

“Green Growth” in Kazakhstan: Political Leadership, Business Strategies and Environmental Fiscal Reform for Competitive System Change

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Abstract—The objective of this research work is to discuss the concept of “green growth” in the Republic of Kazakhstan introduced by its government in the “National Sustainable Development Strategy” with the objective of transition to a resource-efficient, “green economy.” We believe that emerging economies like Kazakhstan can pursue a cleaner and more efficient development path by introducing an environmental tax system based on resource consumption rather than only income and labor. The key issues discussed in this article are the eco-efficiency, which refers to closing the gap between economic and ecological efficiencies, and the structural change of the economy toward “green growth.” We also strongly believe that studying the experience of East Asian countries on “green reform” including eco-innovation and “green solutions” in business is essential to the case of Kazakhstan. All of these will raise the status of Kazakhstan to the level of one of the thirty developed countries over the next decades.

Keywords—Economic strategy, green growth, green solutions, natural resource management, environmental tax system.

I. INTRODUCTION

“GREEN GROWTH” is a path of economic growth which uses natural resources in a sustainable manner. It is a crucial economic strategy for emerging economies. It is also a key issue in Kazakhstan, because the country has significant share of the global strategic raw materials: oil and gas, uranium and other rare natural resources. A favorable environment for the development of environmentally – oriented “green business” can be achieved by fiscal levers and tax privileges. The key aspects are economic growth, social inclusiveness and environmental protection. We focused our work on the issue of eco-efficiency (balance between economic and ecological efficiencies), environmental taxation and its strategic considerations, the innovative experience of East Asian countries in “green growth,” and finally we provided specific steps for Republic of Kazakhstan to successfully pursue “green growth” strategy.

Properly designed environmental tax reforms can achieve shifting the burden of taxes from labor and income to environmentally damaging activities, such as resource use or pollution. This will also generate more jobs and growth and

reduce resource consumption and pollution. We assume that one of the most effective tools for the introduction of “green growth” is the implementation of environmental taxes (eco-taxes). For example, putting a price on carbon, through a carbon tax, is crucial for reducing carbon emissions, decreasing carbon intensity and stimulating “green growth.”

According to the Economic and Social Commission for Asia and the Pacific (ESCAP) shifting away from current resource – and carbon – intensive growth practices to a low-carbon and green economy would reduce local pollution and lead to substantial savings related to health services and productivity. To illustrate this we may refer to the data provided by the International Energy Agency: the cost of pollution on current trends will be an estimated US\$133 billion in China and US\$617 billion globally in 2035. Relying on low-carbon technologies now will likely reduce these figures to an estimated US\$86 billion for China and US\$428 billion globally, a saving of US\$47 billion and US\$189 billion, respectively, in 2035 [1], [2].

In addition, the integration of the principles of “green growth” in the strategic planning will contribute to the successful fulfillment of Kazakhstan’s international obligations under ratification of the Kyoto Protocol. The government of Kazakhstan has been promoting regional cooperation by hosting the Sixth Ministerial Conference on Environment and Development in Asia and the Pacific (MCED-6) in 2010 and launched the Astana Green Bridge Initiative: Europe-Asia-Pacific Partnership Programme for Green Growth.

Our research goal is to provide our readers with the comprehensive information and practical implementing strategies that lead to improvement of resource efficiency, sustainable development, and promotion of “green growth” in Kazakhstan. We will go through the following steps: How to raise the standards of living of a growing population, and improve the efficiency of using natural capital and develop the economy of Kazakhstan to become ecologically efficient. How to close the gap between the ecological and economic efficiencies. And finally, how the Government of Kazakhstan will enable conditions for businesses to thrive in a “green economy.” In order to achieve our goals, we need to change the structure of the economy, optimize the quality of growth, and introduce new infrastructure planning so that solar and wind power become economically attractive, and, at the same time, it should not negatively affect the poor. In addition, we need a properly designed environmental fiscal reform. We believe that with a proper system change the “green growth”

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can deliver a double dividend, which is a higher growth with lower environmental impact.

