A Study on the Efficiency of Oil and Gas Use in Kazakhstan

Kuanyshev Bekturgan, Yong-Seok Choi

Sunchon National University

Content

- 1. Chapter I: Introduction. Country Background
- 2. Chapter II: Energy production
- 3. Chapter III: Energy saving and energy efficiency policy
- 4. Chapter IV: Oil and Gas global Value chain
- 5. Chapter V: Kazakhstan in the Oil and Gas Value Chain

Chapter I: Introduction. Country background

- Kazakhstan is abundant in natural resources such as coal, oil, natural gas, and uranium, as well as renewable energy sources such as wind, solar, hydro, and biomass. Despite this, the country's electricity supply is currently reliant on fossil fuels. Coal-fired power plants generate 75% of overall electricity, raising questions over greenhouse gas pollution and their effects on human health and the atmosphere.

- The Republic of Kazakhstan is a presidential republic with a unitary administration. The President of the Republic is the country's top representative, determining the country's domestic and foreign policy priorities and representing Kazakhstan both domestically and internationally. Kazakhstan gained independence from the Soviet Union on December 16, 1991. Astana, the country's capital, is the country's largest city. Kazakh is the official language of Kazakhstan. Russian has been designated as an interethnic contact language.


KAZAKHSTAN
Map, Flag and National Emblem
ҚАЗАҚСТАН

- The tenge is the local currency (KZT). The Republic of Kazakhstan is situated in the heart of the Eurasian continent, halfway between the Atlantic and Pacific Oceans. It is the ninth-largest country in the world and the fourth-largest country in Eurasia, with a total area of 2,724,900 km2. Kazakhstan shares borders with Russia to the west and north, China to the east, and Uzbekistan, Kyrgyzstan, and Turkmenistan to the south. The country's boundaries stretch for 12.2 thousand kilometers, including 600 kilometers along the Caspian Sea (Brussels, 2014).

Chapter II: Energy Production

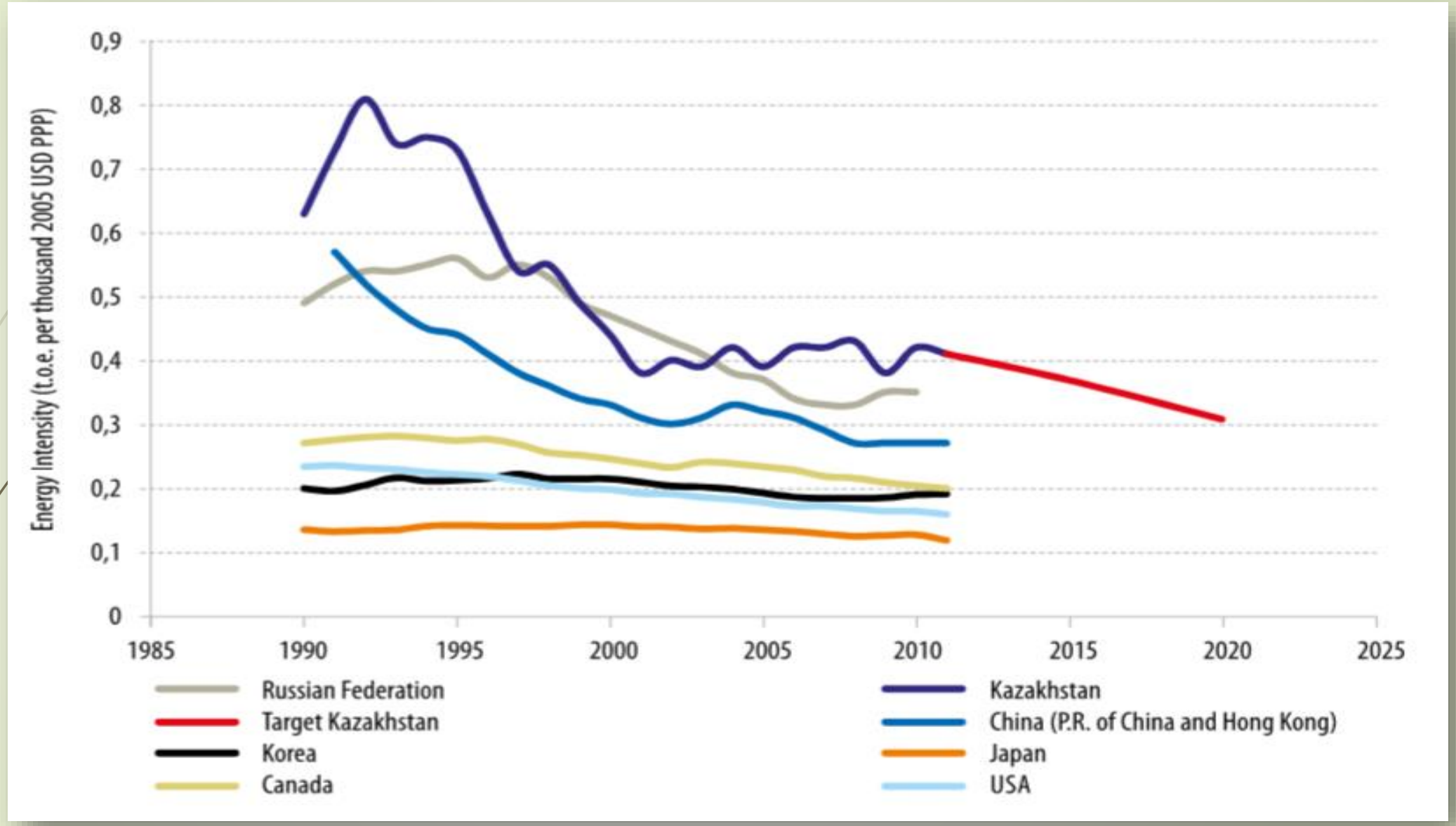
- Following the disintegration of the former Soviet Union, Kazakhstan's government decided that increased revenues from oil and natural gas exports could help the country's economic recovery, so it began exploring and developing the western region's untapped oil and natural gas reserves.


