NORTHEAST ASIAN MAYORS’ FORUM:
THEMATIC MEETING ON URBAN GREEN GROWTH

September 21-22, 2015
Ulaanbaatar, Mongolia
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JOINT COMMUNIQUE BY THE PARTICIPANTS OF THE NORTHEAST ASIAN MAYORS’ FORUM THEMATIC MEETING ON URBAN GREEN GROWTH ........................ 132
The first Northeast Asian Mayors’ Forum, held in 2014 in Ulaanbaatar, discussed, among others, the topic of Green Cities: Urban Environmental Management and Green Development. The participants expressed a strong desire to further strengthen cooperation between NEA cities in the area of green growth. Cities across the world including Asia are increasingly paying attention to the environmental impacts of urban development and are developing policies for green urban growth. Challenges include pollution, effective management of solid waste, and increasing rates of energy consumption. Facing these challenges, cities across Asia are seeking to effectively use green technologies in industry, transport, housing, food production, etc. in order to reduce emissions, foster energy efficiency, and increase livability. The cities in Northeast Asia have varying experiences in green development, and it is therefore important that they learn from each other and present the most efficient solutions on pressing issues. This is the very purpose of the proposed forum of the Northeast Asian cities on green growth, which will serve as a specialized meeting on green development for cities at the Northeast Asian Mayors’ Forum 2.

The Asia Foundation and The Zorig Foundation prepared the Forum Summary that includes notes taken at the forum, as well as review of transcriptions from those speakers that presented in Mongolian, Chinese, Korean, Russian and English. Any errors are those of the organizers and do not reflect the views of the City of Ulaanbaatar.

The Organizing Committee
Thematic Meeting on Urban Green Growth
Northeast Asian Mayors’ Forum
Ulaanbaatar, 21-22 September 2015
Esteemed guests and delegates,

I am pleased to offer my sincere greetings to you.

I would like to extend my heartfelt gratitude to honorable mayors, dear guests, and delegates for joining the Northeast Asian Mayors’ Forum thematic meeting on Urban Green Development, which is hosted in the capital city of Mongolia, Ulaanbaatar.

The first time Ulaanbaatar hosted the Northeast Asian Mayors, Forum was in 2014 to address issues on sustainable development of cities, negative impacts of urbanization and population centralization on the environment for creating favorable living conditions, green development, and sustainable development. The forum achieved strong results and contributed to fostering cooperation between the cities.

This time, Northeast Asian cities are gathering in Ulaanbaatar to focus on green development. Persistant centralization and plan-less urbanization pose big challenges, including negative effects on the environment and ecological balance; air, water, and soil pollution; a shortage in engineering, social infrastructure, and housing; and unfavorable living conditions. For this, I have no doubt that the present forum will afford us a wide opportunity to
share our best experiences and views in the most adequate ways to tackle challenges the cities are facing.

Global cities, Asian cities in particular, are paying even more attention to the negative effects of urbanization on the environment, and shaping their green development policy. Nevertheless, there are still big challenges demanding settlement areas to deal with air, water, and soil pollution, waste and ever-increasing energy consumption, housing and food production, reducing environmental pollution, using energy in efficient and rational ways, and creating favorable living conditions.

Ulaanbaatar is also not idle. We are designing the Green Development Strategy of Ulaanbaatar, in compliance with the Ulaanbaatar Development Master Plan and National Green Development Policy, to create good living conditions for city residents, create potential for adapting to global climate change, and implement green development policy in the capital.

This forum is special, as it convenes before the 21st session of the Conference of Parties to the UN Framework Convention on Climate Change that will take place in Paris this December. We will submit the outcome of this forum at the upcoming event in Paris. I am fully convinced that esteemed participants of the forum will join.

On behalf of my office and all residents of Ulaanbaatar, I would like to welcome all of you to our city and wish the forum great success.

E. Bat-Uul,
Capital City Governor and
Mayor of Ulaanbaatar
Chairman:
Mr. Bat-Erdene Togooch, Deputy Mayor for Ecology and Green Development

Honorable Battsereg Namdag, Minister of Environment, Green Development and Tourism

Heads of Delegations / Shenzhen, Niigata, Ulan-Ude

H.E. Oyun Sanjaasuren, President of the United Nations Environment Assembly and Member of Parliament
Honorable Battsereg N.
Member of the State Great Khural and Minister of Environment, Green Development, and Tourism

Distinguished guests, ladies, and gentlemen!

First of all, I would like to congratulate and deeply thank Mayor of Ulaanbaatar Mr. Bat-Uul for initiating the Northeast Asian Mayors’ Forum on Urban Green Growth.

On behalf of the Mongolian government, I would like to thank the distinguished mayors and all the delegates who have gathered here to support Ulaanbaatar city’s initiatives and discuss the challenges in the region as well as share experiences and best practices.

The emphasis of this forum has been chosen to coincide with the United Nations high-level meeting to approve the 2030 Agenda for Sustainable Development, COP 21 (Conference of the Parties), and the United Nations Conference on Climate Change, which will take place in Paris.

We are all aware that climate change has become the most pressing issue worldwide. Scientists point out that urban areas must play a major role in keeping global warming at bay and reducing greenhouse gases. Today, more than half of the world’s population is living in urban areas, and this number is expected to increase to 70 percent by 2050. At the same time 70 percent of the world’s greenhouse gases are produced in urban areas.

Therefore, it is important for cities to pursue a green development model in order to reduce the effects of climate change and create comfortable living conditions.

Mongolia has drafted and already started implementing its green development policy based on the country’s specifics and in line with the global green development trends.
To overcome the environmental and social challenges that we are facing in the Mongolian capital, where almost half of the population resides, it is important for each citizen and each business entity to change their way of life and wasteful consumption habits. There are plenty of opportunities if we work together to create a resilient, eco-friendly city, with fewer greenhouse gas emissions and less waste, that supports efficient production, successfully implements the green development strategy, and sustains a balanced ecosystem.

The Mongolian government is working on the implementation of its green development policy by offering economic incentives, such as green tax and benefits as well as by improving legal regulations. The Ministry and Ulaanbaatar Municipality have signed a memorandum of understanding on green development and are working jointly on reducing environmental pollution and degradation, protecting and rehabilitating forests and water resources, improving the management of protected natural areas, and developing sustainable tourism.

I am confident that the thematic sessions and discussions of this forum will address the challenges faced by Northeast Asian cities by sharing practices and experiences of eco cities and eco-friendly solutions for infrastructure facilities such as water supply, sewage, energy, and transportation, as well as by improving public awareness on green growth and sustainable development. The forum will also be a valuable contribution to the formulation and implementation of Ulaanbaatar city’s green development strategy.

The Ministry of Environment, Green Development, and Tourism is ready to cooperate in the implementation of the resolutions and initiatives on urban green growth that will be adopted during this Northeast Asian Mayors’ Forum.

Thank you for your attention.
Good morning! I am Park Won-soon, the Mayor of Seoul, and I’m very pleased to meet you here today.

First of all, I would like to express my gratitude to the Mayor of Ulaanbaatar, E. Bat-Uul, and the President of The Asia Foundation, David Arnold, for hosting the second Northeast Asian Mayors’ Forum. I would also like to thank the Mayors of Northeast Asian countries for taking the time to participate in this forum. Last night, when I landed at the airport in Ulaanbaatar, it was the first time I stepped on Mongolian land. Mongolia is a land of vast steppes and clear blue skies, where the horses graze freely, and people have lived in harmony with nature for thousands of years, preserving the beauty of the steppes. Unfortunately this wonderful, beautiful land is fiercely threatened by desertification. For example, Tsagaannuur Lake in Mongolia is on the verge of extinction due to desertification. Studies show that in the last 67 years, 1,166 lakes and 887 rivers in Mongolia have dried up and disappeared due to desertification. For the last century, the rate of desertification has been 4000 times higher than the last few thousand years.
What shall we do about desertification, about other disasters such as sandstorms, climate change, the life of the polar bear living on the North Pole ice that is melting day by day? Chernobyl is still a deadly place. Fukushima remains an issue we need to resolve. The Gobi and the steppes must be protected along with actions against desertification. Mongolia’s desertification is of concern not only to Mongolia; it is an issue for humanity as a whole.

I believe that, in response to climate change, we must first and foremost develop a new type of urban planning. Northeast Asia has many established cities with long histories, but also many cities that are in their primary stages of urbanization and developing rapidly. We should refrain from old-fashioned urban planning that is focused on industrialism and construction, and introduce new planning. New urbanization is a city that responds to climate change, one that is energy independent, and where humans and nature are closely intertwined. This concept is also
The city of Seoul was completely destroyed after the war on the Korean peninsula, but today it has developed itself into a city of 10 million people, with 12 million tourists visiting annually. Nevertheless, Seoul’s intensive, highly centralized development has also created environmental and energy issues.

Seoul’s skies were indiscriminately filled with dust and air pollution in the 1980s, the 1990s, and the beginning of the 2000s. Development of heavy industries resulted in river pollution and the destruction of trees in the city.

In spite of that, we strove through replanning to create an environmentally friendly Seoul that withstands climate change and energy issues. We are implementing a new urban concept, “Green Dream, Green City.” This concept must be implemented not only by the city administration, but also with the cooperation of each resident of the city. People ask, “What is the secret behind these changes to Seoul?” I believe that city residents play the most important role in this effort.

Not only Seoul, but Northeast Asia; even the whole world wants these kinds of changes. Thus, different cities around the world must work together on this change. Our city created car-

Forum Summary
free streets in order to decrease the number of automobiles which that are the main reason for air pollution and greenhouse gases.

As a result of this endeavor, the amount of fine dust decreased from 71μg/m³ in 2001 to 46μg/m³ in 2014. But these numbers are still high compared to indicators of other large cities. Efforts on air quality improvement should not be limited to Seoul only. Northeast Asian cities must work together to create a system leading to the implementation of this policy.

At the United Nations Climate Change Conference that is to be held in December 2015, Northeast Asian cities must show that we have united goals. Cities and their residents must transcend national boundaries and unite. Our goal is to pursue collective efforts in solving problems of the environment, the economy, and society through sustainable urban development.

Another way to combat climate change is to conserve energy. We started the “One Less Nuclear Power Plant” initiative to conserve energy equivalent to the energy produced by one nuclear power plant. In this regard, solar power and renewable energy should be produced, and we have started building hydro and wind power stations. Furthermore, with the participation of city residents, we’ve created numerous pedestrian walkways, bike lanes, and parks. Today, the city of Seoul dreams of changes reaching to Northeast Asia and beyond.

At the International Council for Local Environmental
Initiatives World Congress that was held last April, I was chosen as the president of this organization. The Council unites 76 countries and more than a thousand individual, large cities. The Congress gathered over twenty thousand delegates from 240 local governments worldwide and pledged to decrease greenhouse gas emissions by one ton per person, or ten million tons altogether. Also, last year delegates of thirteen Northeast Asian cities gathered and issued an appeal to tackle air pollution and other urgent environmental issues. Our next action is the Northeast Asian Cities Air Quality Improvement Conference, which is to be held in November in Beijing. We will further discuss measures for stopping desertification and decreasing air pollution. Additionally, the United Nations Assembly will soon adopt new Sustainable Development Goals. In a sense, our activities can be said to have reached a new, higher level.

Just look at Europe. The European countries, with their long history of waging war against each other, have now created a unified government called the European Union, greatly valuing peaceful development. Why can’t we do the same? Our geographic location allows us to fly two to three hours by plane and gather at one place where we can meet. We have the same history, the same DNA, the same appearance, and the same root languages. If we open up our hearts, we can become brothers forever.

Thank you.

Keynote speech delivered in Korean. Translation provided by The Zorig Foundation.
My warm Greetings to all of you on behalf of Shenzhen city. The theme of our Forum is “Green Development.” Thus, I would like to briefly introduce how the city of Shenzhen became a green city.

Shenzhen, one of the most important seaports of China, is home to a population of 12 million, with an area of 50 square kilometers. Growing day by day, the GDP of Shenzhen city has been increasing steadily in recent years.

We have been taking various measurements in order to reduce carbon emissions and to lower pollutants produced by our industry. Our strategic goal is to make our city green in the long-term future, and we are working hard to fulfill this goal. As a result of efficiency policies applied to industry, agriculture, and other sectors affecting Shenzhen city’s development, pollution in the city has been decreased in recent years by 19.5 percent. We are determined to develop our city into the model city of China, achieve great success in environmental protection, and particularly strive for the development of a green city.

We welcome you, the delegates of the forum, to visit our city of Shenzhen.
Honorable Furuki Takeyoshi

Deputy Governor,
City of Niigata

I am sending my warm greetings to the honorable delegates from the Northeast Asian cities.

In 2007, the honorary consulate Office of Ulaanbaatar was established in Niigata. Since then, we have been pursuing our cooperation in small and medium-sized enterprise technology, forestation, and grass planting in Dornogovi province (in the Mongolian desert). Furthermore, we are keen to broaden our cooperation in the sectors of the economy and culture. In collaboration with the Japanese embassy in Ulaanbaatar, we have implemented many projects in the past, and we are determined to continue them in the future as well. Honorary Consul Mr. Nakayama was at the core of all the above activities, and the people of Niigata appreciated very much when he received an award from the government of Mongolia.

Many Mongolian athletes are competing in Japanese sumo wrestling. The Japanese people admire the skillful and powerful wrestling techniques of Mongolian wrestlers. Because of this, our people have warm and friendly feelings about the people of Mongolia. I came to Mongolia for the first time in July 2015, and this is my second visit. Mongolia is a land of rich natural resources and wide-stretching steppes, and I would like to finish my speech by wishing great success to your country’s economic growth and prosperity. Thank you for your attention.
The city of Ulan-Ude is located 100 kilometers from Lake Baikal. Therefore, the issue of maintaining the unique ecological status of Lake Baikal, and the most efficient use of its natural resources, is a matter of utmost importance, not only to the residents of Ulan-Ude, but also to the whole region.

The most critical ecological issue for Ulan-Ude is pollution, which is mainly emitted by vehicles and industrial facilities. Purification of the air in Ulan-Ude is significant for the entire Republic of Buryatia as well. On the other hand, local administration pays special attention to efficient water management and the reduction of negative impacts on the environment. All the above activities are very important and would help to create a favorable environment for both the residents of the city and the tourists visiting our city.

I wish you all, my friends and colleagues, a very successful conference. Thank you for your attention.
We all acknowledge that the world today is facing an increasing number of challenges that are very complex in nature and require coordinated, firm action. By the end of 21st century, we are expecting the world population to reach 11 billion, and if the demand for food, energy, and water continues to increase, we will need multiple planets. The earth is not able sustain the development that we are facing. Therefore, this week and next week, the UN will be discussing sustainable development goals and will be trying to change the global path from brown to greener.

