

# ASEM Eco-Innovation Index 2017

## Country Report

MONGOLIA





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# Table of Contents

<b>1. Background</b>	8
1.1 General Information of the Country	8
1.2 Macro-economic development	14
1.3 National Production Factors	17
1.4 Market and Corporate Structure	21
1.5 Environmental Sustainability	23
<b>2. Eco-Innovation Performance (Environmentally friendly development)</b>	27
2.1 Natural capital and development.	27
2.2 Definition of Eco-Innovation (Paradigm of green development)	27
2.3 Major Eco-Innovation Organizations	27
2.4 Selected Eco-Innovation Areas	31
<b>3. Circular Economy and eco-innovation areas and new trends</b>	35
3.1 Strategic goals of the environmentally sound development and eco-innovations	35
3.2 Lead Market Information	38
3.3 Best Practices	41
<b>4. Barriers and drivers to circular economy and eco-innovation in Mongolia</b>	44
4.1 Drivers to Eco-Innovation and circular economy	44
4.2 Barriers and Gaps of Eco-Innovation and circular economy	45
<b>5. Policy Landscape: towards circular economy in Mongolia</b>	48
5.1 Mongolian legal framework relating to innovation and entrepreneurship	48
5.2 National Eco-Innovation Roadmap and Governance	54
<b>6. Analysis on Eco-Innovation Using 2017 ASEI</b>	55
6.1 Background 2017 ASEM Eco-Innovation Index (ASEI)	55
6.2 Overview of Mongolia Eco-Innovation using ASEI	58
<b>7. Report Synthesis</b>	63
Annex: Survey Sampling on Eco-Innovation on Mongolia	64

## Table List

Table 1.1 Economic Forecasts for East Asian Countries	16
Table 1.2 Mongolia's GHG emissions/removals by sectors in 1990 and 2014	24
Table 6.1. 2017 ASEM Eco-Innovation Index (ASEI)	55
Table 6.2. Calculation Methodologies for 2017 ASEI	57

## Figure List

Figure 1.1. Map of Mongolia	8
Figure 1.2. Annual mean air temperature (left) and annual precipitation amount (right) changes, 1940-2015.	12
Figure 1.3. Mongolia's economic growth trend	15
Figure 1.4. GDP Growth of Mongolia.	15
Figure 1.5. Human Development Index changes of Mongolia	18
Figure 1.6. Level of education in Mongolia	18
Figure 1.7. Number of registered patents and filed applications in Mongolia	19
Figure 1.8. Paved road in Mongolia	20
Figure 1.9. Investment in road construction	20
Figure 1.10 Competitiveness of overall Mongolia	21
Figure 1.11. Most problematic factors for doing business	22
Figure 1.12. Mongolia and East Asia and Pacific Competitiveness Index	22
Figure 1.13. CO <sub>2</sub> emissions metric tons per capita in Mongolia from 1960-2014	25
Figure 1.14. CO <sub>2</sub> Emissions by Sectors in Mongolia, 2010	25
Figure 3.1. Active enterprises by sector, 2014	40
Figure 3.2. Active enterprises by firm size, 2013	40
Figure 3.3 General Design of Eco-city Mairdar	41
Figure 6.1. Overview of Analysis on Mongolia's Eco-innovation using 2017 ASEI	58
Figure 6.2. Overview of Analysis on Mongolia's Eco-innovation using 2017 ASEI	58
Figure 6.3 Analysis of Mongolia's Eco-Innovation Capacity using 2017 ASEI	59
Figure 6.4. Analysis of Mongolia's Eco-Innovation Capacity using 2017 ASEI	59
Figure 6.5.. Analysis on Mongolia's Eco-Innovation Supporting Environment using 2017 ASEI	60
Figure 6.6. Analysis on Mongolia's Eco-Innovation Supporting Environment using 2017 ASEI	60
Figure 6.7. Analysis of Mongolia's Eco-Innovation Capacity using 2017 ASEI	61
Figure 6.8. Analysis of Mongolia's Eco-Innovation Capacity using 2017 ASEI	61
Figure 6.9. Analysis on Mongolia's Eco-Innovation Performance using 2017 ASEI	62
Figure 6.10. Analysis on Mongolia's Eco-Innovation Performance using 2017 ASEI	62

As a nation with small population located between two giants, Mongolia has been looking for its economic comparative advantage. Mining contributed to over 22% of the GDP in 2015. The recent commodity price drops have pushed the nation to look into options for diversifying the economy, and many people are turning to entrepreneurial activities. The government has no laws that explicitly promote entrepreneurship, but it introduced Combined service kiosks to simplify business registration and licensing processes for business owners. Additionally, the government has created policies recently to improve the innovation system by proposing science and technology plans or projects to reform higher education towards a research focus. In general, many legal experts say that the laws are written well, but the major challenge is implementing and enforcing these laws. For example, there have been lapses in IP protection where an inventor forcing these laws. For example, there have been resulting in many startups distrusting the system and not prioritizing the proper registration of IP. With the recent Parliament election and turnover in the government, it is uncertain what stance the new officials will take towards innovation and entrepreneurship.

Mongolia has a unique history and it is important to understand the socio-economic background of the country to identify challenges and opportunities it faces. Since early 1990's Mongolia has made a political and economic transition from a one-party political system to a free, democratic system, and from a planned economy to a private sector-led, market economy. Today, Mongolia faces with serious environmental problems, although Mongolia until recently was one of the world's most pollution free and environmentally unspoiled places on earth. However, Mongolia now is not pollution free. Current environmental issues in Mongolia are urban air pollution, desertification, climate change, deforestation, overgrazing and limited natural freshwater resources in some areas<sup>1</sup>. Therefore, Mongolia believes that environmentally sound technics and technologies and eco-innovation solutions could help to solve these environmental issues.

In 2012, the government of *Mongolia* announced that *green development concept* is a new *development* pathway of the country. The main goal of the Green Development Policy of Mongolia approved in 2014 by the Parliament of the country is to advance Mongolia's national development in an environmentally sustainable manner, building the conditions for future generations to benefit and gain in the long term and to ensure environmental sustainability through creation of growth based on green development concepts and through citizens' participation and inclusiveness.

The terms "sustainable development", "green development", "environmentally sound technology", "green products", "clean energy", "Waste Reduce, Reuse and Recycle", etc. are more often used rather than "eco-innovation" in Mongolia. In Mongolia, eco-innovation could refer to green technology as well as scientific-based or innovative business models that have minimized human impact on environment. In addition, the key objective of environmental sustainability identified in the Sustainable Development Vision 2030 (SDV 2030) of Mongolia is to ascertain inclusive economic growth and sustainable social development, and provide the fundamentals of improving the quality of people's lives by efficiently using natural resources, preserving the sustainability of the ecosystem, and creating opportunities to benefit from natural resources in the long-run. Therefore, eco-innovation issues are very closely linked with the principles of the green development pathway and goals of sustainable development agenda of Mongolia.

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1. CIA World Factbook

# 1. Background

## 1.1 General Information of the Country

### Quick Facts<sup>1</sup>:

As of 2016:

Surface area	1,564,120 sq. km.
Population	3.1 million
Population growth	1.5 percent
population density	1.8 person/per sq. km
The nearest sea port	1,693 km (Tianjin, China)
GDP	11.16
GDP per capita	3,951.9

### Country context

**Size and location:** Mongolia is located in the north-east Asia and bounded between 41°35'-52°06'N latitudes and 87°47'-119°57'E longitudes. The country territory is occupied 1,564.1 thousand. sq. km, which extends 2,392 km from west to north and 1,259 km from north to south with one of the lowest population density of 1.8 person/per sq. km and is ranked second worldwide. Mongolia borders with the Russian Federation to the north and Republic of China to the south and the total length of the national border is 8,252.7 km. Mongolia is one of the biggest landlocked country in the world, it is over 1,693 km from the nearest seaport in Tianjin, China. The lack of access to sea has led the country to rely heavily on relations with its neighbours. Also, the scarce population spread over a large territory makes the cost of transport and social service delivery relatively high.



Figure 1.1. Map of Mongolia

1 World Bank Group, 2016

**Population:** Population growth rate of Mongolia was highest in Asian continent reaching 2.1-2.5% before 1990<sup>th</sup>. At the end of 2015, the total population of Mongolia has reached 3,057.8 thousands<sup>2</sup> (NSO, 2015). A birth rate per 1000 citizen have been increased in 2006-2009 and reached 25.7 in 2009 and then observed slight decrease up to 23.1 in 2010 and since 2012, the birth rate has a continuous increasing trend and in 2015, the birth rate of Mongolia reached 28.0 per 1000 persons. An average life expectancy of the country in 2015 is 69.9 year. An average life expectancy according to gender diversity, for women is 75.84 year and for men is 66.02 year. Despite the low overall density and apparent remoteness, Mongolia's population is largely urban (68%) and increasingly concentrated in the capital of Ulaanbaatar (45% of the total population)<sup>2</sup>.

**State structure:** The governance of Mongolia is parliamentary and composed from Government and local government units and politically unitary state. In terms of administrative delineation and units, Mongolia consists of 21 aimags (provinces), 329 soums (sub-aimags) and 1560 bags (sub-soums). As for the capital city of Ulaanbaatar, consists of 9 districts and 132 khoroos (sub-districts). In the constitution of Mongolia states that administrative and territorial management to be implemented by corporate management of local self-governance and the state control. Therefore, administrative and territorial units have a special organization, which is called "Citizen Representative Khural (Assembly)" for local management similar to the public council. Recently, the decentralization process continuously ongoing since 1990<sup>th</sup>.

**Climate:** The climate of Mongolia is harsh continental due to its very unique geographical location in the center of the Eurasian continent such as highly elevated above sea level, surrounded by high mountains and highly remotely from the sea. Therefore, main features of Mongolian climate are characterized by high seasonality with very distinct four seasons, high fluctuations of temperature and low precipitation. Latitudinal and altitudinal spatial distribution could be clearly distinguished in any geographical distribution of climate variables. The annual mean air temperature is about -4°C in the Altai, Khangai, Khentei and Khuvsgol mountains ranges, -6-8°C in the depressions between mountains ranges, also along the valley of big rivers, 2°C in the steppe and semi-desert region and 6°C in the southern Gobi desert area even exceeds. The annual precipitation exceeds 400 mm at high mountain belts, while 300-400 mm in the Khangai, Khuvsgol and Khentei mountains and also in the Khalkh river basin in the Eastern region, 250-300 mm in Mongol Altai and forest-steppe, 150-250 mm in steppe and 50-150 mm in Gobi and desert region. In the south-inner side of Altai Mountain, annual precipitation ranges even less than 55 mm. About 85% of total precipitation falls from April to September and among them, 50-60% falls only in July and August.

**Land use:** According to the land use classification (integrated land fund/resource), land cover of Mongolia is classified into following classes. Where 73.5% of the country is considered for agricultural land use (0.9% of which for crop production, 1.5% for hayfield and 96.2% to be pasture); 0.46% is occupied by urban area; 9.6% is forest including bush and shrub; 0.4% is to be water bodies and remaining 1.7% belongs to unused land. However, depending on definition and classification terms, the percentage of forest cover appears to be different in some sources. For example, forest cover of Mongolia is to be 11.89 % in forestry source while according to land use classification, forest cover percentage is 9.14% of the country. Relatively large area of the country belongs to the classification of land for special needs (where lands ensuring national defense and security, natural reserve, national protected area, lands under road and communication networks).

2 National Statistical Office (2015). "Population, by regions, aimags and the Capital, Urban and Rural, 1935-2014." www.1212.mn.

**Natural resources:** Geological surveys show Mongolia to be abundantly endowed in mineral resources, including copper, gold, iron, oil, zinc, molybdenum, fluor spar, uranium, tin, and tungsten<sup>3</sup>. Because exploitation is capital intensive, only a fraction of these national resources have been exploited. Mongolia is also abundantly endowed in solar and wind resource with studies demonstrating ample resource for exploitation that is only just beginning and constrained primarily by the economics of transmission distance to market and challenges around cross-border power trade. Minerals and various industries associated with mining make up about a large portion of Mongolia's GDP and exports and earn a big chunk of foreign reserves. The fortune of the economy is often dependent of the world prices of copper and other minerals. The main problem with mining in Mongolia is that a lack of roads and basic infrastructure makes its resources expensive to extract. Minerals are often in remote wilderness areas. Many of the mines that are currently in operation are close to the Trans-Mongolian Railway.

Environmentalists worry about the cost on the environment of aggressive mining. Mining activities, including artisanal mining that illegally uses mercury, have become a growing concern for the environment. In addition to degradation and erosion, mining activities and infrastructure have reduced the amount of land available for agricultural pursuits. Thus, mining and herding are in competition for suitable land, and the potential for increased land conflict is growing as each industry expands.

The economy of the Mongolia and food security of population directly depends on the agricultural sector and many other sectors of the economy such as mining mainly based on land resource. Therefore, soil erosion, desertification and any other forms of land degradation are key important problems of Mongolia, which are waiting for urgent solutions. Recently, land degradation continuously increased from year to year in the country. Mining pit, damp, wastewater, traffic of heavy mining machinery related (road damage and dust) to the open mining operation and activities are much contributing to increasing of land degradation and environmental pollution in the country.

**Water resource and glacier:** Mongolia is a continental country, with three huge watersheds. Water resources depend mostly on rivers flowing out of the country, but there are comparatively high levels of surface and ground water resources. The rivers belong to the inland catchments basins of the Arctic Sea, the Pacific Ocean and the Central Asia Inland Basin. In the north and west mountains, the water network is of high density. The south, central and south-east parts have a few rivers and other water resources, usually in depressions with no outflow. Mongolia has 3,811 rivers and streams running a total of 67,000km; over 3,000 lakes; around 6,900 constant springs; over 190 glaciers covering about 540 square km; and over 250 mineral springs from specific water ecosystems. Surface water resource of Mongolia composed mainly from lake water which is about 500 cubic km and another 19.4 cubic km accumulates in glaciers. Average river runoff is estimated to be 34.6 km<sup>3</sup>/year. River runoff 30.6 km<sup>3</sup> forms within Mongolian territory and remaining 4 km<sup>3</sup> of river runoff forms in neighboring countries and flows through Mongolian territory<sup>4</sup>. Reachable groundwater resource is estimated<sup>5</sup> to be 10.8 km<sup>3</sup>. In 2010, water use rate was 326.3 million m<sup>3</sup>/year and it is expected to increase up to 478.2 million m<sup>3</sup>/year in 2021 according to the low use scenario. In mid scenario, the growth rate of water use will be 26.8% and will be doubled in high scenario compared to this low use.

3 CIA World Factbook

4 B. Myagmarjav and G.Davaa (Editors). Surface water of Mongolia. Ulaanbaatar, 1999

5 N.Jadambaa. Hydrogeology, Geology, and Minerals of Mongolia, Volume 8. Ulaanbaatar, 2009

**Forest resource.** Mongolian forest grows up on the southern edge of the cold temperate region of northern hemisphere under harsh continental climate condition. Therefore, its productivity is low, the growth rate is slow and very vulnerable to climate change, drought, wildfire harmful insects, and tree diseases. Besides such natural factors, the forest is also vulnerable to the human impacts, therefore, natural recovery capability of the forest is extremely weak.

All type of tree species, shrubs, and saxaul which grow in Mongolian territory and including planted forest is defined as forest resource of Mongolia. According to forest report of 2016, Mongolian forest resource is estimated by 18,454.6 thous.ha, 17911.1 thous. ha (97 %) of them corresponds to the forested area and 543.5 thous. ha (3 %) in the forest zone. About 68.6% of forest area (12,280.0 thous.ha) is covered by forest. From them, 11,500.4 thous.ha is occupied by natural trees, 777.5 thous.ha by shrubs and bushes, 2.1 thous.ha by planted forest and 31.5% (5,631.1 thous.ha) area has not yet covered by forest. The ratio between forested areas and the total area of territory as expressed by percent is called forest richness, which is estimated by 7.9 percent<sup>6</sup>.

**Biological resource.** Nowadays, there are 18,300 species of vertebrates, invertebrates, and plants registered in Mongolia as biodiversity. Although number of species in terms of classification of species seemed to be relatively well enough registered, information on their natural resource, numbers are very much limited. Mainly, endangered and hunting value mammals and birds, also some plant species are more studied and information about them more available. At present days, 39 orders, 112 families, 683 genus and 3127 species are registered in Mongolian plant kingdom. Among the officially registered species, 153 species are native and 458 of them endemic. Moreover, 1574 species of algae, 1030 species of lichen and 470 species of mushroom have been registered. From the plant kingdom, 195 species are introduced in Mongolian Red Book as critically endangered and near threatened. Recently, distribution and resource atlas of 80 species of profitable plant of Mongolia are published.

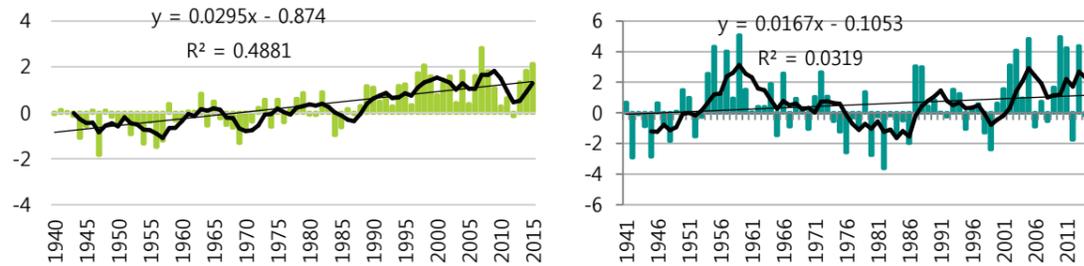
**Environmental challenges:** Today, Mongolia faces a number of environmental challenges such as urban air pollution, climate change, land degradation and desertification, water scarcity, and deforestation,

**Air pollution:** Mongolia has one of the planet's highest levels of urban air pollution. According to WHO's database, PM10 levels (particulate matter smaller than 10 micrometers in diameter) in Ulaanbaatar in 2008 were the third worst in the world with an average level of 279, far greater than the global average of 71. For PM2.5, Ulaanbaatar had the highest concentration of any city in the world, with an annual average of 63.0 compared to the global average of 11. Air pollution levels differ between central city areas and ger areas. Pollution in the ger districts can be 35 times higher than Mongolian Air Quality Standards (AQSs). To resolve these challenges and build a sustainable future, the Government of Mongolia (GoM) has initiated range of policies to develop a green economy, that "results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities." Air pollution, caused primarily by the burning of coal for power and heat generation, imposes a significant burden on the health and economy of UB. A 2013 study estimated that 29% of cardiopulmonary mortality and 40% of lung cancer deaths in UB are attributable to ambient air pollution, representing almost 10% of total mortality in UB. Studies have concluded that the economic impacts of air pollution range from 18-28% of UB's GDP and 8-13% of Mongolia's GDP.

**Climate change:** Annual mean air temperature over Mongolia has increased by 2.24°C between 1940-

6 Forest Land Area of Mongolia. Center for Forest Research and Development. Ulaanbaatar, 2016.

2015 (Figure 1.2) that is much higher than global average. Warming intensity is higher in a mountainous region and less in the steppe and Gobi region. In Mongolia, 85% of total precipitation falls in the warm season and only 3% even less precipitated as snow in winter. There was not to significantly change annual precipitation during last 76 years, only small 7% decrease is detected (Figure 1.2). However, winter snow is getting to increase. Since 1940, it was increased by 22% and also 40% since 1961. It indicates that winter snow is suddenly increased due to high-intensity global warming.



**Figure 1.2.** Annual mean air temperature (left) and annual precipitation amount (right) changes, 1940-2015.

As a consequence of climate change, frequency and magnitude of disastrous weather phenomena, such as wind- and duststorms, heavy rain- and snowfall, floods, droughts and dzuds, have increased since 1940s.

*Future climate change projections* show that in near future (2016-2035), the seasonal temperature change will range only 2.0-2.3°C, but it will be expected as 2.4-6.3°C depending on each RCP scenarios in far future (2081-2100). For precipitation change, winter snow is expecting to increase and summer rainfall has no significant change. Winter snowfall might be increased by 10.1-14.0% depending on each scenario in near future and by 15.5-50.2% in far future as respectively.

*Land Degradation and Desertification:* In addition to climatic factors there are several specific human activities that have led to serious and widespread desertification in Mongolia. Animal husbandry, especially in the arid and semi-arid regions, is considered as the most essential human induced factor affecting desertification risk in Mongolia. It is an important cause of soil erosion. Grazing pressure is greatest near settlements and water sources. The carrying capacity of pastureland is frequently exceeded in the areas receiving the greatest grazing pressure, resulting in degradation of the composition of plant species and soil denudation<sup>7</sup>. The Desertification atlas of Mongolia shows that 77.8 percent of total Mongolian territory has been affected by desertification to differing degrees. In detail, the vulnerability of 35.3 percent of land is low, 25.9 percent is moderate, 6.7 percent is high, while 9.9 percent is very high. In comparison to 2006, the statistics prove that the percentage of Mongolian land greatly vulnerable has now risen by two to three percent<sup>8</sup>.