Karachaganak
Kazakhstan
Russia
Kenkiyak
Kashagan
Tengiz
Sea
Aral
Kalamkas
Karazhanbas
Uzen
China
Turkmenistan

- Because of the significant capital needs and technical requirements, the government chose to invite foreign investors to exploit new oil and natural gas fields. The joint efforts of Kazakhstan's state-owned oil/natural gas corporation and foreign companies to expand the country's main oil and natural gas fields resulted in positive growth in oil and natural gas output in 1995 and 1996, respectively. Tengiz and Karachaganak were the major fields that helped the increase in oil and natural gas production (Naoko Doi, 2010)

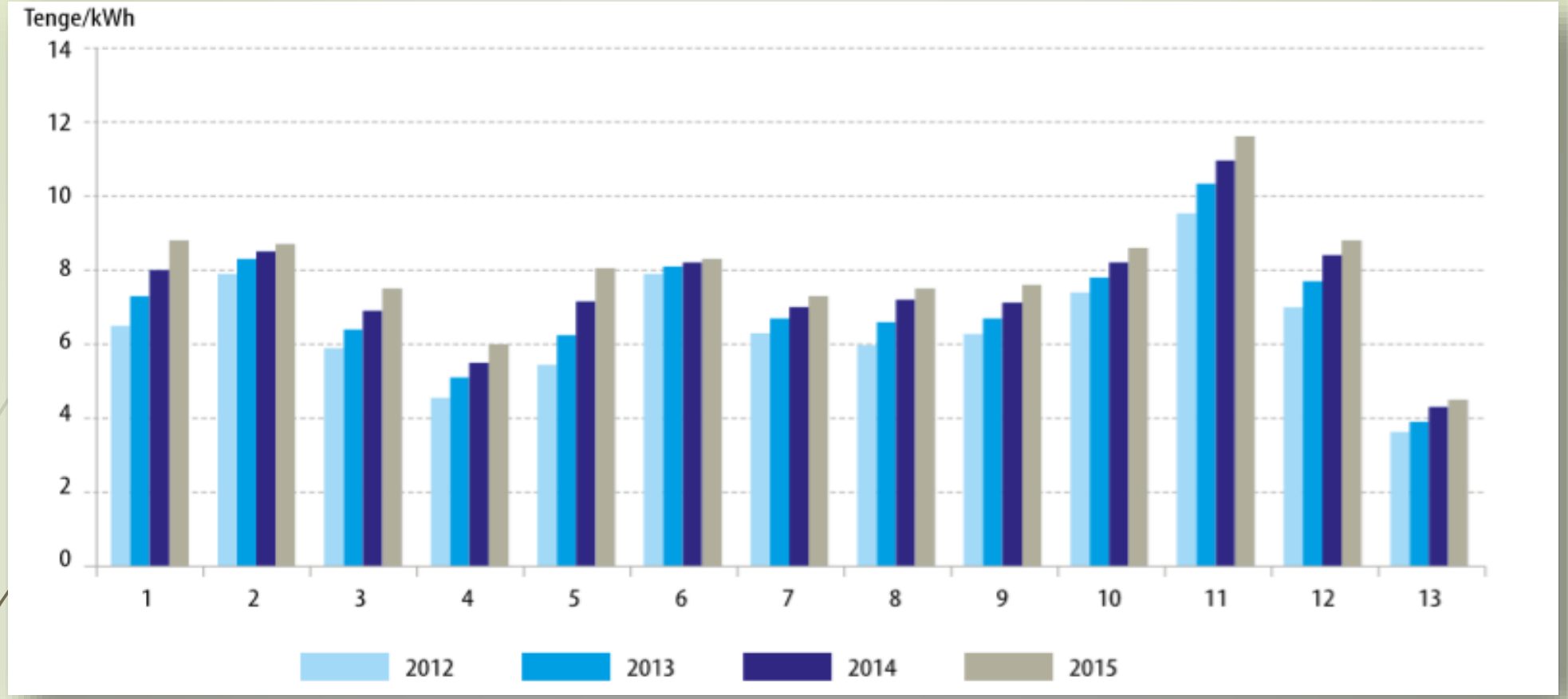
Chapter III: Energy saving and Energy efficiency policy