II. THE PRINCIPLES OF "GREEN GROWTH" IN THE TAX SYSTEM AND STRATEGIC PLANNING

Unfortunately, today not many countries are following the "green growth" path because there is not yet an established economic theory, its hypothesis or prescription, and guidance on how to follow the "green growth" way. Mostly, non-developed countries are following the conventional "brown growth" which is resource - and pollution - intensive growth [2]. Those that show a positive example in "green" direction are mainly industrialized countries like the United States, Sweden, Japan, South Korea, etc. For instance, benefits from the Japanese Shinkansen system of high speed rail network are huge. The savings in time are equivalent to around US\$6.2 billion, avoiding 1,800 deaths and 10,000 serious injuries and reduced annual CO₂ emissions between Tokyo and Osaka every year [2]. So, development of new "green business" in the Republic of Kazakhstan will lead it to industrialization, which would give the country the status among the 30 most developed countries in the world by 2050.

The concept of "Green Growth" in Republic of Kazakhstan is based on the use of four principles:

- 1) The principle of eco-efficiency, implying maximization of useful features of goods and services, while minimizing the environmental impact throughout the product life cycle;
- 2) The principle of resource management involves taking into account the need to preserve natural resources;
- 3) The principle of unity implies coherence of all subjects of the national economy, participating in the development process;
- 4) The principle of intersectionality means involvement of representatives of various sectors of society in decision-making [3].

According to the concept of "Green Growth" above, four principles are integrated into the strategic planning of national economic development through the following mechanisms:

- a) Reforming the system of budget relations by introducing environmental taxes;
- b) Implementation of sustainable production and consumption models;
- c) Development of "green business;"
- d) Creating a sustainable infrastructure [3].

Fiscal levers and tax privileges may lead to a favorable environment for the development of environmentally - oriented "green business". By means of tax incentives and development of the partnership in the form of "public-private" within the natural monopoly, the government can implement the most promising projects for promotion of "green growth."

We assume that offering tax breaks for households and companies in case of their transition to renewable energy sources would be a good incentive to move toward "green energy" which is, according to TREIA (Texas Renewable Energy Industries Association), naturally regenerated over a short time frame and carbon neutral source of energy like

wind, hydroelectric power, solar, etc. Energy efficiency and renewable energy should be considered as national priorities, and integrated into policies on energy and the environment.

The implementation of the environmental tax system and tax incentives will benefit the environment because it leads to the rational natural resource management. To illustrate, a carbon tax is crucial for reducing carbon emissions, decreasing carbon intensity and stimulating "green growth." ESCAP analysis shows that a carbon tax would be effective in reducing CO₂ emissions from the Asian region, with the biggest reductions in developing countries while having a positive effect on their economies.

We believe that one of the most effective tools for the introduction of "green growth" is the implementation of environmental taxes (eco-taxes). Kazakhstan tax law has environmental taxes on "subsurface users," these are oil, gas and mining companies. There are amendments and additions in the law on environmental taxes, which takes into account the international experience of its application. Before 2009 the environmental tax rates, their procedure of calculation and administration were determined only in the subsoil use contracts and were not regulated by the tax legislation of the Republic of Kazakhstan. Today, eco-taxes are regulated by the Tax Code.

Currently, there are no generally accepted standards for environmental taxation, but, from our point of view, there are general principles and mechanisms to be followed:

- introducing new taxes or restructuring existing taxes;
- gradual implementation of environmental taxes;
- use of progressive taxes;
- avoidance of double taxation;
- implementation of greater use of market mechanisms;
- minimization of the impact on competition;

Green-tax reforms can be implemented by several principles and measures, such as introducing new taxes or restructuring existing taxes, for instance it may be taxes on transport or energy. Also, implementation of environmental taxes should be gradual and based on progressive taxes, so that the lower-income individuals are not negatively affected.

It should be noted that, in the sector of processing of natural resources, in most countries oil and gas companies are exempt from environmental taxes directly, and subjected to taxation by means of indirect taxes (excise taxes). The introduction of environmental taxes will improve the environment, stimulate users of natural resources to reduce emissions and lead to rational national resource management.

The main purpose of the introduction of eco-taxes is the redistribution of the tax burden from socially significant activities (like employment) to activity that causes harm to the environment. In addition, the redistribution of budget funds, in order to increase investment in the development of environmentally friendly activities, such as the improvement of transport infrastructure and development of public transportation to reduce air pollution in large cities, may be also one of the steps to reform the tax system. In our case, the goal is not to increase the tax burden, but to take efficient

measures to protect the environment and preserve the natural capital for future generations.

Eco-taxes are the most effective tool for creating effective social and environmental oriented fiscal system. Its main principles are to internalize the costs of production and provide an even distribution of income. Thus, the introduction of eco-taxes will not increase the overall tax burden, but would contribute to the redistribution within the society, and, at the same time, reduce environmental damage to nature.

