

PROGRAM

OF THE DEVELOPMENT OF GREEN ECONOMY

IN THE KYRGYZ REPUBLIC FOR YEARS 2019-2023

Introduction

Over a sustained period of time, the development of the Kyrgyz Republic, just like that of many other countries of the world, was aimed at achieving economic growth, mostly through an intensive and non-rational use of natural resources. The depletion of natural capital due to its active use was exacerbated by weak management that never allowed ecosystems to recover. In recent years, it has become apparent that progressing further along the path of economic growth without taking into consideration ecological and social factors is fraught with major hazards for both the current and future generations.

The definition of Green Economy does not replace the concept of sustainable development but is a foundation for the achievement of sustainability of development. Sustainability of development is the most important long-term goal, yet, to achieve it one must make the economy green. The United Nations Organization (hereinafter, the UN) Environmental Program defines Green Economy as an economy that enhances human welfare and ensures social equity while significantly reducing risks for the environment and its depletion.

In the Kyrgyz Republic, the understanding of Green Economy is defined as an economy that results in the improvement of people's welfare and the enhancement of social equity with the concurrent significant reduction of risks for the environment, while conserving and multiplying natural capital, efficiently using resources and incentivizing the conservation of natural ecosystems of the country. In a Green Economy, the growth of income and employment is ensured by state and private investments channeled into the reduction of carbon emissions and pollution, the creation of green jobs available to women and men as well as of an auspicious environment for the population's life and health, and the improvement of efficiency of the use of energy, resources and ecosystem services.

At the 2012 Rio+20 UN Sustainable Development Conference, the Kyrgyz Republic reiterated its commitment to sustainable development via the promotion of Green Economy priorities. For the Kyrgyz Republic, such an approach is a practical need since the national socioeconomic development is in large part based on the consumption of natural resources. Recognizing the importance of the transition to Green Economy, the country drafted and approved, via a Resolution of Jogorku Kenesh of the Kyrgyz Republic dated 28 June 2018, the Concept of Green Economy "Kyrgyzstan as a Country of Green Economy."

An intensive use of natural resources undoubtedly significantly contributes to the economic growth in the short run, however, it is important to understand that in the long run it has significant adverse implications: a wide-scale poverty

and deterioration of the population's health due to polluted air and poor-quality drinking water, as well as food and energy shortages.

As early as these days, the Kyrgyz Republic has been observing bothersome trends. The area of agricultural lands deemed degraded or subjected to degradation has been on the rise. Land degradation in the Kyrgyz Republic in large part is a result of an unsustainable use of agricultural lands, overgrazing, and inefficient systems of irrigation and management of water stock. Agriculture is the primary consumer of fresh water. Irrigation and agricultural water supply consume about 95% of the total volume of water used. At the same time, the extent of water loss during the transportation is very high – about 25% of the total water intake. Combined, these factors put our country before a risk of the aggravation of problems associated with providing our population with adequate amount of food.

Water resources are just as important for the provision of the Kyrgyz Republic with electrical energy. Despite the potential of renewable energy, these days the consumption of electrical energy in the Kyrgyz Republic already exceeded the volume of its production, which is a serious impediment to economic development, and therefore the relevance of energy saving and energy efficiency cannot be overstated.

Pursuant to the quantitative analysis of the International Renewable Energy Agency, the introduction of renewable energy sources stimulates economic growth, opens up new employment opportunities, improves human welfare and facilitates the achievement of climate-safe future.

Climate experts note an increase in the concentrations of carbon dioxide (CO₂) in the atmosphere compared to the pre-industrial levels (about 280 parts per million (ppm)). In 2016, the average CO₂ concentration (403 ppm) was 40% higher than in mid 19th century, with an average growth of 2 ppm per year over the past ten years. Two thirds of global CO₂ emissions from the burning of fuel is caused by the production of electricity and heat at 42%, and transport at 24%.

CO₂ emissions in the sector of production and consumption of energy account for 68% of global man-caused emissions of greenhouse gasses (GHG). Most of GHG is generated by the energy supply sector that includes all the processes of extraction, conversion, storage, transmission and distribution of energy, except for those that utilize secondary energy for the provision of energy services in the sectors of end consumption.

Pursuant to the International Renewable Energy Agency data on the Kyrgyz Republic, a reduction of CO₂ emissions is 56,6% of the 1990 level and a continuous growth since 1995, including an increase in emissions of 10% – up to 9,9 million tons CO₂ from the burning of fuel in 2015.

The expected climate change will render a significant impact on the population's life conditions and health, but it is the poor demographics, and especially women, children and the elderly that will become most vulnerable to it.

Throughout the world, climate risks are viewed as a threat to sustainable economic development. Amidst climate change, planning sustainable development becomes planning with consideration given to climate change adaptation. Natural disasters and other consequences of climate change have become more intensive and frequent, while short-term development measures (not taking into account the measures to prevent climate change consequences) can exacerbate the adverse impact of climate change.

An increased air pollution adversely impacts human health and ecosystem sustainability and enhances the corrosion of elements of technical infrastructure. Air pollution is a particularly acute and relevant problem in urban areas of the country. Experts estimate that more than 87% of primary pollutants are emitted into air by vehicles whose national fleet is growing annually. This results in a decrease in the population's fitness for work and, as a result, an increase in the population's health expenditures, as well as in a loss of ecosystems and an emergence of additional economic costs needed to sustain infrastructural objects.

There is research available that proves an adverse impact on humans of elevated concentrations of carbon oxide (CO), sulfur dioxide (SO₂), nitrogen oxides (NO_x), ozone and other substances present in the atmospheric air. Formaldehyde is one of the most toxic substances that adversely impacts human health.

Population growth and consumption increases stimulate the growth in the emergence of waste generated by production and consumption. The volume of the emergence of waste is closely related to the level of economic activity and reflects the structures of production and consumption that formed up in the society. Basically, more than 70% of the waste accumulated in dumpsters could be recycled and disposed of, and that only demonstrates an inefficient use of resources and potential losses in the economy. Landfills of the Kyrgyz Republic have accumulated more than 16 million tons of consumption-generated waste. Annually, one can observe a generation of about 520 thousand tons of waste. There are no precise data on accumulated waste, however, due to a lack of an organized transportation of, and accounting for, the quantities of the waste placed there.

Green Economy includes the issues of an equitable access to natural resources, the distribution of benefits and minimization of risks for various social groups. As research findings suggest, gender and poverty are interrelated and create mutually enhancing barriers to social change, hence, the transition to Green Economy is not a gender-neutral process and requires an all-encompassing consideration of the human dimension. Women and men contribute differently to the existing economic system, enjoy differing benefits, respond to different impulses, and prefer different solutions. Yet, it is imperative that, in the course of the drafting of policies, we take into consideration interests of women not only as objects of such policies but also as important agents with the implications of such consideration on the development, implementation and assessment of such policies.

Undoubtedly, the stimulation of the transition to Green Economy will require changes in the approaches to, and principles of, the regulation of financial flows, as well as effective measures of fiscal policies and public procurements. Taking into account the fact that the financial sector does not directly impact the transition to Green Economy, it can facilitate a rational use of natural resources, a reduction of costs of energy consumption, and a decrease in ecological and social risks via investments, the integration of requirements for zero-waste generation, harmlessness and high technologies.

The development of human capacity and the availability of qualified staff are keys to the transition to Green Economy and the introduction of national sustainable development principles. It is the high human capacity and public awareness that will enable us to successfully bring to fruition all our industry-specific and national development programs.

The combination of the factors above, as well as the exacerbation of risks and threats of the depletion of natural resources and environmental pollution, underscore the need for, and relevance of, the transition by the Kyrgyz Republic to Green Economy. The development of Green Economy in the country requires changes in the state policies aimed at stimulation of the following: energy efficiency and energy saving, production of energy from renewable energy sources, an enhancement of efficiency of the use of water and land resources in urban and rural areas, an ecosystem-based approach to adaptation to climate change, and a monitoring of, and accounting for, ecosystem services. Eventually, all the transformations required will have to be funneled toward a positive impact on the quality of human life and environment.

With consideration given to the above, the overarching goal of the Program is to create fundamentals for the introduction of Green Economy approaches to the development of priority sectors of the national economy.

I. Stable Natural Ecosystems

The central focus on Sustainable Development Goals was on their imminent link to sustainability. Sustainability means retaining and maintaining systems of livelihoods and provides for the determination of such a volume of consumption that, without destroying capital stocks, but including natural capital, i.e. natural resources, can be sustained at the required adequate level indefinitely.

The current trend of economic development is based on the achievement of GDP growth in the short run at the expense of depletion of natural resources. At the same time, neither losses from the environmental degradation nor from the natural capital depreciation that may in the long run result in a progressive unsustainability of the national economy.

Therefore, it is highly relevant to ensure sustainability of ecosystems and design sustainable development mechanisms thanks to which economic and social development could continue for generations.

Goal. Conserve and restore natural ecosystems and biodiversity adequate to sustain the ability of natural systems to self-regulate and compensate for consequences and man-caused activities.

Analysis of the current situation. Currently, the national economy mostly uses resource-destroying technologies. The existing natural resource use pricing mechanism does not take into account the adverse external costs and thus fails to set economic limitations on the excessive use of natural resources. However, an economic growth based on a mere and sheer use of natural resources can only take place within a finite capacity of ecosystems.

Biodiversity serves as a basis for the creation of the required conditions for ecosystems to function and ecological services to be provided which is what is critical for human activities and national development and what contributes to the socioeconomic development and achievement of SDGs including poverty reduction.

Overuse, reduction of areas of natural ecosystems will inevitably lead to a decline in quality of life and depletion of the economic resource base.

The Kyrgyz Republic is a mountainous country where almost 90% of the territory is 1500 m above sea level. Around 30% of the country's territory is represented by valleys and plains, 70% – high mountains that mostly belong to the Tian Shan Mountain Range with its relatively smaller part located in Pamir.

Despite the fact that the Kyrgyz Republic is a small country in terms of territory (only covering 0,13% of the global terrestrial area), it possesses a very high species diversity – about 2% of all flora and more than 3% of all fauna, with some plants and animals being endemic to the country.

Biodiversity of the Kyrgyz Republic is further represented by plants, viruses, bacteria, and animal organisms in various ecosystems and total more than 26 500 species.

The fragmentation of habitats and the reduction of their area as well as biocenological consequences of man-caused activities result in a decline in biodiversity. For instance, the Red List of the Kyrgyz Republic already contains 202 rare and endangered animal and plant species.

Over the past 100 years, the human pressure led to the disappearance of some species and the endangerment of others. Within the medium and large mammalian fauna, 1 species became extinct (tiger) and 15 are endangered; within the avian fauna, 4 species became extinct and 26 are endangered; within flora, losses seem to be the lowest: only one plant species became extinct, though 56 remain endangered. About 150 species of insects and more than 30 other invertebrates are endangered, while 2 species have been confirmed extinct.

The role of the majority of animal species in the functioning of ecosystems and the support of their stable existence has not been fully studied. Biodiversity stocktaking and monitoring are not run systematically, and when do run, mostly cover individual groups of animal species.

Accounting for conservation and restoration of natural ecosystems must become one of the priority directions of the work performed by the state and the

society since it is the ecosystems that will connect generations and guarantee future economic growth.

Despite their relatively small area (5,61%), forests of the Kyrgyz Republic play a key role in ensuring ecological stability and forming climate in the country. Forests of the Kyrgyz Republic are represented by four types: nut and fruit forests, spruce forests, juniper forests, and floodplain forests. All the country's forests are subject to nature conservation and environmental protection.

In order to increase the area of forests, the country annually plants more than 1000 ha of trees, of which 65-80 % on mountain slopes. A positive factor in ensuring ecological sustainability is an observable trend for an increase in the planting of forest species that facilitate the conservation of natural ecosystems.

The country started introducing the System of Environmental-Economic Accounts in the forestry sector. The accounting for forest resources allows showing the real contribution of the forestry to the country's GDP. Here, the share of the forestry sector in the GDP in 2014 totaled 0,05 %, while pilot estimations per forestry accounts demonstrated it at 1,24%. The increase mostly resulted from non-timber forest products.

Today, the main threat to forests stems from non-rational use by local communities of natural resources. A lack of arable lands and pastures, shortages of other sources of income compel local residents to actively use forest resources to sustain their lives. The human impact on forest resources is ever-growing and gradually results in forest degradation and, subsequently, deforestation.

Deforestation and land degradation are the main causes of the loss of biodiversity. The country has been observing a steady growth of the cattle headcount whose unregulated and non-systematic grazing lead to a destruction of ecosystems of pastures that account for 40% of the total area of the country and 85% of agricultural lands, with norms of grazing exceeded several times. In order to resolve this problem, measures need to be taken to aim to sustainable land (and in particular, pasture) and forest resource management.

Due to the use of land for purposes of agri-cenoses and urban landscapes, the area of plains and semi-deserts of valleys and inter-mountain basins with the elevation from 500 to 1000 m above seas level keeps shrinking. Those ecosystems are inhabited by plain and semi-desert flora and fauna including rare and endangered species: desert plants, reptiles, plain birds and mammals.

Unsustainable practices of land use and non-rational water use for irrigation and other agricultural needs trigger adverse changes resulting in waterlogging, salinization and erosion.

The use of agri-chemicals leads to a decline in the population of natural pollinizers (insects, small birds and bats); and once they get into soil, they aggravate soil mineralization which reduces the topsoil, moreover, since a lot of tillage lands are on slopes, traces of fertilizers are washed out more aggressively and chemicals contaminate a much larger area down the slope.

Mining activities taking place mostly in high-mountainous but particularly fragile and vulnerable ecosystems are a factor of human disturbance, destruction and pollution of natural ecosystems for the local habitats of flora and fauna.

Noncompliance with nature conservation laws, poaching, illegal fishing, logging, and collection of non-timber forest products entail a deterioration of biodiversity and a reduction of areas of natural ecosystems. A reduction in species population and isolation of the spatial distribution of their populations, in turn, leads to a disruption of the species genetic structure.

Collection of timber and non-timber forest products, fishing, medicinal herb gathering, and other forms of informal economy are available to the local public. At the same time, local residents engaged in such activities, as a rule, fail to understand the need for rational nature use that frequently implies some kind of restrictions and, sometimes, even financial investments into the forests used.

Women are still poorly represented at all levels of policy drafting and decision making in natural resources and rational use of nature, environmental conservation and protection and damage mitigation and elimination. Their experience and skills in promoting and monitoring of the right ways of nature use are still underutilized.

At the same time, women frequently play a leading role or act as true leaders in the promotion of ecological ethics, reducing the use of resources and proper disposal and recycling of resources to minimize waste and prevent overconsumption. Women also frequently contribute to nature use management including by running local awareness raising campaigns to promote environmental protection, especially in areas where such activities are crucial.

In several regions of the country, it is women that, as a rule, are the more stable members of their communities since men frequently have to work far from home delegating the responsibility of ensuring rational and sustainable allocation of resources in their households and communities.

It is also important because law-stipulated liability does not necessarily result in behavioral changes among violators of regulations, nor does it motivate the implementation of preventative environmental protection or the introduction of new more ecologically effective technologies. Amounts of fines and penalties are much lower than the actual costs required to cover the full extent of the damage caused.

Degradation of natural resources, environmental pollution, and losses of biodiversity diminish the capacity of ecosystems for self-restoration and recovery.

Climate change will affect all forest landscapes and biodiversity of the Kyrgyz Republic. It is presumed that as a result of air temperature rise, changes in water supply and a projected increase in CO₂ concentrations, major changes in forests and their biodiversity will take place at two levels: at the structural level (physiology and metabolism of trees and wildlife) and the level of ecosystem functioning.

The subsequent air temperature rise will entail a shift in vertical belts of vegetative communities. Desert and semi-desert plants will take over the niche of

mountain plains and meadow plains with a concurrent species replacement and biodiversity and forest density loss. At the same time, a certain extension of the vegetation period also becomes possible.

Migration of forests to higher elevations may lead to an increase in vulnerability of many plant species as a result of genetic and ecological impacts. Many tree species will not be able to adapt and will disappear due to climate change which will lead to a loss of related ecosystems.

Non-rational use of natural resources and a reduction of areas of natural ecosystems will inevitably lead to a decline in the quality of life of local residents and their communities, as well as a depletion of the resource base for the national economic development. Social consequences of a decline in biodiversity and degradation of natural ecosystems is difficult to underestimate, as they entail a decline in quality and way of life, a decrease of livelihoods, a deepening of the gap between the rich and the poor, and a rise in inequality between men and women.

Gender, just as poverty, is a major aspect of the decline in biodiversity and must be recognized as an important factor at the policy level. Basically, gender and poverty are interrelated and create mutually solidifying barriers to social change. A reduction of natural ecosystems is not gender-neutral and poses various risks for various social fabrics, for women and men.

The importance of the gender approach to policy drafting when considering biodiversity conservation is really about the fact that men and women contribute differently to biodiversity decrease and perceive, and respond to, consequences of ecosystem degradation differently. Men and women play different gender roles and exercise different responsibilities, possess differing access to resources and decision making.

The restoration and conservation of natural landscapes, ecosystems and biodiversity is the foundation for an auspicious human life and environment.

The existing system of specially protected natural areas does not fully ensure a due coverage and treatment needed to conserve the country's natural wealth. The primary problem in the effective functioning of specially protected natural areas (7,4% of the total area of the country) is a lack of an effective scientifically substantiated system of management as well as poor level of equipment and funding and a weak logistical base of such specially protected natural areas. They fail cover all the main critical natural ecosystems and do not form a reliable ecological shed and framework. Subsequent compartmentalization of the ecological space and a loss of natural links between populations and habitats are particularly hazardous. Therefore, one needs to expand and develop economic potential via the support of ecologically friendly business projects (ecological tourism, beekeeping, etc.).

Primary directions in the achievement of national sustainable development include the growth of an ecologically oriented business, enhancement of the social activity of the general public, formation of the public ecological worldview, and

realization of the joint responsibility for the conservation and retention of the natural and resource potential of the Kyrgyz Republic.

The socioeconomic development of the Kyrgyz Republic must be based on a preliminary ecological and economic assessment of natural resources with the identification of limits of their use in the short run.

Effectiveness of actions to prevent the loss of biodiversity will depend on the resolution of problems and underlying causes that exacerbate them. Important aspects will include whether or not real benefits of biodiversity and costs associated with its loss were reflected in economic and market systems.

The availability of information about the true value of ecosystem services and the integration of ecosystem services into national strategic planning will enable the country to make more effective and justified decisions, i.e. account for the national natural capital.

Objectives. In order to achieve this goal, the following objectives were identified: 1) regulate the pressure on natural ecosystems; 2) conserve and restore the natural environment; 3) use ecosystem services sustainably; 4) ensure the accounting for the value of ecosystems and biodiversity in the course of the planning and processes of development; 5) develop among the people an ecological culture and a habit of careful treatment of species.

1) Regulate the pressure on natural ecosystems

This objective will be achieved by way of establishing a dialog between sectors and subjects of activities supported by planning tools such as the assessment of human disturbance and economic tools such as stimulation including biodiversity aspects.

Measures will be taken to account for risks that men and women face as a result of measures taken as part of the UN Convention on Biological Diversity (Rio de Janeiro, 5 June 1992) to which the Kyrgyz Republic acceded pursuant to the Law of the Kyrgyz Republic dated 26 July 1996 #40. Additional measures will be channeled into raising awareness of biodiversity conservation decision makers about the importance of gender obligations assumed by the country as part of national and international processes;

2) Conserve and restore the natural environment

Measures will be aimed at promoting a landscape approach to biodiversity conservation, retaining a structural domestic biodiversity and the required habitats of natural ecosystems including by creating ecological corridors connecting specialty protected natural areas with various other areas of regulated nature use.

In the first place, the country plans to develop criteria, standards and indicators of natural ecosystem degradation, run studies of the state of natural habitats, biodiversity with a breakdown by primary ecosystems, prepare recommendations to establish limits of transformation or degradation of natural habitats. The biodiversity conservation monitoring will involve an equal number of men and women.

Measures will also aim to mitigate threats and eliminate direct and indirect causes of disappearance of species including by protecting habitats of rare and endangered species listed in the Red List of the Kyrgyz Republic.

Additionally, measures will be taken to build capacity of men and women in assessing the state of forests based on species-related indicators and supporting women's initiatives as part of ecosystem and biodiversity conservation and climate change adaptation efforts;

3) Use ecosystem services sustainably

Conservation of natural resources and biodiversity does not imply a refusal to use them. Rather, it is about rationally applying them to ensure sustainable development for current and future generations. If biological resources can be valued, investments in their conservation can be substantiated indicating prospective benefits (i.e. valuating positive consequences for the economy or an improvement in quality of life following the application of nature conservation measures).

Measures will be designed to apply the landscape approach to land use planning and forest resource sustainable management, design and implementation of tools to value ecosystem services. When valuating biodiversity resources, accounting for their use by both men and women will be ensured.

The forestry sector plans to draft integrated forest management plans for pilot forestry farms including by a wider delegation of responsibilities for management and administration to local levels. Measures also provide for designing mechanisms of stimulation of the use of certification and labeling standards;

4) Ensure the accounting for the value of ecosystems and biodiversity in the course of the planning and processes of development

Measures are aimed to create a nationwide system of economic valuation of biodiversity as a national asset. They provide for including the issues of biodiversity, including the valuation of biodiversity, into national and local development strategies, planning processes, Systems of National Accounts (SNA), which facilitates making biodiversity more relevant and signifying the importance of the accounting for costs and benefits associated with the conservation and sustainable use of biodiversity in decision making.

This objective is also aimed at improving the monitoring of, and methods of accounting for, biodiversity, the development of new technologies and inter-agency mechanisms of collecting and systematizing information and data on biodiversity conservation, including via electronic tools. The drafting of the national strategy and action plan to conserve biodiversity will ensure an equal and effective involvement of women;

5) Develop among the people an ecological culture and a habit of careful treatment of species

Measures to implement this objective are aimed at raising awareness about the value of biodiversity by way of conducting training in a formal context of education, e.g. in schools and higher education institutions in the area of

sustainable education as well as in an informal context, e.g. in museums, reserves, parks in the form of websites, movies and informational materials.

In order to raise awareness, the Program provides for information campaign facilitating not only awareness raising but also changes in the behavior and the implementation of specific activities. The Program provides for developing the practice of the engagement of volunteers and representatives of the interested general public in the resolution of challenges associated with biodiversity conservation, promotion of research collaborations among universities, scientific and public organizations in specially protected natural areas. Training of women in agricultural higher education institutions will be encouraged including in majors related to forestry (education quotas).

Expected results:

- the introduction of economic and other stimuli to motivate commercial entities to take measures improving biodiversity was worked out;
- a program of stage-by-stage restoration of degraded ecosystems was drafted;
- a network of specially protected natural territories was expanded up to 10% of the country's entire area and an economic capacity of the network of specially protected natural areas was strengthened thanks to a support by ecologically friendly business projects (ecological tourism, beekeeping, medicinal herbs, etc.);
- a methodology for the assessment and valuation of ecosystems services was drafted and integrated into strategic planning;
- contribution of the forestry sector to GDP was increased up to 0,1% by way of introducing a System of Environmental-Economic Accounting, and conditions for improving economic sustainability of forestry and development of recreation and other capacity of forest ecosystems were created;
- the forest-covered area of the country was increased by 5,7% by 2023;
- the area of plantations of fast-growing tree species was increased;
- a forestry information system was created;
- measures to fight poaching and illegal logging were enhanced;
- climate change adaptation measures in ecosystem and biodiversity conservation were designed.

II. Priority Directions of the Development of Green Economy in the Kyrgyz Republic

1. Green energy

Goal. Taking into consideration the fact that main components of a sustainable Green Economy include energy security, environmental protection, and energy for high-quality life, the goal of the energy sector by 2023 is to reduce energy-intensiveness of GDP with a concurrent increase in people's and economic entities' access to reliable and timely energy supply.

