FRIEDRICH EBERT STIFTUNG

Study

# Resource Efficiency Gains and Green Growth Perspectives in Kazakhstan

**Gulmira Ismagulova**
September 2012

- Kazakhstan is an oil-rich country. At the same time, this wealth of resources is the main obstacle to green growth. In addition, low expenditures on research and development, an immature national innovation system, inefficient use of resources (water) and energy (efficiency 2.4 times below world average) and the lack of an environmental tax system provide important obstacles.

- $CO_2$-emissions per capita continue to rise; fuel combustion still accounts for 92 per cent of total emissions. The main potential for energy saving and reducing $CO_2$-emissions lies in industry, road transport and urban public utilities, esp. in heating networks.

- The main potential for green jobs lies in a more efficient use of agricultural land, in the food sector and in infrastructural modernisation of economic sectors, which is supported through public-private partnerships.

- A national market for greenhouse gas emissions quotas will be introduced in 2013, and laws on energy efficiency, conservation and the use of renewable energy were drafted in recent years. Nevertheless, measures concerning the promotion of a green economy and green jobs still remain fragmented.

# Content

## Introduction

Global crises, which have a substantial impact on the development of national economies, tend to occur suddenly. Economics has not yet designed precise instruments to predict when they will occur. However, it can assess both endogenous and exogenous factors contributing to the risk of adverse events in national economies and develop appropriate recommendations for improving internal and external policies, implementation of which can increase the competitiveness of the national economy to minimise damage from adverse events and to change long-term development trends.

Following such recommendations the government of Kazakhstan has implemented appropriate anti-crisis action plans and is continuing to improve the institutional framework for Kazakhstan's sustainable development. At present, the government is developing and implementing comprehensive post-crisis development measures in various sectors of the economy, thus ensuring macroeconomic stability and raising living standards.

We have undertaken our analysis of the current situation in Kazakhstan in the context of global trends.

## 1.1 Global Trends

World economic growth in 2010 turned out to be higher than the IMF's forecasts. According to the World Economic Outlook (April 2011), more dynamic growth was caused by increased consumption in the United States and Japan in the second half of 2010. Based on 2010 trends, the IMF predicted that the global economy would grow by 4.4 per cent and 4.5 per cent in 2011 and 2012, respectively. At the same time, the economies of developed countries could grow by 2.4 per cent and those of developing countries by 6.5 per cent in 2011. In developed countries growth will not be strong enough. To significantly reduce the risk of social disruption, governments are increasing spending and trying to reduce unemployment. Continuing high rates of economic growth in developing countries as a whole can ensure the growth of the global economy.

Food prices rose above the level reached in mid-2008 when the global economy faced a food crisis. Oil prices crossed the threshold value (USD 100 per barrel) due to events in the Arab world and are close to pre-crisis levels. The earthquake in Japan caused only a short-term decline in world oil prices.

Prices of raw materials (mineral and food) are rising amid concerns about growing threats to global food, energy and climate security. The latter impacts on carbon-intensive goods and services associated with the consumption of all types of hydrocarbon fuels.

International experts do not expect a catastrophic fall in world commodity prices. Investors are now comfortable enough to maintain capital in commodities, as other markets are »very volatile«. Mining sector shares in European markets are rising. In particular, Kazakhmys in 2011 bought a huge portion of its own shares due to the excellent financial results. Metals rose strongly in foreign markets.

## 1.2 Retrospective GDP Dynamics in Kazakhstan

An analysis of macroeconomic indicators shows that by 1999 the economy of Kazakhstan had passed the lowest point of the economic crisis it experienced during the transition period and had begun its recovery. Average annual real growth before the transition crisis was one of the highest in the world, at about 10 per cent per annum.

In 2007, due to the decline in raw materials exports, GDP growth began to slow in Kazakhstan, standing at 8.9 per cent at the end of the year. Over the next two years GDP growth slowed to 3.3 per cent and 1.2 per cent in 2008 and 2009, respectively, due to the banking crisis and the credit crunch.

To overcome the crisis the government mobilised state assets and for this purpose established the National Welfare Fund »Samruk-Kazyna« in 2008. The effects of this injection were seen in 2010.

In 2010, reforms were introduced into the system of state planning in response to the Strategic Plan of the Republic of Kazakhstan up to 2020, taking into account

Table 1 »Green« national accounts of the Republic of Kazakhstan, 2000–2010 (% of GNI)

| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | World | UMIG* | HIG** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GNI per capita, World Bank Atlas method (US-Dollar) | 1250 | 1260 | 1350 | 1520 | 1780 | 2250 | 2940 | 3870 | 5020 | 6160 | 6920 | 8732 | 7502 | 37990 |
| **National accounting aggregates** | | | | | | | | | | | | | | |
| Gross saving | 22,8 | 21,5 | 20,1 | 25,5 | 28,1 | 27,0 | 28,5 | 34,5 | 32,5 | 46,2 | 30,8 | 18,3 | 19,9 | 16,1 |
| Consumption of fixed capital | 8,6 | 10,1 | 10,4 | 10,0 | 10,5 | 12,0 | 12,5 | 13,1 | 13,8 | 13,5 | 12,7 | 13,1 | 11,8 | 14,1 |
| Education expenditure | 14,2 | 11,5 | 4,4 | 4,4 | 4,4 | 4,4 | 4,4 | 4,4 | 4,4 | 4,4 | 4,4 | 4,2 | 4,1 | 4,6 |
| Energy depletion | 21,6 | 40,6 | 30,2 | 33,4 | 38,9 | 39,9 | 53,6 | 52,4 | 28,3 | 31,3 | 20,8 | 2,0 | 6,4 | 0,9 |
| Mineral depletion | 0 | 0 | 0 | 0 | 0,6 | 1,6 | 1,7 | 4,2 | 2,4 | 1,8 | 1,2 | 0,3 | 1,0 | 0,1 |
| Net forest depletion | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CO2 damage | 5,2 | 5,1 | 4,5 | 4,4 | 4,1 | 3,0 | 2,5 | 2,1 | 2,0 | 1,4 | 1,6 | 0,4 | 0,6 | 0,2 |
| Particulate emission damage | | | 0,4 | 0,4 | 0,4 | 0,5 | 0,3 | 0,3 | 0,3 | 0,1 | 0,1 | 0,2 | 0,2 | 0,1 |
| *Adjusted net savings* | *-8,2* | *-29,6* | *-20,8* | *-18,3* | *-22,1* | *-25,5* | *-38,0* | *-33,0* | *-9,9* | *2,5* | *-1,2* | *6,4* | *3,9* | *5,2* |

* UMIG = Uppermiddle income group ** HIG = High income group

Sources: The little green data book, World Bank 2000–2011

the new situation.[1] Implementation of SPIID projects listed in the »Map of Industrialization« and the »Business Road Map – 2020« has started. The situation on foreign markets with regard to raw materials has improved due to steady growth in the Asia-Pacific region. All these factors have led to real GDP growth of 7.2 per cent.

In 2011, growth reached 7.5 per cent, significantly higher than the World Bank (4.5 per cent) and IMF (6.5 per cent) forecasts. Kazakhstan's fiscal and external positions are becoming stronger, with a low level of public debt and large increases in international reserves and oil revenues.

In general, in 2011 Kazakhstan's GDP, according to our calculations, increased by 1.95 times the level it achieved in 2001.

This high GDP growth does not mean that the nation is steadily growing, however, as it largely depends on the method of accounting. The UN proposes to use a system of integrated environmental and economic accounting. The World Bank introduced the genuine savings index (Adjusted net savings), which assesses the economic situation of the nation employing a new methodology.

According to the values of genuine savings index (see Table 1), it can be argued that, prior to the global financial and economic crisis (2007) Kazakhstan's economy was developing mainly due to deflation/reduction of natural capital and the expansion (though not equivalent) of physical and human capital.[2] Growth was mainly due to the mining of mineral resources which accounted for about 40.6–56.6 per cent of gross national income in 2001–2007. The pace of investment in fixed assets (companies, buildings, infrastructure) is close to the world average, which is primarily set by developed and rapidly growing economies. Expenditure on education is getting closer to that in the developed countries. The conditional damage due to carbon dioxide emissions is eight times higher than in developed countries, three times higher than in the group of countries with above average income and twice the world average.

Health damage from air pollution in cities corresponds to the level of developed countries.

From the value of adjusted net savings we can see that, due to the current global crisis, the government's economic development strategy has been adjusted. Even though it reached minus 33–38 per cent of GNI in 2009 it turned positive and in 2010, when GDP growth was 7.2 per cent, it was estimated at minus 1.2 per cent. Thus, in order to mitigate the impact of the crisis on the national economy the government mobilised other growth factors, drawing on its reserves.

1. The global financial and economic instability and increasing environmental risks.

2. An analysis of national data on wages, life expectancy, morbidity, availability of utilities, residential space per capita, and similar shows a steady improvement in quality of life in Kazakhstan.

## 1.3 Structure of Gross Value Added in Kazakhstan

The share of industry in the structure of gross value added is only 32.8 per cent (see Table 2). In the pre-crisis period, it was tending to decrease as the manufacturing sector did not receive the necessary investment (see Table 3). It began to rise, however, as the government implemented anti-crisis action programmes, such as the following:

- The government programme for the accelerated industrial-innovative development of Kazakhstan, 2010–2014;
- The »Business Road Map 2020«;
- The programme for post-crisis recovery (recovery of competitive enterprises) for 2011–2016;
- The State Programme for the Development of Education, 2011–2020;
- »Productivity 2020«;
- The State Programme for Development of Science, 2007–2012;
- The State Programme for the Development of Health Care – »Salamatty Kazakhstan« – for 2011–2015.