Another effective economic mechanism of the "green growth" is implementing payments for ecosystem services (PES), also known as payments for environmental services (or benefits), which represent incentives offered to farmers or landowners in exchange for managing their land to provide ecological service [4]. Mostly, PES programs are funded by governments, but sometimes there are intermediaries, such as nongovernment organizations. The world's largest and longest running PES program is the Conservation Reserve Program in the United States.

According to analysis in the UN-sponsored report "Millennium Ecosystem Assessment" it is essential to create PES schemes. They provide a logically integrated framework that allows comparing the costs of changes in ecosystem services and the benefits from their use. It also serves as a basis for estimating the distribution of costs and benefits among all stakeholders and compensation, which can be made in order to prevent environmental damage.

Reference [5] shows that a key objective of PES schemes is to generate stable revenue flows that help compensate farmers for their efforts and opportunity costs incurred in reducing environmental pollution and other externality costs that adversely impact the shared commons of the local, national and global environment. Opportunities for PES may be found in various environmental sectors like forests, pastures, biodiversity, etc.

Application of PES can provide a solution to the problem of greenhouse gas emissions under Kyoto Protocol, the availability of water supply of small towns in the country, and other issues that require complex solutions.

It seems that the criteria of public health should have a priority among all factors taken into account during developing and implementing strategic plans and measures to ensure the ecological security of the country. Environmental factors directly impact the human health. For instance, one out of four deaths globally is attributable to environmental causes, such as polluted air, contaminated water and lack of adequate sanitation [6]. Strategic plans and measures to ensure the ecological security of the country include assessing the influence of environmental factors on health of the population, as well as work conducting the rehabilitation of the population of the regions affected by nuclear testing, or living in areas of ecological disasters.

Therefore, integration of the principles of "green growth" in the strategic planning will contribute to the successful fulfillment of international obligations of Kazakhstan within the ratification of Kyoto Protocol.

So, the integration of the principles of "green growth" in the system of strategic planning and taxation in Kazakhstan would allow the effective use of the available natural resources, industrial capacity, and generally will allow the improvement of the quality of life.

III. CLOSING THE GAP BETWEEN ECONOMIC AND ECOLOGICAL EFFICIENCIES

Under the current economic systems, governments and companies are mostly concerned about economic efficiency which is based on high productivity and high returns and hardly think about ecological aspects. As the result we have an increasing gap between economic and ecological efficiencies. In this section we are going to focus on the eco-efficiency, i.e., how to close such gap.

Eco-efficiency should build a win-win synergy between the economy and the environment. To achieve this, we need a fundamental economic system change: improvement of infrastructure, better designed prices, governance and the lifestyle itself. According to [2], the system change brings a double dividend: on one hand more growth and employment and on the other hand less environmental impact.

For solving problems of eco-efficiency and shifting to the sustainable development in Kazakhstan, we suggest the following policy options and strategies:

1. Improving the methods of calculating payments for environmental pollution;
2. Encouraging the use of energy-efficient and resource-saving technologies (greening the economy);
3. Investing in natural capital (contribution to agriculture, forests, etc.).

The first strategy can be attributed to the introduction of eco-taxes, redistribution of the tax burden that was explained in the previous section (part two). Obviously, this approach should be linked with other policy instruments in the field of environmental protection. By environmental protection we refer to the sustainable management of natural resources, protection of biodiversity and ecosystem services, and to the sustainable production and consumption. Particular policy instruments may be the tools encouraging the introduction of cleaner production, for the impact of redistribution of the tax burden on polluting industries.

The implementation of the second and third strategies include "greening business (economy)" which is referred to encouraging industries to use resources more efficiently, substituting fossil fuels with renewable energy sources, improving occupational health and safety conditions, taking increased producer responsibility, reducing the overall risks for the environment and promoting the 3R (reduce, reuse, recycle) approach. These strategies are subject to integration into the existing fiscal system of the country. There is a need in investments toward such sectors as renewable energy, energy efficiency, sustainable transport, waste management and recycling.

IV. THE EXPERIENCE OF THREE ASIAN COUNTRIES: TURNING GREEN INTO A BUSINESS OPPORTUNITY

We assume that the economic policy and the environmental protection, as well as natural resource use policy should be mutually complementary and be developed in close association with each other. Innovations should play the key role in this case.