Analysis of the current situation. In the Kyrgyz Republic, the main fuel and energy resources include coal, gas, electrical energy, heat energy, hot water supply and fuels and lubricants. However, projections by leading energy agencies note a growing trend for the electrification of the energy sector as one of the main trends in the global energy system along with a rapidly deployed technology of clean energy and a reduction of its cost.

An assessment of the sustainable energy policy and regulatory support was conducted among 111 countries (representing about 96% of the global population) by the RISE Project – a World Bank initiative. The analysis covers three energy areas: access to energy, energy efficiency and renewable energy sources (RES). Per 27 indicators measuring governments' policies in RES and energy saving¹, Kyrgyzstan scored 64 points out of 100 possible. In an assessment system in which the higher score indicated a better preparedness for sustainable energy, the world-average score totaled 56, with Russia scoring 77, Kazakhstan – 78, Tajikistan – 60, and the average score for the region being 71. Therefore, Kyrgyzstan is lagging behind the average regional score by 15 points.

In 2016, the expenditures of a global consumer on electricity became almost equal to expenditures on oil. In future, we expect a transition to an economy oriented at services with a cleaner structure of energy consumption. This means that the share of electricity in the structure of consumption of fuel and energy resources will grow including in the sectors of transport and heat and hot water supply.

The established generating capacity of electrical stations in the Kyrgyz Republic totaled 3 938,75 MW in 2018, of which up to 90% of the generation came thanks to Hydro Power Plants (HPPs) located mostly in the south of the country which results in a need for major costs of energy transmission and distribution. RES are represented by small HPPs of total capacity of 46,75 MW that generate 1,5% of electrical energy. This leads to the energy sector becoming dependent on the changing river runoff that, in turn, depends on climate.

Over 2010-2017, the energy sector of the Kyrgyz Republic reached a certain progress: the 1st turbine block of the Kambarata HPP-2 of capacity of 120 MW was commissioned, a 110 kV Aigultash-Samat OHPL was commissioned, 500 kV substations Datka and Kemin were built, 500 kV and 220 kV Datka-Kemin OHPL in the south of the country were built with a total length of 248 km, thus ensuring the country's independence from energy systems of neighboring countries and creating preconditions for further development of the capacity of the energy system of the Kyrgyz Republic. The modernization of the Bishkek City Heat Power Plant was completed with capacity increased to 812 MW, and the rehabilitation of the Toktogul HPP is underway. A reduction of electrical energy losses from 34% to 18,6% was achieved in 2017, while the global average is at

¹ RISE Project – a World Bank initiative: Regulatory Indicators For Sustainable Energy, A Global Scorecard for Policy Makers, 2017 International Bank for Reconstruction and Development/The World Bank, Sudeshna Ghosh Banerjee, Alejandro Moreno, Jonathan Sinton, Tanya Primiani, Joonkyung Seong

8,26%², with normal loss rate considered to be between 6% to 8%³. The introduction of smart meters and the Automated Metering and Information System of Commercial Accounting for Electrical Energy resulted in a reduction of commercial losses from 21% to 1,0%.

At the same time, pursuant to key indicators of the International Energy Agency, energy intensiveness of the GDP of the Kyrgyz Republic is rather high and totaled 0,66 TOE⁴ per USD 1000 of GDP in 2015, with the global average being 0,18 TOE, in OECD countries being – 0,11, in China – 0,33, in Eastern Europe and Eurasia – 0,4, in Kazakhstan – 0,42. Therefore, it is crucial and relevant for the Kyrgyz Republic to pursue an energy-saving policy to increase energy efficiency and decrease energy intensiveness of its GDP.

Increasing energy efficiency on the global scale already allowed consuming 12% less electricity in 2016 compared to 2000. Progress in energy efficiency allowed households throughout the world to spend 10-30% less money on energy⁵. Energy efficiency is an important tool of protecting public health and the environment. Energy efficiency reduces emissions of GHG and decreases the amount of fossil fuels needed to satisfy needs for energy. Emissions render a direct impact on the environment and human health. Energy efficiency also minimizes the impact of natural disasters on vulnerable demographics and enhances reliability of electrical grids and networks while helping avoid blackouts and disconnections and ensuring resilience in the face of storms, floods and other natural calamities⁶.

Achieving the goal set for green energy encounters a range of challenges and obstacles. Here, a growth of demand for energy carriers exceeds their supply which is further aggravated by a lack of reserve capacities and dependence of electrical energy production by large and small HPPs on natural and climatic conditions. Starting in 2014, electrical energy consumption in the Kyrgyz Republic exceeded domestic generation by 1,9% - 5,3%, with the exception of high-water seasons of 2017-2018. The volume of imports of electrical energy in 2015 totaled more than 1,18 billion kWh for the total amount of more than KGS 5,2 billion.

The existing generating capacities of the Kyrgyz Republic are situated in areas far from their primary consumers while sporting a significant drawback in the decentralized generating capacities of RES. At the same time, the Kyrgyz Republic possesses a major capacity for RES. Technically feasible hydropower capacities are estimated at 142,5 billion kWh, while the economically substantiated (generating) capacities are estimated at 60 billion kWh. Capacities of the small hydropower sector total around 5–8 billion kWh per year (up to 13%

² <https://data.worldbank.org/indicator/eg.elc.loss.zs>

³ IEA ETSAP - Technology Brief E12 – April 2014, https://iea-etsap.org/E-TechDS/PDF/E12_el-t&d_KV_Apr2014_GSOK.pdf

⁴ TOE – Ton of Oil Equivalent

⁵ The 2018 International Energy Efficiency Scorecard, Fernando Castro-Alvarez, Shruti Vaidyanathan, Hannah Bastian, and Jen King, June 2018, Report I1801, American Council for an Energy-Efficient Economy.

⁶ The 2018 International Energy Efficiency Scorecard, Fernando Castro-Alvarez, Shruti Vaidyanathan, Hannah Bastian, and Jen King, June 2018, Report I1801, American Council for an Energy-Efficient Economy.

of the total capacity) and the use of small rivers is one of the more relevant directions in the business of the prospective utilization of the country's hydropower resources.

The share of RES in the total end consumption of energy in the Kyrgyz Republic is insignificant and in 2017 totaled 1,5% of the total electrical energy generation. This share is produced fully by hydropower sector that in 2017 grew by 3,25 MW (7,5%) and whose total established capacity was 46,75 MW, with the overall established capacity estimated at 3 938,75 MW.

Energy saving and energy efficiency policies in the Kyrgyz Republic are developed and pursued slowly although the country possesses major potential in this area. The Energy Saving and Energy Efficiency Policy Planning Program of the Kyrgyz Republic for Years 2015-2017, as approved by Resolution of the Government of the Kyrgyz Republic dated 25 August 2015 #601, that provides for a section on energy saving and energy efficiency in buildings was not fully implemented. The country lacks programs for the reconstruction and repair of buildings of cities and regions.

Another serious problem is a lack of real mechanisms stimulating prospective participants of the energy saving process including an investment deficit and a poor support by the government in the implementation of the energy saving policy. As a result, the country sees a growth of the gap between current and optimal consumption of energy that could have been made available thanks to using existing energy-efficient measures and technologies.

Currently, the housing stock of the Kyrgyz Republic contains 82,5 million m², of which 45% are in urban areas, and 55% – in rural areas. Overall, 98% of the entire stock is private-owned, with the stock of public and administrative buildings in the country totaling 7,7 million m². The population and stock of residential and public buildings and the price of energy carries all consistently grow. Here, the population of the Kyrgyz Republic between 2009 – 2017 grew by 735 thousand people or by 14%. At the same time, the residential housing stock grew by 27%.

Overall, one can observe a low energy efficiency of the housing stock which is confirmed by the fact that 48% of the energy generated in the country is spent on heating. Characteristics of buildings built primarily without any considerations for insulation bring about the high actual energy consumption: in individual houses – more than 350 kWh/m², in multi-story apartment buildings – 140–174 kWh/m², which is 2–3 times higher the norm and 3–4 time higher than in similar buildings in developed countries. In an average house or building, due to low energy efficiency of walls, windows, and heating systems, losses of heat energy reach a whopping 70%, which entails high heating costs.

At the moment, the technologies used in designing, building and maintaining new buildings, as a rule, fail to aim for mastering state-of-the-art technologies but rather attempt to keep the energy efficiency level currently available. An obsolete and inefficient regulatory and technical framework of

norms and standards of the past century in used in designing new buildings. For instance, standards of 1978 are used for sources of heat energy; and those of 1991 for systems of heating, ventilation and air conditioning.

The situation is even more alarming if one looks at the existing stock of buildings since their capital repairs would require significant funds. Individual groups of buildings in use (residential houses, schools, kindergartens, etc.) need capital repairs or reconstruction. Basically, more than 85% of the housing stock, 93% of schools, 81 of kindergartens, 77% of administrative buildings, and 60% of hospitals and family medicine centers were built prior to 1991 when energy saving was not a relevant issue. The highest potential (up to 40% energy saving rate) for energy saving is observed in the stock of residential and public buildings built as per typical designs using industrial methods and precast structures.

One also needs to note a relatively low public awareness about opportunities and advantages provided by energy-saving doing of business and leading of lifestyle. One of the most widespread problems is the low priority of energy issues compared to alternative needs of consumers. Energy-efficient products, as a rule, are costlier and less known compared to alternatives.

There is also a persisting gap in the training of energy sector personnel. Pursuant to findings of the energy sector research, in secondary and higher vocational education institutions, 83,1% of students are men and only 16,9% are women. Gender statistics suggest that employment in the energy sector is significantly gender-biased for men (90,5%), which results in a segregation on the labor market and solidification and reproduction of inequality.

Overall, population growth is a determinant in the demand for heat and electrical energy since about 86% of heat energy and 57% of electrical energy are used for utilities, cultural and domestic and other needs (including their release to the public).

According to UN projections, by 2025 population of the Kyrgyz Republic will grow by 8,7%. Given the average growth of electrical energy consumption of 3,58% per year between 2012 and 2015 at a population growth of 1,85%, one can expect a growth of demand for electrical energy by 2023 of at least 16%, and with consideration given to the demand on part of economic entities – up to 20%, which is consistent with global trends. Pursuant to the global energy projections WEO-2017, as drafted by IEA, one can expect a growth of global energy needs by 2040 of 30% and an increase in electrical energy needs of 60%.

The existing tariff policy for electrical and heat energy does not correspond to costs of energy companies and hinders the development of the country's energy sector. Factual average tariffs for electrical energy for households are significantly subsidized. Here, the average tariff for electrical energy is KGS 1 per kWh for households and KGS 2,2 per kWh for companies with the average tariff being KGS 1,4 per kWh and the cost of generation, transmission and distribution totaling KGS 1,69 per kWh in 2017. Loses of the energy sector in 2017 totaled KGS 1,8 billion, while accumulated losses totaled KGS 6,7 billion.

This circumstance results in a restriction of opportunities for the accumulation of finance needed for technical modernization which, in combination with the manifestations of poor management practices, leads to an increase in accidents and a reduction in the quality of electrical energy supply. Shortage of funds among fuel and energy companies triggered by lower-than-cost tariffs also limits opportunities for full-fledged efforts to modernize and reconstruct the existing energy objects and build new ones.

Up to 80% of accident-related disconnections of consumers from energy supply result from failures of networks and grids of 10(6) kW. About 50% of the primary stock of networks and grids are operated at excess their established useful life, while their physical wear rate is oftentimes critical. During the autumn and winter time, network and grid overload is frequently observed due to an almost threefold increase in electrical energy consumption by the general public compared to summertime. In 2017, the number of accident-related disconnections in the Electrical Stations, OJSC totaled 37 occurrences, National Electrical Grid of Kyrgyzstan, OJSC – 374 cases, and energy distribution companies – 6,1 thousand.

Reforming the tariff policy is complicated by a risk of social grievance due to the excessive politicization of the energy industry and non-transparency of information about the state of the energy sector. Pursuant to the latest poll of the general public's awareness about energy sector reforms⁷, 65% of respondents stated that tariffs should be reduced even though their expenditure on electrical energy supply only account for a modest share of their total household expenditures – between 2,3% and 2,6%.

Policies run in the energy sector do not take into account relations between the suggested measures to develop the energy sector and the state of the environment, healthcare, economic growth and social aspects of national development. It is clear that energy sector development efforts that are implemented without consideration given to global trends and SDGs will threaten the achievement of the national strategic goals.

Objectives. Taking into consideration that obstacles and barriers above, the achievement of goals set for the energy sector will be ensured by the attainment of the following objectives: 1) improve the system of evaluation and monitoring of the state of the energy sector; 2) improve the energy policy; 3) enhance transparency of activities of the fuel and energy complex and ensure profitability of energy companies; 4) enhance efficiency of energy consumption; 5) enhance energy efficiency of buildings; 6) increase the share of renewable energy sources in the total end energy consumption; 7) enhance public awareness of energy saving and renewable energy sources.

1) Improve the system of evaluation and monitoring of the state of the energy sector

⁷ Survey of public awareness about energy sector reforms in the Kyrgyz Republic, M-Vector, 2017.

In order to fully assess the potential of energy efficiency, RES and Green Economy, one needs to identify key indicators of green development in various sectors and monitor the data to secure relevant information about trends in the energy sector that can facilitate planning an adequate decision making process.

Given that without changes and proper accounting, it will be impossible to create integrated energy sector models, a Matric of Indicators of Monitoring and Evaluation of the Transition of the Kyrgyz Republic to Sustainable Development will be augmented by SDG 7 indicators, energy security indicators⁸ and other required Green Economy indicators⁹.

Additionally, energy saving and energy efficiency indicators will be created, as well as uniform forms of reporting and practices of annual open reporting and information for the general public by large companies and commercial entities, state bodies and bodies of local governments;

2) Improve the energy policy

As part of this objective, one needs to analyze the state of normative legal acts and strategic documents in the energy sector and the regulation of fuel and energy complexes and harmonize laws with international commitments and national strategic development goals. Amendments will be made in Laws of the Kyrgyz Republic “On Energy” and “On Electrical Energy” to account for the altered nature of the industry’s organizations as well as identify more clearly and solidify powers of organizations in decision making.

Creating an energy sector integrated development planning model that takes into account causal relationships and mutual impact of various economic sectors will allow selecting, implementing and adjusting, in a timely manner, more effective measures to resolve objectives in the energy sector.

As per results of the energy sector integrated development planning, the draft Concept of Development of the Fuel and Energy Complex of the Kyrgyz Republic till Year 2040 will be amended by appropriate provisions and target indicators in energy saving and RES;

3) Enhance transparency of activities of the fuel and energy complex and ensure profitability of energy companies

One of the main measures to remediate the energy sector is the design and gradual introduction of a tariff policy that is based on the recovery of the cost of generation of heat and electrical energy supplied at target subsidies to low-income population government social protection programs.

Sound actions to raise awareness of the general public about the real state of the energy sector, a substantiated tariff and improving efficiency, transparency and accountability of energy companies will make it possible to gradually reduce and eliminate losses in the energy sector.

⁸ Assistance to the Government of the Kyrgyz Republic in Designing Interrelated National Indicators of Water, Energy and Food Security, Galina Samokhlyob – National Statistical Committee of the Kyrgyz Republic, Abdybay Jaylobayev, O. Murzagatov, Management and Editing by: Kanykey Orozbayeva - National Statistical Committee of the Kyrgyz Republic, draft 2017.

⁹A Guidance Manual for Green Economy Indicators, UNEP, http://www.un-page.org/files/public/content-page/unep_indicators_ge_for_web.pdf

In order to improve transparency and accountability, a policy of quarterly provision of information about the state of, work in, and plans of, the development of the energy sector will be pursued along with recommendations on energy saving and the introduction of RES drafted.

Additionally, the country will mandatorily publish technical and economic indicators and financial reporting of energy companies on their websites, on the website of the National Energy Holding Company, OJSC and in the media to ensure independent analysis of the energy sector's performance and its transparency and accountability.

Outreach should contain evidence determining the interrelations among tariff raising, improvement of the energy sector and stronger protection of the low-income and vulnerable demographics;

4) Enhance efficiency of energy consumption

A reduction in energy intensiveness of GDP of 10% by 2023 is expected to be reached via an increase in the efficiency of energy consumption. Energy efficiency is called “the first fuel” that frequently is a less costly way to satisfy additional emerging demand for energy. Investments into energy efficiency and policies aimed at supporting energy efficiency help save people's money, decrease dependence on imports of energy and reduce environmental pollution.

Improving quality and reliability of energy supply to consumers amidst insufficient own resources of natural gas and oil, as well as shortages of electrical energy generated by HPPs, especially during wintertime, requires an intensive introduction of energy saving efforts, raising awareness of energy consumers about the state the energy sector, improving the energy sector system management, and an expedited introduction of additional generating capacities including large HPPs and RES.

One needs to draft an energy saving program of the Kyrgyz Republic with clearly established national goals of energy saving: a reduction in the total energy consumption which in most developed nations exceeds 1%. For instance, the Russian Energy Saving Program provides for an annual decrease in energy intensiveness of 1,5%.

The development of the market of energy service companies and amendments to the Law of the Kyrgyz Republic “On Energy Saving” and the drafting of bylaws to stimulate operation and performance of energy service companies in the state, municipal and private sectors will facilitate a decrease in energy intensiveness of GDP.

Measures aimed at reducing water consumption may help reduce energy consumption. Since water and energy are interrelated and cross-cutting on both the supply side (generation of electrical energy / wastewater) and the end consumer side (residential, commercial, industrial, and agricultural sectors), this link between energy and water manifests itself in a large volume of water needed to produce and deliver electrical energy.

Pumps, engines, and construction equipment in water supply and sewerage networks consumer a lot of energy. On the end user's side, energy and water are

inseparable in houses, companies and manufacturing facilities, and an increase in water efficiency results in energy saving;

5) Enhance energy efficiency of buildings

Enhancing energy efficiency is a matter of organization, strategies, methods and state support of such efforts. Energy saving can be primarily implemented thanks to the introduction of corresponding technological solutions when even the simplest building renovation projects yield up to 40% in energy saving.

In order to achieve this objective, norms provided for in a respective legislative framework will be realized to assess buildings and facilities for energy efficiency and energy certification. Additionally, one would need to revise the legislative framework of the Kyrgyz Republic with consideration given to requirements for energy saving, energy efficiency in the construction industry and drafting of new technical regulations.

Important changes include providing companies and organizations that consume of energy carriers, both partially and fully funded from the state budget, with opportunities to fully dispose of their saved energy resources.

In order to ensure proper conditions for quality capital repairs and reconstruction of the existing stock of buildings including the enhancement of energy efficiency of buildings with consideration given to improving the microclimate in them, as well as cost-efficiency and a reduction in consumption (use) of energy resources and GHG emissions, one needs to create a sustainable system of legal regulation. The Housing Code of the Kyrgyz Republic must provide for a mandatory payment into cumulative funds intended for capital repairs, and criteria for the priority order of buildings and facilities subject to capital repairs must be drafted with the program of capital repairs of such buildings to be piloted in 2020.

By 2021, bodies of local governments must draft a program of capital repairs of the housing stock situated in their jurisdictions with the indication of the name of the responsible official and a system of enforcement and compliance. Additionally, one needs to draft standards in energy safety for social, educational and healthcare buildings and facilities.

Mechanisms for securing loans for capital repairs, energy saving projects and efforts and subsidization of energy audits and procedures of energy certification of buildings will be designed along with mechanism for cooperation with energy service companies.

Additionally, technical specifications for capital repairs of typical buildings will be drafted to implement which one would be able to use monies from the cumulative funds above, as well as of typical designs of energy-efficient private houses that can ensure an efficient investment into the enhancement of energy efficiency of buildings and facilities.

This objective also provides for drafting bylaws to operate and maintain residential houses and municipal buildings. This will allow creating a modern system of efficient operation and maintenance, introducing an energy

management system based on ISO 50001, which will result in energy consumption and GHG emission reduction.

In order to prevent, identify and counter violations by bodies of state authorities, bodies of local governments, legal entities, individual entrepreneurs and citizens of provisions and requirements as set out by laws of the Kyrgyz Republic, a system of state and municipal housing supervision will be introduced.

Measures to improve staff capacity at all levels including designing, construction, operation, state control, municipality performance and associations of house owners will also have to be implemented as part of this objective. In particular, training programs and curricula will be drafted for HEIs to train and retrain specialists in RES. Quotas for women in the fuel and energy complex staff training and retraining systems will be provided, and access of women to information about, and technologies of, RES and energy efficiency will be made available including via targeted training;

6) Increase the share of renewable energy sources in the total end energy consumption

Diversifying RES generating capacities will allow improving resilience to climate change and provision of solar, wind and other district-specific generation in accordance with locally available resources.

In order to develop RES in the Kyrgyz Republic, one will identify the advisability of their introduction at the district level based on estimation of the cost of electrical energy supply via national networks and grids, potential and cost of RES that can be installed in a given district. The assessment of costs and benefits from the introduction of RES compared to energy supply from existing national networks and grids will allow drafting recommendations for each district with consideration given to projected increases in energy consumption till year 2040.

Other important areas that many private households are interested in include energy micro-generation on the basis of RES that improves rationality of energy resource use and allows developing a technological practice of the dual “network-consumer” interaction.

Simple mechanisms will be designed ensuring access for private households to networks as sellers and guaranteeing a purchase (uptake) of excess electrical energy that emerges at owners of such energy generating objects;

7) Enhance public awareness of energy saving and renewable energy sources

This objective is focused raising awareness of end consumers about the need for energy saving, opportunities to choose between traditional and alternative energy sources and creating financial opportunities to stimulate the transition to clean energy sources.

In order to achieve this objective, one needs to implement a wide-scale awareness raising campaign to raise public awareness about energy saving and RES and ensure the drafting and introduction of educational modules on green energy into secondary school and HEI curricula.

In addition, enhancement of qualification of state and municipal employees in energy saving and RES will be conducted by way of drafting educational modules and annual training.

Bodies of local governments and respective responsible state bodies will systematically run awareness raising campaigns for target audiences with consideration given to relevant information channels, gender specificities and needs including practical recommendations on the saving and rational use of energy resources, the need for a reduction of CO₂ emissions, benefits of energy saving and the transition to clean and energy-efficient technologies for human health.

Expected results:

- GDP energy intensiveness was reduced by 4,5% by 2023;
- energy consumption of residential, public, administrative, multi-functional and non-production building was reduced by 10% by 2023;
- distribution losses were reduced to 13% by 2023;
- commercial losses were reduced by 100%;
- RES objects of total established capacity of at least 50 MW were commissioned;
- transparency, management effectiveness and financial sustainability of energy companies were ensured allowing them to serve and modernize, in a timely manner, the existing generating capacities and objects of transmission and distribution infrastructure;
- an inflow of more than USD 300 million worth of private investments into the energy sector was ensured by 2023;
- reliable and uninterrupted supply of all types of energy and fuel resources to the population was ensured;
- the population supports and actively introduces energy-efficient technologies and RES;
- the country runs a sustainable and effective system of personnel training and qualification enhancement;
- the business community and population use and introduce energy-efficient technologies.

2. Green agriculture

Goal. Ensure the provision of the population by ecologically clean food supply via a sustainable resource management and development of resource-saving, organic and climate-resilient agriculture.

Analysis of the current situation. In the Kyrgyz Republic, agriculture remains to be one of the priority areas of the national economy's real sector. It is represented by a multi-faceted agricultural production: plant farming, livestock farming, water management and irrigation, plant protection and quarantining, mechanization, veterinary science and practice, land use, and food and processing industries.