- The most famous measure of economic energy efficiency is GDP energy intensity. The ratio of primary energy demand (coal, oil, gas, and other energy resources) to the nation's real GDP is used to quantify it. Kazakhstan is among the top ten countries with the highest energy intensity in this regard10. However, even though per capita energy usage is increasing, the country's GDP energy intensity is on the decline. Kazakhstan's high GDP energy level is attributed in part to a variety of natural factors:
- Winters are long and snowy, with a harshly continental atmosphere;
- Energy-intensive segments of the economy have a high prevalence in the GDP system;
- A large, sparsely settled region;
- A considerable length of transportation infrastructure (oil and gas pipelines, power lines, water lines);


Energy intensity (t.o.e. per thousand 2005 USD PPP)
0,9
0,8
0,7
0,6
0,5
0,4
0,3
0,2
0,1
0
1985
1990
1995
2000
2005
2010
2015
2020
2025
Russian Federation
Target Kazakhstan
Korea
Canada
Kazakhstan
China (P.R. of China and Hong Kong)
Japan
USA

- The pricing strategy around energy markets is based on government control of rates. Tariffs and their highest level in relation to controlled services provided by natural monopolies shall not be smaller than the expense of regulated services and shall result in gains from successful performance of a natural monopoly, according to the RK Law on Natural Monopolies and Regulated Markets. Natural monopolies in Kazakhstan have the following services:

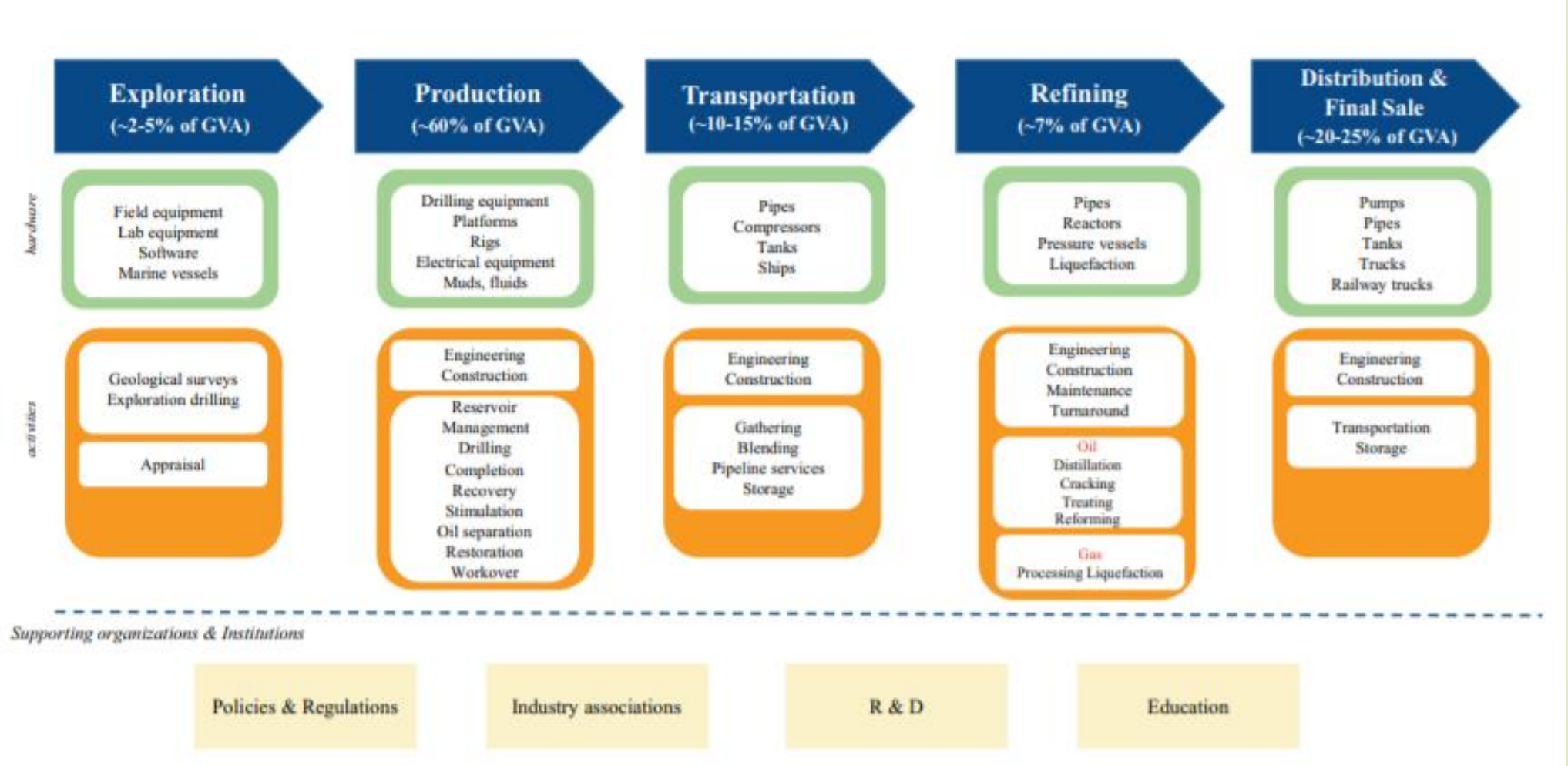
- main pipelines for crude oil/petroleum products transportation;
- operation of party tank facilities; transportation of raw gas through connecting gas lines; storing and transportation of sales gas through connecting gas lines, main gas lines, and/or gas delivery networks;
- transmission and storage of electricity;
- generating, transmitting, distributing, and supplying heat;
- Grid production and electric power consumption are under operational dispatch supervision;
- Production and use of electric power must be balanced



