



# GREEN DEVELOPMENT STRATEGIC ACTION PLAN FOR ULAANBAATAR 2020



# GREEN DEVELOPMENT STRATEGIC ACTION PLAN FOR ULAANBAATAR 2020

|  |    |
|--|----|
| 1. Introduction .....  | 1  |
| 2. Background .....  | 3  |
| 2.1 Rationale .....  | 3  |
| 2.2 Process .....  | 3  |
| 3. Green Development Policy Environment .....                            | 5  |
| 3.1 National Green Development Policy .....                              | 5  |
| 3.2 Ulaanbaatar 2020 Master Plan and Development Approach for 2030 ..... | 5  |
| 3.3 Ulaanbaatar Economic Development Strategy .....                      | 5  |
| 4. Main Green Development Challenges .....                               | 7  |
| Challenge 1. Air Pollution .....   | 7  |
| Challenge 2. Solid Waste Management .....                                | 8  |
| Challenge 3. Sewage and Sullage .....                                    | 9  |
| Challenge 4. Water Scarcity and Pollution .....                          | 9  |
| Challenge 5. Contaminated Soil .....                                     | 10 |
| Challenge 6. Vulnerability to Climate Change .....                       | 10 |
| Challenge 7. Institutional Capacity .....                                | 11 |
| 5. Goals and Strategic Actions .....                                     | 13 |
| Goal 1: Cleaner Air .....  | 15 |
| Goal 2: Sustainable Transport .....                                      | 18 |
| Goal 3: Improved Solid Waste Management .....                            | 19 |
| Goal 4: Water Security .....   | 21 |
| Goal 5: Cleaner Soil .....   | 22 |
| Goal 6: Participation in the Sustaining the Environment .....            | 23 |
| Goal 7: Climate Change Resilient .....                                   | 24 |
| Endnotes .....   | 25 |



*“Since the start of the new City administration, ecology and green development has become an independent sector within the administration’s structure. We have started looking into how other cities efficiently and effectively develop their green growth and green development strategies. It won’t take long before Ulaanbaatar will become a green city.”*

MR. BAT-UUL ERDENE,  
CAPITAL CITY GOVERNOR AND MAYOR OF ULAANBAATAR





British Embassy  
Ulaanbaatar



The Asia Foundation

## ACKNOWLEDGMENT

*Development of this strategy document was made possible by the generous financial and technical contributions of Foreign and Commonwealth Office of the Government of United Kingdom through The British Embassy Ulaanbaatar and The Asia Foundation.*

### **We thank the following individuals, whose contributions made development of this strategy document possible**

O. Amartuvshin, Director of Ulaanbaatar Chamber of Commerce  
N. Dulguun, Secretariat of Ulaanbaatar Chamber of Commerce  
D. Basandorj, Director of Water Research Institute, Mongolian University of Science and Technology (Consultant of Water Section)  
Ts. Bulganmurun, Senior Program Officer of Green Growth Planning and Implementation, Global Green Growth Institute in Mongolia  
B. Tsolmon, Executive Director of Zorig Foundation  
B. Gerelmaa, Program Coordinator of Zorig Foundation  
B. Itgel, Executive Director of Novaterra, LLC.  
Ts. Uranchimeg, Senior Officer of Policy and Strategic Planning Department of Ministry of Environment and Green Development  
N. Enkhbold, Director of Ulaanbaatar Clean Air Project  
O. Enkhtuya, Director of The Nature Conservancy Mongolia  
B. Erdene, Executive Director of Mongolian Environmental Civil Council  
B. Batmunkh, Project Manager of International Financial Corporation  
Z. Manlaibaatar, Researcher at the Economic Research Institute, National University of Mongolia  
G. Tuul, Director of Eco Banking Division, Khas Bank  
S. Tungalag, Head of “Khongor Gobi” non-government organization  
D. Enkhtuya, Operations director of Oyunii Undraa Group  
G. Bat-Erdene, Director of SCG Consulting, LLC.  
Ch. Bat-Ulzii, Forest Expert of REDD+ National Forest Inventory in Mongolia, GIZ  
A. Bat-Od, “Building Smart” Project Manager of Urkh, LLC.  
B. Munkhbayar, Director of Energy Efficiency Center, Mongolian University of Science and Technology  
P. Ongonsar, Environmental Officer of Asian Development Bank  
I. Tumurbaatar, Senior Officer of Clean Technology Department of Ministry of Environment and Green Development  
B. Erdene-Ochir, Operations Officer in charge of rural social resilience of World Bank in Mongolia  
B. Altangerel, Executive Director of Green Trends, LLC.  
B. Chuluunkhuu, Climate Change Policy and Climate Financing Officer of Biodiversity and Adaptation of Key Forest Ecosystems to Climate Change II Project, GIZ  
M. Khosbayar, Senior Officer of Department of Clean Development and Clean Manufacturing of Mongolian National Chamber of Commerce and Industry  
B. Altanduulga Head of Technical Policy Reform department, Ulaanbaatar Electricity Distribution Network  
R. Badamdanddin, President of Wind Energy Association  
B. Achitsan, Foreign Relations’ Officer of Wind Energy Association  
A. Burenbold, Department Head of Ulaanbaatar Heating Network  
Ch. Sonomdagva, Professor of Mongolian National University (Consultant on Air Pollution section)  
B. Bolor, Air Quality Researcher of Public Health Institute  
B. Delgerbayar, Project Manager of POPs at UNIDO (Consultant on Solid Waste Management section)  
A. Javkhlantuya, Head of Soil, Biochemical Laboratory of University of Life Science

A. Buyanbaatar, Department Chair of Agrobiological School of University of Life Science  
P. Ariunaa, Hygiene Manager, WaSH Action of Mongolia  
Ts. Battseren, Executive Director, WaSH Action of Mongolia  
N. Javzansuren, Water Manager, WaSH Action of Mongolia  
P. Batiimaa, Team Leader of Mongolia Water Security Assessment, ADB TA Project  
P. Oyunbat, Soil Expert at Geography and Geo-ecology Institute (Consultant on Soil Pollution section)  
D. Odonkhuu, Officer of Green and Sustainable Development, GIZ/SDC Education for Sustainable Development Project  
S. Bayarsaikhan, National advisor, GIZ/SDC Education for Sustainable Development Project  
Ts. Chimedlkham, Officer of Strategy Policy and Planning department, Ministry of Education, Culture and Science  
Z. Batjargal, Advisor of UN Environment Assembly of UNEP (Consultant on Climate Change section)  
U. Tungalag, National Consultant of The Asia Foundation, Head of “Saruul Khuduu” Environmental Research Center  
Lesley Dove, Independent Consultant of The Asia Foundation,  
N. Ariunaa, Deputy Project Manager of The Asia Foundation  
G. Gantulga, Program Officer of The Asia Foundation  
T. Aldarsaikhan, Consultant of The Asia Foundation