<sup>7</sup> Zambyn Batjargal, Desertification in Mongolia, RALA REPORT NO. 200

<sup>8</sup> The Desertification atlas of Mongolia, 2013

*The depletion of water resources:* The impact of human activities and regional droughts on water resources in Mongolia over the past several decades has been profound. Water use for irrigation, mining etc., and human activities in watersheds such as deforestation, have

resulted in substantial reductions in river flows and flow regimes, water level reductions or complete drying of many lakes, and lowering of ground water tables. For example, the annual average flow of the Tuul river has been reduced by 32% and roughly half of this reduction may be attributed to the cutting of 270 km<sup>2</sup> of forest in the watershed of this river 40–50 years ago.

A water censuses by the Ministry of Environment and Tourism showed how Mongolia's water reserves have decreased. Over the last five years, 683 rivers, 1,484 ponds and springs and 760 lakes have dried up, due not only to human factors, but also to a loss of natural balance. As a result, the government declared 2004 the Year for Water Policy Innovation.

*Energy resource and energy production:* The coal is a main resource for Mongolia for energy and heat production. However, environmental pollution issues, especially burning raw coal and use for different purposes is becoming very serious problems of the society. Besides the ineffective use of coal, air pollution has become an extremely critical issue for cities especially for the capital city of Ulaanbaatar due to use of coal in individual houses (Ger Districts) and thermal power plants for heating and energy production. Currently, 80% of total power generated come from coal. Mongolia's renewable energy resources is considered abundant. However, due to financial and other challenges, renewables are still being underutilized. It is notable to mention that with the financial mechanisms are in place such as Japan-Mongolian Joint Credit Mechanism (JCM), Green Climate Fund (GCF) and multilateral financial channels, several private sector led renewable energy projects are implemented in Mongolia including 50 MW wind farm under CDM, two individual 10 MW solar power plants under JCM, 10 MW solar plant under GCF and 50 MW wind farm funded by multilateral financial agencies.

*Legal Framework:* Mongolia has joined the United Nations Framework Convention on Climate Change (UNFCCC) in 1993, the Kyoto Protocol in 1999 and the Paris Agreement on Climate Change in 2016. Therefore, these documents are international legislative bases and statement to follow on climate change policies and strategies. Although there is no special law on climate change in Mongolia, there are some other laws which reflect the concept and support climate change-related measures and activities. In another words, the climate change issues have yet precisely and completely reflected in related laws and development programs of Mongolia. However, at some extent the general principle and concept of policy and legal framework on climate change are considered in Mongolia. For example, these legislative documents: the Law on Air, Law on Energy, Law on Forest, Green Development Policy, Sustainable Development Vision 2030, National Programme on Climate Change and Mongolia's Intended National Contribution, are all reflected mitigation and adaptation needs and appropriate measures.

## 1.2 Macro-economic development

Besides natural barriers such as harsh and arid climate, landlocked geographical location, Mongolia is trying to overcome different obstacles and problems related to the transition from a planned economy to a market economy since 1990s. Mongolia has a unique history and it is important to understand the socio-economic background of the country to identify challenges and opportunities it faces. Since early 1990's Mongolia has made a political and economic transition from a one-party political system to a free, democratic system, and from a planned economy to a private sector-led, market economy. Although having to reach yet at planned targets and results in each area, the government implements a number of complex measures related to privatization, liberalization on trade and investment and integrated exchange rate and going ahead keeping the general orientation of country's development. As a nation with a nomadic tradition, Mongolia has been reliant on livestock and agriculture for thousands of years. In recent years, large mineral deposits were discovered in the southern part of the country and the economic activity shifted towards mining. Mining is currently the sector that contributes most to GDP (22%), followed by wholesale and retail trade (15%) and agriculture (12%). Mongolia became the world's fastest growing economy, averaging 11% per year between 2010 and 2014, with a peak of 17.5% in 2011.

Due to a rapid growth in the mining sector from 2008 -2012, macro-economic indicators are much improved and economic growth has reached 17.5% in 2011. This expanded GDP to an estimated \$12 billion and gross national income (GNI) per capita to \$4,320 in 2014, pushing Mongolia into the World Bank's upper middle income country (UMIC) classification this year. This growth was one of the tops of the world, however, depending on several internal and external factors, could not keep this performance and national economic growth rate slowed down to 12.3% in 2012 and 11.6% in 2013 and 7.9% in 2014 and 2.3% in 2015. The main reason for such decline was the price drop in Mongolia's export products such as coal, iron ore, copper, and other mining products in the world markets. Mongolia currently faces serious balance-of-payments pressures.

Animal husbandry is still occupied an important role in country's economy, employment and export earnings. About 12.8% of Mongolia's GDP consists of the agricultural sector and 77.5% was created by animal husbandry by 2015. 35.0% of country's total workforce belongs to the agricultural sector and 7.0% of export of the country comes from this sector<sup>9</sup>. Although over 20 percent of the animals are lost during severe dzud (harsh winter weather condition) of 2009-2010, the sector has been revived back again. By the end of 2015, the number of livestock reached a historical record level of 56 million of heads. However, due to the over exceeding livestock density and as well as climate change the pasture degradation has become the significant issue in Mongolia.

Previously, arable farming did not play a very important role in the agricultural sector in Mongolia. However, since the 1960s, cultivation campaign of prairie land has begun and the new agriculture sector has formed. The size of cultivated land has greatly expanded until 1990 and turnover fields had reached 1.3 million hectares. Since 1990, due to economic crises, cultivation areas much reduced, no longer and cultivation of prairie land and only potatoes, vegetables, fodder crops were planted in a smaller area. But, the government is launched campaign "Prairie land campaign-3" in 2008 as result of the implementation of agriculture support policies and the agricultural sector recovered again. Cultivated and planted lands are significantly increased from previous years and by 2015, 390.7 thousand hectares of area cultivated for crops and 12.8 ha for potatoes and 7.7 thousand hectares of vegetables were planted in 2015<sup>9</sup>. Thus, Mongolian arable farming sector nearly meets domestic demand for all grain and potato crops and provides more than half of the vegetable needs. Unfortunately, under continental dry climate condition with frequent droughts, a variation of harvest is high and unstable.

<sup>9</sup> NSO, 2014

Over the past 27 years, Mongolia has transformed into a vibrant democracy, with treble the level of GDP per capita. With vast agricultural and mineral resources and an increasingly educated population, Mongolia's long-term development prospects are promising, but the economy is facing significant challenges in the near term that should be urgently addressed. Mongolia's economic transition has been viewed as quite successful compared to most other countries that were in similar circumstances. The transition period Mongolia has experienced can be divided into three distinctive phases (Figure 1.3).

In the near term, the Mongolian economy continues to wrestle with persistent economic imbalances. Economic growth slowed to 1 percent in 2016 amid declining exports due to continued weakness in the commodity market and slower growth in the key export market of China (Figure 1.4). The economy has become increasingly reliant on the mining sector—its share of GDP today stands at 20 percent, twice the ratio of a decade ago—and the lack of diversification amplifies the impact of changes in commodity prices.

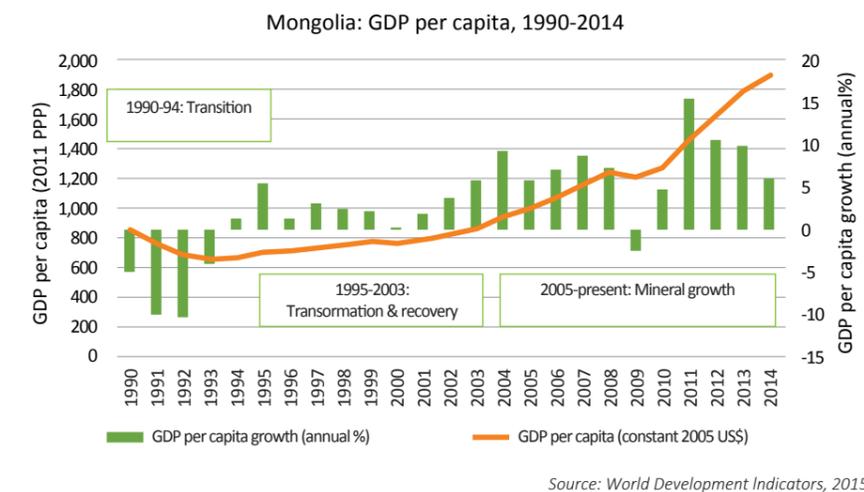


Figure 1.3. Mongolia's economic growth trend



Figure 1.4. GDP Growth of Mongolia.<sup>10</sup>

<sup>10</sup> Asian Development Outlook 2017 Update

As the economy boomed in the years since 2010, poverty has fallen apace—Mongolia’s poverty rate declined from 38.8 percent in 2010 to 27.4 percent in 2012 to 21.6 percent in 2014. Even in 2014, many people remained near the poverty line—the weakening economy is raising concerns about the ability of Mongolia’s most vulnerable to deal with the slow-down. According to the World Bank’s data, Mongolia’s poverty headcount ratio at national poverty lines (% of population) in 2016 is 21.6% in population and its poverty headcount ratio at \$1.90 a day is 0.2% (Table 1.1).

The economy grew by 5.3% in the first half of 2017, recovering strongly from only 1.2% growth in 2016. Services lifted GDP by 4.3 percentage points, and agriculture by 1.0 point. Coal production soared, with coal exports increasing by more than fourfold. However, mining as a whole slumped as copper concentrate production languished, causing the larger industry sector to subtract marginally from growth. On the demand side, investment, mainly into mining, contributed 13.2 percentage points to growth, and consumption added 1.6 points. Net exports subtracted almost 9.6 points as imports rose by 37.4% in tandem with mining investment<sup>11</sup>. According to Asian Development Bank’s forecast, its economy will grow 2.0% in 2018. Its growth in 2018 will be driven by agriculture and construction. Growth will accelerate this year on large mining investments, then moderate in 2018 as coal production reaches full capacity. Inflation will rise in both years, and the current account will remain in deficit on the surge of imports for mining works. Cooperation with the international community is key to addressing financing gaps and preserving economic and social stability. Strengthening the management of natural resources revenue remains a major challenge.

## Economic forecasts for East Asian countries

	GDP growth (%, year)	Inflation (%, year)	Current account balance (% of GDP)
Country	2017 <sup>f</sup>	2018 <sup>f</sup>	
China, People’s Republic of	6.7	6.4	
Hong Kong, China	2.0	2.1	
Korea, Republic of	2.7	2.7	
Mongolia	2.5	2.0	
Taipei, China	2.0	2.2	
Average	6.0	5.7	

**Table 1.1.** Economic Forecasts for East Asian Countries<sup>10</sup>

To ensure sustainable and inclusive growth and continue to reduce poverty, Mongolia will need to strengthen governance; build institutional capacity to manage public revenues efficiently; allocate its resources effectively among spending, investing, and saving; and ensure equal opportunities to all its

citizens in urban and rural areas. It needs to do this in a manner which protects the environment and intergenerational equity.

Mongolia’s Green Development Policy integrates poverty–environment objectives and indicators. Substantial progress was also made in 17 provincial development plans and in the National Socio-Economic Development Plan (2016–2020), in which sustainable development and inclusive growth are outcomes in support of the country’s economic development.

## 1.3 National Production Factors

### a. Institutions

According to the Global Competitiveness Report 2016-2017 published by World Economic Forum, Mongolia’s institutions was ranked in the 96<sup>th</sup> out of 138 countries with the value score of 3.5 out of 7. For the property rights and intellectual rights, it was ranked in the 110<sup>th</sup> and 120<sup>th</sup> place out of 138, respectively. Property rights and intellectual rights play a primordial role as safety devices that ensure economic performance without risking technologies achieved through eco-innovation being stolen or copied. In other words, in Mongolia, implementation of laws which protect property and intellectual rights is very weak compared to other countries.

Corporations can contribute to innovation and entrepreneurship in many ways, most commonly through acquiring new products and technologies from entrepreneurs. Corporations also have the potential of offering much more through the exchange of human talent and knowledge or by providing physical and financial resources. The governmental and corporate stakeholders have fairly close interactions in Mongolia, primarily due to the presence of its 377 registered State-Owned Enterprises (SOE) and through permitting and registration. In general, most companies found the procedures to be easy but time consuming. Numerous other laws and regulations apply to corporations. Typically, business associations such as the Mongolian National Chamber of Commerce and Industry, the Business Council of Mongolia, or the American Chamber of Commerce will advocate for policy changes to the government on behalf of their corporate members. With such a young market economy and a small population, the business sector in Mongolia is quite small. Of the 126,560 registered establishments in Mongolia in 2015, only 64,301 are active. Of the 2,392 active establishments with more than 50 employees, over 66% are located in Ulaanbaatar. Unfortunately, limited data was found on further segmenting the larger establishments.

### b. Human Resources

Mongolia’s HDI value for 2015 is 0.735— which put the country in the high human development category—positioning it at 92 out of 188 countries and territories. Between 1990 and 2015, Mongolia’s HDI value increased from 0.579 to 0.735 within 25 years, an increase of 0.96 percent<sup>12</sup> (Figure 1.5).

11 Asian Development Outlook 2017 Update

12 Human Development Report on Mongolia, 2016, UNDP



Figure 1.5. Human Development Index changes of Mongolia

The rates for secondary education enrollment and tertiary education enrollment were respectively 90.7% and 64.3%, which ranked it as 75th and 38th place out of 138 countries. Quality of math and science education was ranked in the 40th place out of 138 and its value score as 4.6 out of 7 (Global Competitiveness Report 2016-2017, WEF) (Figure 1.6).

Poverty declined significantly during the boom years, with the percentage of Mongolians below the national poverty line declining from 39% in 2010 to 22% in 2014. While poverty has declined overall, it remains higher in rural areas (26%) than in urban areas (19%). Although recent data is limited, there is a public perception of increased income inequality and access to jobs, education, healthcare and basic public services.

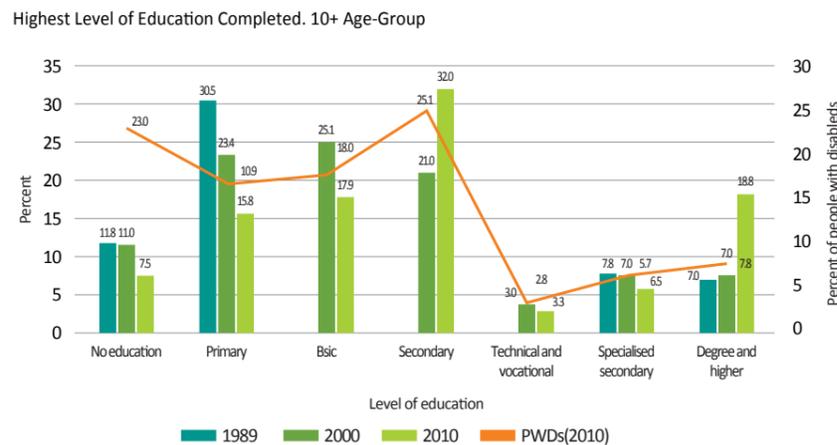


Figure 1.6. Level of education in Mongolia

The country's rapid urbanization and migration of citizens to Ulaanbaatar (UB) have created economic opportunities, but also pockets of vulnerability. Many of those who have risen above the poverty line in the past few years remain near it, implying vulnerability to negative economic shocks.<sup>8</sup> UB's population nearly doubled between 2000 and 2014, and 45% of Mongolia's population now resides there. During

that same time period, UB's economy grew from 50% of Mongolia's total GDP to 64%. Many of these migrants settled in informal communities of traditional *ger* dwellings around Ulaanbaatar. As a result, approximately 60% of UB's population – and 27% of Mongolia's population – lives in these unplanned “ger districts” with more limited access to public services. Women's groups have noted that the inflow of migrants to UB has increased vulnerability to exploitation and trafficking. Despite the recent mining and construction boom, the share of employment in construction (6%) and mining and energy (6%) remained relatively flat, and these sectors tend to create fewer employment opportunities for women. Despite higher rates of educational attainment than men, the female labor force participation rate has decreased in recent years and female earnings are on average lower than those of their male counterparts in similar professions. Females are also under-represented among managers and executives, as well as business owners.

### c. Technology and Innovation

Mongolia's total expenditure on R&D (%) was found to be very low by marking the rank of 58 out of 63 countries evaluated by IMD in 2017. Company spending on R&D and University-industry collaboration in R&D ranked 77<sup>th</sup> and 108<sup>th</sup> place respectively. In addition, the total R&D personnel per capita was ranked in 48<sup>th</sup> out of 63 which remains very low. In other words, the overall investment in R&D in Mongolia has tendency to be very weak as above mentioned indicators show clearly.

Looking at the Intellectual Property Office of Mongolia's (IPOM) statistics, the numbers of patents and applications filed have been increasing continuously since 2009. However, at the world level, the ratio of patent application ranked 75<sup>th</sup> place and scored 0.7 out of 7, respectively. Availability of latest technologies was ranked in 96<sup>th</sup> out of 138 (WEF 2016-2017). This indicates that there is more systematic protection for the intellectual side and of the patents in terms of supporting the nation's technology and innovation.

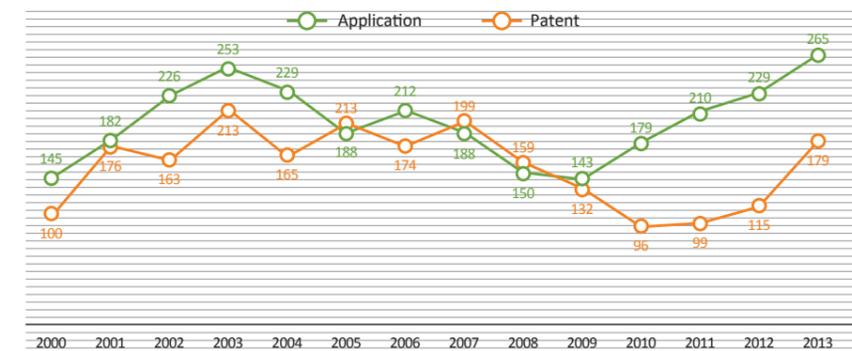


Figure 1.7<sup>13</sup>. Number of registered patents and filed applications in Mongolia

Firm-level technology absorption was ranked in 72<sup>th</sup> out of 138 (WEF 2016-2017) and the capacity for innovation was ranked in 57<sup>th</sup> out of 138 (WEF 2016-2017).

13 Intellectual Property Office of Mongolia 2014

#### d. Infrastructure

The quality of overall infrastructure in Mongolia seems low by looking at its ranking of 102th place out of 138 countries. The Quality of roads' value scored 3.0 out of 7.0, ranking placed 109th place (WEF 2016-2017).

The road network in Mongolia is 49,250 km in length, of which 12,722 km is the state/national roads and 36,528 km is the local/provincial roads (including 553 km of mining roads). 2,656 km of paved roads were built only in 2013 and 2014, and as of 2016, 17 aimags out of 21 aimags are connected with Ulaanbaatar via paved road. The length of the paved road increased from 2,950 km to 5,300 km (20% of the state gravel/earth roads were upgraded to paved roads)<sup>14</sup> (Source: The Northeast Asian Economic Review Vol. 4, No. 2, November 2016).

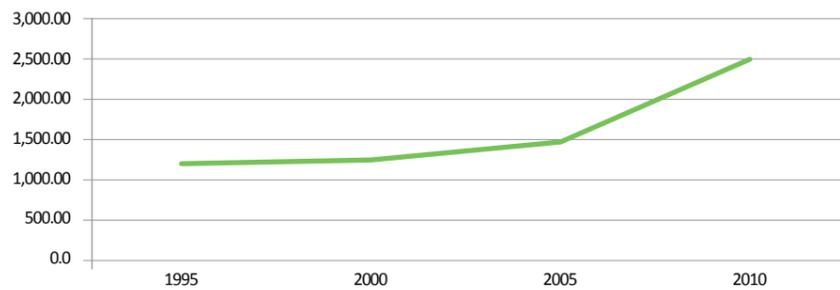


Figure 1.8. Paved road in Mongolia

Investments in the road construction exponentially grew during the last five years. Compared to 2005, the investment in the road construction grew as much as five times. Investments mainly come from the stage budget, road fund, international loans, grants and public and private partnerships.

