the off-shore sector at the onset.

The will to modernize exists in Kazakhstan's oil and gas sector. Much like Statoil, KazMunaiGaz has aspirations to be a competitive international actor when it completes its first quarter century of operation. Combined with this is the presence of Kazenergy, the only sector-based professional organization of an international caliber in the country, which would make an appropriate home for originating and monitoring a pilot project to introduce an experimental regulatory regime for an appropriate aspect of off-shore production.

Such a pilot project would benefit from direct engagement with experts from Norway's PSA, and NORSOK, as well as specialists from Statoil. These outside experts could provide essential help in

shaping the focus of the pilot project and the curriculum for the training modules that would need to constitute a basic part of the pilot project. As Statoil already maintains close engagement with its Russian partners, bringing in Russian observers to the pilot project would also be beneficial, especially given the harmonization of standards and regulations currently under way as part of the preparations for the formation of the Eurasian Economic Union in 2015.

In order for such a pilot project to be a success, the training component will be critical. A strong educational basis will need to be implemented for the various kinds of officials, inspectors and specialists who will be involved in writing the new pilot regulations as well as the engineers, geologists, and other kinds of workers and managers who will be charged with implementation.

Part of this training must focus on teaching people new ways to think about how to solve problems. Kazakhstan's bureaucracy is suffering from generational strains. It is simultaneously striving to introduce a modern competence-based civil service while retaining its Soviet-era trained experts in order to prevent a "brain-drain" during what is turning out to be a two-generation transition from the old Soviet-era command and control economy.

Transforming the way people think is difficult, but the future of Kazakhstan's development is dependent on experimenting with such revolutionary changes. Conducting these experiments as a pilot project ensures that it will not shake up the social fabric or cause other unforeseen legal or social consequences.

For all their strengths and technical expertise, there is a major weakness that is characteristic of the current group of Soviet-era trained experts who serve in the bureaucracy and in the technical committees that the government depends upon. These experts, though highly trained, were socialized in a very paternalistic view of government. Government is everywhere charged with the responsibility for protecting its citizens. But in the Soviet-era mindset that has characterized state-building in Kazakhstan (and elsewhere in the CIS) during the first post-Soviet generation, government is understood to be more capable of exerting control over individuals' lives than the individuals themselves. This attitude carries over to supervision of industry and is reflected in the entire process of how industrial safety is regulated.

Many of these experts who are of the older generation nevertheless provide invaluable technical skills. And as they depart from the scene through death or retirement, there is likely to be an acute shortage of trained experts capable of evaluating industrial standards and setting government regulation. Given the acute stress on Kazakhstan's education system over the past two decades, these experts are certainly not being reproduced with comparably skilled individuals in numbers necessary for their replacement. This is yet another key reason to transfer more responsibility to industry for setting the standards used to form the basis of government regulations and to encourage constructive dialogue between industry and government engineers.

Bearing in mind these challenges, the development of a pilot project could also serve as an opportunity to engage in experimental training to develop a core group of highly qualified engineers in cutting edge technology in the area of the pilot project. These specially prepared cadres can then themselves serve as trainers for training other specialists.

In similar fashion, those inspectors and regulators who participate in the pilot project should also then serve as trainers for regulators in other spheres. Following the conclusion of the pilot project

they would be well prepared to design curricular modules for the preparation of specialists who can themselves then serve as regulators.

This kind of training is critical if Kazakhstan's engineers and technical specialists are to remain on top of the technological innovations that are being made internationally. Without this up-to-date understanding of industry, regulators cannot ensure that the national standards remain current with evolving developments in international best practices. This is an expensive and time consuming process for an education system already under considerable stress to modernize from pre-K through advanced training.

As regulations become less prescriptive, it is essential that Kazakhstan develop professional cadres that fully understand new technical processes and technologies. Kazakhstan must develop the technical expertise to set objectives that are in line with current international norms, keep guidelines up to date, and maintain fruitful dialogue with industries concerning the country's interests with regard to technical regulation. As demonstrated by reforms in Norway, all of these tasks are essential to encouraging economic growth within the context of industrial and environmental safety.