#### **Officials of Municipality of Ulaanbaatar**

T. Bat-Erdene, Vice Governor responsible for Environment and Green Development of Ulaanbaatar  
G. Bolormaa, Head of Environment and Green Development Agency of Ulaanbaatar  
S. Bayarbaatar, Head of Strategic Policy and Planning Department of the Governor’s Office of Ulaanbaatar  
D. Otgonbaatar, Head of Project and Cooperation Department of the Capital City Governor’s Office  
Kh. Marat, Head of Environment and Resources Department of Environment and Green Development Agency of Ulaanbaatar  
N. Dondogdorj, Head of Manufacturing Department of Manufacturing and Trade Agency of Ulaanbaatar  
T. Altansukh, Officer responsible for Agricultural and Environmental Data at Statistical Agency of Ulaanbaatar  
G. Gansukh, Officer responsible for Energy Policy and Planning at Strategic Policy and Planning Department of the Capital city Governor’s Office  
D. Khorolsuren, Head of Economic Development Agency of Ulaanbaatar  
E. Bayarmagnai, Officer responsible for Construction Investment at Education Agency of Ulaanbaatar  
B. Bazarragchaa, Plumbing and Electrical Engineer of Investment Agency of Ulaanbaatar  
Ch. Boldbaatar, Head of Forestry and Greening Department of Environment and Green Development Agency of Ulaanbaatar  
M. Javkhlan, Architect of Urban Planning and Design Institute of Ulaanbaatar  
Ts. Myagmarsuren, Senior Officer of Transportation Agency of Ulaanbaatar  
O. Odjargal, Officer responsible for Landscaping at the Mayor’s Office of Ulaanbaatar  
B. Olzbayar, Officer responsible for database at Planning and Research Department of Road Agency of Ulaanbaatar  
D. Oyuntuul, Plumbing and Electrical Engineer of Investment Agency of Ulaanbaatar  
T. Soyol-Erdene, Urban Planner at Planning and Research Department of General Planning Agency of Ulaanbaatar  
Ts. Khosjiguur, Economist of Development Management Department of Urban Planning and Design Institute of Ulaanbaatar  
S. Ariuntsetseg, Officer responsible for Ecology, Manufacturing, Agriculture and Natural Resources at Strategic Policy and Planning Department of the Capital City Governor’s Office  
Z. Batbileg, Methodologist of Chemistry and Biology Training at Education Agency of Ulaanbaatar  
E. Bolortsetseg, Officer of Arts Department of Arts and Culture Agency of Ulaanbaatar  
Mendsaikhan, Officer responsible for Health Education and Cooperation of the Divisions at Education Agency of Ulaanbaatar  
N. Nasanjargal, Officer responsible for Renewable Energy of Air Quality Agency of Ulaanbaatar  
M. Otgonbayar, Officer responsible for Air Monitoring of Air Quality Agency of Ulaanbaatar  
D. Sanchirbayar, Officer responsible for Ger Area Heating Supply of Air Quality Agency of Ulaanbaatar  
Ts. Undral, Officer responsible for Public Health at Health Agency of Ulaanbaatar  
L. Uyanga, Urban Planner of Urban Planning and Design Institute of Ulaanbaatar





# 1 INTRODUCTION

The city is proud to be a center of attraction and an engine of innovation, job creation and economic development. However, the rapid rate of urbanization also presents various challenges which negatively impact the environment and the livability of the city. Air pollution has become one of the biggest challenges that negatively affects the city residents. Almost 60% of the population lives in low density peri-urban ger areas, residents continue to lack access to basic urban services. Inadequate public transportation means that residents endure long and uncomfortable commutes to school, work or elsewhere in the city. Increasing numbers of vehicles on the road causing serious congestion and contributing to air pollution. The Tuul River, the main source of water supply for the city, is heavily polluted by under- and untreated sewage and sillage, damaging to the land and livestock it waters. Solid waste is mostly disposed of in three landfill sites, only one of which is sanitary.

Ulaanbaatar's green vision originates from the National Green Development Policy 2014, the Ulaanbaatar 2020 Master Plan and Development Approach for 2030<sup>1</sup> (the "Master Plan") and the Ulaanbaatar Economic Development Strategy, 2015. Ulaanbaatar City Municipality (MUB) has put tremendous effort to tackle environmental challenges and develop the city as a green, environmentally sustainable with inclusive economic growth, active public participation and a safe and healthy living environment for its citizens. Ulaanbaatar's vision is to become a green city supports the achievement of the UN Sustainable Development Goal 11 "to make cities and human settlements inclusive, safe, resilient and sustainable", Goal 13 "to take urgent action to combat climate change and its impacts" and many of the other Goals.

To bolster implementation of these policy documents, the Capital City Governor and Mayor of Ulaanbaatar in June 2015 initiated the preparation of a green development strategic action plan, which links planned and ongoing projects and planning decisions to existing policy documents, to ensure that they collectively contribute to the overarching vision of Ulaanbaatar becoming a greener city.

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

## VISION

Ulaanbaatar will be a green city, environmentally sustainable with inclusive economic growth, active public participation and a safe and healthy living environment for its citizens

development of Ulaanbaatar. The key challenges identified were environmental, 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, see Box: Ulaanbaatar Green Milestones, there is a lot to be done to make the city more attractive to international businesses and tourists.

Ulaanbaatar Municipality is required by the three underlying policy documents to implement a large number of initiatives and to do so in a period of global economic slowdown. The purpose of this strategy and action plan is to operationalize the green development agenda. To facilitate this, it prioritizes manageable short term actions which are within the Municipality's jurisdiction and the large infrastructure projects which are already in the pipeline. The latter can only be implemented with the support of the National Government and investors.

