Presentation

IV KAZENERGY National Energy Report 2019

Matthew J. Sagers, Managing Director, Eurasia Energy, Head of the Russian and Caspian Energy Advisory Service, IHS Markit,
matt.sagers@ihsmarkit.com

Nur-Sultan, 27 September 2019

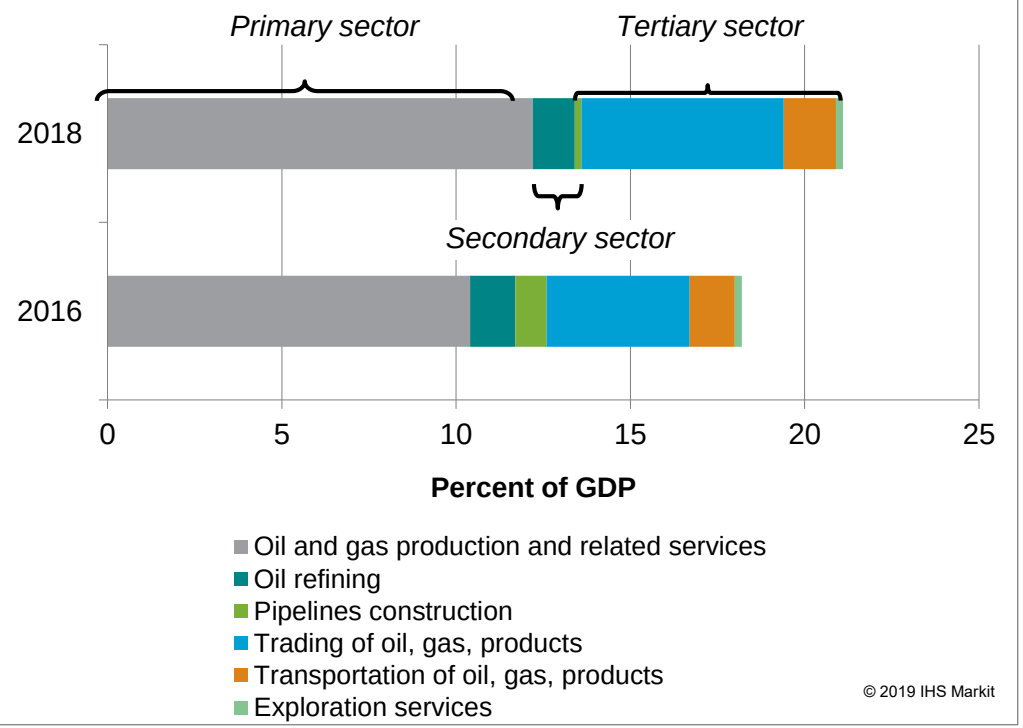
Key aspects of the National Energy Report 2019 (NER19): Goals, objectives, audience

- **Provides analytical, internally consistent, and independent overview of major energy sectors**
- **NER19 format changed and more focused, providing analysis of key select questions facing the energy sector in Kazakhstan, such as**
  - Attracting new investments
  - Ensuring ample gas supply for the domestic market and exports
  - Managing the upcoming integration within the Eurasian Economic Union (EAEU)
  - Meeting the Paris Accord commitments
  - Renewables integration and emerging challenges of the nascent capacity market in the power sector
- **Concise update of main data on Kazakhstan's fuel and energy complex presented in previous Reports**
- **This report is intended for**
  - Kazakhstan's decision-makers and business leaders
  - Potential investors in Kazakhstan's energy sector
  - Domestic and international opinion leaders or influencers
  - Kazakhstan's population

Kazakhstan's economy depends heavily on energy sector, mainly oil and gas

Largely due to higher global oil prices, the share of the energy sector in national GDP edged back up to about 23% in 2018 (compared with 27% in 2010 and 19% in 2016)

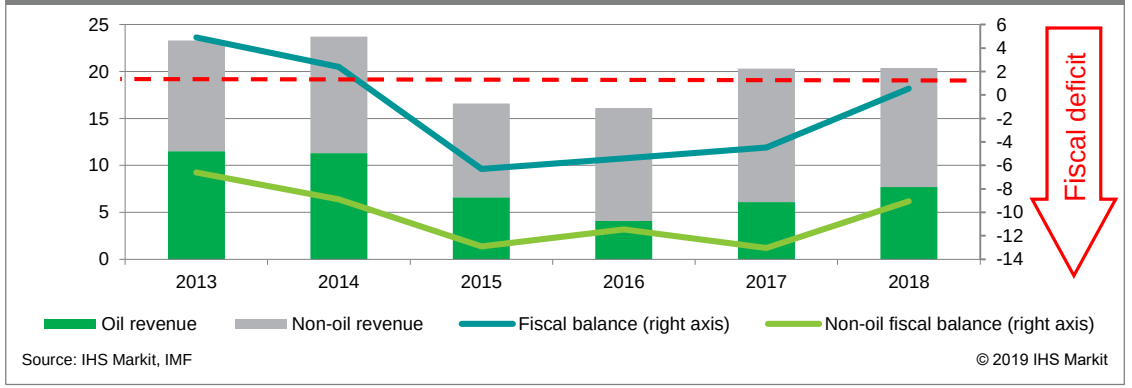
Kazakhstan's oil and gas industry contribution to GDP



Total contribution of energy sector to GDP in 2018 was ~23%

Higher prices increased share of oil in total budget revenues from 25.4 % in 2016 to 27.8% in 2018; higher oil revenues translated into lower fiscal deficit

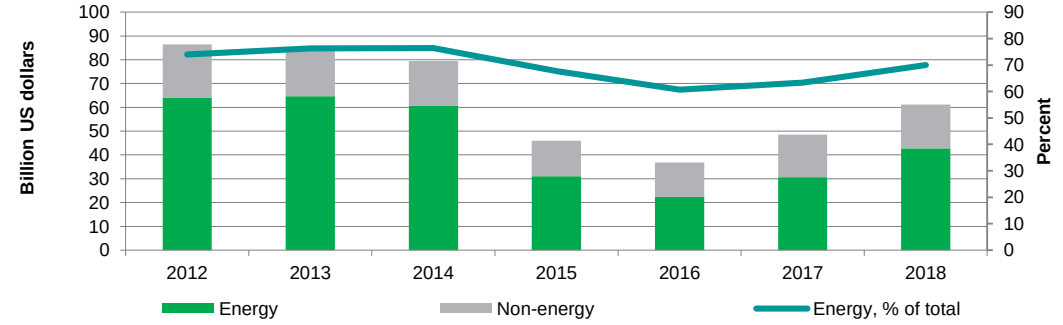
Kazakhstan's government finances, % of GDP