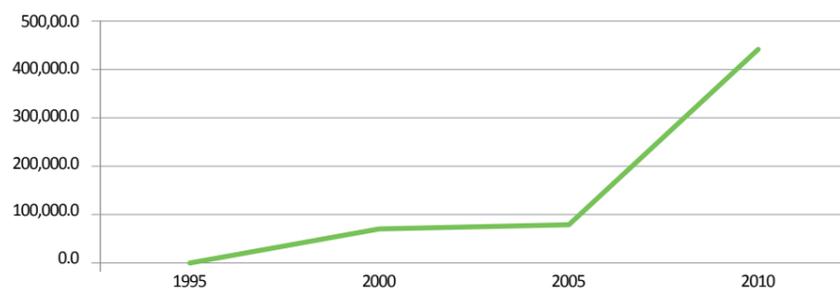


Figure 1.9. Investment in road construction

14 The Northeast Asian Economic Review Vol. 4, No. 2, November 2016

The number of internet users is 7.1% in population, ranking 109<sup>th</sup> place out of 138 countries (IMD 2017), which ranked 62<sup>th</sup> place out of 63 economies in IMD World Digital competitiveness ranking 2017. In addition, the fixed-broadband internet subscriptions are 7.1 out of 100 population, ranking 79<sup>th</sup> place out of 138 countries. This shows Mongolia's overall top weaknesses in infrastructure. On the other hand, investment in Telecommunications ranked 13<sup>th</sup> place out of 63 economies, which shows one of the country's top strengths (Figure 1.10).

Infrastructure	Rank	Infrastructure	Rank
4.5.08 Women with degrees	6	4.5.15 University education	63
4.1.25 Electricity costs for industrial clients	6	4.3.25 Innovative capacity	63
4.1.08 Population - growth	8	4.3.24 Knowledge transfer	63
4.2.01 Investment in Telecommunications	13	4.2.08 Internet users	62
		4.4.11 Energy intensity	62
		4.3.18 Number of patents in force	62
		4.2.21 Cyber security	62
		4.1.18 Water transportation	62
		4.1.15 Quality of air transportation	62
		4.3.23 Intellectual property rights	62

<Strengths>

<Weaknesses>

Figure 1.10<sup>15</sup>. Competitiveness of overall Mongolia

## 1.4 Market and Corporate Structure

In Mongolia, an average level of local market competition in the area was observed with the score of 4.6 out of 7, while the extent of market dominance was a quite low level by ranking 136<sup>th</sup> among 138 countries (WEF 2016-2017). The effectiveness of anti-monopoly policy also turns out to be lower than other countries by ranking 129<sup>th</sup> place out of 138 countries.

For the business sophistication, it ranked 123<sup>th</sup> place out of 138 countries and scored 3.3 value out of 7.

15 IMD\_Compitiveness trends overall Mongolia, 2017

## Most problematic factors for doing business

Source: World Economic Forum, Executive Opinion Survey 2016

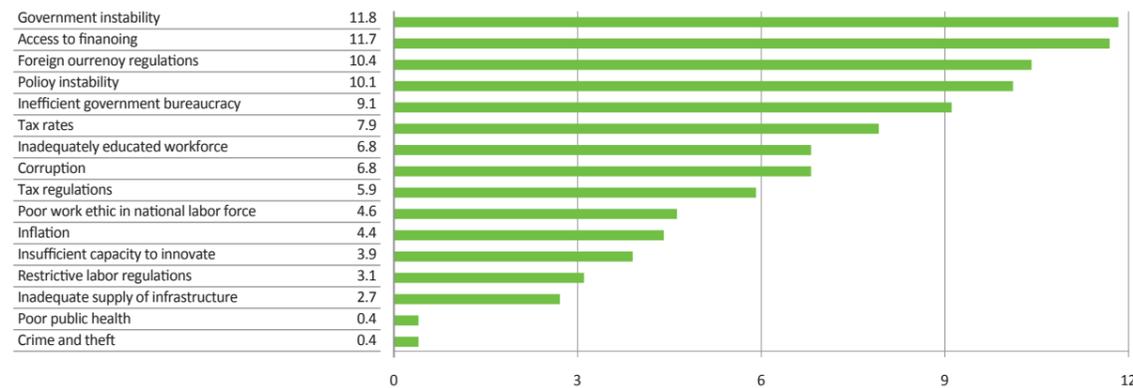


Figure 1.11<sup>15</sup>. Most problematic factors for doing business

According to the IMD World Competitiveness Index (Figure 1.2), the most problematic factors in doing business in Mongolia are government instability, financial accessibility, foreign exchange regulations, policy instability, inefficiently educated workforce, corruption, tax regulations, poor work ethic in national workforce, inflation, insufficient capacity to innovate, restrictive labor regulations, inadequate supply of infrastructure, poor public health, and crime and theft (Figure 1.11).

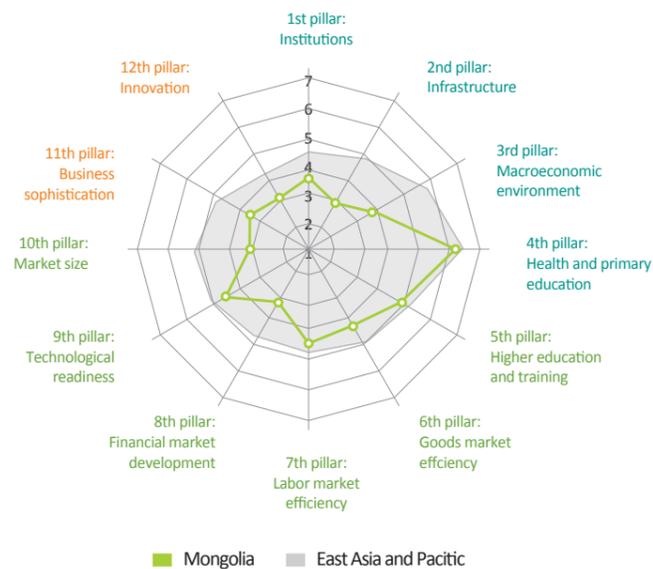


Figure 1.12<sup>16</sup>. Mongolia and East Asia and Pacific Competitiveness Index

The primary sources of corporate governance legislation in Mongolia are the Company Law; the Banking Law; and the Law on Securities Market. A Corporate Governance Code was adopted in 2007 by the Financial Regulatory Commission of Mongolia, and it was recently reviewed in 2014. Listed companies are recommended to include a corporate governance report about their compliance with the Code, but

this practice does not seem to be well implemented (Corporate Governance in Transition Economies Mongolia Country Report)

Although Mongolia's medium term outlook is promising, the weak and unstable macroeconomic environment appears to be the most binding constraint to economic growth in Mongolia in the short term. Mongolia's economy grew on average 11% per year between 2010 and 2014, driven by a major expansion of extractive industries, particularly copper and coal. This expansion was financed by a large increase in foreign direct investment, reaching levels of 45% of GDP in 2011. Mining has quickly come to dominate Mongolia's economy, with minerals accounting for 89% of all exports, and 89% of those exports bound for China. Despite a significant reduction in poverty and an increase in per capita income, the dependence on mining, concentrated trade with a single partner, and lack of diversification in other sectors have left Mongolia vulnerable to external shocks. During the boom, the Mongolian government also borrowed substantially from international markets, with external debt reaching 54.9% of GDP in 2014. The economic slowdown has created a budget deficit equal to 11% of GDP with debt service looming in 2017. The government plans to issue sovereign bonds to refinance the debt, but debt service remains high, at 27.9% of exports.

## 1.5 Environmental Sustainability

The objective of environmental sustainability is to ascertain inclusive economic growth and sustainable social development, and provide the fundamentals of improving the quality of people's lives by efficiently using natural resources, preserving the sustainability of the ecosystem, and creating opportunities to benefit from natural resources in the long-run.

The principles of environmental sustainability of Mongolia are to:

- promote participation of local residents and people at large to ensure environmental sustainability;
- use resource efficiently and effectively;
- support clean technology and encourage low-waste and sustainable production and consumption;
- establish climate-resilient and low-carbon societies,
- develop and enforce environmental rehabilitation at international standard level;
- encourage environment-friendly attitude and appropriate behavior.

The major environmental problems facing Mongolia today are:

- Desertification
- Climate change
- Shortage of water supply
- Urban air pollution
- Land degradation by mining activities and overgrazing,
- Illegal timber harvesting

Air pollution and desertification are perhaps the most endemic, and result from broad economic and environmental problems. Timber harvesting and the trade in endangered species are more specific to highly marginalized populations, but despite their characterization as "legal enforcement" issues they are actually symptoms of economic despair. (cf. WB report on the illegal forestry industry).

One of the suitable and multi-benefit ways to protect ecosystem and environment in Mongolia is to receive ecologically valuable territories under state or local government protection. As of 2014, totally 27.2 millions of hectare area is under state protection, which is 17.4% of total territory of the country. National target of the protected area network is up to 30% of the territory by 2030. Also, big area of the country is under local government protection. A large percentage of the total land (77.8%) is degraded to some extent: 40% due to natural causes and 60% due to human activities, such as overgrazing.

Since Mongolia is located in the hotspot area of global warning, its annual mean air temperature has increased by 2.24°C and precipitation has decreased by 7% during the last 75 years. In addition, frequency and magnitude of disastrous weather phenomena is increasing as a result of global climate change. These changes in climate system of Mongolia cause serious problems associated with its adverse impacts on biophysical components and socio-economic sectors of the country.

#### National Greenhouse Gas Inventory:

The main sources of GHG emissions have been divided into the following sectors: Energy, Industrial Processes and Product Use, Agriculture, Land use, Land use change and Forestry (LULUCF) and Waste. Total GHG emissions in Mongolia in 2014 were 34,482.73 Gg CO<sub>2</sub>-eq (excluding LULUCF). This represented 57.09% increase from the 1990 level of 21,950.73 Gg CO<sub>2</sub>-eq and 5.49% increase from the 2013 level with 32,687.27 Gg CO<sub>2</sub>-eq. Net GHG emissions in 2014 were 10,030.80 Gg CO<sub>2</sub>-eq (including LULUCF). This represented 1,034.44% increase from the 1990 level of -1,073.46 Gg CO<sub>2</sub>-eq and 23.23% increase from the 2013 level with 8,139.60 Gg CO<sub>2</sub>-eq.

In general, emission and removal from each sector increased in 2014 comparing to the base year and differences are showed in the Table by percentage changes and absolute values of each GHG inventory sectors (Table 1.2).

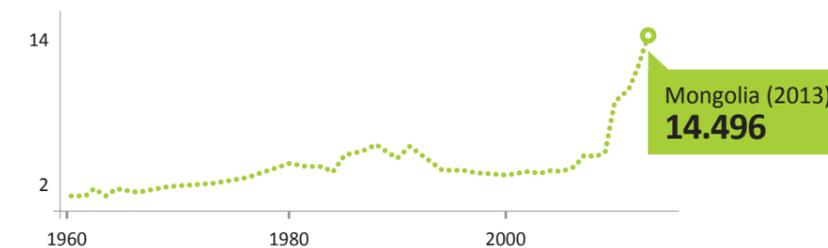
**Table 1.2.** Mongolia's GHG emissions/removals by sectors in 1990 and 2014

Sector	Emissions, (Gg CO <sub>2</sub> -eq)		Change from 1990 (Gg CO <sub>2</sub> -eq)	Change from 1990 (%)
	1990	2014		
Energy	11,091.14	17,267.79	6,176.64	55.69
IPPU	218.66	328.06	109.39	50.03
Agriculture	10,585.30	16,726.98	6,141.68	58.02
Waste	55.62	159.91	104.29	187.49
Total (excluding LULUCF)	21,950.73	34,482.73	12,532.00	57.09
LULUCF	-23,024.18	-24,451.93	-1,427.75	6.20
Net total (including LULUCF)	-1,073.46	10,030.80	11,104.26	1,034.44

GHG emissions in 2014 from the energy sector were 17,267.79 Gg CO<sub>2</sub>-eq accounting for 50.08% of total national emissions. The second highest sharing of the total emission were from the Agriculture sector with 16,726.98 Gg CO<sub>2</sub>-eq accounting for 48.51%. Emissions from IPPU and Waste sector contributed 328.1 Gg CO<sub>2</sub>-eq (0.95%) and 159.91 Gg CO<sub>2</sub>-eq (0.46%) respectively to the national total in 2014. Comparing to the 1990, sectoral emission increase for the Energy sector was 55.69%, for the IPPU sector was 50.03%, for the agriculture sector was 58.02, for the waste sector 187.49% and removal for the LULUCF sector was 6.2% in 2014.

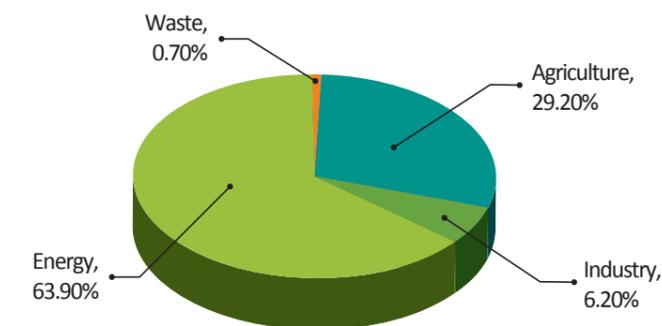
Two main sources of the total emission were energy and agriculture sector for all years of the inventory. However, percentage share of emission sources were varied year by year depending on economic and climatic factors such as demand increase in energy sector and natural disaster occurrence in agriculture sector.

According to the World Bank's data, the CO<sub>2</sub> emissions (metric tons per capita) records 14.496 in 2013 in Mongolia. The increasing rate is rapidly growing from mid 2000s<sup>17</sup> (Figure 1.13).



**Figure 1.13.** CO<sub>2</sub> emissions metric tons per capita in Mongolia from 1960-2014

The Intended Nationally Determined Contribution (INDC) of Mongolia includes proposed measures and additional actions for energy (including transport), industrial processes, agriculture and waste<sup>18</sup>. Greenhouse gas emissions by sector for 2010 of Mongolia is shown below.



**Figure 1.14.** CO<sub>2</sub> Emissions by Sectors in Mongolia, 2010

<sup>17</sup> World Bank Database

<sup>18</sup> UNFCCC, Mongolia INDC

### ***National Commitments of Mongolia:***

The melting of permafrost and glaciers, surface water shortages, and soil and pasture degradation have been identified as particular challenges faced by Mongolia as a result of climate change. Due to a high degree of vulnerability to climate change, adaptation is particularly important for Mongolia, and as such a distinct adaptation component is therefore included in the Mongolian INDC. The priorities for the adaptation actions are based on a detailed analysis of the expected impacts, potential solutions and challenges, and of possible synergies between adaptation and mitigation activities.

In its INDC, Mongolia has outlined a series of the GHG mitigation policies and measures that the country commits to implement up to 2030, in the energy, industry, agriculture and waste sectors. The expected mitigation impact of these policies and measures will be a 14% reduction in total national GHG emissions excluding Land use, land-use change and forestry (LULUCF) by 2030, compared to the projected emissions under a business as usual (BAU) scenario. Those and other potentially more ambitious commitments are contingent upon gaining access to new technologies and sources of finance through internationally agreed mechanisms and instruments under the auspices of the UNFCCC.

Mongolia initiated specific acts on renewable energy and introduced a feed-in-tariff (FIT) scheme for renewable energy. Mongolia slowly catches up to eco-innovation approaches. The elaboration of this INDC involved a multi-stakeholder process and consultations with key public bodies. It is largely based on existing legal frameworks and adopted policies of the Mongolian government, approved by the Parliament. Domestic legally-binding legislation already in place includes:

- Green development policy, 2014 (2014-2030)
- Sustainable Development Vision 2030, 2016
- National Action Programme on Climate Change (NAPCC), 2011 (2011-2021)
- State policy on energy, 2015 (2015-2030)
- National agriculture development policy, 2010 (2010-2021)
- State policy on forest, 2015 (2016-2030)
- MDGs-based comprehensive national development programme, 2008 (2008-2021)
- Law on renewable energy, 2015
- Law on energy, 2015
- Law on waste, 2017
- State policy on Industry, 2015 (2015-2030)

Majority of the development and climate policies and programmes cover periods up to 2016 and 2021. Thus, during the period of 2016-2020, Mongolia will elaborate relevant policy documents for consultation at the national level for its development and national climate policies for the period 2021-2030. Progress towards the fulfillment of the contribution will be assessed through an annual review of the implementation progress of the proposed policies and measures<sup>19</sup>.

<sup>19</sup> INDC of Mongolia, 2015

## **2. Eco-Innovation Performance (Environmentally friendly development)**

### **2.1 Natural capital and development.**

Historically, Mongolia's economic activities were dependent on natural and cultural factors, including vast territory with sparse population, pastoral livestock adapted to its harsh climate, and household-centered nomadic lifestyle. Mongolian traditional nomadic pastoralism is the best environmentally friendly way to make a business in the world. The terrain is mostly semi-desert and desert plains in the central, southern, and eastern parts of the country and the major mountain ranges stretch from the west to southwest. Agricultural and arable land is estimated at 73% and 0.4%, respectively, while forest is around 8% of the territory located mostly at the mountainous areas in the north. Groundwater provides 90% of the water consumption for the country, with a reserve of 10 km<sup>3</sup>/year and the total reserve of surface water is estimated at 535 km<sup>3</sup> consisting from rivers, lakes, springs, and glaciers.

Detailed information on natural capital (i.e. natural and mineral resources), and its role in national economy of Mongolia is given above in Section 1.1.

### **2.2 Definition of Eco-Innovation (Paradigm of green development)**

There is no a specific law or other legal instrument in Mongolia where a definition of Eco-innovation is clearly given, although a Law on Innovation is existing. However, general understanding about eco-innovation is that eco-innovation is the development of products and processes that contribute to green development, applying environmentally sound technologies and knowledge to keep natural balance of the environment or to elicit direct or indirect ecological improvements. This includes a range of related ideas, from advanced environmentally friendly technics and technologies to socially acceptable innovative paths towards sustainability. In the Law on Science and Technology approved in 2006, "innovation" is described as "transformation of the results and products of researchers and introducing the end product to industries and services". While there are many definitions and concepts of innovation, it can be simply say that "Innovation is all activities that successfully do things better than before".

The idea of eco-innovation is fairly new for Mongolia although the nature and environmental conservation paradigm is an integral part of lifestyle of Mongolians for centuries, especially local herders and pastoralists from the ancient time.

The terms “sustainable development”, “green development”, “environmentally sound technology”, “green products”, “clean energy”, “Waste Reduce, Reuse and Recycle”, etc. are more often used rather than “eco-innovation” in Mongolia. In Mongolia, eco-innovation could refer to green technology as well as scientific-based or innovative business models that have minimized human impact on environment. In addition, the key objective of environmental sustainability identified in the Sustainable Development Vision 2030 (SDV 2030) of Mongolia is to ascertain inclusive economic growth and sustainable social development, and provide the fundamentals of improving the quality of people’s lives by efficiently using natural resources, preserving the sustainability of the ecosystem, and creating opportunities to benefit from natural resources in the long-run.

Therefore, eco-innovation issues are very closely linked with the principles of the green development pathway and goals of sustainable development agenda of Mongolia. Eco-innovation is often used interchangeably with “environmental innovation” or “green innovation” and is also often linked with environmental technology, eco-efficiency, eco-design, environmental design, sustainable design, or sustainable innovation. While the term “environmental innovation” is used in similar contexts to “eco-innovation”, the other terms are mostly used when referring to product or process design, and therefore focus more on the technological aspects of eco-innovation rather than the societal or political aspects. Eco-innovation is the process by which responsible capitalism aligns with ecological innovation to construct products which have a generative nature and are recyclable back into the environment for usage in other industries.

The most common usage of the term “eco-innovation” is to refer to innovative products or “eco-products and processes that reduce environmental impacts. This is often used in conjunction with eco-efficiency and eco-design. One of the important principles of eco-innovation is its social and cultural acceptance and the effectiveness of eco-innovations.

Therefore, eco-innovation can be accepted as product, process or organizational innovations that contribute to the economic, environmental and social pillars of sustainability. Eco-innovation is building blocks for sustainable development. They add market value and also increase environmental and social acceptance.

Green innovation or eco-innovation can be described in general terms as the introduction, by any area within a company, of a new or significantly improved product, process or method for marketing or organization in order to create economic benefits and reduce environmental impact. These understandings are somehow reflected in the Green Development Policy and Sustainable Development Vision 2030.

### 2.3 Major Eco-Innovation Organizations

*The government* has no laws that explicitly promote entrepreneurship, but it introduced combined service kiosks to simplify business registration and licensing processes for business owners. Additionally, the government has created policies recently to improve the innovation system by proposing science

and technology plans or projects to reform higher education towards a research focus. In general, many legal experts say that the laws are written well, but the major challenge is implementing and enforcing these laws. For example, there have been lapses in IP protection where an inventor’s work is not properly protected or are leaked, resulting in many startups distrusting the system and not prioritizing the proper registration of IP. With the recent election and turnover in the government, it is uncertain what stance the new officials will take towards innovation and entrepreneurship.