The GDSAP is an important milestone on Ulaanbaatar's journey to green city status. The Municipality looks forward to collaborating with the private sector, civil society, academia, international organizations and residents who must all join forces to implement the action plan and move toward the goals.



## ULAANBAATAR MUNICIPALITY GREEN MILESTONES

|                |   |
|----------------|---|
| August 2012    | New City administration appoints Vice-Governor to spearhead the green agenda  |
| August 2012    | Bus lanes introduced and final digit number plate restriction introduced  |
| January 2013   | Ulaanbaatar Municipality and Ministry of Environment sign MoU   |
| January 2013   | Methodology of Health and Safety Index for the capital city and districts was approved  |
| January 2013   | Ger area redevelopment commences in association with ger area dwellers and the private sector   |
| Since 2013     | 3% of city's budget allocated for greening Ulaanbaatar  |
| May 2013       | Development of the draft city charter started   |
| June 2014      | Rail buses introduced by Ulaanbaatar Municipality   |
| September 2014 | Electric cars introduced by Ulaanbaatar Municipality in association with Mitsubishi Motors  |
| January 2015   | Approval of Satellite Cities' Charter   |
| May 2015       | Solid waste management regulation amended   |
| May 2015       | Bus Rapid Transit – first tranche of financing agreed between ADB, Ministry of Finance and Ulaanbaatar Municipality                     |
| June 2015      | Capital City Governor and Mayor initiates the development of a Green Development Strategy and Action Plan                               |
| July 2015      | Ulaanbaatar Municipality starts cooperation with Ecological Sequestration Trust to promote smart, resilient and sustainable development |
| July 2015      | Planned reform of public transportation (New buses were introduced; routes were reorganized; SMART cards were introduced)               |
| September 2015 | North East Asia Mayors' Forum, Urban Green Growth Meeting hosted by Ulaanbaatar Municipality  |
| December 2015  | Ulaanbaatar Municipality representatives participated in COP 21 in Paris, and presented the draft green development action plan         |



# 2 BACKGROUND

## 2.1 Rationale

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 increasingly 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.

Cities such as Vancouver and Singapore rank among the top greenest and most liveable cities in the world and constitute important examples for the successful adoption and implementation of urban green growth strategies. They have been able to reduce their environmental footprint, attract green businesses and create green jobs and improve the living environment for their residents.

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.

## 2.2 Process

Under the leadership of the Capital City Governor and the Mayor of Ulaanbaatar, the Municipality initiated a participatory and consultative process to develop the GDSAP. A wide range of stakeholders were involved including residents, the private sector, NGOs, academia, international organizations and national government. The process involved:

1. the establishment of a main working group to lead its development; the establishment of three thematic sub-working groups of key stakeholders to consult, comment and develop the draft plan by organizing meetings to receive consultation from the experts;
2. survey of residents to determine the challenges.





Figure 1. Planning, Implementation and Monitoring Process of the GDSAP<sup>ii</sup>

This document is the next important step in formalizing the Municipality's commitment to green development. More comprehensive institutional arrangements for implementation of the GDSAP will be made based on international best practices as reflected in Figure 1.

Ulaanbaatar Municipality has two roles in the implementation of the GDSAP. It will seek investment to ensure that improved urban services can be provided to residents and businesses in return for reasonable tariffs and enforce standards so that citizens and businesses will not face the direct or indirect costs of corrupt practices.

# 3 GREEN DEVELOPMENT POLICY ENVIRONMENT

GDSAP is rooted in three key pieces of national and municipal policies and planning documents and will help to operationalize them within Ulaanbaatar.

## 3.1 National Green Development Policy

In 2014, Mongolia's first Green Development Policy was adopted by Parliament. 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, good solid waste management, 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.

## 3.2 Ulaanbaatar 2020 Master Plan and Development Approach for 2030

The Master Plan sets out the design and spatial strategies for the long-term development of the city.

It identifies six development approaches.

1. Become a safe, healthy and green city that is resilient to climate change
2. Provide a liveable environment through appropriate land use planning, infrastructure and housing
3. Become a city with good governance and a developed legal environment that serves the general public and the private sector
4. Encourage the further development of settlements, towns and satellite cities outside the city center
5. Become one of Asia's tourist destination cities
6. Become an internationally competitive business center and be developed as a world-standard capital city.

## National Green Development Policy

Key objectives:

1. Promote a sustainable consumption and production pattern with efficient use of natural resources, low greenhouse gas emissions and reduced waste generation
2. Sustain ecosystem's carrying capacity by enhancing environmental protection and restoration activities, and reducing environmental pollution and degradation
3. Increase investment in natural capital, human development and clean technology by introducing financing, tax, lending and other incentives for supporting a green economy
4. Engrain a green lifestyle by reducing poverty and promoting green jobs
5. Encourage education, science, and technology to serve as the catalyst for green development, and develop cultural values and livelihoods that are in harmony with nature
6. Develop and implement a population settlement plan in accordance with climate change, while considering the availability of natural resources and the resilience of regions.

## 3.3 Ulaanbaatar Economic Development Strategy

The Ulaanbaatar Economic Development Strategy was approved and adopted as a part of Ulaanbaatar 2020 Master Plan and Development Approach 2030. Under the Strategy, the Municipality aims to bring the city's development to the next step, resolve challenges that the city faces, determine new economic policy and develop the economy, and improve the residents' living conditions.

Three long-term goals among the Economic Development Strategy's long-term goals directly relate to the green agenda.

- Become a city that emphasizes green development to promote a safe and secure quality of life for all citizens.
- Build and maintain infrastructure that uses modern, innovative, and green technology solutions funded by an equitable tariff system
- Build and maintain an environmentally friendly and fully integrated public transport system that meets the needs of residents and supports economic development





## 4 MAIN GREEN DEVELOPMENT CHALLENGES

The Municipality faces many challenges to establishing Ulaanbaatar as a green city and cannot reasonably address all of them at once. A public survey of city residents and discussions in multi-stakeholder working groups identified the following priority challenges.

### Challenge 1. Air Pollution

Air pollution was one of the main challenges, associated with alarming public health concerns. Ulaanbaatar is the coldest capital city in the world and is reliant, almost entirely, on coal for its heating. Houses in the ger areas are heated with stoves using coal and firewood. The apartment area is generally heated by district heating from coal-powered combined heat and power stations (CHPS). Heat-only boilers (HOB) are used in some institutional buildings.