Source: IHS Markit, IMF

Energy comprised 70% of country's total export earnings in 2018

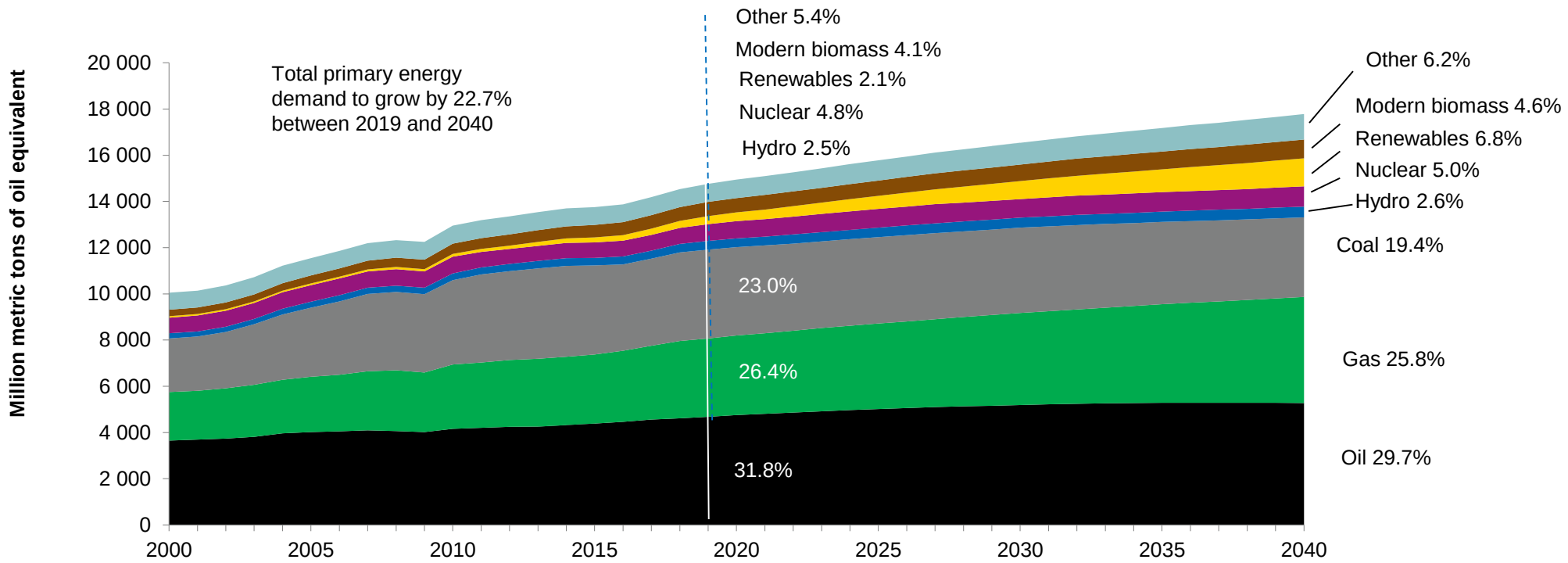
Energy in Kazakshtan's exports*



Notes: * Energy includes all commodities under the Harmonized System Code of 27
Source: IHS Markit, Kazakhstan's Statistics Committee

Hydrocarbons remain largest component of global energy consumption in all of IHS Markit's latest scenarios to 2040 (notwithstanding rapid growth of renewables), ensuring viable long-term market for Kazakh oil and gas exports

Global primary energy consumption by fuel in IHS Markit base-case (Rivalry) scenario

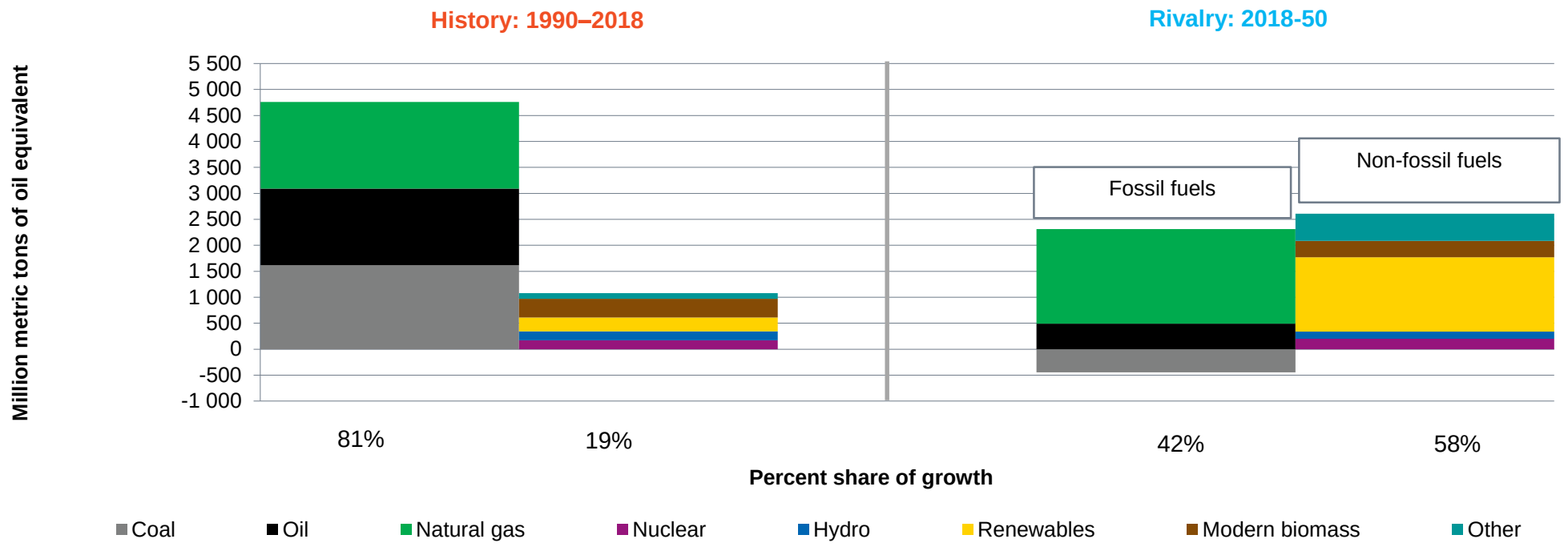


Notes:
Primary energy consumption is the direct use of crude energy that has not been subjected to any conversion or transformation process. Oil consumption includes international marine/aviation bunkers; does not include biofuels, which at the primary energy level are not associated with petroleum. Coal category includes steam and coking coal. Renewables include solar, wind, geothermal, and tide/wave/ocean energy. Modern biomass includes biofuels in transport and biomass used in industry, power generation, district heating and refineries. Other category includes solid waste, traditional biomass, ambient heat and net trade of electricity and heat.

Source: IHS Markit

Natural gas accounts for the largest share of increase in global energy consumption in IHS Markit base scenarios to 2040, with renewables in second place; Oil demand grows slightly, while coal declines

Historical and projected global primary energy demand growth in IHS Markit base-case (Rivalry) scenario



Notes:
Primary energy consumption is the direct use of crude energy that has not been subjected to any conversion or transformation process. Oil consumption includes international marine/aviation bunkers; does not include biofuels, which at the primary energy level are not associated with petroleum. Coal category includes steam and coking coal. Renewables include solar, wind, geothermal, and tide/wave/ocean energy. Modern biomass includes biofuels in transport and biomass used in industry, power generation, district heating and refineries. Other category includes solid waste, traditional biomass, ambient heat and net trade of electricity and heat.

Source: IHS Markit

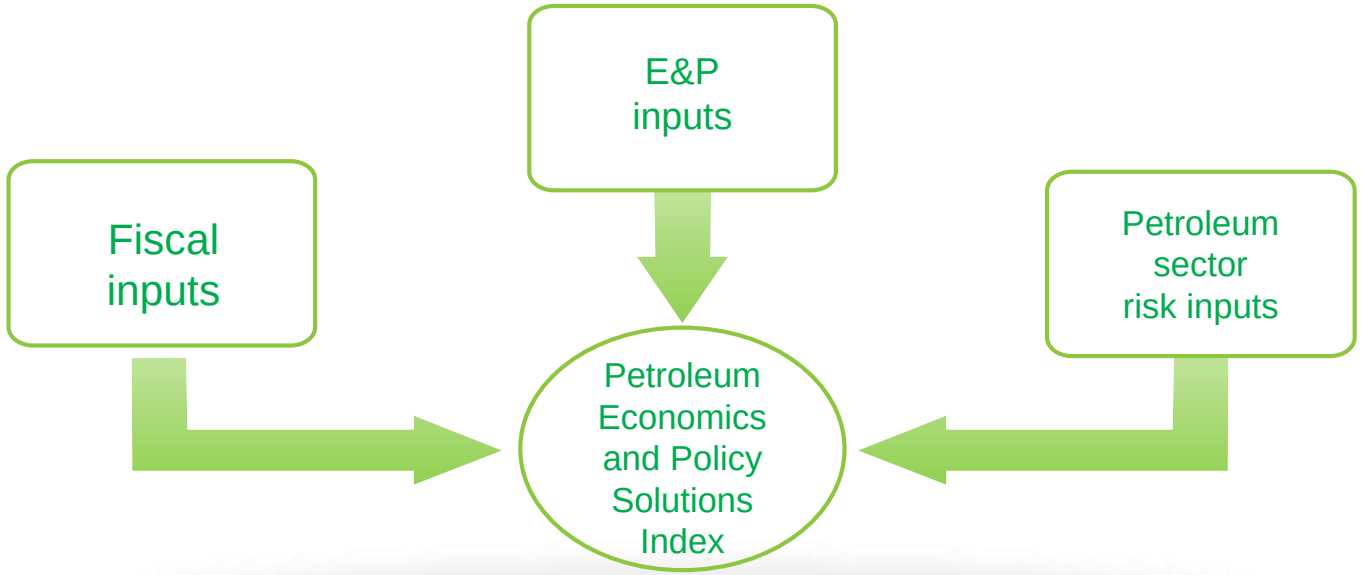
Kazakhstan’s Investment Climate and Overall Attractiveness

Key Points:

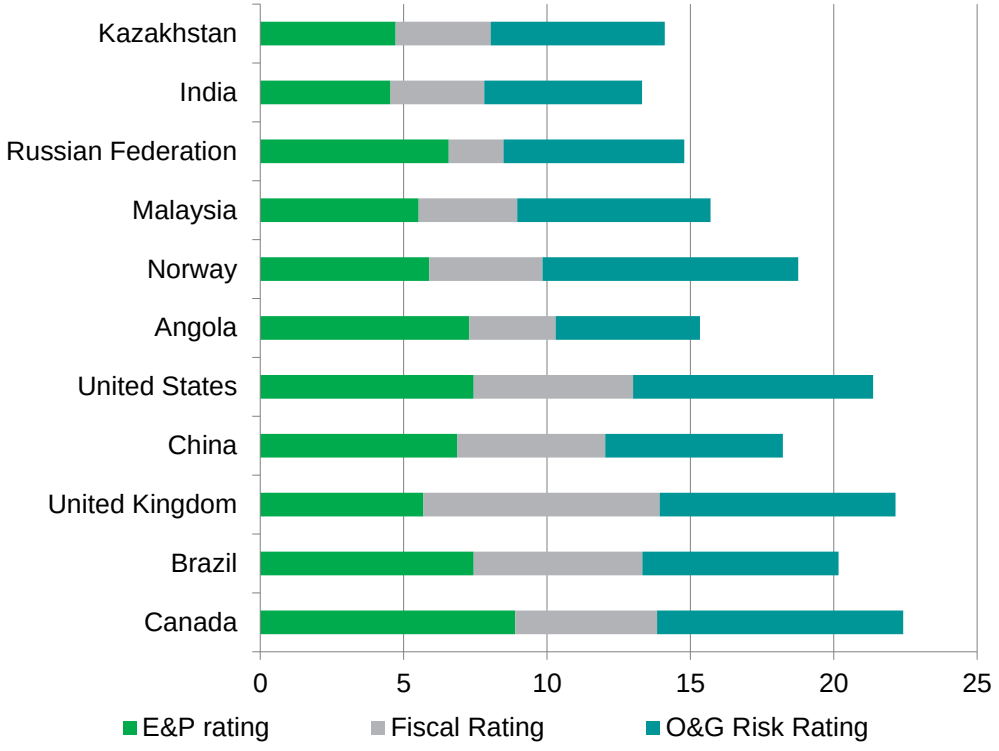
- Kazakhstan’s general business climate rankings remain generally good and actually improving in international comparisons, but companies worldwide are being much more selective with new projects—increasing the level competition among resource-holding countries for available investment
- Kazakhstan has taken important steps in recent years to rationalize upstream legislation and regulations: changes to the Tax Code and Subsoil Code that took effect in 2018 included new fiscal incentives for selected upstream investment and some improvements in subsoil auction procedures
- Additional regulatory changes are nevertheless clearly required to remain attractive for new investment: further refinement of tax and subsoil legislation still needed and especially reformulation of problematic draft Ecology Code
- Government policy of maintaining low electricity, natural gas, and refined products prices for consumers complicates the task of incentivizing production, processing, and distribution of these resources; revenues derived these activities must be sufficient to finance reinvestment in these sectors
- Pending formation of single EAEU markets in oil and oil products, natural gas, and electric power will add further complexity to decisions on domestic pricing

Assessing Kazakhstan's upstream investment attractiveness using IHS Markit's PEPS Index: Internationally, Kazakhstan's rank is close to the median for investing in new projects, on par with Russia

- **Petroleum Economics and Policy Solutions (PEPS) Index** - provides a broader view by assessing fiscal terms, along with other factors important for investments, including availability of resources and above-ground risks
- Although Kazakh Tax Code, Subsoil Code amended and improved, general direction for gas development policy does not strongly encourage energy investments



IHS Markit PEPS Country Ratings and Rankings, Q2 2019

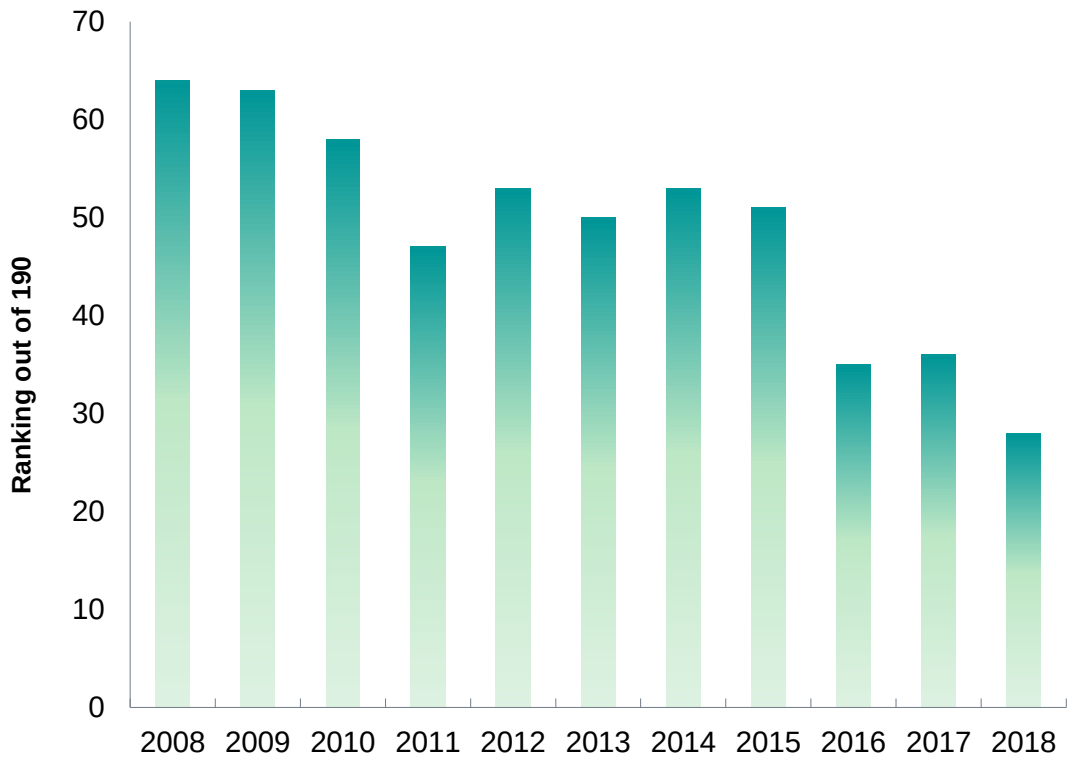


Notes: The breakdown of the overall rating is as follows: E&P rating (50%), Fiscal rating (35%), O&G risk (15%)

Source: IHS Markit

Since 2015, Kazakhstan ascended rapidly in the annual country rankings on the World Bank Group's "Ease of Doing Business Index" (EBD)