*Corporate representatives* often describe their innovations as having the internal impact of increasing productivity and decreasing costs. Large corporations in Mongolia tend to grow horizontally rather than vertically, preferring to branch out to new orthogonal ventures rather than build depth. Many of the companies also do not have a dedicated research and development division, only examining the feasibility of the new direction when proposed. In general, corporations recognize the value of entrepreneurship but have little interest and effect on directly contributing to the development of startups. Overall, few high risk funds are available specifically for entrepreneurs. *Venture capital* is basically non-existent in Mongolia. While there are private investors that will fund entrepreneurs, few select to publicize their activities. Funds are available for traditional SMEs (smaller than 150 employees) through the government’s SME fund; however, it is unclear how these funds are distributed and whether entrepreneurs receive them. Commercial banks provide loans with high interest rates for SMEs and require a one-year history and immobile assets as collateral. These criteria make such funding difficult to obtain for startups.

*Universities* are a major stakeholder in the innovation and entrepreneurial ecosystem. The most apparent role of universities is serving as the powerhouses for training and educating the necessary human talent and skilled workforce for the country’s economic growth. However, universities have the capability of extending beyond this traditional role to utilize their resources to better foster innovation and entrepreneurship in the community. *Mongolian universities* tend to be more teaching focused with heavily theoretical and outdated curricula. With high competition between the more than 200 higher education institutions, many schools are currently restructuring their systems to improve education quality and to better disseminate tacit knowledge. Thus, universities have opened labs and state-of-the-art prototyping space to its students; however, these facilities are not used frequently.

Entrepreneurship is also of high interest to universities, with many planning to introduce new courses or open centers to better support their student and faculty endeavours. Although it will be a matter of time before the effectiveness of such efforts can be evaluated, research, innovation, and entrepreneurship programs are still young but growing in universities.

*Mongolian Innovation and Technology Center* at Mongolian National University stimulates, guides, fosters and promotes the development and commercialization of innovations by the Mongolians in the fields of science, medicine & technology. As a private university, Mongolian National University and the Mongolian National Innovation & Technology Center are building our own campus without any assistance or public funding. The primary goal of the Mongolian National Innovation & Technology Center is academic education and research areas of the nine Research Centers. Each Research Center is expected to cooperate and integrate with others at MNITC, in a way to foster innovation, invention and inspiration. Currently under construction on land adjacent to the Mongolian National University Campus, the Mongolian Information and Technology is a visionary project that will incorporate the best elements of acclaimed innovation centers such as Silicon Valley and bring high-tech employment to the nation’s youth. MNITC believes that Mongolia has much to offer a way beyond mining and the

Mongolia National University is going to be a major player in Solar, Biotech, Information Technology and Agricultural Research, firstly in Mongolia and Central Asia, and ultimately, across the globe.

Although *entrepreneurship* is still quite new in the country, the startup community exists and is growing. Much of the youth, particularly those who studied abroad, have openly embraced the concept and are working towards building their own startups. While many of the entrepreneurs look to produce IT-based startups, a number also focus on developing a Mongolian brand of products that use the country's natural resources, such as livestock materials and sea buckthorn. Regardless of the sector, all entrepreneurs share a number of challenges. Over 70% regard funding as a major challenge, with many eventually obtaining interest free loans from friends and family, self-financing out of their own pockets, or finding a private wealthy investor through personal connections. Other major hurdles include understanding the customer, finding human talent, and enforcing intellectual property (IP) rights.

Numerous *other organizations* support the entrepreneurship community by providing trainings or other resources. One of the most impactful has been Startup Mongolia, which adapts the TechStars programs. That contains a collection of programs to educate people on entrepreneurship and innovation, ideathons, and an accelerator program. Together, these programs help foster the young startup culture and community in Mongolia. There are also many resources around that encourage entrepreneurship, including *the National IT Park incubator, CLUB Coworking, the Women's Business Center, and the Startup Council of the Mongolian National Chamber of Commerce and Industry*. In general, these programs not only offer invaluable resources for entrepreneurs but also help raise public awareness and education on entrepreneurship and innovation.

*The Startup Community:* An additional stakeholder to the innovation and entrepreneurial ecosystems includes community organizations, such as accelerator programs, associations, incubators, and co-working spaces. In Mongolia, these organizations are playing an active role in promoting the startup culture and general concepts of innovation and entrepreneurship. Through their programs, these organizations offer a means of connecting the different innovation ecosystem stakeholders.

*Startup Mongolia:* The most visible and largest startup program in Mongolia is Startup Mongolia. This NGO had its humble beginnings in 2011 through hosting Startup Weekend events. In the past five years, the organization has grown drastically and hosted over 300 events.

*Business associations:* A number of business associations also exist to help advocate for businesses. These associations will lobby for policy changes or act as a liaison between businesses and the government. In general, these organizations work to create a good business environment in Mongolia.

*Mongolian National Chamber of Commerce and Industry (MNCCI):* The largest business organization is the MNCCI, with over 3,000 members. The chamber of commerce has also 33 councils that focus on specific groups. To promote entrepreneurship, the MNCCI recently established a Startup Council less than one year ago. This council focuses on providing network resources and financial benefits to young companies. The MNCCI provides special membership discounts to startups, including free use of office space and heavily discounted membership and training fees. The council is currently working with Startup Mongolia to build much needed venture capital funding in Mongolia. Perhaps the most tangible benefit entrepreneurial members have received is connections with other established businesses.

*Business Council of Mongolia (BCM):* BCM is the second largest group after the MNCCI, with 220

members; however, the BCM has a greater number of international members. Like the MNCCI, BCM has a number of focused working groups. While the BCM does not have a startup focus, the organization is looking into hosting pitching events.

*Informal groups:* In addition to the formal organizations and programs listed above, other informal groups focused on innovation and entrepreneurship likely exist. One of such group is the *Facebook group – Young Mongolian entrepreneurs*. This informal group organizes occasional meetups for entrepreneurs to mingle and discuss their ideas. Although there are no explicitly advertised services, the group contributes to the entrepreneurial ecosystem by providing a supportive network for entrepreneurs to share their resources and challenges.

## 2.4 Selected Eco-Innovation Areas

To sustain itself in the small market, corporations often adopt a horizontal, rather than vertical, model for growth, creating new companies across vastly different areas. For example, one company can hold operations in construction, mining, energy, and wool production. Business is often done with limited business planning or strategizing, with most companies making decisions on “gut” feelings. A few large companies will do research, which also contributes to their sustained success. As a result, most corporations do not have a research and development division. Thus, the type of innovation that each company uses is highly dependent on the company's operations. Each company has a different relationship with technology, with most companies taking the traditional role as a passive consumer. To demonstrate how corporate innovation occurs, we highlight a few key examples from different industries.

*Mining:* With mining being the largest industry in Mongolia, international commodities price fluctuations and the mine production rates can greatly influence the country's economy. Thus, they have the potential of significantly influencing the national innovation system. As a result, the innovation efforts of three companies were explored: the SOE holding company Erdenes Mongol, the Oyu Tolgoi (OT) mine (5,000 employees), and the Mongolian Mining Corporation (MMC, 2,000 employees). The government has more involvement with the mining activities due to special laws in place to manage the assets. Under the Law on Minerals (2006), the Mongolian government owns the mineral resources in the country and can grant mining rights. The state is also entitled to own up to 50% of reserves that were found through government-funded explorations and up to 34% for those found by other means. Erdenes Mongol was previously operating under the Law on Human Development Fund (1999), which enabled all citizens to act as shareholders. The company has since transitioned to act as a private entity under the Company Law, allowing board members instead of the prime minister to appoint the CEO. Stalls in the mining projects often occur due to governmental involvement and disagreements between the shareholders.

Innovation in mining is primarily driven by the activity of large projects. For example, the development of the mines requires supporting infrastructure both large and small, such as power plants or suppliers of disposable goods. As a result, mining companies often contract out to entrepreneurs to fulfil their needs; however, most the tenders look for goods and services that can be provided by traditional SMEs. Such

interaction with entrepreneurs is quite common for companies. MMC was the first and one of the few companies in Mongolia to introduce a washing plant. This facility has enabled MMC to survive a global drop in coal prices. The company, however, is unlikely to update their technologies or invest in research or innovation in the near future, because the mine will still be producing revenue for at least 28 years. Innovations at these large corporations often focus on improving safety and productivity.

OT has a growth and innovations team that is intended to acquire talent and expertise for its different business units. These changes are often small-scale, such as extending truck beds safely to allow for increased loads to be transported. While these innovations may be small, they can result in millions of dollars in savings. To promote innovation, OT will provide awards to ideas or publicize innovations through in company newsletters.

*Construction, Manufacturing, Energy, and Distribution:* The Nomin Construction and Development (200 employees), the furniture manufacturer UMECO (88 employees), and the green energy company Monhorus (70 employees) companies actively seek cutting edge technologies to implement in their production pipelines or use in their energy installations. UMECO is the first company in Mongolia to introduce a state-of-the-art automated manufacturing system from Europe. Although the companies do not produce any new technologies in-house and have limited interest in investing in young, underdeveloped technologies, these corporations will attend annual international fairs and expos to learn about new equipment. Monhorus has explored opportunities of building research collaborations with universities, but these efforts were never initiated.

One of the largest American companies present in Mongolia is Wagner Asia (500 employees), which is a distributor for heavy equipment in the mining and construction fields. While Wagner serves as a venue for introducing cutting edge foreign technologies and was the first company in Mongolia to implement IT systems in their workflow, the company primarily focuses on business systems innovation. For example, Wagner contains an analytics and innovation division to develop organizational strategies. Although an internal audit process developed by Wagner was adapted by a US company, few innovations have spread beyond the company boundaries. However, Wagner and a few of the larger companies do focus on developing human talent outside its company through providing guest lectures at local universities or offering internships at the company.

*Telecommunications:* Mongolia's ICT sector developed very rapidly, with four major mobile phone service providers and over 4 million mobile users. Unitel (1,300 employees) is one of the largest mobile operators and was introduced 10 years after the establishment of MobiCom. To compete in the market, Unitel differentiated itself through its marketing strategies and innovation in both product and business processes. Although new products are released very frequently, the company does not have a research and development division. They will, however, perform business research to predict market trends. Surprisingly, Unitel outsources most of the implementation of their projects and coding to SMEs.

*Financial:* Banks traditionally aid entrepreneurs by providing loans. SMEs make up only 16% of commercial bank loan amounts. Note that the financial and investment climate of Mongolia is discussed in more detail in the Capital section of this paper. Banks also provide other means of supporting entrepreneurs. The Arig Bank has created an innovation infrastructure within the company to develop solutions for its customers. Arig allows ideas to be developed by any employee and will compensate the creator of the new products with a percentage of the revenue earned. To support entrepreneurship, the company

worked closely with startup InfnitE solutions to build SWIPE, an affordable card reader that interfaces with mobile devices. These devices later enabled the company to track the payment history of its clients, building confidence for Arig to provide unsecured lending. The XAC bank is one of the commercial banks who established an eco-banking department and works actively in the field of climate financing in the country.

*Corporate Social Responsibility (CSR)* is a relatively new practice in Mongolia. Although few companies practice CSR, the reception of the projects has been generally positive. Through CSR, companies are often able to develop programs to better support education.

Innovation in the corporate stakeholder seems to be achieved sporadically and in isolation. For reasons that are unclear, corporations in Mongolia often lack long-term business planning. Thus, many companies do not have dedicated research divisions for either product or business development. Only when a direction is suggested does a team assemble to analyze the potential of the idea. While companies will innovate internally, the effects of these innovations rarely impact the external innovation ecosystem. This can be better understood by the corporate view of innovation as a means to decrease cost and increase productivity. When innovative ideas are implemented in companies, the changes are often small-scale.

In general, corporations do little to directly encourage entrepreneurship. They do, however, help sustain SMEs by posting tenders, through contracted services, or even help develop training materials for SMEs. To grow the innovation ecosystem in Mongolia, corporations can increase collaboration with other local stakeholders, particularly university and entrepreneurs.

*Clean and Renewable Energy:* As mentioned above, coal is a main source of energy generation in Mongolia. However, at the same time, coal burning is the main source of greenhouse gas emissions and urban air pollutions in Mongolia. Therefore, there is an ambitious target to improve the coal burning technology in Combined Heat and Power (CHP) plants, Heat only boilers and household stoves, as well as to increase of renewable energy share in total energy balance of Mongolia. Mongolian researchers jointly with the U.S. National Renewable Energy Laboratory estimates that Mongolia has 2.6 terawatts (TW) of total renewable energy potential. With 300 days of sunshine per year, a high level of wind resources, low moisture, and low temperatures, the Gobi Desert has been identified as a suitable location for construction of both solar facilities, including concentrated solar, and wind power plants. The Eg, Selenge, Zavkhan, and Khovd River watersheds in the northern and western regions of Mongolia have also been identified as areas with abundant hydropower resources. Following the inauguration of Mongolia's first utility-scale wind farm facility in July 2013, which was funded in part by the Millennium Challenge Corporation, the Mongolia government has demonstrated a strong political commitment to green development by seeking to raise the share of renewable energy from its current seven percent of installed capacity to 20 percent by 2023, and to further increase this to 30 percent by 2030. Growing numbers of wind and solar projects are in the pipeline in response to the renewable energy targets set by the government.

To incentivize renewable energy development, the Mongolian government has mandated feed-in tariffs of 8 to 9.5 U.S. cents per kWh for wind energy and 15 to 18 U.S. cents per kWh for solar energy. In addition, in December 2015 the Mongolian government provided for customs and VAT exemptions for imports of renewable energy equipment.

*Clean Energy Asia LLC (CEA)* was established in 2012 as a joint venture between Newcom LLC and

SB Energy Corp., renewable energy arm of Japan's Softbank Corporation. Its main goals are to produce renewable energy in Mongolia, expanding investment in and development of the renewable energy sector in Mongolia as well as exporting clean energy to other regions thus facilitating the creation of the Asia Super Grid. CEA wants to provide customers with long-term electricity supply from clean sources, in Mongolia as well as in the greater Asia region. When including moderate-level wind resources, or those suitable for rural power applications, this estimate increases to over 8,123 terawatt-hours per year. CEA is a strong supporter of the Asia Super Grid Initiative, which aims to facilitate a regional electricity system based on renewable energy. National grids of Japan, Korea, China, Mongolia and Russia are envisioned to be included in the interconnection. It is anticipated that this will make Mongolia the region's renewable energy leader. Mongolia has the resources and potential for this role and committed to realizing these potentials to power the growth and prosperity of the Asian continent. The Salkhit 50MW wind farm is the first renewable energy generator to be connected with central grid, first IPP and first utility with a private investment in renewable energy of Mongolia. Largest CDM project registered in UN. Clean Energy Asia LLC (CEA) is developing the 50MW (25 wind turbine generator (WTG) *Tsetsii Wind Farm (Project)*. The Project lenders include the European Bank for Reconstruction and Development (EBRD) and Japan International Cooperation Agency (JICA). The Project will be constructed under Lender's strict environmental and social requirements. The Project aims to meet this demand in rural areas by reducing reliance on coal for electricity generation and helping to solve the issue during peak loads by utilizing the wind energy potential of Mongolia. The Project will have a positive benefit through the displacement of greenhouse gas emissions produced through thermal energy generation. Approximately 230,000 tons of greenhouse gas emissions would be displaced as a result of the Project. There would be 180,000 tons of coal and 1.2 million tons of water saved through Project implementation.

*Mongolian company Solar Power International LLC* in cooperation with Japan's Sharp corporation and Shigemitsu shoji Co., Ltd have completed the construction of the biggest solar power plant of Mongolia, located in Khongor soum, Darkhan-Uul aimag in 2017. According to the preliminary study, the 10MW solar power plant has a capacity to generate 15.2 million kWh electricity per year through its 32,274 solar panels, which is able to provide renewable energy to 20 thousand homes. Moreover, the power plant will reduce greenhouse gas emissions by 14,764 tons.

*Mongolia Energy Corporation Limited (MEC Ltd.)* is an energy and resources developer, with operation and investment over Mongolia and Xinjiang in North Western China. The Company moved into the energy and resources industry upon its first acquisition of 34,000 hectares of concession areas at Khushuut and Darvi, Western Mongolia in 2007. MEC currently has projects and investments in the independent nation of Mongolia and Xinjiang, PRC for coal, ferrous, and non-ferrous metal resources. As an energy and resources developer, MEC acquires concessions with great potential and coordinates a well-built international team of experts to lead exploration, development, and compliance aspects relating to the concessions in a professional, sustainable, and responsible manner.

## 3. Circular Economy and eco-innovation areas and new trends

### 3.1 Strategic goals of the environmentally sound development and eco-innovations

Main goal of the Green Development Policy (GDP) of Mongolia approved in 2014 by the Parliament of the country is to advance Mongolia's national development in an environmentally sustainable manner, building the conditions for future generations to benefit and gain in the long term and to ensure environmental sustainability through creation of growth based on green development concepts and through citizens' participation and inclusiveness.

Key principles of GDP are:

1. Environmentally friendly attitudes, habits and competencies;
2. Support for clean advanced technologies;
3. Efficient, effective and rational use of resources.

GDP Strategic Objectives are:

1. Promote resource efficient, low carbon production and consumption with emphasis on waste reduction,
2. Maintain ecosystem balance and reduce environmental degradation while intensifying reclamation activities and environmental protection,
3. Promote investment in environmental protection, human development and clean technology and leverage tax, credit and incentive mechanisms to finance green economy,
4. Promote green jobs, reduce poverty and promote green lifestyle,
5. Make education, science and technology and innovation accelerators of green development by promoting environmentally adapted style and cultural values,
6. Plan and implement human settlement adapted to climate change, and natural resources carrying capacity.

The Parliament of Mongolia adopted the Law on Science and Technology in 2006. In this law, "innovation" is described as "transformation of the results and products of researchers and introducing the end product to industries and services". The state policy to store and develop national innovation system is to form a triple helix between scientific, business and Government organizations. In other words, research, business and policy are being brought together to form a harmony.

The Government of Mongolia, with an active support of UNESCO has adopted the Master Plan of Science and Technology 2007-2020. The plan is now used as the tool to develop Mongolia's science and technology sector. There are 5 key goals and 17 strategies in the Master plan. Key goals of the Master plan are:

- Improve the competitive nature of research works based on market economy demand
- Establish a productive system of innovation
- Develop and improve the legal condition for research production
- Reform the economy based on innovation technology
- Improve and expand science and technology international cooperation

Approaches to implementing an innovation system in the country include:

Strategy 1. To create economic stimuli for the collaboration of science-industry activities and joint research work:

- Support and stimulate co-funding or research development by public and private sectors, strengthen the cooperation between public and private sectors in the field of science and technology
- State support in the implementation of joint research by firms and research institutions in the framework of science and technology priorities
- Coordinate closely the selection of government funded research themes with innovation activities
- Organize innovation activity as a principal form of activity of research institute and universities
- State support in creating at research institutes and universities the units for technology transfer, incubator center and high tech small and medium enterprises
- Establish a council on technology policy at regional and national levels.

Strategy 2. Implement a policy supporting all types of innovation funding:

- Create a system of continuous funding for projects at all phases of innovation
- Create a venture fund for financing
- Establish legal environment for continuous support for all phases of innovation activities through financial policy
- Expand state support on activities of startup innovation firms
- Improve the legal environment on regulating financial risks of innovation
- Develop cooperation of parties involved in the innovation system
- Create legal framework of owning, protecting, transferring and using the results of government-financed innovation projects

Strategy 3. Create and develop the innovation infrastructure:

- Develop the production technological infrastructure (technology park, innovation and technology center, business incubator, technology transfer center)

- Develop the forms of cooperation of parties involved in the innovation system
- Adopt the law on legal status of the elements of innovation infrastructure that was created with the participation of state property
- Within the framework of economic priority areas, create and develop innovation infrastructure based on large regional industries
- Provide state support aiming to create the centers responsible for conducting the technological research, patenting, finding investors, protecting the legal rights of intellectual property.

Strategy 4. Establishing a system that prepares specialists and provides information and consulting service that are useful for participants in innovation activities:

- Create a specialized National information database responsible for supporting innovation activities in order to protect, popularize and commercialize the results of government financed innovation research
- Create (independent, or under a research institute or university) centers of specialized education and consulting services on protection of intellectual property, standardization, delivering certificates, conducting technological evaluations
- Establish in the name of innovation a continued multi-level training system, introduce and diffuse the innovation culture in science and production fields
- Prepare specialized human resources in innovation activities, conduct specialized training
- Provide colleges and universities that have license to conduct training on innovation policy and management- with skilled instructors and professors, enhance the learning environment
- Advertise by mass media the results and achievement of successfully implemented innovation activities, regularly, organizes the innovation exhibition and trade fairs

Expected outcomes of innovation activities are:

- Establishment of an effective national infrastructure, legal environment and management for innovation activities
- Development of market relations in use of intellectual resources, innovation assets, innovation products and services supporting innovation
- Creation of multiple forms of funding and government supports for innovation activities
- Creation of advanced technology based innovation clusters as the result of enhanced science-industry collaboration.