The experience of the countries of East Asia shows that the effect of “green reform” can be characterized as innovative, which promotes a radical restructuring of the national economy and ensures the competitiveness of the country in the long term period.

Without doubt, the transition to a “green economy” in a country that has rich natural resources requires extensive research on the efficacy and adaptation to the national context. Emerging countries may have an advantage in exploiting eco-innovation and “green solutions”. So, it is very useful to study the experience of East Asia that started the “green reforms” a little earlier, such as People’s Republic of China, Republic of Korea and Japan.

People’s Republic of China: A Global Leader in Solar and Wind Energy

China has sufficient experience in implementing the principles of “green economy”, including the planning, investment and economic management of the country. For example, it has rapidly become the world’s leading manufacturer of solar photovoltaic cells (electrical device that converts the energy of sunlight directly into electricity) increasing its global market share in only eight years from 1% to 35% [2].

Moreover, according to the International Energy Agency, already this year, China may become the largest producer of wind power in the world, as compared to 5 years ago when there was not a single wind turbine operating effectively in the country.

An important step in the development of “green economy” in China will be the development of nanotechnology, which is the engineering of functional systems at the molecular scale, according to studies conducted by the National Nanotechnology Initiative. Nanotechnologies will help people in optimizing the use of limited resources and will make our lives more secure overall. The Global Innovation Center for Nano-Fiber Application (GICNA) has already been established in Beijing as a co-operational platform for low-carbon technologies in the country’s “green development” that will help to solve the problem of energy conservation and to clean air.

Our experience on “green growth” indicates that China has taken huge steps towards ‘green growth’ since 2005. As a result, today there are substantial improvements in energy consumption, energy efficiency and recycling technologies in China. For example, it has enforced requirements for the cost-effective reduction of heating and cooling loads and new buildings must save 50% on energy use [2]. The new challenges for China are to improve the level of well-being, sustain the rapid growth and continue to follow a “green

growth” path as part of a new development strategy. However, it should be noted that many emerging economies like China and Kazakhstan are still facing difficulties implementing their development strategies and require ideas and assistance to achieve efficiency gains.

Republic of Korea: Moving Ahead on Developmental Success in Green Innovation

It is widely known that South Korea is actively implementing the idea of “green reforms,” developing “green modes” of transportation, alternative sources of fresh water, waste processing technology, etc. Specialists of the United Nations Environment Programme (UNEP) recognized South Korea as one of the world leaders in the development of “green technologies.”

According to the Presidential Committee on Green Growth of the Republic of Korea, the country will be by 2020 in the top seven countries and by 2050 in the top five countries with the most advanced “green economy.” These strategies are based on:

- 1) the reduction of greenhouse gas emissions to atmosphere and adapting to climate change;
- 2) the creation of new engines that use “green technology;”
- 3) the increase in the standard of living due to the “greening” the quality of life and becoming a model country with a “green economy;”
- 4) the creation of favorable conditions for participation of business people in the development of environmental projects and increase the interest population in these projects [2].

The purpose of the technological innovations in South Korea is to prevent environmental degradation caused by intensive economic growth. The main mechanisms for achieving this objective are to stimulate investment into the development and use of non-carbon energy sources, conservation and restoration of natural resources.

Currently, many incentives, like grants, cheap loans, or tax relief, are provided for private firms in Korea to invest into new technology. The major South Korean corporations are investing heavily in new technologies: solar energy, smart grids, lithium batteries, low-carbon plastic, etc. Hyundai and Samsung have become leaders in this field, through pursuing a “stability” policy, which refers to investment in human capital (allocating more resources to education and training), development of long-term infrastructure projects, etc. Moreover, the Government of South Korea is extending support to small and medium-sized, eco-oriented businesses.

Japan: Toward a Low-Carbon Society Vision

In 2008, the government of Japan announced its Low-Carbon Society Vision policy. The policy sets a long-term target of 60–80% CO₂ emissions reduction by the year 2050 from the current level [2]. The government of Japan is cooperating with developed countries on technological innovations for further emission reductions, and supporting them on disseminating and promoting technologies and contributing to their transition to low-carbon societies that are

resistant to the effects of climate change. In addition, Japan outlines specific mechanisms such as emissions trading, tax reform and green technology innovation. Also, there is an implementation of the pay-as-you-throw systems that leads to the reduction of waste between 20 % and 30 % [7].