I applaud Mayor Bat-Uul and Vice Mayor Bat-Erdene for inviting the mayors of Northeast Asian cities to come to Ulaanbaatar to discuss how cities can contribute most to sustainable development. Cities are at the center of the solution for sustainable development, because we are expecting more than 60 percent of the world’s population to live in cities by 2050.

Mongolia adopted a green development strategy two years ago, and I am very happy to see Ulaanbaatar city at the center of trying to implement that strategy today.

I wish you all the best in devising concrete and constructive solutions to move our region, our nations, and our globe towards a more sustainable, greener, and cleaner path.

Thank you.
The development and rapid urbanization of Asian cities have accelerated the growth of production and industrialization along with numerous environmental and social challenges. The discussion of green growth issues as a global phenomenon will help address the green growth trends among Northeast Asian cities based on previous expertise of already leading green cities such as Vancouver, Edmonton, and Stockholm. The first session will present a discussion panel for Northeast Asian cities to discuss vital issues including greenhouse emissions, air pollution, and the development of sustainable energy resources. Considerably more than half the total population of Mongolia resides in the capital city of Ulaanbaatar, also known as the financial center of the nation. Air pollution in Ulaanbaatar city is recognized by the WHO as the second worst in the world. Therefore, the implementation of a green growth strategy is of paramount importance.

**Moderator:**
Mrs. Meloney C. Lindberg, Country Representative, The Asia Foundation Mongolia Office

**Speakers:**

**Urban Green Growth Trends in Northeast Asia**  
Dr. Kilaparti Ramakrishna, Northeast Asia Office Director, United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP)

**Brief Overview of Key Challenges and Strategies to Tackle the Problems**  
Mr. Bat-Erdene T., Deputy Mayor of Ecology and Green Development

**Air pollution in Ulaanbaatar**  
Mr. Enkhbold N., Director, Control Unit, Ulaanbaatar Clean Air Project, World Bank

**Capacity Development Project for Air Pollution Control in Ulaanbaatar City Phase 2**  
Mr. Mutsumi Sato, Chief Representative, Japan International Cooperation Agency

**Hulanbuir: Supporting Green and Low Carbon Emissions to Build a Civilized and United Society**  
Mr. Cui Xin Yu, Secretariat of the City Administration

**The City of Seoul's Green Growth Report**  
Dr. Wang Kwangik, Research Fellow/Smart and Green City Specialist, Korea Research Institute for Human Settlements

**UB City Green Development Scenarios**  
Dr. Chuluun T., Director, Sustainable Development Institute, National University of Mongolia
**Urban Green Growth Trends in Northeast Asia**

**Introduction**

Every city is unique in its own way, yet they have many things in common. Green growth is about ensuring sustainable development through effective use of resources and investment in natural resources. The UN’s organizations in the fields of environment and economy have conducted numerous researches on this matter and produced many publications. Cities are also undertaking their own actions to address this matter. They are investing in human capital and natural capital. Investments in human and natural capital are directly linked with the three pillar principles of sustainable development. In other words, these investments directly affect social inclusiveness, economic growth, and environmental sustainability.
The Northeast Asian region does not differ from other regions. Despite the persisting economic recession, this region has its own unique economic growth factors. The upward trend of greenhouse gas emissions, fueled by active economic and industrial production, demands attention from each individual country of the region.

**DECOUPLING**

*Improving energy/carbon intensity of GDP for relative decoupling*

*Decarbonizing energy for absolute decoupling*

There is a concept called resource decoupling. It refers to how much energy is used to produce an economic output. This indicator is expected to increase in the future. As the economy grows the energy consumption per economic output also increases. The experiences of the industrialized countries show that as the economy grows, energy consumption per capita also increases. However, a lot of progress has been made in reducing energy consumption per economic output. For instance, the practices of industrialized countries show that, even with high energy consumption, it’s still possible to reduce the cost per economic output.
LOW CARBON TRANSITION

- **Improving energy intensity** of economy
- **Decarbonizing** primary energy and electricity
- **Enhancing the assimilative capacity of natural sinks**
- **Investing into new and improving existing urban infrastructure**

The above figure shows how to reduce carbon dioxide emissions. The total carbon dioxide (CO$_2$) emissions depend on the number of people (P) living in the world. The next dependent is service per capita (S). The next indicator is the amount of energy (E) required per unit of service. The last one is the amount of carbon (C) emitted by a unit of energy.

World population will soon reach 11 billion. Therefore, we are facing the threat of depletion of our resources. As the population grows, the use of services will also increase. Thus, we will need to find an optimal solution to support development without an increase in energy spending and an increase in carbon dioxide emission. The experience of countries shows that a lot of work needs to be done to improve carbon dioxide per GDP or resource decoupling. Otherwise, it will be difficult to reduce desertification. The effective use of natural resources is also important. Investing in natural resources will have a positive effect. Investing in infrastructure can also reduce energy loss and the loss of natural resources.

**THE ROLE OF CITIES**

Cities should provide the services people require. Those services need to be accessible. We need to think about reducing greenhouse gas emissions that contribute to climate change. Currently, 70 percent of greenhouse gas is produced by cities. Northeast Asia alone produces 32 percent of global greenhouse gas emissions. This in turn shows the significant role that cities play in greenhouse gas emissions. In other words, if the cities take
actions to reduce greenhouse gas emissions the results will be felt globally.

**WHY CITIES?**

- Cities worldwide account for 70% of GHG emissions due to their energy-intensive infrastructure and lifestyle.
- Northeast Asian countries contributed 32% of global CO₂ emissions from fuel consumption (2012).
- It is estimated that low-carbon urban solutions available today could generate savings with a current value of US$16.6 trillion by 2050 (The New Climate Economy, 2015).
- Urban centers are also ideal “policy labs” to experiment with new policies and innovative measures.

Recently, the UN published a report on greenhouse gas emissions. The report highlighted the importance of innovation and reform. In other words, innovation provides us with the opportunities to reduce greenhouse gas emissions by reducing carbon without the need to reduce products and services. Therefore, use of new technologies and innovations will make a considerable impact in the Northeast Asian region, which is responsible for 32 percent of total greenhouse gas emissions. This in turn will have a positive impact on the world.

It is important for cities to have a specific program to combat climate change. For example, former New York City Mayor Mr. Bloomberg initiated a policy addressing this issue and implemented it. In the past, talk about climate came only from presidents and prime ministers. In recent days, following Mr. Bloomberg’s lead, cities are implementing their own innovative initiatives. The underlying mechanism for these new initiatives is public-private partnership. This mechanism is utilized in investments in infrastructure that would reduce greenhouse gas emissions.

**SUSTAINABLE INFRASTRUCTURE**

When constructing an infrastructure, we need to take into account the efficient use of energy. When constructing an energy facility, we need to think about how to save costs. We need to consider what benefits an investment made today would bring in the future. Today, a lot of investments are made on infrastructure
projects. However, they need to be flexible enough to withstand any policy changes. Otherwise, that investment becomes redundant. Therefore, we have come up with the concept of sustainable infrastructure. For example, sustainable transportation should be able to adapt to changes.

Each country is taking actions to improve its infrastructure. Mongolia has made its contribution by passing its green development policy.

**UNESCAP**

The UN has published numerous publications on where we are on this matter, what we should do in the future, and what changes might be expected in the future. UNESCAP has published a report entitled “Low Carbon Cities in the Northeast Asia Region.” The report presents the projects implemented by the countries of this region. UNESCAP constantly works on collecting new data and making them accessible to others. It is important for us to exchange information and methodology with each other. Thus, it should be noted that this meeting is very timely.
Mr. Bat-Erdene T.
Deputy Mayor for Ecology and Green Development,
Ulaanbaatar Municipal Administration

BRIEF OVERVIEW OF KEY CHALLENGES AND STRATEGIES TO TACKLE THE PROBLEMS

ABOUT ULAANBAATAR

Ulaanbaatar is a young city. If you think that the first modern buildings were built around the 1940s, the city is about 60-70 years old. It is the coldest capital in the world, with an annual median temperature of minus 3 degrees Celsius. Our capital is also a city of nomads. We Mongolians traditionally have a nomadic lifestyle, but now, in the modern days, we are choosing to combine it with a settled civilization. Therefore, we have the biggest nomadic city with a transitional experience. Ulaanbaatar is the capital of Mongolia – center of political, social, and economic life. Sixty-five percent of the country’s GDP is generated here. It is considered a young city, because 80 percent of the population is younger than 40 years of age. This shows that we can easily adapt to change. With a population of 1.3 million, it is rapidly growing and urbanizing. That is why Ulaanbaatar is following the footsteps of a big city; it is not a small city.
Like most other cities, we are facing challenges such as air pollution, waste disposal, clean water and greywater management, soil contamination, water shortage, and weak environmental awareness. However, we need to overcome these challenges.

**AIR POLLUTION**

- One of the most polluted cities, especially in winter
- PM10, PM2.5, NO, SO2 far exceed standards
- High disease rates, high health costs
- Sources: ger district smoke (80%), CHP (6%), roads (4%), vehicle exhaust (10%)

**WASTE**

- Annual solid waste 1.1 million tons
- Winter: ash (49%), food residuals (25%), plastics (24%), paper (13%), textile (1%)
- Weak capacity for R3
- Outdated technology for wastewater treatment

**AIR POLLUTION**

Ulaanbaatar is considered one of the smoggiest cities in the world. The primary source of air pollution is the burning of raw coal for heat during the winter, which lasts almost 7 months. This is consumer-induced air pollution. Another factor is the geographical location of Ulaanbaatar, a hollow valley between four mountains that creates a lake of cold air where the wind does not naturally chase away the smog. In general, we have identified four causes for Ulaanbaatar’s air pollution: 80 percent originates from the ger districts, six percent from CHP, four percent from road dust, and ten percent from vehicle exhaust.
WASTE

Ulaanbaatar produces more than one million tons of waste annually, and there are three central landfills. Unfortunately, we don’t have a commercial recycling center yet, and that poses one more environmental challenge to our city.

WATER SHORTAGE, POLLUTION

- Daily water consumption 300,000 m³
- Underground water the only source
- Declining Tuul river flow, lowering water table
- Tuul river is polluted by improperly treated wastewater.

SOIL CONTAMINATION

- High contamination by bacteria, mold and fungi, organics
- Main areas: ger districts, open markets, and waste dumping points
- Pollution by heavy metals from auto repair shops, industrial entities
- Main source: unimproved pit latrines and wastewater pits in ger districts

WATER SHORTAGE, POLLUTION

Ulaanbaatar uses 300,000 m³ of water per day. A big concern and challenge in this regard is that all this water comes from precious underground sources. Demand for water is expected to increase by another 300,000 m³, and it will be a major challenge for us to find new sources.

SOIL CONTAMINATION

A shortage of installed sewage pipe infrastructure is another big challenge caused by the rapid speed of construction in the city and the fact that half of Ulaanbaatar does not have planned infrastructure.
WEAK ENVIRONMENTAL AWARENESS AND PARTICIPATION

As I have mentioned before, even though Mongolians possess nomadic cultural traditions, we need to adapt to an urban lifestyle. We need to change some of our habits and behavior accordingly. We are still in the process of absorbing urban culture and norms. To become urban citizens, we need to raise awareness and improve education of the public in this regard.

VULNERABILITY TO CLIMATE CHANGE

Ulaanbaatar is extremely vulnerable to climate change. The city’s location between four mountains creates a danger of flooding in case of heavy rains. Therefore, we need to learn to become more resilient to natural disasters.

NEW OPPORTUNITIES

Despite many challenges, new opportunities are opening up for us. The whole world is on the path to a more green and sustainable development model. Our city has also chosen this path, and I would like to urge other cities participating in this meeting to follow the same pattern.
With the emergence of this new model, we are also in the process of building our green development strategy. By organizing this meeting, we would like to demonstrate to you our support for green and sustainable development, and to appeal to the public and regional cities for cooperation. In 2014, the Mongolian parliament adopted the country’s first national green development policy and updated the Master Plan 2030 for Ulaanbaatar. In 2015, we have approved the Ulaanbaatar Economic Development Strategy. Based on these legal documents, we are in the midst of developing our green development strategy. We are doing this by involving civil society, government, the private sector, and scientists. Armed with this strategy, we can overcome the challenges, lay the foundation for green growth, and achieve sustainable development.

One of the goals of this forum is to listen to your suggestions, learn from your experience, and cooperate with you, so we can refine our strategy.

In this strategy we have also set goals to overcome difficult challenges that need to be addressed, such as cutting GHG emissions, waste reduction, integrated water management, enhancement of waste treatment capacity, and environmental education. Increasing resilience and adaptive capacity of our citizens is particularly important to us.
EXPECTED OUTCOMES

We expect to have the Ulaanbaatar City Green Development Strategic Action Plan 2020 adopted, and through international cooperation we intend to become a city that is green and environmentally friendly. We also hope that the participating international financial institutions will work with us and make appropriate investments to support our green growth. Again I emphasize our desire to work with all international organizations present here.

We are confident that with our Green Strategic Action Plan we can create a great Asian city where green development will lead us to a friendly environment for those living in the city of Ulaanbaatar.
Air pollution is one of the critical issues of Ulaanbaatar. Today I’m presenting the history of Ulaanbaatar’s air pollution from 2008 to 2015 in chronological order and the actions undertaken by Ulaanbaatar city to tackle this issue.

2008– Ulaanbaatar air pollution reached its pinnacle. The air pollution, fueled by increased inflow of migrants, exceeded global standards, turning Mongolia into one of the leading countries in air pollution. The state declared a national emergency on air pollution and urged foreign donors to undertake projects and programs addressing this matter. As a result, many donor organizations, including JICA, GIZ, World Bank, MCA, EBRD, and ADB, have launched projects and programs combating air pollution.

2010– For the first time in history, Mongolia adopted a law on air quality. Studies have been carried out to identify the sources of pollution, and it was revealed that 80 percent originated from the traditional stoves used widely in ger districts. In 2010, ADB established an efficient stove laboratory and carried out an efficient stove program. The same year, MCA launched its Clean Air project.

2012– A National Committee on Air Pollution Reduction was established next to the Presidential Secretariat. In order to fund projects and programs against air pollution, the government of Mongolia established the Clean Air Fund and commenced financing such projects. Moreover, air pollution monitoring stations were installed in Ulaanbaatar. JICA initiated its Air Quality Capacity Building program. Moreover, Ulaanbaatar Municipality introduced...
replanning of ger districts. Replanning of ger districts is a long-term policy for combating air pollution, while the efficient stove project is effective in the short term.

In 2012, the Ulaanbaatar Clean Air project commenced with funding from the World Bank. Since its establishment, the project has improved the efficient stove testing laboratory, funded by ADB, by adding regular and low pressure stands. This in turn laid the foundation for manufacturing efficient stoves domestically. As of today, nine types of efficient stoves are being sold in Ulaanbaatar. Additionally, we set up a stove development center next to the laboratory. This center is used to improve the quality of low-quality stoves coming from the laboratory. Within two years after commencement of the project, we supplied 40,813 stoves to citizens.