Smog is a common feature during the winter due to increase of coal consumption. In 2011, an air quality study funded by the World Bank<sup>iii</sup> drew attention to the dangerous levels of particulate matter (PM2.5 & PM10) and its very significant impact on health.

Very high concentrations of PM occur on some days when the “very cold weather and low winds create an inversion which traps the pollution emitted from low heights within a shallow layer of air near the ground”<sup>iv</sup>. High levels of CO<sub>2</sub> emissions serve to exacerbate the inversion.

| Major Sources | Air Pollutants ('000 t/year) |              |                 |                 |
|---------------|------------------------------|--------------|-----------------|-----------------|
|               | So <sub>2</sub>              | Pm10         | Co <sub>2</sub> | No <sub>x</sub> |
| CHPS          | 13.28                        | 14.11        | 50.82           | 13.48           |
| HOBs          | 1.68                         | 2.94         | 5.71            | 0.36            |
| Ger areas     | 4.68                         | 3.65         | 151.13          | 2.01            |
| Paved roads   | 0.20                         | 0.20         | 32.00           | 5.11            |
| Unpaved roads | 0.07                         | 0.07         | 10.48           | 1.67            |
| Dry soil dust | -                            | 9.27         | -               | -               |
| <b>Total</b>  | <b>19.91</b>                 | <b>30.24</b> | <b>250.14</b>   | <b>22.64</b>    |

Table 1 Main Source of Air Pollutants<sup>v</sup>

Table 1 shows the main sources of key air pollutants and reflects the degree of the problem. Table 2 shows the change over time in the levels of the key pollutants. Levels of PM10, PM2.5, NO<sub>2</sub> and SO<sub>2</sub> remain stubbornly high but the level of PM2.5 is trending downwards. Improvement in the level of PM2.5 may reflect the success of the improved stoves which were designed for the ger areas and subsidized to ensure swift take up.

Despite this improvement air pollution remains dire. As one local expert puts it, “as long as we are dependent on burning coal with old technology we will have air pollution.”

| Pollutant       | Quantity µg/m <sup>3</sup> |      |      |      |      |            |
|-----------------|----------------------------|------|------|------|------|------------|
|                 | 2010                       | 2011 | 2012 | 2013 | 2014 | Safe Level |
| PM10            | 170                        | 230  | 260  | 195  | 190  | 50         |
| PM2.5           | -                          | 135  | 105  | 73   | 63   | 25         |
| NO <sub>2</sub> | 35                         | 46   | 45   | 59   | 38   | 30         |
| SO <sub>2</sub> | 27                         | 31   | 30   | 21   | 21   | 10         |

Table 2. Change in Main Pollutant Levels 2011-2014<sup>vi</sup>

## Challenge 2. Solid Waste Management

Ulaanbaatar sends 1.1 m tons of solid waste to landfill annually. Two of the three landfill sites are not sanitary. Fires are common, at least on the two unimproved sites, and contribute to air pollution.

Table 3 shows the sources of the waste. Ger area residents produce more waste per capita because of the ash produced from heating in the winter when it accounts for 49% of all waste produced by households. Details are shown in Figure 2. No proven methods or resolution have been found to deal with challenges faced by waste ash. Ash causes a particular problem as it is often disposed of in the streets and as hot ashes are among the cause of burning on the landfills.

| Source                             | Quantity (tons)  | %          |
|------------------------------------|------------------|------------|
| Road and public spaces             | 106,003          | 9.8        |
| Apartments                         | 169,493          | 15.5       |
| Ger area                           | 306,038          | 28.0       |
| Businesses and government premises | 509,942          | 46.7       |
| <b>Total</b>                       | <b>1,091,477</b> | <b>100</b> |

Table 3 Sources of Solid Waste<sup>vii</sup>

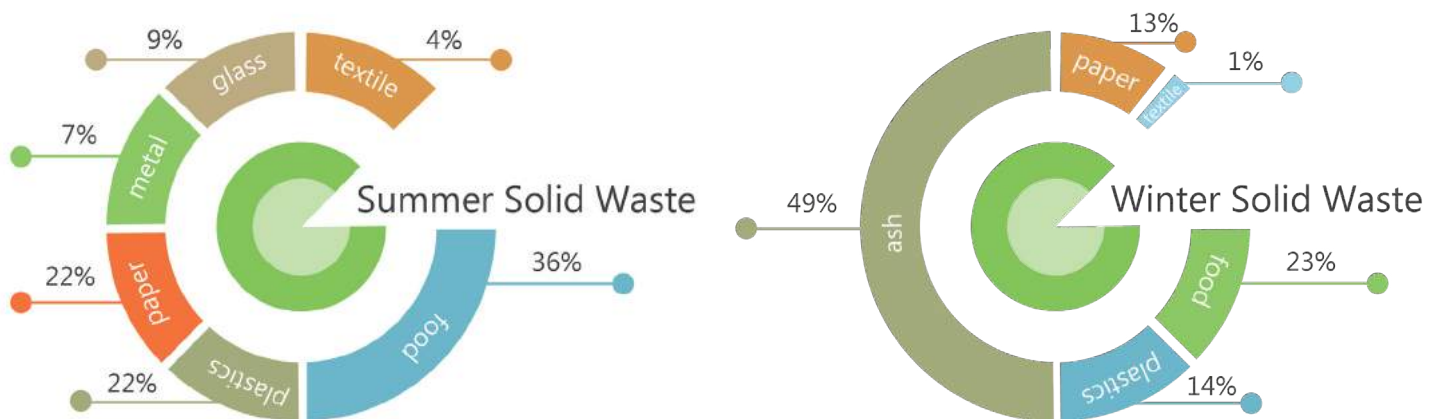


Figure 2 Composition of Solid Waste in Summer and Winter<sup>viii</sup>

Sorting and recycling is undertaken by a few private companies. The Mongolian Waste Recycling Association reports that a significant proportion of waste is recycled by small businesses<sup>ix</sup> or collected and exported to China for recycling. Rag pickers scavenge from waste bins in the city and on the landfill sites and sell them to recyclable collection sites<sup>x</sup>.

The major problems associated with solid waste management are irregular collections in ger areas, poor solid waste management at household level and fly-tipping (illegal dumping) by the construction

industry. All three of these problems are related to residents' and businesses perceptions of their role in keeping the city clean. Bad habits developed when waste collections were not efficient. Changing this mindset is the priority of the Municipality, and there have been pilot projects and some participatory project funding at khoroo (micro district) level.