The above-mentioned programmes were drawn up in response to the Strategic Development Plan for 2020. The main criteria in selecting projects for public support are as follows: improving competitiveness, creating jobs, increasing productivity and developing the manufacturing sector.

Among manufacturing sectors the largest contributions to gross value added came from metallurgy (13.9

Table 2 Structure of gross value added, Kazakhstan, 1999–2010 (% of GDP)

| Year | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Value Added** (GVA) | 94.4 | 93.4 | 93.1 | 92.9 | 93.2 | 94.0 | 93.8 | 93.5 | 92.9 | 93.0 | 95.4 | |
| **Agriculture, value added** (Agriculture, Fishery and Hunting) | 9.9 | 8.0 | 8.7 | 8.0 | 7.8 | 7.1 | 6.4 | 5.5 | 5.7 | 5.3 | 6.2 | |
| **Industry, value added**, % of GDP | 28.2 | 33.2 | 30.7 | 29.5 | 29.1 | 29.3 | 29.8 | 29.5 | 28.3 | 32.2 | 30.6 | 32.8 |
| **Services, etc., value added** | 52.5 | 48.3 | 49.4 | 50.6 | 51.8 | 53.4 | 52.0 | 51.6 | 54.3 | 52.1 | 53.9 | |

Table 3 Structure of gross value added, manufacturing (% of total industry GVA)

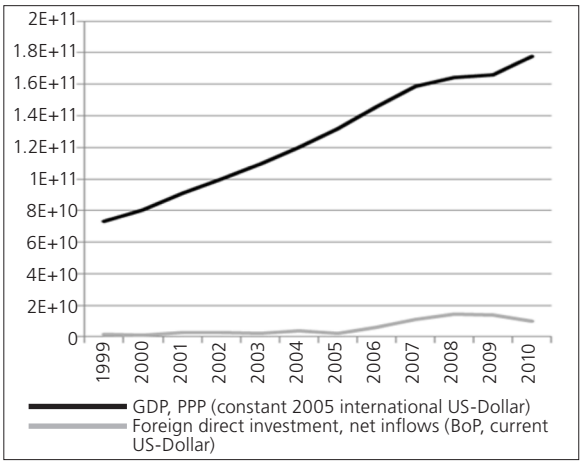
| | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Industry** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** |
| **Manufacturing industry** | **49.93** | **50.61** | **53.61** | **49.19** | **48.88** | **45.46** | **40.42** | **39.36** | **40.62** | **36.61** | **35.60** | **34.41** |
| **Food production, including soft drinks and tobacco** | **17.16** | **13.02** | **13.43** | **12.54** | **12.49** | **10.23** | **9.13** | **7.74** | **8.08** | **6.85** | **7.67** | **7.29** |
| Textile and garment industry | 3.31 | 2.42 | 2.30 | 1.94 | 1.66 | 1.22 | 1.00 | 0.76 | 0.59 | 0.38 | 0.38 | 0.34 |
| Leather and leather products | 0.19 | 0.26 | 0.22 | 0.20 | 0.09 | 0.10 | 0.08 | 1.10 | 0.08 | 0.08 | 0.09 | 0.04 |
| Wood production | 0.60 | 0.48 | 0.67 | 0.65 | 0.20 | 0.18 | 0.20 | 0.20 | 0.21 | 0.21 | 0.22 | 0.32 |
| Paper, pulp and publishing industry | 0.47 | 0.76 | 0.97 | 1.07 | 1.16 | 1.30 | 1.37 | 1.24 | 1.21 | 0.99 | 1.01 | 0.46 |
| Coke and nuclear materials production | 1.14 | 1.39 | 2.37 | 1.32 | 0.87 | 0.82 | 0.55 | 0.67 | 0.87 | 0.70 | 0.73 | 0.30 |
| **Oil processing products** | **2.69** | **3.15** | **4.34** | **3.82** | **4.11** | **2.71** | **2.67** | **2.29** | **2.07** | **3.46** | **4.10** | **4.74** |
| Chemical industry | 1.04 | 0.88 | 1.42 | 1.44 | 1.39 | 1.09 | 0.92 | 0.82 | 0.97 | 0.99 | 0.86 | 1.21 |
| Production of major pharmaceutical goods | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.15 |
| Production of rubber and plastic goods | 0.32 | 0.24 | 0.26 | 0.35 | 0.40 | 0.45 | 0.47 | 0.50 | 0.61 | 0.48 | 0.47 | 0.59 |
| **Production of other non-metallic mineral products** | **1.17** | **0.97** | **1.22** | **1.41** | **1.80** | **1.51** | **1.82** | **1.91** | **2.68** | **2.08** | **1.79** | **1.97** |
| **Metallurgy** | **17.91** | **23.77** | **22.36** | **20.74** | **20.43** | **21.47** | **17.69** | **18.50** | **18.51** | **16.65** | **14.50** | **13.9** |
| Machinery and equipment | 1.75 | 1.47 | 1.33 | 1.19 | 1.58 | 1.27 | 1.31 | 1.12 | 1.49 | 1.27 | 1.15 | 0.88 |
| Electrical equipment | 0.86 | 0.74 | 0.80 | 0.75 | 0.95 | 0.88 | 0.81 | 0.77 | 0.78 | 0.66 | 0.60 | 0.57 |
| Transportation, vehicles and equipment | 1.04 | 0.70 | 1.41 | 1.15 | 1.14 | 1.53 | 1.83 | 2.04 | 1.85 | 1.14 | 1.26 | 0.26 |
| **Repair and installation of machinery and equipment** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **1.34** |
| Other industries | 0.27 | 0.37 | 0.50 | 0.60 | 0.62 | 0.70 | 0.57 | 0.69 | 0.62 | 0.67 | 0.75 | 0.07 |

per cent), the food industry (7.3 per cent), oil refining, gas, coal and uranium enrichment (4.7 per cent), non-metallic mineral products (2 per cent) and the chemical industry (1.2 per cent).

## 1.4 Factors of Economic Growth

The inflow of foreign direct investment (FDI) in the mid -1990s contributed greatly to the Kazakh economy and continues to play an important role in economic development. However, the relatively weak correlation factor of 0.75 obtained in a correlation analysis (see Figure 1) revealed that, in addition to the impact of FDI, GDP growth is affected by other, more important factors of development.

Figure 1 Dynamics of GDP
(PPP constant 2005 international $) and foreign direct investment in Kazakhstan

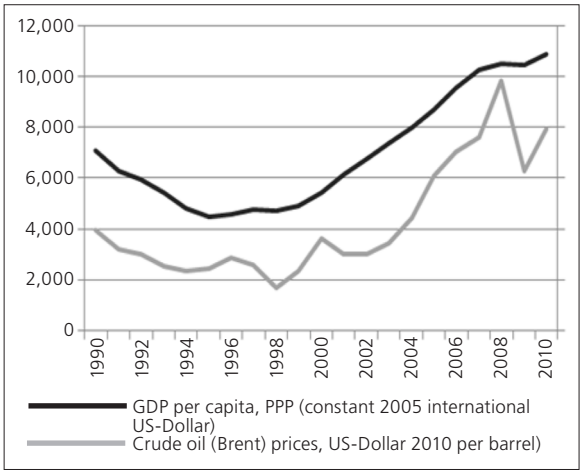



Source: G. Ismagulova; based on data from World Bank (GDP per capita) and IMF (Foreign direct investment)

There is a fairly close correlation (0.92) between the dynamics of per capita GDP in Kazakhstan and the dynamics of world oil prices (see Figure 2). This result confirms that Kazakhstan's economy is »sitting on the oil needle«, onto which it was hoisted by FDI.

In 2008–2009 the money accumulated in the National (oil) Fund for economic downturns made it possible to avoid a sharp decline in GDP. Accumulated for the needs of future generations incomes from oil production have functioned as a buffer for contemporaries. As pointed out by the head of the National Bank of Kazakhstan G. Marchenko, the economy will not be affected by the negative consequences of the second wave of the crisis due to National Fund reserves if the crisis does not go on for too long (no more than 1.5–2 years).

Figure 2 Dynamics of GDP per capita and the price of crude oil (Brent) on world markets, 1990–2010




Source: G. Ismagulova; based on data from World Bank (GDP per capita) and British Petroleum (crude oil prices).

Kazakhstan does not produce Brent crude, but as shown by the National Bank data, FDI has become significant since 1993. In 1993 and 1994 the share of FDI in oil and gas production was 72.5 per cent and 74 per cent, respectively. In 2010, FDI in oil and gas production amounted (in absolute terms) to USD 3.2 billion, around the average over the past 10 years. In percentage terms, this represented 17.6 per cent, 52.6 per cent of FDI (USD 9.5 billion) having been allocated for exploration in Kazakhstan. The latter figure indicates that global demand for Kazakhstan's mineral resources will not fall in the coming decades. It is also unlikely that there will be a sharp decrease in prices for oil and metals as a result of the recession in developed economies since a new trend can be observed, namely an increase in global demand for mineral resources due to demand from the Asia-Pacific nations, which in response to the global financial crisis have intensified their policies of strengthening domestic demand in order to avoid increases in poverty. The population in these countries continues to grow and rapid economic development is ensured by large-scale industrialisation. Kazakhstan, at the centre of the continent, can reorient its export flows from Europe to Asia.

Given that oil, gas and metal reserves will last for more than two decades and their prices are unlikely to fall significantly, it is reasonable to assume that the raw materials sector of the economy will continue to ensure stable GDP growth up to 2030. At present, fuel resources account for 70.6 per cent and metal products 11.2 per cent in the structure of exports.

Thus, continuing global demand for mineral resources will ensure the stable growth of Kazakhstan's economy in the long run as even during the crisis demand for raw minerals in the world's developed countries, which hitherto have been the main importers of Kazakhstan's raw materials, has not fallen. This can be considered as one of the major barriers to green growth. This barrier can be overcome if the international community, represented by international organizations, can influence on Kazakhstan's strategic priorities.