The project team drafted a housing strategy based on an individual’s payment capacity. Also, our team has drafted feasibility studies for centralized heat supply and urban greenery. In addition, we drew up a feasibility study for improving power plants.

Furthermore, we observed that it is essential to cooperate with the public in furthering our actions. Public support is essential in the success of our work. Thus, our team worked closely with citizens. As a result of our public relations campaigns, citizens’ perception of new initiatives improved. This in turn contributed to citizens’ adoption of efficient stoves.

Between 2011 and 2015, the small particle indicators reduced dramatically. For instance, we succeeded in reducing ger district pollution by 21 percent. The project also contributed to reducing large particles. As of now, we’re missing a stable policy on this matter. It’s unclear how long we will carry out this project in the future. The project will cease in 2017. Yet it is unclear how we should sustain our achievements thus far and how this project will continue in the future.
BACKGROUND

The air pollution in Ulaanbaatar city has been severe, especially in the wintertime. Major pollutants are particulate matters including dust, PM10, and PM2.5. According to the National Agency for Meteorology and Environment Monitoring (NAMEM), the highest monthly average value of PM10 ambient concentration showed as much as 1,000 μg/m$^3$ during the winter in 2011, and all monitoring sites show high concentration of PM10 exceeding the Mongolian ambient air quality standards (100 μg/m$^3$ for 24 hours average and 50 μg/m$^3$ for yearly average) posing serious health risks for citizens. Also, other pollutants, such as SO2 and NO2, are problematic throughout the year, occasionally exceeding the Mongolian air quality standards.

The major emission sources are coal combustion, estimated at more than six million tons annually, at the three old coal-fired plants for power and heat generation (Combined Heat and Power Plant No.4, No.3 and No.2), 200 heat-only boilers, about 1,000 small boilers such as coal-fired water heaters, and numerous traditional stoves and wall stoves at more than 170,000 family dwellings in ger areas. Mongolia is a coal-rich country with limited options for energy sources, heavily dependent on coal containing a great amount of water and ash resulting in dust-emitting characteristics. In addition to coal combustion, increasing automobile emissions, wind-blown dust from ash ponds of the power plants, and other fugitive sources are also contributing to
the severe air pollution. The JICA Project Phase 1 estimated total
dust and PM10 emissions for the year 2011 at 38,758 tons and
26,529 tons, respectively.

Due to the scarcity of credible data and information
necessary for air quality analysis, the air pollution structure for PM10
and PM2.5 in Ulaanbaatar city has not yet been well analyzed,
despite various efforts supported by international donors.
Extremely cold winters also create various technical difficulties in
monitoring both emissions and ambient air qualities at credible
levels. Effective air pollution control requires a solid technical and
scientific base, strong coordination among numerous relevant
authorities, and well-designed legal and regulatory frameworks,
and the necessary human resources and institutional capacity
have not yet been prepared to meet those requirements in the
country. It has been critical to develop human resources and
institutional capacity of the relevant authorities at the national and
the city levels for effective air pollution control in Ulaanbaatar city.

To cope with this situation, based on a request by the
Government of Mongolia, the Government of Japan provided
technical assistance from 2010 to 2013 through the JICA
“Capacity Development Project for Air Pollution Control in
Ulaanbaatar City,” which focused on building the capacity of the
AQDCC and other relevant agencies at the city and national levels
to control emission sources. Major activities included technology
transfer for on-site measurements of boiler emissions, including
dust and PM10 among other pollutants, elaboration of a credible
emissions inventory and air pollution simulation model; creation of
a boiler registration and management system, and elaboration of
emission control measures and technical evaluation of emission
reductions and air quality improvements. In order to continue the
capacity development in this area, the government of Mongolia
requested phase 2 of the project in 2012. The government of
Japan approved the project for 2013 implementation.
OVERALL GOAL, PROJECT PURPOSE, AND OUTPUTS

The project is designed for AQDCC and relevant agencies to reach an overall goal, by achieving the project purpose and nine specific outputs. The project team consists of the counterpart, the counterpart working group, and JICA experts.

Table: Duration, Overall Goal, Project Purpose and Expected Outputs

<table>
<thead>
<tr>
<th>Project Title</th>
<th>Capacity Development Project for Air Pollution Control in Ulaanbaatar City Phase 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration</td>
<td>November 2013 to May 2017 (3 years and 6 months)</td>
</tr>
<tr>
<td>Overall Goal</td>
<td>Measures for reduction of emissions of air pollutants will be strengthened in Ulaanbaatar City.</td>
</tr>
<tr>
<td>Project Purpose</td>
<td>Capacity for air pollution control in Ulaanbaatar City is strengthened, paying special attention to the development of human resources and coordinating mechanisms of the AQDCC and other relevant agencies, along with other aspects of capacity development.</td>
</tr>
<tr>
<td>Output 1</td>
<td>Capability of emission source monitoring is strengthened.</td>
</tr>
<tr>
<td>Output 2</td>
<td>Capability of ambient air quality monitoring is strengthened.</td>
</tr>
<tr>
<td>Output 3</td>
<td>Capability to evaluate pollution structure is strengthened by integrating emissions inventory, simulation model and ambient air quality monitoring.</td>
</tr>
<tr>
<td>Output 4</td>
<td>Decision-making process for air pollution control is improved, by utilizing technical abilities of AQDCC and the relevant agencies.</td>
</tr>
<tr>
<td>Output 5</td>
<td>AQDCC and the relevant agencies promote public awareness program and implement advisory system for citizen in Ulaanbaatar city.</td>
</tr>
<tr>
<td>Output 6</td>
<td>Capability to technically evaluate air pollution control measures is strengthened.</td>
</tr>
<tr>
<td>Output 7</td>
<td>Capability of AQDCC and the related agencies to regulate and control emission sources is strengthened.</td>
</tr>
<tr>
<td>Output 8</td>
<td>Emission control measures at major polluters are enhanced by AQDCC and the related agencies.</td>
</tr>
<tr>
<td>Output 9</td>
<td>AQDCC and the related agencies develop a mechanism to coordinate outputs 1 to 8.</td>
</tr>
</tbody>
</table>

In order to achieve the project goal and purpose, and based on the achievements and lessons of Project Phase 1, Project Phase 2 is designed to establish an air quality management cycle, reflecting the realities of the Mongolian side, consisting of four steps: (i) analysis of air quality and emission sources and evaluation of air pollution control measures; (ii) air pollution control strategy, policy, and decision making, (iii) evaluation of air pollution control measures; and (iv) implementation of air pollution control measures. This cycle will enable sound decision making by Mongolian authorities as a whole in controlling air pollution in the Ulaanbaatar city area by utilizing technical capabilities, developed through the Project, at the professional agencies such as AQDCC and NAMEM. In addition to the continuing
emphasis on human resource development since Phase 1, the Project emphasizes strengthening of the coordinating mechanisms among relevant authorities and stakeholders.

IMPLEMENTATION STRUCTURE OF PROJECT

The Project consists of the organizations and experts shown in the chart. AQDCC is the counterpart (C/P), the responsible agency of the Project. The counterpart working group (C/P-WG) is organized by related organizations to implement project activities. The director of AQDCC is the project director, responsible for overall administration and implementation of the Project, while the deputy director of AQDCC is the project manager, responsible for the managerial and technical matters of the Project. JICA experts will give necessary technical guidance, advice, and recommendations to the C/P and C/P-WG for the implementation of the Project. The Joint Coordinating Committee (JCC) facilitates inter-organizational coordination. The Project will be closely coordinated with the activities of relevant donors, such as the Ulaanbaatar Clean Air Project (UBCAP) supported by the World Bank. The Project will also be coordinated with other relevant projects and programs of JICA to create synergy effects.

Chart: Implementation Structure of the Project
Ladies and Gentlemen!

It’s my great pleasure to attend this forum on Urban Green Growth hosted by Mongolia. I would like to say a few words on behalf of the city of Hulanbuir of the Inner Mongolia Autonomous Region.

We are all aware that one of the newest development strategies for countries around the world is to strengthen the relationship between humans and nature and prioritize green development. This is a sustainable strategy consistent with the interests of the nation. By declaring green development our top priority, we will be able to provide our nation with clean air and water and healthy food, and consolidate the city with its natural environment. It is what we all want to pursue.

Now I would like to share with you how we, the citizens of Hulanbuir, gained experience and knowledge of how to develop a green city.

A GREEN CITY IS A LOW CARBON CITY, AS WE ALL KNOW

In recent years, Hulanbuir city has been guided by the policy of “the combined path of sustainable economic development and low-carbon” as top priority, and it has been pursuing technological upgrades and structural changes in main sectors of the economy by prioritizing improvements in energy efficiency and the use of new and renewable energy. At the same
time, we are developing strategically important new industries and services. Our activities towards green development include the efficient use of water, forests, mines, and other natural resources, developing low-carbon and energy-saving technologies and industries, eliminating carbon emissions by increasing forestry, and changing life patterns. We are taking relevant steps and implementing stage-by-stage plans to transform the entire city into a low-carbon city by reducing air pollution or when we are creating new buildings, roads and transportation, parks, and gardens.

Currently, in Hulanbuir, there are a total of 13 wind power plants with a capacity of 710.27 megawatts, and all of them are connected to the city electric grid. There is also a 250.75 megawatt hydroelectric power plant in the city. In the next few years, we are planning to build five solar power plants with a capacity of 100 megawatts each.

SECONDLY, A GREEN CITY IS A CITY WITH ENERGY SAVINGS

In recent years, the emphasis for the economic development of Hulanbuir city has been on efficient and renewable sources of energy, such as high-efficiency hydropower and clean energy as well as the use of energy-saving construction materials. In 2011-2013, residential buildings totaling 1,339,000 square meters used energy-saving designs. In 2014, this number was 540,000 square meters. Some other energy-saving projects were launched, including the conversion of coal into oil, ethanol, and olefin, and the refinement and multiple use of brown coal.

OF COURSE, A GREEN CITY IS A CIVILIZED CITY

Main indicators of green development include, among others, high levels of public morality, state institutions working efficiently with no corruption, a well-organized and healthy society, and developed systems of technology, culture, and health and safety.

In the near future, Hulanbuir city residents want to create a civilized and friendly city with quality public services, improved social security, and an advanced legal environment, where green culture is consolidated in every sphere—people’s lives, government policy, and the economy.

Finally, I would like to encourage all of us to make an effort and take appropriate action to build the green city!
Thank you all for your attention!

INTRODUCTION

The crisis of climate change represents a major challenge to urban areas all over the world to achieve green growth, and the responses by cities have been significant.

In July 2011, the government of Seoul, South Korea, established a set of goals and initiatives to save energy and reduce greenhouse gas emissions when it adopted the “Low Carbon Green Growth in the Seoul Metropolitan Area” framework. In 2012, the municipal government adopted the “One Less Nuclear Power Plant” plan to improve energy efficiency and cut consumption by an amount equivalent to one nuclear power plant in a bid to address climate change preemptively.

The Seoul government is also committed to promoting green growth policies to respond to climate change. At the 2015 world congress of ICLEI, Local Governments for Sustainability, Seoul’s representatives called for reducing greenhouse gas emissions by 40 percent – 20 million tons – by 2030.

This study reviews the progress of green growth policy in the Seoul metropolitan area and the Republic of Korea, and suggests ways in which efficiency and enforcement can be improved.
ABSTRACT

Cities and urban areas are facing the green growth challenge throughout Asia. Moving away from the traditional economic growth model, associated with high environmental damage and depletion of natural resources, towards sustainable, low impact, and inclusive strategies that foster economic development with little or no impact on the environment is seen as the obvious next step for the future of our economies.

In the case of Ulaanbaatar, there are challenges to overcome to realize the city’s green growth potential; however, there are also some opportunities to consider when discussing ways in which green growth can lead to green development via policies, strategies, initiatives, and practices.

A SWOT analysis was used to better understand the current situation in the context of green growth, which was then utilized to explore potential development pathways for the short and long terms. These include current policies that serve to either support or constrain green growth, such as the Green Development Policy adopted by Parliament in 2014, as well as cyclical events that shape the city’s green growth context.

Identifying current initiatives and practices in the areas of urban and transportation planning that sit well with the green growth concept will enable an exploration of Ulaanbaatar city’s potential for green growth, and further recommendations for a more resilient and smart city have been offered.
GREEN INFRASTRUCTURE

Green and sustainable infrastructure development is a critical issue that requires a series of research studies to find the most efficient solutions fit for each distinct environment. Green infrastructures such as wind farms and solar panels have become a growing trend globally. For example, a wind farm situated 44 miles from the capital city of Ulaanbaatar has proven that building green infrastructure is not a far-fetched plan in Mongolia. Furthermore, successful green transportation and living policies implemented in Ulaanbaatar city, including promoting eco-friendly transportation devices, and rewarding daily public transportation users, have helped decrease overall carbon fuel intensity in the city. Green growth strategies and other measures to encourage eco-friendly transportation and effectively decrease carbon emissions will be discussed.

Moderator:
Mr. Thomas Eriksson, Deputy Resident Representative, UNDP

Speakers:
Sustainable Urban Planning: Eco-districts
Mr. Arnaud Heckmann, Senior Urban Development Specialist, ADB

Urban Green Transportation in Northeast Asia
Mr. Ki-Joon KIM, Senior Transport Specialist, ADB

Research in the Region: Green Growth Policies and Efforts in Northeast Asian Cities
Evaluation on the Urban Domestic Solid Waste Management and Reform Suggestions for Chinese Cities
Dr. Guojun Song, President of Environmental Policy and Planning Institute, Renmin University of China

Shenzhen: Shenzhen City and Green Transportation
Honorable Ai Xue Feng, Vice Mayor of Shenzhen
SUSTAINABLE URBAN PLANNING:
ECO-DISTRICTS

A “Green city” encompasses a wide range of aspects, including policies and pragmatic aspects. Transition towards a green city requires a city to reform its social, economic, and environmental conditions. But there are challenges to deal with.

The concept of a green city is typically harder to implement in full scale. Therefore, as examples show, it can be implemented within the framework of the green district. Then, for planning and implementation purposes, it is important for the designated eco-district to list the set of all problems that exist in its territory. Issues such as policies for city planning and construction of buildings, potential locations for the use of renewable energy, and citizens participation must be important considerations.

Where should the eco-district be built? It can be built anywhere. Wherever there is a potential to save resources, and capacity for renewable energy exists, we can build eco-districts suited to local conditions.

Introducing mixed-use projects. By employing mixed-use projects that involve not only apartments and other housing but also kindergartens, schools, services, businesses, and recreational centers we can achieve goals of comprehensive planning. There is another important issue, which is transportation. Early in the district planning stage, ways to arrange public transportation efficiently to meet the needs of the district should be considered.