More than 65% of the country's population resides in rural areas. The agri-industrial sector is one of the industries ensuring food security of the country (with the agricultural production accounting for about 32% of employment where 40% of all jobs are held by¹⁰). In the overwhelming majority of cases, decisions in techniques of crop farming are made by heads of households (with 80% of such households being those that are led by men¹¹).

Agriculture accounts for 14% of the country's GDP. In the total volume of agricultural production, livestock farming accounts for 48%, plant farming – around 50%, forestry, fishing and services – about 2%. The main volume of products is provided by farms and individual ancillary household gardens (96%). The country has more than 428 thousand farms of which 20,2% (85 043) are women-led.

Agri-climatic conditions in the country are quite auspicious for growing wheat, corn, barley, potatoes, cotton and other crops. However, changes in the hydrology and temperature triggered by climate change (late spring and early autumn frost and chill, high temperatures, etc.), environmental pollution and unfavorable ameliorative situation in some districts of the country restrict the full use of agri-climatic and land resources¹².

The Kyrgyz Republic, being a mountainous agrarian country, naturally faces many risks inherent to mountainous ecosystems. Primary problems preventing the achievement of the goal include soil degradation, non-rational use of water and land resources and an adverse impact of climate change. Additionally, factors hindering the development of resource-saving and organic agriculture include the existing legislative framework, a poor development of voluntary product certification systems, and risks associated with access to finance, technologies, findings of relevant research and a general lack of timely information needed for proper managerial decision making.

Development of agriculture directly depends on the state of soils resources that are the main means of agricultural production. The existing traditional crop farming techniques significantly contribute to soil degradation and pollution.

As a result of the excessive pressures on soil, noncompliance with crop rotation regimen, and insufficient remediation activities, soil fertility is decreasing. The analysis of humus content in topsoil demonstrated that due to the observed climate change and technologies used, the content of humus in topsoil is decreasing in all provinces of the country.

Findings of soil studies show a trend for a decrease in the humus content on arable lands of about 10-30%, entailing a reduction in soil fertility (degradation) of arable lands.

Primary problems leading to a decrease in soil fertility and an increase in soil degradation include: salinization, alkalinity, desertification, waterlogging, stoniness and erosion. Here, the country sees salinization, to various degrees, of

¹⁰ Women and Men of the Kyrgyz Republic. Statistical compilation. 2017.

¹¹ *Gender in Societal Perception*. Bishkek 2016.

¹² *Third National Communication of the Kyrgyz Republic to the UNFCCC*. – B.: El Elion, LLC, 2016. – p. 274.

163,8 thousand ha of lands or 13,9%, water erosion – 714,6 thousand ha or 59,3% of the total area of arable lands (Table 1). On piedmont irrigated lands with elevated slopes, in the case of unregulated irrigation, up to 40-120 tons of humus layer is washed away which only totals 20-40 cm of the topsoil.

The threat of irreversible loss of soils of piedmont lands on an area of 700 thousand ha of irrigated lands is quite acute and real, including on an area of 300 thousand ha on lands with a slope of more than 20 degrees. A lack of soil moistening can also adversely impact crop productivity. Overall, varying degrees of soil degradation reduce productivity of agricultural crop productivity by 20-60%.

Table 1. Qualitative characteristics of lands in the Kyrgyz Republic

Negative soil properties	All lands of agricultural companies, thousands of hectares	Including arable lands, thousands of hectares
Salinized	1 190,8 (11,1%)	163,8 (13,9%)
Alkalinized	480,2 (4,5%)	99,3 (8,2%)
Waterlogged	138,6 (1,3%)	14,6 (1,2%)
Stony	4 021,2 (37,5%)	346,7 (28,8%)
Wind-eroded	5 689,8 (53,1%)	651,1 (54,0%)
Water-eroded	5 626,8 (52,6%)	714,6 (59,3%)

In essence, of the total area of pastures of 9 009,3 thousand ha, pasture users only use 96% of them. The maximum productivity of hay meadows and pastures is relatively low and totals 25 mh/ha for summer pastures, which is lower than productivity achieved in developed countries. For instance, in the Netherlands, productivity of hay meadows and pastures totals 120 mh/ha, in France – 45-50, in Germany – 60, in Belgium – 80, in Denmark – 90 mh/ha of dry mass.

In many ways this is due to differences in natural and climatic conditions, but effective pasture management practices in developed countries account for a large share of this difference.

The degradation process is increasing every year and in some parts of the country has become irreversible. Pursuant to findings of the monitoring conducted by the SDI Kyrgyzgiprozem, it was established that degradation affected more than 60% of pasture area: 18% – heavily degraded; 5% – eroded to various extents; 4% – located on steep slopes (40° and more); 17% – became bushlands; 13% – fouled by non-feed grass; 16% – became stony lands; 30% – conditionally clean.

Pursuant to findings of the analysis of productivity of pastures as obtained from various sources, productivity of summer pastures in early 1960's totaled 8,6 mh/ha of dry mass, in 1990's it decreased to 5,7 mh/ha, and according to the latest data (as at 2004), the average productivity of summer pastures was registered at 2,7 mh/ha. Over the past decade alone, a productivity drop totaled 36%.

Currently, about 25% of pastures are mildly or severely degraded. The area of degraded winter pastures increased from 12% to 16%, that of degraded spring and autumn pastures (intensively used) – from 16% to 26%. The area of eroded pastures and bushlands increased too. Total bushlands increased by 40% and totals 1 500 thousand ha. The area of intensively used grazing pastures increased significantly, especially among spring and autumn pastures, while in many high-mountain regions the grass stand is heavily pressured by non-systematized grazing and is severely overgrazed. Intensive grazing resulted in a significant change in grass stand composition now biased toward a decrease in feed grass and a rapid increase in weeds and other non-feed grasses.

Currently, about a third of the area of pastures is choked with poisonous, harmful and inedible plants and grasses. The situation is further exacerbated by the fact that it is mostly high-productivity and high-precipitation meadow and plain pasturelands that are so affected where weeds now account for 70-90% of the grass stand. Over the past 20 years, the area of conditionally clean pastures decreased from 3 544,8 thousand ha to 2 741 thousand ha.

Pursuant to expert assessments, in the first half of the pasture season (between April 15 and July 15), the pressure of the actual conditional cattle headcount on pastures is around 64% of the total area of pastures, since productivity of pastures at that time is higher than in any other season and totals on average 22 mh/ha. At the same time, during the second half of the pasture season (between July 16 and October 15) pasture productivity decreases to 10 mh/ha resulting in an overgrazing with the cattle-induced pressure on pastures rising to 140%, which is a key factor in the pasture degradation process.

Negative contributions to soil cover degradation is also made by non-rational use of pastures when scientifically substantiated systems of pasture rotation are not applied. At the same time, the inability to apply scientifically substantiated methods of crop turnover in plant farming and pasture rotation is associated with small-scale land use and its low-volume production. Additionally, lack of knowledge and experience among farmers and low effectiveness of government policies in management, monitoring and sustainable use of pasture play a role.

For purposes of pasture management, in compliance with the Law of the Kyrgyz Republic “On Pastures,” a total of 454 pasture committees were created. Pasture management is heavily gender-segregated – 98% of pasture committees are led by men, which is a major underutilization of women’s capacity in, approaches to, experience and practices in natural resource management and further solidifies unsustainable practices.

The Kyrgyz Republic possesses a sufficient volume of water to expand and reclaim lands, as well as to increase productivity of irrigated lands provided that water resources are used rationally¹³. The capacity of irrigation is estimated at around 2,25 million ha. At the same time, the area of irrigated water is decreasing

¹³ *Irrigation in Central Asia in Figures*. Aquastat survey – 2012. Food and Agricultural Organization, Rome, 2013.

and while in 1996 irrigated the area of lands totaled 1 077 thousand ha, it currently only totals 1 020 thousand ha. As per UN experts' estimates, in order to satisfy its food needs, a country must possess at least 0,3 ha of irrigated land per capita. In the Kyrgyz Republic, however, the value of this indicator is less than 0,2 ha.

The territory of the Kyrgyz Republic can be split into two hydrological zones: 1) a zone of runoff formation (mountain) that covers 178,8 thousand km² or 87% of the territory; 2) a zone of runoff dispersion – 26,7 thousand km² (13% of the territory). The majority of rivers are fed by glacial and/or snow melting. The highest runoff is observed between April and July, during which 80-90% of runoff is formed in a span of about 120-180 days all the way till August or September. As a rule, smaller and quickly drying flows are observed in August and September, during the final phase of the vegetation period.

Significant changes in surface runoff are expected for all most probable climate scenarios. As per projections, an increase in surface runoff will take place during the period of 2020-2025 thanks to an increase in glacial area. Then, runoff will decrease to about 42,4 – 20,4 km³, which accounts for 43,6 – 88,4% of runoff in 2050. Most of the country's territory (85%) is in a state of a positive water balance (along river runoffs). The remaining 15% is in a state of negative water balance where water is lost in the course of irrigation, soil percolation, and evaporation. This applies to Chui province, periphery of Fergana province, plains around lakes and piedmonts, as well as floodplains of other rivers¹⁴ and implies a presence of probable material risks that the population will have to face in case of a drought. Over the period of 1965-1990, compared to a previous period of 1930-1964, the frequency of droughts of various intensity increased twofold. As per data of the State Agency for Environmental Protection and Forestry under the Government of the Kyrgyz Republic, of particular concern are climate change impacts on the state of glaciers. There are a total of 8 208 glaciers in the country's territory. As of today, the glacial ice area already decreased by 20%. Estimates imply that by 2100 the country may lose all of its glaciers. This will severely impact agricultural productivity.

In order to arrange irrigation, local communities created Water User Associations. Their operations impact sustainability of water use in many local communities. At the same time, WUAs sport a major gender imbalance biased toward men where women are eliminated from the decision making process.

Agriculture is the most climate-dependent industry and its productivity, especially in plant farming, directly depends on a given year's climate – volume of precipitation, its seasonal distribution and humidity during the vegetative period. Per its climate conditions, the Kyrgyz Republic is in the zone of risky land husbandry. A decrease in water resources and changes in temperature resulting from climate change will imminently impact reclamation status of lands used and agricultural crop productivity. In addition, climate change will undoubtedly

¹⁴ *Review of Ecological Performance. Kyrgyzstan.* – UN, New York and Geneva, 2009. - [http://www.nature.kg/images/files/Kyrgyzstan %20II %20ru.pdf](http://www.nature.kg/images/files/Kyrgyzstan%20II%20ru.pdf)

impact soil fertility especially the primary indicator of tillage fertility – humus content. Climate change in the form of higher aridization can only exacerbate the situation since air temperature rises and frequent droughts can adversely impact soil microflora that actively participates in the formation of the humus layer.

Amidst glacial degradation, changes in precipitation and temperature, changes in resources of river runoffs, the conditions for growing agricultural crops and their productivity change too. The projected reduction in productivity of plant farming and animal farming will render the most adverse impact on the most vulnerable and poor demographics¹⁵.

Non-rational methods of agricultural use or treatment of soils can entail emissions of soil carbon into air in the form of CO₂ and become a factor of climate change. In turn, climate is one of the most important factors of soil formation and geographic distribution of soils. Changes in temperature and the nature of distribution of precipitation can render an immense impact on organic matter and processes occurring in soils, as well as on plants and agricultural crops growing on them.

In addition to the economic damage, agriculture is also susceptible to a growing impact of extreme weather phenomena associated with climate change. The Law of the Kyrgyz Republic “On Specificities of Plant Farming Insurance” fails to provide to a mechanism of implementation of such insurance which prevents rural producers from recovering losses sustained as a result of disaster and calamities.

Organic agriculture is a system of agricultural production that pays special attention to environmental protection and use of natural farming methods. The entire agricultural cycle, from production and processing to transportation and delivery, precludes any form of the use of genetically modified organisms, pesticides, mineral fertilizers and various artificial additives. Resource-saving agriculture is characterized by the use of less aggressive methods of soil treatment such as minimal-till or no –till, application of crop rotation and protection of topsoil by mulching. Both approaches, in the first place, underscore the value of soil as the primary means of agricultural production and a need for full compliance with land use rules.

Currently, the country’s organic agricultural production is becoming more popular and widespread. Organic farms are represented by three large agricultural cooperatives, ten rural districts that unite 23 villages. The number of commercial entities producing organic agricultural produce reached 1 700. These farms grow organic agricultural produce on an area of 7 565 ha. Primary organic products in the country include cotton, chickpeas, kidney beans, apricot, medicinal herbs, prunes, nuts, and potatoes.

At the same time, the Kyrgyz Republic witnesses an insufficient systemic approach to organic agricultural production, in particular, the country lacks a coherent legal framework, system of inspections, certification and accreditation,

¹⁵ *Third National Communication of the Kyrgyz Republic to the UNFCCC*. – B.: El Elion, LLC, 2016. – p. 274.

database, marketing and monitoring, and farmers' awareness is generally very low. Similar problems associated with a lack of well-defined regulatory framework, accurate information and monitoring are inherent to resource-saving agriculture. In many ways, the development of resource-saving agriculture as well as organic agriculture rests on the support rendered by international donors.

Important strategic areas of agriculture and the entire agri-industrial complex include progress in science and research and innovation that allow continuously upgrading the production based on the latest advancements in science and technical progress. Currently, new technologies in this sector are introduced at a rate much slower than in the manufacturing industry. For instance, resource-saving technologies in the dairy livestock farming: milking parlors may actually become innovative projects in their own right. Improving the quality of livestock and indoor cattle keeping and fattening can also become a new direction in sustainable pasture management reducing the pressure on ecosystems and increasing productivity. Given the above, targeted programs must possess an innovative orientation.

Problems encountered in the introduction of new technologies include the following: their initial high price, presence of import duties and VAT on materials and equipment, a lack of research, low-scale production of farms. A lack of qualified staff to serve technologies and/or a high cost of maintenance as well as a general lack of awareness about the technologies in question or a lack of research are the main causes of such a poor access to advanced technologies.

Abundance and low cost of resources (e.g. water, electricity), as well as low-scale agricultural farming are the main risks for, and barriers to, the development of high-technology agriculture.

Insufficiency of reliable data and the aspects listed will result in an incoherent policy in supporting the introduction of modern technologies.

In the Kyrgyz Republic, various development partner-supported projects introduce and implement climate-resilient and resource-saving technologies such as laser field layout and zoning, no-till technology for various agricultural crops: grains, legumes, corn, sugar beets, etc. Annually, farmers of Issyk-Kul and Chui provinces, utilizing resource-saving technologies sow 200-300 ha of grain crops, 30-50 ha of esparcet (sainfoin) and lucern (alfalfa), and 300 ha in Batken province.

While in farming field schools, farmers familiarize themselves with theoretical and practical foundations of no-till crop farming. One should note that it is very difficult for farmers to alter their customary practices as they prefer a conventional technology of sowing and general crop farming. Yet, every year more and more farmers are found to be interested in no-till crop farming practices.

Methods of climate-resilient agriculture in many ways coincide with organic and resource-saving land husbandry. At the same time, the stress is on a target reduction of adverse consequences of resource use in the agrarian production. Therefore, farmers responsible for using soil and water resources need

new technologies and knowledge required to make optimal decisions in the management of said resources.

Objectives. The achievement of sustainable resource management in the agrarian sector and the development of resource-saving, organic and climate-resilient agriculture facilitating the increase in productivity in the sector is expected to occur thanks to the implementation of the following objectives: 1) achieve sustainable management of land and water resources in the agrarian sector by way of proper planning; 2) develop the market for organic agriculture; 3) develop and introduce state-of-the-art technologies for the enhancement of productivity and efficient use of production factors; 4) improve the legislative and regulatory framework regulating the development of green agricultural production; 5) finance green agriculture; 6) build capacity by way of awareness raising among, and training of, agricultural producers in green agriculture methods; 7) adapt to climate change and mitigate its adverse implications.

1) Achieve sustainable management of land and water resources in the agrarian sector by way of proper planning

Soil is a non-renewable resource. Sustainable soil management is cheaper than soil restoration as its recovery spans longer than a human lifetime. This objective provides for a modernization of the material and technical basis of soil laboratories of the State Design Institute “Kyrgyzgiprozem” and a study of the current state of soils, their composition, and content of organic substances. For this purpose, one will conduct soil and agri-chemical assays with a subsequent certification and assessment of soil fertility. This will facilitate an improvement in soil resource monitoring and form a basis to design land use planning tools by way of identifying areas where the application of specific types of practices will be banned, especially the application of chemical fertilizers or methods of land use that entail erosion. Guiding principles and/or regulations on soil resource management can complement these tools. additionally, agri-sylvan reclamation works such as a planting of field shelterbelts to reduce soil degradation will be conducted.

Sustainable pasture management and livestock farming will be achieved by increasing productivity of pasturelands and reducing their degradation. For this purpose, a system of sustainable pasture management will be designed including livestock farming quality improvement (shifting from quantity to quality) and cattle headcount regulation. A stocktaking of pastures will be taken and mechanisms of pasture monitoring will be designed and implemented. This objective requires the introduction of adequate approaches to pasture rotation and mechanisms for pasture rotation plan implementation.

As part of efforts to achieve sustainable pasture management, the Program provides for a design and implementation of differentiated approaches to valuating (pricing) the so-called pasture ticket (a fee-based permit for grazing), introduction of local taxes on a cattle headcount increase. Additionally, mechanisms will be designed to attract domestic investment/finance to improve the pasture infrastructure and the state of pastures. As part of this objective, one

will design mechanisms for scientifically substantiated pasture use and stimulation of indoor keeping of cattle (large) and small ruminants. For this purpose, one will pilot a system of environmental-economic accounting for pastures.

In order to conserve soils and manage ecosystems sustainably, one will design and implement a methodology for an ecosystem-based climate change adaptation and other methods of sustainable land use.

Taking into consideration global trends associated with global warming and projections of consistent decreases in fresh water availability and reserves, the issue of efficient water resource management all the way from its natural source to the end consumer has become ever so relevant. In order to ensure food security and enhance productivity, one will design sustainable irrigation schemes that are harmonized with a corresponding water availability.

Despite the fact that there is still seemingly enough water, climate change adaptation will require designing mechanisms for ensuring access to water during dry seasons.

The planned modernization of the irrigation infrastructure, timely repairs and dredging of canals from sedimentation and organic matters and other consequences of siltation will help reduce technical water losses. Additionally, the construction of irrigation facilities and collecting and draining systems, as well as terracing slopes and the installation of water collection canals on them will contribute to fighting water erosion and increasing the efficiency output ratio in the course of water supply to ensure a rational water use and general water saving.

In addition, one will introduce quotas for the representation of women at the level of WUAs (at least 30%, pursuant to the laws in effect);

2) Develop the market for organic agriculture

In order to develop organic agriculture, one will introduce a cluster-based approach that combines the potential of producers, processors, distributors, scientific bodies and central and local governments. The implementation of the cluster approach will require a drafting of project proposals to attract investors into an infrastructural financing of organic agriculture. At the initial stage, one will design and implement pilot projects on organic agriculture in Batken, Issyk-Kul and Chui provinces (with one district in each province above selected based on the principle of specialization). The program provides for the creation of state-of-the-art, independent trustworthy laboratories accessible and affordable to farmers, as well as conditions for the production and exportation of organic agricultural produce. In addition, the program provides for a review of taxes on imports of organic fertilizers. In order to ensure a full provision with organic fertilizers, investments into the construction of an organic fertilizer plant will be planned. In order to expedite the exchange of commercial and legal information and facilitate exports of organic agricultural produce, a legal advisory and inquiry system platform will be created. The program also provides for opportunities for extending tax breaks to producers of biological formulations and pharmaceuticals and organic fertilizers to stimulate their production in required quantities. One

will also work to attract investments into the creation of trade and logistics centers;

3) Develop and introduce state-of-the-art technologies for the enhancement of productivity and efficient use of production factors

For purposes of improving access to technologies and modernizing agriculture, one will draft a program of the financing of technologies, analysis of customs duties and VAT on climate technologies, introduction of training programs, and conduct of thematic and applied research. Examples could include designing mechanisms for the introduction of progressive irrigation methods including drip irrigation that could rationally use water, utilize new irrigated areas and facilitate a reduction of land resource degradation. Resource-saving technologies in dairy production will include the following: milking parlors can become a truly innovative project in the livestock farming sector of the agricultural industry. Assistance will be provided in the creation of agricultural cooperatives and provision of stimuli to avoid small-scale agricultural farming via the encouragement of the use of jointly-purchased and collectively applied technologies. Additionally, one will create an infrastructure of spatial data for the authorized state body responsible for the state policy in the agri-industrial complex including livestock farming, fishery development (aquaculture), plant farming, plant quarantining, land improvement and reclamation, land and water resources, and irrigation and land reclamation infrastructure, food and processing industry, for the purpose of improving reliability of data and ensuring an ongoing monitoring of land and water resources;

4) Improve the legislative and regulatory framework regulating the development of green agricultural production

Improving the legislative framework will aim to bring the laws in effect into compliance with Green Economy goals. In particular, one will conduct a stocktaking of all legal acts in the area of agriculture to check them for consistency with current norms of Green Economy goals so that subsequently they could be amended accordingly. As part of this objective, the Law of the Kyrgyz Republic “On Pastures” will be amended to reflect the enhancement of responsibility and liability of pasture committees for the degradation of pasturelands.

Additionally, passing the Law of the Kyrgyz Republic “On Organic Agricultural Production” is expected along with appropriate bylaws needed for its implementation, enforcement and compliance. Sustainable management of land and water resources and attraction of technologies require an adequate analysis with a subsequent identification of policies and improvement of a respective legal framework.

Additionally, the national legislative framework will be studied for compliance with international climate change commitments assumed as part of the UN Convention to Combat Desertification as well as other international legal instruments. A regulation on the procedure for provision of law-productivity agricultural pasturelands for development and implementation of agriculture is expected to be drafted, along with a regulation of agri-chemical survey of

agricultural lands and certification of fields (land plots irrespective of their form of ownership). A mechanism of plant farming insurance will be designed in compliance with the Law of the Kyrgyz Republic “On Specificities of Plant Farming Insurance” and appropriate bylaws will be passed. A separate legal acts will be drafted to regulate livestock farming insurance accompanied by a respective mechanism of livestock farming insurance in full compliance with other normative legal acts generally regulating insurance in the livestock farming sector of the Kyrgyz Republic;

5) Finance green agriculture

Fiscal policies to support agriculture and their drawbacks and weaknesses are directly associated with the pricing policy in irrigation water supply and tax breaks for agricultural producers and processors. The existing measures to support agriculture in reality are inadequate for the development of sustainable agriculture. As a result of this support, a small-scale agricultural producer sees traditional water use and land use methods more profitable since the introduction of sustainable technologies entails major expenditures, especially during the introductory phase of such a project. It is larger agricultural producers that are more open to green technologies but generally carry a higher tax burden. These factors are precisely the reason why the majority of farmers do not strive for unification and enlargement.

Therefore, one needs to improve a state policy in supporting agricultural producers. The state needs to create stimuli and incentives for careful and economical water use, sustainable land use and enlargement of agricultural holdings. In addition, all state program aiming to finance agriculture must be consistent with the policy promoting Green Economy in the Kyrgyz Republic.

For this reason, one needs to reform the tariff policy in the area of irrigation water supply and change the existing tax policy with respect to agricultural personnel. One of the reform approaches provides for the introduction of the so-called tax patent for farming activities. The tax policy in the agricultural sector will be analyzed and findings of the analysis will underlie recommendations that stimulate benefits from, or subsidies for, the transition to Green Economy. Findings of the study of the state of soils will be used to prepare recommendations on changes in the tax policy regarding agricultural personnel including the introduction of soil certificates and tax patents for agricultural workers and farmers;

6) Build capacity by way of awareness raising among, and training of, agricultural producers in green agriculture methods

Primary activities to attain this objective will aim to improve awareness of the general public about socioeconomic consequences of climate change including the ever-growing problem of water shortages and land degradation as well as about advantages of organic and resource-saving agricultural production. Special attention will be paid to expanding access to information about, and technologies of, organic agriculture, drip irrigation, etc. Training programs will

be designed to train and retrain agricultural specialists for HEIs with consideration given to quotas for women.