It should be noted that the five-year comprehensive anti-crisis policy, which also addresses the employment issue, is based on the assumption that the demand for and price of mineral resources will not fall in the long term. In particular, oil prices should not fall below 70–80 dollars per barrel. This assumption is shared by many international experts. On this basis, the government spends billions of dollars in the real sector of the economy, paying particular attention to employment.

## 1.5 Labour Force

The labour force in Kazakhstan should not be considered cheap; since 2005 Kazakhstan has ranked second in the CIS in terms of average wages. Analysis of migration rates also reveals a large influx of immigrants.

In recent years, the share of employees on wages above 75,000 tenge has tended to increase[3] (it stood at 30.9 per cent in 2010). Since 2005 their share has increased by over 25.3 percentage points. Employees receiving between 25,001 and 75,000 tenge accounted for 65.9 per cent, with 2.8 per cent of employees receiving between 12,001 and 25,000 tenge.

The National Bank conducted a one-off 25 per cent devaluation on 4 February 2009 to maintain macroeconomic stability and to help the banking system to overcome the effects of the global financial crisis. The devaluation had an impact on the index of real wages (see Figure 3). However, an active public policy and governmental action plan aimed at ensuring employment to those who had become unemployed, provision of retraining, reining in the consumer price index and so on made it possible to resume rising real wage growth in Kazakhstan (see Figures 4–6).

Figure 3 Index of real wages (%)

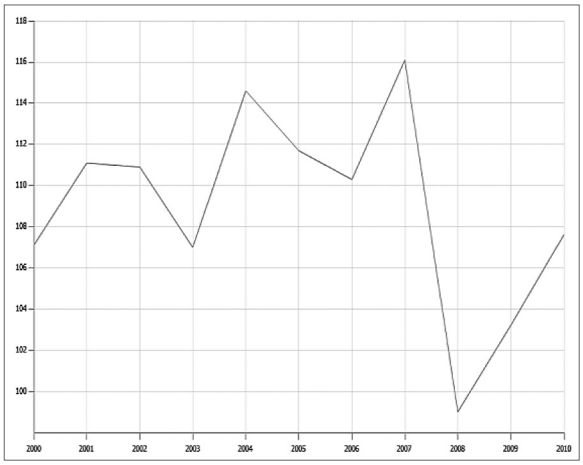
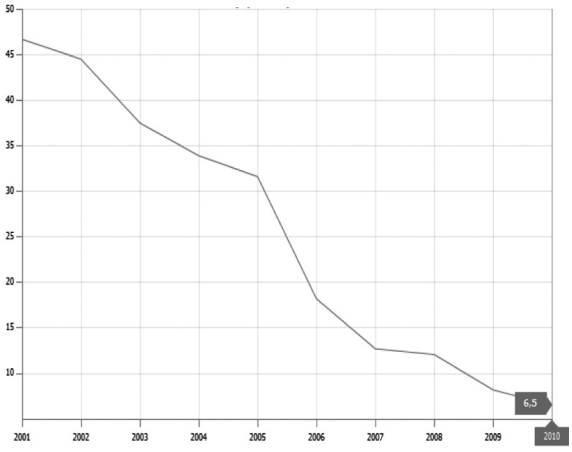



Figure 4 Share of population with income below subsistence minimum (%)




3. More than 500 US dollars at the official exchange rate.

Figure 5 Unemployment rate (%)

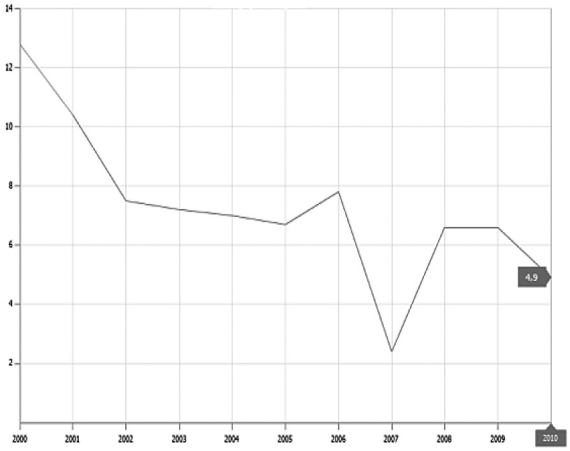
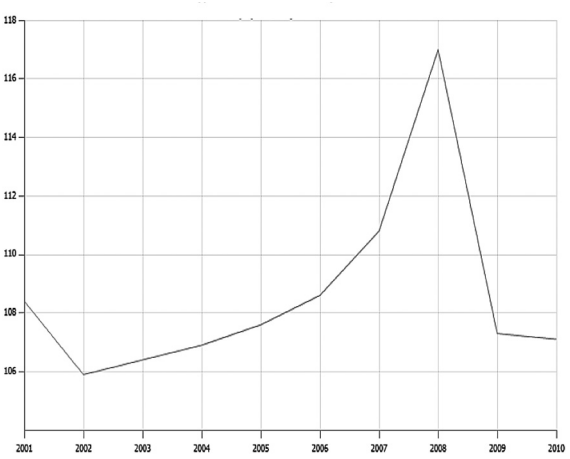



Figure 6 Inflation (%)




Source: www.taldau.stat.kz

## 1.6 Innovation

Introducing innovation into Kazakhstan is very difficult. The index of innovative activity in industry remains almost unchanged at only 4.3 per cent.[4] Statistics on science and innovation in Kazakhstan have been available for almost five years, but there are still no data on applied innovative technologies and goods necessary in the assessment of green growth.

Between 2006 and 2010 the authorities in charge of protecting intellectual property rights received 1,557–1,850 patent applications a year from locals and non-residents, of which 82–133 applications a year referred to developed models and 167–301 to industrial samples, while trademarks accounted for 3,618–4,107 applications; 6–32 and 35–147 applications referred to new breeds of animals and plants, respectively.

According to the Global Competitiveness Report of the World Economic Forum, 2011–2012 (see Table 4), Kazakhstan ranks 114th out of 142 countries in terms of the aggregated factor »Innovation and application of innovation in business«, sub-index »Innovation and sophistication factors«. This is far below not only OECD members South Korea and Turkey, but also China and India, countries with low per capita income. The lowest rating concerns industrial innovation (116th), while the improvement of business culture (109th place) is a little better.

Table 4 Comparative table of ranks and values of country sub-indices: innovation and sophistication factors, by two integral parameters

| | Innovation and sohistication factors | | Pillars | | | |
|---|---|---|---|---|---|---|
| | | | 11. Business sophistication | | 12. Innovation | |
| Country/Economy | Rank | Score | Rank | Score | Rank | Score |
| Armenia | 110 | 3.09 | 107 | 3.43 | 112 | 2.74 |
| Azerbaijan | 67 | 3.51 | 73 | 3.81 | 60 | 3.20 |
| China | 31 | 4.15 | 37 | 4.37 | 29 | 3.92 |
| Estonia | 37 | 3.98 | 53 | 4.16 | 30 | 3.81 |
| Georgia | 117 | 3.01 | 110 | 3.39 | 118 | 2.62 |
| India | 40 | 3.92 | 53 | 4.27 | 38 | 3.58 |
| Kazakhstan | 114 | 3.04 | 109 | 3.42 | 116 | 2.67 |
| Korea, Rep. | 18 | 4.87 | 25 | 4.86 | 14 | 4.89 |
| Kyrgyz Republic | 138 | 2.57 | 127 | 3.13 | 141 | 2.01 |
| Latvia | 64 | 3.53 | 71 | 3.84 | 59 | 3.21 |
| Lithuania | 50 | 3.78 | 54 | 4.13 | 48 | 3.43 |
| Moldova | 127 | 2.86 | 117 | 3.27 | 128 | 2.44 |
| Tajikistan | 100 | 3.19 | 112 | 3.38 | 83 | 3.01 |
| Turkey | 58 | 3.62 | 58 | 4.09 | 69 | 3.15 |
| Ukraine | 93 | 3.29 | 103 | 3.48 | 74 | 3.11 |

Note: Table designed by the author based on the World Economic Forum's Global Competitiveness Report 2011–2012.

In recent years, expenditure on research and development in Kazakhstan on average accounted for 0.25 per cent of GDP, in comparison to 3.49 per cent in Finland,

4. The share of businesses that introduced technological and production innovations during the year.

3.64 per cent in Korea, 2.6 per cent in the United States and 1.44 per cent in China, while the OECD average is 2.24 per cent.

Most of the innovation in Kazakhstan is stimulated directly by the state and the majority of research work is conducted in government laboratories. According to ARKS data, in 2010 the share of the private sector in R&D was only 36.6 per cent, while in Japan (78.5 per cent), China (73.3 per cent) and the United States (72.6 per cent) most R&D is implemented in the private sector.

According to B. Zhumagulov, Minister of Education and Science, Kazakhstan ranks 59th out of 65 in the International Programme for Student Assessment (PISA) because the national education and training system does not encourage the formation of innovative thinking. This is reflected in the low level of national research and development outcomes and the growing demand from businesses for progress in this field.

The low level of entrepreneurship is another factor constraining innovation in Kazakhstan. Kazakhstan does not have a competitive market capable of generating innovation. The most dynamic sectors of industry often have to acquire or master foreign technologies.

## 1.7 Long-term Development Priorities

The government of Kazakhstan has set itself the long-term strategic task of helping domestic producers to establish a foothold in domestic and foreign markets under the conditions of the expanding economic space within the Customs Union and the growing prospects of Asian-Pacific emerging markets. The state will support in particular export-oriented sectors of the economy, including, together with the traditional fuel, energy and metallurgical sectors, the nuclear and chemical industries, machine building, construction industry, pharmaceuticals, agribusiness, light industry and tourism. In traditional industry, support will be focused on developing advanced processing industries. The state will also encourage information and communication technologies, biotechnology, alternative energy and space activities, which constitute a basis for the »economy of the future.« Kazakhstan's unique geographical position enables it to play the role of effective global intermediary in Asia and the CIS (Russia, Central Asia, China, Iran, and India).