When developing eco-districts, make sure that potential district residents will not belong to the same income-level group.
When all residents are from low-income families, the district is likely to have high rates of crime and violence, whereas high-income families living in one district become more segregated from the society. Therefore, it is better to build a city with mixed-income neighborhoods.

Resources available in the eco-district should be used efficiently. Resources need to be reused and recycled. One example is shown in the picture below: rainwater collected from the roof of a building is stored and reused later to water green facilities.

**Resource Efficient Neighborhood**

**Energy efficiency:** High performance building, meaning energy efficient, durable, comfortable, healthy, environmentally friendly.

**Renewable Energy:**
- Solar / wind energy
- Geothermal energy
- Biomass energy

**3R principles:**
For water conservancy
- **Recovery** Rainwater / greywater
- **Recycling** Greywater
- **Re-use** domestic use / irrigation

Civic participation is very important. When citizens are involved in the process from the policy drafting stage, they become much more familiar with the concept of green development and will provide active support at the implementation stage.

Eco-districts have been created in several countries throughout the world. Their experience demonstrates that using this concept we can save energy, enhance cooperation between public and private sector, and increase citizen participation and initiatives. On the other hand, experience shows that when developing an eco-district policy, it is not advisable to set highly ambitious goals or unrealistic tasks that will be impossible to implement later. Harmony between realistic policy and pragmatic investment approaches is the key to success for implementation of eco-district projects.
Redevelopment for Ger Areas

Ger areas redevelopment is an integrated process with multiple and interlinked challenges – land redevelopment, water shortage, air pollution, green areas, affordable housing…

- Communities are ready,
- Strategic locations with development potential
- Can be adaptive and be implemented block by block

Support to ongoing programs and strategies. Master plan, affordable housing strategy, green city strategy, urban redevelopment law, redevelopment programs…

In our view, Mongolia has the potential to house eco-districts, especially now, when it can be tied in with the ger area redevelopment that started recently. Redevelopment involves new infrastructure and new building projects, so the eco-district concept can be incorporated in the ger area redevelopment as part of the whole, comprehensive plan. We are in the process of discussing with the city administration the possibility of turning the redevelopment into a green project. Eco-district projects usually involve many stakeholders, including government organizations, commercial banks, and private-sector funds, and there is a practice of creating a designated company to be in charge of planning exclusively. Most importantly, as mentioned before, it needs to be custom-tailored to local needs and features.
Mr. Ki-Joon Kim  
Senior Transport Specialist, ADB

NORTHEAST ASIAN CITIES, GREEN TRANSPORTATION

I have been working in Ulaanbaatar on urban transportation for the last five years. Our Asian Development Bank urban transportation project will be implemented immediately, starting next month.

As a matter of fact, the city administration is vested with the power to make decisions regarding city infrastructure. Once taken, decisions of that type are powerful enough to affect people’s lives for 30, 40, or even 50 years. For instance, if the city invests more in public transportation, people are more likely to use it. If new roads are built, the number of automobiles will increase. So, let’s talk about examples of some model cities around the world.

**New York City:** Some time ago, this city faced the same challenges as Ulaanbaatar, including air pollution, traffic congestion, and auto accidents (it is estimated that an average of 8-15 percent of GDP is lost to traffic congestion alone). At the end of the 1800s, New York started its world-famous transition, in certain respects inimitable according to some researchers. Robert Moses, architect and urban planner, was the one who shaped modern New York City. He played a significant role in building New York as an industrial center. He favored highways that ran from one end of the city to the other.
Chicago and Los Angeles were able to make the same transition based on Robert Moses’s concept. In contrast, Tokyo has invested more in public transportation and sidewalks, which are suitable for the friendly lifestyle of the Japanese.

Beijing’s city transportation system has its own features. Twenty years ago, the majority of the population rode bicycles, but after a massive change unseen anywhere else in the world today, one now barely sees anyone riding a bicycle in this city. Looking at these examples, we can see that cities are required to make decisions based on their long-term prospects. According to the latest trend, people prefer riding bicycles or walking on sidewalks. For example, bicycle lanes and sidewalks are increasingly being built in New York where the roads were designed predominantly for motor vehicles. Boston, similarly, is increasing its green facilities versus concrete buildings.

Changes in Seoul have also been related to its long-term prospects. The old overpasses were used for 35 to 40 years, but from 2002 to 2006, the city’s Mayor changed the roads to green facilities and built sidewalks, allowing people to walk. He also restored the river that was once covered by an overpass.
Ulaanbaatar has a choice to make. The Asian Development Bank proposes two public transportation lines for the city to select from (BRT and MRT). Now the city needs to make a decision on the selection, which is not a simple task. There are number of factors involved, including how to effectively spend available funds, how to select the right line, and in what order to implement the project if there are several directions to follow. We are working hard to solve these problems.

Ulaanbaatar : Decisions to Make
BRT or MRT or Roads?
Amsterdam, Copenhagen, and London offer a variety of unique solutions for those who ride bicycles. Overpasses and concrete roads are becoming outdated in terms of infrastructure. Recently, cities are coming up with an idea to build infrastructure that includes sidewalks and bicycle lanes. Otherwise, while we work on solving traffic congestion, the number of vehicles keeps increasing, thus making the solution impossible. We created the problems ourselves, so it’s up to us to find solutions.

Copenhagen
ABSTRACT

It has been more than ten years since the Chinese government announced policies to reduce domestic solid waste. So far, however, there has been no apparent progress, even in the pilot cities. This paper presents the findings of an evaluation of cities’ solid-waste management performance, and offers recommendations for the reform of domestic solid-waste management policies.

DETOXIFICATION

The detoxification treatment rate in urban areas has been increasing year by year, reaching a reported 93.42 percent in 2012, which could be an overestimate. For household waste generated in rural areas, the treatment rate is just 62.02 percent. Information regarding pollutants discharged from domestic solid-waste disposal facilities is very limited, and there is therefore a lack of evidence that these discharges adhere to environmental standards. Some reports have suggested that landfill leachate regularly fails by a large margin to meet environmental standards, especially in cities spending little on end-of-pipe treatment.
WASTE REDUCTION

There has been no substantial progress in reducing urban domestic solid waste, which stood at 1.12 kg per capita per day in 2012. Even among waste separation pilot cities, domestic solid waste per capita per day has not decreased uniformly. Therefore, there is still great potential for reducing domestic solid waste. If source classification policies are not carried out, progress in domestic solid-waste reduction will be slow, and it will be difficult to realize reuse and cost minimization objectives.

RESOURCE RECOVERY

There is insufficient statistical information documenting the rate of reuse of domestic solid waste, but resource recovery rates are still low, and they vary among cities. For instance, the rates for Beijing, Benxi, Mudanjiang, and Suzhou are respectively 25.32 percent 24.74 percent 61.52 percent and 20.11 percent. According to an evaluation of the recycling rates for paper and plastic waste, recycling could be improved substantially, both at the national level and among cities studied.

INVESTMENT IN EQUIPMENT

Investment in equipment for domestic solid waste management is gradually growing, but some of that equipment remains unused. Investment in end-of-pipe disposal of domestic solid waste is generally low. There is substantial variation among cities in their individual expenditures on solid-waste management, because of disparities in available revenues. Among cities that invest less than the average, many do not meet pollution discharge standards.

The total cost for landfill disposal of domestic solid waste in Beijing was 1,530.7 yuan per ton in 2012, of which 59.1 percent went for collection costs, 21.4 percent for land use, and the remainder for transportation and end-of-pipe treatment. The total cost is much higher than Beijing’s non-resident domestic solid waste treatment fee (300 yuan per ton), which should not be subsidized. At current discharge levels, per capita expenditure on waste treatment is up to 480.5 yuan per ton per year, higher than the end-of-pipe disposal cost disclosed in Beijing, and it doesn't help to classify and reduce municipal solid waste.
SHENZHEN CITY

Shenzhen is a relatively new city, established more than 30 years ago and located next to Hong Kong. Earlier, it was a small fishermen’s village, but today the population of the city has already reached 11 million. With the city’s GDP exceeding 160 billion RMB, it has grown in a relatively short period of time into one of the most competitive large cities in the world. Shenzhen is an example of significant success in the history of our industrial development.

The modernization of this city can be judged by its infrastructure. Trains in the city used to be powered by steam locomotives; now all of them have been replaced with electric engines. The subway network is currently 178 km long and will reach 866 km according to the long-term plan. Before, due to the smog, you could see only grey skies above the port, but now you can observe a clear blue sky.

Public transportation such as aircraft and ships are now using green energy as much as possible. The city has a railway network with 19 routes. Also, over 900 roads are available for cars, and 14,816 green buses are in service for public transportation. 55.6 percent of the total city population uses public transportation. Daily, 30 million passengers commute by well-developed subway and bus systems, and automobile, bicycle, and pedestrian road networks.

As a policy matter, Shenzhen offers city residents different
incentives for green consumption, like subsidizing electric cars or encouraging wider use of subways. Sustainable development can be achieved if we treat nature properly and hand it over to the next generation. It is our goal to keep our city green and make it a pleasant place to live.
The current world population of 7.2 billion is projected to reach 9.6 billion by 2050, meaning that we will need more than one earth to support our needs if the population continues with the current consumption pattern. Current unsustainable consumption patterns are destroying the environment, depleting stocks of natural resources, distributing resources in an inequitable manner, and contributing to social problems. There is an urgent need to shift from the current pattern to more sustainable, green living. Green, sustainable ways of living and the importance of educating youngsters as well as adults with green education are discussed in this session.

Moderator:
Dr. Kilaparti Ramakrishna, Northeast Asia Office Director, United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP)

Speakers:
Shifting the Lifestyle
Ms. Altantsetseg S., PAGE National Coordinator, UNEP

Education for Sustainable Development
Mr. Amgalan A., Project Director of “Education for Sustainable Development” Project, Swiss Agency for Development and Cooperation

Green Jobs
Ms. Lakshmii B., Executive Director, Economic Policy & Competitiveness Research Center

Ulan-Ude: Sustainable Development of Ulan-Ude City
Honorable Alexander Golkov, Mayor of Ulan-Ude

Hulanbuir: Supporting Green and Low Carbon Emissions to Build a Civilized and United Society
Mr. Cui Xin Yu, Secretariat of the City Administration

Haikou: Haikou and Agriculture
Mr. Han Bin, Head of the Delegation, Haikou
CONSUMER BEHAVIOR

The green consumer is a person who is mindful of his or her actions and is conscious of environmental, social, and moral causes when making any purchase. The survey shows that five percent of all consumers are concerned about the environment before making a purchase. The key factors that influence consumer behavior are their purchasing power and the cost of the item.

For example, German consumers prefer quality in general, and being a green consumer depends on their level of income.

On the other hand, people are cautious of any product that has a “recycled” label on it. Even the word “waste” itself evokes a negative feeling. Also, the social status and reputation of individuals tend to influence their purchasing process. People want to fit in at work or with friends, so they prefer to purchase designer brands.

Age also plays a role in consumer behavior. According to the survey, people tend to want the brightest and fairest things at the age of 18-25.

Gender-wise, women purchase predominantly groceries, childcare products, and cleaning products, while men tend to make the big purchases such as vehicles and electrical appliances, where energy efficiency and reduction in consumption should be considered.

Initially, the government tried to educate the public on this subject, but they had little impact, because they approached it in a very official manner. Advertising today is more targeted and is spread through various social and conventional media channels. Table 1 and 2 show the good practices that were successful.
Table 1:

GOOD PRACTICES

Sydney, Australia

- Higher sustainability standards at the design stage. Prospective buyers of new apartments could be shown a BASIX ratings certificate, so they could be aware of how well the building performs environmentally.
- Buildings with better sustainability standards can reduce bills for owners and tenants in the long run, and this is a major selling point for new apartments.
- The residential apartments sustainability plan used data from the city’s Smart Green Apartments program – a three-year sustainability trial that took place in 30 buildings across the city from 2011 to 2013.

Table 2:

GOOD PRACTICES

Ecofriendly Consumption Habits

- Japan: Building on cultural traditions to promote sustainable packaging and recycling through its 3R campaign.
- France: TV campaign, “Let us Reduce Our Garbage: We’re Overflowing.” targeting single-use throwaway products, excessive paper printing, and bottled water.
- USA: Local governments financed the development of an advertising campaign, “Water: Use it Wisely,” with the tagline, “There are a number of ways to save water, and they all start with you. You are water-saving device number one.”

Green consumption depends on the consumers and what they consider to be relevant to them. Depending on the relevance, their purchasing patterns will vary.

PAGE is a project designed to promote green economy and is implemented jointly by the United Nations 5 organizations – the United Nations Development Program, the United Nations Environment Program, the United Nations Industrial Development Program, the International Labour Organization, and the United Nations Institute for Education and Advertisement.
Mr. Amgalan A.
Head of the Education for Sustainable Development Project, (GIZ)

EDUCATION FOR SUSTAINABLE DEVELOPMENT

Our project is co-financed by the Mongolian government and the Swiss Agency for Development and Cooperation. Implementing units are the German Society for International Cooperation, the University of Ursula, and the Swiss organization IZB.

Donors
- Ministry of Education, Culture, and Science (MECS)
- Ministry of Environment, Green Development, and Tourism (MEGDT)
- Swiss Agency for Development and Cooperation (SDC)

Implementing Agents/Beneficiaries
- Ministries, Universities, National Centre for Lifelong Learning
- NGOs, SMEs, Media, Schools, Teachers, and Students

Time/Budget/Coverage
- Project Phase I: 2015 - 2017
- Budget: 12.8 Million CHF
- 21 Aimags and 9 Districts of UB

Project coordination and facilitation
- GIZ IS (Germany)
- Uppsala University (Sweden)
- IZB, PH Zug (Switzerland)

Today, whenever we talk about city development or rural area development, inevitably we touch upon the topics of air pollution, waste, and consumption. Because these are the issues that need to be addressed in education for sustainable development and green development, our government welcomed the request of the Swiss government to introduce a related program starting from January 1, 2015. The main goal of our project is to deliver to the public the basic principles of sustainable development and
green growth policy. One of our tasks is to include the concept of sustainable development in the general education curriculum of schools. The project will be implemented in two stages, the first in 2015-2017, and the second in 2018-2019. Our program is intended to provide education that will bring change for the next generation of society. Our children need to understand about the proper use of our planet and keeping it in good condition even 30 years from now. Nelson Mandela’s words, “Education is the most powerful weapon which you can use to change the world,” are the foundation of our project.

Our program is designed to provide education for sustainable development that fits the Mongolian context, rather than trying to adopt other countries’ models. In order to do so, we base our education program on Mongolian traditions, history, and culture. Currently, we are in the process of developing a formal document. After completion of this document, we are planning to conduct a series of training courses on sustainable development education for all schools and teachers throughout the country. Although it hasn’t been long since our project started, we have already renewed the core program of general education jointly with the Ministry of Education, Science, and Culture. Here we made a classification of relevant curricula and embedded the concept of sustainable development education into each of them. As part of this work we printed 15,000 copies of the core curriculum and distributed them to the whole country. Furthermore, we are now designing the textbook for the core program. We have also started to train the main people who will be delivering the program, the teachers. Twenty thousand of them will be trained by the end of this year.