Kazakhstan's ease of doing business improvement in ranking

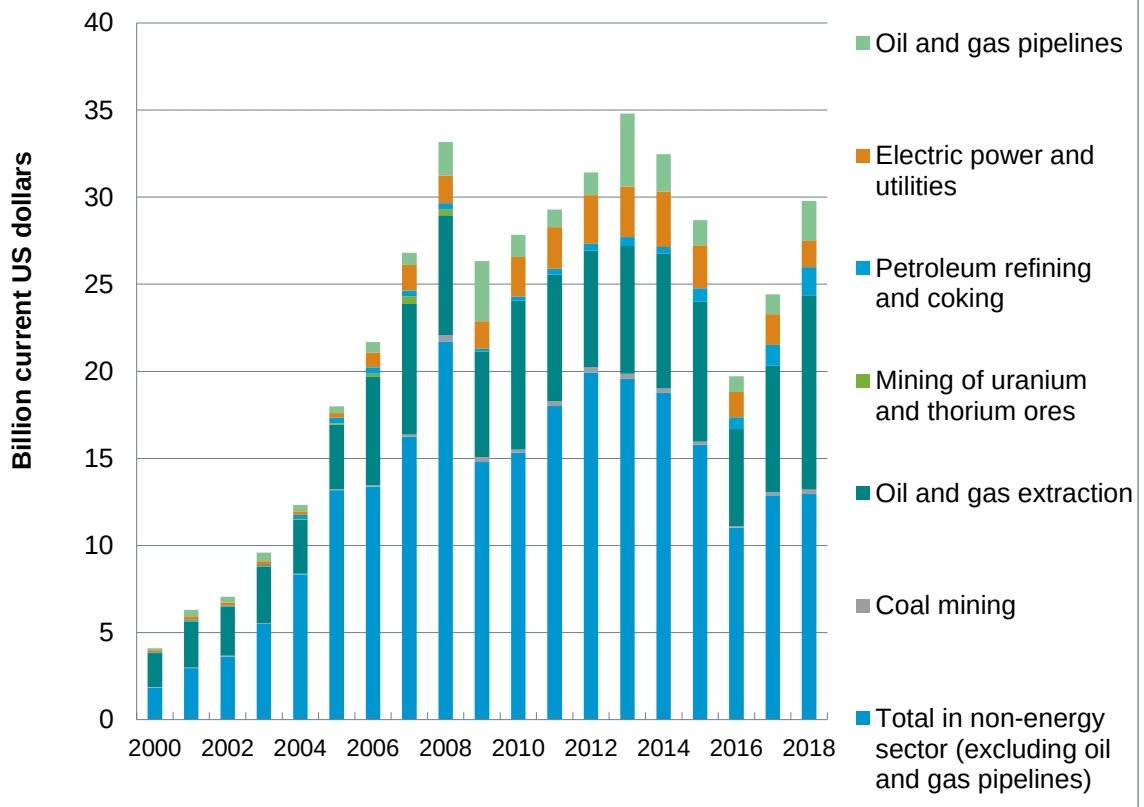


Source: World Bank Ease of Doing Business Ranking

- EBD - widely used ranking of countries assessing regulatory environment conducive to the operation of a small or medium-size business.
- Kazakhstan ranked 28th of 190 countries for 2019, improving by 7 places since 2017
- Kazakhstan scores particularly high on "protecting minority investors" component, ranking first among all countries for 2019 (a surprising result)
- But Kazakhstan continues to be hindered on more general measures of overall investment attractiveness (not covered in the EDB) including relatively low labor skills of the workforce, unpredictability of monetary policy (reflecting pressure on the tenge in a low oil price environment, clarity and predictability of currency control laws), and limited access to financing

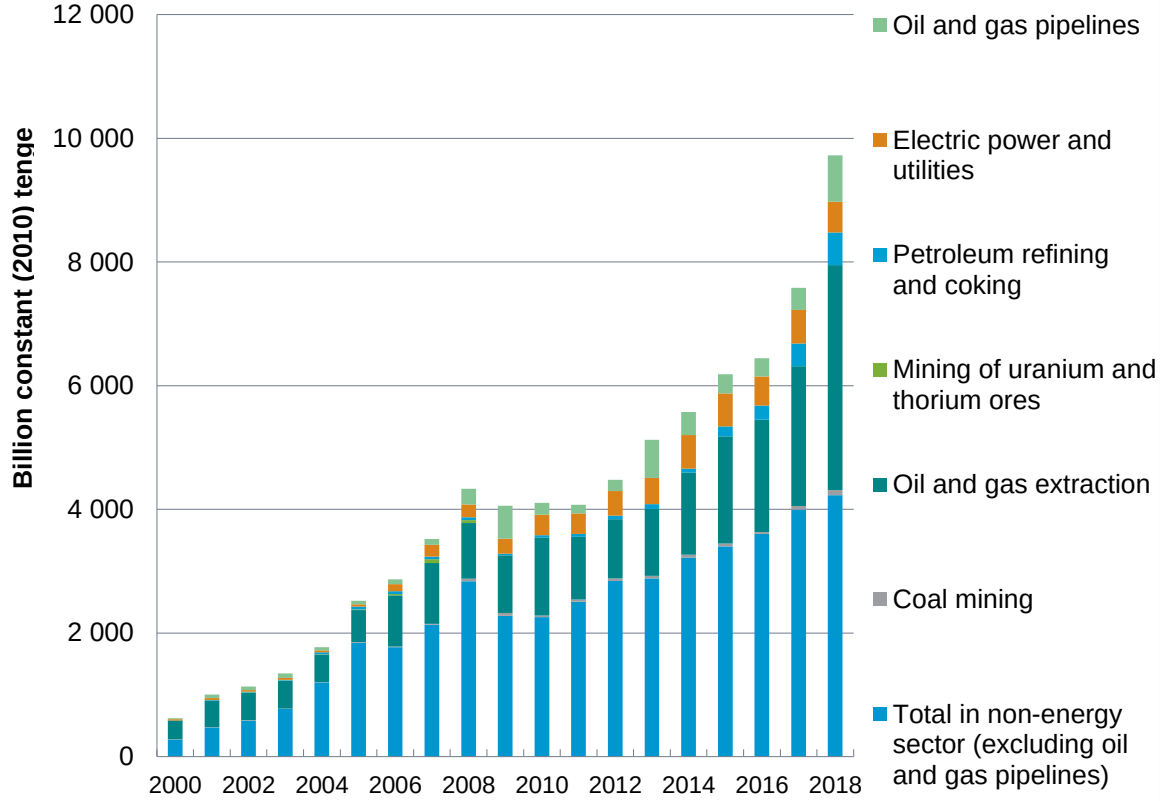
Investment in Kazakhstan has generally been rising (in tenge), but more volatile in dollars; 35% of investment in oil and gas industry

Total investment in fixed assets in Kazakhstan's economy - current US dollars



Source: IHS Markit, Kazakhstan Statistics Committee

Total investment in fixed assets in Kazakhstan's economy - constant (2010) tenge



Source: IHS Markit, Kazakhstan Statistics Committee

Planned formation of single oil and gas market in Eurasian Economic Union (EAEU) by 2025 presents harmonization challenges

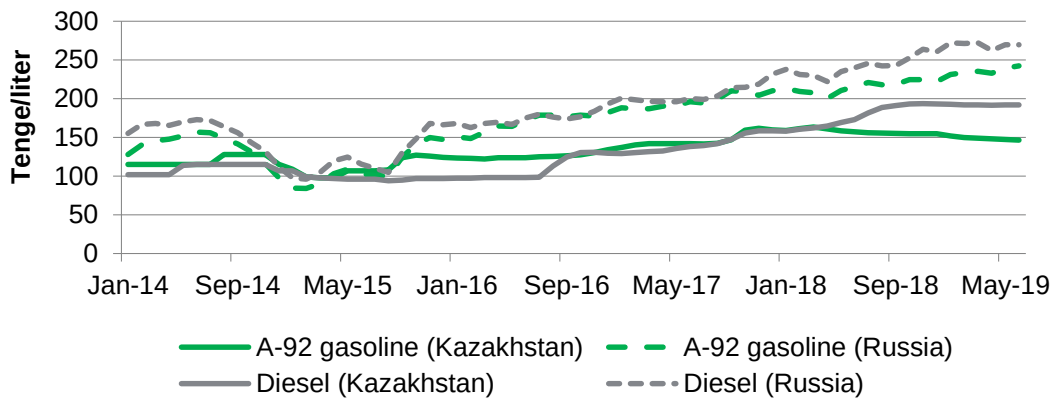
Oil Sector:

- Kazakhstan has lowest retail gasoline and diesel prices among five EAEU members; incentivizes redirection of Kazakh motor fuels to consumers in neighboring states in various types of “grey” schemes
- Within the single economic space, prices will likely move towards export parity, similar to what exists in Russia as well as in countries that import Russian oil and products (e.g., Belarus, Kyrgyzstan, and Armenia)

Gas Sector:

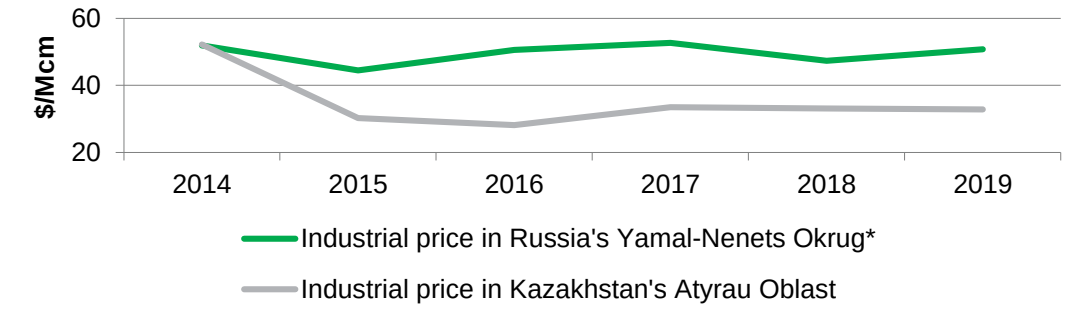
- Artificially low domestic gas prices also will impede Kazakhstan’s efforts to harmonize its prices with those of Russia in lead-in to EAEU common market
- To harmonize industrial gas prices in western Kazakhstan’s producing area (Atyrau Oblast) with those in gas-producing Yamal-Nenets Okrug in Russia would require 13% increase each year between 2020 and 2025