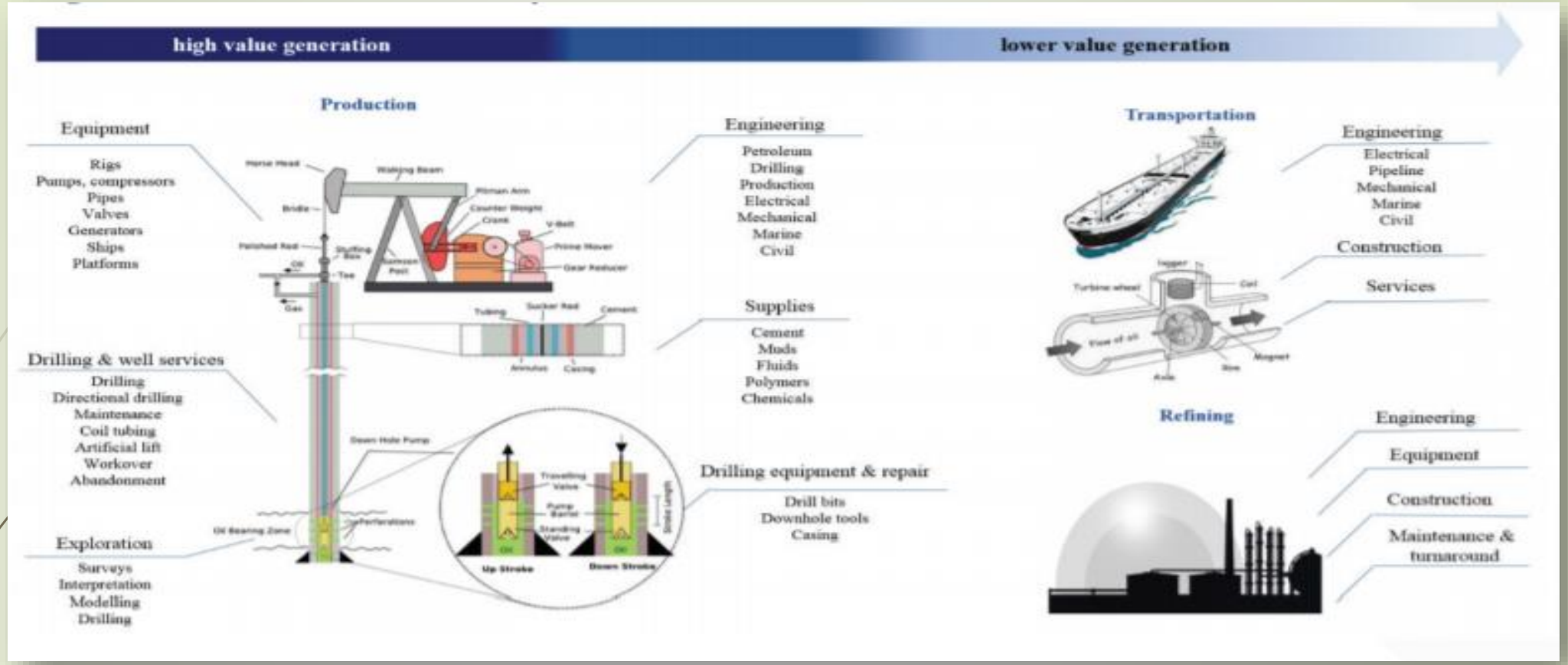
- Figure 3: Maximum tariffs for electric power generation by groups of energy producing companies.

Chapter IV: Oil and Gas Global Value Chain

- Exploration, processing (or extraction), storage and shipping, refining, and marketing and distribution are all important parts of the oil and gas supply chain. Each section includes a variety of activities and uses a variety of development factors (Figure 4; percentage of value added at each stage of the chain is shown in parentheses). Oil and gas businesses work in an ecosystem created by supporting organizations and agencies. Their consistency and design have a big impact on the chain's configuration, how it works, and, most importantly, how it upgrades trajectories.