Additionally, training will be provided to members of pasture committees to develop skills in pasture productivity enhancement and rational pasture resources use.

The curricula of secondary and higher vocational institutions will be augmented by a dedicated specialization in organic agriculture with appropriate training supplements published. Farmers wishing to transition to organic methods of farming will be able to attend qualification enhancement training courses;

7) Adapt to climate change and mitigate its adverse implications

Agriculture is one of the most climate-dependent areas of human activity and livelihoods. It is one of the primary sources of GHG and, while concurrently being the most climate-vulnerable sectors, requires an immediate adaptation of its entire system of food production. In order to ensure proper climate decision making, one needs to develop climate service between suppliers of climate information and decision makers at all levels.

In order to make climate-informed decisions in the agricultural sector, one will develop and strengthen an informational and scientific foundation of climate change studies, design and implement operational and long-term measures to adapt the agricultural sector to climate change with a focus on an ecosystem-based adaptation and green decision making. As a result, drought- and salinization-resilient sorts of agricultural crops will be selected and used and areas for resource-saving land husbandry will be expanded.

Expected results:

- soil and agri-chemical assays of lands of farms were conducted to perform scientifically substantiated application of organic and mineral fertilizers to achieve planned and stable yields;
- the scale of soil degradation was reduced and new lands were commissioned for agricultural turnover;
- the number of violations associated with non-rational land use was decreased thanks to a stocktaking, certification and comprehensive assessment of soil fertility on each land plot (field) and an improvement of the soil fertility conservation and enhancement control system;
- a modernization of the material and technical basis of soil laboratories of the State Design Institute “Kyrgyzgiprozem” was conducted and a system of monitoring of the state of agricultural lands was designed;
- a databank of soil fertility of agricultural-purpose lands was created;
- effective norms and technologies of the application of fertilizers were established to increase yields on pasturelands;
- degradation of pastures was reduced and the state of pasture grass stand was improved;
- the Law of the Kyrgyz Republic “On Organic Agricultural Production” and national standards were drafted and entered into force and a national certification body was identified;

- a concept of drip irrigation was drafted and a regulation on the procedure for a provision of low-productivity pasture-type agricultural lands for their development and use in agricultural production was prepared;
- 18 irrigation objects were commissioned and accompanying corresponding irrigation facilities were built;
- slopes were terraced and water collection canals were built on them;
- a system of climate risk insurance in plant farming was introduced;
- a system of climate risk insurance in livestock farming was introduced;
- consumers' and producers' awareness about advantages of organic and resource-saving agriculture was raised;
- stimuli and incentives for agricultural producers to shift to green technologies were created;
- community-based irrigation water and pasture management organizations now possess significant capacity, introduce sustainable management methods and are no more than 70% specific gender-heavy;
- the scale of the pollution of soil and water resources was reduced;
- climate risks for agricultural producers were mitigated via the introduction of an agricultural insurance system;
- state-of-the-art physical technologies and modern techniques are used in agriculture in the Kyrgyz Republic.

3. Green manufacturing industry

Goal. Promote efficiency of use of resources and cleaner production processes in the manufacturing industry of the Kyrgyz Republic.

Analysis of the current situation. The United Nations Industrial Development Organization describes green manufacturing industry as industrial production and development that do not take place at the expense of the deterioration of natural systems or result in unfavorable consequences for human health¹⁶. Within the context of this program, a green manufacturing industry can be defined as a reduction of the impact of industrial processes on the environment by way of more effectively using resources, gradually discontinuing to use toxic substances, introducing new ecologically clean technologies, replacing fossil fuels with RES, improving health and safety and reducing emissions of pollutants and generation of waste by complying with ecological norms and standards. Thus, the green industrialization process includes increasing efficiency of resource use, compliance with environmental norms and maximum utilization of RES.

One of the main approaches to monitoring green industrialization in the Kyrgyz Republic is a manufacturing industry policy in achieving UN SDGs. Out of 17 SDGs, four relate to environmental challenges and economic development. Out of 169 targets constituting the very essence of the 17 SDGs, manufacturing industry can facilitate the achievement of four of them and 12 of their related

¹⁶ UNIDO (2011), UNIDO Green Industry, Policies for supporting Green Industry.

indicators of which 8 are imminently linked to the environment. In addition to the eight indicators, one needs to keep in mind one that is associated with monitoring industrial air pollution as represented in the form of total suspended particulate matter or SO₂ emissions, yet SDGs lack a primary goal aimed specifically at reducing air pollution¹⁷.

In order to identify potential solutions for green industrialization, one needs to analyze the industrial ecological situation in the Kyrgyz Republic.

The Kyrgyz Republic holds the 99th position in the economic indicator ranking of 2018 out of 180 countries, while in 2016 it held the 71st place¹⁸. Other Central Asian states held the following positions as at 2018: Kazakhstan – 101, Tajikistan – 129, Turkmenistan – 38, Uzbekistan – 136³.

Water resources of the country are endangered by chemical and organic pollution mostly triggered by numerous waste deposits and informal landfills (that are not properly controlled) and the waste generated by mining companies. An international comparison shows that the growth in pollution (as measured by emissions of CO₂) and resource consumption (as measured by the use of materials) was relatively high in the processing industry of the Kyrgyz Republic. Basically, CO₂ emissions increased by about 140% over the period of 1995-2013 which exceeds even a respective growth in middle-income countries¹⁹. The Kyrgyz Republic is also ahead of other low- and middle-income countries when it comes to the use of materials. The use of materials in the processing industry is inefficient while production methods are wasteful which requires the introduction of ongoing monitoring and an improvement of the current unsustainable practices. Additionally, a decrease in the use of more resource-efficient means of production over time may result in a major environmental damage.

Air pollution from stationary sources in 2017 totaled 50 thousand tons which is 36% higher than in 2011 (Table 2). The largest emissions of pollutants come from the Heat Power Plant (67%), manufacturing industry sector (27%) and mining sector (6%). These three sectors combined account for about 94,4% of all pollutants in the air. Substances such as suspended particles (particulate matter), SO₂, CO, NO and HC dominate in emissions from stationary sources²⁰.

Table 2. Industrial air pollution

Indicators (thousand tons)	2011	2012	2013	2014	2015	2016	2017
Gas-discharged pollutant catching and detoxifying devices	288	273	369	479	419	338	366
Air-polluting emissions from stationary sources	36	37	39	61	61	53	50
Total emissions from stationary sources	324	310	408	540	478	390	415

¹⁷ <https://pub.iges.or.jp/pub/application-sdgs-air-pollution>.

¹⁸ Environmental Performance Index (2018), Environmental Performance Index, Yale University Center for International Earth Science Information Network, Columbia University.

¹⁹ UNIDO (2017), Diagnostic for the Programme for Country Partnership (PCP), The Kyrgyz Republic, Building a competitive manufacturing base for strong and inclusive growth. Vienna: UNIDO

²⁰ Atadjanov Sabir, T. N. (2012). The National Report on the state of the environment of the Kyrgyz Republic for 2006-2011. Bishkek: The Government of the Kyrgyz Republic, the SAEPP, UNDP-UNEP.

% of processed emissions	89	88	90	89	87	86	88
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Total emissions from stationary sources into air increased in 2006 – 2009. In 2010, a reduction in total mass emissions of 21% took place compared to 2009, due to a decline in extraction and production in certain sectors of the national economy such as the mining industry, oil industry, food industry, leather and timber processing.⁵ In 2011, emissions increased 1,2 times compared to 2010. In 2011 – 2017, another growth was observed. Of the total amount of emissions, on average, 88% is contained in special places and about 12% of pollutants are discharged into air without any prior filtering and processing.

Industrial waste increased on average by 5,7% during 2010 – 2017. The volume of toxic waste in 2017 totaled 120 933 thousand tons which is 7,3% more than in 2016 (Table 3). Of the total amount of toxic waste from manufacturing companies, only an insignificant fraction is harmless which created a major environmental risk for the country should this trend persist in the long run.

Table 3. Volume of toxic production waste

Indicators (thousand tons)	2011	2012	2013	2014	2015	2016	2017
Manufacturing companies' waste at the year start	88 923	93 692	108 330	102 766	109 348	112 670	120 933
Intensity of manufacturing companies' waste	577	860	694	690	729	767	-
Amount of waste in the reporting year	5 876	4 771	7 957	10 040	10 498	12 377	12 653
Fully harmless, processed and/or disposed waste	33	0.2	0.3	0.1	0.3	0.3	0.5

Industrial water use only accounts for 0,67% of the total use of water resources. Industrial intensiveness of water totaled 2,19 in 2017 which is 27% more than in the previous year and 11% more than in 2011 (Table 4).

Primary sources of emissions include the energy sector (74%), agriculture (16,1%), waste (5,5%), industrial processes (4,2%), land use, changes in land use and forestry (0,2%). In addition to GHG emissions, from the environmental standpoint, emissions of precursor gases also play an important role. The distribution of emissions of precursor gases is similar to the distribution of emissions of GHG. A significant role is played by the energy sector (82,9%), followed by manufacturing industry (9,8%), agriculture (6,8%), solvents and changes in land use.

Table 4. Protection and rational use of water resources

Indicators (million m ³)	2011	2012	2013	2014	2015	2016	2017
Water consumption	4 864,0	4 863,0	5 114,0	4 768,0	5 224,5	4 668,7	5 072,4
For manufacturing needs (industrial water use)	78	82	40	81	87	67	69,1
Industrial water intensity	1,97	1,33	3,90	1,84	1,72	2,19	no data
For irrigation and agricultural needs	4 634,0	4 482,6	4 543,6	4 530,5	4 922,2	4 435,3	4 821,6
Wastewater	116,0	115,7	113,5	103,6	99,9	100,0	101,6
Water treated in compliance with standards	109	109	103	104	94	93	95
Collection of wastewater (without processing or insufficiently treated)	4	4	5	2	2	2	2

Costs of pollution reduction are levied on emissions of pollutant into air, discharges of pollutants into water and disposal of waste by mobile and stationary sources. However, the system of environmental monitoring is simply inadequate as part of an authorized national environmental body due to a lack of the required infrastructure, testing laboratories and financial constraints. One of the primary institutional problems of the failure to enforce compliance with environmental norms in the Kyrgyz Republic is the restricted access to industrial objects.

The development of the environmental management systems (EMS) in companies was stimulated by the Government of the Kyrgyz Republic in early 2000s. The ISO 14001 standard was adopted as a nation standard in 2002. ISO 14003 and ISO 14005 standards were adopted later. In order to ensure energy efficiency, energy safety and energy consumption, the country further introduced ISO 50001 (Energy Management Systems). The Center for Standardization and Metrology under the Ministry of Economy of the Kyrgyz Republic heads the environmental management system in compliance with ISO 14000 standards and creates conditions for consistent and targeted protection of the environment from adverse impacts rendered by the operation of industrial companies²¹.

In order to design comprehensive solutions, a cleaner industrial production and resolve environmental management challenges, one finds it advisable that a National Center for Environmentally Clean Production be created.

Economic zones are expected to serve as a driving force of the national economic growth. The Kyrgyz Republic already has five Free Economic Zones: FEZ Bishkek, FEZ Maymak, FEZ Naryn, FEZ Karakol and Fez Leylek. FEZ

²¹Kyrgyzstandart. (n.d.). *Quality management*. Retrieved September 28, 2018, from The Center for Standardization and Metrology: <http://www.nism.gov.kg/menedzhment-kachestva.html>

Naryn intends to encourage the production of ecologically clean products and therefore one needs to draft a corresponding environmental management program for FEZs²².

Per capita energy consumption increased by more than 30% over the period of 2010-2015. Overall, the domestic energy generation covers 45% of the country's needs and therefore the Kyrgyz Republic has to import the remaining 55% (on average). Pursuant to statistics, the manufacturing industry uses the bulk of energy in the country – 34%, housing sector - 37%, and transport - 29%²³.

The strategic choice is about formulating a policy in industrialization that is based, in particular, on reliable and adequate sources of energy and electrical energy. Nevertheless, despite possessing a major potential for the generation of electrical energy, the Kyrgyz Republic suffers from a low reliability of energy supply. Disconnections and blackouts are frequent. All these factors speak of a dire need for further deploying generating capacities to ensure reliable energy supply needed for future industrial development and expansion of industrial companies, especially energy companies, such as cement production plants and other manufacturing companies. In terms of sources of energy carriers, the largest share in the total volume of end energy consumption within the manufacturing industry of the Kyrgyz Republic is contributed by coal (40%), petroleum (25%), electricity (25%), and natural gas (10%).

The draft Concept of the Development of the Fuel and Energy Complex in the Kyrgyz Republic till Year 2030 indicates a need for applying RES and measures to increase energy efficiency. According to estimates of the State Committee for Manufacturing Industry, Energy and Mining of the Kyrgyz Republic, the capacity of hydropower sector totals 5–8 billion MWh per year, wind – 44,6 million MWh per year, solar energy – 490 million MWh per year, and biomass – 1,3 billion MWh per year, which prospective could be used as a clean source of energy for the manufacturing industry.

The draft Concept in questions provides for measures to enhance efficiency of resource use. It also provides for ensuring energy efficiency thanks to a reduction in an overall energy consumption by the national economy, introduction of market prices for energy consumption. The technical capacity of energy efficiency in the manufacturing industry totals 11,2% of the annual energy consumption. In comparison, the technical capacity in the housing sector totals up to 80% of annual consumption²⁴. Energy efficiency potentials are estimated at a projected growth of energy consumption by 150% by 2020 and by 210% by 2030 with a growth of GDP of 197% by 2020 and of 320% by 2030. Pursuant to data of the State Committee for Manufacturing Industry, Energy and Mining of the Kyrgyz Republic on the development of the fuel and energy complex of the Kyrgyz Republic by 2030, a reduction in GDP energy intensiveness will total 20%

²²ADB. (2018). *A Diagnostic Study of Kyrgyz Republic's Free Economic Zones and Industrial Parks*. Manila: Asian Development Bank.

²³https://www.unece.org/fileadmin/DAM/energy/se/pdfs/gee21/projects/FinalReport_KG.pdf

²⁴ Presentation by SCMIEM of the Kyrgyz Republic "Energy Saving in the Kyrgyz Republic."

during 2015-2030. A growth of energy consumption must also stay below the economic growth rate which will help save energy at a rate of 3,65–4,1 billion kWh by 2030.

One of the existing energy efficiency programs in effect in the country today is KyrSEFF which has been implemented by the UNISON Group since 2013. Since the program launch, a total of 968 energy housing and business sector efficiency projects were supported which facilitated a saving of more than 150 000 MWh and a reduction of CO₂ emissions of more than 35 000 tons. KyrSEFF provides loans and grants to increase energy resources and resource efficiency in the housing sector and in buildings and facilities of the industrial sector. The program is based on best European practices via the EBRD Sustainable Energy Financing Facilities (SEFF) that include credit lines for commercial companies amounting from hundreds of USD to USD 2 million. The Kyrgyz Republic possesses a major potential in implementing measures to enhance energy efficiency in the manufacturing industry. As per various estimates, the implementation of adequate measures may facilitate a reduction in the overall demand for electrical energy of 40%–46% and of 11% in the manufacturing industry specifically²⁵.

The World Bank identified the following barriers to the transformation of the energy sector in the Kyrgyz Republic and introduction of measures to increase energy efficiency: overlapping and competing (conflicting) roles and responsibilities in the policy design, ownership and regulation of the manufacturing industry; suboptimal contractual and uptake (billing) arrangements that prevent transparency of, and accountability for, cash and energy flows and undermined incentives for sectoral companies to improve their operating and financial indicators; inefficient annual expenditure planning instead of investment prioritization based on transparent criteria and forward-looking (prospective) planning of sectoral development and with consideration given to an ambiguous legislative framework and regulatory environment.

Objectives. In order to achieve the goal set above, the following objectives will have to be attained: 1) identify the capacity for the implementation of measures for an efficient use of resources and energy- and water-intensive sectors of the manufacturing industry; 2) improve industrial management practices in the environmental protection and strengthen the industrial symbiosis in Free Economic Zones; 3) introduce measures in resource efficiency and clean production by way of creating a National Clean Production Center; 4) improve the regulation in the environmental protection for the manufacturing industry.

1) Identify the capacity for the implementation of measures for an efficient use of resources and energy- and water-intensive sectors of the manufacturing industry

Given high GHG emissions and the use of materials and resources in the manufacturing industry sector, one needs to take measures to introduce

²⁵<http://www.kyrseff.kg>

mechanisms of an efficient use of resources to demonstrate a possible resource saving and cost reduction. Data on primary parameters of the manufacturing industry will be collected to determine the cost of energy needed for the manufacturing industry production. Additionally, one will analyze factors such as technologies, labor productivity and production factors, process stability, resource efficiency, etc. the analysis will include the entire chain of production and introduction of measures in energy efficiency, as well as estimates of GHG emissions. Recommendations will be drafted on the basis of a comparison of electrical stations in the Kyrgyz Republic with comparable units from the global practice. The analysis will prioritize identifying the sector's ability to integrate new technologies and achievement of improvements in total factor productivity and efficiency of the operation of existing equipment. The starting phase will include an analysis of a limited number of stations. Then, the analysis will cover all existing stations using models designed for UNIDO. These models can be used as a tool for self-assessment of stations' efficiency. Findings of this analysis will be used in drafting recommendations to introduce a policy in resource efficiency at the national level;

2) Improve industrial management practices in the environmental protection and strengthen the industrial symbiosis in Free Economic Zones

The Kyrgyz Republic currently maintains five economic zones where industrial environmental protection management is not applied and that could help in the introduction of national and international standards in their respective regions. A new eco-industrial park is a new approach to forming such plans. Such examples help identify standards for the assessment of industrial parks and plan measures to reconstruct existing parks or improve the planning of new industrial parks with a view of achieving SDGs. An international framework program for the introduction of eco-industrial parks, as drafted jointly by UNIDO, World Bank, and GIZ, contains conditions needed to introduce eco-industrial parks as well as a guidance on implementing conditions and various programmatic proposals;

3) Introduce measures in resource efficiency and clean production by way of creating a National Clean Production Center

The process of achieving SDGs in the manufacturing industry sector and environmental protection can be supported by funding the National Center for Clean Production. Such a center could render advisory support to stakeholders in the course of the introduction of innovations in public administration such as various economic initiatives needed to create stimuli in the manufacturing industry to implement SDGs and facilitate manufacturing companies in identifying the most cost-efficient ways of using resources, increasing resource efficiency and introducing international environmental protection standards. Such centers could also facilitate a transmission and dissemination of information about international standards in efficient use of energy, water and materials. Such a center in the Kyrgyz Republic can gain access to the available expertise of more than 50 similar centers as already created by UNIDO and UNEP in various

countries. Such centers currently render advisory to national governments and industrial companies. Most such centers operate on the basis of already existing national institutions and perform four main functions: disseminating information and conducting training, rendering technical cooperation, assessing industrial companies, and preparing recommendations for national governments;

4) Improve the regulation in the environmental protection for the manufacturing industry

Effective programs, as well as regulation, are crucial in industrial environmental protection management. Programs must consist of four types of actions: standards, licenses, monitoring and audit, and implementation. As per an OECD assessment, certain problems in the design and introduction of nature conservation audit in the Kyrgyz Republic had been identified. These problems include the creation of priorities for short-term interests of companies over environmental impact problems, inadequate fulfillment by regulating bodies of their mission and a confrontational dynamic with local communities.

Within this context, the following environmental protection regulation efforts are suggested:

- reviewing environmental protection standards and establishing limits of permissible emissions with consideration given to economic and technical criteria;

- introducing a practice of a regular monitoring and reporting on part of industrial companies supported by own operational budgets. Ensuring regular inspections by state control bodies;

- ensuring an adequate level of powers and autonomy for state bodies conducting inspections as well as for inspectors who observe environmental protection monitoring. Ensuring, concurrently, the transparency of the process and reporting on part of inspectors about inspections conducted;

- allocating an adequate budget for controlling bodies conducting inspections and monitoring and regularly publishing reports about the compliance by industrial companies with environmental protection standards.

Expected results:

- efficiency of the use of energy and water resources and materials by industrial companies was improved;

- air and water pollution rates as well as industrial waste discharge rates by industrial companies were reduced;

- environmental protection and nature conservation management practices in Free Economic Zones was improved;

- industrial environmental protection and nature conservation regulation was effectively implemented;

- investment laws and agreements were updated.

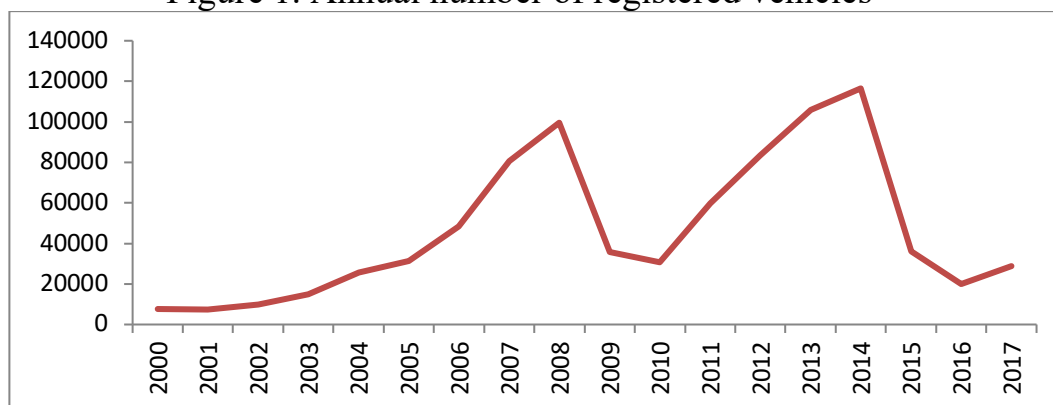
4. Low-carbon and ecologically clean transport

Goal. Decrease CO₂ emissions and concentration of pollutants in the air of the cities of Bishkek and Osh thanks to a transition to electrically- and low-carbon (bio)fuel-powered public transport.

Analysis of the current situation. The harm inflicted upon the environment by human pressure is particularly evident in the assessment of air quality in the country's territory, especially in cities with population of more than a million. In the course of the drafting of this Program, it was impossible to assess qualitative and quantitative losses of the state from social costs of air pollution-induced public healthcare including costs of natural wealth conservation, especially the retention of glaciers.

The main source of air pollution in the cities of Bishkek and Osh is the transport sector. From the perspective of sustainable development, the transport sector is impacting the quality of population's life through factors such as air quality, time spent in traffic jams, public transport fares, speed of public transport and its comfortability.

Figure 1. Annual number of registered vehicles



Pursuant to a quantitative analysis of registered vehicles, between 2007 and 2017, the number of road vehicles increased more than 2,7 times. Here, the peak of registration of vehicles was observed in 2008 followed by a rapid decline in imports of vehicles. A similar situation was observed in 2014–2015 (Figure 1).

These phenomena are related with the global economic crisis of 2008 and restrictions accompanying the country's accession to the Eurasian Economic Union (EEU) in 2014.

City of Bishkek. Pursuant to statistical data, the number of road vehicles (passenger cars, buses and minibuses) in Bishkek totals 38,4% of the total fleet of vehicles of the same category registered throughout the country.

As per the analysis of rankings of passenger vehicles by year of manufacture, the passenger car fleet in Bishkek older than 10 years totals 93,2%. This aging fleet, along with a low quality of fuel it consumes, became the primary

cause of the consistent excess of maximum permissible concentrations of pollutants in the air of the country's capital.