Retail refined product prices in Kazakhstan and Russia (Omsk Oblast)



Source: IHS Markit

Comparison of natural gas price trend in Kazakhstan (Atyrau Oblast) and Russia (Yamal-Nenets Okrug)



Notes: Prices include VAT
Source: IHS Markit

Kazakh Oil Industry: Accomplishments and Challenges

Accomplishments:

- Kazakhstan officially joined the OPEC+ initiatives (Vienna Alliance) to rein in oil production and rebalance global markets during 2017–19, and has benefited from resulting recovery of world oil prices; but Kazakh “mega” project schedules have remained key driver of Kazakhstan’s production profile rather than Kazakh authorities’ OPEC+ commitments
- Kazakh oil output returned to growth trajectory overall during 2017–18 (after declining three years in a row), and IHS Markit outlook is for substantial continued expansion during 2020–35
- Completion of $6 billion refinery modernization program at Kazakhstan’s three major plants—Atyrau, Pavlodar, and Shymkent—underpinned expansion of total Kazakh refinery throughput, along with lightening of average refined product barrel, shifting the country to self-sufficiency in motor gasoline

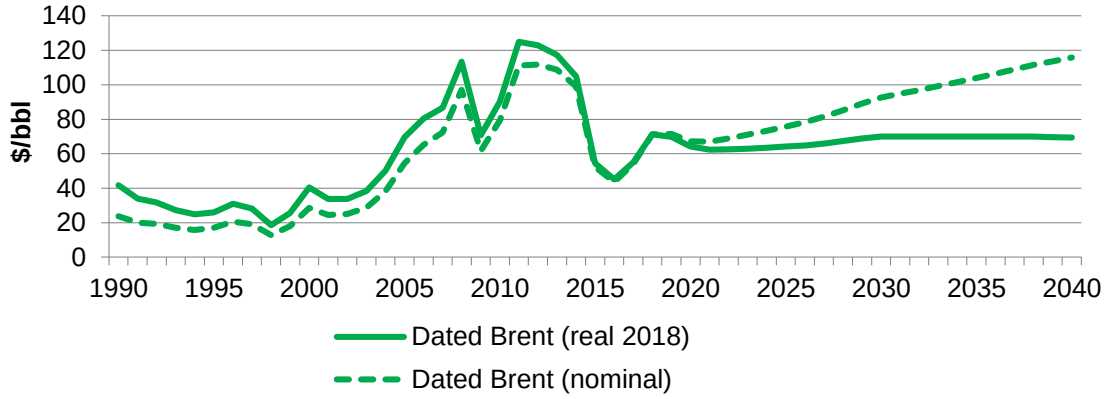
Challenges:

- Over-regulation of Kazakhstan’s downstream oil sector generally remains serious impediment to industry development
  - Current “tolling” system leaves upstream suppliers with insufficient incentive to deliver crude to domestic refineries—particularly given artificially low prices in domestic refined product markets (resulting in netback for domestic crude deliveries that is well below export netback parity)
  - Periodic product import and export bans are another major market distortion

Market management by Vienna Alliance has been instrumental in (partial) recovery of oil prices, while Kazakhstan has played growing role in OPEC+ reductions program

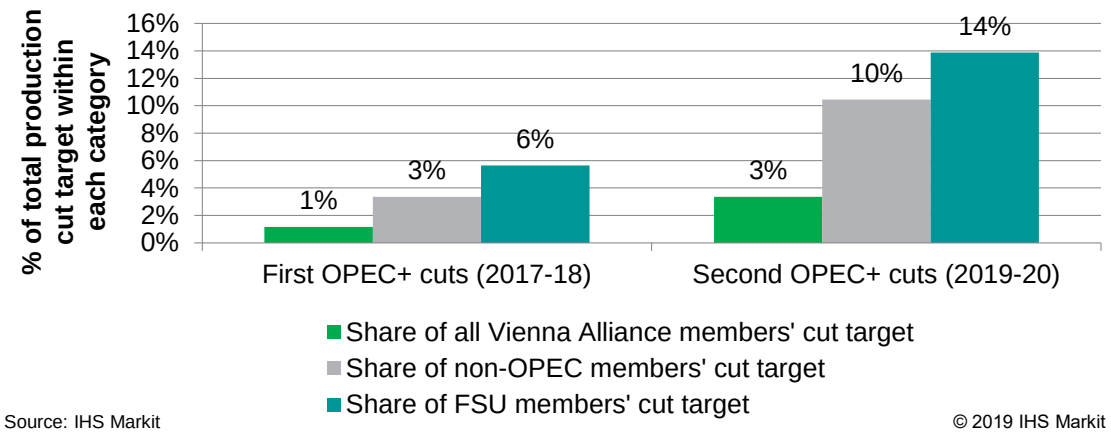
- First round of OPEC+ cuts in 2017-18 took about 1.8 million b/d off market, and Brent prices during this period responded, with Kazakh oil export price trend basically mirroring Brent dynamic
  - Average annual price of CPC Blend—accounting for bulk of Kazakh crude exports—rose by around 61% during 2017–18 compared with 2016, reaching average of about $70/bbl in 2018
  - Net result for Kazakhstan of price rise over 2017–18 was $18.7 billion increase in combined crude oil and refined product export earnings in 2018 compared with 2016, with bulk of this concentrated in crude revenue
- Second round of OPEC+ cuts starting in January 2019 smaller than first round overall, but Kazakhstan doubled its reduction target for second round—from 20,000 b/d to 40,000 b/d
- Most decisive factor in Kazakh oil production profile nevertheless remains planned schedules of Kashagan, Tengiz, and Karachaganak “mega” projects (e.g., maintenance programs) rather than any explicit actions by Kazakh authorities in support of Vienna Alliance targets
- Kazakhstan well positioned to contribute to periodic OPEC+ output increases if need be, as in second half of 2018
  - September 2019 drone attack on Saudi facilities heightens importance of remaining spare capacity among other OPEC+ members

Annual Dated Brent (FOB North Sea) price outlook to 2040



Source: IHS Markit; Historical Prices: Argus Media Limited

Changes in Kazakhstan's share of OPEC+ cut targets within key categories of OPEC+ producers

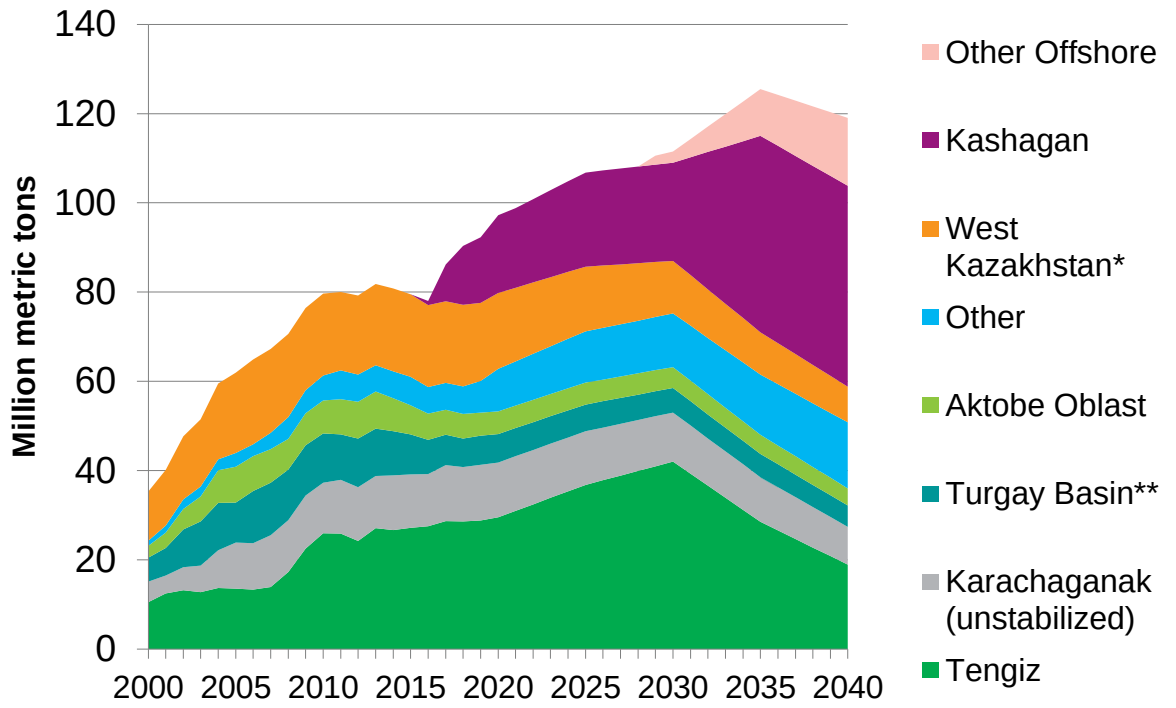


Source: IHS Markit

Kazakh oil production rebounded in 2017-18, and remains on solid growth trajectory in near to medium term