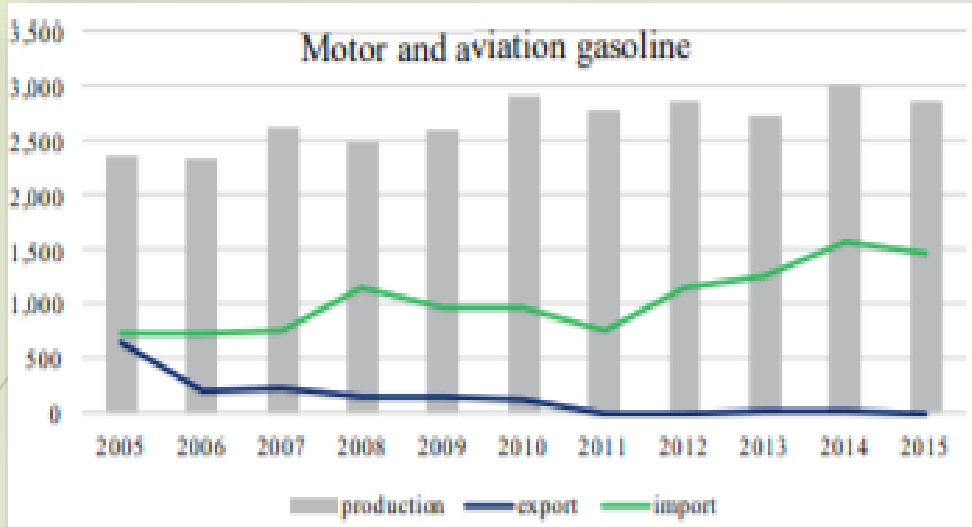
- Figure 4: oil and gas value chain

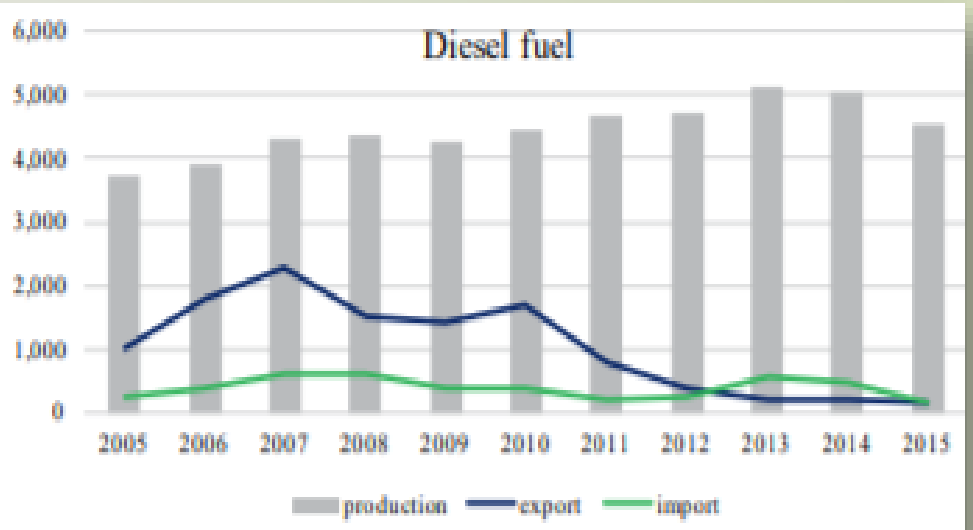


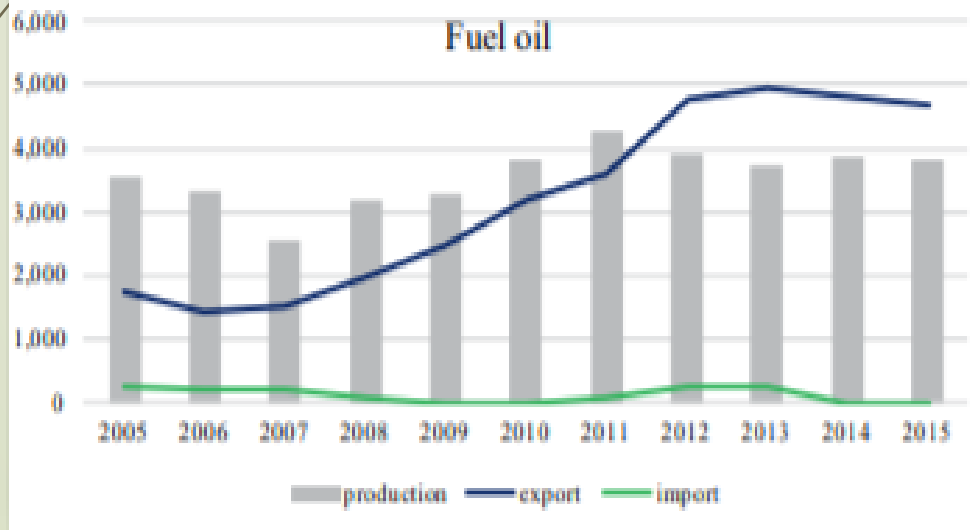
- Figure 5: Oil and Gas Production System

Chapter V: Kazakhstan in Oil and Gas Value Chain

- Kazakhstan is the world's 16th largest oil producer and Eurasia's second largest producer after Russia. With proven oil reserves of 30 billion barrels as of December 2015, the country ranks 12th in terms of oil reserves, only behind Nigeria (BP 2016). Thanks to the rapid increase in oil production and favorable market climate in the 2000s, the nation experienced rapid economic growth. The most valuable export item is oil. Its share of total exports increased from 49% in 2000 to 59 percent in 2015, touching nearly 70% of total exports at the peak price in 2014. (Figure 13).


Motor and aviation gasoline
3,500
3,000
2,500
2,000
1,500
1,000
500
0
2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015
production
export
import


Diesel fuel
6,000
5,000
4,000
3,000
2,000
1,000
0
2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015
production
export
import


Fuel oil
6,000
5,000
4,000
3,000
2,000
1,000
0
2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015
production
export
import

- After a merger between national generating and transportation firms "Kazakhoil" and "Transportation of oil and gas," the national company "KazMunaiGas" JSC (KMG) was formed in 2002. The Sovereign Wealth Fund "Samruk-Kazyna" owns 90% of KMG shares, while the National Bank of RK owns the remaining 10%. There are 220 companies in the KMG group.