In implementation of the circular economy goals in the country, *improvement of waste management* through introducing 3R (reduce, reuse, recycle) principles is playing a vital role. Waste management improvements, waste reduction and the creation of a clean and healthy environment are some of the objectives of Mongolia's National Development Policy based on the Sustainable Development Goals, Mongolia's Stance on National Security, Green Development Policy, and the Medium-Term Target Programme of "New Development". The Law on Waste (2017) was ratified by the parliament on 12 May 2017. The Government of Mongolia's increasing focus and priority in waste management and environmental protection is greatly visible through its active involvement in reviewing and formulating new and progressive national policies and legal frameworks. Although the existing and planned efforts

of the Mongolian government in progressively overcoming challenges in the solid waste sector are commendable, Mongolia's solid waste management sector has untapped potential for improvement. With this backdrop and to promote the solid waste management sector in the country, a solid waste management strategies and action plans at the national and capital city levels were developed. The objectives of this National Waste Management Strategies and Action Plans are to highlight the necessity of greening the development pathway, ensure sound management of solid wastes, promote conservation and efficient use of resources, strive for environmentally sound technologies and approaches, reduce adverse impacts to the climate by reducing GHG emissions and short-lived climate pollutants (SLCPs) generated by the waste sector, drive behavioural change of the public towards the adoption of the 3R principles, create infrastructure for the collection and disposal of waste, promote and encourage capacity building and raise social responsibility of citizens, business establishments and corporations.

### 3.2 Lead Market Information

The variation over time in the quantitative values of Mongolia's key economic indicators and trade statistics captures the dramatic difference between the country's decidedly positive medium-to-long-term prospects as an investment destination and its less rosy short-term prospects.

Over the past decade, Mongolia's GDP has increased by 223 percent (\$3.41 billion in 2006 versus \$11.7 billion in 2016), its GDP per capita has increased by 231 percent (\$1,134 to \$3,754), its poverty rate has dropped from 37 percent to 22 percent, and its inflation rate has dropped from an annual average of 23 percent to 3.4 percent in April 2017. The factors responsible for this impressive record — including tremendous mineral reserves, agricultural endowments, proximity to the vast Asia market, and an educated labor force — remain in place and bode well.

Since 2011, however, the numbers suggest a disconcerting trend. Foreign direct investment (FDI) into Mongolia has steadily decreased from a high of \$4.7 billion in 2011, reaching only \$218 million in 2016. GDP growth has similarly declined since 2011 (17.3 percent to 1.0 percent), the official unemployment rate has increased from 4.8 percent to 9.1 percent, and public sector debt as a percentage of GDP has ballooned from 33 percent to 93 percent over the period from 2011 to 2016. Although some factors responsible for this steep downturn are beyond Mongolia's control (global commodity prices, China's economic slowdown), others were self-imposed (FDI-d discouraging legislation, capricious corporate tax levies, prosecutions of dubious merit of foreign business executives).

Against this backdrop, the new majority government, elected in June 2016, has taken some encouraging steps. First, the U.S.-Mongolia Agreement on Transparency in Matters Related to International Trade and Investment, or Transparency Agreement, went into effect on March 20, 2017. Warmly welcomed by U.S. and foreign investors alike, it will establish clear processes for drafting and commenting on new legislation and regulations and require strict transparency related to laws involving trade and investment.

In May 2017 the International Monetary Fund (IMF) approved an agreement with the Mongolian govern-

ment on a comprehensive \$5.5 billion relief package that will not only begin addressing Mongolia's large public debt, but also bring with it necessary discipline and budget reforms, as well as an in-depth review of banking assets. The IMF-led agreement has enabled the government to refinance international bonds that came due in March 2017, a more attractive and politically palatable alternative to relying exclusively on Chinese financing. While the IMF program's budget tightening will initially dampen economic growth, the government has committed to reform its fiscal and borrowing practices, improve its banking sector, and complete long-delayed regulatory reforms that should put it on a path toward long-term, sustainable economic growth.

China and Russia, Mongolia's only contiguous neighbors, dominate the Mongolian market. More than 90 percent of Mongolian exports are shipped to or through China; Russia provides 90 percent of Mongolia's refined petroleum products and 20 percent of its electrical power.

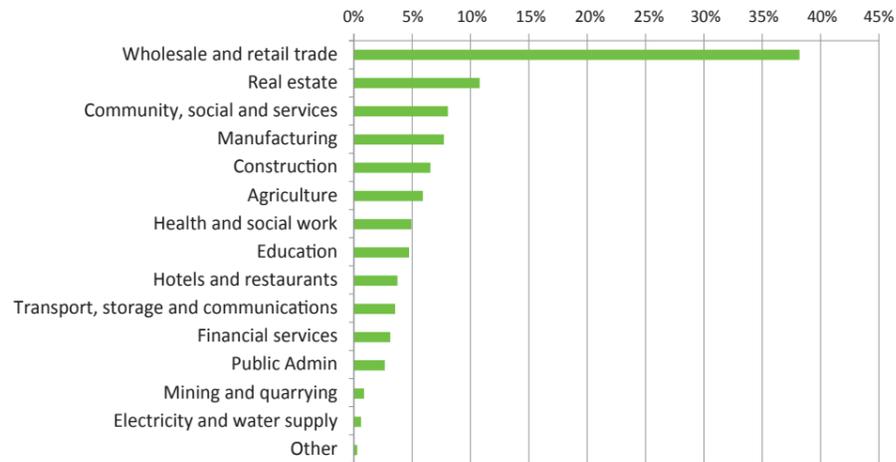
Mongolia exported \$4.05 billion in goods and services in 2016 (\$4.03 billion in 2015) and imported \$3.45 billion (\$3.87 billion in 2015). U.S. companies exported \$55.6 million in goods and services to Mongolia in 2016 (\$69.2 million in 2015) and imported \$11.2 million (\$17.3 million in 2015). Accordingly, the U.S. share of total Mongolian trade amounts to slightly more than one percent of all Mongolian imports.

**Productive Sector Analysis:** Based on available data on GDP segmentation, contribution to employment, and level of exports, the agriculture and mining sectors are the backbones of Mongolia's economy. Due to a size of population, country's internal growth opportunity is limited. However, its geographical location, landlocked between China and Russia, facilitates access two enormous markets which provides a vast growth opportunity via export. Since Mongolia has vast untapped land and a sort of cosmopolites and plants, the country can benefit from a development of value added cosmetic and biological add-on products which can become a prospective export oriented growth industry. As Mongolia is strategically located close to the highly developed countries such as South Korea, Japan, and other Asian countries with high purchasing power, the country can potentially be trading partners for sustainable and organic products.

The government has identified the following as its primary sources of competitive advantage:

- Undeveloped productive land
- Livestock volume and know-how
- Physical proximity to large markets
- Improvement on doing business indicators
- High literacy level
- Homogeneous society

According to the National Statistics Office, in 2014, over 35% of active enterprises were in trading sectors (Figure 3.1). Most agricultural activity is performed at a household level; active enterprises in agriculture amount to just over 5%, but it accounts for the highest sector by employment, over 300,000 people. In contrast, mining employs just over 50,000 people, but represents the largest share of GDP (about 18%). The construction sector is the fastest growing sector.

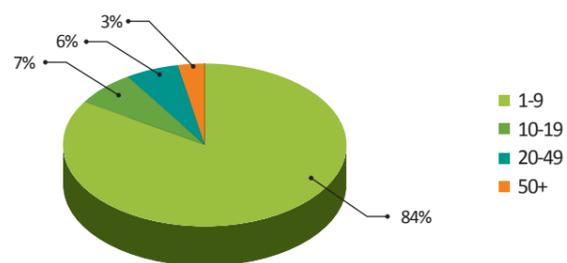


Source: National Statistical Office, Number of active establishments, by divisions of economic activities(2015)

Figure 3.1. Active enterprises by sector, 2014

As of 2013, more than 53,000 small and medium enterprises (SMEs) were active in Mongolia, representing 97% of all enterprises<sup>20</sup> (Figure 3.2). 61% of employees operated in rural areas. However, there has been a notable decline employment in rural areas since 2012. Growth rates in the number of enterprises in both rural and urban areas are similar. While data on women-owned enterprises is not systematically collected, they are estimated to comprise up to 60% of microenterprises and SMEs. Women owned businesses tend to be smaller, have lower turnover and fewer employees.

Percent of active enterprises by number of employees, 2013



Source: National Statistical Office, Number of Active Establishments, by employment size class (2015)

Figure 3.2. Active enterprises by firm size, 2013

Since the transition to a market economy in the early 1990s, the private sector's share of the economy has grown. Although certain sectors remain dominated by the government, namely water (41% private), arts (26% private), education (23% private), health (23% private), and electricity (14% private), private sector value added accounts for 81 percent of GDP.

<sup>20</sup> National Statistical Office 2015, Number of active establishments, by employment size size class

### 3.3 Best Practices

*Eco-city Mairdar.* A new eco-city is being built in Mongolia. Designed by German city planners and complying to strict environmental standards, Mairdar City is to become the new political and religious center of the country. Although not much construction has taken place so far, the plan foresees the building of a new urban center - Mairdar City - in this location that houses 300,000 inhabitants. It will also have its own university, museums and religious centers, along with areas dedicated for tourism and film industries. The city is also expected to become the seat of the Mongolian government one day, away from the current capital Ulaanbaatar. Sites have already been earmarked for the construction of buildings. Ulaanbaatar was actually built for 600,000 inhabitants, but now more than 1.3 million live there. This is because a huge proportion of the nation's population is concentrated in the capital causing serious urban challenges. This is why Mongolia is planning Mairdar City as an ecological urban development project. The city, which is to draw most of its energy from renewable sources, will follow ecological principles and feature an independent drinking water supply as well as an environmentally-friendly and decentralized traffic and living concepts. For instance, the rain water coming down from the surrounding hills will be collected, cleaned and then channeled as drinking water onto a lake which will also serve as a local recreational area. The first stage of Mairdar City's construction for an estimated 90,000 people is set to be ready by 2030.



Figure 3.3. General Design of Eco-city Mairdar

*Building awareness of entrepreneurship:* Perhaps the most apparent impact of Startup Mongolia has been building public awareness of entrepreneurship and innovation. Five years ago when the organization started, the business atmosphere was very different, and many people were unaware of what entrepreneurship meant [2,5]. Startup Mongolia has multiple methods of building excitement for and promoting entrepreneurship and innovation.

The first method is through introducing learning programs such as the Startup Show, where hosts interview entrepreneurs about their experiences in building their own startups. There are now over 80 episodes. In 2013, Startup Mongolia introduced monthly Drink Entrepreneur events for casual meetups and discussions on entrepreneurship. One year later, the group added the monthly Startup Grind series. These fireside chats and question/answer sessions with distinguished lecturers allow for more intimate interaction and networking to occur between established industry members and young entrepreneurs.

*Building innovation and entrepreneurship capacity:* Startup Mongolia goes beyond providing programs to create a supportive entrepreneurial network. The NGO has also introduced a number of programs and resources to foster innovation. For example, the organization began offering Stanford's Design Thinking course in 2015. The class is very well received, with some students describing it as being "brilliant" [6]. To provide a space for innovators to gather, Startup Mongolia has also collaborated with the Mongolian university of Science and Technology to create the Open Innovation Lab (OIL) available for public access. This facility offers classroom and office space, as well as a 3D printer [7].

One of the earliest programs Startup Mongolia offered was the Startup Weekend Ideathons. Over the course of a weekend, participants pitch problems and proposed solutions, vote for a business idea, recruit team members, and present a prototype. These ideathons are often themed. For example, the organization hosted the Startup Mompreneurs. It promotes women's participation in entrepreneurship. The fast pace of the event makes Startup Weekend extremely exciting for newcomers [5]. Often these weekends are also sponsored by large, local companies such as Unitel and Mobicom. These events not only promote innovation but also provide entrepreneurial support for the young community.

*Engaging other stakeholders:* Startup Mongolia is without a doubt the premier organization in Mongolia for establishing a startup foundation. It is also one of the only organizations to offer a diversity of resources and programs at all stages for developing ideas into entrepreneurial solutions. To accomplish these, Startup Mongolia has interacted with many of the different stakeholders, including other organizations such as the Mongolian National Chamber of Commerce and Industry to create a Startup Council. They have also worked closely with the National University of Mongolia and the Mongolian University of Science and Technology to create tailored coursework. While funding is still earlystage, Startup Mongolia has managed to attract potential risk capital through hosting demo days. Funding sources may even emerge from international partners through its Startup Train event. The NGO also had the capability of engaging corporate sponsors for its events. Just five years old, Startup Mongolia has already become an integral node in the country to connect different stakeholders together to more efficiently stimulate the innovation ecosystem.

*Women Entrepreneurs of Mongolia:* The Women Entrepreneurs of Mongolia (WEM) was founded in October 2015 to create a supportive network for women in business. As a result of this connection, WEM works closely with Startup Mongolia to plan certain events, a number of which are focused on women in business. More recently, the organization collaborated with the Ministry of Industry to set up Startup Weekends in the Mongolian countryside to address challenges faced there.

*Maker Movement and Spaces:* The Maker Movement in Mongolia is also similarly young in Mongolia. Startup Mongolia had initiated a Maker's Week in October of 2015. This was one of the first times that the Maker's movement was publicized in Mongolia. Since then, Startup Mongolia has been working to nurture and grow the community [7]. While a few makerspaces do exist in Ulaanbaatar, knowledge of their resources and their usage is fairly limited

*Training and Business Centers:* Khan Business Incubator realistically acts more as a training center. Its services, which include training and advice, are provided for free for clients who receive loans from Khan Bank. Since its inception 10 years ago, the number of clients has grown to over 400. These clients are primarily more established SMEs. Additional details about the incubator center can be found in the Corporate section under the Financial subheading.

The Khan Business Incubator is looking to expand its business and target young startups. Through discussions with the government, the incubator is seeking means of better supporting innovation. If the incubator is able to develop an investment program that supports these innovative startups, the center would provide an invaluable funding resource in Ulaanbaatar.

*Development Solutions* was established in 2013 through the Youth Business Mongolia initiative branched from the Youth Business International as a method of providing support for SMEs. Since then, the organization has focused on developing extensive 3 day training sessions, mentoring programs, and networking events to connect its clients with financing agencies. The intensive program teaches attendees details on a number of topics essential for business from market planning to create a viable financial proposal.

*Incubators:* The National IT Park is also currently undergoing restructuring and will soon be transitioned to the governance of the National University of Mongolia.

*Mongolian Academy of Sciences (MAS) Technology Incubator* offers laboratory and research services for companies to aid in developing new technologies. In Mongolia, certification services are quite limited. The Incubator may potentially help realize the innovations that are developed locally.

## 4. Barriers of and drivers to circular economy and eco-innovation in Mongolia

### 4.1 Drivers to Eco-Innovation and circular economy

Recently, Mongolia has launched numerous programs and policies towards building higher quality Higher Education Institutions (HEIs) and a stronger innovation system. There are a number of legal and policy instruments which determine the overall high-level strategy for the Government of Mongolia: the Comprehensive National Development Strategy of Mongolia, which is based on the Millennium Development Goals (MDGs) and Sustainable Development Vision 2030 of Mongolia. It is worth considering these strategies as background the Green Development Policy approved in 2014. National Green Development Policy is aimed at ensuring that green development becomes one of Mongolia's fundamental development policies. These national development strategies are the key policy drivers to the green development and ecologically-oriented innovations in the country.

The GoM is also supporting economic development through the Small and Medium Enterprise (SME) Development Programme. Given SMEs comprise two-thirds of business entities in Mongolia and around 20 per cent of GDP, and 738,800 people are employed in these businesses (around 70 per cent of the labour market) with; supporting smaller business will be crucial for economic development. The programme is intended to raise the employment rate, improve the quality and safety of workplaces, and spur the creation of export-oriented and import-replacing national products. The GoM has developed the draft "Development Programme for Small and Medium Enterprises" (2014-2016) within the Law on Small and Medium Enterprises.

Although universities have made much progress to expand their functions beyond teaching, there still remain improvements both internally and through policy reform that can be made to better position universities as a stronger stakeholder in the entrepreneurship and innovation ecosystem.

It is now looking for cooperation and donor partners to finalise the Development Programme. The former Ministry of Economic Development (MED) had developed important arrangements for concessions on innovation projects. The passage of the Law on Innovation (2010) opened up opportunities to implement projects through public-private partnerships, such as those in the energy sector.

Mongolia's private sector is an important driver for green development. Therefore, the private sector in Mongolia is actively engaged in developing the green economy, even developing their own green strategies. Furthermore, the Mongolian National Chamber of Commerce and Industry (MNCCI), an important representative of the business community, produces its own "Green paper". There are six strategic objectives in the MNCCI's "Moving from Brown to Green economy" national programme initiative. The document includes the "5x20" goals which lists five targets for the Mongolian Economy to

be reached by 2020:

- Decrease greenhouse gas emissions by 20 percent per unit of GDP;
- Increase energy efficiency by 20 percent;
- Increase renewable energy sources up to 20 percent of total installed capacity;
- Increase investment in natural capital by 20 percent; and
- Increase "Green procurement" up to 20 percent of Government and local government' procurement.

The strategy calls for not less than 2 per cent of GDP in Green investment every year. The first three years from 2013 to 2015 should be the transition period from a brown to green economy, while 2016-2020 will be the stage for sustaining and developing a low-carbon green growth model. One of the initiatives within green labelling is the MNCCI's Green Hotel Eco Label initiative. In terms of consumer goods, the MNCCI in cooperation with the MEGD seeks to establish internationally recognised rules and procedures for labelling green products. The MNCCI is also promoting an organic food promotion programme, known as "Organic Mongolia".

The MNCCI has established the Green Credit Guarantee Fund (GCGF). The purpose of the fund is to provide a collateral guarantee for energy efficiency improvements, green investments, and cleaner production projects. It is hoped that the GCGF will help address one of the primary barriers to financing of energy efficiency and other environmental improvement projects, notably inadequate collateral. In addition, it is anticipated that loans guaranteed by the fund will be given at below market rates, reflecting the reduced risk provided by the guarantee.

### 4.2 Barriers and Gaps of Eco-Innovation and circular economy

One of the most noticeable gaps is the lack of startups emerging from universities. One possible cause is the limited availability of interdisciplinary projects and coursework in universities. Currently, each department or organization acts separately. Universities would benefit on multiple levels through these interactions: by creating a tighter knit internal network and raising awareness of available resources and services. This could help foster a more supportive community for both students and faculty to engage in innovation and entrepreneurial activities. The Global Startups Labs collaboration with MIT provides a well supported method for universities to launch startups. Increased support for similar programs can only help improve the innovation and entrepreneurial capacities of universities.

Further, more deliberate advertisements and events can be held to better promote available but underused resources. Even within the university stakeholder, the different schools can focus on increasing collaboration. In general, knowledge of resources offered by other universities is fairly limited. Additionally, some policies cause limitation on university development of innovation and entrepreneurship. Although universities have the capacity of establishing contracts with private entities, some laws provide additional financial burden or prohibit universities from accepting outside income and equipment. These laws must be re-examined to enable universities to better utilize their resources.

Despite the significant financial restrictions, universities have been able to start new research laboratories, entrepreneurship centers, and alumni networks. By cultivating these systems to improve and expand the services offered, universities can better foster their innovation and entrepreneurial capacities.

There are a number of knowledge gaps regarding the key economic, social and environmental challenges in Mongolia, as well as the programmes and policies designed to tackle these challenges. For instance, there are differences in the level of knowledge and understanding of green economy among the Government, business community and the general public. Due to lack of knowledge and understanding, utilising efficient usage of resources, recycling and environmentally-friendly activities are often neglected. Therefore, it would be useful to promote new perceptions and knowledge.

The difficulties faced by entrepreneurs in Mongolia include several that one would expect to see in any budding startup community – accessing mentors, seed funding, expanding into foreign markets, and growing a team. However, several difficulties are more specific to the case of Mongolia, primarily a lack of consumer understanding and mistrust of intellectual property protection.

*1. Funding:* The largest difficulties faced by entrepreneurs in Mongolia relate to funding. In most cases, it is extremely difficult for entrepreneurs to find the seed funding necessary to launch a venture or make the product or business developments required to expand to global markets. As discussed in the Capital section of this report, there are no venture capitalists or angel investors in Mongolia. As a result, most of the interviewed entrepreneurs obtained funding through their own savings, informal loans from friends and family, or through wealthy, unnamed individuals.

*2. Consumer understanding:* Consumer understanding is another key difficulty for Mongolian entrepreneurs. This difficulty pertains to both entrepreneurs' lack of understanding of the current market needs as well as consumers' lack of understanding of the appeal of innovative products.