The road network of Bishkek was designed for 90–100 thousand vehicles which, amidst the already excessive number of vehicles in the city that puts pressure on the existing infrastructure, creates traffic jams in certain parts of the city throughout the day. This, in turn, affects the city's economy and increases fuel consumption.

Expanding roads only partially eases vehicular traffic. At the same time, pursuant to the Lewis-Mogridge position, as confirmed by numerous studies and experiences of various cities, expanding roads only results in more vehicles in the city, which, under current trends and circumstances, will lead to more emissions. Expanding roads is also linked to tree cutting which is negatively perceived by the city's population and damages the city's environment. In this case, the city's Mayor's Office has a tough task at hand trying to find a balance between road expansion and retention of trees and other green plants.

The share of public transport in Bishkek is a mere 1% of the total number of registered vehicles which need to be replenished with a fresher fleet (Table 5).

Trolleybuses are the country's only type of green public transport that serves 12 routes in Bishkek. The capital owns 169 trolleybuses, however, some of them need to be replaced. At the same time, their routes need to be updated since the general public prefers minibuses that serve more popular routes.

A total of 43 private operators in Bishkek serve 122 routes and cover 2 280 km. On average, 2 700 minibuses are operational in Bishkek on a daily basis.

Table 5. Number and age of buses and minibuses in Bishkek

Road vehicle age	< 5 years	5-10 years	10-15 years	> 15 years	Total
Buses	10 (2%)	205 (44%)	253 (54%)	-	468
Minibuses	-	400 (10%)	800 (20%)	2 800 (70%)	4 000

Buses serve 16 routes with one of them served by a private operator. This company's buses are natural gas-powered. Out of 458 municipal buses, only 120 are operational. The rest require in-depth maintenance and some of those even major repairs.

City of Osh. The transport sector of the city of Osh contains about 6% of the total vehicles of a similar category registered in the country. Since 2013, the number of passenger vehicles grew by 25%. The fleet of passenger vehicles older than 10 years accounts for about 94% of all such vehicles.

The share of public transport in Osh is miniscule since only 2 trolleybus routes and 3 bus routes are in operation served by a municipal company. The city is served by 1 166 minibuses that belong to 23 private operators. 81% of the minibus fleet are represented by vehicles older than 10 years. At the same time, the city's landscape simply does not allow using large-capacity buses and trolleybuses.

Public transportation. In order to achieve a material progress in reducing emissions of pollutants and CO₂ from vehicles, the public transport sectors of Bishkek and Osh need to be reformed.

One should take into account the fact that using minibuses for purposes of public transportation is non-rational from the perspective of a severely limited space on the cities' roads. Using a larger full-fledged high-capacity bus or a similar trolleybus can replace up to 5 minibuses. This indicates a need for an alternative or an increase in the number of buses and trolleybuses.

Additionally, the level of quality of passenger transportation does not correspond to the established requirements, in particular when it comes to needs of Persons With Disabilities (PWD). At the same time, trolleybuses procured by the Bishkek Mayor's Office have special devices for PWD which is consistent with the second objective of SDG 11.

An unsatisfactory quality of services rendered by minibuses became one of the reasons for city residents' having switched to bicycles. Yet, despite the growing number of cyclists in the city, their numbers are still impeded by a lack of an adequate cycling infrastructure.

The problems experienced in the course of using public transportation make city residents purchase own cars despite the relative expensiveness of ownership and operation. Public transport fares are consistent with the quality of service, yet, quantitatively speaking, the current fare set is inadequate for improving the situation. In Osh, the fare for school students and retirees is a mere KGS 1 per trip, while it rises to KGS 6 for other categories of citizens. Such prices make investments into new municipal transport simply unreasonable.

At the same time, private companies are not motivated to invest in their fleets in the form of a transition to natural gas as fuel by way of installing natural gas-propelled generating units into the conventional Internal Combustion Engines of their minibuses.

The main problem is really a short-term nature of contracts awarded to them (no longer than 3 years). Amidst such circumstances and Mayor's Office-capped fares in effect, private public transport fleet owners are simply disincentivized to make capital-intensive and risky investments into their fleets. Natural gas-powered buses cost more than diesel-powered ones. At the same time, in the long run, using natural gas is actually more profitable since the price difference between natural gas and diesel fuel is, on average, KGS 20 per liter.

At the international level, a trend for a transition of public transport to natural gas remains relevant. In 2015, the Czech Republic adopted a National Program of Actions in Environmentally Clean Transport System pursuant to which by year 2020 natural gas was supposed to account for 10% of the total volume of fuel consumed in the transport sector including electrical energy. In 2017, every sixth bus registered in the Czech Republic was fueled by condensed natural gas.

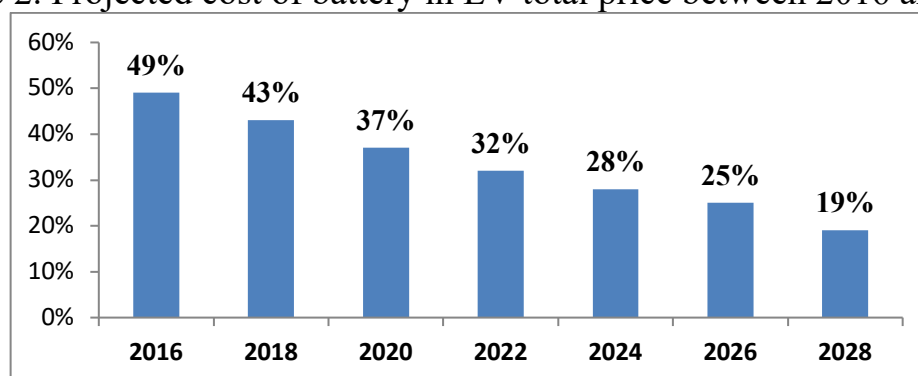
As per OECD estimates, a procurement by Bishkek of 98 new condensed natural gas-powered trolleybuses and 118 buses may result in a reduction of

emissions of CO₂ of 9,555 t/year, CO – 43,762 t/year, NO_x – 174,604 t/year, suspended particles – 4,132 t/year, SO₂ – 3,905 t/year. In Osh, procuring 17 new condensed natural gas-powered trolleybuses and 170 buses may result in a reduction of emissions of CO₂ of 8,165 t/year, CO – 50,916 t/year, NO_x – 198,916 t/year, suspended particles – 4,871 t/year, SO₂ – 4,617 t/year.

Currently, the Kyrgyz Republic does not motivate a transition of private operators to low-carbon fuel or a purchase of such fuel-powered buses. There are no incentives for ordinary vehicle owners who do not wish to face a problem of searching for natural gas fueling stations and are not always prepared to invest into the installation of the required complementary units for their ICEs despite the obvious savings in the long run.

Electrically powered vehicles (EVs). Pursuant to expert estimates by IEA, the number of vehicles by 2020 will total 13 million, and around 130 million by 2030. At the same time, several European nations declared their plans to ban sales of gasoline and diesel ICE cars by 2040. One should note that about a half of the cost of an EV falls on the cost of its electrical battery. Pursuant to a report by McKinsey & Company, in 2010 the cost of a battery totaled USD 1000/1 kWh. By 2016, however, this figure dropped to USD 227/1 kWh. At the same time, the cost of batteries continues to decline due to technological progress and increasing competition (Figure 2).

Figure 2. Projected cost of battery in EV total price between 2016 and 2030



In order to resolve issues associated with the aging fleet and low fuel quality, the Government of the Kyrgyz Republic assumed commitments to transition to using Euro-5 and Euro-6 classes of fuel and reduced import duty rates for new cars and introduced stimulating and zero-duty rates for hybrid and EV vehicles respectively.

Yet, the measures above did not prove to be adequate to reduce emissions of pollutants and CO₂.

The zero-rate import tariffs on EVs are currently not a sufficient stimulus to increase the share of EVs in the country's vehicular fleet. Here, the biggest obstacle to a widespread popularity of EVs is a lack of the electrical charging infrastructure. Pursuant to expert estimates, replacing 3–5% of ICE cars with a

similar number of EVs in the Kyrgyz Republic, however, may facilitate major positive changes in the environment of Bishkek.

The growth of EVs is one of the more relevant trends in the current development of the global automotive industry. The main motivation in the proliferation of EVs is associated with their environmental soundness and efficiency, as well as superior consumer properties: a lack of noise, dynamic characteristics, low operation costs, etc.

The annual need of the Kyrgyz Republic for imports of fuels and lubricants totals around 1 million tons of petroleum products amounting to more than USD 500 million.

Bishkek accounts for the largest share of the entire volume of gasoline (94%) and diesel fuel (89%) consumed (as at 2014).

Emissions into air from mobile sources in 2014 totaled 400,27 thousand tons, which is 1,6 times more than in 2011 (Table 6). CO_x and NO_x as well as HC_x emissions resulting from the consumption of gasoline accounted for the highest volume of all emissions in 2014.

Table 6. Emissions of air pollutants from fuel consumed by road vehicles, thousand tons

Emissions	2011	2012	2013	2014
Gasoline				
Carbon oxide	207,634	379,904	306,897	306,258
Hydrocarbons	22,741	41,609	33,613	33,542
Sulphur dioxide	0,742	1,357	1,096	1,093
Nitrogen oxide	13,348	24,422	19,729	19,688
Soot and carbon dust	0,544	0,995	0,803	0,802
Diesel fuel				
Carbon oxide	5,075	13,173	14,244	16,528
Hydrocarbons	2,052	5,325	5,758	6,722
Sulphur dioxide	0,216	0,561	0,606	0,707
Nitrogen oxide	3,563	9,249	10,001	11,675
Soot and carbon dust	0,994	2,579	2,788	3,255
Total emissions	256,909	479,174	395,535	400,270

The existing low electrical energy tariffs provide favorable conditions for the proliferation of EVs in the Kyrgyz Republic. As per conditional estimates, when comparing ICE-propelled cars and EVs, annual operation costs of ICE cars are 10 times higher than those of EVs. At the same time, the price of a new EV is comparatively higher than that of a similar ICE car, however, subsequent operating costs will be much lower.

Objectives. Taking into consideration the problems and barriers above, the achievement of the goal set above will be ensured by the attainment of the following objectives: 1) increase the share of low-carbon and electrical public transport with special devices for PWD in the cities of Bishkek and Osh by 403 units; 2) improve the system of public transport in the cities of Bishkek and Osh;

3) create the electrical charging infrastructure in the cities of Bishkek and Osh and along the Bishkek-Osh and Bishkek-Karakol national highways; 4) develop and introduce administrative and economic tools to create basic conditions to stimulate demand for EVs in the cities of Bishkek and Osh.

1) Increase the share of low-carbon and electrical public transport with special devices for PWD in the cities of Bishkek and Osh by 403 units

In order to resolve the problem of insufficient municipal transport, the capital will gradually procure 98 trolleybuses of which 20 will be equipped with rechargeable batteries and 118 condensed natural gas-powered buses. All new buses and trolleybuses will be equipped with special devices for PWDs. The city of Osh will procure new 17 trolleybuses and 170 condensed natural gas-powered buses;

2) Improve the system of public transport in the cities of Bishkek and Osh

With the introduction of electronic fare payment in public transport in Bishkek, the Mayor's Office will receive reliable information about passenger transportation. Using that information, fares will be revised to create a new level playing field to assist the currently unprofitable municipal transport. Pursuant to the new fare system, targeted subsidies will be extended to most vulnerable demographics, a healthy competition will be developed and encouraged and a basis will be formed to achieve the second objective of SDG 11, while making the cost of using public transport for city residents cheaper than operating and owning a private vehicle. At the same time, Mayor's Offices of Bishkek and Osh will try to identify streets on which dedicated public transport lanes could be introduced.

At the same time, routes of buses and trolleybuses with accumulating batteries will be changed depending on the passenger traffic in the city which should enable the municipal public transport to serve the most popular routes. When increasing the number of one-way streets, the Mayor's Office will prioritize public transport by providing it with dedicated lanes.

Following the redistribution of routes for private operators serving the public with minibuses, subsequent policies will aim to provide private operators with long-term contracts that take into account their business interests and provide for a regular refreshment of their vehicle fleets which, in combination with measures to transition Euro-5 fuel class, will help reduce emissions.

Improving the quality of passenger transportation in public transport stimulates some car owners to abandon their vehicles in favor of public transport which may help partially alleviate the traffic jams and reduce emissions. For comfort of city residents, the Mayor's Office will design an inquiry app service that should reflect real-time traffic jams. Information will be received from public transport locating sensors. Taking into account the average public transport speed at a given point of time, the software will identify traffic jams.

In order to verify data, the software will also take into account the distance between trolleybuses, buses and minibuses relative to one another at a given section of a given road. If that distance does not significantly change, that will indicate an emerging traffic congestion. Drivers, passengers and pedestrians will

also be able to indicate emerging traffic jams on/via their smartphones. At the same time, this data will be used by Bishkek and Osh Mayor's Offices to make the most optimal decisions in urban planning;

3) Create the electrical charging infrastructure in the cities of Bishkek and Osh and along the Bishkek-Osh and Bishkek-Karakol national highways

A stimulating factor for a wide-scale proliferation of EVs is the creation of electrical charging infrastructure in the cities of Bishkek and Osh. In order to create and develop such infrastructure, one will conduct a study to identify the optimal location of charging stations from the urban planning perspective. Such a study should also help identify minimum technical specifications for public charging stations. Findings of such study will be used to prepare corresponding investment lots;

4) Develop and introduce administrative and economic tools to create basic conditions to stimulate demand for EVs in the cities of Bishkek and Osh

A partial resolution of the public transport challenges and the problem of excessive number of vehicles on roads will be supported by measures to design and introduce economic and administrative tools to stimulate a transition by vehicle owners to low-carbon vehicles and EVs.

In particular, thanks to the introduction of green taxes, the state budget will receive funds that could be diverted to the implementation of measures to develop the public transport sector. In part, these funds could help recover the missing tax receipts emerging from the introduction of tax breaks and benefits.

Measures in fiscal stimulation to reduce emissions from the public sector are provided for in the Fiscal Incentivization section. Additionally, as part of fiscal incentivization, one will study a prospective repeal of VAT for individuals and legal entities that import EVs into the territory of the Kyrgyz Republic.

In addition to the introduction of zero-rate import duties on EVs, the Government of the Kyrgyz Republic will study the possibility of the introduction of stimulating green tariffs on electrical energy in the amount of KGS 1,07 per 1 kWh (without VAT) for public electrical charging stations-recharged EVs.

One of the most important steps in transitioning to EVs will be a gradual replacement with the existing fleet of vehicles operated by state bodies with EVs which will further popularize the use of EVs by and among the general public with the government setting an example.

Expected results:

- the share of low-carbon and electrically-powered public transport with special devices for PWD in Bishkek and Osh was increased by 403 units;
- stimuli were created to increase demand for EVs and abandon ICE vehicles in favor of public transport;
- emissions of CO₂ and an overall concentration of air pollutants in Bishkek and Osh were decreased;
- an informational service to monitor traffic jams in Bishkek and Osh was designed and launched;

- the most popular and longest routes in Bishkek and Osh are served by municipal operators;
- investment lots to introduce electrical charging infrastructure in Bishkek and Osh (at least 30 charging stations) and along the Bishkek – Osh and Bishkek – Karakol national highways were prepared;
- A Plan of Activities to Replace (Transition from) the Vehicle Fleet of State Organizations (Ministries and Agencies) with (to) EVs was approved by a Resolution of Government of the Kyrgyz Republic.

5. Sustainable tourism

Goal. Create basic tools to stimulate a transition to sustainable tourism to improve quality of life of local population and conserve ecosystems and natural capital for future generations.

Analysis of the current situation. Pursuant to the UN World Travel Organization²⁶, in 2017, the number of international tourists totaled 1,3 billion people, revenues from tourism – USD 1,4 trillion, total contribution of tourism to the global GDP – 10 % (of the global GDP), and 270 million people are employed by this sector accounting for about 8% of the global workforce (every 10th job).

In 2020, it was expected that traveling to famous cities, popular resorts and historical and cultural monuments would be performed by 1,8 billion people, and that revenues from tourism services would total around USD 2 trillion. That would mean that new jobs would be created and millions of people would find gainful employment and livelihoods. While back in 1998, the global tourism employed about 115 million people, by 1999 the figure was 270 million people, and by 2020 the figure is expected to rise to 550 million people. This evidences the fact that tourism is one of the locomotives of the global economic progress.

The significance of the tourism industry is also noted in global objectives of SDGs that talk about a need for designing and implementing strategies to encourage sustainable tourism that facilitates a creation of jobs, development of local culture and production of local products. Tourism development is reflected in two SDGs: *Strengthen the capacity of domestic financial institutions to encourage and to expand access to banking, insurance and financial services for all* (SDG 8) and *Ensure sustainable consumption and production patterns* (SDG 12).

The Kyrgyz Republic possesses a high tourism potential and several major auspicious conditions for a successful development of the tourism sector. Nevertheless, to the backdrop of a record dynamic in global tourism, the development of this sector in the Kyrgyz Republic is still only average at best.

Tourism in one of the priority areas of state economic policy in the Kyrgyz Republic. Over the past five years, pursuant to data of the National Statistical Committee, specific share of tourism in GDP totaled 4,3–4,7%.

²⁶ UN World Tourism Organization, *Tourism Highlights, 2018 Edition*.

As per the World Travel and Tourism Council, the Kyrgyz Republic holds the 102nd place in the global ranking of the tourism sector's direct contribution to GDP. International experts' estimates suggest that the Kyrgyz Republic utilizes its tourism potential for no more than 15% of its maximum which explains its insignificant share in GDP.

Such numbers leave room for taking advantage of opportunities to utilize tourism for further economic growth and development, resolve social problems, create additional jobs, and improve public welfare, while implying and entailing significant challenges and responsibility.

Pursuant to data of the international community, tourism development and tourist activities facilitate a depletion of natural resources in several regions of the world, resulting a shortages of fresh water, loss of biodiversity, soil degradation and pollution along with a set of other adverse consequences. Tourism's contribution to global warming is estimated 5% of the total global GHG emissions.

Pursuant to trends and projections, in the long run, the development of the tourism sector may entail adverse impacts. Under a scenario of business as usual (without any emission reduction), by 2050 the growth of tourism implies an increase in energy consumption (154%), GHG emissions (131%), water consumption (152%) and solid waste disposal (251%).

Sustainability principles apply to economic, ecological and sociocultural aspects of tourism development and in order to guarantee long-term sustainability, one needs to establish a balance among all the three dimensions in question.

Currently, one needs to consider the issue of how to support a progressive but sustainable tourism development. It will be very difficult to achieve to the backdrop of the current state expenditures on tourism development.

There is an observable trend for unorganized tourism. The number of tourists in 2016 totaled 1 273,2 thousand people including in the organized tourism subsector – 627,6 thousand people, and in the unorganized tourism subsector – 645,6 thousand people. At the same time, the share of tourists in the organized tourism subsector declined from 59,3% in 2012 to 49,3% in 2016, while the share of tourists in the unorganized tourism subsector over the same period increased from 40,7% to 50,7%. Also, the number of visitors in specially protected natural areas (with the exception of the Issyk-Kul Biosphere Area) totaled 67,0 thousand people or 10,6% of the total number of organized tourists.

Pursuant to IUCN: CBT-based tourism – is a form of tourism in which a local community possesses significant control of, and participation in, its development and management; with a significant share of benefits from it retained by the community.” The majority of CBT groups are situated in remote mountainous areas. Ecotourism facilitates a reduction of wide-scale poverty a proliferation of inclusive growth in the country by creating and diversifying income sources for the more vulnerable demographics, especially rural women. Such an approach could become a good resource for tourism diversification and involvement of all regions of the country into the tourism sector. Ecotourism

Development Framework by CBT groups was designed in the Kyrgyz Republic and since 2003 a CBT-based Kyrgyz Association of Tourism (KAT) has been in operation. KAT unites 15 CBT groups. In 2008, CBT groups created 412 jobs with an average salary of USD 40 per month, while households of the Arslanbob Resort (Jalal-Abad province) engaged in ecotourism earn between USD 245 and 306 per year which, on average, accounts for 15–25% of their annual income. Studies showed that CBT groups serve around 10 000 foreign tourists every year. An average 8-day stay costing USD 20 per day will result in around USD 1,6 million worth of tourism services rendered and earned per year.

Unique places, pristine nature of highlands, ancient architectural and historical monuments, numerous natural reserves all create conditions for ecological tourism development – a new trend in the modern business of tourism.

Additionally, one needs to more clearly identify institutional responsibilities and objectives in ensuring sustainable tourism.

Objectives. The goal set for the tourism sector shall be achieved by the attainment of the following objectives: 1) ensure the development of a legal and institutional environment for the transition to sustainable tourism; 2) develop and introduce tools and mechanisms of stimulation and support of the transition to sustainable tourism; 3) stimulate the development of sustainable tourism in rural areas by way of zoning, branding in rural areas and the development of small infrastructure.

1) Ensure the development of a legal and institutional environment for the transition to sustainable tourism

In order to achieve this objective, one will assess sustainability of the tourism industry, establish legal specificities of requirements of ecological standards and ecological certification for vendors of tourism services including for the introduction of a voluntary ecological certification and for small wastewater treatment facilities;

2) Develop and introduce tools and mechanisms of stimulation and support of the transition to sustainable tourism

In order to transition to sustainable tourism, one will design and apply financial, regulatory and informational tools, subsidies and benefits, infrastructural support via mechanisms of public-private partnership. For this purpose, one needs to identify priority infrastructural projects needed to develop and support objects of tourism.

In order to build capacity, instill and promote the culture of careful treatment of natural resources, one will analyze the labor market and needs for personnel in the tourism industry and conduct trainings on ecotourism and the use of green technologies;

3) Stimulate the development of sustainable tourism in rural areas by way of zoning, branding in rural areas and the development of small infrastructure

Imbalances in the distribution of income from tourism and environmental pollution will be handled by encouraging ecotourism and community-based tourism (CBT). CBT groups rely on sustainable practice and thus facilitate the

conservation of natural and cultural heritage. They offer to tourists local food grown using traditional agricultural methods, customary lodging (e.g. in nomadic collapsible houses – *yurts*), traditional music, arts, crafts, and cultural traditions. The implementation of this objective will facilitate a creation and diversification of revenue sources for the most vulnerable demographics, especially rural women. Such an approach may become a good resource for tourism diversification and for the involvement of all regions of the country with consideration given to specificities and changing tourism capacities.

Expected results:

- a growth of the share of tourism in GDP of up to 10% was ensured;
- the local economic basis was diversified and additional sources of income were identified;
- local are involved in tourism operations and a growth of local public's income was ensured;
- a growth of revenues of bodies of local governments from tourism was ensured.

6. Municipal waste management

Given the diversity of waste and the need for using differing approaches to managing various types of waste, depending on its origin, class of hazardousness, and state, this Program provides for handling the challenge of proper municipal waste management which should create preconditions necessary to reduce the volume of waste created by 2030, attract the required investments and generally develop the municipal waste management sector in the country.

Goal. Create organizational and legal mechanisms facilitating the minimization of municipal waste by way of involving into production of secondary material resources and forming an official sector of waste recycling, disposal and decontamination.

Analysis of the current situation. As the global practice suggests, sustainable development in the waste management industry provides for requirements for the waste management system that regulate using such opportunities as careful waste separation, reuse of all useful components of the waste, generating energy, ecologically safe dumping of waste fractions not subject to recycling or disposal.

Sustainability of a comprehensive system of waste management is ensured by a development of the market of secondary raw materials made from recycled waste, prevention of illegal dumping of waste (a control system) and application of the “polluter pays” principle.