In order for a modern regulatory regime to encourage growth, Kazakhstan must be prepared to supply workers with the technical capacity to staff new enterprises. Cadres will be needed to staff laboratories, modern consulting agencies, new manufacturing enterprises, and a variety of technology-reliant positions in the oil and gas industry. Highly trained cadres are what allow technology transfer to be sustained. While allowing more efficient implementation of new equipment and processes is important, its positive effect on the Kazakh economy will be weakened if Kazakhstan does not have the workers to operate new generations of equipment. Technology transfer, therefore, involves more than simply bringing in a new piece of equipment; it is also the transfer of skills and technical knowledge that become self-sustaining and lead to local innovation.

Developing highly trained, internationally competitive cadres will require Kazakhstan to make both international and domestic investments in technical education. Kazakhstan's Bolashak program has already reaped success for training the country's future leaders in highly competitive international universities. Kazakhstan would be well served by establishing a similar program for promoting a broad base of technical expertise. The government should seek to develop internship opportunities for training a new generation of engineers in modern practices across a range of technology-intensive industries.

At the same time, if Kazakhstan is to become a leader in innovation, it must develop an internationally competitive education system for engineering. At a time when Kazakhstan is developing several specialized oil and gas technology institutes, it has a unique opportunity to ensure that these institutes contain a strong educational component.

The adoption of a modern regulatory regime and the training of technical experts are closely intertwined, and one cannot succeed without the other. Kazakhstan will need to focus on both aspects to achieve, in the words of President Nazarbayev, a "knowledge-intensive basis for its economy."

Appendix A: Standards and Technical Regulations

The central component of modern industry regulation is the **standard**. Standards are technical documents providing guidelines on best practices and safety, quality, and compatibility information. They may developed by a government agency in charge of standardization (a National Standards Body, or NSB), regional standards bodies such as the European Committee for Standardization (CEN), by private standards organizations such as the American Petroleum Institute (API), international organizations such as the International Organization for Standardization (ISO), or by an individual company. Regardless of how a standard is developed, all standards share two characteristics: (1) compliance is **voluntary** until they are incorporated into an enforceable legal instrument (such as a technical regulation) by a government; and (2) they are developed by **consensus**, with input given by both governmental and nongovernmental stakeholders.

While standards can be developed by an NSB for use in one country, the overwhelming trend in past years is for companies to adopt **international standards**. These standards may be developed by large international organizations like the ISO or the International Electrotechnical Commission (IEC), or by industry-specific standards organizations like the API or the Petroleum Industry Data Exchange (PIDX). International standards benefit both businesses and governments in a number of ways. The world economy is steadily globalizing, and nowhere is this more true than in the oil and gas industry. International standards allow multinational companies to apply the same technological processes and equipment across all their areas of operation and allow them to purchase from local suppliers that have committed to producing equipment manufactured to the same standards as could be purchased anywhere else in the world. Governments, for their part, benefit from the expertise and regulatory guidelines provided by international standards without having to invest the tremendous amount of resources required to develop them independently. For areas of regulation where governments believe that voluntary conformity is insufficient, they often incorporate international standards into technical regulations, making compliance with a standard legally enforceable.

Kazakhstan's Law on Technical Regulation (2004) allowed **company-developed standards** to be developed and adopted in order to fulfill legal technical requirements. In developed economies, most companies are now striving to reduce their use of internal company standards for the same reasons they are striving to reduce their reliance on national standards. That is, adopting international standards ensures better conformity with international best practices and also reduces the burden on the company to invest in the expertise needed to develop a standard.

Technical regulations are developed by panels of experts who are selected by the government agency responsible for the area of regulation.[26] Technical regulations lay down a range of detailed requirements for the object they regulate. Technical regulations also often include a catalogue of standards, construction norms, fire safety regulations, and other regulatory documents that a company may comply with to be deemed in compliance with the technical regulation.

According to the 2004 law "On Technical Regulation," mandatory technical regulation should only be used in place of standards with the aim of:

(1) Ensuring the safety of goods and processes for human life and health and environmental safety, including the safety of plant and animal life;

(2) Ensuring national security; and

(3) Prevention of actions that mislead consumers as to the safety and quality of goods and services.