### Challenge 3. Sewage and Sullage

Sewage treatment is inadequate. The Ulaanbaatar Water Supply and Sewerage Company (USUG) manages the centralized system that serves the apartment area and a very small proportion of the ger areas. The main water treatment plants are the central wastewater treatment plant (CWTP) which has a capacity of 170,000 m<sup>3</sup> per day, the airport treatment plant with a capacity of 3,000 m<sup>3</sup> per day and Khargia treatment facility with a capacity of 13,000 m<sup>3</sup> per day<sup>xi</sup>. The volume of wastewater now far exceeds the physical and technical capacity of these plants which have obsolete technical equipment dating from the socialist era. As a result 170,000 to 190,000 m<sup>3</sup> of improperly treated wastewater is discharged into the Tuul River daily<sup>xii</sup>. This is obviously causing ecosystem degradation and biodiversity harm and impacting on livestock which are pastured downstream.

Almost 190,000 households, 95% of all ger households, have on-site pit-latrines<sup>xiii</sup>. Most of those households dispose of their sullage in the street or into sub-standard wastewater pits. A study in 2011 estimated that only 16% of the latrines and 9% of the wastewater pits complied with sanitation standards<sup>xiv</sup>. Unfortunately that proportion is likely to have decreased since 2011 as there have been no successful widespread sanitation initiatives and there has been a significant increase in the number of households<sup>xv</sup>.

### Challenge 4. Water Scarcity and Pollution

Ulaanbaatar consumes almost 300,000 m<sup>3</sup> water per day, twice as much as 20 years ago. Studies predict that the demand for water will increase to 358,000 m<sup>3</sup> a day in 2020 and 458,000 m<sup>3</sup> per day by 2030<sup>xvi</sup>. On the supply side, the Tuul River is the sole provider of the capital's water; its surface flow has been declining since the mid-1990s. Groundwater tables have been dropping for the last 50 years and the current extraction rate far exceeds the natural recharge capacity.

USUG distributes approximately 150,000 m<sup>3</sup> water per day for domestic use, of which an estimated 15% is lost due to leakage from the outdated water network and theft of water. An additional estimated 150,000 m<sup>3</sup> per day is drained from the aquifer by ground wells run by power stations, industries and individuals.

According to USUG, over 80% of Ulaanbaatar residents are connected to the central water supply, although water is only supplied through water kiosks in the ger areas. The remainder, mostly the residents of ger districts, access water through pipeline-connected water kiosks or through truck-supplied kiosks. A striking difference exists in per capita water

consumption between the residents of ger and apartment areas. The average apartment resident uses 18 times more water than the average ger area resident. Ger area residents pay two to three times as much for water than the residents living in apartment areas. The tariff in apartment areas is MNT 0.50 or 0.025 US cents per liter, one of the cheapest in the world. Meanwhile, USUG struggles to cover its operation and maintenance costs and service its debts, and has no resources for making necessary investments to meet growing demands.

The quality of water being supplied is deteriorating. It is under threat from the release of under- and untreated wastewater into the river, and improperly regulated gravel extraction, tourist camps and livestock grazing in the river basin. The self-purification capacity of Tuul River in the downstream of Ulaanbaatar is six times less than the upper stream in the Gorkhi-Terelj National Park.

Given decreasing supply, increasing inefficiencies in water distribution and conservation and increasing demand, the city is likely to face water shortages in the future.

### **Challenge 5. Contaminated Soil**

Since wastewater treatment and solid waste management are both challenges, it is not surprising that soil contamination is also a challenge. The Institute of Geography and Geo-ecology Laboratory of the Mongolian Academy of Sciences undertook a study in 2014, financed by the Capital City Environment and Green Development Agency. Soil in ger areas, large marketplaces, and waste dump

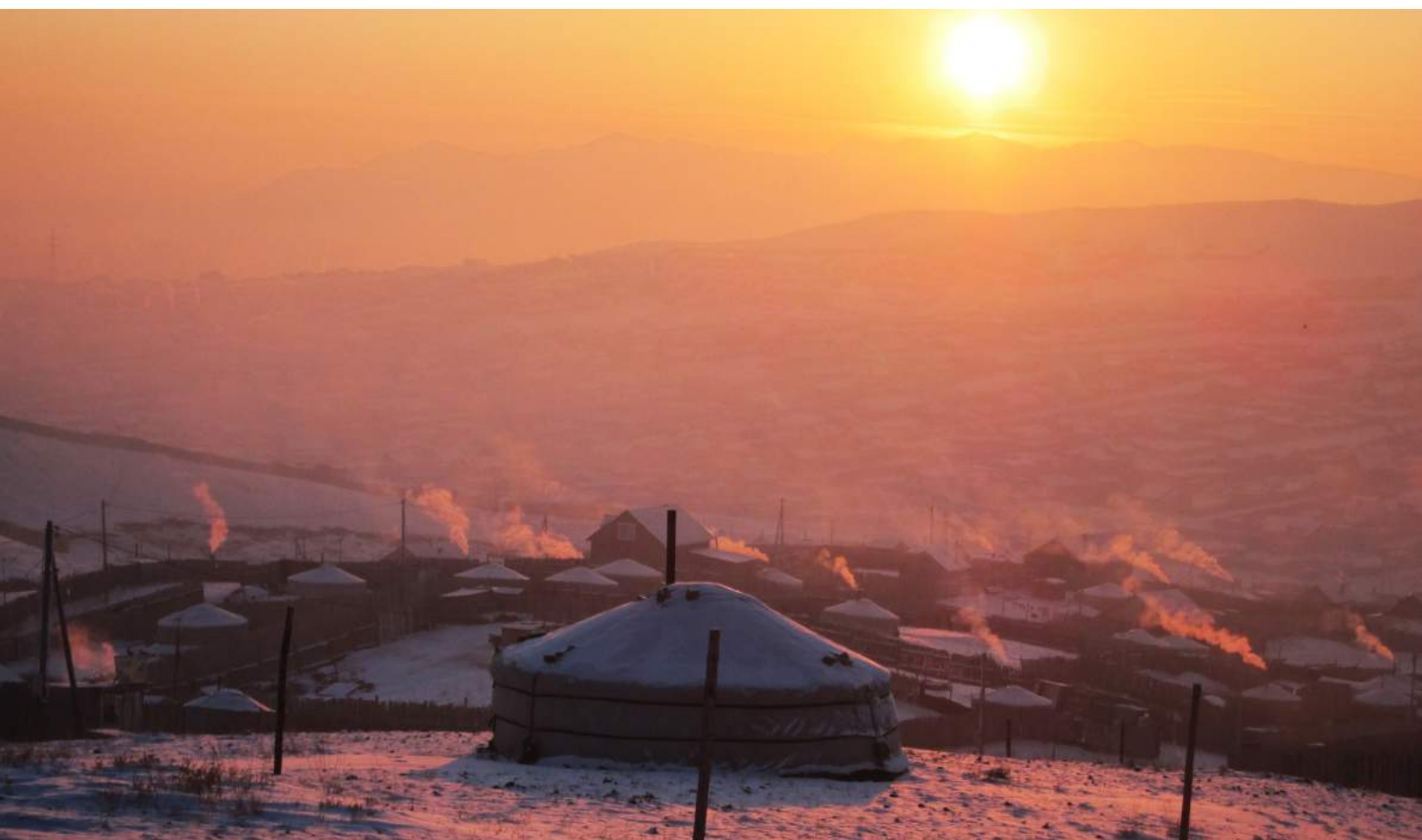
areas were particularly badly polluted with bacteria. High levels of heavy metals were found including lead, chromium, and zinc especially around auto shops and tanneries. High levels of organic substances, ammonium and sulphate were found, associated with poor sanitation and urban agriculture.