We are working with the Ministry of Environment and Tourism on the action plan for the green development program that was approved by the Mongolian government in 2014. Another important goal of this project is the introduction of the “green standard” or ISO-14000 certificate. Our experts conducted an extensive survey, and according to them, currently only one entity in our country has received this certificate. At the moment, we are preparing for this work and conducting lots of surveys. The first requirement is to gain green certification, so it is important to introduce it. In conclusion, we should say that we not only need to work with schools and decision makers, but to spread sustainable development education to the public at large.
GREEN JOBS

NATIONAL GREEN DEVELOPMENT STRATEGY

In 2012, at the Rio+20 meeting, five organizations chose Mongolia for the PAGE program, as one of seven model countries to implement green development and green strategies. The PAGE program called on the United Nations to support interested countries in their transition to greener and more inclusive economies. As part of the PAGE inception phase and a broader stocktaking exercise, ILO has committed to undertaking a green jobs mapping study. The two basic surveys conducted before implementing the PAGE program are the state of the green economy in Mongolia and the situation with green jobs.
The research showed that green jobs constitute 11.5 percent of total employment in Mongolia. The two surveys also show that Mongolia is one of the countries that are affected greatly by climate change. For example, shorter intervals between desertification and seasonal cycles sharply increased the number of years affected by drought and harsh winter. Data also show that during these years migration from rural areas to the city increases dramatically.

As mentioned in the ILO’s *Assessing Green Jobs Potential in Developing Countries: A Practitioner’s Guide 2*, the concept of “green jobs” can be broadly defined as the direct employment created in different sectors of the economy and through related activities that reduces the environmental impact of those sectors and activities and ultimately brings it down to sustainable levels. The main methodology of the research work was to compare the indicators of employment efficiency with the environmental impact indicators.

<table>
<thead>
<tr>
<th>Environment Indicators</th>
<th>Criteria for proper employment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whether meeting the domestic and international laws and regulations related to the surrounding environment</td>
<td>Satisfying the needs of the minimum wage</td>
</tr>
<tr>
<td>Are there voluntary standards, green products and services; whether there is a production management system</td>
<td>Freedom of association and collective expression of opinion, with rights to negotiate</td>
</tr>
<tr>
<td>Are there objectives and strategies set jointly by public and private sector</td>
<td>Prohibiting forced or compulsory labor, without discrimination based on employment and occupation</td>
</tr>
<tr>
<td>Are there benchmark indicators of the industry; whether there are basic indicators of production, the industry</td>
<td>No child labor, fulfilling requirements of occupational safety and health standards</td>
</tr>
<tr>
<td>Activity-based initiatives with a positive impact on the environment</td>
<td></td>
</tr>
</tbody>
</table>

We looked at green jobs by sectors which included agriculture, animal husbandry, energy, water and wastewater management, transportation, and construction. We also researched the ongoing programs in these sectors.
### Green Jobs in Mongolia in Selected Economic Sectors

<table>
<thead>
<tr>
<th>#</th>
<th>Sector</th>
<th>Employment</th>
<th>D Jobs</th>
<th>EF Jobs</th>
<th>Green Jobs</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Animal husbandry</td>
<td>342,882</td>
<td>42,512</td>
<td>252,915</td>
<td>42,512</td>
<td>12.4</td>
</tr>
<tr>
<td>2</td>
<td>Crop production</td>
<td>58,477</td>
<td>20,932</td>
<td>4,591</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Forestry</td>
<td>3,923</td>
<td>3,923</td>
<td>3,923</td>
<td>3,923</td>
<td>100</td>
</tr>
<tr>
<td>4</td>
<td>Energy</td>
<td>14,500</td>
<td>14,500</td>
<td>1,231</td>
<td>1,231</td>
<td>8.5</td>
</tr>
<tr>
<td>5</td>
<td>Water, sewerage, water treatment</td>
<td>6,538</td>
<td>6,538</td>
<td>5,159</td>
<td>5,159</td>
<td>78.9</td>
</tr>
<tr>
<td>6</td>
<td>Solid waste management</td>
<td>1,401</td>
<td>300</td>
<td>1,401</td>
<td>300</td>
<td>21.4</td>
</tr>
<tr>
<td>7</td>
<td>Transport</td>
<td>72,900</td>
<td>72,900</td>
<td>12,506</td>
<td>12,506</td>
<td>17.1</td>
</tr>
<tr>
<td>8</td>
<td>Construction</td>
<td>69,300</td>
<td>69,300</td>
<td>3,610</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total (no)</td>
<td>569,921</td>
<td>290,905</td>
<td>285,336</td>
<td>65,631</td>
<td>11.5</td>
</tr>
</tbody>
</table>

| Share of employment                      | 40.5%      | 50.0%   | 11.5%   |

*D Jobs = Decent Jobs, EF Jobs = Environmentally Friendly Jobs*

The percentage of green jobs was calculated using data on overall rate of employment, and from among the categories such as proper jobs and environment-friendly jobs. The result showed that, as of today, the agriculture and construction sectors do not offer green jobs, because according to our requirements, the jobs these sectors offer are not eligible to be described as green: they are seasonal, and very few environmentally friendly technologies are used in these two sectors.

In our opinion, in order to provide greater support for green jobs, there is a need for coordinated action to consolidate the National Green Development Strategy with the Action Plan for city development.
With its 25 years of history, the city of Ulan-Ude is one of the oldest registered with UNESCO World Heritage. Located 100 km from Lake Baikal, and with a population of half a million (the third largest in eastern Siberia), it is a big city that occupies 377 square kilometers of territory. Our population includes more than 100 ethnic groups, and the average age of our citizens is 34. Since the 1990s, the city has registered over 234 historical artifacts, which makes it one of the prominent historic cities of Russia.

Ulan-Ude is a multi-religion city with remarkable architectural masterpieces, including many Buddhist monasteries. Since 1977, the city has been developing steadily according to strategic plans. Currently, we are implementing an urban development plan up to 2020.

There are over 1,000 business entities operating in our city. From 2007 to 2014, the city generated 9.5 billion rubles in revenues, received investments worth 150 billion rubles, and saw GDP increase by 2.4 times. Population has grown constantly during the last eight years.

Because the city is located in the Lake Baikal area, it requires us to always consider the ecological aspect of the area and use environmentally friendly technologies. City planning is done in accordance with a green growth strategy. Social and economic development programs involve issues of environmental and air quality protection, water supply, waste, forest conservation, and ecological education. The city’s general plan seeks to improve basic infrastructure by developing tourism and supporting other
sectors. The tourism industry is growing every year, and compared to the previous year, 2014 statistics show an increase of 15 percent in the number of visitors coming to Ulan-Ude city.

The trolleys – our means of green transportation – carry 15 million passengers a year, accounting for 45 percent of total public transportation. We’ve implemented the worldwide practice of car-free day and built a seven km jogging and bicycle road for the people of Ulan-Ude.

Environmental education is provided to all citizens of the city. Various campaigns and activities are carried out, like the eco-marathon. Joint ecological expeditions of children from Ulan-Ude and Ulaanbaatar are a great example of our cooperation on the regional level.

Ulan-Ude city’s geographic location is of great advantage to us. The Trans-Siberian Railway, which connects Northeast Asia to Europe, passes through our territory. Therefore, we think our partnership will be expanding in the future. 2016, the year of our 350th anniversary, will be an important milestone in our history, and we would like to invite all of you to our celebration.
Mr. Han Bin
Head of the Delegation, Haikou

HAIKOU: HAIKOU AND AGRICULTURE

HAIKOU (VIDEO)

Even though the city of Haikou, the center of Hainan province, was formally established only recently, it has more than a thousand years of history and a population of two million. Soon we will be officially celebrating our 20th anniversary. Haikou is an important seaport that connects China with Southeast Asia and other countries. We are planning to develop the city of Haikou into a land of paradise. We invite you to visit Haikou and invest in our city.
Unsustainable patterns of energy production and consumption not only threaten human health and quality of life, but also affect ecosystems and contribute to climate change. Sustainable energy, therefore, can be an engine for poverty reduction, social progress, equity, enhanced resilience, economic growth, and environmental sustainability. Support and advocacy for an energy sector market transformation through a range of interventions on policy, finance, capacity development, and awareness creation is needed. Encouraging investments that help deliver sustainable energy products and services, and de-risking the policy and financial environment, help to develop the socio-economic context in which sustainable energy can be possible, viable, and practical.

Moderator:
Dr. Badamdamdin R., President of Mongolian Wind Energy Association

Speakers:
Potential for Large Scale Power Generation in the Gobi Desert and the Northeast Asian Supergrid
Dr. Enebish N., Renewable Energy Senior Specialist, Ministry of Energy

Future of Clean Energy
Dr. Gankhuyag D., Executive Director, Clean Energy Asia, Newcom Group

Niigata City: Combining the Best of Urban and Rural Life to Create a Healthy Living Capital
Honorable Furuki Takeyoshi, Vice Mayor of the City of Niigata

Elista City: Green Growth Challenges and Ways to Resolve Them
Honorable Namruev Vyacheslav Khozykovych, Mayor of the City of Elista
Dr. Enebish N.
Renewable Energy Senior Specialist,
Ministry of Energy

POTENTIAL FOR LARGE-SCALE POWER GENERATION IN THE GOBI DESERT AND THE NORTHEAST ASIAN SUPERGRID

The Middle East is supplying about 89 percent of global demand for energy, while Japan is considered one of the most vulnerable countries in terms of energy security due to lack of natural resources, which limits its ability to generate its own energy sources.

CURRENT STATUS — ENERGY SECURITY

- In terms of energy security, Russia is the only country in the region with the capacity to export energy to other countries, whereas China, Japan, and the Republic of Korea.
- Japan is the second-largest importer of coal after China.
- In 2013, China was the second-largest crude oil importer in the world, and Japan was number three.
- In LNG imports, Japan is number one, and South Korea is number two.
- Korea imports 96 percent of its primary energy from abroad, and 82 percent of its oil imports are purchased from the Middle East (IEA, 2012a)
- Compared to other NEA states, South Korea and Japan are more vulnerable in terms of energy security, as they have almost no natural resources and both countries are highly energy dependent.

Figure 1. Energy security (world oil reserves by region)
PROJECTED INSTALLED CAPACITY AND GENERATION IN NORTHEAST ASIAN COUNTRIES, 2010-2030

<table>
<thead>
<tr>
<th>Energy</th>
<th>Installed Capacity (GW)</th>
<th>Generation (TWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal</td>
<td>24,285</td>
<td>14.34%</td>
</tr>
<tr>
<td>Oil</td>
<td>4,789</td>
<td>2.82%</td>
</tr>
<tr>
<td>Gas</td>
<td>2,300</td>
<td>1.35%</td>
</tr>
<tr>
<td>NRE</td>
<td>5,710</td>
<td>3.33%</td>
</tr>
<tr>
<td>Total</td>
<td>37,294</td>
<td>21.76%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Country</th>
<th>Installed Capacity (GW)</th>
<th>Generation (TWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>691,970</td>
<td>41.00%</td>
</tr>
<tr>
<td>Japan</td>
<td>1,332,894</td>
<td>39.00%</td>
</tr>
<tr>
<td>Korea</td>
<td>1,249,264</td>
<td>20.00%</td>
</tr>
<tr>
<td>Total</td>
<td>3,273,133</td>
<td>50.00%</td>
</tr>
</tbody>
</table>

Source: Gobitec and Asian Super Grid for Renewable Energies in Northeast Asia, 2014

Table 1. Installed capacity and generation of energy in Northeast Asian countries

ENERGY CONSUMPTION BY REGION, 1990-2040

Global energy demand is expected to increase more than 50% by 2040, with largest increase in Asia, 2/3 of it in Northeast Asia.

Figure 2. Energy consumption by region 1990-2040

According to current projections, Asia will be responsible for about 50 percent of global energy consumption, 20 percent of which will be attributed to rapidly developing countries of the Northeast Asian region. According to energy sector research conducted by the Asian Development Bank, Asia is currently responsible for 34 percent of global energy consumption. This share is projected to reach 51 percent by 2035. Given that the
the economies of Northeast Asian countries are growing rapidly, energy consumption in this region will increase significantly as well. In addition, countries of this region import coal, natural gas, and oil from other countries. Growing energy consumption in this region creates a necessity to ensure energy security in the region. Therefore, creating renewable energy sources based on local resources available in the region is becoming a critical issue that needs to be addressed immediately.

In the past 10 years, there have been significant technological advancements in the field of renewable energy in countries such as China, South Korea, and Japan. During the past five years, China has placed a great amount of importance on this issue by adopting several state policies to support the development of the renewable energy sector. In order to meet the growing energy demand of the region, large-scale renewable energy projects need to be implemented in the very near future. These projects need to be large-scale projects spanning several countries of the region. With each coming year, renewable energy is becoming a larger part of the global energy sector. Compared to other renewable energy sources, high-capacity solar power plants are relatively challenging to construct. Construction of long-distance, high-voltage electric power transmission lines is difficult as well. Currently, countries from Africa and South Asia as well China have built such power plants.

**Figure 3. Role of renewable energy in development of energy industry**
The largest countries of the Northeast Asian region are setting ambitious goals in the field of renewable energy. For example, China is planning to supply 15 percent of its total energy demand from renewable energy sources, and almost 50 percent of its total demand by 2050. As for Mongolia, according to the recently approved state policy on energy, our country has set a very ambitious and bold goal of having 30 percent of total energy consumption supplied through renewable energy sources by 2030. In order to achieve this goal, Mongolia has planned several large projects, such as improvement of electric power transmission lines, increase in overall capacity of power lines and the central energy grid, and establishment of a high-voltage electric power supergrid.

The concept of a supergrid has already become well known in Europe. The European supergrid is a high-voltage, direct-current network connecting offshore and onshore supernodes, located in European countries, that collect renewable energy and deliver it to the existing high-voltage grid on land. There are high-capacity grids located in Northern Europe capable of importing high-voltage electric power from offshore supernodes (Figures 4 and 5).

**Figure 4.**
THE SEATEC Initiative (NORTHERN EUROPE)

European offshore super grid: transmitting electricity through HVDC interconnectors within Northern Europe

![SEATEC Initiative Map]

Source: European Wind Energy Association (EWEA) 2009 / 2010

**Figure 5.**

As for Mongolia, President Ts. Elbegdorj proposed the Gobitec Initiative, a project to build solar power plants in Mongolia. It is a large-scale supergrid project with the goal of renewable energy production through photovoltaics in the Gobi Desert in Mongolia and China (Figures 6 and 7). By building solar plants and wind farms in some parts of the Gobi Desert, as well as in South Korea and China, the supergrid will allow our countries to generate energy and export it to other countries. The latest technological advances in the renewable energy field are being utilized in the implementation of this project. The proposed high-voltage, high-capacity, supergrid network will span Mongolia and other Northeast Asian countries.