Internationally, Japan is a huge contributor to the reduction of methane emissions in developing countries. The country is also actively involved in reducing emissions of black carbon and tropospheric ozone through the provision of technical assistance and the implementation of a large number of projects to improve energy efficiency and reduce polluting emissions in the developing countries of Asia.

The experience of ecological automobile manufacturing in Japan is of great interest as one of the main aspects of “green reforms.” Thus, Nissan introduced and began to manufacture the first electric car with the model name Leaf. It is significant that the market for this model includes not only Japan itself but also the United States and Europe.

TABLE I
GREEN COMPONENTS OF SELECTED NATIONAL STIMULUS PACKAGES

	China	Republic of Korea	Japan
Total green stimulus for announced period (US\$ billions)	51	36.28	12
Share of green components in total package (%)	8.7	81	1.62
Share of green stimulus in GDP (%)	1.18	3	0.28
Total green jobs expected to be created (thousands)	1500	960	1000
Total amount of green tax cuts (US\$ billions)	-	10.17	3.1
Total investments in green infrastructure (US\$ billions)	30.07	24.21	-

Source: [2]

The economic stimulus packages include green components (Table I), with investments channeled toward such sectors as renewable energy, energy efficiency, sustainable transport, waste management and recycling.

According to the table above, among the region's many stimulus packages, the Republic of Korea committed the largest share of its stimulus response to green components. Regarding the total green jobs to be created, China is leading in this case, which may be due to its large population. According to United States Census Bureau China together with India constitute about 37 % of the world's populations, and this number is continuously increasing. South Korea, again, is leading in the total amount of green tax cuts. Lastly, in total investments in green infrastructure, China leads by spending approximately US\$6 billion more than its neighbor South Korea. Japan is actively supporting and helping other countries in “green growth” directions. For instance, at the international level, Japan has made a significant contribution to the reduction of methane emissions in developing countries, particularly in Asia.

To sum up, “Green Growth” is a relatively new concept, and there are limited examples of success, mainly from industrialized countries. We could see from this section, that highly emerging and developed economies like China and South Korea are performing in the “green” direction

particularly with Western developed countries like the United States and France. More research is needed on this direction, especially in developing countries, which can generate various growth opportunities and lead to considerable economic benefits.

V. LONG-TERM VISION AND POLITICAL LEADERSHIP FOR SYSTEM CHANGE

Republic of Kazakhstan's development, for the next decades, is defined by the “Strategy 2050” where the direction is taken to “green economy”. The transition to “green growth” is one of the main options for sustainable development and also a kind of preparation for the upcoming third industrial revolution which ideas are based on the wide availability of renewable energy. The concept of “green growth” in the Republic of Kazakhstan was introduced by its government in the “National Sustainable Development Strategy” (2007) and adopted in the “Zhasyl Damu Green Development Strategy” (2010) with the objective of transition to a resource-efficient, “green economy.”

The strategies provide the framework for a national project that is focused on the replacement of outdated technologies with modern sustainable alternatives to ensure cost cutting and improvement of human health. In addition, it would create “green jobs” while providing a positive impact on the environment.

President Nursultan Nazarbayev outlined new approaches to overcome the global financial crisis through the partnership of countries, which is a collaborative work for the common good and security of nations, and well explained in his book “The strategy of radical renewal of the global community and partnership of civilizations [9].” One of its mechanisms may be the program “Green Bridge”, which was first proposed by Mr. Nazarbayev at the III Astana Economic Forum in 2010. According to him it is a continuation of the Seoul Initiative “Green Growth” which is a multilateral, cross-sectoral and voluntary partnership program. It will provide a stable and long-term basis for “green investments,” transfer of new technologies and innovations from industrialized nations to developing countries, in order to update the sectors of the economy and create new and long-term “green jobs.”

The main objective of the Astana Initiative is to enhance the environmental cooperation with Europe, Asia and the Pacific to promote the “green economy,” and strengthen the partnership of public and private sectors, NGOs (non-governmental organizations) and international organizations. The Astana Initiative “Green Bridge” was approved by the UN Economic Commission for Europe and the Economic and Social Commission for Asia and the Pacific.

To solve environmental and social problems, in our view, on one hand developed countries should share their experience in the latest “green technology,” by transferring their innovations and know-how, and on the other hand developing countries should provide favorable conditions for their implementation. All partner countries should contribute and offer free markets for goods produced by “green technology.”