Appendix B: Requirements of an Expert Conclusion on the Compliance of Technology With Safety Norms[27]

According to the state services standard on "Granting Permission for the Implementation of Technologies, Technical Devices, and Materials," expert conclusions must include:

1. Title of the expert conclusion;
2. Introductory section, including the basis for conducting the expertise, contact information of the expert organization, contact information of the expert specialists, and proof of attestation allowing them to conduct industrial safety expertise;
3. Catalogue of the subjects of the expertise;
4. Information about the organization;
5. Purpose of the expertise;
6. Depending on the subject of expertise, information and documents examined in the process of the expert conclusion (concerning project planning, construction, operations, and repairs), as well as technologies, technical devices, and materials examined, specifying the year of production, factory and country of the producer, reference numbers, brand, and other indications necessary for identification;
7. Information on equipment used in the process of providing expertise;
8. A short description of the characteristics and purpose of the subject of expertise;
9. Results of the expert conclusion;
10. Closing section with scientifically-based conclusions, and recommendations on technical solutions and actions;
11. Appendix containing a catalogue of legal, technical, and methodological documents used during the process of conducting expertise, copies of the audit of specialists' proficiency and of acts that have undergone examination;
12. Information on the probability of harmful or dangerous exposure by personnel, the general public, and the environment, and the degree to which they would be affected in using the subject of expertise in the case of an accident or incident;
13. Information on the compliance of the data collected as a result of the expertise with current norms of the Republic of Kazakhstan;

The expert conclusion on compliance of a technology with industrial safety requirements should also contain:

1. Information on dangerous industrial factors resulting from the technological process conducted by a given technology and their limits;
2. Information on compliance of the threshold limits of harmful and dangerous industrial factors with the normative limits in place in the Republic of Kazakhstan;
3. Information on technical measures providing a reduction in harmful and dangerous industrial factors to within the allowed limits, the extent of their reliability;

The expert conclusion on compliance of technical devices with industrial safety requirements should also contain:

1. Information on the threshold limits of all harmful and dangerous industrial factors resulting from the operation of the technical device;
2. Information on constructive solutions, providing a reduction in harmful and dangerous industrial factors to within the allowed limits, the extent of their reliability;

The expert conclusion on compliance of materials with industrial safety requirements should also contain:

1. Information on the threshold limits of all harmful and dangerous industrial factors resulting from the implementation of the material;
2. Information on technical solutions providing a reduction in harmful and dangerous industrial factors to within the allowed limits, the extent of their reliability.

Appendix C: Structuring National Quality Infrastructure

Regardless of a system's effectiveness, every modern regulatory regime consists of four primary elements. These are:

1. a regulatory component consisting of voluntary standards, mandatory technical regulations, and other mandatory codes that establish best practices and requirements for industry;

2. a compliance component that provides incentives for companies to remain in compliance with regulations or sanctions companies that violate mandatory requirements;

3. an accreditation component that authorizes organizations to provide compliance testing; and

4. a metrology component that establishes a uniform system of weights and measures.

Taken collectively, these components play two major roles regulating interactions between the domestic economy and the global economy at large. First, they make up a **National Quality Infrastructure** (NQI), the system that ensures that domestic manufacturing meets the requirements of international purchasers. And second, they make up a system of **technical regulation**, which ensures personal and environmental safety in industrial production. Modernizing each of these components allows a country's NQI and its system of technical regulation to ensure quality and safety while promoting economic and technological development.

Kazakhstan's regulatory regime is structured as follows:

1. **Regulatory Component:** a system of voluntary national standards and organization standards and an array of mandatory documents including Technical Regulations, SNiPs, VUPPs, Customs Union Technical Regulations (TR TS), etc.;

2. **Compliance Component:** Accredited conformity assessment bodies, Ministry of Emergency Situations, Ministry of Innovation and New Technologies (MINT);

3. **Accreditation Component:** National Center for Accreditation;

4. **Metrology Component:** Committee on Technical Regulation and Metrology.

The **Accreditation** and **Metrology** components of Kazakhstan's regulatory regime do not pose significant obstacles to technological development in the country. The National Center for Accreditation provides accreditation services to laboratories and independent certification bodies and the Committee on Technical Regulation and Metrology provides calibration services that are generally in line with international norms. Kazakhstan's **Regulatory** and **Compliance** components, however, greatly complicate the development of high-technology industries and the adoption of technological advances.

About the Authors

Martha Brill Olcott is a senior associate with the Russia and Eurasia Program at the Carnegie Endowment in Washington, DC and co-director of the al-Farabi Carnegie Program on Central Asia.

Eli Keene was the program coordinator for the al-Farabi Carnegie Program on Central Asia from 2012–2014.

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