- Three “mega” projects—accounting for around 60% of national output in 2018—have propelled Kazakhstan’s oil sector into new position, setting stage for further development of these and other projects
  - Kashagan: successful ramp-up and debottlenecking
  - Tengiz: launch of the major Future Growth Project
  - Karachaganak: amicable, comprehensive settlement of long-standing issues
- Fully owned subsidiaries of KazMunayGaz (KMG), the national oil company, are fourth largest source of Kazakh oil production, but their output has been essentially flat since 2012
- IHS Markit outlook is for expansion of total Kazakh oil production by around 39% during 2019–35, centered primarily at Tengiz and Kashagan, after which aggregate production expected to stagnate and decline
- Smaller, independent oil producers in Kazakhstan clearly could play greater role in country’s oil balance, but realization of this potential depends on greatly improved business conditions for smaller companies

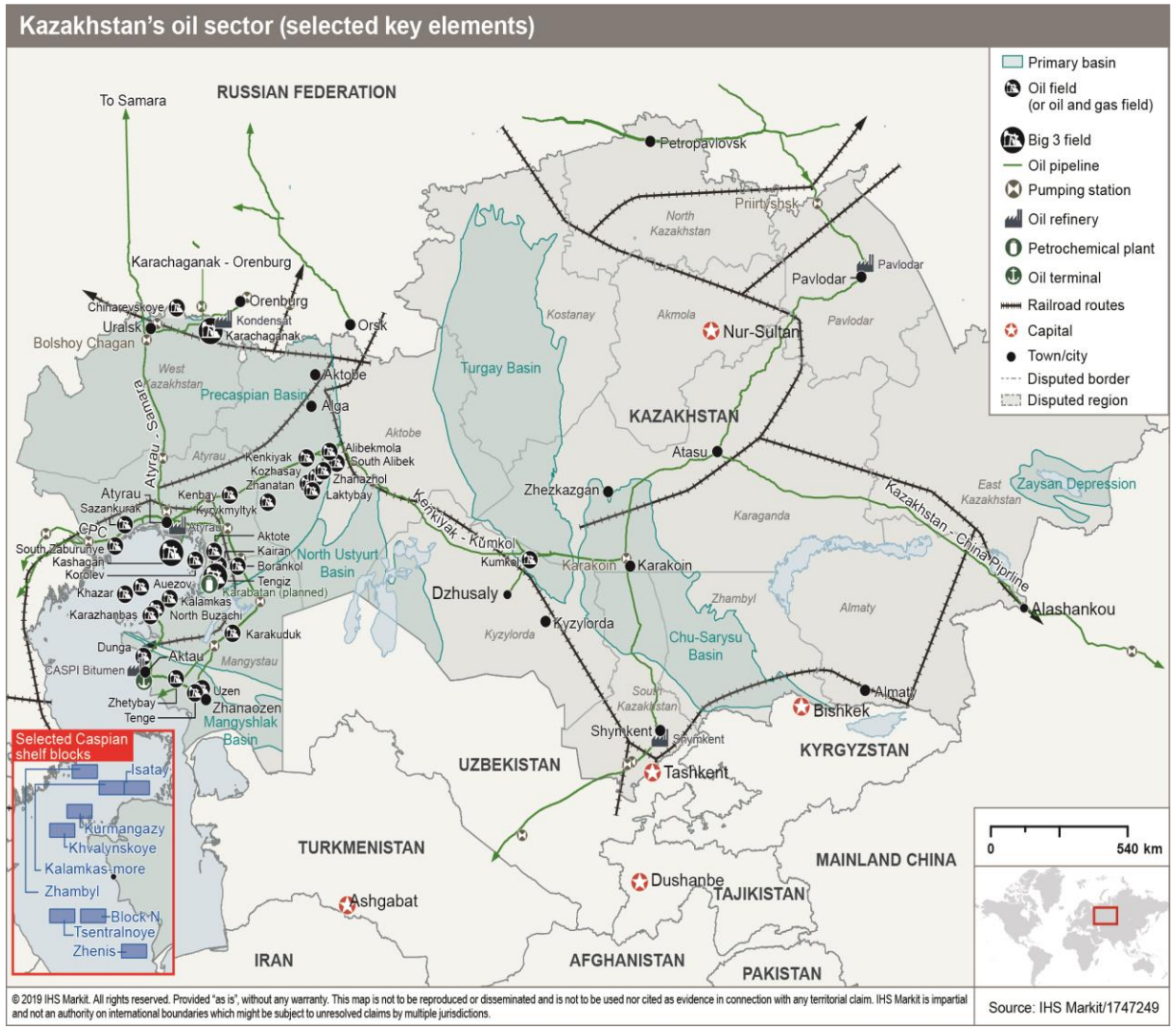
Kazakhstan’s oil production outlook to 2040 in the IHS Markit base case



*West Kazakhstan production (not to be confused with the Kazakh oblast of the same name) covers the output of five legacy producers: UzenMunayGaz, MangistauMunayGaz, EmbaMunayGaz, CNPC International/Buzachi Operating, and KarazhanbasMunay. These producers are grouped together because of their location, similar crude quality, and general production dynamics as mature operators.
**Turgay Basin Includes Amangeldy in Zhambyl Oblast.

Source: IHS Markit (Eurasian Oil Export Outlook)

Kazakh oil exports rise alongside production, with Caspian Pipeline Consortium (CPC) route handling bulk of increment, while other outlets poised to take more oil longer term

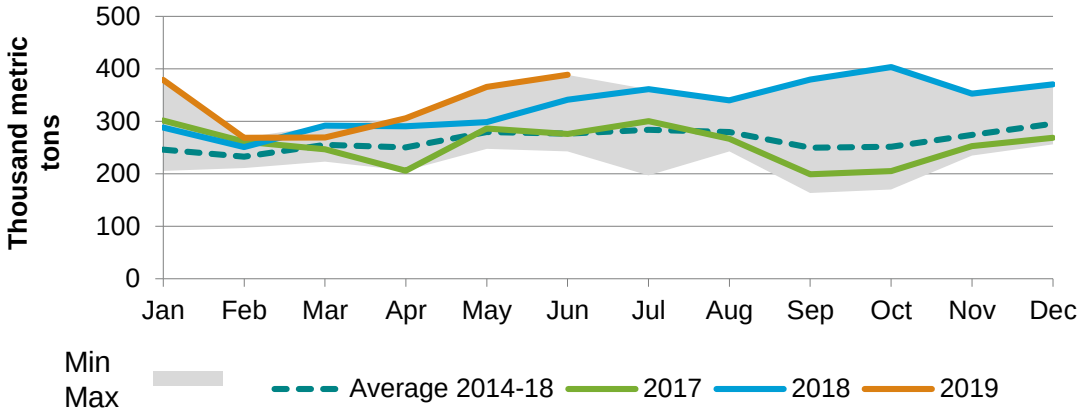


- CPC pipeline (that transits Russia to Black Sea) handled roughly three quarters of Kazakh oil exports in 2018, and expected to remain chief outlet for Kazakh oil exports during scenario period
  - CPC's share of total Kazakh oil exports in 2040 will contract to about 65% in IHS Markit base case
- CPC pipeline constraints and Kazakhstan's "multi-vector" export strategy mean that incremental Kazakh oil will be evacuated via other routes
  - During period 2019–40 Kazakhstan expected to ship larger volumes via Kazakhstan-China pipeline
  - Shipments will likely resume via Baku-Tbilisi-Ceyhan pipeline
- Kazakhstan's oil remains well positioned to compete in expanding Asian oil markets, while European demand for Kazakh oil expected to endure

Refinery modernization program completed, at cost of ~$6 billion, but over-regulation of downstream impairs future industry development