Investing in natural capital, clean energy and ecological efficiency provide an opportunity for the new “green model” of economic growth and job creation, which are the bases for social development. Today, countries are already experiencing serious problems with unemployment and growing population. Thus, the challenge for us is to create enough jobs for people, especially the youth. Other aspects may include provision of equal opportunities for both men and women and equal wealth distribution.

Using the analyses of ESCAP on the process of pursuing “green growth” in their roadmap “Low Carbon Green Growth Roadmap for Asia and the Pacific” and implementing it to the case of Kazakhstan, we propose the following five steps to begin shifting toward “green growth” in the Republic of Kazakhstan:

1) Optimization of Quality of Growth and Maximization of Net Growth

The Republic of Kazakhstan needs to optimize the quality of growth and maximize net growth. Instead of just maximizing production (GDP) we need to focus also on improving quality of growth. This includes focusing on generation of employment opportunities, social inclusiveness and ecological sustainability. It requires socio-economic development strategies that can maximize net growth by reducing losses that degrade human, social and natural capital.

2) Change in the Structure of the Economy

“Green growth” in Kazakhstan requires changing the structure of the economy which includes prices, institutions, governance and lifestyles. We need to prioritize long-term plans on institutional arrangements and governance, regulation and behavioral change for low carbon “green growth.” A supporting legal framework and special committee for “green growth,” chaired by the head of state, are required. As we stated before on our research article, there is a need for environmental tax and fiscal reforms that would shift taxes from income to pollution while, at the same time, generate higher growth and employment.

3) New Infrastructure Planning and Design

The system change in the country for “green growth” requires new infrastructure planning and design. The eco-efficiency criteria should be taken into account in planning, designing and operations. More investments in public transport are needed. For instances, limiting private car use, shifting transport systems from road to rail, etc.

Existing buildings need to improve their energy efficiency, and new buildings should meet the “green building” (also known as “green construction” or “sustainable building”) standards that refer to the responsible and efficient use of energy, water, and other resources throughout a building's life-cycle, according to the WBDG (Whole Building Design Guide) program of the National Institute of Building Sciences.

Energy policy should be based on energy efficiency. A proper water resource management is needed to secure water resources, prevent urban flooding and conserve and restore the ecosystem. This could help to prevent disastrous catastrophes

like in the Aral Sea, one of the largest lakes in the world, which became 75% desert; the terrible floods in Kyzyl-Agash, in Almaty region, that caused great destruction by taking the lives of many persons and damaging and destroying many buildings; the persistent problems from floods and draughts in Syrdarya river in south of Kazakhstan, etc. Proper measures should be taken to prevent such catastrophes in the future.

Moreover, the waste needs to be turned from a cost into a resource. We may learn from the experience of industrialized nations in the area of waste management that focus on recycling. For example, Sweden which is among the most progressive nations on the planet has the innovative waste-to-energy program which burns garbage in order to generate heat and electricity. According to “Swedish Waste Management Association,” 20% of their district heating (residential and commercial buildings) and electricity for a quarter of a million homes are provided due to the efficient waste management system.

4) Turning the “Green Growth” Into a Business Opportunity

Greening the economy requires new and upgraded infrastructure, greening of current industries and creating new ones that produce “greener goods and services.” Government of the Republic of Kazakhstan needs to create the conditions for businesses to thrive in a “green economy.” This requires a mix of regulation, economic, fiscal and information instruments. First of all, public finances should be used strategically to leverage private investments. The government needs to promote transparency by environmental reporting, and consumer awareness through eco-labeling, which is identified by Global Eco-labelling Network as an overall proven environmental preference of a product or service within a specific product/service category. We need to adopt a long-term and transparent legislation and give businesses enough time to adjust to changes.

5) Implementing the Low-Carbon Strategies

Government of Kazakhstan needs to formulate the low-carbon development strategies. A low-carbon development strategy is a combination of national economic development and climate change planning into a more integrated and coordinated approach. In the future investments of R&D, the targets for the reduction of greenhouse emissions should be also strategically prioritized by the government. The low carbon development strategies require the political commitment at the top executive level.

We believe that with a proper system change the “green growth” can deliver a double dividend, which is higher growth with lower environmental impact. Without doubt, the long term vision and political leadership are essential in our case.