*3. Human capital:* Over 25% of entrepreneurs interviewed expressed difficulties regarding the lack of a skilled workforce. Startups involving IT expressed trouble hiring software developers with strong technical backgrounds, and as a result a few IT Startups now outsource for their software developing needs. Additionally, entrepreneurs disclosed difficulties finding team members that are capable of preparing strong business plans. One startup experienced negative cash flow for over one year while they focused on obtaining a large amount of funding instead of on product development. In the end, they realized that their startups required significantly less capital than they had projected in their initial business plans. Had there been mentors or resources available to the startup in its earliest stages, the startup might have corrected its mistake and began product development much earlier.

Some worry that Mongolia may later suffer from “*brain drain*” (where talented and bright youth leave their home country to work abroad). For those that do return after going abroad, several mentioned a sense of familial and national loyalty as well as with an acknowledgement of the plethora of opportunities for startups in Mongolia. Startups in Mongolia, a developing economy of three million people, have the potential to create waves in the society, whereas startups in developed nations such as the United States rarely have such a large impact.

*4. Office space.* Finding affordable office space was listed as a difficulty by approximately one in four entrepreneurs interviewed. One entrepreneur estimated that an appropriate office space could be rented for 500-700USD per month on average [14]. Several businesses, established corporations and startups

alike, prefer to find office space near Chinggis Square, near the center of Ulaanbaatar, and along Seoul Street and Beijing Street. These are attractive locations because there are several restaurants and coffee shops surrounding the areas that offer locations for meeting clients.

*5. Resources and infrastructure:* As entrepreneurship is young in Mongolia, there are very few resources available for startups. Startup Mongolia, the Mongolian National Chamber of Commerce and Industry, and the National IT Park offer key resources such as business trainings, discounted office space, and pitch events. However, outside of these three institutions, support for entrepreneurs is minimal.

*6. Government regulations:* Overall, there are no legal hurdles to the development of a startup. There is a kiosk center for all business registration needs. One area of government regulation that is particularly lacking relates to product exportation. Once a startup has survived in the Mongolian market, the next step is often to expand into the markets of foreign countries.

## 5. Policy Landscape: towards circular economy in Mongolia

### 5.1 Mongolian legal framework relating to innovation and entrepreneurship

The Mongolian government is actively working to improve the regulations and policies that have been molded over the past 27 years. In particular, the government is focusing its attention on developing science and technology. In 2007, the Mongolian Ministry of Education, Culture and Science in conjunction with the United Nations Educational, Scientific and Cultural Organization (UNESCO) released the “Science & Technology Master Plan for Mongolia.” The plan acknowledges the importance of developing a stronger knowledge-based economy and outlines possible steps to improve the rate and depth of development in scientific fields.

Upon the transition to democracy, the country first focused on developing legal frameworks for research and development (R&D) and innovation before implementing educational policies. Out of these laws include the 1998 Government policy on Science and Technology which outlines the legal framework for handling new technologies and innovations. Later, the 2002 Education Law of Mongolia was enacted to outline the education rights of the country citizens. Through the law, at least 20% of the annual government budget is required to be spent on education. Generally, the spending for education has been consistently around 17% of the general government expenditure and 5% of the total GDP for the past 10 years.

With the legal framework built up, focus on education in the early 2000s came in the form of developing Mongolia’s information and communications technology (ICT) sector.

Through the success of numerous policies, Mongolians now begin to learn ICT skills starting in grade four, and general ICT education is fairly strong with high internet access in secondary schools (91%) and low learner to computer ratios (17), as of 2015.

Although ICT remains a priority, the government has more recently focused its attention on developing its innovation infrastructure. After the collapse of the Soviet Era, the Mongolian government allowed all institutions to pursue research. While MAS still exists, universities are now establishing their own laboratories. With a relatively young research infrastructure in the country, numerous reformations in education policy and structure have already occurred. These efforts include the Science and Technology (S&T) Master Plan of Mongolia 2007-2020, the National Innovation System (2008), and the higher education reformation project, all of which aim to build the research and innovation capacities of universities.

There are several legal policies in place that seek to better promote innovation and entrepreneurship. While there is debate over the extent to which the government should promote innovation and entrepreneurship, most interviewees generally agreed that the current legal system does not hinder these areas.

However, several reference documents have indicated that gaps in implementation and enforcement of certain laws can indirectly hinder idea generation and business development.

Currently, knowledge based economy index for Mongolia is 4.23, which is 35.6 percent higher than it was 12 years ago. In comparison to a study carried out by World bank, the average index in South East Asia is 3.63, Uzbekistan 3.27, Vietnam 3.10, Kazakhstan 4.5 and PR of China 4.23. An analysis based on the main aggregate result, in order to enforce knowledge based economy it is important to pay closer attention to innovation issues. For example,

1. Economic incentive and institutional regime rating is 4.65
2. Educated, creative and skilled people rating is 6.67
3. Dynamic information infrastructure rating is 4.67

Mongolia’s innovation index, in that case rate is 0.159. Therefore, a “National Innovation development program” (2008-2015) was adopted by the Government of Mongolia in 2008, within the framework of the Master Plan of Science. This National Program consists of 4 sub chapters:

1. Chapter on establishing an innovation structure
2. Chapter on developing advanced technology
3. Chapter on supporting academic and research work at state owned higher education institutions
4. Chapter on preparing young researchers

This study will focus on the chapter on establishing an innovation structure. This chapter is closely correlated to the Master Plan of Science policy strategies and states the means of implementing the objectives, clarifying the financial, legal terms and results in a detailed manner.

There are several national laws that impact the innovation and entrepreneurship ecosystem of Mongolia. These include the *1993 Law on Taxation*, the *1997 Law on Bankruptcy*, the *2010 Law on Competition*, the *2012 Law on Credit Guarantee Fund*, and the *2012 Law on Innovation*<sup>21</sup>. Additionally, this section will explain the Japan-Mongolia Economic Partnership Agreement, which will likely influence Mongolian business practices in the near future.

#### *Law on Investment and Law on Investment Funds:*

In 2013, the Mongolian government passed two laws to regulate current practices surrounding investment: the Law on Investment and the Law on Investment Funds. These practices include investment licenses, management, and supervision. Under this law, investment funds can only be established and managed by licensed investment management companies, and all investment funds will be supervised and regulated by the Financial Regulatory Commission (FRC). Furthermore, under the Law on Investment, foreign investors and local investors are treated in a similar manner, except when investment occurs in three key sectors: mining, media and communications, or banking. In these sectors, a requisite

<sup>21</sup> Law on Taxation 1993,  
Law on Bankruptcy 1997,  
Law on Competition 2010,  
Law on Credit Guarantee Fund 2012,  
Law on Innovation 2012

amount of investment must originate from domestic entities.

With regards to entrepreneurship, the investment law is viewed as imposing severe financial requirements. For example, if a foreign entity acquires 25% or more in a Mongolian entity, a minimum of 100,000 USD in investment is required, regardless of whether the Mongolian entity is an established institution or a startup. Additionally, the amount of investment must be proportional among shareholders. If a foreign entrepreneur contributes 100,000 USD, then a local investor must also contribute 100,000 USD. This can lead to local entrepreneurs being less willing to partner with non-Mongolian businesses.

However, the law is a step in the right direction in terms of improving the current ecosystem for foreign investors. If an investor invests more than 500,000 USD, the investor may enter into an Investment Agreement with the Invest Mongolia Agency (IMA) that may enable various tax benefits. If an investor invests more than 15 million USD, then the IMA can issue a tax stabilization certificate to hold tax rates for a certain period of time. However, these policies are less likely to be of use in scenarios where startups require less than 500,000 USD for seed funding or business development.

#### *Intellectual Property Rights:*

The IPOM regards intellectual property rights (IPRs) as a pillar for innovation in Mongolia. The Mongolian people are entitled to intellectual property rights (IPRs) through the Patent Law of Mongolia (last amended in 1999), the Law on Copyright and Related Rights (last amended in 2006), and the Law on Trademarks and Geographical Indications (last amended in 2010). In 2014 alone, a total of 265 patents were filed. Mongolia also belongs to several World Intellectual Property Organization (WIPO) treaties, including the World Trade Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS). However, the parliament of Mongolia (the “State Great Khural”) has not yet ratified any WIPO internet treaties. Several entrepreneurs interviewed were not concerned about registering their IP, stating that although it was on their to-do list, it was not a top priority. Other entrepreneurs decided to register IP soon after product development. Several entrepreneurs interviewed agreed that IP registration is relatively cheap and very straightforward. One entrepreneur found that the registration for a Mongolian patent took six months, 20,000 MNT (9.39 USD), and lasts for 15 years. Overall, the practice of IP registration does not seem to be very popular, possibly due to poor understanding of the importance and registration processes surrounding IP.

Legal experts agreed that the legislative framework for IPRs exists but there are sometimes difficulties in implementing and enforcing IPRs. One issue identified by entrepreneurs was the theft of IP with little government reaction or enforcement of IP laws. Additionally, there are issues involving international IP registration. In order to export products, distributors in foreign countries often require that the product hold an international patent. These international patents are considerably more expensive than national patents and require a much more complex process.

In the past few years, the State Great Khural has passed several pieces of legislation aimed at improving the IP system in Mongolia. One example of recently introduced legislation, a clause in the 2012 Law on Innovation, is akin to the American Bayh-Dole Act. This clause allows universities to own all IP procured by universities under government funding. Before this law, all IP procured by universities with the aid of government funding would subsequently belong to the state. Additionally, on September 1, 2016, a new amendment to the criminal law will take effect, including a new clause on damages. In Clause 18.4 of Article 18 of the Criminal Law of Mongolia, if an individual copies or produces the product without

permission of the IP owner, a 540,027,000 unit worth penalty will be imposed. This unit is equal to 2,000 MNT, and thus the penalty will be 10,800,000 – 54,000,000 MNT. There is hope that this strict penalty will be enforced and that this enforcement will help to dissuade future infringing activities.

The IPOM is currently working on several projects that will also hopefully improve the current IP system. With the help of WIPO, the IPOM is working to establish a technology network for technology and innovation support centers throughout Mongolia. This project will create a hub of existing technology transfer and IP offices at universities and institutions around Ulaanbaatar to improve access to trainings and knowledge of IPRs.

#### *Japan-Mongolia Economic Partnership Agreement:*

The Japan-Mongolia Economic Partnership Agreement was signed in February 10, 2015. This bilateral agreement dramatically reduces importation taxes while also seeking to promote investment and protect intellectual property. Trade agreements such as this will likely serve to help Mongolian companies emerge on the global market and increase business capacity.

#### *Green Development Policy (GDP):*

The GDP was adopted by Parliament in 2014. The policy supports the commitments of the United Nations Global Conference on Sustainable Development in Rio de Janeiro in 2012 to promote sustainable, green development. It introduces a development model that focuses on the improved well-being and prosperity of the Mongolian citizen. This is to be achieved by provision of sustainable ecosystem services, more effective consumption of natural resources and inclusive, environmentally sound economic growth. The Policy defines mechanisms for promoting the transition to the green development model. Key indicators for determining the transition include efficient natural resource utilization, recycling, green employment, green investment, green procurement and environmentally friendly production. The Policy includes the concept of “green city”, which it defines as a city that ensures comfortable living conditions and development opportunities and has smart infrastructure services.

#### *Sustainable Development Vision 2030 (SDV 2030):*

The SDV 2030 is an important legal instrument identified basic objectives and principles of green and sustainable development in the country. Key objectives of the industry and innovation sector were described as follows:

1. Develop the industrial sector based on advanced methods, technology and innovations, and increase productivity.
2. Introduce advanced technology in food industry, improve the competitiveness, increase domestic supply in main food products, and ensure that citizens are supplied with healthy and safe food products.
3. Develop the chemical industrial sector, and supply the main types of fuel products meeting international standards from local production.

#### *The Green Development Strategic Action Plan (GDSAP) for Ulaanbaatar:*

Ulaanbaatar Municipality recognizes that the challenges the city faces are not unique and are shared by many cities throughout the world including in the Northeast Asia region. Everywhere, cities are in-

creasingly concerned about the environmental impacts of urban development and together with citizens, private sector and other stakeholders are adopting urban green growth strategies using more efficient and more environmentally-friendly technologies, products and practices.

Ulaanbaatar aspires to be a green city. Various municipal and national policies promoting green growth and development have been adopted. However, Ulaanbaatar needs a clear green development strategy and action plan to prioritize problems and identify strategic actions which will address the negative consequences of rapid urbanization and ensure inclusivity and sustainability. This Green Development Strategic Action Plan (GDSAP) for Ulaanbaatar has been developed through a consultative process involving subject matter experts, the private sector, civil society and residents.

Through public surveys and in-depth consultations, seven priority challenges and green goals have been identified to promote green development of Ulaanbaatar (Figure 8). The key challenges identified were environmental issues and the main effect of the poor environment is that Ulaanbaatar is not a very “livable” city. Although the Mayor has initiated several major green initiatives such as Ulaanbaatar Green Milestones, extensive efforts should be invested to make the city more attractive to international businesses and tourists..

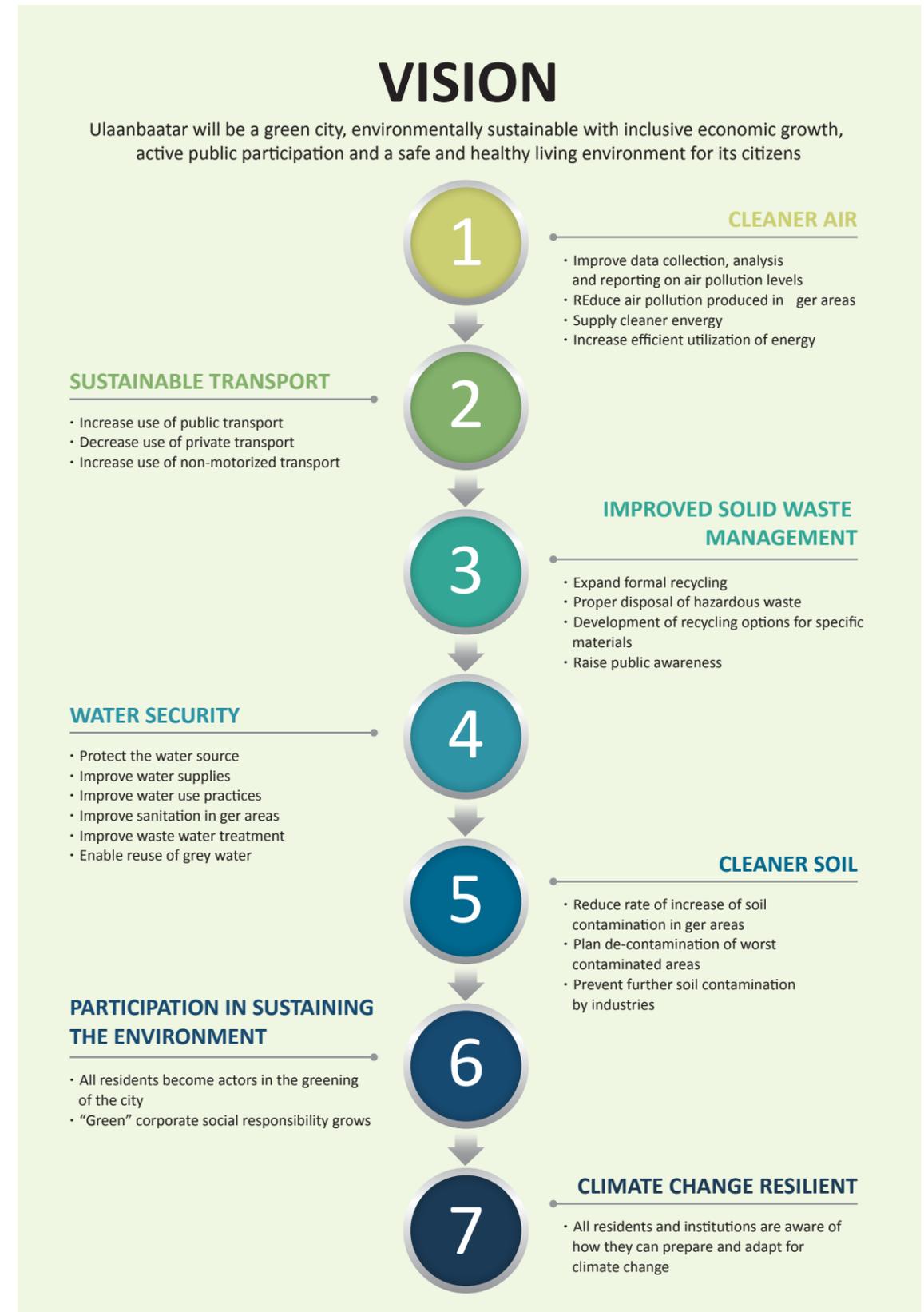


Figure 5.1. Priority challenges and goals identified to promote green development of Ulaanbaatar city

## 5.2 National Eco-Innovation Roadmap and Governance

*Key Actors* are Government of Mongolia, academy, universities, public and private sector of the country. The Government of Mongolia is a key player who is mandated to provide central policy direction, leadership and coordination of scientific and technological efforts and ensure that the results therefrom are obtained and utilized in areas of maximum economic and social benefits for the people. Generally, the issues related to research and development (R&D) and innovation are under the responsibility of *the Ministry of Education, Culture and Science of Mongolia*. Within the structure of the ministry, a Department of Science and Technology Policy Management and Division of Innovation are functioning to make policy and strategies in the field of science and technology, innovation and science, manage and coordinate the implementation of the national policy documents to achieve the goals and targets identified in these policy documents.

The Ministry of Environment and Tourism plays an important role in developing and implementing eco-innovation initiatives and measures in the country. The department of Green Development Policy and Planning, and Division of Science and Technology of the ministry are the main responsible units for green development, climate change and eco-innovation.

Other ministries such as Ministry of Energy, the Ministry of Mining and Heavy Industry, the Ministry of Food, Agriculture and Light Industry, the Ministry of Construction and Urban Development, and the Ministry of Road and Transportation are also responsible for R&D and innovations in their respective areas.

Scientific community such as Mongolian Academy of Sciences, research institutions, laboratories and research centers are a solid cornerstone of research and innovations. The important role of universities, private companies and NGOs in innovation is already underlined in above sections.

Developing and implementing a policy that stimulates the commitment towards establishing a network with integrated and coordinated goals and directions; the efforts of such policy support should be aimed at enhancing technology development, innovation and its feasibility. In order to establish innovation, the participation of research institutions and Universities are essential. State involvement to execute, coordinate and provide assistance is also grand. However, business organization participation and initiation, as well as legal coordination and bonuses from the state are needed when innovation surpasses the “valley of destruction”. Therefore, the Mongolian National Innovation system needs to be implemented and developed with a tight cooperation of public and private sector approach. Science-education- business chain of mechanism is required (Figure 5.2).

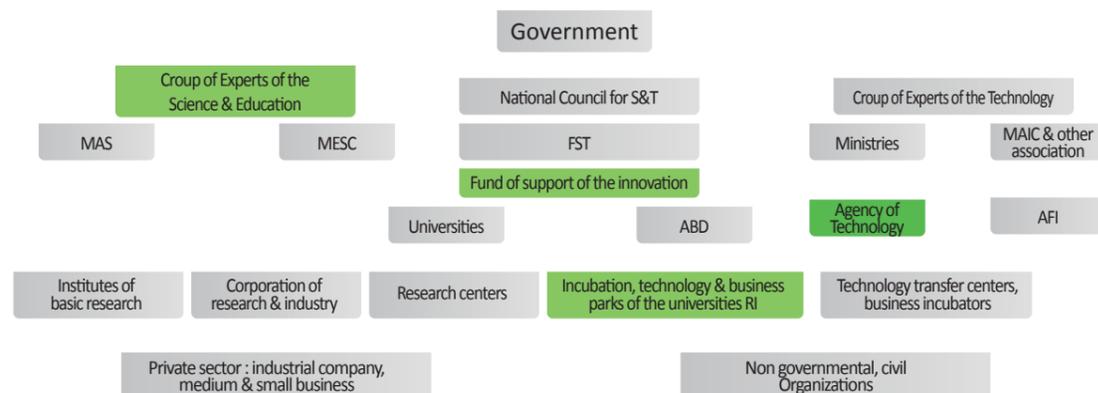


Figure 5.2. Structure of National Innovation System of Mongolia

## 6. Analysis on Eco-Innovation Using 2017 ASEI

### 6.1 Background 2017 ASEM Eco-Innovation Index (ASEI)

The ASEM Eco-Innovation Index (ASEI) has been developed and modified since 2012 by ASEIC. The ASEI was developed based on the input/output framework of eco-innovation. It aims to develop as an international tool to quantitatively and qualitatively measure the level and status of eco-innovation of ASEM member countries and expects to promote eco-innovation at regional and global level creating an active stage of communication between Europe and Asia, and as a result, encourage governments to enhance their eco-innovation related policies and regulations. The ASEI is composed of 20 indicators divided into four components: “Eco-innovation Capacity”, “Eco-innovation Supporting Environment”, “Eco-innovation Activity” and “Eco-innovation Performance” (Table 6.1).