Waste from tanneries and hazardous waste from medical facilities and chemical waste has been stored in the absence of proper disposal facilities. Seepage from these stores has led to dangerous levels of contamination.

### **Challenge 6. Vulnerability to Climate Change**

Despite Mongolia's marginal contribution to global climate change, the country is experiencing its impact. For the last 20 years, the capital city has seen warmer spring, summer and autumn seasons with milder winters. The mean precipitation has decreased. The rate of evapotranspiration has increased. Precipitation has changed, characterized by heavy storms, so less water can be absorbed.

The flow in the Tuul River is expected to decline in flow exacerbating concerns about water scarcity and quality in the City. Less water implies reduced natural purification capacity of the River, whilst warmer water and the declining quality of ambient water worsen the already problematic sanitation in the City and increase public health risks. The frequency and intensity of flash floods in Ulaanbaatar have been increasing, impacting especially on the ger areas. The city emergency agencies report that residents, institutions and businesses lack awareness and





preparedness for climatic hazards.

Pasture land in the rural areas will further decline as the temperature warms. As Ulaanbaatar is the destination of choice for internal migrants, it is likely to see increasing influxes of people.

### **Challenge 7. Weak Institutional Capacity, Lack of Knowledge and Participation from the Residents**

Many of the green challenges that Ulaanbaatar faces result from institutional inefficiencies, lack of regulation or failure to implement the existing regulations. There are skill gaps, overlapping functions which lead to confusion and poor coordination between public institutions.

Residents, businesses and manufacturers have lack of knowledge and awareness of how their activities cause negative impacts to the environment. In addition, legal environment for accountability and responsibility for polluting the environment is lacking.

Meanwhile, active citizen participation is being encouraged by the National Government and the Ulaanbaatar Municipality. This can be extended to the provision of urban services, including monitoring those services, being consulted on planning matters (through deliberative polling), better information and increased accountability. Together "participation and accountability provide a focal point for community and social movement mobilisation for sustainable development"<sup>xvii</sup>.









## 5. GOALS AND STRATEGIC ACTIONS

The following goals are identified for implementation to developing Ulaanbaatar as a green city until 2020.

**1 Cleaner air**

**2 Sustainable transport**

**3 Improved solid waste management**

**4 Water security**

**5 Cleaner soil**

**6 Participation in sustaining the environment**

**7 Climate change resilient**



# VISION

Ulaanbaatar will be a green city, environmentally sustainable with inclusive economic growth, active public participation and a safe and healthy living environment for its citizens