## 1.8 Risks

The oil and gas fields provided to foreign investors on a concession basis will be exhausted by 2030–2035. By that time Kazakhstan aims to have made substantial progress in the fight against corruption, as well as to have eliminated administrative barriers to business development, improved the quality of vocational training and increased the level of R&D, especially in developing new technologies. Otherwise, it will be almost impossible to maintain the current GDP growth rate. Economic history shows that structural crises are overcome more easily through the introduction of radically new technological and product innovations across all sectors of the economy, which requires huge investment in research and development and training for the real economy.

Reducing corruption and developing science and education will require drastic measures in the short term. Neglecting them or half-hearted efforts will lead to a rapid slowdown in economic growth after 2015 and by 2030 we can expect a growth rate of no more than two per cent per annum.

The risk of Kazakhstan's economy overheating has declined significantly due to increased government regulation of the financial market. Kazakhstan's stock market is of the closed type, which protects the economy to some extent.

However, attention is also paid to the various exogenous risks that must be kept under control and preparations have been made to minimise possible damage. They include:

- significant deterioration in the trade balance due to falling world prices for energy, metals, grain and other goods (Kazakhstan's exports of primary commodities account for over 41 per cent of GDP);

- decrease in FDI inflows as a result of a deterioration in the global economy (2009, 11.94 per cent of GDP; 2010, 6.97 per cent of GDP);

- a reduction in foreign currency inflows will put pressure on the tenge exchange rate, weakening it and bringing about a deterioration of the external debt, which remains at a high level (77 per cent of GDP or 156.9 per cent of annual export revenue in 2009);

■ a fall in world export prices and an economic slowdown will reduce tax revenues.

The regionalisation of national economies (the formation of international unions) will be considered as a countermeasure to the negative impact of trade globalisation and as an attempt to strengthen the competitiveness of co-partners. According to the experts, the development of the Customs Union (CU) will act as a powerful impetus to the development of the three economies participating in the Union (Russia, Belarus and Kazakhstan). According to Russian sources, the business environment in Kazakhstan is much more attractive than that of Russia, therefore in the first few months after the CU was launched more than 500 Russian companies closed their businesses in Russia and re-registered them in Kazakhstan. The results of integration are so far uncertain. There are both »pluses« and »minuses«. However, trade turnover between the countries has grown substantially.[5] Furthermore, the Customs Union has not had a significant effect on the development of the carbon-intensive sectors of the economy.

Analysis of policy documents pertaining to the state planning system and indicators of national economic development indicates that Kazakhstan's annual growth rate through 2015 will be maintained at about seven per cent per annum, based on the development of the »brown economy.« Next up to 2020 it can be kept at six per cent per annum, with a further slowing of the pace of growth to 4.5 per cent by 2030.[6] However, if no progress is made with reducing corruption and improving education and training and if financial instability is allowed to engulf the banking sector, it will be difficult to maintain growth at two per cent up to 2030. Restructuring in all sectors of the economy in accordance with the principles of green growth and ensuring green jobs primarily through the training of young people will contribute significantly to overcoming economic stagnation.

In this regard, the Ministry of Environmental Protection intends to draw up a long-term green growth strategy for Kazakhstan which will incorporate the results of the UNDP projects on designing of low-carbon development and adaptation to climate-change-concepts, tools and indicators for green growth developed under the ESCAP project, as well as all the existing policy documents of the central authorities.

Three of the four areas identified in the draft Low-carbon Development Concept 2050 (LCDC-50), which was discussed actively and widely by all stakeholders in 2010–2011, are now under implementation (see Table 5 on next page).

Despite the second wave of the global crisis that will have serious consequences for developed countries (the EU and the United States), the post-crisis recovery efforts of the government of Kazakhstan and the continuing growth of the economies of the Asia-Pacific region will ensure Kazakhstan steady economic growth until 2030. If the strategic policy on the transition to low-carbon development is not implemented, increased exports of hydrocarbons and energy-intensive products (ferrous and nonferrous metals, single-crystal silicon to produce solar panels) may lead to steady growth in GHG emissions.

Kazakhstan's economy may continue to grow for another 20 years if political stability is maintained. Based on the current political system we can assume that if radical change occurred (including a change in economic policy), there would be a new redistribution of property and corruption would flourish, accompanied by financial instability and economic disruption.

In addition, the international situation must be considered. The application of double standards by developed countries in international political and trade relations7 may lead to the introduction of a carbon-based customs duty within the framework of the WTO and by individual countries.

In order to measure different aspects of the transition to green development various indicators are employed that characterise the consumed quantity of natural resources and waste generation per unit of output or per capita. They make it possible to assess the sustainability of production and consumption technologies comprehensively. The variety of indicators can be designed for the assessment of green growth, but in this study it is

5. Analysis of the foreign trade balance shows that exports to Russia in the first quarter of 2012 are much lower than imports. A detailed analysis shows that this is due to the import of technological equipment and final consumption of goods.

6. Opinion of the author.

7. A subtle form of discrimination against developing countries.

Table 5 Implementation status of the main areas of low-carbon development, listed in the draft Concept for the Transition to Low-carbon Development by 2050

| **Priorities for the transition to low-carbon development** | **Actions of the government of Kazakhstan** |
|---|---|
| 1. Improving energy efficiency in all sectors of the economy to reduce the expected level of energy consumption. | In 2011, the Law on energy efficiency and conservation was introduced and a comprehensive plan to improve energy efficiency and conservation, which included most of the measures laid down in the draft LCDC-50, were adopted. As part of SPIID's task of reducing the energy intensity by 10 per cent by 2015 compared to 2008. The selection of industrial projects for state support is guided by energy efficiency criteria. |
| 2. Speeding up development of renewable energy through the use of hydropower, wind power, biomass, biodegradable and combustible waste, solar and geothermal energy to replace high-emission technologies and meet the growing demand. | In 2009 the Law on promoting the use of renewable energy sources was introduced. Currently, all the subordinate regulations, including tariffs, R&D subsidies, tax incentives and subsidies for constructing renewable energy sources are being drafted. |
| 3. Regulation of national GHG emissions through the organization and operation of a national quota market. | In 2011 a decision was made to launch the national quota market for GHG emissions from January 2013. Work on regulations on the introduction and operation of the market has been ongoing since 2010. |
| 4. Public awareness of the mitigation of climate change. | Comprehensive action has not yet been taken, but there are plans to introduce new subjects into the curriculum at all levels of education. |

reasonable to focus on those that characterise the energy efficiency of GDP, carbon-capacity GDP, emissions and water consumption.

## 1.9 Energy Efficiency

At the present time, according to the World Bank, Kazakhstan is among the top ten most energy wasting economies in the world. The energy efficiency of GDP is 2.4 times below the world average, 2.3 times lower than the average for the group to which Kazakhstan is assigned in terms of income per capita (upper middle income group) and 2.9 times lower than the average for the group of countries with high per capita income (high income group)(see Table 6).

As shown in Table 6, energy efficiency increased by 14.3 per cent in 2001–2009. As the values for the energy efficiency of GDP in Table 6 were compiled based on the

Table 6 Energy indicators for green growth, Kazakhstan, 2000–2010

| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | World | UMIG** | HIG*** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GDP per unit of energy use (2005 PPP$/kg oil equivalent)* | 1,8 | 2,1 | 2,2 | 1,7 | 1,8 | 1,9 | 1,9 | 2,5 | 2,4 | 2,4 | 2,3 | 5,5 | 5,2 | 6,6 |
| Energy use per capita (kg oil equivalent) | 2590 | 2374 | 2594 | 2705 | 3123 | 3342 | 3651 | 3462 | 4012 | 4292 | 4525 | 1835 | 2177 | 5131 |
| Energy from biomass products and waste (% of total) | | | | | 0,2 | 0,1 | 0,1 | 0,1 | 0,1 | 0,1 | 0,2 | 9,8 | 6,8 | 3,9 |
| Electric power consumption per capita (kWh) | 2399 | 2448 | 2622 | 2850 | 2911 | 3510 | 3621 | 3206 | 4293 | 4448 | 4689 | 2875 | 3001 | 9518 |
| Electricity generated using fossil fuel (% of total) | 72 | 72 | 69,9 | 69,9 | 69,9 | 69,9 | 88 | 88,4 | 89,2 | 89,3 | 90,7 | 67,2 | 64,7 | 62,9 |
| Electricity generated by hydropower (% of total) | | | | | | | 12 | 11,6 | 10,8 | 10,7 | 9,3 | 15,8 | 26,4 | 11,3 |

* till 2007 - 2000 PPP $/kg oil equivalent ** UMIG = Uppermiddle income group *** HIG = High income group

Sources: The little green data book, World Bank 2000–2011

Table 7 Energy intensity of GDP, Kazakhstan, 2001–2009

| | | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| GDP | billions const. int. $ 2005 | 91.319 | 100,268 | 109,593 | 120,114 | 131,765 | | | | |
| Energy consumption | thousand ton coal equivalent | 105192 | 112068 | 118017 | 125176 | 129688 | | | | |
| consumption | thousand ton coal equivalent | 76611 | 92030 | 96062 | 100098 | 102805 | | | | |
| other consumption | thousand ton coal equivalent | 23809 | 14904 | 15798 | 18137 | 19133 | | | | |
| losses | thousand ton coal equivalent | 4772 | 5134 | 6157 | 6941 | 7750 | | | | |
| Energy consumption | thousand ton oil equivalent | 73634.4 | 78447,6 | 82611,9 | 87623,2 | 90781,6 | | | | |
| Energy intensity | kg o.e./1000 $ 2005 | 806,343 | 782,379 | 753,806 | 729,500 | 688,966 | | | | |

Note: Table calculated by the author on the basis of GDP data from the World Bank (World Development Outlook, October 2011) and the fuel-energy balances of Kazakhstan's Statistical Agency for 2001–2009.