**GOBITEC Initiative (NORTHEAST ASIA)**

Based on the more than 15 years of study by the IEA PVPS Task 8 research team, it was concluded that the Gobi Desert Mongolia and China is one of the best candidate sites for VLS-PV systems to be integrated to the regional network for Northeast Asia.

![Gobitec Initiative Diagram]

The Gobitec project, aims to realize establishment of VLS-PV & LS-CSP and wind power plants in the Gobi desert, which could be integrated in to the Northeast Asia regional network. Gobitec is a kind of project that has not been realized before in this region.

**Figure 6.**
Core technologies
- Large Scale RE power generation in Gobi desert
- IT, ESS, HVDC, etc.
- Electricity transmission through connected grid to each country

*Figure 7.*

Supergrid projects use high-voltage direct-current (HVDC) technology for electric power transmission, a technology which has been developing rapidly in recent years. Figure 8 shows HVDC systems planned for commissioning for the period of 2012-2020. Currently there are about 400,000 km HVDC grids in the world, 226,000 km of which are located in India.

**HVDC SYSTEMS PLANNED FOR COMMISSIONING 2012-2020**

<table>
<thead>
<tr>
<th>Region</th>
<th>Number</th>
<th>Length of DC lines (km)</th>
<th>Total capacity (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>North America</td>
<td>29</td>
<td>26,992</td>
<td>75,150</td>
</tr>
<tr>
<td>Europe</td>
<td>23</td>
<td>5,772</td>
<td>20,220</td>
</tr>
<tr>
<td>China &amp; India</td>
<td>33</td>
<td>60,561</td>
<td>266,700</td>
</tr>
<tr>
<td>Rest of World</td>
<td>12</td>
<td>25,120</td>
<td>37,110</td>
</tr>
<tr>
<td>Total</td>
<td>97</td>
<td>118,445</td>
<td>399,180</td>
</tr>
</tbody>
</table>

Source: Navigant Research, 2014

*Figure 8.*
In recent years, China has conducted several major research projects to explore energy production from solar and wind power sources, especially from solar plants in the Gobi region. China has substantial experience in the field of HVDC technology, and has created about 2000 km of grids on its territory. China is currently implementing several new projects to create more supergrids. There are many solar plants and wind farms based on these grids in northern and western regions of China (Figures 9 and 10).

**Figure 9.**

**CHINA UHVDC PLANNING**

![UHVDC Planning Map](image)

By 2030, China has planned to construct 27 UHVDC links, and planning to form a strong and smart power grid in China

**Figure 10.**

**ELECTRICITY TRANSMISSION FROM LARGE-SCALE RENEWABLE-ENERGY POWER PLANTS IN CHINA**

China has built several long-distance HVDC lines to connect large-scale hydro, and newly introduced wind and solar Giga-plants in northwest and northern China, to industrial centers in the south
Energy import and export is currently occurring small scale in three places; however, it is primarily limited to bilateral agreements with the neighboring countries of Russia and China.

**Figure 11.**

**FUTURE INTEGRATED ENERGY SYSTEM OF MONGOLIA – PROPOSED OPTION**

Figure 11 displays the current state of the integrated energy system of Mongolia, and Figure 12 shows a proposed option for the system, including the location of energy plants and power lines, if the Northeast Asian supergrid project is implemented in Mongolia.

To summarize, Mongolia has great potential for energy production from the solar and wind power resources of the Gobi region. In order to harness the full potential of renewable energy...
resources from the Gobi Desert, our government needs to establish policy-level energy cooperation with other countries of the Northeast Asian region and improve the regulatory and legal framework to support this field. As a result, we could have a supergrid system that would facilitate production and transmission of energy between countries of the region and significantly contribute to meeting the rapidly growing demand and consumption of the energy. As mentioned before, China already has a great deal of experience and expertise in this field, and it can share its experiences and lessons and help to establish supergrids and long-distance power transmission lines crossing international borders. Last but not least, I would like to strongly emphasize that we critically need more regional energy integration in Northeast Asia.

Thank you for your attention.
Thematic Meeting on Urban Green Growth

Dr. Gankhuyag D.
Chief Executive Officer, Clean Energy Asia LLC, Newcom Group, Current State of Energy Sector in Mongolia

FUTURE OF CLEAN ENERGY

Currently, the total energy capacity of Mongolia is measured at a little over one gigawatt. In contrast, China generates over 120 megawatts from wind power alone. The present state of the energy sector in Mongolia is one of great vulnerability, given that about 20 percent of total energy demand is supplied by energy imported from Siberia in Russia. Primary users of this energy are large-scale coal mines located in Umnugovi province, and the Oyu Tolgoi mine. Because of the large amount of energy imported from abroad, Mongolia’s energy security is dependent on neighboring countries. Furthermore, due to lack of energy resources, in case of urgent demand, dependence on the energy supply systems of neighboring countries will grow even more.

PRESENT SHARE OF RENEWABLE ENERGY IN ELECTRICITY GENERATION

<table>
<thead>
<tr>
<th>Power Plant</th>
<th>Capacity</th>
<th>Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>ChPs</td>
<td>1054.3 MW</td>
<td>89.19%</td>
</tr>
<tr>
<td>Renewable power plant</td>
<td>81.7 MW</td>
<td>6.91%</td>
</tr>
<tr>
<td>Diesel power plant</td>
<td>46 MW</td>
<td>3.89%</td>
</tr>
<tr>
<td>Total</td>
<td>1182 MW</td>
<td>100%</td>
</tr>
</tbody>
</table>

(Source: National Dispatching Center, Ministry of Energy (2014))

Electricity generation in 2014

- ChPs: 5191.3 million kWh – 78.46%
- Solar PV Systems: 0.6 million kWh – 0.006
- Diesel Power Plant: 8.2 million kWh – 0.12%
- Hydropower Plant: 66.3 million kWh – 0.97%
- Wind Farm: 125.4 million kWh – 1.84%
- Total Local Generation: 5392.0 million kWh – 79.47%
- Import (Russia & China): 1386.0 million kWh – 20.53%
- Total: 6788.0 million kWh – 100.0%

(Source: Energy Statistics, published by the EPC, 2014)
Within the framework of the government policy to address environmental impact issues, several projects were initiated and are now being implemented. One of the projects was a 50-megawatt wind farm in Salkhit, implemented by Newcom Group. Currently, Salkhit wind farm is the only renewable energy plant connected to the central energy grid, whereas other renewable energy plants generating power from solar and other sources are not connected to the central grid. Therefore, Mongolia needs to liberalize its foreign investment policy and create favorable conditions in order to attract the foreign investment required for development of the renewable energy sector. It goes without saying that Mongolia is still rich in natural resources. It is known for being one of the world’s leaders in known coal reserves. Most of Mongolia’s energy consumption is concentrated in Ulaanbaatar city, because almost half of Mongolia’s population, which has recently reached three million, resides in the capital city.

**PLANNING OF CHP5 (COMBINED HEAT AND POWER) PLANT PROJECT**

Even though, in past 30-40 years, Mongolia has heavily invested in its power plants, given that they have been operating since the 1960s and 70s, all of them are outdated and almost obsolete. Therefore, we need to build new power plants based on environmentally friendly technology. The government has initiated and is starting to implement a project to build a combined heat and power (CHP) plant No.5. After lengthy discussions and arguments about the location of the proposed power plant No.5, it was agreed that the city of Ulaanbaatar needs at least one more large-scale power plant in order to meet its energy demand, and the decision was made to launch the implementation of the project. The purpose of the project is to create a new power plant, based on water-saving technology, that will supply at least 50 percent of the city’s energy needs. Ulaanbaatar city is already facing a water supply issue, which is becoming more critical. Therefore, a decision was made to introduce water-saving technology for power plant No.5.

The currently operational power plant No.4 was built in the 1960s, and at the time it was considered an environmentally friendly project based on the latest technological advances.
Based on project estimates, compared to power plant No.4, the newly proposed power plant No.5 will use 7.5 times less water. The new power plant will use combined heat and power technology that is now widely used in many countries around the world, and that has been internationally recognized for its numerous advantages. Most important is that the new plant uses best-quality coal, so there will be minimal environmental pollution, especially emissions of pollutant gases.

**EMISSION OF POLLUTANTS IN THE FLUE GAS**

- Pollutant emissions of CHP5 will be much lower than existing CHPs.
- It will be lower than the requirements of the World Bank standard.

<table>
<thead>
<tr>
<th>Emission indicator for 1 MWh electricity generation (content in the flue gas)</th>
<th>WB(*)</th>
<th>CHP5</th>
<th>CHP4</th>
<th>CHP3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Particulate matter (mg/Nm³)</td>
<td>30</td>
<td>30</td>
<td>150-200</td>
<td>1000-1200</td>
</tr>
<tr>
<td>SO₂ (mg/Nm³)</td>
<td>200</td>
<td>150</td>
<td>1200</td>
<td>850</td>
</tr>
<tr>
<td>NOx (mg/Nm³)</td>
<td>200</td>
<td>150</td>
<td>540</td>
<td>400</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Emission indicator for 1 kWh of electricity generation /content in the flue gas/ (gr/kWh)</th>
<th>CHP2</th>
<th>CHP3</th>
<th>CHP4</th>
<th>CHP5</th>
</tr>
</thead>
<tbody>
<tr>
<td>SO₂</td>
<td>14.10</td>
<td>5.00</td>
<td>4.16</td>
<td>0.94</td>
</tr>
<tr>
<td>NOx</td>
<td>16.51</td>
<td>5.85</td>
<td>4.86</td>
<td>1.10</td>
</tr>
<tr>
<td>Particulate matter</td>
<td>65.71</td>
<td>11.90</td>
<td>9.90</td>
<td>0.02</td>
</tr>
</tbody>
</table>

**Figure 2.**

Air pollution is one of the major issues faced by Ulaanbaatar city. Figure 2 displays the total amount of air pollution generated by currently operating power plants. The Asian Development Bank, NCM Bank of Korea, and other larger funding organizations are planning to finance the power plant No.5 project. Very strict requirements need to be fulfilled by the project in order to become eligible for such a large investment from various funders, and one of the main requirements is implementation of environmentally friendly technologies. Even though Mongolia is intending to introduce technological advances that meet these requirements and criteria, specifications and performance indicators selected by us are better than the standards set by the World Bank (See Figure 2).
ENERGY GENERATION EFFICIENCY

<table>
<thead>
<tr>
<th>Indicator</th>
<th>CHP5 (design)</th>
<th>CHP4 (in 2014)</th>
<th>CHP3 (in 2014)</th>
</tr>
</thead>
<tbody>
<tr>
<td>In electricity generation (gr/kWh)</td>
<td>263</td>
<td>303.0</td>
<td>359.3</td>
</tr>
<tr>
<td>In Heat production (kg/Gcal)</td>
<td>159.58</td>
<td>174.3</td>
<td>180.2</td>
</tr>
</tbody>
</table>

Lower fuel consumption compared to other CHPs.

- Conditional fuel – artificial unit: a fuel with a calorific value of 7000 kcal/kg
- Used for comparing consumption of coals with different qualities

<table>
<thead>
<tr>
<th>Indicators</th>
<th>CHP5 (design)</th>
<th>CHP4 (in 2014)</th>
<th>CHP3 (in 2014)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal use ratio</td>
<td>Baganuur 30%</td>
<td>Baganuur 53%</td>
<td>Baganuur 100%</td>
</tr>
<tr>
<td></td>
<td>Shivee-Ovoo 70%</td>
<td>Shivee-Ovoo 47%</td>
<td></td>
</tr>
<tr>
<td>Combined heat and electricity generation efficiency, %</td>
<td>68%</td>
<td>40.6%</td>
<td>38.0%</td>
</tr>
</tbody>
</table>

Although, majority of coal will be low quality Shivee-Ovoo coal the energy generating efficiency will be much higher than other power plants.

Proposed power plant No.5 will consume less coal compared to currently operating power plant No.4, but it will generate the same amount of energy. The new plant will use coal from Shivee-Ovoo and Baganuur, and according to the project plan, the efficiency level of the new power plant will be 40 percent higher than the currently operating power plants. Not only will the power plant emit fewer toxic and poisonous gases and contaminants, but it will use the latest air exchange and ventilation systems.

SIGNIFICANTLY LESS USE OF WATER

- **CHP4**
  - **Water-cooled cooling system**
  - Installed capacity - 580 MW in 2012
  - Annual water consumption 9,730,867.24 m³ (in 2012)
  - Make-up water for district heating is not included.

- **CHP5**
  - **Air-cooled cooling system**
  - Installed capacity – 450 MW
  - Annual water consumption – 1,332,000.00 m³ Make-up water for district heating is not included.
  - About 7.3 times lower compared to CHP4
CURRENT STATE OF RENEWABLE ENERGY SECTOR

The next issue concerns renewable energy. As for Mongolia, there are many opportunities related to the generation of renewable energy, especially when it comes to wind power. By carrying out large-scale projects in this sector, Mongolia can start exporting clean energy, generated from wind power, via the Asian Supergrid.

About 80 percent of our country’s exports come from the mining sector. Because this dependence on one sector can be an economic weakness, the government of Mongolia is implementing several policies to support diversification of the economy. One policy to increase exports is development of the renewable energy sector and increasing exports of renewable energy.

CLEAN ENERGY PROJECTS IMPLEMENTED AND DIVERSIFYING THE ENERGY MIX

The renewable energy sector of Mongolia consists of numerous, small-scale solar and hydropower plants and the recently established Salkhit wind farm, located seven km from Ulaanbaatar city (Figure 5).
**LAWS, PROGRAMS, AND POLICY DOCUMENTS PROMOTING CLEAN ENERGY**

<table>
<thead>
<tr>
<th>No.</th>
<th>Name of document</th>
<th>Approved</th>
<th>Amended</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Legal Framework</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Energy Law of Mongolia</td>
<td>2001</td>
<td>In 2015</td>
</tr>
<tr>
<td>4</td>
<td>Concession Law</td>
<td>2010</td>
<td>in 2010</td>
</tr>
<tr>
<td>5</td>
<td>Energy Conservation and Efficiency Law</td>
<td>2015</td>
<td></td>
</tr>
</tbody>
</table>

**Development Programs**

<table>
<thead>
<tr>
<th>No.</th>
<th>Program</th>
<th>Year</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>“100,000 Solar Ger” National Program</td>
<td>1999</td>
<td>implemented</td>
</tr>
<tr>
<td>8</td>
<td>Millennium Development Goals-Based Comprehensive National Development Strategy of Mongolia</td>
<td>2007</td>
<td></td>
</tr>
</tbody>
</table>

**Government Policy Document**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>State Policy on the Energy Sector</td>
<td>2015</td>
<td></td>
</tr>
</tbody>
</table>

• Some programs were revoked, and goals stated in them were consolidated and included in the “State Policy on the Energy Sector,” approved in 2015.