SDGs draw major attention to waste management. One of the targets of SDG 8 provides for the following: “Improve progressively, through 2030, global resource efficiency in consumption and production and endeavor to decouple economic growth from environmental degradation, in accordance with the 10-

year framework of programs on sustainable consumption and production, with developed countries taking the lead.” SDG 12, in turn, states:

- *By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment;*

- *By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.*

As of today, landfills of the Kyrgyz Republic have accumulated about 16 million 409 thousand 629 tons of consumption waste. Annually, about 519,87 thousand tons of waste is generated. At the same time, there is no definitive data on the accumulated waste due to a lack of an organized transportation and placement of waste and accounting for placed waste.

As a result of stocktaking²⁷, as at 2018, there were 406 landfills in the country of which only 107 were legal (sanctioned) that cover about 616,3 ha including:

- 506,5 ha – agricultural-purpose lands (82%);
- 79 ha – lands of residential settlements (12,8%);
- 7,6 ha – lands of the state forestry stock (1,2 %);
- 23,3 ha – industrial-, transport-, communication-, energy-, defense- and other-purpose lands (4%).

Many dump sites – almost 96% of those occupied by trash and even those that had been properly sanctioned and have all the required permits and title-establishing documents – had not been transformed into an appropriate category of lands needed for the placement of waste.

As a rule, lands including valuable agricultural-purpose lands and forestry stock lands, are not used for their intended purposes which contradicts the Land Code of the Kyrgyz Republic that does not allow using a land plot for a purposes other than intended.

Operating capacities of many landfills in large cities are designed for 15–20 years (as at 70s of the previous century), and yet this operating lifespan has stretched for more than 30 by now. Landfills were created and are being operated without any compliance with technical, sanitary and environmental safety standards, they are not isolated nor fenced which makes them yet another source of environmental pollution and a hazard to human health of residents of adjacent and closely located settlements.

As part of the latest stocktaking, an approximate morphological composition of the waste placed had been taken (visually).

Morphologically, large landfills of the Kyrgyz Republic sport the following waste composition: plastic – 21%, glass – 10%, construction waste – 14%, food waste – 20%, other organic waste – 12%, ash – 11%, metal – 0,5%, paper and cardboard – 1%, textiles – 0,5%, electronic and electrical and technical waste and

²⁷ A collaboration between SAEPF and SIETS, 2018.

other waste (including medical waste) – 10%. The morphological composition of waste is not the same throughout the country and generally changes depending on a given district's welfare level.

In rural areas, the locally placed waste's morphological composition mostly includes construction waste, carcasses of dead animals, agricultural waste, etc.

Pursuant to requirements of the Procedure for Production and Consumption Waste Management in the Kyrgyz Republic as approved by Resolution of Government of the Kyrgyz Republic dated 5 August 2015 #559, collection of consumption and production waste falling under the category of secondary (recycled/recyclable) raw materials must be performed on waste emergence sites separately in compliance with their intended recycling and use.

Additionally, national laws prohibit dump sites from accepting hazardous waste and waste that can be used for purposes of creating secondary (recycled) raw materials.

Yet, despite these requirements, more than 70% of placed waste accounts for waste perfectly suitable for recycling and disposal.

Official waste collectors take out and place on landfills hazardous waste together with other municipal waste. This creates a major hazard for human health and environment.

Therefore, the better part of municipal waste that contains such hazardous consumption waste elements as medical, construction, electronic and electrical and technical waste, that emerge as part of domestic consumption and commerce and end up on landfills due to a lack of separated municipal waste collection and recycling, eventually appear on dump sites and landfills.

Other major problems include polyethylene bags that are barely biodegradable and, despite all the fencing, are blown away from and out of dump sites and landfills creating yet another adverse impact on the environment.

Medical and biological waste is a source of various infections and a biological threat to the environment and human health. The composition of electronic and electrical and technical waste contains such hazardous materials and elements as cadmium, lead, mercury, etc.

Additionally, areas of dump sites become habitats of mice, insects, and rats that are carriers of various communicable diseases and present a great epidemiological threat to the population.

Waste, on the one hand, is a source of adverse impact on human health and environment, and on the other hand, is a source of conditionally renewable material and fuel and energy resources that are conventionally called secondary (recycled) raw materials.

Using waste as secondary (recyclable/recycled) raw materials helps achieve a lot of commercial and economic objectives such as saving primary raw materials, preventing pollution of water bodies, soil and air basin, expanding the production of replacement parts and items made of artificial materials, and producing new types of consumer goods.

One of the main obstacles to the formation of the waste recycling industry is a very low level of separated waste collection. Basically, all the waste is piled together and placed in dump sites. The area of large dump sites and landfills sees the operation of illegal waste sorters who frequently have no established residence or IDs. Waste sorting in southern parts of the capital is mostly performed by women and children. Some of them let animals intended for eventual slaughter and sale for meat graze in the territory of landfills, some of them build houses in the sanitary restricted zone which is a major breach of the country's sanitary and epidemiological laws. This problem may entail far-reaching social and medical consequences.

There are very few specialized organizations that render services in collection, transportation and dumping of municipal waste. Specialized organizations rendering such services mostly operate in Chui province. It is rural administrations that render services in collecting, transporting and dumping municipal waste elsewhere in the country or it is the local population that simply transports and dumps their waste at local dump sites.

The legal waste recycling sector is developed very poorly in the country. Mostly, only paper and plastic (in the form of PET bottles) are subject to some kind of separated collection and recycling. The analysis of the current situation with waste suggests that there are no comprehensive waste recycling, disposal and decontamination sites. Insufficient attention is paid to this problem in the course of the drafting of environmental policies and nature conservation laws. There are problems with inter-agency cooperation in waste management.

One of the main problems in the arrangement of economically efficient companies dealing with waste recycling and disposal and producing products made of secondary (recycled) raw materials is a lack of a developed infrastructure for separated waste collection and sorting.

The analysis of the state of the formal waste recycling sector evidences the fact that most such waste is excluded from secondary commercial turnover and is not a subject to commercial operations. For instance, in 2017, the State Agency for Environmental Protection and Forestry under Government of the Kyrgyz Republic only issued 7 licenses to dispose of, store, dump and destroy toxic materials and substances:

- Asia AKU Metal, LLC – disposal of lead batteries;
- Kant Tire Recycling Plant – disposal of tires and plastic;
- Kara-Balta Mining Plant – dumping of toxic waste;
- Janar Electronic, LLC – primary recycling of electronic waste (mostly, office equipment);
- Bishkek Vtorchermet, LLC – recycling of lead batteries;
- Nika KG, LLC – recycling of used oils and batteries;
- Yakupov, Private Entrepreneur – recycling of used oils, lead batteries and tires.

The growth of the share of recycled waste is hindered by an inadequately functioning system of state and production control in the area of waste

management, as well as high operating and financial costs that are key conditions for an efficient arrangement of waste recycling, disposal and decontamination, as well as an inadequate market development and a low demand for products made of waste-derived raw materials.

In contrast with the formal waste management sector, illegal waste recycling is rather widespread since it is a profitable business and is, in the first place, associated with low operating costs compared costs of formal recyclers.

Informal waste collectors pick up most valuable components of waste right on dumping sites. Nevertheless, waste collected by trash collectors contain 28% of valuable fractions, of which recyclable paper accounts for 10%; glass – 8%; metals – 1%; plastic – 8%; textiles – 1%. Organic waste accounts for 49% of the rest of municipal waste, and other matters – 22%. This revenue-generating area of activities of low-income population poses major public health risks especially for women and children involved in such work.

The material and technical basis of the existing waste management system is obsolete and requires modernization and refreshment. The level of uniformity and interchangeability of waste management transport fleet and waste container stock is low.

Despite the comparatively developed area of legal regulation (consisting of more than 60 legal acts) of waste management, not all legal provisions are enforced or complied with in practice and thus require improvement and regulation²⁸.

As a matter of priority, one needs to improve and specify the system of terms and definitions in waste management and introduce new concepts associated with types and objects of activities in waste recycling, disposal and decontamination. The country's laws lack provisions regulating the collection and recycling of secondary (recyclable) raw materials, do not use mechanisms of economic stimulation of the development of the sector of secondary (recyclable) raw materials recycling. Existing waste management laws lack requirements for companies with regard to waste recycling and with regard to technologies of recycling.

The said laws do mention waste that falls under the category of secondary (recyclable) raw materials, however, a definition of that term and a list of such waste are lacking. The definition of the very term “secondary raw materials” is lacking too.

Laws also fail to fully reflect inter-agency cooperation in the regulation and arrangement of activities in waste recycling, disposal and decontamination. Standard-setting in waste management is limited to stating the formation, movement and placement of hazardous waste on the basis of draft norms of waste emergence and limits on their placement. There are no adequately effective managerial decisions in resource saving, introduction of best available technologies, involvement of waste into commercial turnover, enhancement of

²⁸ http://www.ecology.gov.kg/public/images/file_library/201805251452046.pdf

efficiency in waste management. The better part of waste is simply immediately and directly routed to dumping sites pursuant to limits of their quantities.

Economic regulation in the area of waste management is conducted by way of levying a fee for waste placement with consideration given to waste volume, class and standards of placement.

At the same time, mechanisms of state economic “positive” reinforcement are lacking, e.g. in the form of a reduction of tax on ecologically clean products or a prioritization, in the course of public procurements, of such products for environmentally oriented businesses. Social tax benefits aiming to stimulate waste management and utilization of secondary (recycled) raw materials are also lacking.

Pursuant to data of the National Statistical Committee of the Kyrgyz Republic, the emergence of waste in the territory of our country over the period of 2010–2016 increased twofold (Table 7). In 2016, the share of recycled and disposed waste in companies relative to emerging waste totaled 67%, at the same time, 99% (4 044 thousand tons²⁹) of recycled and disposed waste was the result of operations of the mining industry, i.e. it is basically an indicator of the mining sector’s waste only. The remainder of the waste undergoes almost no recycling.

Table 7. Waste from production and consumption, thousand tons/year

	2010	2011	2012	2013	2014	2015	2016
Presence of waste of production and consumption in the territory (at start of year)	84 858,9	94 929,6	99 805,2	108 330,8	112 667,5	114 910,5	120 929,6
Emergence of waste of production and consumption in the territory	5 806,8	10 152,9	4 930,2	7 957,3	10 223,0	10 498,9	12 377,5
Used by companies (processed, destroyed)	2,1	4,2	16,1	3 070,3	4 933,3	4 893,0	4 072,0
Collection of municipal waste (solid domestic waste)	1 114,6	1 173,8	980,4	1 175,6	994,9	1 113,3	1 230,1

²⁹ Data for 2016.

The formation of production and consumption waste per capita is growing throughout the country. In 2010, this figure was 1 118,2 kg per person, in 2016, it increased almost twofold and reached 2 015,8 kg per person.

There are no official data on the municipal waste as a whole that represents a combination of waste from commercial entities and household waste falling under the category of municipal waste. Therefore, there is no way to quantify dynamic indicators of municipal waste emergence nor the share and flows of waste remitted for recycling.

Pursuant to the data available, however, the volume of waste is consistently growing, efforts to minimize it are insufficient, and the bulk of waste is simply rerouted for dumping.

Persistence of the existing trends does not facilitate the achievement of SDGs in terms of the minimization and prevention of waste emergence and may entail a set of adverse implications such as:

- a growth of the emergence of waste associated with an intensive use of natural raw materials and fuel and energy resources, an increase in the share of consumption of industrial and agricultural products, an increase in the use of packaging materials resulting in a growth of waste dumped given a general lack, and frequent absence, of sorting and recycling capacities;
- a deterioration of the environmental situation associated with the strengthening of the adverse impact of growing flows of placed and dumped waste on the environment and human health, a depletion of non-renewable natural resources, a growing accumulation of damage to environmental components;
- an increasing gap between the state and key indicators of waste management in the country compared to developed nations including in the area of energy and resource saving, design and application of efficient equipment and technologies of involvement of waste into the commercial turnover;
- a restriction of access to the participation in joint international projects due to a general investment and technological unattractiveness of the sector's infrastructure as well as the shortage of financial resources and qualified staff in the sector.

If the current trends persist, by 2030, the development of waste management will slow down which, in turn, will lead to a deterioration of environmental components all the way up to irreversible adverse implications and, accordingly, to a growth of incidence of diseases among the general public triggered by such factors.

Objectives. Taking into consideration the goal set above and the existing problems, the state policy in the municipal waste management shall be aimed at attaining the following objectives: 1) introduce into the legislative and regulatory framework provisions on the use of separate collection of municipal waste facilitating the attraction of secondary material resources into the commercial turnover; 2) introduce into the normative and regulatory framework modern economic mechanisms of waste management; 3) ensure proper state control and supervision at all stages of waste management; 4) enhance public awareness of,

and ecological culture and interest in, separate waste collection and minimization of emergence of waste.

1) Introduce into the legislative and regulatory framework provisions on the use of separate collection of municipal waste facilitating the attraction of secondary material resources into the commercial turnover

In order to achieve this objective, one will draft Rules of Separated Municipal Waste Collection in Settlements of the Kyrgyz Republic with a list of types of municipal waste ensuring a strict regulation of separated municipal waste collection with consideration given to risk reduction and provision of social guarantees to employees involved in waste sorting and recycling. Additionally, laws will be amended to regulate, and make relevant, provisions ensuring the involvement into commercial turnover of secondary (recycled) raw materials. In order to harmonize and clarify the terminology used in waste management, the Program provides for approving concepts and definitions that determine the understanding of secondary (recycled) raw materials. In order to ensure the involvement of secondary (recycled) raw materials into commercial turnover, criteria and procedures for allocating waste to categories of secondary (recycled) raw materials will be drafted and a list of types of waste falling under such categories will be prepared;

2) Introduce into the normative and regulatory framework modern economic mechanisms of waste management

This objective aims to regulate the Extended Producer Responsibility (EPR) principles and stimulate the introduction of nature conservation, resource-saving and low-waste technologies via the provision of subsidies and benefits to environmentally oriented businesses. This objective will also aim to amend laws needed to develop:

- a system of tax breaks and preferences stimulating environmental entrepreneurship and nature conservation;
- a system of concessional loans aimed at supporting business plans of investment projects linked to waste disposal and recycling;
- a state/municipal commission for products made of recycled raw materials;

3) Ensure proper state control and supervision at all stages of waste management

This objective provides for the regulation of requirements set for facilities that decontaminate, recycle, and dispose of, waste and use ecologically safe technologies of waste decontamination, recycling and disposal and determine responsibility and liability for the violation of separated waste collection. Additionally, laws will be amended to regulate categories of lands occupied for purposes of waste placement;

4) Enhance public awareness of, and ecological culture and interest in, separate waste collection and minimization of emergence of waste

This objective will be attained by conducting outreach and awareness raising about the general public to disseminate information about advantages of separated waste collection.

Expected results:

- draft and adopt, during the Program implementation period, the following 11 legislative acts (3 laws of the Kyrgyz Republic and 8 resolutions of the Government of the Kyrgyz Republic):

- draft laws of the Kyrgyz Republic:

- on amendments to legislative acts of the Kyrgyz Republic regarding the enhancement of the level of involvement of secondary (recycled) raw materials into commercial turnover in the territory of the Kyrgyz Republic;

- on amendments to legislative acts of the Kyrgyz Republic regarding the introduction of environmental management mechanisms for waste management. The amendments will ensure the development of a system of tax breaks and preferences stimulating environmental entrepreneurship and nature conservation, a system of concessional loans aimed at supporting business plans of investment projects associated with the objectives of waste disposal and recycling, as well as a state commission for products made of secondary (recycled) raw materials;

- amendments to the Land Code of the Kyrgyz Republic on the regulation of categories of lands occupied by waste placement facilities;

- draft resolutions of the Government of the Kyrgyz Republic:

- approving the Rules of Separated Municipal Waste Collection in Settlements and List of Types of Municipal Waste;

- approving the Criteria and Procedures for Allocating Waste to Categories of Secondary (Recycled) Raw Materials and List of Types of Waste Galling under Category of Secondary (Recycled) Raw Materials;

- 4 draft resolutions on the implementation of EPR in the territory of the Kyrgyz Republic:

- approving the Methodology for Calculation of Payment for the Arrangement of Waste Collection, Transportation, Recycling, Disposal and Decontamination;

- amending the Resolution of the Government of the Kyrgyz Republic “On Procedures for Production and consumption Waste Management in the Territory of the Kyrgyz Republic” regarding the regulation of requirements set for facilities for waste decontamination, recycling and disposal and the use of environmentally safe technologies of waste decontamination, recycling and disposal.

- Pursuant to the normative legal acts drafted, one will:

- introduce into checklists of the State Inspectorate for Ecological and Technical Safety under the Government of the Kyrgyz Republic requirements for businesses concerning waste management;

- draft and submit for approval a draft Law of the Kyrgyz Republic “On Amendments to Legislative Acts of the Kyrgyz Republic Regarding Responsibility and Liability for Violation of Separated Waste Collection Rules”;

raise public awareness throughout the country with up to 90% of the population covered;

ensure that the media regularly publish information about advantages of separated waste collection.

7. Green cities

Goal. Create a foundation for sustainable development of green cities in urban planning of the Kyrgyz Republic.

Analysis of the current situation. 93% of the territory of the Kyrgyz Republic is covered by mountains where construction is limited due to high seismicity, geodynamics (mobility) of mountain terrain and a general lack of study of the areas. Only 20% of the country's territory is suitable for the construction of residential housing. Of that area, 7% of the territory is covered by cities and settlements, tillage, orchards and new constructions. The country has 40 districts, 31 cities including 2 national-level ones (Bishkek and Osh), 12 provincial-level cities and 17 district-level cities, and 453 rural districts (*aiyl aymaks*). Over the past 20 years, population in almost all cities except for Bishkek, Jalal-Abad and Uzgen did not change significantly. The largest city of the country is its capital where more than a million people reside. Other large cities include Osh and Jalal-Abad where 267 and 100,7 thousand people reside, respectively, while other cities are small and medium towns and townships with population between 3 and 70 thousand people.

Small cities continue to see their development slow down and, in many ways, this is brought about by changes such as the restructuring of town-forming large industrial companies that used to be the foundation of many towns and townships in the country and whose downsizing and/or departure resulted in a loss of jobs and a major decline in local living standards.

In order to resolve these problems, state strategic documents were approved. In 2009, the Government of the Kyrgyz Republic approved the Concept of State Regional Policy of the Kyrgyz Republic, in 2017 – the Concept of Regional Policy of the Kyrgyz Republic for Years 2018-2022. However, currently, there are problems with the arrangement, planning, designing, and regulation of spatial management due to a lack of a full package of urban planning documentation. This includes general scheme and designs of regional planning at the national level, general plans of cities and villages, rules of land use and development and a series of other required laws, legal and technical regulatory acts.

General schemes and designs are consistent with large strategic, assessment and cadaster objectives in developing transit international corridors, appraisal of natural, production, material and technical and live resources. The Kyrgyz Republic lacks a sufficient number of such schemes at the national level which makes the country susceptible to complex, highly continental climate, mountainous landscape with high seismicity, endangering the safety of its people.

97,8% of all the country's settlements are situated in areas of seismicity of 8-9. Therefore, efficiency of administration and governance in this area remains to be low.

Infrastructural agencies operate in various bodies, which is inefficient for prompt responding. In the majority of design institutes, a lack of science and research officers and experimental laboratories is observed which only complicates the pursuit of a modern urban planning infrastructural policy. Objectives in urban planning are split among different agencies: regional planning is done by the Ministry of Economy of the Kyrgyz Republic, architectural monuments are covered by the Ministry of Culture, Information and Tourism of the Kyrgyz Republic, infrastructural issues are covered by the Ministry of Transport and Roads of the Kyrgyz Republic and the State Committee for Information Technologies and Communication of the Kyrgyz Republic, resources are covered by the State Committee for Manufacturing Industry, Energy and Mining of the Kyrgyz Republic and the State Agency for Environmental Protection and Forestry of the Kyrgyz Republic with the rest of the issues covered by the State Agency for Architecture, Construction and Housing Stock of the Kyrgyz Republic.

Currently, city budgets on average spend 40-50% of their funds on their municipal housing stock, while budgets of rural districts spend up to 80% of their funds to pay salaries of their personnel. The existing social infrastructure of cities that includes medical treatment and educational institutions, parks, housing, etc. is developed insufficiently. There is a shortage of preschool and school institutions in cities to satisfy their numbers and density as per Construction Norms and Rules and in some case their buildings are in critical accident-prone condition. New medical treatment institutions in small and medium cities are built infrequently.

Housing is one of the factors impacting the territorial and spatial planning and regulation of cities. The existing domestic migration trend when rural residents move to urban areas resulted in a situation when the housing issue was resolved by outright squatting when newly arriving rural residents were illegally capturing territories on city outskirts. In order to resolve this problem, the Government of the Kyrgyz Republic approved the Program of Affordable Housing 2015-2020 that provided for housing loaning at 8% APR, yet, one needs to take into account that the old housing stock of the country is rapidly approaching its useful life (50 years). Taking into consideration the seismic properties of the country's lands, houses built as per Construction Norms and Rules of 1962 are simply unreliable after the expiry of their useful life.

Access to sanitary amenities is only available to 50% of rural residents and about 82% of urban residents. In more than 80% of all cities there has been no stocktaking and planting of green stock. General PWD infrastructure is lacking almost everywhere including PWD-sensitive infrastructure that reduces barriers to their socialization. Sports facilities are also poorly developed throughout the country.

The urban utilities and services infrastructure was largely worn out by 2001 since the most active period of networks and services installation was back in the 70s of the previous century, while the maximum useful life of such services is no longer than 30-40 years. This impacts both the quality of utilities services and the level of technical losses in them which sometimes reaches a whopping 60%.

The share of the population possessing a consistent access to drinking water supply decreased and totaled 89,9% in 2016, which is lower than the level of 2012, when this figure was 93,2%. The lowest figures for this indicator are registered in Batken, Jalal-Abad and Osh provinces – from 75% to 85% respectively. Heating in Bishkek and Osh is provided via Heat Power Plants while other cities still use boiler facilities and household furnace-based heating.

The country also has a high road accident rate. Pursuant to data of the World Health Organization (WHO), the Kyrgyz Republic holds the 2nd place among the European region's nations in the ranking of fatalities resulting from road vehicular accidents per 100 000 people – 19,2 persons (as of 2010). Road accident injuries are a frequent cause of mortality in the age group of 5 to 29. Annually, more than 1200 people die from road vehicular accidents and up to 10 000 are injured.

Other significant problems in cities include a high level of air pollution and municipal waste that worsen the environmental situation. Most cities have so-called abandoned (orphan) sites, which represent unused territories and non-operation facilities that are unsafe and pollute the city environment and decay slowly. Additionally, significant funds are injected into the improvement of the urban landscapes and construction of new parks and public spaces, yet, commercial profitability and break-even aspects are not considered, i.e. one needs to invest even more funds to sustain and maintain such new facilities. Cities and settlements situated near tailing sites are particularly dangerous. Most cities of the country need modernization, reconstruction and creation of quality infrastructure.

Currently, one needs to start with identifying and taking stock of resources available in a given territory, analyzing and assessing capacities of cities with consideration given to social, economic and ecological aspects of development including the analysis of city development strategies. One thus needs to consistently attain the following objectives:

Objectives. In order to achieve the goal set above, the following objectives shall be attained: 1) create legislative and institutional frameworks for the development of green cities; 2) create a city management system with consideration given to green city principles; 3) develop a technical and communication infrastructure (utilities networks and roads) of cities ensuring safety, ecological sustainability and a socially inclusive environment; 4) awareness raising and training.

1) Create legislative and institutional frameworks for the development of green cities

This objective provides for analyzing and assessing the existing legislative and technical regulatory acts to identify contradictions and gaps in, and barriers to, the development of green cities. It will require analyzing and assessing 12

legislative and technical regulatory acts that significantly impact the level of territorial and spatial and economic development. One needs to create a city development fund supported by a science and research institute for comprehensive development of cities and their infrastructure on the basis of a public-private partnership with the involvement of private businesses and investors who possess a capacity in mobilizing resources and design rules of entering local markets for investment projects while acting as a regulatory mechanism. Should conflicts of interest emerge, city development funds can, in the best interest of cities, take responsibility and remit the project implementation to bodies of local governments or local businesses.