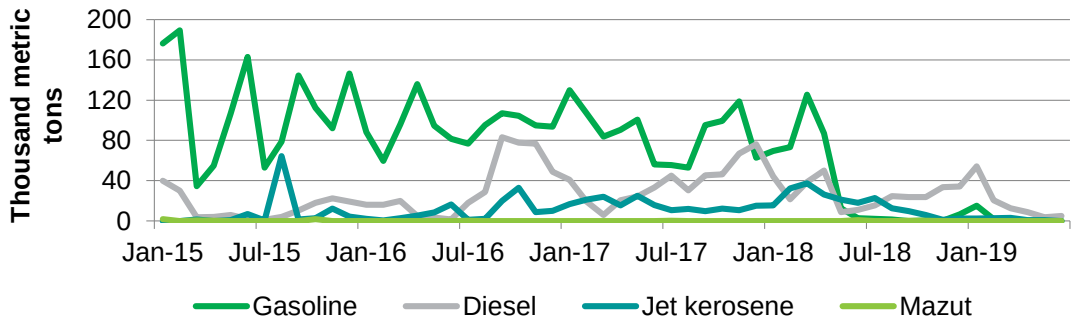
- Three key goals of Atyrau, Pavlodar, and Shymkent plant modernization now largely met
  - Increasing “depth” of refining (i.e., boosting share of higher-value light products in total slate), as reflected in the sharp increase in Kazakh motor gasoline production
  - Eliminated need for imports of Russian light products (Energy Ministry concludes that modernized refineries should satisfy domestic needs through at least 2030), enabling Kazakh refiners to compete more effectively for niches in regional product export markets
  - Reaching EAEU technical specifications for product quality: all three refineries now produce K-4 and K-5 grade fuels (similar to Euro-4 and Euro-5), which is specification agreed for EAEU
- Downstream oil sector’s transition to market remains incomplete
  - Retail product prices heavily administered by Kazakhstan’s State Committee for Regulating Natural Monopolies and Competition Protection (KREMiZK)—notwithstanding official price liberalization
  - Periodic product import and export bans constitute another major market distortion
  - KMG and other “tolling” (give-and-take) providers supply crude to the three refineries under system that ensures high margins for refiners—allowing them to pay down loans associated with refinery modernization—but leaves upstream suppliers with effectively no incentive to divert crude to domestic market

Monthly gasoline production trends in Kazakhstan



Source: IHS Markit, Kazakhstan Committee on Statistics, Infotek

Monthly imports of refined products by Kazakhstan, 2015-18



Source: IHS Markit, Kazakhstan Committee on Statistics

Kazakh Gas Industry: Accomplishments and Challenges

Accomplishments:

- Natural gas production (gross extraction) has been increasing rather robustly in recent years, boosted mainly by growth in output at Kashagan, while commercial production (gross output minus reinjection) has also been on rise
- Kazakhstan has taken advantage of opportunities made possible by 2015 completion of Beyneu-Bozoy-Shymkent pipeline, which set stage for increased domestic gas consumption in southern, central, and northern parts of the country, as well as increased Kazakh pipeline exports to China
- Long-held plans to establish major gas-based petrochemical industry in western Kazakhstan appear to be on verge of realization following launch of full-scale construction of planned Atyrau gas-chemical complex

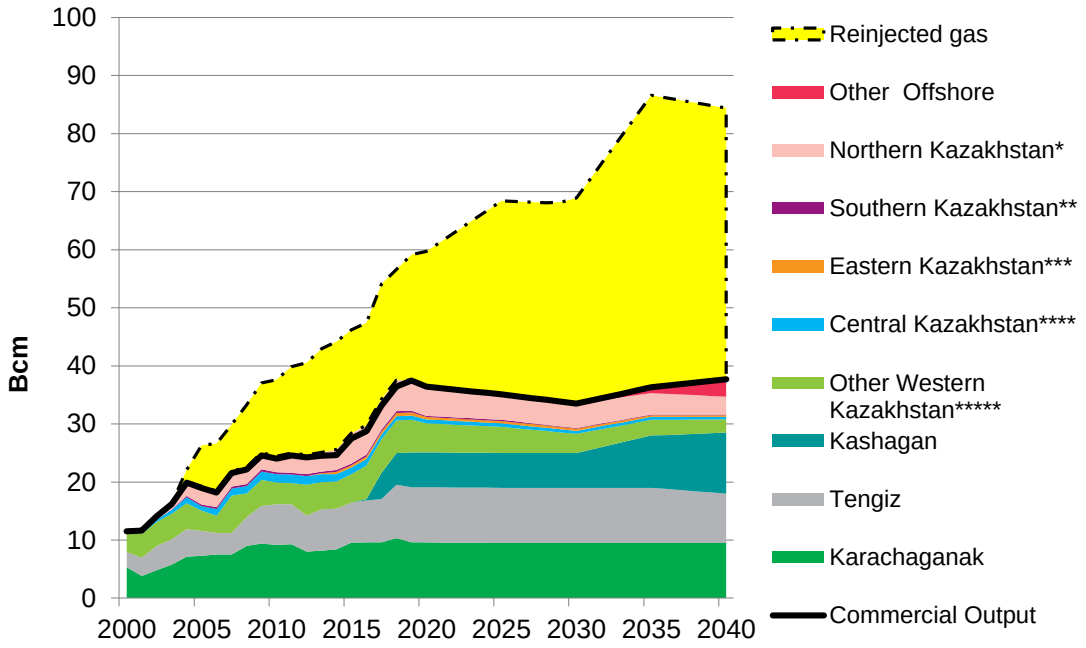
Challenges:

- Combination of low prices for producers of associated gas and low end-user prices threatens Kazakhstan's gasification goals, by dis-incentivizing production of commercial gas and also discouraging its efficient use by consumers
- Kazakhstan's gas balance expected to become increasingly tight in coming years, with commercial production growth outpaced by increase in domestic consumption
- Because of constrained commercial supply, Kazakhstan will have to make hard choices between achieving high levels of exports to lucrative Chinese markets or making more gas available in (mainly unprofitable) domestic markets

Tightening domestic gas balance presents difficult choice between export growth and increased domestic consumption

- Despite increased opportunities to grow both exports and domestic consumption, Kazakhstan's commercial gas supply remains constrained
- Over coming years, commercial production expected to grow very little, while more robust growth likely in domestic consumption and export opportunities continue to beckon
- Constraint on commercial supplies will thus force Kazakhstan to choose between achieving high levels of exports to China (up to 10 Bcm/y during 2019-23) or making more gas available for domestic use
- IHS Markit base-case scenario does not envisage exports to China exceeding 8 Bcm/y over forecast period out to 2040
- Underlying source of problem: combination of low prices for producers of associated gas offered by state-owned national gas operator KazTransGas (KTG) and low end-user prices set by KREMiZK

Kazakhstan's gas production profile to 2040 in the IHS Markit base case



*Northern Kazakhstan: Aktobe Oblast
**Southern Kazakhstan: Zhambyl Oblast
***Eastern Kazakhstan: East Kazakhstan Oblast
****Central Kazakhstan: Kyzyl-orda Oblast
*****Other Western Kazakhstan: Atyrau, West Kazakhstan, Mangistau Oblasts