LGDB during 2000–2006 are not compatible with those of 2007–2010,[8] we made our own calculations, according to which the energy intensity of GDP in Kazakhstan in light of all the losses at the stage of energy consumption actually fell by 19.3 per cent over the same period (see Table 7).

It should be noted that most energy-efficient technologies, high-quality building materials and final consumption goods are imported due to the underdeveloped machine-building sector in Kazakhstan.

Within the framework of the state programme of industrial development the government partially compensates entrepreneurs with regard to interest on bank loans, with a view to improving energy efficiency in priority sectors. At the same time, within each programme there are also other related requirements, such as competitiveness and job creation.

The development of renewable energy is a long-term policy priority of the government of Kazakhstan.

Taxes on energy consumption, as well as the introduction of white and green certificates have not yet been provided for.

8. Due to shifting from 2000 to 2005 as base year.

## 1.10 Carbon Intensity of GDP

The carbon intensity of GDP, according to the World Bank, declined from 1.7 kgCO2 per 1 international dollar in PPS 2005 (in 2007) to 1.4 kgCO2/ $ PPS 2005 (in 2010). However, per capita emissions continue to rise, for some reason. Between 2000 and 2010 this figure increased more than 1.8 times, and thus was 3.2 times higher than the carbon intensity of the global economy, 2.8 times higher than that of countries in the upper middle income group and 17.6 per cent higher than that of the developed countries (high income countries). Nevertheless, Kazakhstan currently emits less than in 1990 and, according to the WWWF Research Assessment, Kazakhstan has the status of a »net creditor« with regard to »footprint« indicators (Living Planet 2008).

The data on concentrations of emissions of suspended particles up to 10 micrograms (PM10, mcg/m3) in the air basin of cities are unrepresentative as measurements are made in only two residential sites in the country. However, if they are valid, this indicator represents an improvement of 44.4 per cent over the period 2003–2010.

As automobile transport is the major pollutant in urban areas, the World Bank provides data on the consumption of motor fuel per capita. However, prior to 2008 only the number of passenger vehicles per 1,000 people was counted. Now, the tools in place make it possible to calculate the consumption of motor fuel per capita. In Kazakhstan this indicator is above the global average, but lower than in both comparison groups.

Because it is not possible to calculate the last two indicators in this study, it is reasonable to conclude that

Table 8 World Bank indicators on emissions, Kazakhstan, 2000–2010

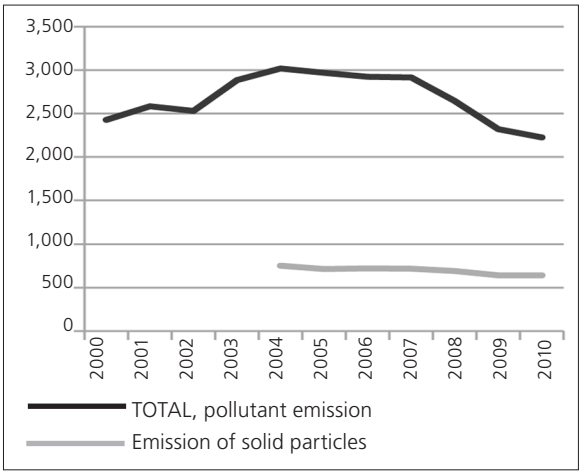
| **Emissions and pollutions** | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | World | UMIG** | HIG*** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO2 emisions per unit of GDP (kg/2005 PPP $) | 1,7 | 1,7 | 1,5 | 1,7 | 1,8 | 1,8 | 1,7 | 1,7 | 1,4 | 1,3 | 1,4 | 0,5 | 0,5 | 0,4 |
| CO2 emissions per capita (metric tons) | 8,0 | 8,2 | 7,4 | 8,1 | 8,1 | 9,9 | 10,7 | 13,3 | 11,9 | 12,6 | 14,7 | 4,6 | 5,3 | 12,5 |
| CO2 emissions growth (%) | | | | | | | -81 | -31 | -37 | -34 | | 36 | 3,8 | 17,9 |
| Perticulate matter (urban pop.-weighted avg., µg/cu. m) | | | 27 | 27 | 27 | 25 | 19 | 19 | 19 | 19 | 15 | 46 | 31 | 24 |
| Transport sector fuel consumption per capita (liters) | 66 | 66 | 65 | 67 | 72 | 71 | 80 | 93 | 252 | 284 | 277 | 261 | 320 | 964 |

** UMIG = Uppermiddle income group *** HIG = High income group

Sources: The little green data book, World Bank 2000–2011

total emissions of pollutants across Kazakhstan began to decline in 2005, but a more pronounced decline has been observed since 2008 (see Figure 7). This does not apply to the concentration of pollutants in the air basin of settlements, although an overall trend is discernible.

Figure 7 Dynamics of air pollutant emissions, Kazakhstan, 2000–2010 (thousand tonnes)




Source: Figure based on data from ARKS (www.stat.kz).

## 1.11 Potential for Reducing Energy Intensity and Carbon Intensity

As part of the development of national strategies for green growth, the carbon dioxide emissions from fuel combustion are considered separately from all greenhouse gas emissions. The issues of energy efficiency and conservation are considered separately in order to draw up an action plan on the behaviour of indirect emitters of greenhouse gases.[9]

For the analysis of national data on GHG emissions, including carbon dioxide from fuel combustion, this study reviews the National Report on the inventory of GHG emissions, which was updated and verified in 2011. Currently, it is available on the UNFCCC website (http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/5270.php) where the data for 1990–2008 can be downloaded.

In Kazakhstan, the fuel and energy resources consumed in the combustion process are estimated at 2.862 million terajoules (see Table 9).

According to the confirmed data, in 1990 in Kazakhstan $CO_2$ emissions totalled 264.8 million tonnes without absorption (256.05 million tonnes with absorption). At the same time, 91 per cent of the carbon dioxide released into the atmosphere comes from the combustion of various fuels in all sectors of the economy (246.9 million tonnes).

Carbon dioxide emissions demonstrated a falling trend until 2000. In 1999, they amounted to 110.008 million tonnes, excluding absorption, which is 56.1 per cent lower than that of 1990, the year before Kazakhstan exited the USSR. At the same time, 92 per cent of emissions still come from fuel combustion.

9. Any economic entity, including individuals, is »guilty« directly and/or indirectly, with regard to aggregate GHG emissions, because they are consumers of energy services (electricity, heating, hot water), transport services and various public and commercial services, the provision of which would be impossible without combustion of fuel and consumption of electricity and heat.

Table 9 Structure of energy consumption and CO2 emissions by category of sources and key sectors of the economy, 2010

| | Source category and sector of economy | Power consumption, million teraJ | | Carbon dioxide emissions, million tonnes | |
|---|---|---|---|---|---|
| **A** | **Fuel combustion** | **2.862** | | **241.1** | (100%) |
| **A1** | Energy sector | 1.253 | | 107.6 | |
| | *Production of electricity and heat, of which* | *1.157* | (100%) | *101.6* | *(42.1%)* |
| | solid fuel | | (66.6%) | 77.9 | (32.3%) |
| | gas | | (18.9) | 15.8 | (6.6%) |
| | oil fuel | | (14.5) | 13.9 | (5.8%) |
| | Bio-mass | | (0,037) | 0.05 | |
| **A2** | **In industry and construction** | **0.550** | | 51.7 | |
| | ferrous metallurgy | 0.117 | | 16.6 | (6.9%) |
| | non-ferrous metallurgy | 0.099 | | 9.3 | (3.9%) |
| | chemical industry | 0.089 | | 6.2 | (2.6%) |
| | food and tobacco industry | 0.010 | | 0.749 | |
| | pulp and paper and printing industry | 0.0005 | | 0.043 | |
| | *other* | *0.243* | | *18.803* | |
| **A3** | **Transport** | **0.315** | | **22.1** | (9.2%) |
| | automobile transport | 0.239 | | 16.6 | (6.9%) |
| | rail transport | 0.066 | | 4.8 | (2%) |
| | pipeline transport | 0.0076 | | 0.444 | |
| | water transport | 0.003 | | 0.2 | |
| | civil aviation | 0.0006 | | 0.043 | |

Note: The table is designed and compiled by G. Ismagulova based on CRF Kazakhstan, May 2011.

Since 2000, CO2 emissions have been on the rise. Although GDP recovered its 1990 level in 2003, emissions in 2008 were 24.3 per cent below 1990 levels. Of these, 246.9 million tonnes of CO2 (93.25 per cent) were generated in the burning of fuels in all sectors of the economy, 6.75 per cent by industrial processes. Absorption of emission by ecosystems accounted for 8.8 million tonnes of CO2, or 3.3 per cent of total emissions.

According to our calculations (see Table 8), 42.1 per cent of carbon dioxide emissions from fuel combustion pertains to thermal power plants, 6.9 per cent to the steel industry and road transport, 3.9 per cent to non-ferrous metals, 2.6 per cent to the chemical industry, and 2 per cent to rail transport. The above-mentioned emitters of carbon dioxide have the greatest potential for reducing the quantity of fuel combustion and direct GHG emissions.

The power generation sector has the greatest potential. Depreciation of fixed assets in the active part of the industry exceeded 70 per cent, with heat networks registering 63 per cent and electrical networks 73 per cent. Modernization in these sectors will significantly reduce total emissions of GHGs.