*Figure 6.*

**GOVERNMENT POLICIES ON RENEWABLE ENERGY**

The government fully supports clean technology and renewable energy through its policies, and has issued and approved relevant laws and regulations (See Figure 6). Most recently, two months ago, the Parliament of Mongolia approved the state policy for the energy sector. This policy promotes several major goals on how to regulate the energy sector in an environmentally friendly manner. One of the objectives of the newly developed policy states that renewable energy will supply 20 percent of the total energy demand by 2020, and 30 percent by 2030. The Gobitec Initiative has also been included in the policy document. In order to attract foreign investment and encourage participation and involvement from the private sector, taxation and the legal environment need to be improved significantly. As you know, local power plant No.4 is currently responsible for supplying a major portion of the total energy demand of the country. Therefore, it is essential to ensure the sustainability of these operations and proposed initiatives.
NIIGATA CITY: COMBINING THE BEST OF URBAN AND RURAL LIFE TO CREATE A HEALTHY LIVING CAPITAL

NIIGATA

Let me introduce you to Niigata, the capital and the most populated city of Niigata Prefecture. This city is a prime example of how urban development and rural agriculture coexist in an environmentally friendly manner. Our city has a population of 810 thousand, and total area of 726 square kilometers. Niigata established a sister-city relationship with Harbin city of China, and signed numerous cooperation agreements with Seoul city of South Korea.

At this year’s meeting of ministers of culture from Japan, China and Korea, Niigata was selected as one of three Culture Cities of the East Asia. Niigata now will represent Japan in the region and hold various cultural and artistic events to promote cultural development throughout the region. As one of three Culture Cities of East Asia, Niigata is striving to promote and convey the highly diverse cultures of East Asia around the world.

The longest river of Japan, the Shinano River, and the second-largest river of Japan, the Agano River, flow through the city of Niigata. Our city is located along the banks of these rivers on an even terrain of sand and soil formed by the river flow. The city is surrounded by hills and mountains, and with the help and support of our citizens, we preserve and maintain the green environment.

Earlier, because of its low elevation, our city constantly faced challenges related to loss of forest and agricultural land...
due to floods and swamps. We addressed this issue by taking specific measures such as building drains and gutters in Shinano River basin areas, and drying swamps near Agano River delta areas, in order to create land for agriculture and crop farming.

On the other hand, there are sand dunes in Niigata, stretched along the ocean shore. Many years ago, croplands and homes of residents could easily be covered in sand by strong winds and storms. Efforts of local people to prevent this natural disaster began about 300 years ago by building walls and fences from bamboo and wicker to stop sand movement carried by winds and gusts. We have also built specifically shaped dams and barriers to reduce the sand hazard even further. In addition, a forest buffer zone was established to prevent sand movement. The city administration declared this forest a special protected area. The advantages and benefits of forest buffer zones are conveyed to the citizens on a regular basis, and forests are protected with their active participation and involvement.

The symbol of our city is the Bandai Bridge, which connects our two rivers. The name of the bridge means “forever” or “eternity” and symbolizes the eternal prosperity of the city. The bridge, with six arches, was constructed in 1929, and was designated a nationally Important Cultural Property in July 2004. It was strong enough to withstand collapse during the 1964 Niigata earthquake of 6.5 magnitude. The dam protecting the bridge is not only a visually appealing construction gracing the banks of the river, but also provides protection from floods, and is the first-ever dam in the world with a 50 degree slope. The dam was developed as a green area, and is regularly visited by citizens for recreational purposes. Bandai Bridge is directly connected to the main street of the city, and the large area covered by the bridge contains 940 sakura, or cherry blossom trees, and is decorated with various streetlights.

Students from local schools come to this particular area to study. Also, there are numerous restaurants and cafes for youth. Various artistic and cultural events are common in this area as well. Citizens of our city like to visit this area to relax and have a rest. It is also one of the main tourist attractions.

In order to develop and promote green areas and reduce emissions of greenhouse gases, we are growing lawns on the roofs of buildings and creating green curtains over the walls of buildings.
using climbing plants. We have developed many initiatives to increase the participation and involvement of citizens in these efforts.

About 48 percent of our city’s territory is used for agriculture and crop farming. Our city fully meets its demand for food products, but we have set various objectives to coordinate other types of agricultural activities. We called this project the New Food Valley project. In May of 2014, the government of Japan supported our initiative by declaring Niigata city a center of innovation in the field of agriculture and crop farming, as well as a National Strategic Special Zone of Japan. As one of the major suppliers to the Japanese food market, we will use these new opportunities to organize meetings and conferences for global promotion of the food culture, agriculture, and crop farming of Japan.

Let me briefly present the urban development and planning of Niigata city. Japanese society is facing numerous issues such as old age and the environment. Our city is facing these challenges and difficulties as well. The proportion of automobiles participating in city traffic has increased from 52 percent in 1988 to 69 percent this year. The number of automobiles per household has reached 1.59, showing how overly dependent our lives have become on cars. In addition, the number of passengers travelling by bus has decreased by 40 percent in the past 10 years. By 2020, the number of people over 65 years of age will increase by 50 thousand, and the percentage of senior citizens is projected to exceed 30 percent. The number of senior citizens will increase in the future, and they will have no choice but to use public transportation. This can lead to a shortage of public transportation as well failure in quality of service.

Based on current conditions, as well as assumptions and trends observed today, we are developing strategic plans for Niigata city. In order to ensure access to quality public transportation between the city center and rural areas with agriculture and crop farming, we have identified three factors that require our attention. First, we must ensure access to public transportation throughout the city. Second, we must strengthen and improve public transportation from the suburbs to the city center. Third, we must further improve public transportation services in the city center itself. Implementation of the first stage of the plan started recently, on September 5, and a new express
bus service, Bus Rapid Transit, was introduced. According to the plan, the entire framework, including schedules, service networks, etc., will be established to ensure access to and delivery of public transportation for the next 20-30 years.
We have travelled six thousand kilometers to come to this forum. Please allow me to say a few words about my city and my people. Our Republic lies on the vast lands along the shores of the Caspian Sea, on the ancient route of the Silk Road. As we know, the Silk Road, which connected East and West, was not only the path for migrating nations, but also a field for trade and commerce, as well as the battlefield of many wars. This road that connected two continents and two civilizations for many centuries has also defined our nation’s development and way of life. On our current territory, Kalmyks settled in the beginning of the 17th century. The people of Kalmykia were originally western Mongols, or the Oirads. Four hundred years ago, some of them started their journey from Mongolia to the west. Millions of herds and five hundred thousand people simultaneously moved to the west, and at the end of this great move, we have settled on the land we live on today.

The city of Elista is the capital of the Republic of Kalmykia of the Russian Federation, and just a few days ago we celebrated the 150th anniversary of our city. Elista is the headquarter of our government. It is the center of our economy, culture, education, and science. Lying on the shores of the Caspian Sea, the Republic of Kalmykia is the only Buddhist Asian country on the European continent. Elista is a diverse city, home to over 80 nationalities. The city’s development is defined by the unique features of our economy, geopolitics, natural resources, investment, and
geographic location. In the 1960s and 1970s, our city saw the rapid growth of industries and construction of apartment buildings, and by now we have reached 23.7 square meters of housing per capita. On the economic performance side, Elista is a leading city in Kalmykia today. It also leads in investment, trade, construction, and other socio-economic indicators. The city is divided into ten districts, and each district has tall modern buildings. Most apartments are connected to central power, water, and sewerage systems. Environmental safety and efficient use of natural resources are the primary objectives of our policy. We strive to maintain eco-balance while continuing our economic development. Elista’s policies, laws, and regulations are aimed towards improving the livelihoods of our residents, preserving nature, and ensuring ecological balance. Civil society and individuals are encouraged to take action in the same direction. Our country is rich in natural resources, especially in oil and natural gas. But Kalmykia is one of the driest countries in the area, with annual precipitation of 210-240 millimeters. And our city is located in an area with the extreme continental climate and scarce water resources. Water supply is the biggest issue in our city. Even though we operate seven water supply plants, they are in need of repairs and restoration. The government and the provincial authorities are assisting us in this regard. For example, on the initiative of President Putin, additional water sources will be supplied to our city from the Putumsk water basin. The water supply plant is now being constructed by the private sector through a concession contract, and the city of Elista will soon receive much awaited water.

One of the biggest ecological problems for us is waste. The amount of waste produced by our city is increasing by six to eight percent annually. There is an immediate need to address the issue of proper management of industrial and household waste. The capacity to burn, sort, and recycle hard waste needs to be ensured, and the government and the city are putting their best efforts into this work.

We are working on creating additional power sources by establishing solar power stations in 100 hectares of land. Topics discussed at this forum are very important to our city and our country. I think that all participants should use the information and knowledge gained from this forum to solve issues faced by our cities and serve the interest of city residents. I wish you all good luck.
The need to design energy efficient buildings arises from a variety of external pressures: legislation, emissions of ozone depleting gases, public awareness of our pollution of the planet, among others. Experts in their respective fields contribute articles ranging in scope from issues of basic competence to advanced design, enabling designers to obtain insight into the entire gamut of the subject and, at the same time, provide sufficient back-up references for individuals to follow up areas of special interest.

Moderator:
D. Otgonbaatar, Head of Project and Cooperation Department, Governor’s Office

Speakers:
The Urban Nexus: Innovative Multi-Sectoral Approach Promoting Green Growth
Ms. Ruth Erlebeck, Regional Project Director of Urban Nexus Project, GIZ

Green Development: Global Challenges, Local Solutions
Ms. Jennifer Butz, Country Portfolio Director, GGGI

Karamay City: Green Infrastructure
Honorable Liu Botao, Deputy Mayor of Karamay
Urban Nexus is all about water, energy, and food. This project is financed by the German Federal Ministry for Economic Cooperation and Development. It is one of the rare regional projects of the GIZ. Thus, it’s not limited to one country. The project is based in Bangkok, where our political partner is UNESCAP. UNESCAP has outreach to 36 countries in the Asia-Pacific region. Our implementation partner is ICLEI – an association of cities. This regional project of GIZ covers 11 cities in 10 countries. Ulaanbaatar plays a very prominent and very active role in this project.

It all began in August 2011 at the conference in Bonn organized by ministries. Afterwards, Urban Nexus was taken to the Rio +20 conference and presented in discussions there. The rationale of the project is that if we continue with existing production and consumption then we will face great deficiencies of water, energy, and food. By 2030, at the latest, we may have deficiencies of up to 30 percent. Therefore, these three sectors were selected as the core sectors of the Urban Nexus project. The project seeks to advise and change mind-sets by enabling parties to see sideways – in other words, to see wastewater not as a burden, but rather as an opportunity. For instance, wastewater can be used to generate energy, produce service water or
irrigation water, while the residue can be used in urban agriculture. In other words, the project seeks to close the loop by undertaking a cross-sectoral approach. Urban Nexus is gaining international recognition as it aligns with the Sustainable Development Goals and the Habitat III Agenda.

Cities present many opportunities and challenges. Cities occupy one-half to one percent of the land worldwide. Cities produce 70 percent of the GDP. Ulaanbaatar produces 65 percent. Cities account for over 60 percent of energy consumption worldwide, and for 70 percent of green house gas emissions. Cities are also responsible for 70 percent of global waste production. As Ban Ki-moon, secretary-general of the UN, noted, “Cities are where the battle for sustainable development will be won or lost.”

OBJECTIVES

According to UNEP’s 2011 definition “green growth” encompasses three elements – low carbon, resource efficiency, and inclusiveness. Inclusion of all groups is essential in the creation of resilient cities. All groups, especially the lower-income groups, should be included in decision making and implementation of green-growth initiatives. Green growth serves as the guiding principle for the Urban Nexus project.

The Urban Nexus project seeks to create resilient structures and sustainable cities through improvement of physical infrastructure, which entails introduction of innovative nexus technologies. Secondly, the project seeks to improve social infrastructure. This entails inclusion of all groups and parties, and elimination of segregation. Also under this objective, the project seeks to facilitate good governance and public participation.
Finally, the project encourages green economic growth through job creation and capacity building.

**APPROACH**

When introducing innovative engineering technologies, they cannot be simply brought in; they have to be adapted to the respective circumstances of each city and district. It has to be tailored to the institution and studied beforehand. Urban planning and the breaking open of silo thinking are needed to allow cross-sectoral teams to work together so that integrated solutions can be found. That’s why our nexus partner cities and Ulaanbaatar have created nexus task forces, where multiple sectors identify infrastructure projects. There are certain issues that cities on their own cannot address; thus, provincial, regional, and national players need to be involved. Cities need to seek solutions by looking beyond their national boundaries. Private, civil, and governmental sectors as well as academe play integral parts in ensuring sustainability. Universities and institutions of higher learning are important, as they shape the future players. The Urban Nexus project conducted preliminary feasibility studies—not long-term and costly studies, but short-term and fairly cheap ones.

**URBAN NEXUS PROJECTS**

*Physical Infrastructure*

In order to boost the energy efficiency of buildings, the project chose a building located in Bayanburd, Ulaanbaatar, that consumed 360 kWh/m² of heat energy per annum and reduced its energy consumption by 40 percent, to 240 kWh/m². The figures could have been further lowered if the water and heat could have been regulated. They are currently being regulated partially by opening and closing windows manually. An initiative known as the Mongolian German Eco-City is being implemented in cooperation with the city and the Ministry of Construction and Infrastructure. Under this initiative, new buildings with solar panels for floor heating and warm water provision were erected. The solar panels work for four to five years, and the heat consumption amounts to 120 kWh/m² per annum. On behalf of USAID, Urban Nexus did a thermo-technical rehabilitation of three schools in
Ulaanbaatar. Heat consumption was reduced by 50 percent in these schools. Prior to this upgrade, in harsh winter months, the teachers and the students studied in classrooms where the average temperature was around eight degrees centigrade. This naturally isn’t an adequate temperature to promote learning. Now, however, the classrooms are very warm and balmy, with average temperatures of 20 degrees centigrade and above. Aside from reducing energy consumption, the project seeks to introduce energy-plus houses.

Germany has erected hundreds of energy-plus houses. The energy-plus houses produce more energy than the household consumes. In other words, the house serves as a power plant. The energy-plus house utilizes chargeable cards, and was first launched in 2011. This house was tested on a family that lived there for two years to see if such a high-tech house is livable. After close monitoring, it was revealed that the house wasn’t meeting its 140 kwh/m2 goal. Thus, certain modifications were introduced to improve it. The energy-plus house is currently being adopted by the partner cities in Shandong province, China. This initiative will be undertaken in cooperation with private developers. The energy-plus house model can also be utilized on high-rise buildings. One such building is currently being erected in Frankfurt, Germany. Frankfurt is seeking to become the most climate neutral city in the world by 2050.