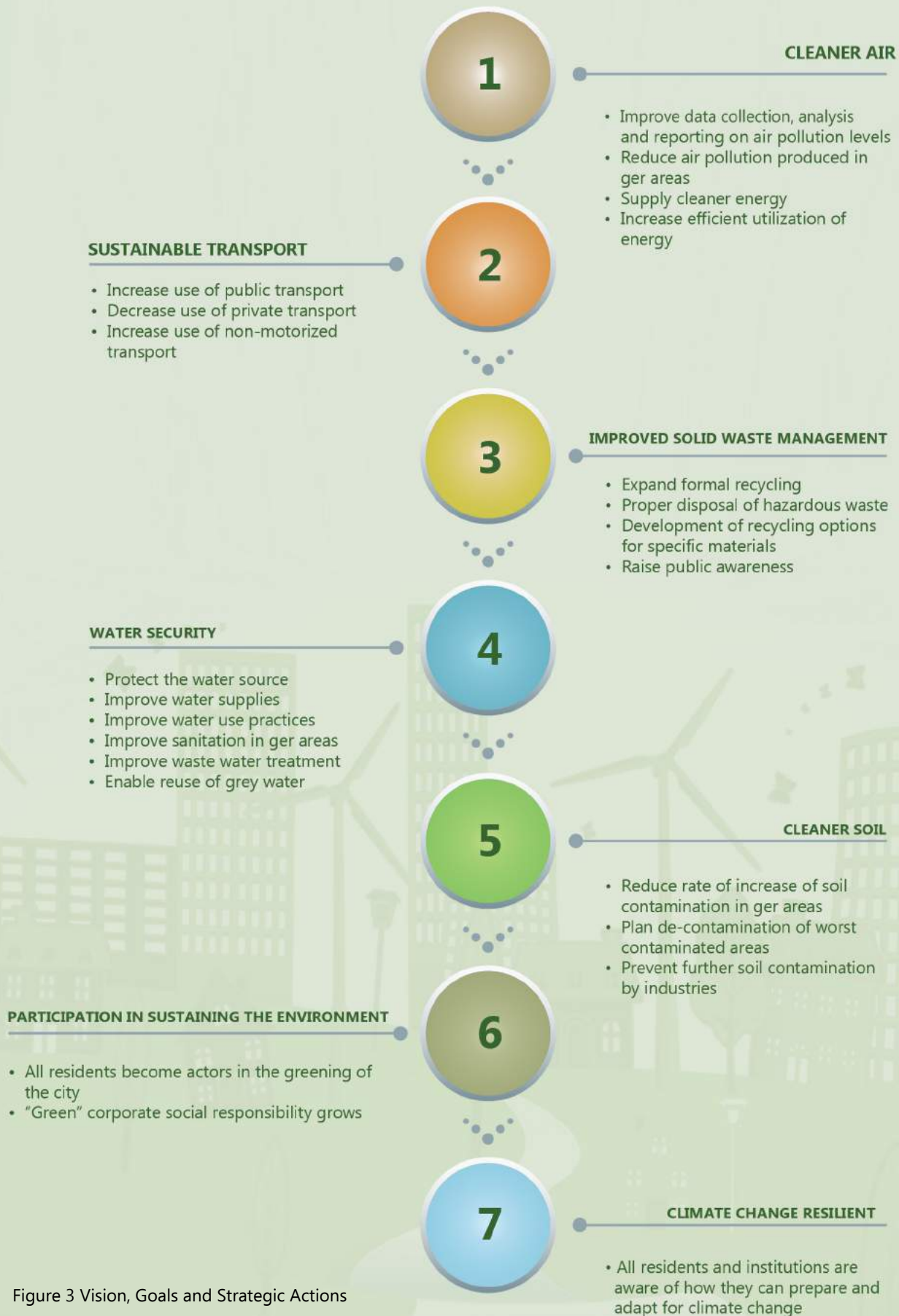


Figure 3 Vision, Goals and Strategic Actions





## GOAL 1 CLEANER AIR

**Objective 1.1** Improve data collection, analysis and reporting on air pollution levels

**Strategic actions:**

- Improve data collection and analysis methods to meet national standards and international best practice<sup>xviii</sup>
- Build capacity in the Air Quality Agency of the Ulaanbaatar City Municipality
- Develop pollutant dispersion model for the city possibly in partnership with an academic institution

**Objective 1.2** Reduce air pollution produced in ger areas

**Strategic actions:**

- Monitor and promote optimum usage of low emission stoves
- Increase housing density in ger areas by facilitating exchange of under-served land for fully serviced apartments through partnerships with the municipality and the private sector
- Improve urban services and infrastructure in ger area subcenters and transport corridors with the city center
- Undertake feasibility studies for decentralised provision of heating and power to improve existing centralized provision of heating and power

- Encourage development of satellite cities

**Objective 1.3** Supply cleaner energy

**Strategic actions:**

- Construction of Ulaanbaatar hydro-electric plant through concession agreement by private sector
- Undertake studies to monitor and optimise uptake of renewable energy, wind, hydro and solar, in the grid, then begin construction of renewable energy infrastructure through public private partnership
- Undertake feasibility studies for the incorporation of renewable energy sources into new buildings and retrofitting to all the city owned buildings and facilities

**Objective 1.4** Increase efficient utilization of energy

**Strategic actions:**

- Introduce energy audits for all municipal buildings and encourage uptake for apartment blocks and business premises
- Develop and implement energy efficiency guidelines in all municipal buildings
- Update energy efficiency construction norms and standards in new buildings, and improve implementations
- Introduce Municipal regulations which require best practice international standards on energy efficiency to be met in construction in the City. Enforce new regulations city-wide
- Promote retrofitting of energy efficient



- measures in older buildings in association with the private sector, and households
- Promote use of energy efficient technologies in the private sector
- Raise public awareness of the potential financial savings from energy efficient behaviour

**Objective 1.5** Increase carbon sink and reduce dry soil dust

**Strategic actions:**

- Pave, mulch or regularly seed with grass all non-paved areas of the core city area to reduce dust
- Plant trees and prevent and protect the city forest area from deterioration
- Expand greenings in the city, and create new city parks
- Improve legal environment for protecting and maintaining greening of the city





## GOAL 2 SUSTAINABLE TRANSPORT

### Objective 2.1 Increase use of public transport

#### Strategic actions:

- Expand roads and continue to use the first lane as the public transport lanes
- Introduce Bus Rapid Transit System (BRTS)
- Continue programme of replacing old buses with newer ones with lower emissions
- Introduce Light Rail Transit (LRT) connecting Ulaanbaatar to the satellite cities

### Objective 2.2 Decrease use of private transport

#### Strategic actions:

- Maintain the license restriction plate policy
- Enforce exhaust emission standards for all motorised vehicles
- Improve management of public parking in the city
- Conduct a feasibility study on possibility of introducing quality of gasoline used in Ulaanbaatar to the European Union's standards

### Objective 2.3 Increase use of non-motorized transport

#### Strategic actions:

- Develop bicycle lanes in association with the Ulaanbaatar Bikes Project
- Create car-free zones to ensure safety of pedestrians, and develop pedestrian sidewalks next to all the roads

## GOAL 3 IMPROVED SOLID WASTE MANAGEMENT

### Objective 3.1 Expand formal recycling

#### Strategic actions:

- Develop a financial and economic model for recycling in Ulaanbaatar
- Expand role of private sector in solid waste collection, sorting and recycling
- Introduce sorting of waste at source and its collection in association with the private sector and NGOs
- On completion of feasibility study, undertake detailed design and develop financing mechanism for the recycling factories at a serviced industrial park (eco-park) located at landfills
- Support the individuals who collect recyclables for a living, and improve legal environments for work in association with NGOs

### Objective 3.2 Proper disposal of hazardous waste

#### Strategic actions:

- Cooperate with the relevant ministry responsible for environment and UNIDO to implement the Stockholm Convention on POPs
- Cooperate with relevant national ministries and organizations to ensure proper disposal of medical waste

- Cooperate with relevant national ministries to ensure proper disposal of hazardous waste
- Construct specific site to disinfect and destroy organic livestock waste from slaughterhouses

### Objective 3.3 Development of recycling ash and compost waste

#### Strategic actions:

- In association with the research institutions research and pilot composting at main markets of Ulaanbatar
- R&D for resource efficient methods for recycling both ash resulting from heating of households in the ger areas and the ash produced by power plants
- In association with the relevant ministry responsible for environment undertake feasibility study into efficient methods for recycling e-waste

### Objective 3.4 Raise public awareness

#### Strategic actions:

- Introduce and promote 3R (reduce, reuse and recycle) principles to city residents