The energy intensity of GDP is dependent not only on the depreciation of fixed assets in the energy sector, but also on the dominance of export-oriented energy-intensive industries in the industrial structure whose emissions account for 13.4 per cent of CO2. Transport is responsible for 9.2 per cent of CO2 emissions.

Since energy and transport are infrastructural sectors of the national economy, their direct emissions have an indirect impact on consumers of electricity and heat, which have great potential for more efficiency.

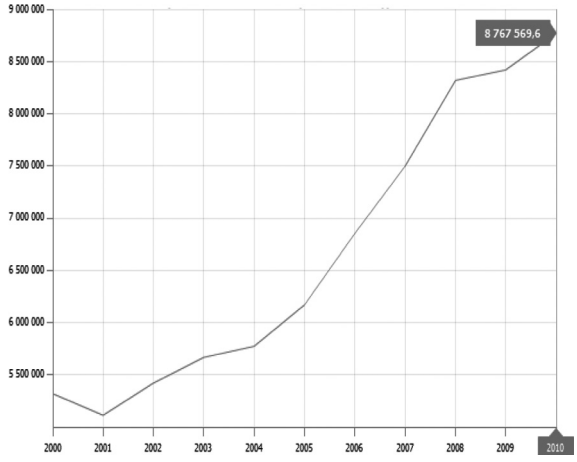
According to the structure of Kazakhstan's electricity balance for 2009, electricity consumption by industry amounted to 62.1 per cent of total consumption, including 9.7 per cent used by the electro energy sector for its own needs; 3 per cent of the electricity was consumed by food sectors (agriculture, forestry and fisheries, in-

cluding hunting), while the construction sector consumed 1.2 per cent of electricity. The share of electricity consumption for the production of material goods in the economy of Kazakhstan is 66.3 per cent.

In the service sector infrastructural branches such as transport, warehousing, postal and courier services and street lighting consume another 10.3 per cent of electricity. Trade consumes 1.8 per cent. Overall, services require 14.63 per cent of electrical power consumption.

The population consumes 10.8 per cent of electricity (3.2 per cent and 7.6 per cent by the rural and urban populations, respectively[10]). During 2001–2010 the population's electricity consumption increased by more than 1.7 times (see Figure 8).

Figure 8 Dynamics of energy consumption by the population of Kazakhstan, 2000–2010 (thousand KW hour)




Source: www.taldau.stat.kz

It should be noted that not all measures aimed at energy efficiency can be recovered in Kazakhstan because of the relatively low tariffs for energy services. This is a key economic barrier to improving energy efficiency.

The tariff improvement for individuals is closely associated with the availability of advanced metering, as well as the automation and integration of related processes into a single system that makes it possible to read the electricity meter, analyze the quality of provided services and issue the appropriate bill for payment. The author does not know whether Kazakhstan has the potential to develop such technology, however in neighbouring Russia ESCO 3E has attained fairly good results in solving such problems. This company intends to enter the Kazakhstan market.

In the absence of the information technology needed to manage household demand for electricity and the growing crisis of electricity generation capacity, in 2009 a quota-based electricity consumption[11] policy was introduced in the residential sector in all regions. It is based on two tariffs: one for the amount of energy consumed within the established limits /quotas, and another for those who consume electricity above the limit. The current tariffs for the majority of people are acceptable as consumption has been increasing since 2009 (see Figure 8). The Agency for Regulating Natural Monopolies is considering the introduction of a three-level tariff system for domestic users. The third tariff would be double the basic tariff (first tariff).

The technical and commercial losses of electricity account for 8.27 per cent (sales 1.3 per cent, technical 6.9 per cent).

In 2013, Kazakhstan will launch the national quota market for greenhouse gas with an initial allocation of emission permits between major emitters at the 2008 emissions level. Subsequently, these quotas will be successively cut to encourage emitters to reduce the energy and carbon intensity of production. The penalties introduced for quota violations will be accumulated in the National Carbon Fund, followed by investment in new green jobs in the energy sector.

In the short and medium term, it is possibly to achieve good results in energy saving and in reducing CO2 emissions in industry, road transport and urban public utilities (heating network) through the improvement of SNiPs[12] and the technical regulations on emissions of pollutants by stationary fuel-burning sources. The other option is to tighten the requirements for importing second-hand vehicles. Some strict requirements have already been

10. According to the World Bank, the urban population makes up 58.2 per cent of total.

11. For each person living in an apartment.

12. Building standards and regulations.

Table 10 Indicators of water consumption, Kazakhstan, 2000–2010

| **Water and sanitation** | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | World | UMIG** | HIG*** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Internal freshwater resources per capita (cu.m) | 7352 | 7371 | 7278 | 7368 | 5041 | 5030 | 4978 | 4978 | 4871 | 4871 | 4871 | 6511 | 18143 | 9031 |
| Freshwater withdrawal | | | | | | | | | | | | | | |
| Total (% of internal resources) | 30.7 | 30.7 | 30.7 | 30.7 | 44.9 | 46.4 | 46.4 | 46.4 | 46.4 | 46.4 | 42.1 | 9 | 3.3 | 10.5 |
| Agriculture (% of total freshwater withdrawal | 81 | 81 | 81 | 81 | 81 | 82 | 82 | 82 | 82 | 82 | 87 | 70 | 65 | 42 |
| Access to improved water source (% of total population) | 91 | 91 | 91 | 91 | 86 | 86 | 86 | 86 | 96 | 96 | 95 | 87 | 95 | 100 |
| Rural population (%) | 82 | 82 | 82 | 82 | 72 | 72 | 73 | 73 | 91 | 91 | 90 | 78 | 86 | 98 |
| Urban population (%) | 98 | 98 | 98 | 98 | 96 | 96 | 97 | 97 | 99 | 99 | 99 | 96 | 98 | 100 |
| Access to improved sanitation (% of total population) | | | 99 | 99 | 72 | 72 | 72 | 72 | 97 | 97 | 97 | 61 | 84 | 99 |
| Rural population (%) | 98 | 98 | 98 | 98 | 52 | 52 | 52 | 52 | 98 | 98 | 98 | 45 | 67 | 98 |
| Urban population (%) | 100 | 100 | 100 | 100 | 87 | 87 | 87 | 87 | 97 | 97 | 97 | 76 | 90 | 100 |

** UMIG = Uppermiddle income group *** HIG = High income group

Sources: The little green data book, World Bank 2000–2011

introduced. It is also necessary to tighten the technical barriers for the import of newly manufactured vehicles. However, all measures must be carried out consistently.

## 1.12 Resource Intensity

Currently, resource intensity is measured by consumption of materials per unit of GDP or other unit of measurement of well-being. The mass[13] of used natural resources (including renewable and non-renewable) is divided by GDP or some other indicator. The calculation of these indicators is described in the GRI manual for companies on the preparation of reports on sustainable development. Material intensity is used in the preparation of global reports on resource efficiency within the UNEP. It is accustomed to calculate water and material intensity separately. To calculate the material intensity of GDP for Kazakhstan is not yet possible due to the inadequacy of the database available for this purpose. It is likely, however, that this indicator is higher than that of China.

Water is the natural resource that most restricts development in Kazakhstan. Under climate change, the issue of water supply for both households and businesses is becoming more and more difficult, as the data on water consumption show (see Table 10).

The stock of fresh water per capita declined by 33.7 per cent in 2000–2010. This figure is a quarter below the global average value and 46 per cent lower than in developed countries. At the same time, the taking of water for domestic use from surface water sources increased from 30.7 per cent to 42.1 per cent, while the world average intake accounts for only nine per cent of the surface freshwater. These figures indicate that the problems of water supply in Kazakhstan are exacerbated and require urgent solutions.

The share of the population with access to good quality water sources is strongly overestimated. According to the ARKS, this figure increased from 78.7 per cent to 82.5 per cent during 2006–2010.

The most water-intensive sector of the economy, as shown in Table 10, is agriculture. According to World Bank data, the increased water intake was caused by the needs of this sector (87 per cent of total water withdrawal). Considering that the rural population density in Kazakhstan is 11.4 times less than in countries with high per capita income (see Table 11), it can be concluded that the agricultural land in Kazakhstan is used not effectively enough or is out of use (abandoned). Therefore, the issue of more efficient use of agricultural land in Kazakhstan can be considered one of the priorities for developing green businesses and green jobs.

13. For measures of weight or volume.

Table 11 Indicators of agricultural development, Kazakhstan, 2000–2010

| **Agriculture** | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | World | UMIG** | HIG*** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Agricultural land (% of land area) | 79,6 | 78,7 | 79 | 77 | 77 | 77 | 77 | 77 | 77 | 77 | 77 | 38 | 30 | 37 |
| Agricultural productivity (value added per worker, 2000 $) | | | | | | | | | 1652 | 1870 | 1775 | 1072 | 3671 | 25774 |
| Food production index (1999–2001 = 100) | 64,5 | 62,7 | 74 | 76 | | | | 64 | 116 | 137 | 145 | 123 | 129 | 106 |
| Population density, rural (people/sq. km of arable land) | 22 | 22 | 31 | 31 | 30 | 29 | 29 | 29 | 29 | 29 | 29 | 548 | 153 | 331 |

** UMIG = Uppermiddle income group *** HIG = High income group

Sources: The little green data book, World Bank 2000–2011

According to World Bank data, agricultural land decreased by 3.6 per cent in 2000. Crop productivity has increased by 7.5 per cent over the past three years. However, productivity per person employed in agriculture in Kazakhstan lags behind the developed countries by 15.6 times. This gap is caused by bad weather conditions, water scarcity, low population density and backward technology.