Additionally, a full package of urban planning documentation will be prepared: national-level general schemes and designs, general plans of cities and villages, detailed layout designs, rules of land use and development, a master plan (for Bishkek) and opportunities for the enhancement of the role of the body responsible for a unified urban planning policy in the country will be considered;

2) Create a city management system with consideration given to green city principles

In order to build capacity of cities, one will take a set of measures changing the existing procedure of city management and territorial and spatial regulation. The Program provides for analyzing and assessing capacities of cities with consideration given to social, economic, and environmental aspects of development including city development strategies. The Spatial Development Strategy of the Kyrgyz Republic that needs to be drafted will become a part of national-level strategic planning and a basis by which all other city spatial development strategies should be guided by. In future, city spatial development strategies will be drafted for all cities of the country. This process will involve all demographics and ensure equal participation of men and women.

Additionally, a set of measures aimed at an inclusive city policy and territorial and spatial sustainable planning and city and settlement development will be drafted for their use by local authorities. In particular, a guidance, recommendations, methodological instructions for city policies and management as well as for territorial and spatial development and sustainable planning of cities and settlements will be prepared for their use by local authorities;

3) Develop a technical and communication infrastructure (utilities networks and roads) of cities ensuring safety, ecological sustainability and a socially inclusive environment

The main principle of green cities is controlling, ensuring quality of, and accounting for consumption within the city sustenance infrastructure for which general regulations or Smart City Concepts will be designed. A wide coverage of participants, all citizens with respect to controlling, ensuring quality of, and accounting for consumption will introduce a new paradigm of environmental thinking, careful treatment of resources. A new concept of the development of city public spaces will be drafted that provides for opportunities for the introduction of green technologies and stimulating measures that create

conditions for city development. Drafting such a concept with the involvement of the population, authorities, businesses and supported by specialists will take into account break-even and profitability concept as a mandatory component of the implementation of all infrastructural projects (engineering and technical, communication, social). Additionally, the concepts will provide for a review of the existing priorities and principles of financing of investment projects and the allocation of responsibilities by way of introducing public-private partnerships in the engineering and technical and communication infrastructure;

4) Awareness raising and training

An inclusive Green Economy is socially oriented while its urban planning policies are implemented with a wide coverage of the general public, city communities, business community, and authorities, with all the actors responsible for economic prosperity achieved without damaging the ecology but by creating an equitable and auspicious urban environment. Here, information would be key. First of all, one will need capacity building for municipal authorities and policy drafters and implementers. Many countries' experiences show that informational materials will need to be drafted that can be disseminated through numerous channels of communication including through public transport. This objective provides for training workshops to integrate and secure the buy-in, consent and trust of the public, authorities, business community, and specialists in urban social inclusive policy, municipal administration and governance, and regulation of territorial and spatial planning.

Expected results:

- a full package of urban planning documentation was prepared: general schemes and designs at the national level, general plans of cities and villages, detailed layout designs, rules of land use and development, a master plan (for the city of Bishkek);
- contradictions, gaps, barriers to the development of green cities are identified and eliminated;
- a Spatial Development Strategy of the Kyrgyz Republic is developed;
- strategies of spatial development for cities of the Kyrgyz Republic are developed;
- municipal administration is improved involving the general public, city communities, business community and authorities.

III. Supporting the Process to Transition to an Inclusive Green Economy

1. Sustainable financing

Goal. Introduce sustainable financing of Green Economy activities into the banking and microfinancing sectors by way of bringing the national financial system into compliance with requirements of international climate funds to subsequently utilize the domestic and international financial capacity.

Analysis of the current situation. The world community recognized that the transition to Green Economy is closely related to the development of sustainable financing, in other words, “to support sustainable growth one needs to develop sustainable financing principles and mobilize climate funds.” As part of the Rio Big 20, the practice of global green finance and the concept of ecologization of the financial system (“greening” the financial system or making it environmentally smart) were brought to the global level of discussion and focus.

Sustainable financing of Green Economy activities resonates with SDG 8.10 “Strengthen the capacity of domestic financial institutions to encourage and to expand access to banking, insurance and financial services for all.”

Several countries throughout the world implement various programs of sustainable financing taking into account the fact that this type of financing is one of the underlying factors of sustainable development.

The market for green financing is a fast-growing and forward-looking segment of the global financial market. Here, as at 2017:

- the market for green bonds totaled more than USD 150 billion³⁰;
- the market for climate securities³¹ – more than USD 700 billion³²;
- bank-issued green loans and state financing totaled, per differing estimates, about USD 1-1,5 trillion³³;
- more than 400 institutional investors are managing more than USD 25 trillion worth of investments subject to low-carbon principles of financing³⁴;
- 1,5 thousand participating members of the UN Principles of Responsible Investment (UN PRI) manage assets worth more than USD 62 trillion³⁵.

Currently, the country’s banking and microfinancing sectors have already created and offered green financing products that are yet to be spun off and are still contained in social components such as the green financing component.

The country gained some experience in project financing via commercial banks of the Kyrgyz Republic by international donor organizations. The country’s development partners support the government by facilitating sustainable financing. The main share of Green Economy project financing is provided by the KyrSEFF+ Program. This program was designed by the European Bank for Reconstruction and Development (EBRD) with a total loan portfolio of USD 55 million. KyrSEFF+ is implemented in all regions of the country with the involvement of local partner commercial banks. The introduction of bank products as part of KyrSEFF+ generated experience of more than 60 companies over 2 years. As part of the program, between 2013 and 2017, the cooperation with commercial banks and microfinance organizations resulted in the issuance of more than USD 22 million worth of projects financing aimed at energy saving and energy efficiency.

³⁰ <https://www.climatebonds.net/>

³¹ Climate securities - securities that are issued to finance not only green projects but also climate change mitigation projects.

³² <https://www.climatebonds.net/>

³³ G20 Green Finance Study Group G20 Green Finance Synthesis Report, 15.07.2016

³⁴ <https://www.unpri.org/>

³⁵ <https://www.unpri.org/>

In 2017, the second phase of this program was launched that intends to use another USD 35 million in collaboration with commercial banks and microfinance organizations. The program provides for financing projects aimed at energy saving, energy efficiency, resource and water efficiency, and improving energy efficiency of residential building and companies.

EBRD together with other multilateral development banks also support the Climate Investment Program and the creation of the Climate Finance Center. This Center was created under the Government of the Kyrgyz Republic as part of the Pilot Program for Climate Resilience (PPCR) as supported by the Climate Investment Fund. Technical assistance to certain microfinance organizations of the Kyrgyz Republic is also rendered by IFC including by conducting workshops on energy efficiency loans for households. The Association of Bankers of Mongolia also expressed its intent to assist in the national sustainable development agenda.

Financing is a fundamentally important auspicious tool to perform activities needed to achieve target indicators of the Kyrgyz Republic for its National Sustainable Development Strategy. Currently, banks and microfinance organizations of the Kyrgyz Republic face a situation when the expansion of their operations becomes closely related to a wide range of social, ecological and economic sustainability and social integration. Therefore, the Union of Banks of Kyrgyzstan (UBK) and the Microfinance Organization Association (MFOA) facilitate the promotion of sustainable financing of entrepreneurial activities based on Green Economy principles. Overall, the banking sector is capable of shaping sustainable financing of Green Economy principles due to its ability to systemically cover the national economy.

The Kyrgyz Republic promotes several initiatives in sustainable financing. Some microfinance organizations have already accumulated experience in extending energy efficiency loans (for better insulation of glazed openings of rural houses) and gender equality (financing women-led companies). A Nature Development Fund under the Strategic Agreement on Environmental Protection and Investment Promotion was signed between the Government of the Kyrgyz Republic and the Centerra Gold Inc. and the Kumtor Gold Company, CJSC on 11 September 2017. Capitalization of this Fund is ensured primarily by the Kumtor Gold Company and the very fund intended to invest in the environmental protection development and natural resource conservation as well as in the solidification of capacity of ecologists in the area adjacent to the Kumtor gold mine and elsewhere in the Kyrgyz Republic.

UBK commenced the introduction of sustainable financing principles of Green Economy in the banking sector of the country. 14 commercial banks and 1 MFO signed a Declaration to Create a Green Economy Charter to combine their efforts to shape sustainable financing. They drafted roadmaps to introduce sustainable financing in the banking and microfinancing sectors based on Green Economy principles.

Additionally, UBK join the Sustainable Banking Network (SBN) that is a unique community of financial sector regulators and bank associations of developing countries committed to promoting sustainable financing consistent with best international practices. SBN facilitates collective training of its members and supports them in drafting policies and associated initiatives to create drivers for sustainable financing in their native jurisdictions.

Yet, despite the obvious progress in promoting green financing, the introduction of green instruments and loaning practices in the financial sector is still its formative stage. At the same time, the achievement of goals set for priority directions of the present Program will need financial resources.

A successful introduction of green instruments and loaning practices in the financial sector will become a springboard for the launch of the National Green Financing System.

Objectives. The central idea of global cooperation and the unification of financial and green issues is about connecting the procedures for the resolution of global and national nature- and climate-related and ecological problems with the toolkit of modern global financial markets and via the “greening.” The achievement of the goal to introduce principles of sustainable (green) financing in the banking and microfinancing sector shall be achieved by the attainment of the following objectives: 1) identify the banking sector’s prospective demand and needs for the introduction of green financing principles; 2) prepare the banking and microfinancing sectors for the IFC PS Standards; 3) introduce the system of assessment, observation, control and accompaniment of activities in Green Economy; 4) train personnel and clients of the banking system and microfinance organizations; 5) introduce in practice sustainable financing into the banking and microfinancing sectors; 6) study potential mechanisms of green financing.

1) Identify the banking sector’s prospective demand and needs for the introduction of green financing principles

In order to attain this objective, the Government of the Kyrgyz Republic will take measures to identify the types of entrepreneurial activities and loan products that comply with Green Economy principles. The country will analyze existing Green Economy services and prepare suggestions on creating new products;

2) Prepare the banking and microfinancing sectors for the IFC PS Standards

Combined efforts of the banking and microfinancing sectors will be aimed to identify strategic sectors for financing and the development of sectoral programs. The country also plans to draft and approve internal procedures of commercial banks with respect to products associated with Green Economy. Structural divisions of banks will be augmented by functions in financing Green Economy activities and risk management;

3) Introduce the system of assessment, observation, control and accompaniment of activities in Green Economy

In order to attain this objective, the Program provides for a design of forms of observation, control and assessment of financing of Green Economy activities.

Additionally, the country plans to adapt indicators of the Organization of Economic Cooperation and Development to select relevant Green Economy indicators for each product offered by commercial banks. An analysis will further be prepared and required normative legal acts to introduce standards of sustainable financing of Green Economy activities will be drafted;

4) Train personnel and clients of the banking system and microfinance organizations

This objective will be attained by assessing the preparedness of commercial banks to mobilize funds for Green Economy products, ability of bank personnel to account for, value, control and monitor Green Economy activities. Personnel and clientele of the banking sector will be trained and their literacy in green financing will be improved;

5) Introduce in practice sustainable financing into the banking and microfinancing sectors

As part of this objective, a roadmap to the introduction of Green Economy principles will be drafted and loaning of pilot green financing projects will be arranged. Additionally, a review of the commencement of the practice of the introduction of green financing will be prepared including a monitoring of compliance with provisions of global climate funds, international organizations and stakeholders. The Program also provides for the creation of a joint banking and microfinancing green financing fund with mechanism of contributions and use of its joint funds needed to ensure its successful performance will be designed;

6) Study potential mechanisms of green financing

In order to attain this objective, the Program provides for studying the potential of relevant financial instruments such as capital, quasi-shareholder, bonds, and collateral-free financing based on sustainable financing. Additionally, new financial instruments will be designed in the form of green bonds and insurance; mobile and online microfinancing; ecologically clean loans and green marketing.

The Program also provides for studying opportunities for state involvement and analyzing the legislative framework to create investment funds. Insurance products and services will be studied (e.g. insurance based on agricultural indices) so as to adapt to climate change and the role of bank and microfinance organization supervision policy and financial market reforms as part of sustainable financing of Green Economy activities.

Expected results:

- activities of the financial sector are consistent with Green Economy principles;

- a tested mechanism of sustainable financing of Green Economy activities was launched that will ensure a multiplier effect in all economic sectors of the Kyrgyz Republic;

- commercial banks of the Kyrgyz Republic will gain an opportunity to attract green investments to realize their green financing commitments from global climate funds.

2. Fiscal incentivization

Goal. Introduce green stimuli via fiscal tools.

Analysis of the current situation. Green fiscal tools are related to fiscal and ecological policies and combine taxation and pricing tools that increase income whenever ecological goals are achieved.

The fiscal tools applied for ecological purposes are capable of effectively influencing price signals and market stimuli and directing consumers and producers toward more sustainable options.

Properly selected and implemented fiscal tools results in socially, ecologically and financially sustainable results.

Some of the most widespread and effective green fiscal tools include green taxes (fuel and carbon taxes), ecological payments, tax breaks and state subsidies for green producers and suppliers of services.

Fiscal policies directly impact the achievement of certain SDGs such as: SDG 11 *Make cities and human settlements inclusive, safe, resilient and sustainable*; SDG 12 *Ensure sustainable consumption and production patterns*, and SDG 15 *Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss*. Green fiscal policies will favorably impact the achievement of these SDGs while the current policies significantly hinder it.

The Kyrgyz Republic drafted national green growth monitoring and evaluation indicators that were grouped into five key blocks with consideration given to OECD, such as: carbon and energy productivity, natural assets, ecological quality of life, economic opportunities and response policy, socioeconomic context and growth characteristics. The matrix of indicators in question was prepared in compliance with the conceptual idea for the transition to sustainable development model as prescribed in the National Sustainable Development Strategy of the Kyrgyz Republic for Years 2018-2040.

Principles of tax and tariff mechanisms of nature use are provided for in the Ecological Security Concept of the Kyrgyz Republic as approved by Decree of President of the Kyrgyz Republic dated 23 November 2007 #506. The idea found its development in the National Sustainable Development Strategy of the Kyrgyz Republic for Years 2018-2040 that indicates directions in tax stimulation of Green Economy. The Fiscal Policy Concept of the Kyrgyz Republic for Years 2015-2020 and its Plan of Activities to implement it provide for creating stimuli to promote and use ecological technologies, equipment and products and creating an inter-agency working group to design tools and mechanisms stimulating the development of Green Economy.

The Kyrgyz Republic currently maintains certain elements of green fiscal tools such as preferential customs tariffs for the importation of EVs and hybrid vehicles, fines and penalties for air, soil and water pollution that fail to adequately

reach their objective – discouraging commercial entities from polluting the environment. Additionally, the receipts from such ecological taxes are not spent to compensate for the environmental damage sustained and rather are remitted to the central budget and spent under a general procedure.

The Kyrgyz Republic practices “brown” fiscal tools such as so-called environmentally harmful subsidies from the state budget. As per OECD definition, subsidies are a result of government action that provide advantages to consumers or producers allowing them to sustain income or reduce costs. If such action, however, results in environmental damage, such subsidies are defined as environmentally harmful.

Primary environmentally harmful subsidies in the Kyrgyz Republic include the following:

- financing infrastructural projects (road and irrigation construction) including with funds of official development partners;
- financing intensive development of agriculture without taking into account the value of ecosystems including with funds of official development partners;
- regulating tariffs (energy, housing and utilities, and agriculture);
- tax breaks in the agri-industrial complex.

The first two types of environmentally harmful subsidies are difficult to eliminate since their societal benefits are strong. Rather, mechanisms of the environmental impact assessment need to be applied to them and the minimization of environmental and ecosystem damage should be attempted.

The last two types of environmentally harmful subsidies need to be reformed. For instance, tariff (price) regulation in the heat energy supply sector resulted in a significant subsidization from the national budget – basically, a direct financing of the stocking of fuel to generate heat energy for the population by the state-owned heat energy enterprise “Kyrgyzteploenergo.” It thus supports the pollution of air. Contrary to priorities of sustainable development in the area of the improvement of energy efficiency of the national economy, the subsidy in question encourages an inefficient use of energy resources. At the same time, the social burden of this subsidy is very high: pursuant to the data of the National Statistical Committee of the Kyrgyz Republic, poverty level in the country was registered at 25,6%, while urban poverty was, as a rule, somewhat lower. In other words, about a quarter of all consumers of the state-owned heat energy enterprise “Kyrgyzteploenergo” needs this subsidy.

Tariff regulation harmful to the environment and ecosystems is also applied to electrical energy and irrigation water for agriculture.

Tax breaks for agricultural producers and processors also require a close examination since they are provided to all such entities irrespective of the technology they are using. Therefore, these breaks in their current form cannot be consistent with Green Economy principles.

It is apparent that the transition to Green Economy principles will affect interests of various demographics: businesspeople, urban residents, farmers.

However, without introducing green fiscal tools, it will be impossible to achieve development in other directions of Green Economy.

In future, if the current trends persist, green fiscal tools keep lacking and the ecologization of the fiscal policies is not implement, the country will not be able to fully improve the situation with natural resource and waste management and environmental pollution.

A lack of benefits and stimuli for the transition to green technologies will see the country lag behind from the global economy and make domestic production uncompetitive on global markets where one can observe a trend for the promotion of green products and services. The Kyrgyz Republic is already 10-20 years behind developed countries in terms of ecological reforms.

One needs to lay foundation for the ecologization of fiscal policies and development of Green Economy; introduce green fiscal policy principles into strategic documents and related normative legal acts. One also needs to identify priority sectors for the application of this tool and achieve the minimum indicators to determine the level of the ecologization of the fiscal policies in the country and select the most effective fiscal policy tools that facilitate green growth.

In addition, for purposes of analyzing prospective green tax reforms, the country currently lacks statistical data and a clear system of monitoring of the state of the environment (air, land, and water quality) and economic indicators ensuring the accounting for natural resources and the assessment of commercial operations' impact on their state.

Given the fact that the first stages of the transition to green technologies are linked to relatively high expenditures, it will be difficult to stimulate and regulate economic and fiscal stimuli for the transition to Green Economy without a proper legislative framework.

Objectives. The fiscal tools to be selected by the Kyrgyz Republic must be adapted to specific national circumstances. They must be developed with consideration given to specific problems, history, political context, ecological challenges and the fiscal environment that the country faces today. As part of the introduction of green fiscal tools, the following objectives are expected to be attained: 1) introduce green taxes; 2) enhance efficiency of ecological payments; 3) reform environmentally harmful subsidies; 4) introduce green state subsidies.

1) Introduce green taxes

Pursuant to the global experience, tax stimuli generate effect quickly and are easy to administer. Green financial mechanisms possess the potential to generate more revenues for the state budget. A green tax reform can stimulate economic activities with consideration given to the use of the revenues received to level out the tax burden, accumulate ecological and economic benefits. At the same time, the design and application of financial tools must vary depending on the eventual goal.

Green taxes and charges are intended to support a green reform by increasing economic costs of producing environmentally harmful goods and

services. They stimulate people to intuitively select ecologically clean products and services.

In order to control the ecological situation in the country, the following the ecological taxes are suggested for the introduction:

a) first and foremost, the CO₂ tax and the emissions tax on diesel and gasoline-powered vehicles. Currently, the situation in the transport sector in the cities of Bishkek and Osh is the most acute in the Kyrgyz Republic. The country's capital sees a daily emission of more than 240 thousand tons of pollutants of which 180 thousand tons are released by vehicles.

The introduction of these taxes will enable the country to accumulate funds to extend subsidies to prospective EV owners or those who wish to install a natural gas-powered unit into the engine block of their existing cars. The CO₂ tax will be indirect and will depend on the quantity of fuel purchased since the rate of the emission tax will depend on the vehicle age and the technological type of its engine. The procedure for the provision of subsidies and the queuing procedure for their receipt will be transparent. Mandatory technical inspection of soundness and safety of vehicles will be reintroduced;

b) tax on polyethylene bags that do not have a special biological additive that expedites polyethylene's half-life (biodegradability). Problems associated with polyethylene bags were earlier raised by SAEPF. The Kyrgyz Republic imports (mostly from China) about 250 tons of polyethylene bags per month of 3000 tons per year. The tax on polyethylene bags used in retail can be levied on producers or make retail outlets restrict their use of such single-use bags and/or charge their customers for each bag used;

c) in order to reduce the importation of ecologically harmful goods, one needs to raise the rate of the tax on single-use plastic goods such as plastic utensils, razors, agricultural chemicals, pesticides, etc.;

2) Enhance efficiency of ecological payments

The country applied a normative (standard-based) approach to determining the amount of the ecological damage, i.e. fixed price parameters are used as a measure of actual costs of the environmental restoration to estimate a certain figure that can be considered damage, with the estimation of such damage simplified and calculated without costly data collection, valuation or substantiation on part of independent experts. However, as the practice shows, their application results in a significant understatement of damage.

In order to attain this objective, one needs to run the required research to assess opportunities for the introduction of principles and techniques of estimation of the damage that better correspond to SDGs and Green Economy development.

During the first stage of the introduction of new ecological damage estimation principles and techniques, the business community will incur higher costs. However, since the eventual goal of the compensation is to create stimuli to reduce the environmental pollution, some optimization of the private sector's costs is expected in the future.

Other required measures include raising the amount of fines and penalties; improving administration; improving the logistical base of the payment administrators; developing laboratories; increasing the staffing table of both licensing and permitting bodies and controlling entities;

3) Reform environmentally harmful subsidies

The Kyrgyz Republic maintains about 30 subsidies that are potentially harmful for the environment and ecosystems. These subsidies, firstly, create an imbalance on markets and, secondly, have become a burden for the state budget as they lost their primary function – assisting socially vulnerable demographics.

Some of the potentially most harmful subsidies include:

- direct financing of fuel stocking (mostly coal and fuel/heating oil) by boiler facilities of the state-owned heat energy enterprise “Kyrgyzteploenergo” in the amount of more than KGS 1,2 billion a year and establishing a tariff (price) for heat energy supplied by its boiler facilities at a level much lower than its cost of production;

- setting tariffs for electricity lower than its cost of production;

- setting the amount of payment for the supply of irrigation water at a level much lower than its costs of production and without consideration given to the cost of development of irrigation networks.

This objective is aimed at transforming harmful subsidies in such manner that minimizes amounts allocated to finance them from the state budget while reducing the adverse environmental impact.

In order to reform subsidies, the following work needs to be done:

- identifying the target group of subsidy recipients who include socially vulnerable demographics, and those living below poverty line in the first place;

- for tariff-related subsidies – introducing a new mechanism of tariff-setting;

- introducing mechanisms of social assistance to individuals and households who truly need such subsidies;

- introducing a mechanism of using funds made available on the approximation of technological processes of respective sectors to green standards;

- creating an appropriate communication environment.

In order to implement this objective, one needs human resources in the first place. Involving qualified specialists to run studies and design relevant mechanisms will be required. Engaging specialists for this work will require assistance of donor organizations’ projects in financing their fees.

Donor assistance may be required to draft and implement the communication strategy.

As a result of the implementation of this financial decision, funds from the state budget will be made available preliminarily estimated at KGS 4 billion;

4) Introduce green state subsidies

Reforming subsidies harmful to biodiversity will make available a significant amount of funds most of which can be used to finance nature conservation and other activities auspicious for biodiversity.

Over the upcoming three years, the subsidies will be allocated for:

- re-equipment of boiler facilities for them to use more ecologically friendly fuels and improve their energy generation efficiency ratio;
- grants and concessional loans to insulate housing. This mechanism can also be subject to automatic prolongation (a revolving type of loan);
- development of organic agriculture including the development of water-saving and soil-sensitive methods of irrigation.