## GOAL 4 WATER SECURITY

### Objective 4.1 Protect the water source

#### Strategic actions:

- Implement comprehensive activities to protect the water sources and associated ecosystem
- Protect Tuul and other close river sources, and create no-settlement zones
- Develop a structure for ecological service fee from Tuul and other close by river sources

### Objective 4.2 Improve water supplies

#### Strategic actions:

- On completion of feasibility study, undertake detailed design for the Tuul River complex
- Update and expand main water pipelines to reduce water losses
- Create a central water quality inspection laboratory

### Objective 4.3 Improve efficient water use practices

#### Strategic actions:

- Introduce water saving technologies in municipal buildings
- Improve awareness of water efficiency amongst residents of apartments and the private sector

### Objective 4.4 Improve waste water treatment

#### Strategic actions:

- Retrofit the existing Central Wastewater Treatment Plant
- Detailed design and construction for new environmentally friendly, technologically advanced wastewater treatment plant
- Enforce pre-treatment of industrial waste on site to remove harmful pollutants before release into the public sewer

### Objective 4.5 Enable reuse of grey water

#### Strategic actions:

- Develop regulation on re-use of grey water, and enforce those regulations
- Promote and advertise advantages and minimum health risks from reusing grey water to the residents
- Conduct pilot projects to reuse grey water in associations with residents, NGOs and donors



## GOAL 5 CLEANER SOIL

**Objective 5.1** Reduce rate of increase of soil contamination in ger areas

**Strategic actions:**

- Encourage use of effective microorganism and other innovative technologies by householders to sanitise latrines, and replace the latrines with eco-toilets
- Conduct a pilot project to establish smaller waste treatment plants in the ger areas to promote efficient waste removal

**Objective 5.2** Plan decontamination of worst contaminated areas

**Strategic actions:**

- Identify the areas with most hazardous soil contamination and zone them according to their likely impact on the overall environment and public health
- Undertake pre-feasibility study on decontamination of worst areas; decontaminate those areas

**Objective 5.3** Prevent further soil contamination by industries

**Strategic actions:**

- Develop infrastructure and services, including specialised waste treatment plants, at a Heavy Industry Park in Nalaikh district, and relocate factories for construction materials and other polluting industries
- Develop infrastructure and services, including specialised waste treatment plants, at a Light Industry Park in Emeelt, and relocate cashmere and wool mills and particularly tanneries to the periphery of the city
- Relocate car dealerships and auto parts shops to the periphery of the city
- Improve safe disposal of used oils, coolants and other wastes from auto-repair shops



## GOAL 6 PARTICIPATION IN SUSTAINING THE ENVIRONMENT

- Promote development of “green workplaces” in the private sector
- Recognize best green technology and practices of businesses, and award them with “green” certificates

**Objective 6.1** All residents become actors in the greening of the City

### Strategic actions:

- Develop a holistic awareness raising initiative “Green Capital City’s Resident” on efficient energy usage, good waste disposal practices, healthy water usage, good sanitation and resilience to climate change
- Develop an effective media campaign to support “Green Capital City’s Resident” initiative through media outlets and social media
- Encourage residents to stop poor resource utilisation; support green initiatives
- Improve Citizen Service Centre’s online complaint system to promote citizen monitoring of urban services
- Promote habits of sorting and placing waste at the designated spots through solid waste management collection schedules to all households

**Objective 6.2** Increase of corporate social responsibility

### Strategic actions:

- Develop best practice guidelines for environmentally responsible and economically viable business models and support green business initiatives





## GOAL 7 CLIMATE CHANGE RESILIENT

### Strategic actions:

- Create reservoirs throughout the city, and design effective storm drain system to collect water, improve and expand the system
- Implement step by step activities to improve, expand and update storm drain system
- Develop cost-share arrangements for flood defences on the Tuul River to protect housing built in the River Protection Zone
- Develop strategies to withstand natural disasters associated with climate change
- Intensify implementation of natural disaster risk strategy of Ulaanbaatar
- Develop a structure to measure greenhouse gas in Ulaanbaatar



## Endnotes

- i Approved by the Mongolian Great Khural on Feb 8 2013
- ii Based on Green Growth in Practice: Lessons from Country Experiences, published by Global Green Growth Institute, Seoul. <http://www.ggbp.org/sites/all/themes/ggbp/uploads/Green-Growth-in-Practice-062014-ES.pdf>
- iii World Bank. 2011. *Main report*. Washington, DC: World Bank. <http://documents.worldbank.org/curated/en/2011/12/15633946/air-quality-analysis-ulaanbaatar-improving-air-quality-reduce-health-impacts-vol-1-2-main-report>
- iv Ibid p16
- v Source: Air Quality Agency, Ulaanbaatar Municipality
- vi Source: Cold Season Report, 2011-14, National Agency Meteorology and Environmental Monitoring, Government of Mongolia
- vii Source: Ulaanbaatar Mayor's Office, 2015
- viii Source: Ulaanbaatar Mayor's Office, 2015
- ix According to the Mongolian Waste Recycling Association , there are eight recycling factories, recycling materials including vehicle oil, plastics, tyres and car batteries  
Source: The Mongolian Waste Recycling Association
- x Source: Ulaanbaatar Water Supply and Sewerage Company, 2015
- xi Source: Ulaanbaatar Water Supply and Sewerage Company, 2015
- xiii Source: Water Research Centre, University of Science and Technology, Ulaanbaatar
- xiv City Health Agency, Ulaanbaatar Municipality
- xv 2015, ACF, "Sustainable Sanitation for Vulnerable Population in Peri-urban Areas of Ulaanbaatar, Mongolia"
- xvi Source: Ulaanbaatar 2020 Master Plan and Development Approach for 2030
- xvii Andreassen, Bård Anders (2003). Development, Capabilities, Rights: What is New about the Right to Development and a Rights Approach to Development? In: Human Rights and Criminal Justice for the Downtrodden: Essays in Honour of Asbjørn Eide. Leiden/Boston (Martinus Nijhoff Publishers), pp.211-23
- xviii Inter alia, capture data on all pollutant categories, data on pollution levels at key locations (schools, hospitals, traffic congested areas, power stations) and ensure air monitors are positioned appropriately
- xix They became available in 2011 and have been distributed to 97% of ger houses.