Climate change across the country is intensifying drought during the growing season (increasing temperature and decreasing precipitation) and the gradual shift of climatic zones to the north. Wheat (export product) is grown mainly in the north of the country without irrigation. In 2010 a severe drought destroyed much of the harvest in Kazakhstan. In 2011 the yield turned to be so large that neither the farmers nor the government were technically ready to manage the entire harvest to keep it in storage and sell for export.

Irrigated agriculture is more developed in the densely populated southern part of the country. These regions are well endowed with natural water sources.

The transitional crisis has seriously affected the rural communities that remained without adequate support from the state for many years. Under current legislation agricultural land in Kazakhstan has been privatised.

There are no longer any major operations in horticulture, crop cultivation and livestock. This has led to the natural destruction of irrigation facilities, thus causing over 40 per cent of the loss of water in the agricultural sector, depending on the field site.[14] The increase in water losses is the main reason for the growing demand for agricultural water. Reducing water losses in agriculture requires major investments. Therefore, it is first necessary to assess the feasibility of rehabilitating irrigation systems on sites under conditions of adaption to climate change.

According to Kazakh scientists, the restoration of irrigation canals must be done on a selective basis. They recommend reducing the cultivation of water-loving crops, replacing them with drought-resistant ones and refocusing on transhumance, which can be more profitable and less vulnerable to economic activity for rural residents.

The potential for green growth in the food sector is huge. Water-saving irrigation technologies are needed, together with a shift from the growing of moisture-loving to drought-tolerant crops and mobile cattle grazing.

The development of transhumance will supply the world market with clean meat and dairy, wool and leather raw materials and finished products without the addition of organic chemicals and GMOs. Accordingly, the capacity must be developed for processing agricultural raw materials. According to local experts, Kazakhstan can produce three times more food than it needs. Developing the processing of agricultural raw materials will create many jobs in the food, textile, leather and footwear industries.

The remoteness of villages from the densely populated industrial centres creates some difficulties for infrastructural development. There have already been problems associated with electricity supply and the delivery of goods to the city. Requirements for electrical and thermal energy can be addressed through the development of the small renewable energy sector.

14. Irrigation water in some cases does not reach the sites that need it.

Table 12 Forest resources, Kazakhstan, 2000–2010

| **Forests and biodiversity** | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | World | UMIG** | HIG*** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Forest area (% of land area) | 4,5 | 4,5 | 4,5 | 4,5 | 4,5 | 1,2 | 1,2 | 1,2 | 1,2 | 1,2 | 1,2 | 31,1 | 37,2 | 28,9 |
| Deforestation (average annual %, 1990–2005 | -2,2 | -2,2 | -2,2 | -2,2 | -2,2 | 0,2 | 0,2 | 0,2 | 0,2 | 0,2 | 0,1 | 0,1 | 0,1 | -0,1 |
| Nationally protected area (% of land area) | 2,7 | 2,7 | 2,7 | 2,7 | 2,7 | 2,7 | 2,9 | 2,9 | 2,9 | 2,8 | 2,5 | 12,5 | 13 | 13,4 |
| Animal species, total known | | | | 557 | 557 | 642 | 642 | 642 | 642 | | | | | |
| Animal species, threatened | | | | | | | | 55 | 57 | | | | | |
| Mammals | 18 | 18 | 16 | 16 | 16 | 15 | 15 | | | 16 | 16 | | | |
| Birds | 15 | 15 | 15 | 15 | 15 | 23 | 23 | | | 21 | 21 | | | |
| Fish | | | | | | | | | | 13 | 14 | | | |
| Higher plant species, total known | | | | | | | | 6000 | 6000 | | | | | |
| Higher plant species, threatened | | | | | | | | 16 | 16 | 16 | 16 | | | |
| GEF benefits index for biodiversity (0-100, median is 1.5) | | | | | | 5,4 | 5,4 | 5,4 | 5,1 | 5,1 | 5,1 | | | |

** UMIG = Uppermiddle income group *** HIG = High income group

Sources: The little green data book, World Bank 2000–2011

In Almaty and Karaganda oblasts pilot projects on the use of solar panels and wind power plants have been implemented. The problems with the development of infrastructure associated with low-density rural areas, which can still be resolved through the development of social infrastructure in rural areas and the implementation of an active migration policy that encourages the immigration of qualified specialists, skilled farmers and workers for involvement in the agricultural sector.

There are well developed farms in the northern and southern parts of Kazakhstan where the climatic conditions are better than in other regions. The financial situation of the majority of farmers and farms is weak. There have been instances of large landowners buying up land from small farmers, although the buyers often do not use the land. Abandoned land is degraded, subject to invasion by insects. Farmers who lose their land graze their livestock near settlements on public lands. These lands are degraded and trampled. The use of summer pastures faces some difficulties due to the lack of infrastructure (water wells, roads for livestock, tents and so on).

The state is currently implementing major projects to support agriculture and trying to improve the legal framework.

According to the ARKS, for the past eight years (2003–2011) production of meat by carcass weight has increased by 35.5 per cent, milk by 21.2 per cent, eggs by 63.3 per cent and all types of wool by 43.6 per cent.

In general, based on the indicators »Agriculture« and »Water and sanitation« it can be concluded that the use of water resources (despite their scarcity) and farmland is carried out in Kazakhstan very inefficiently and with outdated technologies, thus wasting resources.

Forests, according to the World Bank, cover only 1.2 per cent of the country's area (see Table 12). For the years 2000 to 2004, the national statistics still state 4.5 per cent of forest area, which includes the area of planted saxaul. According to the Ministry of Emergencies, for the past 10 years, the area of forest that has been lost due to fires is equal to the area of planted forest during the same period. Therefore forestry is among the most vulnerable sectors in the economy. The protection of forests is supported by the state. A lot of investment is allocated to forestry both by the state and international organizations. Every year in Kazakhstan, tens of thousands of hectares of land are planted with different tree species, but mainly saxaul, which performs both an ecological and an economic function: it retains moisture, slows down the process of desertification, protects the railways against snow drifts and is good forage for grazing livestock.

The World Bank data on deforestation and protected areas (PAs) do not reflect actual development in Kazakh-

stan. The total area of forests and protected areas is expanding year by year. Certainly it is small as a percentage of the total area. Each year the number of full-time jobs in this sector is increasing, but within the framework of total employment it remains very small across the country.

According to World Bank data, the list of endangered species – mammals, birds and fish – has not changed much for 10 years. It is also substantially at odds with the national database. Thus, according to the ARKS, in 2010 endangered species numbered 28 and 50 for mammals and birds respectively. As of 1 November 2010 protected areas accounted for 2.7 per cent of Kazakhstan's national territory.

## Conclusion

Kazakhstan's economy is based on resources consumption and thus the potential for a greener economy is very high, especially in the sectors identified in the main part of this chapter. The constraining factors in the transition to green growth in Kazakhstan are as follows:

- Immaturity of the national innovation system, including the lack of many important branches of machine engineering, such as the production of equipment for renewable and conventional energy.

- The system of vocational training for science and the real economy is still very weak.

- The financial situation of small and medium-sized businesses, including farms and households, has worsened under the global financial and economic crisis.

- The lack of a centrally managed system for the disposal of solid waste, including absence of a system for recycling mercury-containing light bulbs used by the public.

- Issues of integrated water resource management remain unsolved.

- Agricultural land and water for irrigation are used inefficiently.

- The lack of an environmental tax system/practices; there is only a system based on payments for pollution and pollution permits.

- The lack of advanced metering equipment and tariffs, making it possible to take into account the interests of energy consumers; the quality of energy services.

- Energy supply companies are not interested in implementing energy saving schemes for the benefit of end consumers.

However, Kazakhstan has worked systematically to reduce the human impact on ecosystems and climate. To recap:

- The national market for greenhouse gas emissions quotas will be introduced in 2013 (CO2 and CH4 emissions will be regulated).

- The Law on energy efficiency and conservation has commenced implementation.

- The state is supporting the infrastructural modernisation of economic sectors through public-private partnership.

- Activities related to the conservation of ecosystems and biodiversity and ecotourism15 have been stepped up.

First of all, energy-efficient and environmentally friendly technologies have been introduced in the competitive sectors of the economy, such as oil and gas and metallurgy, but in many instances also in all sectors facing competitive markets. In most businesses, an industrial water recycling system has been introduced. Considering the immaturity of environmental statistics in terms of the analysis of green technology implementation and the strong aggregation of published data it is difficult to identify sectors that have made a significant contribution to improving energy efficiency and conservation/restoration of the environment.

Kazakhstan has not yet introduced a system of labelling for organic products and technologies. No adequate standards have been developed, although this is stipu-

15. However, the development of ecotourism constrained by lack of infrastructure and expertise.

lated in the Environmental Code. Some manufacturers write on packaging »environmentally friendly product« with their own logos. It is therefore difficult to determine how many and which eco-friendly products are manufactured in Kazakhstan and which technologies are employed. In their choice of goods and products the population focus more on ingredients, European labelling of energy-efficient products (the »energy star«) and the availability of certificates ISO (9001, 14001, 50001) and OHSAS.

# Definitions of Terms and Abbreviations Used

**Green growth** is a concept in the strategic management of economic development aimed at preserving natural assets and continuous provision of resources and ecosystem services. The future prosperity and health of the population largely depend on the abovementioned natural resources and ecosystem services. Green growth is characterised by the increasing application of green technologies in all sectors of the economy; increasing green jobs, production and use of environmentally friendly goods and services. Within the framework of green growth policymakers focus on the food sector, energy, water management, conservation and restoration of ecosystems and biodiversity, infrastructure and utilities. Green growth is measured in terms of changes in indicators concerning the reduction of emissions of greenhouse gases and all types of waste generated by production and consumption, energy efficiency and the efficient use of all natural resources (renewable and non-renewable).