Source: IHS Markit

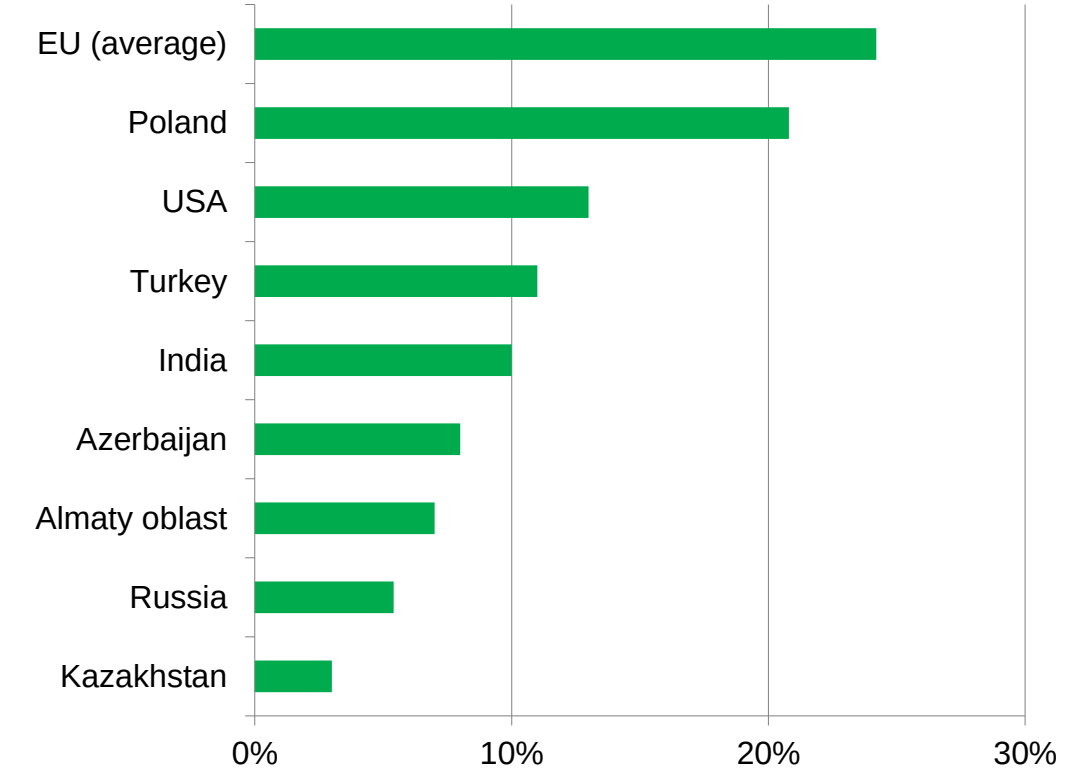
Completion of Beyneu-Bozoy-Shymkent (BBS) natural gas pipeline in 2015 set stage both for ramp-up of exports to China (2018), and gasification of previously un-served regions (2021)

- Completion of BBS pipeline in 2015 connected western gas-producing regions of country to gas-consuming regions in southern Kazakhstan
- Paving way for increased domestic gas consumption both in southern Kazakhstan and in central and northern parts of country
- BBS Karaozek compressor station serves as western inlet for SaryArka pipeline (now under construction), which will deliver piped gas to such major cities as Zhezkazgan, Karaganda, Nur-Sultan, Kokshetau, and Petropavlovsk
- Also triggered dramatic increase in Kazakhstan's pipeline exports to China, as BBS links to Central Asia-China gas pipeline system (CAGP) at Shymkent
- Original capacity of BBS line was 10 Bcm/y, but capacity expanded to 15 Bcm/y in late 2018 upon completion of two additional compressor stations
- In 2018, Kazakh exports to China rose to 5.2 Bcm, from 0.6 Bcm in 2017, and agreement between two countries concluded in 2018 calls for exports to increase to as much as 10 Bcm annually over period 2019–23

Current gas market regulatory structure, largely determined by social considerations, negatively impacts KTG business and complicates wider gas sector development

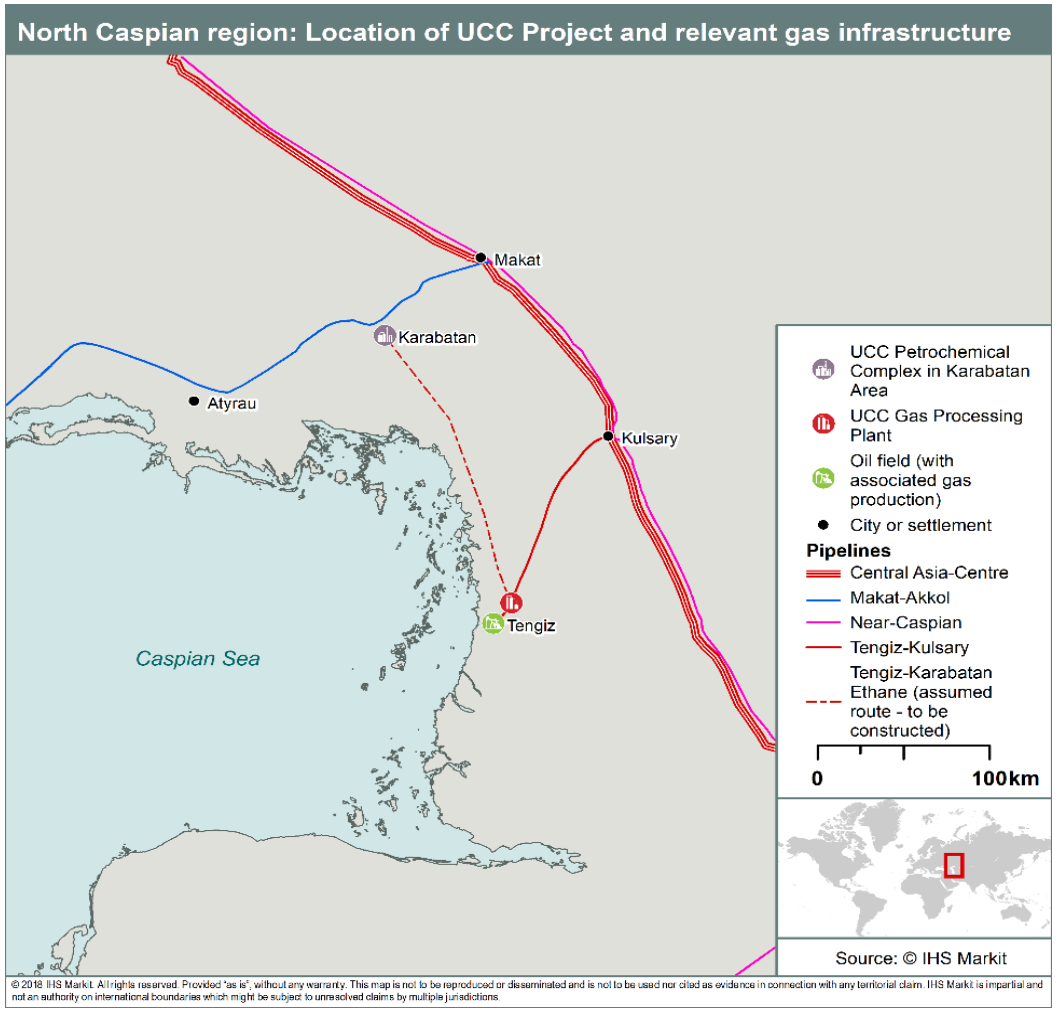
- Competition between domestic demand and exports has important implications for KTG and its overall business operations
  - Company loses money on its basic business, selling gas to domestic consumers
  - Essentially, the company's overall positive margins come from international transportation of natural gas (including third-party transit) as well as gas exports
  - In 2018, Chinese export revenues jumped to $2.47 billion, up from $1.74 billion in 2017, so decline in exports to China after 2023 would represent a major financial blow to company
- Due to social concerns (keeping prices low for end-users and curtailing inflation), gas prices generally have been inadequate to cover KTG's expenses and to generate surplus needed to fund new investment (network expansion) and system maintenance
- Kazakhstan has some of lowest utility rates (for gas, electric power etc.) in world (only 3% of average household income in most oblasts spent on these utilities, much lower than nearly all other countries)
- Suggesting potential for modest rate hikes in Kazakhstan
  - For those most susceptible to rising prices (i.e., nearly 2 million residents who are pensioners on fixed incomes), Kazakhstan should consider developing special system of rebates/subsidies specifically targeting these users

Comparison of spending on energy utilities as share of household income, 2017



Source: IHS Markit

KMG emerges as key catalyst for realization of ambitious Kazakh plans to create globally competitive gas-based petrochemicals sector



- Long-held plans to establish a major gas-based petrochemical industry in western Kazakhstan (Atyrau Oblast) appear to now be finally bearing fruit, partly owing to general improvements in the external economic environment
- Actual construction of Atyrau gas-chemical complex now under way, and orders placed for equipment for Phase 1 of larger project
  - Phase 1 includes propane dehydrogenation unit and polypropylene plant as well as associated infrastructure
  - Total capital expenditures for Phase 1 facilities estimated at $2.3 billion
- In June 2018, Phase 1 of gas-chemical complex was transferred to trust management of KMG NC for implementation, from United Chemical Company (UCC), as both are owned 100% by national sovereign wealth fund Samruk Kazyna—facilitating launch of full-scale construction work (this is now 34% complete compared to only 6% when KMG took over)
- Worldwide, the main element determining costs of integrated polyolefin production and relative competitiveness of a particular plant is actually cost of feedstock—so low-cost NGL feedstock (propane and ethane) available to Kazakh petrochemical plants should make them very competitive globally, even on a delivered cost basis (i.e., including transportation costs), either to European markets or to Asian markets

KAZENERGY

National Energy Report 2019

NCOC
NORTH CASPIAN OPERATING COMPANY

SAMRUK ENERGY

CNPC