Expected results:

- green stimuli (fiscal tools) for the development of green technologies were introduced;
- a growth of tax receipts thanks to newly introduced taxes was achieved;
- a harmful environmental impact as a result of a reduction in the consumption of fossil fuel and an increase in the use of cleaner fuels for transport and heating of buildings was reduced;
- an increase in receipts of contributions and payments to special funds and state budget was achieved;
- the administration of ecological payments from the perspective of goals and objectives was achieved.

3. Sustainable public procurements

Some of the more crucial and effective mechanisms of the implementation of the strategy to transition to green development include sustainable public procurements. Sustainable green procurements are capable of becoming a driving force of sustainable development. This is a widely accepted fact in the international community as solidified by its having been prescribed in one of the UN SDGs.

Goal. Bring the share of sustainable public procurements to 30% by 2023 and to 50% by 2040.

Analysis of the current situation. The objective of SDG 12 provides for encouraging a practice of government procurement consistent with national policies and priorities.

Sustainable procurements will allow achieving an acceptable balance between primary sustainable development principles: economy, society and environment.

Economic factors include such expenditures on goods and services with the consideration given to their entire lifecycles as a purchase, servicing, maintenance, operation and end-of-life costs (including disposal costs) consistent with the good financial management practices.

Social factors include social equity and equality, safety and protection, human rights and employment conditions.

Ecological factors include air, soil and water pollution, climate change, biodiversity, natural resource use and water resource reduction during the entire lifecycle of the product.

Among the goods more actively promoted as part of the sustainable procurement concept in best-practices countries one can single out energy-efficient computing equipment, office equipment made of ecologically friendly materials, recycled paper, EVs, ecologically friendly public transport, and RES-generated electrical energy.

Policies and activities in public procurements are applied throughout the world. 2002 OECD Council recommendations call for governments to create corresponding political frameworks and ensure adequate support for this purpose.

The following green goods can be singled out that take priority in the course of the introduction of sustainable public procurement principles:

- energy-saving computing equipment;
- construction and renovation of energy-saving buildings;
- procurement of ecologically safe transport;
- procurement of recyclable or recycled paper;
- procurement of natural organic products for educational and medical treatment organizations;
- procurement of EVs and electrical public transport;
- procurement of furniture made of ecologically safe materials;
- procurement and installation of renewable energy carriers for electrical energy consumption;
- procurement of A/Cs compliant with modern ecological standards.

The transition to sustainable public procurements in the Kyrgyz Republic was prioritized in the Program of the Government of the Kyrgyz Republic “Unity. Trust. Creation.” The Green Economy Concept of the Kyrgyz Republic “Kyrgyzstan – a Land of Green Economy” as approved by Jogorku Kenesh also sets an objective in a transition to green procurements.

At the same time, public procurements do not comply with basic sustainable public procurement principles from economic, social and ecological perspectives. Here, the state is the single largest purchaser of goods and services (15-25% of GDP), and therefore, taking advantage of its purchasing power, is capable of stimulating sustainable consumption and production via the introduction of sustainable public procurements and sustainable commerce.

Environmental problems in the Kyrgyz Republic such as air pollution, and the violation of maximum permissible concentrations in particular, result in social problems including a deterioration of public health. Pursuant to data of the WHO, the Kyrgyz Republic holds 101st position among 145 in its healthiest nations index.

In 2017, public organizations of the Kyrgyz Republic ran contests and auctions to procure more than KGS 70 billion worth of goods and services. The total number of registered suppliers of goods and services was 13 922 entities including 1 377 foreign suppliers. The number of procuring organizations totaled 3 132 entities. At the same time, about 70% of all procurements account for foreign-made goods such as office and other equipment, furniture, medical

supplies, etc. Also, the existing public procurement system fails to provide for a proper accounting for procurements based on their sustainability.

The production sector in the Kyrgyz Republic sees the operation of organizations that do apply international ecological certification and their experience suggests major benefits from the application of such certification with a focus on environmental conservation and social equity, to wit:

- ISO 14000 on the environmental management system;
- ISO 51000 energy management standard;
- Fair Trade standards;
- FSC certification;
- A “bio kg” organic agricultural product standard;
- A national “adal” (“Halal”) standard;
- A CBT and guesthouse evaluation and certification system;
- A Green Office voluntary ecological certification, etc.

The public procurement system requires significant reforms and changes to introduce sustainable public procurements. The legislative framework, standards and criteria of election, a sustainable procurement planning and projection system, stimulation mechanisms, and public procurement training programs generally are inconsistent with basic principles of sustainable public procurements.

Priority directions in the reforms to transition to sustainable public procurements:

Under the system of regulation of public procurements, the Law of the Kyrgyz Republic “On Public Procurements” and the Law of the Kyrgyz Republic “On Amendments to the of the Kyrgyz Republic “On Public Procurements” dated 11 January 2019 #4 created a legislative framework needed to introduce sustainable public procurement principles. At the same time, other parts of the existing legislative and contractual framework do not allow to fully make government expenditures to introduce sustainable public procurement principles.

Laws of the Kyrgyz Republic lack criteria for the assessment of suppliers of goods and services including to make long-term contracts with consideration given to better offers that could allow procuring under sustainability criteria.

One needs to introduce provisions establishing requirements for international standards in public procurements. Compliance with criteria for access to the EU markets under GSP+, as well as certification obligations under EEU requirements will stimulate the transition of domestic producers to sustainable principles.

The accession of the Kyrgyz Republic to the WTO Agreement on Government Procurement will also help harmonize national law with international sustainable public procurement principles and rules and open foreign public procurement markets for domestic producers.

Ecological certification in the Kyrgyz Republic is not practiced widely. ISO 20400, Sustainable Procurement Guidance, is the first international standard and its primary goal is to assist organizations in drafting and introducing successful sustainable procurement practices and policies. This standard is an

important tool of sustainable public procurement needed to identify the most optimal and environmentally beneficial products among suppliers. The standard criteria are critical in assessing the contractual terms and the described overall methodology in the procurement of goods and inspection of environmental statements made.

In terms of the social aspect, the transition to sustainable public procurements needs to provide for the introduction of criteria which will allow assessing goods and services produced under international labor standards (ILO, Fair Trade, etc.).

One needs to design and introduce a mechanism of stimulation of producers and suppliers of sustainable goods and services and introduce in the bidding documentation a mechanism of encouragement of, and preferences for, products made of recyclable raw materials. It is important to develop a mechanism of financial preferences and concessional loans to promote competitiveness of ecologically friendly products in the priority sectors of the country's economy.

At the moment, the training of specialists in public procurements is conducted at the Training Center of the Ministry of Finance of the Kyrgyz Republic. The current system of training of suppliers and procuring organizations does not provide for specialized programs on sustainable public procurements. It is important to draft training programs and curricula in HEIs on sustainable public procurements.

It is important that a continuous training program be implemented including the drafting of a training strategy to satisfy the country's needs for relevant education. Training fees are an impediment to the training of specialists in sustainable public procurements and therefore mechanisms for ensuring a preferential access to such training must be designed including via the arrangement of online courses at the Training Center of the Ministry of Finance in Kyrgyz, Russian and English.

Objectives. In order to achieve the goal of bringing the share of sustainable public procurements to the level of 30% by 2023, the following objectives will be attained: 1) improve legislation on public procurements; 2) facilitate the development of ecological certification; 3) build capacity of suppliers and procuring organizations for the transition to sustainable public procurements.

1) Improve legislation on public procurements

Improving the public procurement legislation including regulations on technical specifications and corresponding certificates for goods supplied, works performed and services rendered that prove their conformity to ecological, safety and quality criteria including the social dimension. Efforts of the Government of the Kyrgyz Republic will be aimed at promoting the implementation of a sustainable procurement policy and commerce as part of the a multilateral and regional cooperation with EEU and WTO. Regulations and instructions on identifying sustainable/green goods and services will be drafted;

2) Facilitate the development of ecological certification

The development of ecological certification will be implemented via the introduction of international standards in sustainable procurements. Assistance will be rendered to organizations in designing and introducing best practices and policies in sustainable procurements.

Additionally, the Program provides for introducing criteria that allow pricing and assessing goods and services produced under established international labor standards (ILO, Fair Trade, etc.).

Mechanisms to stimulate sustainable public procurements will be designed for suppliers including with the provision of access to concessional sources of financing;

3) Build capacity of suppliers and procuring organizations for the transition to sustainable public procurements

The capacity of suppliers and procuring organizations will be built by drafting and introducing curricula for HEIs and training centers. Specialized courses for HEI instructors on sustainable/green public procurements will be provided on an ongoing basis.

Expected results:

- the transition to sustainable public procurements by 2023 of 30% and by 2040 of 50% was achieved;
- exports of goods and services to EU Member States utilizing the GSP+ tools and treatment were doubled;
- the ranking of the Kyrgyz Republic in the global competitiveness index to the 50th position was achieved;
- figures of the use of child labor were reduced;
- exports by 2023 totaled at least 30% of the GDP with an annual growth of exports of at least 10-12%;
- exports of goods and services increased twofold including thanks to the participation of domestic producers in public procurements (from USD 1 544 million to USD 3 000 million);
- loaning of exports increased fivefold, from 2,9% to 15% of the banking system's loan portfolio including: loaning of stocking and processing of agricultural products including the dairy industry 20-fold, from KGS 271 million to KGS 5,4 billion; agriculture – 3-fold, from KGS 24,6 billion to KGS 75 billion; textile and garments – 5-fold;
- tools and criteria, including those for the accounting for sustainable public procurements, were designed;
- loaning of the manufacturing industry under sustainable criteria was increased 10-fold (from KGS 9 billion to KGS 90 billion);
- air pollution figures were reduced;
- the country's ranking in the Global Rights Index rose;
- the incidence of respiratory diseases declined threefold.

4. Capacity building and awareness raising

Goal. By 2023, improve knowledge and capacity of state employees in the introduction of Green Economy and sustainable development into development programs while raising awareness of the general public and business community.

Analysis of the current situation. The development of the human potential and presence of qualified staff are a key condition for the transition to Green Economy and the introduction of sustainable development principles in the Kyrgyz Republic. It is the high human potential and public awareness that will allow to successfully bring to life all sectoral and national development programs.

In 2018, the UN Institute for Training and Research (UNITAR), as part of the Partnership for Action on Green Economy (PAGE) in collaboration with the American University of Central Asia's Center for Environment and Development (AUCA CED), ran a Green Economy Learning Assessment for the Kyrgyz Republic. The study involved key ministries and findings were presented to all stakeholders.

The findings of the study helped generate conclusions on the development of human potential in strategic national and sectoral programs; the level of knowledge among state employees in selected key sectors and learn about the capacity of HEIs in Green Economy.

Pursuant to the analysis, national strategic development documents provide for the importance of the introduction of Green Economy principles, yet lack sections on building capacity of state employees and stakeholders. At the same time, line ministries do not implement many of the stated activities including due to lack of knowledge and understaffing/lack of capacity among their personnel. The findings also demonstrated a gap between national-level priorities and sectoral programs. Also, the fact that policies are not implemented at the sectoral level indicates a lack of skills among responsible state employees required to effectively liaise, plan and cooperate with other stakeholders and sister ministries and agencies. This also manifests itself in the fact that the inter-agency mechanism of interaction and collaboration in Green Economy at the institutional level is yet to be created.

Pursuant to the analysis, the system of training and learning for state employees in ministries and agencies lacks a systemic approach to education in Green Economy and most of requests are limited to basic courses in administration and specialized workshops. Training rendered by donor organizations for employees of ministries and agencies turned out to be more flexible and offered more comprehensive and relevant courses on Green Economy. Yet, even this type of training is overly specialized. Findings gathered by surveys, interviews and special discussions demonstrated that state employees assess their knowledge and understanding of Green Economy and sustainable development in their departments as very low.

The assessment of learning and training at the HEI level showed a need for integrating Green Economy principles into sectoral programs. Overall,

universities already have basic opportunities associated with Green Economy. It is evident from the fact that many universities already offer courses and degrees linked to Green Economy. At the same time, the number of grant-covered degrees in sustainable natural resource management has recently declined due to a lack of demand. This indicated an asymmetry between the needs of public administration, the functioning of the university system and interests of students. The analysis also showed a need for updating and revising university curricula consistent with the latest developments and scientific progress.

One of the reasons for a high resource intensiveness of production in the private sector and a low share of green businesses among the country's stock of commercial entities is the lack of knowledge in this area.

The country sees a low level of recycling of domestic waste and low public awareness about Green Economy and harmful effects on human health of the environmental pollution. This results in a high level of ecosystem pollution and inefficient spending of income by households.

Overall, the introduction of Green Economy principles will require knowledge among, and retraining of, state employees in many sectors at various levels of public administration, as well as the updating and revision of curricula and scientific methods and a general awareness raising among the general public and business community. Therefore, activities to build and improve human potential will be aimed at state employees of various level of governance, educational organizations (HEIs and schools), and the general public and business community.

Objectives. In order to improve knowledge and capacity of public servants in the introduction of Green Economy principles into development programs while ensuring adequate awareness among the general public and business community, the following objectives will be attained: 1) build capacity of public servants and municipal employees in Green Economy; 2) build capacity of HEIs for them to transfer modern skills in Green Economy and conduct scientific research; 3) raise awareness among the business community and general public of benefits of Green Economy as well as sustainable development and climate change.

1) Build capacity of state and municipal employees in Green Economy

Ensuring conditions for decision makers to improve their knowledge about the importance of Green Economy and the need for a long-term vision of Green Economy in strategic development documents.

In order to introduce Green Economy principles, one needs to ensure that decision makers understand the inevitability and high priority of the introduction of Green Economy into national development programs. As part of this objective, decision makers will participate in various international and local Green Economy forums.

Improving the knowledge of mid-level state employees so that they could associate Green Economy principles with sectoral development plans.

As part of this objective, such mid-level state employees will be trained in additional skills and knowledge needed to successfully integrate Green Economy goals into sectoral programs. This objective will enable them to form sectoral goals and identify barriers to the introduction of Green Economy principles in various sectors.

Training mid-level state employees in technical skills in drafting, implementing and monitoring Green Economy programs.

This objective will be focused in developing technical skills among state employees who will be drafting and implementing sectoral development programs;

2) Build capacity of HEIs for them to transfer modern skills in Green Economy and conduct scientific research

Building capacity of HEIs for them to transfer modern skills in Green Economy and conduct scientific research.

As part of this objective, the country will update curricula of HEIs to bring them into compliance with international standards, introduce training in modeling, improve cooperation among HEIs and line ministries, enhance the research capacity with the participation of international partners;

3) Raise awareness among the business community and general public of benefits of Green Economy as well as sustainable development and climate change

Raising awareness and building capacity of the public sector, private sector and the civil society and media in the promotion and development of Green Economy in the Kyrgyz Republic.

Ensuring the work of annual specialized platforms on public-private dialog on the promotion and development of Green Economy of the Kyrgyz Republic and the promotion of green technologies in the country (by way of conducting a Green Economy Forum, etc.).

Ensuring coordination among all international (financial) organizations, development partners regarding the promotion and development of Green Economy of the Kyrgyz Republic.

Ensuring coordination among all state actors in the promotion and development of Green Economy of the Kyrgyz Republic.

Expected results:

- the capacity of state employees in Green Economy and sustainable development was built;

- awareness of the business community and civil society about Green Economy was raised;

- Green Economy and sustainable development were incorporated into HEI curricula;

- a specialized platform on public-private dialog on the promotion and development of Green Economy of the Kyrgyz Republic and the promotion of green technologies in the country was created.

IV. Program Implementation Management

A strong and effective management at all levels of public administration is an important condition for a successful promotion of the reforms suggested. For an effective management, identification of forward-looking goals and strategic ways to achieve them, a clear-cut system of coordination of activities of all parties involved in the process of the implementation of the present Program is needed. An unambiguous understanding of the required activities and conditions to implement the Program is required at all levels of the system of public administration.

The coordination of activities implies a strong communication leading to an agreed nature of actions of state bodies, public organizations, and the private sector, to implement the Program. The coordination mechanism in question represents a combination of actions and tools that allow coordinating the relations of subjects and comprehensively managing them to achieve overarching strategic goals aimed at sustainable development that is based on Green Economy principles.

The achievement of the goals provided for brings about a need for introducing a coordination mechanism oriented at improving effectiveness and sustainability. A harmonized management system will be created capable of promptly responding the changes in the environment, utilizing an agile mechanism of interaction among the authorities, business, and the society as part of a continuously operating platforms and working groups.

In order to coordinate the implementation of the Program, a Coordination Commission on Green Economy was created. It is chaired by the Vice Prime Minister of the Kyrgyz Republic responsible for the financial and economic sector and investments, with the Vice Chairperson being the Minister of Economy of the Kyrgyz Republic. The Commission also includes representatives of Jogorku Kenesh of the Kyrgyz Republic, state bodies, the business community, and the civil society. The Commission shall meet at least twice a year.

The Coordination Commission's objectives to implement the Program are as follows:

- control the progress of the practical implementation of the Program at the national level;
- assess the results of the Program implementation;
- approve road maps to resolve the most important problems.

The Commission will hear key issues of the Program for which a uniformity of approaches and actions at all levels of the system of public administration is required.

At the level of inter-agency coordination, an Inter-Agency Green Economy Coordination Group was created responsible for the operational management and monitoring of the Program implementation. The Group in question is chaired by the Deputy Minister of Economy of the Kyrgyz Republic responsible for Green Economy issues. The Inter-Agency Green Economy Coordination Group includes

representatives of state bodies, the business community, the civil society, and international organizations that are immediately involved in the Program implementation. The Group shall meet at least once a quarter.

Primary objectives of the Group are as follows:

- ensure overall coordination and management of the Program implementation;
- ensure uninterrupted nature, continuity, and integrity of the Program implementation;
- ensure communication with all stakeholders for purposes of informing them about results of the achievement of Program goals and ensuring proper feedback.

The Group's meetings shall hear issues to be then discussed at the level of the Commission at least twice a year.

The mechanisms of control of the Program implementation progress shall include annual analytical reports of the Commission and alternate reports by representatives of the general public and expert community at the meetings of the Commission. As part of the hearing of such reports, in-depth assessment of accomplishments and shortcomings shall be conducted and future activities shall be planned. Mechanisms and procedures for the submission of annual reports shall be drafted at the beginning of the Program implementation.

Functions of the Ministry of Economy of the Kyrgyz Republic as the Secretariat of the Commission with regard to the Program implementation coordination are as follows:

- collect and analyze information for purposes of monitoring the Program implementation and preparing periodic reports to be submitted at the Coordination meetings;
- assess the effectiveness and impact of the Program;
- ensure the implementation of the Commission's decisions;
- facilitate the coordination of the mobilization of resources to implement the Program;
- coordinate activities of local and international partners with regard to issues of the Program implementation.

In order to monitor the implementation and assess the effectiveness and impact of the Program, ministries and agencies of the Kyrgyz Republic shall on a quarterly basis submit for the summarization information about the Program implementation to the Ministry of Economy of the Kyrgyz Republic. In turn, the Ministry of Economy of the Kyrgyz Republic shall submit to the Commission, as well as to the Office of Government of the Kyrgyz Republic, summarized information about the progress of the implementation of the Program-accompanying Plan of Activities.

Appendix to
the Program of the Development
of Green Economy
in the Kyrgyz Republic
for Years 2019-2023

Terms and definitions

Green Economy	An economy that results in the improvement of people's welfare and the enhancement of social equity with the concurrent significant reduction of risks for the environment, while conserving and multiplying natural capital, efficiently using resources and incentivizing the conservation of natural ecosystems of the country.
Green energy	A renewable energy, an energy that is generated or used in an ecologically responsible manner.
Renewable energy	An energy derived from ongoing processes taking place in the environment that is replenished faster than it is used. Solar, wind, geothermal, and hydrological sources as well as certain types of biomass are the widespread sources of renewable energy.
Energy security	An ensured uninterrupted access to energy sources at reasonable prices.
Sustainable procurements	A process under which an organization satisfies its needs for goods, services, works and technical devices in such a manner that the ratio of price to quality, throughout the period of use, favorably reflects not only on the very organization but also on the society and the economy as a whole, while mitigating the adverse impact on the environment.
Sustainable/green public procurements	A process whereby the state implements rational procurements of goods, works, and services that minimizes the impact on the environment and human health and includes economic and social factors.
Ecological certification	A confirmation of safety for the human and the environment (of products' and services', quality and company systems') compliance with provisions of national and international standards, normative and technical regulations.
Sustainable development	A process of economic and social changes under which the use of natural resources, the channeling of investments, the orientation of scientific and technical development, the development of a person, and

	institutional changes are harmonized with one another and strengthen the current and future capacity for the satisfaction of human needs and aspirations.
Community-based tourism (CBT)	A form of tourism under which a local community possesses a significant control, participates in its development and strengthening, and retains a material part of its advantages.
Extended Producer Responsibility	A strategy aimed at reducing the impact on the environment rendered by the producer's product over its entire lifecycle by way of imposing the responsibility for any and all damage inflicted by its product, and especially the obligation to ensure all stages of the management of waste resulting from the loss by its product of the latter's consumer properties, on the producer.
Product lifecycle	A set of process performed from the moment the society's needs for a certain product are identified to the moment such needs are satisfied and such product's loss of its consumer properties.
Sustainable financing	A financing aimed at supporting economic growth while reducing the pressure on the environment, minimizing waste and increasing efficiency of the use of natural resources. Sustainable financing also covers a raised awareness level and transparency of risks that may impact the state of a finance system and the need for reducing risks of financial and corporate subjects via proper management.
Green incentives	Incentives that stimulate the production and consumption of products, equipment and systems that minimize and reduce the adverse impact of human activities on ecology and motivate an efficient use of natural resources.
Green fiscal policy	A policy of the state's intervention in the economy that uses revenues and expenditures of the state budget as a tool for the introduction of Green Economy principles into the national economy.
Green fiscal tools	Fiscal tools that aim to green growth such as subsidies, tax breaks, ecological payments, etc.

Green growth	Ensuring to a maximum extent economic growth and development that do not impact the quantity and quality of natural assets and instead use the capacity of growth that emerges in the course of the transition to Green Economy. Green growth implies means of stimulating an economic growth and development ensuring the continuation of provision by natural assets of resources and ecological services. For this purpose, the green growth must serve as a catalyst for investments and innovations that will underlie sustainable growth and result in the emergence of new economic opportunities.
Green subsidies	A tool used to provide financial assistance to subjects of manufacturing and commercial as well as entrepreneurial operations to implement environmental protection projects. It includes tax breaks, concessional loans, deferred payments, and debt write-off.
Green tax	A tax paid by consumers for goods or services that are not ecologically clean. The purpose of a green tax is to compensate for adverse consequences associated with the use of such ecologically unclean goods and services.
Green technologies	A production and consumption of products, equipment and systems that minimize and reduce the adverse impact of human activities on the environment.
Ecologization	A process of unflinching and consistent introduction of systems of technological, management and other solutions that allow improving the efficiency of the use of natural resources.
Ecological payments	A payment for environmental pollution and the placement of waste (a payment for an adverse environmental impact) levied on companies, institutions, organizations, foreign legal entities and individuals that implement any activities associated with the use of nature.
Organic agriculture	A system of agricultural production under which special attention is paid to environmental protection and the use of natural farming.

Green manufacturing industry	A reduction in the impact of manufacturing industrial process on the ecology via a more efficient use of resources, a phased discontinuance of the use of toxic substances, the introduction of new ecologically clean technologies, the replacement of fossil fuels with renewable energy, the enhancement of the health and safety level, and a decrease in emissions of pollutants and waste for the purpose of compliance with ecological standards.
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