Calculation Methodologies for 2017 ASEI are given in Table 6.2.

Table 6.1. 2017 ASEM Eco-Innovation Index (ASEI)

Area	Index	Source	Year Collected	Remarks		
Eco-Innovation Capacity	1.1. Potential to improve national competitiveness	WEF	2016	Maintained	Global Competitiveness Index (GCI)	Index
	1.2. General innovation capacity of nation	INSEAD	2016	Maintained	Global Innovation Index (GII)	Index
	1.3. R&D Capacity for Environmental Science	SciVal (Elsevier)	2016	Replaced	Number of published articles	No. of articles/10,000 persons
	1.4. Number of Researchers in Environmental Science	SciVal (Elsevier)	2016	Replaced	No. of published article authors	No. of researchers/10,000 persons
	1.5. Awareness level of company's sustainable management	UN Global Compact	2017	Maintained	No. of companies with sustainable management	Number of companies

Area	Index	Source	Year Collected	Remarks		
Eco-Innovation Supporting Environment	2.1. Government expenditure on green R&D	OECD	2015	Maintained	Gov't environmental R&D expenditure ratio	R&D expenditure ratio (%)
	2.2. Impacts of environmental regulations on corporate competitiveness	IMD	2017	Revised	IMD survey result	10-point scale
	2.3. Corporate priority level of sustainable development	IMD	2017	Replaced	IMD survey result	10-point scale
	2.4. Generation Capacity of Renewable Energy	IRENA	2016	Replaced	Generation capacity	MW/10,000 persons
Eco-Innovation Activities	3.1. Number of companies with green technology	Wisdomain	2016	Revised	No. of companies with green technology (patent application basis)	Number of companies
	3.2. Participation level in environmental management	ISO	2015	Maintained	No. patent certification per GDP (Mil. PPP\$)	No. of environmental certification
	3.3. Industry- academic cooperation on environmental R&D	SciVal (Elsevier)	2016	Replaced	Biz-academic environmental R&D cooperation ratio	Cooperation ratio (%)
	3.4. Share of Green patents	WIPO	2015	Revised	Green patent ratio	Patent ratio (%)
	3.5. Level of renewable energy distribution	IEA	2016	Maintained	Share of renewable energy from total energy generation	Share of renewable energy generation (%)
Eco-Innovation Performance	4.1. Quality of life related to environmental impacts	EPI	2016	Maintained	Environmental Performance Index	Index
	4.2. Greenhouse gas emission intensity	IEA	2014	Maintained	CO <sub>2</sub> concentration	kg CO <sub>2</sub> /2010 USD
	4.3. Environmental sustainability level	WEC	2016	Revised	Environmental sustainability ranking in World Energy Trilemma Index	Index
	4.4. Employment rate in green technology industry	IRENA	2016	Revised	Number of employment	No. of employees/10,000 persons
	4.5. Green Industry Market Size	Wisdomain	2016	Replaced	Ave. number of family countries per patent	Average number of countries

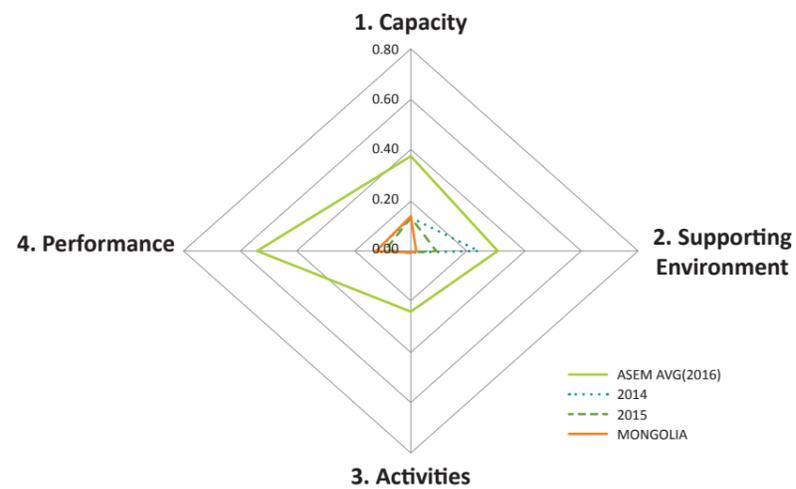
Table 6.2. Calculation Methodologies for 2017 ASEI

Area	Index Name	Calculation Method
Eco-Innovation Capacity	1.1. Potential to improve national competitiveness	WEF GCI of the year
	1.2. General innovation capacity of nation	INSEAD GII of the year
	1.3. R&D Capacity for Environmental Science	No. of environmental sciences articles for the past 5 years (total) per 10,000 persons
	1.4. Number of Researchers in Environmental Science	No. of environmental sciences article authors of the year per 10,000 persons
	1.5. Awareness level of company's sustainable management	No. of companies engaging in sustainable management for the past 5 years (total), 2017 (2013~2017)
Eco-Innovation Supporting Environment	2.1. Government expenditure on green R&D	Gov't environmental R&D expenditure ratio of the year
	2.2. Impacts of environmental regulations on corporate competitiveness	IMD survey index value of the year
	2.3. Corporate priority level of sustainable development	IMD survey index value of the year
	2.4. Generation Capacity of Renewable Energy	Renewable energy generation capacity of the year per 10,000 persons
Eco-Innovation Activities	3.1. Number of companies with green technology	Number of companies with patent applications for the past 5 years, 2016 (2012~2016)
	3.2. Participation level in environmental management	Number of environmental certification of the year per GDP (based on conversion point)
	3.3. Industry- academic cooperation on environmental R&D	Average ratio of cooperation for the past 5 year, 2016 (2012~2016)
	3.4. Share of Green patents	Share of green patent of the year
	3.5. Level of renewable energy distribution	Share of renewable energy of the year from the total of primary energy
Eco-Innovation Performances	4.1. Quality of life related to environmental impacts	Quality of life index of the year
	4.2. Greenhouse gas emission intensity	CO <sub>2</sub> concentration per GDP of the year
	4.3. Environmental sustainability level	Indexed value of environmental sustainability rank of the year
	4.4. Employment rate in green technology industry	Number of employees of the year per 10,000 persons
	4.5. Green Industry Market Size	Average number of family countries for the past 5 years, 2016 (2012~2016)

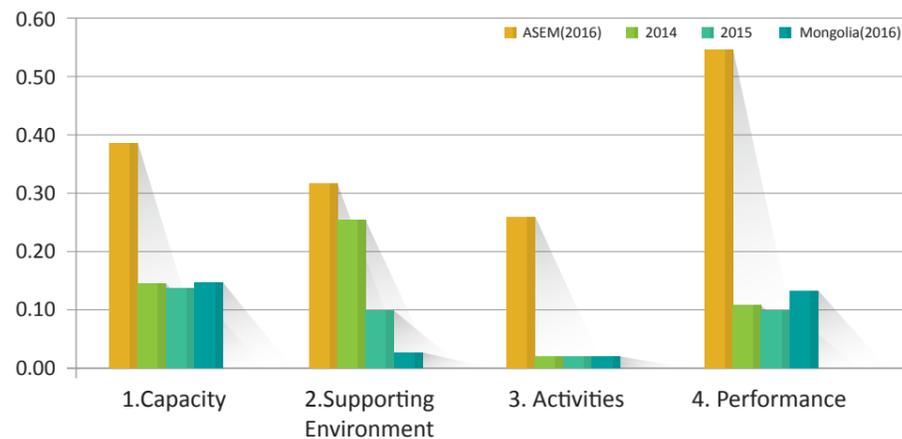
## 6.2 Overview of Mongolia Eco-Innovation using ASEI

According to the 2017 ASEI, which analysed eco-innovation status of ASEM countries from relevant data from 2014-2016, Mongolia showed lower than the averages of ASEM countries in the four areas of ASEI including Capacity, Supporting Environment, Activities and Performance of Eco-Innovation.

In terms of Supporting Environment, Mongolia showed a gradual degradation with the score of 0.02 in 2016 compared to 0.24 in 2014. Eco-innovation Capacity score turned out to be same with the score of 0.13 between 2014 and 2016



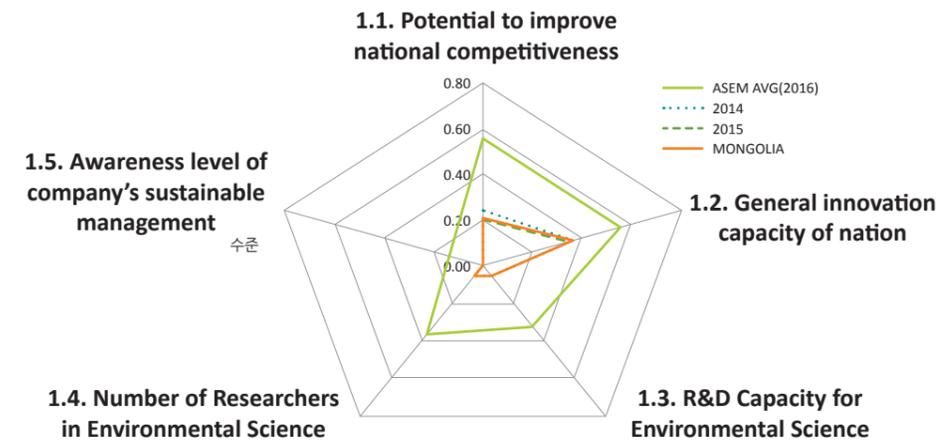
**Figure 6.1.** Overview of Analysis on Mongolia's Eco-innovation using 2017 ASEI  
 Source: Author, drawn from results applying 2017 ASEI of which data is specified in Table 6.1. 2017 ASEM Eco-Innovation Index



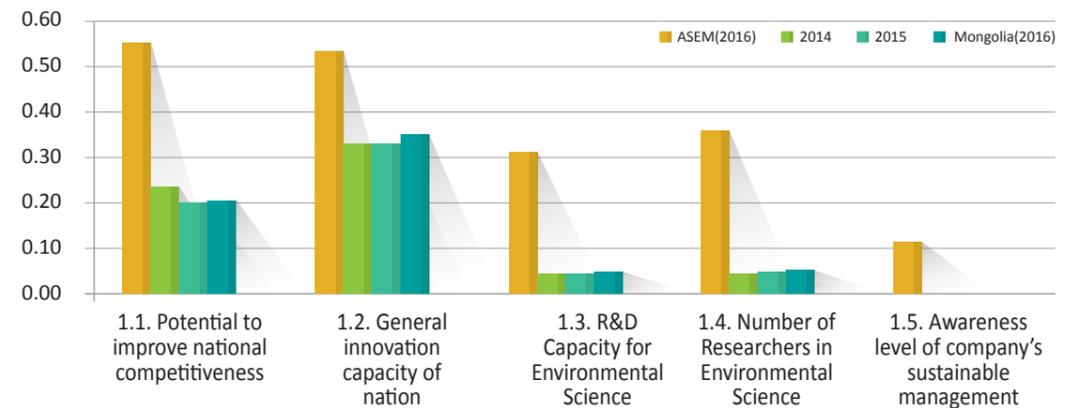
**Figure 6.2.** Overview of Analysis on Mongolia's Eco-innovation using 2017 ASEI  
 Source: Author, drawn from results applying 2017 ASEI of which data is specified in Table 6.1. 2017 M Eco-Innovation Index

### 6.2.1 Eco-Innovation Capacity

As for general innovation capacity of nation, Mongolia showed 0.36 compared to 0.54, the average of ASEM countries. Given that awareness level of company's sustainable management scored '0', it seems that Mongolia needs some special efforts to improve this area.



**Figure 6.3.** Analysis of Mongolia's Eco-Innovation Capacity using 2017 ASEI  
 Source: Author, drawn from results applying 2017 ASEI of which data is specified in Table 6.1. 2017 ASEM Eco-Innovation Index

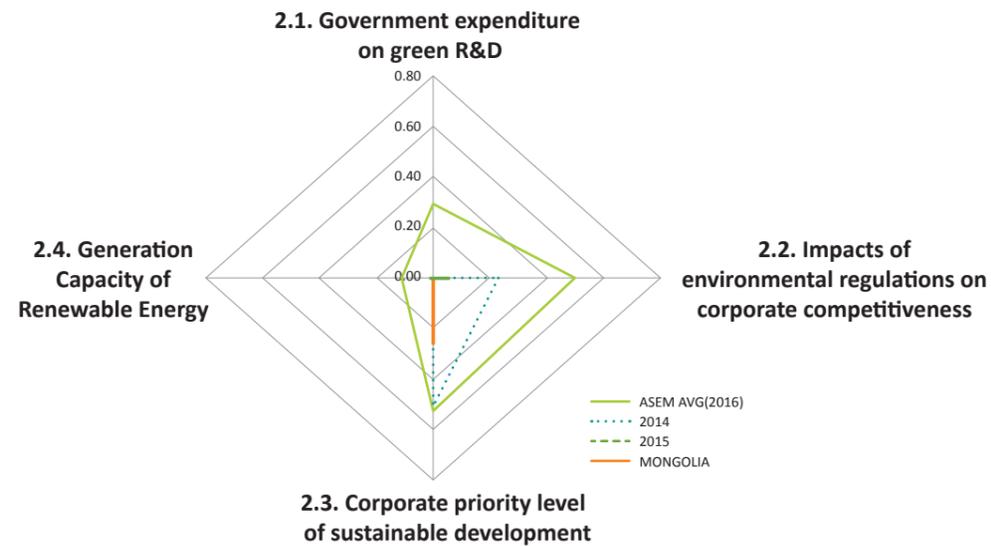


**Figure 6.4.** Analysis of Mongolia's Eco-Innovation Capacity using 2017 ASEI  
 Source: Author, drawn from results applying 2017 ASEI of which data is specified in Table 6.1. 2017 ASEM Eco-Innovation Index

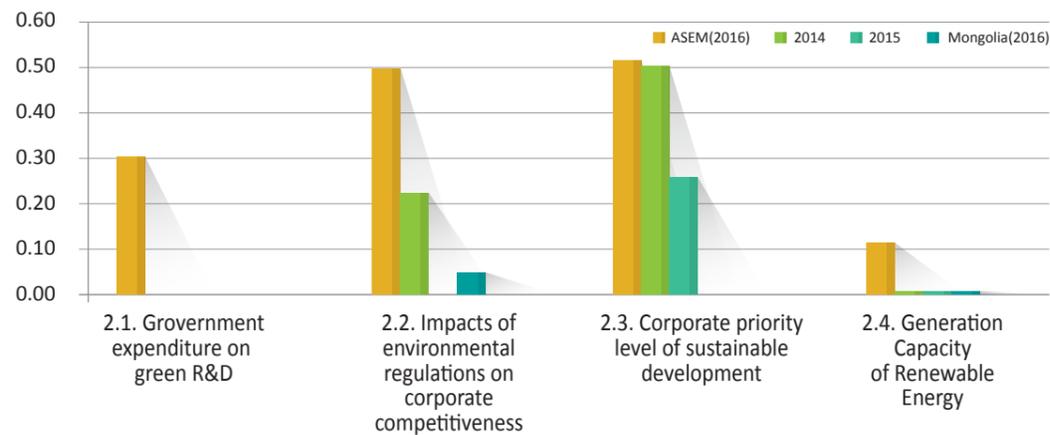
### 6.2.2 Eco-Innovation Supporting Environment

Due to lack of data, it is impossible to analyze Mongolia's government expenditure on green R&D. When it comes to corporate priority level of sustainable development and impacts of environmental regulations on corporate competitiveness, Mongolia scored 0.5 and 0.23 respectively in 2014. However, in

2016, it decreased to almost '0' which means that eco-innovation supporting environment in Mongolia is very poor.



**Figure 6.5.** Analysis on Mongolia's Eco-Innovation Supporting Environment using 2017 ASEI  
Source: Author, drawn from results applying 2017 ASEI of which data is specified in Table 6.1. 2017 ASEM Eco-Innovation Index



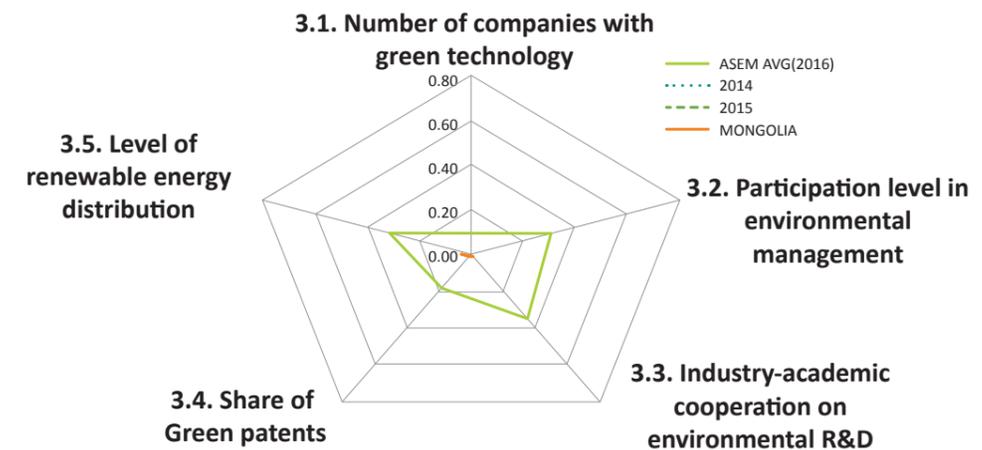
**Figure 6.6.** Analysis on Mongolia's Eco-Innovation Supporting Environment using 2017 ASEI  
Source: Author, drawn from results applying 2017 ASEI of which data is specified in Table 6.1. 2017 M Eco-Innovation Index

### 6.2.3 Eco-Innovation Activities

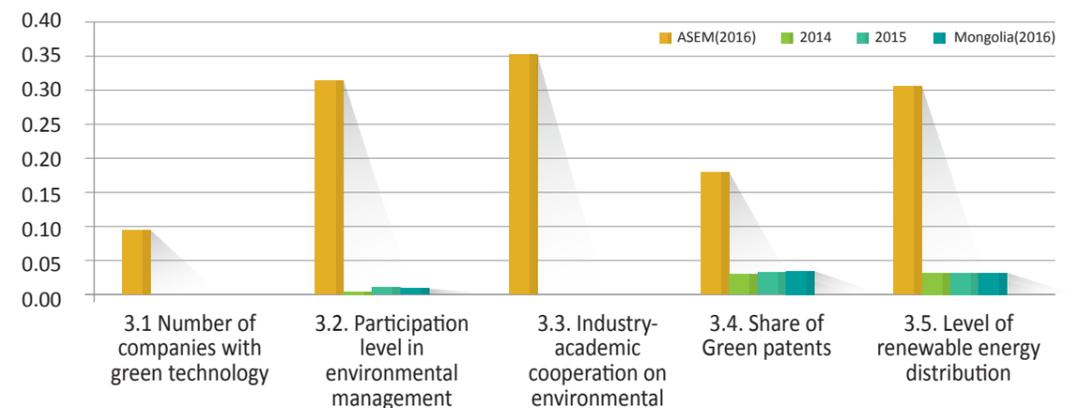
According to the analysis of sub-indicators for eco-innovation activities, Mongolia showed almost inactive compared to the average of ASEM countries in each sector or it doesn't have relevant data.

- In terms of number of companies with green technology, Mongolia showed continually the score of 0.00 since 2014, which means that its data is almost '0' or there is no relevant data to collect for calculation.
- Likewise, the data of 0.00 was calculated for industry-academic cooperation on environmental R&D and share of green patents for the last 3 years.
- As for the areas of participation level in environmental management and level of renewable energy distribution, Mongolia showed 0.01 and 0.03 respectively which appear very low compared to the averages of ASEM countries.

However, it should be noted that the above low scores of sub-indicators for eco-innovation activities in Mongolia depend strongly on availability of data and information specified in official reports and publications. At the level of organizations and companies, there certain activities related to eco-innovation are conducting.



**Figure 6.7.** Analysis of Mongolia's Eco-Innovation Capacity using 2017 ASEI  
Source: Author, drawn from results applying 2017 ASEI of which data is specified in Table 6.1. 2017 ASEM Eco-Innovation Index



**Figure 6.8.** Analysis of Mongolia's Eco-Innovation Capacity using 2017 ASEI  
Source: Author, drawn from results applying 2017 ASEI of which data is specified in Table 6.1. 2017 M Eco-Innovation Index

### 1.1.1 Eco-Innovation Performance

The quality of life related to environmental impacts is comparatively low recording 0.47, compared to 0.71 the average of ASEM countries. Nonetheless, this appears to be relatively high compared to other indicators including employment rate in green technology industry, green industry market size and greenhouse gas emission intensity.

Despite of low eco-innovation performance in Mongolia, the fact that the quality of life related to environmental impacts has been continually improving with a gradual increase from 0.28 in 2014, 0.36 in 2015 to 0.47 in 2016 gives significant perspectives to consider.