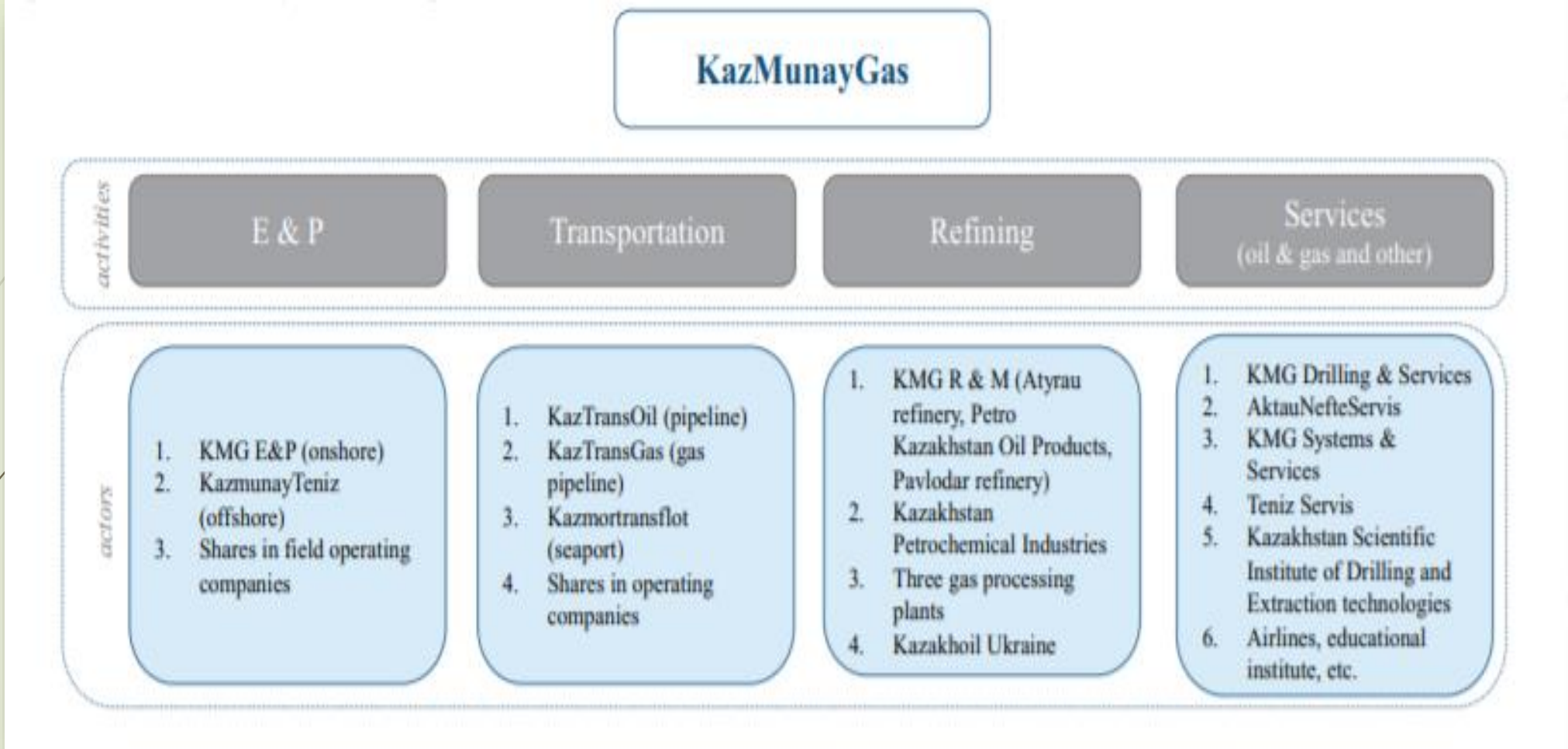
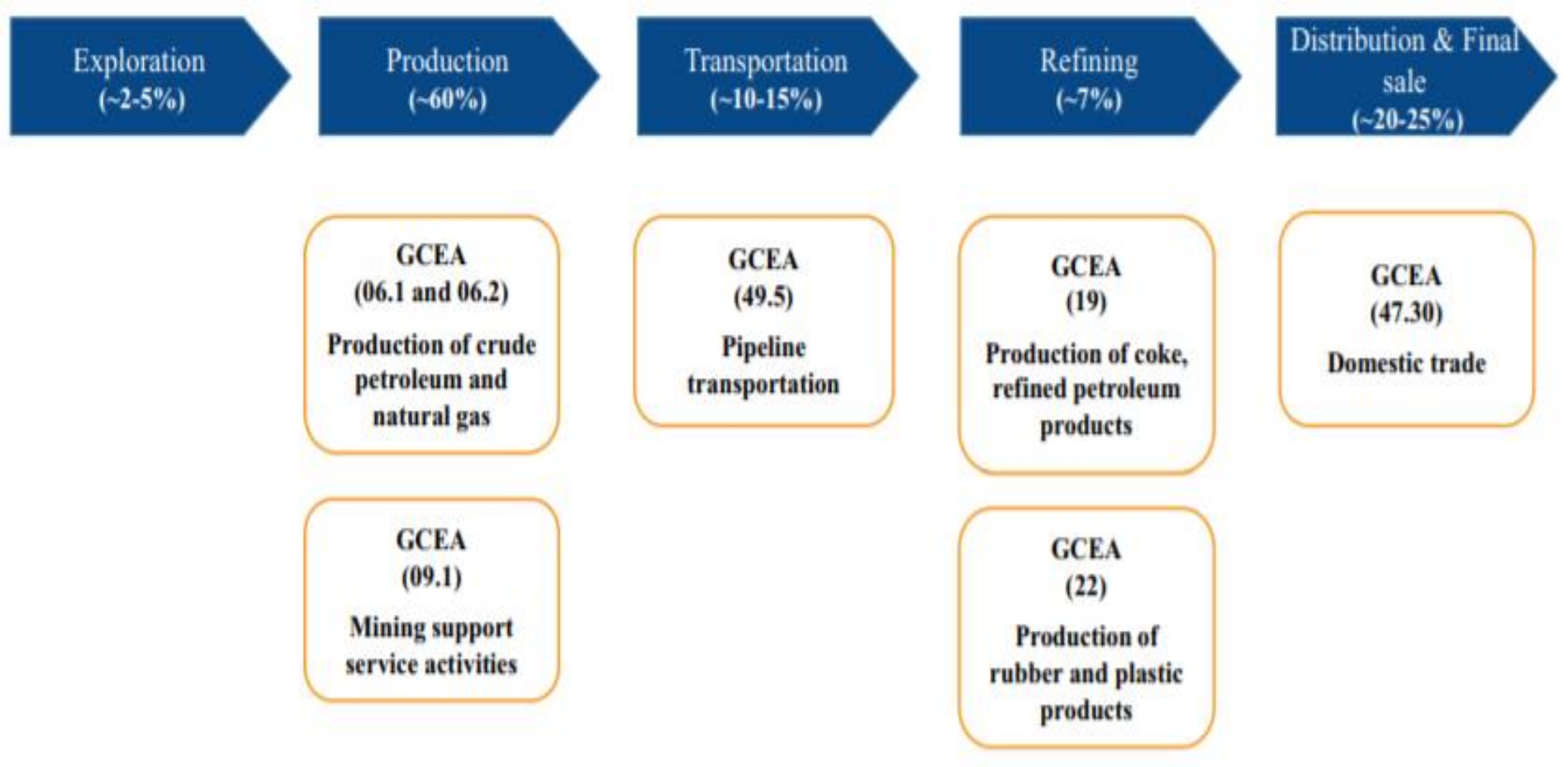


Figure 14: KazMunayGas Group

- The structure of the oil and gas value chain is based on an examination of the types of economic activities that have evolved within each section of the chain. The General grouping of types of economic activities (hereinafter – GCEA) was used to identify economic activity types.
- The manufacturing sector and associated technical services saw the most increases in terms of workforce numbers and pay levels from 2010 to 2015. Specifically, the amount of workers rose by 21%, or 14,500 individuals, during the last five years, whereas the total monthly salary increased by 119 thousand, or 370,000 tenge.



- Figure 15: Oil and Gas GVC

- Thank you for your attention