The Republic of Kazakhstan understands the necessity of “green growth” and already has taken the first major steps in the basic strategic process of formulation, implementation and control mechanisms. The president Nursultan Nazarbayev has approved the “Strategic Plan of Kazakhstan until 2020” based on the principle of “green growth.” According to the Strategic Plan, the objectives are to create a system of resource and

energy efficiency and to introduce renewable energy sources. By 2020, it is targeted to reduce the energy intensity of GDP by 25% and increase the share of alternative energy sources in total energy consumption by 3% [8]. In order to fulfill these obligations, Kazakhstan should take the path of “green growth,” i.e. achieve economic growth by maintaining the integrity of the environment.

VI. CONCLUSION

In 2012, the United Nations declared that by 2030 the world will need at least 50% more food, 45% more energy and 30% more water [10]. People in developing countries are mainly vulnerable to energy and food price volatility.

Today, many countries have already recognized the necessity of “green growth” and are taking important steps toward “greening” their economies, as we are entering a new era of technological innovations with high and volatile resource prices. There are many examples of effective approaches both at the local and community levels such as Low-Carbon Society Vision policy in Japan which significantly reduced the CO₂ emissions in the world, “green technologies” of South Korea that are reducing the greenhouse gas emissions, and mass production of solar and wind power in China that have been discussed earlier in this article.

Firstly, our research paper suggests that solving social and environmental problems can be achieved through properly designed environmental tax reform (implementing the eco-taxes and providing tax incentives) and payments for ecosystem services (PES). The reform requires shifting taxes from labor and income to resource consumption and based on the principle of an even distribution of income, and improving the livelihoods of farmers as environmental service providers.

Another key issue of “green growth” is the eco-efficiency, i.e., how to close the gap between economic and ecological efficiencies. From this research work, we also recommend that eco-efficiency should build a win-win synergy between the economy and the environment. There is a need in fundamental economic system change that will lead to the improvement of infrastructure, better designed prices, governance and the lifestyle itself. In our article we also suggested several policy options and strategies for solving problems of eco-efficiency and shifting to the sustainable development in Kazakhstan.

The economic policy and the environmental protection as well as natural resource use policy should be developed in order to complement each other. The management of innovations should play the key role in this case. The experience of the East Asian countries (People’s Republic of China, densely populated emerging economy, Republic of Korea and its industrialization process and Japan, the industrial/technological leader of the region) represent examples of successful “green reforms” that are characterized as innovative and ensures the competitiveness of such countries in the long term period.

We strongly believe that studying the experience of East Asian countries on “green reform” including eco-innovation and “green solutions” is essential to the case of Republic of Kazakhstan. These countries, characterized by growing

wealth, diversity and change, started developing “green reforms” and “green technologies” earlier than Kazakhstan and are leaders in the sustainable economic and social development in Asia. Their experience shows that the effect of “green reform” is innovative which promotes a radical restructuring of the national economy and ensures the competitiveness of the country in the long term period.

Moreover, in order to minimize the risk and uncertainty in system change we support the need of strategic alliances such as global collective actions and partnerships. These forms of effective international cooperation help to coordinate actions and manage ecological and economic interdependence. To illustrate, the initiatives for regional and international cooperation include the Seoul Initiative on Green Growth adopted at the MCED-5 in March 2005 and the Astana Initiative for Green Bridge adopted at MCED-6 in September 2010. Both of them aim to link Europe, Asia and the Pacific through “green growth.”

Furthermore, support the implementation of key strategic alternatives based on new policy development leaders of the business community in Kazakhstan must start enterprises and new ventures to work cooperatively on technological innovations in the field of “green growth.” New training and degree-programs at vocational schools and universities in Kazakhstan should focus on the “green economy” including courses on the managerial, strategic and technological issues.

We proposed the five steps to begin shifting toward “green growth” in the Republic of Kazakhstan. These steps include: optimization of quality of growth and maximization of net growth; changing the structure of the economy; new infrastructure planning and design; turning the “green growth” into a business opportunity; and implementing the low-carbon strategies. These steps are interrelated with each other and each of them is precisely discussed in the article. We need then to integrate them into socio-economic development planning. The political priority needs a more balanced investment in natural, human and social capital. Thus, long-term development plans should integrate the strategies on improvement of the economic, social and ecological qualities of growth.

To sum up, the realization of “green growth” requires gradual and ambitious transformation of the economic systems. The structure of the economy, comprising such as energy systems, infrastructure, buildings, market prices, regulations and lifestyles, etc. has to be re-engineered to resource efficiency. If we want to raise the standards of living of our growing population, we should start by improving the efficiency of using natural capital, and transforming our economy to become ecological efficient.

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