**Green jobs**, as defined by UNEP,16 are work in the agricultural, manufacturing, R&D, administrative and service sectors. Primarily, work in these sectors contributes to the protection and restoration of environmental quality. Specifically (but not exclusively) green jobs refer to work that supports the protection of ecosystems and biodiversity, reduces energy, water and material consumption in the process of production through a strategy of maximising efficiency, low-carbon development and minimising or reducing to zero all forms of waste and emissions. The ILO adds to this definition the notion of »decent work«, which contributes to reducing poverty while protecting the environment.

**Genuine savings rate/adjusted net savings.** The index was introduced and applied by the World Bank to adjust national accounts due to changes in the natural and social capital of national economies taking place over a given calendar year. It is measured as a percentage of GNI.

16. A green Job, also called a green-collar job is, according to the United Nations Environment Program, »work in agricultural, manufacturing, research and development (R & D), administrative, and service activities that contribute (s) substantially to preserving or restoring environmental quality. Specifically, but not exclusively, this includes jobs that help to protect ecosystems and biodiversity; reduce energy, materials, and water consumption through high efficiency strategies; de-carbonize the economy; and minimize or altogether avoid generation of all forms of waste and pollution.«

| | |
|---|---|
| CIS | Commonwealth of Independent States |
| $CO_2$ | Carbon dioxide |
| CU | Customs Union |
| EU | European Union |
| FDI | Foreign direct investment |
| FER | Fuel and energy resources |
| GDP | Gross domestic product |
| GHG | Greenhouse gases |
| GNI | Gross national income |
| GRI | Global Reporting Initiative (UN initiative to involve the business community in the process of transition to sustainable development through training and publishing of regular reports on the activities of companies) |
| GVA | Gross Value Added |
| H&PU | Housing and communal services |
| IEA | International Energy Agency |
| ILO | International Labour Organization |
| IMF | International Monetary Fund |
| LCDC-50 | Concept for Kazakhstan's Transition to Low-carbon Development by 2050 |
| LGDB | Little Green Data Book, published annually by the World Bank, the indicators in LGDB are incorporated in WDI |
| MEP RK | Ministry of Environmental Protection of the Republic of Kazakhstan |
| ME&S RK | Ministry of Education and Science of the Republic of Kazakhstan |
| OECD | Organisation for Economic Cooperation and Development |
| RK | Republic of Kazakhstan |
| ARKS | Statistical Agency of the Republic of Kazakhstan (Statistical Agency) |
| SPIID | State programme for the accelerated industrial-innovative development of Kazakhstan for 2010–2014 |
| UNEP | United Nations Environment Programme |
| UNFCCC | United Nations Framework Convention on Climate Change |
| 2005 PPP $ | Unit of measure of cost values in international dollars for the given year; used for cross-country analysis mainly by organisations such as the IMF and the World Bank |
| WTO | World Trade Organization |

## Analysis of Data Sources

To ensure comparability, definitions and standards were taken from the following sources:

Definitions of and criteria for green growth: OECD, »Green growth strategy«, available at: http://www.oecd.org/dataoecd/37/34/48224539.pdf. Another article relevant article is »Towards Green Growth« (OECD 2011). Our review of publications by the OECD and UNEP revealed no specific differences in the interpretation of »green growth«.

The definition of »green jobs« was based on ILO publications, namely »Green jobs: towards decent work in a sustainable, low-carbon world«. A comprehensive definition of green jobs was found through the UNEP data retrieval system, translated unofficially into Russian. We also found it reasonable to keep the English definition. The ILO adds to this definition the notion of »decent work«, which contributes to reducing poverty while protecting the environment. The UNEP in all of its publications on green growth focuses on the Millennium Development Goals, including poverty eradication.

Data on energy and environment were taken from the recommended international databases. The report employed the data of the OECD IEA (International Energy Agency): Key World Energy Statistics, 2011 and 2007. The updated information on Kazakhstan in this source refers to 2009 (http://www.iea.org/stats/index.asp). The IEA data on Kazakhstan's energy balance are highly aggregated and thus sectoral analysis is not possible.

With regard to macroeconomic data the OECD general database has no data on Kazakhstan (OECD, Statistical Extracts, OECD Economic Outlook, Volume 2011; OECD Environment Data, Compendium 2008). This also applies to energy, environmental and demographic indicators.

The World Bank publishes indicators describing different aspects of sustainable development, which may also be applicable to the assessment of green growth. They are presented in a suitable form for comparison in terms of average world values and country groups classified by per capita income. However, it was also noted that the World Bank does not always update the database for all countries in good time. It can therefore sometimes be difficult to compare them on an annual basis. For this study, we retrieved all the indicators on Kazakhstan to demonstrate their dynamics over the past decade.

The IMF provides a wealth of macro indicators going back to 1960, thus making it possible to identify long-term trends. At the same time, it is difficult to carry out cross-country analyses. Many indicators, as shown by a comparative analysis, do not coincide with national statistics (even population size). However, it is extremely useful to obtain data on GDP in constant international dollars for a given base year in terms of purchasing power parity.

IEA calculations assume GDP in constant US dollars as of the year 2000, while the World Bank and the IMF employ the international dollar rate for the selected base year (2000 or 2005). The World Bank provides data up to 2007 in 2000 prices, switching to 2005 rates since 2007, making it more complex to trace 10-year dynamics.

Labour market data were retrieved from the ILO database. The figures on Kazakhstan are suitable for analysing, for example, gender inequality, but not for identifying existing green jobs. Employment data by economic sector are available from November 2003, although over the eight-year period there have been significant shifts in employment patterns. The updated data on wages and unemployment refer to 2008, thus providing no possibility for evaluating the Kazakhstan government's anti-crisis employment policy. International organizations are promoting the green growth concept as a tool to mitigate the impact of the global financial and economic crisis on national economies. The data on wages are shown in local currency and thus cannot be compared with those of other nations; we therefore retrieved them from the national statistics. However, a general review showed that the ILO data are broadly consistent with national statistics and reliable.

Implementation of the tasks identified in the TOR for this study faced considerably difficulty due to the requirement of compliance with the recommended databases. Previously, within the framework of projects involving UNDP, ESCAP, EU, MEP and the Scientific Committee of the ME&S the author referred repeatedly to the above-mentioned international databases in carrying out analytical studies and noted their unrepresentativeness (in terms of the reliability of many of the initial data and calculation of indicators).

World Bank and IEA data are suitable for comparative analyses (Kazakhstan with other countries) of a possible green growth transition. The IMF data can be used to build models and design forecast scenarios, but the figures presented are not sufficient for this study. At the same time, from a methodological view point it is difficult to use these data to underpin a comprehensive analysis of green growth in Kazakhstan. Therefore, to demonstrate trends the author found it necessary to rely on the data of Kazakhstan's Statistical Agency (ARKS).

## References

**Astana, National Analytical Centre of the Government of Kazakhstan** (2011): Economic and Financial Risks in Kazakhstan. p. 33.

**Chulanova, Z.** (n.d.): Kazakhstan in the Global Measurement of Competitiveness Rating, online at: http://news.nur.kz/199338.html

**IMF** (2011): World Economic Outlook Update, April.

**International Energy Agency/OECD** (2009): Electricity/Heat in Kazakhstan, online at: http://www.iea.org/stats/electricitydata.asp?COUNTRY_CODE=KZ

**International Energy Agency/OECD** (2009): Oil in Kazakhstan, online at: http://www.iea.org/stats/oildata.asp?COUNTRY_CODE=KZ

**International Energy Agency/OECD** (2009): Project Scope and Implementation Timetable. Natural Gas in Kazakhstan, online at: http://www.iea.org/stats/gasdata.asp?COUNTRY_CODE=KZ

**International Energy Agency/OECD** (2009): Renewables and Waste in Kazakhstan, online at: http://www.iea.org/stats/renewdata.asp?COUNTRY_CODE=KZ

**International Energy Agency/OECD** (2009): Selected Indicators for Kazakhstan, online at: http://www.iea.org/stats/indicators.asp?COUNTRY_CODE=KZ

**Ismagulova, G.** (n.d.): Macroeconomic Policy and Development in Kazakhstan, online at: http://www.unescap.org/pdd/projects/TC-transition/doc/MacroPolicy-Kazak.pdf

**National Bank** (n.d.): Gross Inflows of Foreign Direct Investment in the Republic of Kazakhstan by Type of Economic Activity, online at: http://nationalbank.kz/?docid=680

**Nazarbayev, Nursultan** (2006) **OECD** (2011): Course on Green Growth, Summary for leaders, decision-makers, online at: http://www.oecd.org/dataoecd/59/22/48634082.pdf

**OECD** (2011): Towards Green Growth, online at: http://www.oecd.org/dataoecd/37/34/48224539.pdf

Strategy of Kazakhstan's Entry among the 50 Most Competitive Countries in the World. Kazakhstan on the Threshold of a New Leap Forward in its Development. Message from the President of the Republic of Kazakhstan, Nursultan Nazarbayev, March.

**World Economic Forum** (2012): The Global Competitiveness Report 2011–2012, Geneva: World Economic Forum.

**About the author**

**Dr. Gulmira Ismagulova**, Head, Department of Ecology and Economy Problems of Nature Resource Management, Institute of Economics, Ministry of Education and Science of the Republic of Kazakhstan

This study ist part of a publication series on Green Growth by the Friedrich-Ebert-Foundation. More country studies will follow in the course of 2012.

www.fes-sustainability.org

**Imprint**

Friedrich-Ebert-Stiftung
Central and Eastern Europe
Hiroshimastraße 28 | 10785 Berlin | Germany

Responsible:
Dr. Ernst Hillebrand, Head, Department of Central and Eastern Europe

Tel.: ++49-30-26935-7726 | Fax: ++49-30-26935-9250
http://www.fes.de/international/moe

Orders / contact:
info.moe@fes.de



**ISBN 978-3-86498-257-6**