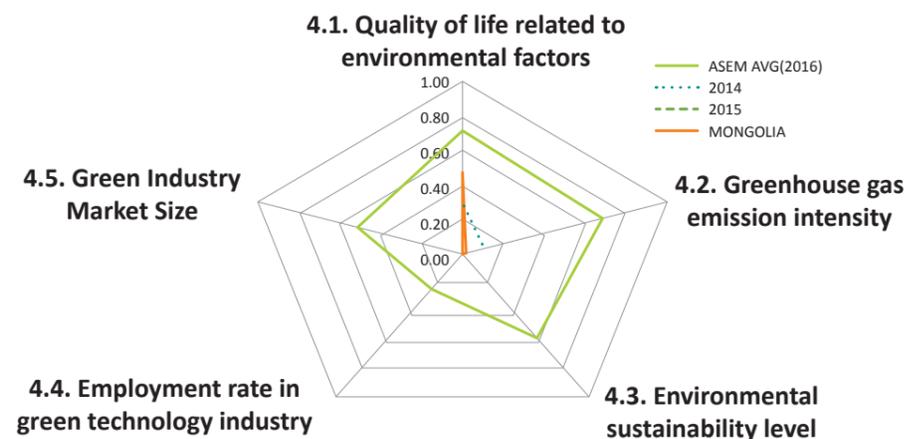


Figure 6.9. Analysis on Mongolia's Eco-Innovation Performance using 2017 ASEI

Source: Author, drawn from results applying 2017 ASEI of which data is specified in Table 6.1. 2017 ASEM Eco-Innovation Index

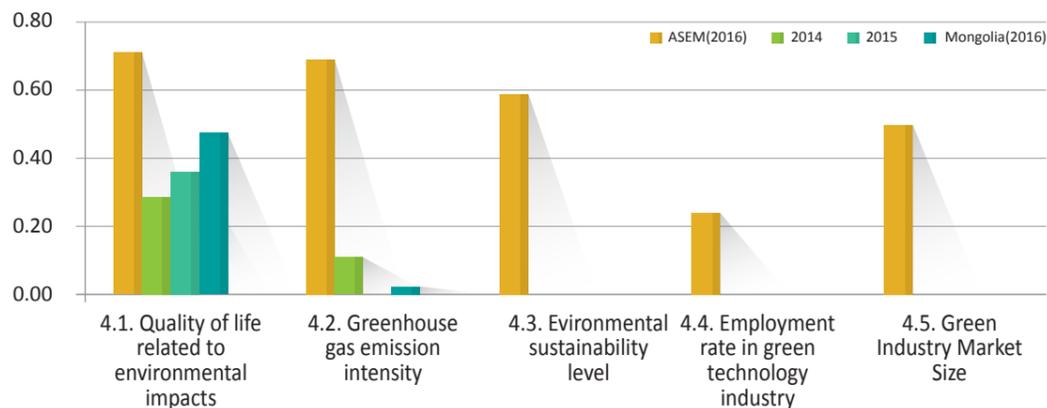


Figure 6.10. Analysis on Mongolia's Eco-Innovation Performance using 2017 ASEI

Source: Author, drawn from results applying 2017 ASEI of which data is specified in Table 6.1. 2017 ASEM Eco-Innovation Index

## 7. Report Synthesis

This report reviews green development, innovation and eco-innovation issues in Mongolia by considering ASEI tasks and requirements with local circumstances on innovative approaches mainly to the environment and economy of the country.

The location and remoteness of Mongolia brings additional difficulty for the landlocked nation to compete with its two large neighbours, China and Russia. Mongolia, mindful of its close proximity to these powerful nations, boasts a “third neighbour policy” and has established favourable relations with nations such as EU, Japan, Republic of Korea and the United States. These relations are one aspect of Mongolia's strong efforts for economic diversification and growth.

However, Mongolia has particular potential for growth through the development of innovation and entrepreneurship. The key component in this development will likely prove to be the Mongolian intelligent and well-educated people themselves. Besides being the most sparsely populated country in the world, the Mongolian population is unique in that roughly 45% of its population is under 24 years of age with roughly half of that number being under 14 years of age<sup>22</sup>. Another important advantage of development perspective of Mongolia is its rich natural and mineral resources.

Although many challenges exist to develop a sustainable innovation environment, Mongolia holds much promise for building a vibrant system. As a young start-up community, numerous efforts are being made to improve the current system. Even with the few resources that entrepreneurs can access, many are still able to build and grow their businesses. With a more supportive and integrated green development pathway and appropriate resources, these entrepreneurs have the potential of expanding beyond the local markets.

It is clear that the Mongolian government is actively shaping its legal framework and policies to better adapt to rapid changes in scientific and technological innovations with strong natural benefits. Although the Mongolian government has yet to develop several policies and programs that exist in developed economies, there is great potential for the role of government in the promotion of eco-innovation and entrepreneurship in Mongolia.

Today, Mongolia faces with serious environmental problems, although Mongolia until recently was one of the world's most pollution free and environmentally unspoiled places on earth. In the early 1990s, the government set aside about one-eighth of the country as strictly protected and eventually plans to make 30 percent protected. However, Mongolia now is not pollution free. Ulaanbaatar is sometimes engulfed in smog produced by large Soviet-built, coal-fired power plants as well as the hundreds of thousands household coal-burning stoves. Mining can be a dirty business in Mongolia. There are hundreds of

22 Central Intelligence Agency. “The World Factbook: East & Southeast Asia: Mongolia.”

<https://www.cia.gov/library/publications/theWorldfactbook/>

2. World Economic Forum. “The Global Competitiveness Report 2015/2016.” 2015.

3. National Statistical Office. “2015 Yearbook.” 2015. [geos/mg.html](http://geos/mg.html)

mines and some of them are quite destructive. Current environmental issues in Mongolia are urban air pollution, desertification, climate change, deforestation, overgrazing and limited natural freshwater resources in some areas<sup>23</sup>.

According to the 2017 ASEI, which analysed eco-innovation status of ASEM countries from relevant data from 2014-2016, Mongolia showed lower than the averages of ASEM countries in the four areas of ASEI including Capacity, Supporting Environment, Activities and Performance of Eco-Innovation. However, it should be draw attention to the fact that the estimated low scores of sub-indicators for eco-innovation activities in Mongolia depend strongly on availability of formal data and information specified in an official reports and publications.

Mongolia believes that environmentally sound technics and technologies and eco-innovations could help to solve these environmental issues.

#### ANNEX: Results from the Sampling Survey on Eco-Innovation in Mongolia

Category	Total number of Businesses in Mongolia					Number of Respondents				
	1~9 people	10 ~19	20 ~49	Over 50 people	Total	1 ~9	10 ~19	29 ~49	Over 50 people	Total
All Sectors	60,668	5,078	3,979	2,457	72,182	17	23	23	34	97
Agriculture, forestry, hunting and fishery	3,084	323	110	22	3,539	2	0	0	0	2
Mining and quarrying	413	87	82	108	690	0	3	2	3	8
Processing industries	4,400	458	237	208	5,303	0	6	11	9	26
<b>Electricity, gas and water supply</b>	<b>84</b>	<b>66</b>	<b>24</b>	<b>68</b>	<b>242</b>	<b>9</b>	<b>9</b>	<b>3</b>	<b>12</b>	<b>33</b>
Construction	4,507	632	562	373	6,074	1	2	2	1	6
Wholesale and retail trade, repair of motor vehicles, household goods	26,163	822	484	275	27,744	0	1	3	3	7
Hotels and restaurants	1,765	233	120	49	2,167	0	0	0	0	0
Transport, storage and communications	2,166	165	136	125	2,592	0	0	0	0	0
Financial services	974	37	29	25	1,065	0	0	0	2	2
Real estate, renting and other bussiness activities	5,935	463	328	218	6,944	0	0	0	0	0
Public administration and defense, compulsory social security	494	277	446	218	1,435	0	0	0	0	0
Education services	1,505	563	767	509	3,344	0	0	0	0	0
Health and social work	2,487	362	340	82	3,271	0	0	0	1	1
Other community, social and personal service activities	6,667	590	314	177	7,748	2	2	0	0	4
Extra-territorial organization and bodies	24	0	0	0	24	3	0	2	3	8

Source: MONGOLIAN STATISTICAL INFORMATION SERVICE, 2016

## The Community Innovation Survey 2017

### Innovations with environmental benefits

An innovation with environmental benefits is a new or significantly improved product(good or service), process, organisational method or marketing method that creates environmental benefits compared to alternatives.

- The environmental benefits can be the primary objective of the innovation or a by-product of other objectives.
- The environmental benefits of an innovation can occur during the production of a good or service, or during its consumption or use by the end user of a product. The end user can be an individual, another enterprise, the Government, etc.

#### 1. During the three years 2014 to 2016, did your enterprise introduce a product (good or service), process, organisational or marketing innovation with any of the following environmental benefits?

	Yes	No
<b><i>Environmental benefits obtained within you enterprise</i></b>	1	0
Reduced material or water use per unit of output	<input type="checkbox"/>	<input type="checkbox"/> <i>ECOMAT</i>
Reduced energy use or CO <sub>2</sub> 'footprint'(reduce total CO <sub>2</sub> production)	<input type="checkbox"/>	<input type="checkbox"/> <i>ECOENO</i>
Reduced air, water, noise or soil pollution	<input type="checkbox"/>	<input type="checkbox"/> <i>ECOPOL</i>
Replaced a share of materials with less polluting or hazardous substitutes	<input type="checkbox"/>	<input type="checkbox"/> <i>ECOSUB</i>
Replaced a share of fossil energy with renewable energy sources	<input type="checkbox"/>	<input type="checkbox"/> <i>ECOREP</i>
Recycled waste, water, or materials for own use or sale	<input type="checkbox"/>	<input type="checkbox"/> <i>ECOREC</i>
<b><i>Environmental benefits obtained during the consumption or use of a good or service by the end user</i></b>		
Reduced energy use or CO <sub>2</sub> 'footprint'	<input type="checkbox"/>	<input type="checkbox"/> <i>ECOENU</i>
Reduced air, water, noise or soil pollution	<input type="checkbox"/>	<input type="checkbox"/> <i>ECOPOS</i>
Facilitated recycling of product after use	<input type="checkbox"/>	<input type="checkbox"/> <i>ECOREA</i>
Extended product life through longer-lasting, more durable products	<input type="checkbox"/>	<input type="checkbox"/> <i>ECOEXT</i>

If no to all options, go to question 4 / Otherwise go to question 2

#### 2. Were any these environmental benefits due to the following types of your enterprise's innovations?

	Yes	No
	1	0
Product (goods or services) innovations	<input type="checkbox"/>	<input type="checkbox"/> <i>ECOPRD</i>
Process innovations	<input type="checkbox"/>	<input type="checkbox"/> <i>ECOPRC</i>
Organisational innovations	<input type="checkbox"/>	<input type="checkbox"/> <i>ECORG</i>
Marketing innovations	<input type="checkbox"/>	<input type="checkbox"/> <i>ECOMKT</i>

### 3. During 2014 to 2016, how important were the following factors in driving your enterprise's decisions to introduce innovations with environmental benefits?

	Degree of importance				
	High	Medium	Low	Not relevant	
	3	2	1	0	
Existing environmental regulations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ENEREG
Existing environmental taxes, charges or fees	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ENETX
Environmental regulations or taxes expected in the future	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ENREGF
Government grants, subsidies or other financial incentives for environmental innovations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ENGRA
Current or expected market demand for environmental innovations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ENDEM
Improving your enterprise's reputation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ENREP
Voluntary actions or initiatives for environmental good practice within your sector	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ENAGR
High cost of energy, water or materials	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ENCOST
Need to meet requirements for public procurement contracts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ENREQU

### 4. Does your enterprise have procedures in place to regularly identify and reduce your enterprise's environmental impacts? (For example preparing environmental audits, setting environmental performance goals, ISO 14001 certification, ISO 50001 certification, etc)

No	<input type="checkbox"/>	0 ENVID
Yes	<input type="checkbox"/>	1

If your enterprise had any procedures in place, then were they implemented?

(Tick all that apply)

Some procedures were implemented before 2014	<input type="checkbox"/>	ECOREC
Some procedures were implemented or significantly changed between 2014 and 2016	<input type="checkbox"/>	ECOREC

### Олон нийт шинэчлэлийн судалгаа 2017

#### Байгаль орчинд ээлтэй шинэчлэлтүүд

Байгаль орчинд ээлтэй шинэчлэл нь шинэ эсвэл мэдэгдэхүйц сайжирсан бүтээгдэхүүний (бараа эсвэл үйлчилгээ) үйл явцын хувьд байгаль орчинд харьцангуй илүү үр ашигтай зохион байгуулалт аргачлал болон маркетингийн хэлбэрийг хэлнэ.

- Байгаль орчинд ээлтэй шинэчлэлийн анхдагч зорилгот болох бусад зорилгот дайвар бүтээгдэхүүн байж болно.
- Шинэчлэлийн орчин дахь сайн үр дүн бараа бүтээгдэхүүн, үйлчилгээний үйлдвэрлэлийн явцад болон эцсийн хэрэглэгчийн хэрэглээнд илэрч гарах боломжтой.

#### 2014-2016 онд 3 жилийн турш танай байгууллага доорх хүрээлэлд ашиг тустай бүтээгдэхүүн(бараа, үйлчилгээ) болон үйл ажиллагаа, зохион байгуулалт, маркетингийн шинэчлэлийг гаргасан уу?

Танай байгууллагад өрнөсөн хүрээлэн буй орчинд ээлтэй нөлөө	Тийм	Үгүй
Бүтээгдэхүүний гаралт бүрт түүхий эд болон усны хэрэглээг багасгасан ECOMAT	<input type="checkbox"/>	<input type="checkbox"/>
Эрчим хүчний хэрэглээ, CO <sub>2</sub> -ийн ялгаралтыг багасгасан (нийт CO <sub>2</sub> үйлдвэрлэлийг багасгах) ECOENO	<input type="checkbox"/>	<input type="checkbox"/>
Агаар, ус, дуу чимээ болон хөрсний бохирдлыг багасгасан ECOPOL	<input type="checkbox"/>	<input type="checkbox"/>
Зарим түүхий эдийг бохирдол, аюул багатай орлуулагчдаар сольсон ECOSUB	<input type="checkbox"/>	<input type="checkbox"/>
Тодорхой хэмжээнд түлшний эрчим хүчийг сэргээгдэх эрчим хүчний эх үүсвэрээр сольсон ECOREP	<input type="checkbox"/>	<input type="checkbox"/>
Хог хаягдал, ус, бусад түүхий эдийг өөрийн хэрэглээ болон борлуулалтад дахин ашигласан ECOREC	<input type="checkbox"/>	<input type="checkbox"/>

#### Хэрэглэгчид хүрэх эцсийн бүтээгдэхүүн, үйлчилгээний хэрэглээний орчны ашиг тус

Хэмнэсэн эрчим хүчний хэмжээ ба CO <sub>2</sub> -ийн ялгаруулалт ECOENU	<input type="checkbox"/>	<input type="checkbox"/>
Хэмнэсэн агаар, ус, дуу чимээ болон хөрсний бохирдол ECOPOS	<input type="checkbox"/>	<input type="checkbox"/>
Бүтээгдэхүүн хэрэглэсний дараа дахин ашиглалтад тус болох ECOREA	<input type="checkbox"/>	<input type="checkbox"/>
Удаан эдэлгээт, чанартай бүтээгдэхүүнээр хэрэглээний хугацааг уртасгах ECOEXT	<input type="checkbox"/>	<input type="checkbox"/>

Хэрэв та дээрх хувилбаруудад үгүй гэсэн бол 4-р асуултад хариулна уу.  
Эсвэл 2-р асуултад хариулна уу.

#### 1. Эдгээр байгаль орчинд тустай талуудын аль нэг нь танай байгууллагын шинэчлэлийн хүрээнд хамрагдаж байгаа бол тэмдэглэнэ үү.

	Тийм	Үгүй
Бүтээгдэхүүний (бараа болон үйлчилгээ) шинэчлэлүүд ECOPRD	<input type="checkbox"/>	<input type="checkbox"/>
Үйл явцын шинэчлэлүүд ECOPRC	<input type="checkbox"/>	<input type="checkbox"/>
Зохион байгуулалтын шинэчлэлүүд ECORG	<input type="checkbox"/>	<input type="checkbox"/>
Маркетингийн шинэчлэлүүд ECOMKT	<input type="checkbox"/>	<input type="checkbox"/>

**2. 2014-оос 2016 оны хооронд, байгальд ээлтэй шинэ санаачлагыг нэвтрүүлэхийн тулд шийдвэр гаргахад дараах хүчин зүйлс хэр чухал байсан бэ?**

	Их 3	Дунд 2	Бага 1	Хамааралгүй 0
Одоо хэрэгжиж буй байгаль орчны зохицуулалтууд ENEREG	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Одоогийн байгаль орчны татвар, хураамж эсвэл төлбөр ENETX	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ирээдүйн байгаль орчны зохицуулалт ба татвар ENREGF	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Байгаль орчны шинэчлэлд зориулсан засгийн газрын буцалтгүй тусламж, мөнгөн тусламж, бусад санхүүгийн урамшуулал ENGRA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Байгаль орчны шинэчлэлт одоо-ирээдүйн зах зээлийн эрэлт ENDEM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Байгууллагын нэр хүндэд сайн ENREP	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Салбар дахь байгаль орчны зөв хэрэгжүүлэлт сайн дурын үйл ажиллагаа, санаачлагууд ENAGR	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Эрчим хүч, ус, түүхий эдийн өндөр өртөг ENCOST	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Нийтийн худалдан авалтын гэрээнд хангагдах шаардлага ENREQU	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**3. Танай байгууллага байгаль орчны нөлөөллийг тогтмол тодорхойлж ЭКО орчны журамтай юу?**

(Жишээлбэл байгаль орчны аудитыг бэлтгэх, байгаль орчны гүйцэтгэл зорилтуудыг тодорхойлох, ISO 14001 гэрчилгээ, ISO 50001 гэрчилгээ... гэх мэт).

Үгүй	<input type="checkbox"/>	0	ENVID
Тийм	<input type="checkbox"/>	1	
Хэрэв танай байгууллага ямар нэг тогтсон журамтай бол хэзээ хэрэгжүүлсэн бэ? (хамаарах бүгдийг тэмдэглэнэ үү)			
Зарим журмууд 2014 оноос өмнө хэрэгжсэн ENVBF	<input type="checkbox"/>		
Зарим журмууд 2014-оос 2016 оны хооронд хэрэгжсэн ба ихээхэн өөрчлөгдсөн ENVBT	<input type="checkbox"/>		

**Eco-friendly Corporate Innovation Survey**

**ЭКО аж ахуйн нэгж шинэчлэлийн тухайн судалгаа**

Аж ахуйн нэгжийн нэр			
Орон нутаг	<input type="checkbox"/> Баруун бүс <input type="checkbox"/> Зүүн бүс	<input type="checkbox"/> Хангайн бүс <input type="checkbox"/> Улаанбаатар	<input type="checkbox"/> Төвийн бүс
Харьяа хэлгэс		Албан тушаал	
Утас		Факс	
И-мэйл хаяг		Овог, нэр	

1. Танай байгууллагын үйл ажиллагааны төрөлд хамаарах хэсгийг тэмдэглэнэ үү?
- 36: Усны хангамж: баяжуулалт ба нийлүүлэлт
- 37: Ус зайлуулах хоолойн систем
- 38: Хог хаягдал цуглуулах: боловсруулалт, ангилан ялгах ажиллагаа, дахин боловсруулах
- 39: Цэвэрлэх ажиллагаа, бусад хог хаягдлыг ангилах үйлчилгээ
- 99: Бусад
- (※ Нэмэлт: шинээр нөхөгдөх энерги зэрэг хэдэн төрөл орох магадлалтай)
2. Өнгөрсөн 3 жилд (2014~2016) танай байгууллагын судалгааны хөгжилд хөрөнгө оруулсан үнийн дүнг тэмдэглэнэ үү.

	2014он	2015он	2016он
судалгааны хөгжилд хөрөнгө оруулсан үнийн дүн	вон	вон	вон

3. Өнгөрсөн 3 жилд (2014~2016) танай байгууллагын онцгой эрхт үйл ажиллагааг тэмдэглэнэ үү.

Ангилал	Дотоодод хүсэлт гаргасан	Дотоодод бүртгүүлсэн	Хилийн чанадад хүсэлт гаргасан	Хилийн чанадад бүртгүүлсэн
Онцгой эрхийн тоо	—	—	—	—

4. Өнгөрсөн 3 жилд (2014~2016) танай байгууллага хэдэн үндсэн ажилтантай ажилласан бэ?

	2014он	2015он	2016он
Үндсэн ажилтны тоо	Хүн	хүн	хүн

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