Innovative approaches to wastewater management are needed to adapt to a 21st century with global population growth, rapid urbanization, increasing consumption in emerging markets, and scarcity of key resources. Global changes make it important to think about energy and material cycles of wastewater streams. By closing the material cycles directly in residential areas, we could protect water resources and utilize wastewater to produce energy.

Alternative wastewater collection systems are being introduced. One such initiatives is the vacuum sewerage collection system. The vacuum sewerage system reduces the impact on the environment and has the lowest carbon footprint of any municipal sewerage system. The vacuum sewerage system collects wastewater by means of a vacuum, thereby minimizing environmental risks, emissions of methane gas, odor, diseases, and contamination. Currently, Da Nang, Vietnam, is utilizing this system. Floods occur in Da Nang frequently and wash up
everything, creating unhygienic situations. With this system, Da Nang will be able to produce food and energy and create a safe system free of contamination. The project is currently in its pilot stage, with 110 local households signed up as beneficiaries. The vacuum sewage system can also be applied on islands. Urban Nexus is currently seeking to do a trial in Ulaanbaatar, specifically at the khoroo level.

**Social infrastructure**

Aside from physical infrastructure, it’s essential to facilitate dialogue and communication. Urban Nexus introduced new formats to facilitate such dialogue and communication. The project holds national-local and subnational-local dialogues on case studies. Nexus partner cities meet twice a year for peer-to-peer learning and South-South dialogue. In these dialogues, the partner cities share their experiences and identify the best ways forward. Urban Nexus also promotes clustering and horizontal integration, by encouraging local governments to solve their infrastructure problems through cooperation beyond their administrative boundaries.

**URBAN SYSTEMS, CHALLENGES AND INNOVATION**

The concept of smart cities is about a multi-sectoral approach integrating different infrastructure systems to achieve resilience, climatic adaptation, energy and resource efficiency and e-mobility, and reduced costs by using synergy potentials, efficient and transparent administration, and public consultation. It is about optimizing synergies between sectors, identifying interlinkages, and economizing on the use of water, energy, and land.
Linear economies which work under the mechanism of “take, make, dispose” cannot cope with increasing shortages of raw materials and natural resources. Green economies should be circular, and should work under the principle of “make, use, return, reuse” to improve resource productivity.

The aim of urban mining is to recognize recyclable materials such as metals, glass, construction materials, electrical household devices, mobiles, etc. and reuse them, as most of them are of significant value. Landfills of most cities are warehouses of precious mineral resources. Urban mining responds to the shortages of key resources.
Global Green Growth Institute (GGGI) was founded at the Rio +20 conference. This was originally an initiative of the Republic of Korea and President Lee Myung-bak. GGGI presented as an international organization in 2012. So GGGI is almost three years old. Greening and green growth was a priority well before GGGI existed. Nevertheless, GGGI’s role and function is to aggregate the global experience around green growth and to share that out to nations, regions, and increasingly to cities where GGGI is working. GGGI’s vision is a resilient world of strong, inclusive, and sustainable growth. This echoes UNEP’s definition and Urban Nexus’s definition of what green growth is. It’s not only economics, it’s not only sustainability, and it’s not only participation. A way to integrate all three dimensions simultaneously needs to be found. In order to do that, GGGI brings in various entities including international, intergovernmental, private sector, and civil society organizations, journalists, and communities.

In three years, GGGI achieved UN observer status. GGGI also is eligible for ODA, which means the contributions that go to GGGI from a country count as their international commitment for overseas development assistance. Currently, C40 is one of the non-state council members of GGGI, which means that GGGI is advised by and constantly informed of the challenges as well as the opportunities that municipal authorities face around the globe. Last year in C40, GGGI undertook a strategic planning
effort, which actually began in Ulaanbaatar in a participatory conference and continued across all 24 countries that are current members of GGGI. In that strategic plan, four key sectoral themes were identified. These include energy, green city development, land use, and water. These aren't just stand-alone sectors; by design, they're integrated and cross-cutting, because that's the nature of green growth, and that's the challenge that each one of us faces, whether we're looking at district, municipal, regional, or international level.

GGGI IN MONGOLIA

GGGI has been proud to be in Mongolia collaborating with government authorities since November 2011, when the first MOU was signed. In 2012, early governmental consultation identified energy and transportation as priority themes, as Mongolia was in the process of developing its own national green development strategy planning and discussions. In July 2013, Mongolia ratified the GGGI establishment agreement. In July 2014, Mongolia's GGGI membership came into force. GGGI held a planning conference last March, which demonstrated how it sought to align its global strategic priorities with the priorities of each one of the 24 member countries. GGGI brought together a number of participants from ministries, the private sector, and civil society.

WHY CITIES MATTER FOR GREEN GROWTH

Urbanization offers opportunities to learn from the regional and global level. High density offers greater efficiencies, greater complexities, and more need for integrated management systems and structures. For Mongolia, ger districts represent poverty and social exclusion. They also represent a population that moved to a place in search for greater opportunities. So there's a motivated population for all of our countries, but particularly among and throughout Asia, vulnerability to climate change, in particular in the context of a four degree temperature rise, is a big challenge.
Why Cities Matter for Green Growth

Urbanization-growth correlation
Income is correlated with urbanization levels
Productivity is higher in urban areas

CITIES:
• Occupy only 2% of the Earth’s land surface,
• House more than 50% of the world’s population,
• Account for ~70% of global GDP,
• Consume more than 60% of global energy and produce 75% of carbon emissions.

OPPORTUNITIES:
• Fast speed of urbanization = urgent need to adjust or learn
• High density, more & bigger cities = new management challenges
• Large ger districts = poverty, social exclusion
• High vulnerability to climate change

GGGI EFFORTS IN MONGOLIA

The urban challenges are complex. That’s why responses need to be layered and coordinated. Similarly to “think globally and act locally,” “think sectorally and act collaboratively” will generate better planning, better implementation, and greater ability to monitor the impact of our combined efforts. GGGI conducted transport research in 2012 and 2013, and in June this year, GGGI released the results at a conference for interested parties. Late last year, GGGI worked to support green development action plans that helped to inform the final presentation to the cabinet on how to move forward – how to move from paper to action – particularly around the energy sector and transportation.

GGGI also presented, in January 2014, four different energy scenarios, using a data set that was cultivated in Mongolia in collaboration with multiple ministries as well as the private sector and civil society. This data set is very unique and has been factored into and filtered through a software program called Long Range Economic Alternative Planning system, or LEAP. The LEAP system was used to continue the analysis and cost-benefit analysis so that decision makers can plan over time what investment costs really look like in a 15- to 20-year investment cycle. By understanding the immediate and long-term implications of investments, GGGI hoped to improve Mongolian financing proposals to better secure financing. It’s not lack of ideas that’s limiting access to climate
finance; it’s not even limited climate finance availability. Instead, there is often a gap between those ideas and the due diligence and rigor of analysis needed to create investment memos that will be sufficiently compelling to investors, that will allow them to understand the risks and opportunities and calculate their return on investment. This is the role that GGGI is playing – green investment advisory. GGGI is undertaking this initiative globally.

Similar to the work that GIZ and USAID did several years back in Ulaanbaatar schools, GGGI has been working with the Ministry of Green Development as well as the Ministry of Education on designing a public kindergarten. This will be a very highly efficient school that meets all specifications of the Ministry of Education. GGGI is currently working with cost modelers to identify locally available materials, because if green inclusiveness is part of green growth, GGGI wants to look at opportunities for green job creation, value chains, and supply chains for these ideas. Finally, GGGI has been working since 2014 with the National Statistics Office (NSO) to support Mongolia’s green indicators effort, because GGGI has to value what it measures and measure what it values. For instance, in Korea, there are 27 indicators that define green growth. However, it took a lot of negotiations and planning to identify those 27 indicators. So GGGI is working with NSO and the Ministry of Green Development to identify what that subset might look like here in Mongolia. There are many opportunities. Every challenge has opportunities: policy targets for inclusive growth, energy efficiency incentives, water information and technology platforms, and greenfields infrastructure.

One of the challenges nowadays is that the data, information, and research are rather overwhelming. There’s an avalanche of information. One of the things that GGGI has done, in collaboration with the World Bank and OECD, is create a green growth knowledge platform, which is available at gggkp.org. This is a global platform that helps to make access to research and case studies more rational and efficient. Research on its own will not suffice; practical applications and on-the-ground experiences are needed, especially at municipal levels, so we encourage use of the platform.

LOOKING FORWARD

GGGI and the government of Mongolia have undertaken a five-year, country-planning framework effort. Now GGGI has
a draft that it will be discussing with government. The strategic framework will help define the collaboration between GGGI and the government looking five years into the future. Defined in the country-planning framework are a number of priorities, including sub-sector analysis of heating system options, and education infrastructure finance (scaling the kindergarten model, given that Mongolia is in need of school facilities across the nation). GGGI is working on a water information system that previously was divided across nine different agencies, working to integrate it into a single data set, which will allow it to be further improved and made more efficient. GGGI is working on policy and action planning. Any urban development policy should be complemented by rural development programs, or it will lead to higher rates of migration. For that reason, GGGI is working with Ulaanbaatar and aimag representatives to facilitate this. Finally, policies, plans, standards, and finances frame green growth development, but each requires information, action, and, above all, accountability. For that reason, information flow is critical.

**CONCLUSION**

To conclude, a lot of green growth challenges mirror the challenges that Mongolia faced when it first transitioned to a democratic system. How do we improve structure? How do we improve communication laterally and vertically? How do we improve the access and flow of information across government dimensions? Thus, it is encouraged that Mongolia use the lessons learned during the transition period over the past 25 years, facilitate and fast-track the adoption of green development and growth nationally, and share those experiences regionally and globally.
The name Karamay is derived from the word meaning “black oil.” It is a relatively new city that was founded in 1955. Our main policy in urban development is to be a leader of green infrastructure. We build green walls on the sides of highways, so the dust from the roads is absorbed without reaching the city. Karamay is located in the Gobi desert, and as such, we have always emphasized greening of our environment. Especially, it is important for us to build green plantations along the roads and other infrastructure. Planting trees has been our practice ever since the city was founded, and now all 450,000 residents of the city take part in this. As of 2014, the city’s green plantations cover a total of 150,000 hectares, which is 38.9 percent of the total city territory.

Planting trees and supporting forestation is the key to increasing groundwater resources and increasing absorption of air pollution. Today, we have nurseries for 110,000 trees, for 10,000 hectares of plantation land.

The governments of our two countries jointly proposed the initiative to build the new Silk Road. On behalf of Karamay city, I would like to say that we will be happy to consult you on green development issues. And I welcome you all to our city!
Growing pressure on water resources – from population and economic growth, climate change, pollution, and other challenges – has major impacts on our social, economic, and environmental well-being. Many of the most important aquifers are being over-pumped, causing widespread declines in groundwater levels. The World Economic Forum 2015 Global Risk Report identified water crises and water security issues as the top, both in terms of probability and impact. This session will discuss the various sustainable water management scenarios in the region.

Moderator:
Dr. Batjargal Z., National Focal Point, UNFCCC & IPCC, Former Minister of Environment

Speakers:
The Involvement of 2030 Water Resources Group in Improvement of Water Resources Management in Ulaanbaatar city
Dr. Dorjsuren D., Representative, Water Resources Group, IFC

Urban Water Management in Northeast Asia
Ms. Batimaa P., Team Leader, Mongolia Water Security Assessment, ADB TA project

Integrated Water, Sanitation, and Sewage Treatment Management
Ms. Oyungerel Ts., Member of the Parliament of Mongolia
Dr. Dorjsuren D.
Representative,
Water Resources Group, IFC

THE INVOLVEMENT OF 2030 WATER RESOURCES GROUP IN IMPROVEMENT OF WATER RESOURCES MANAGEMENT IN ULAANBAATAR CITY

2030 WATER RESOURCES GROUP (WRG)

The 2030 WRG partners with the World Economic Forum and more recently with the International Finance Corporation (IFC) to address global water resource challenges, particularly focusing on solving freshwater availability issues through resource management.

2030 WRG ENGAGEMENT IN MONGOLIA

During his numerous visits to the World Economic Forum, President of Mongolia Elbegdorj Tsakhia has been actively engaged in the 2030 WRG’s activities, and has requested assistance in improving water management systems in Mongolia. This in turn resulted in the signing of a memorandum of understanding between the 2030 WRG and the Ministry of Environment and Green Development of Mongolia in 2013. Prior to commencing its operations, 2030 WRG conducted an analysis of Mongolian water management conditions to determine where to start. This analysis identified priority issues and set the direction for 2030 WRG’s operations in Mongolia. The analysis assessed the up-to-date water management system, opportunities, financial status, human capacity, and technology, and pinpointed future challenges that needed to be addressed. The results of this analysis reveal that immediate attention should be given to the following priority areas:

- Water demand is expected to exceed the current supply
capacity.

- The water supply issue of Ulaanbaatar demands attention. Ulaanbaatar faces the risk of failing to meet the growing demand for water in the next decade.

- Existing water resources are vulnerable to contamination. Ulaanbaatar’s city water supply infrastructure, its decontamination and recycling system, and the wastewater treatment plant are all in need of major overhaul and expansion. In particular, the Ulaanbaatar Water Supply and Sewerage Authority’s business model is not financially viable, and the Authority is unable to finance required infrastructure improvements.

The 2030 WRG concluded that water demand would exceed supply in all scenarios. Therefore, Ulaanbaatar city must work towards increasing water supply sources. The Tuul river is sourced from underground water. Feasibility studies are under way on construction of surface water dams and water complexes based on the Tuul river. After assessing these options, the city decided to go with establishing a water complex. Also, we identified the main water sources. Sustaining these sources and keeping them clean is as important as increasing the number of resources. Ger districts in Ulaanbaatar are located above the river source areas, threatening to contaminate these sources. Therefore, this issue requires special attention when discussing green development and sustainability of the city. It is necessary to focus on this issue and eliminate the sources of pollution. Ger districts require improved sanitation facilities, and the traditional sanitation facilities need to be updated.

Apart from these, the 2030 WRG is working on two other issues. The Group is studying water supply sources for the Gobi area and Ulaanbaatar, and is assessing which of the options are financially viable; and it is conducting an economic analysis of the water supply. Currently, we’re in the final stages of our assessment for the Nyalga, Shivee Ovoo, and Tavan Tolgoi. By the end of this year, we’ll conduct a similar assessment for Ulaanbaatar. We believe that involving 2030 WRG in the green development and water supply issues of the city is crucial, as the 2030 WRG has the capacity to assess water issues from different angles and explore various avenues for solutions. The 2030 WRG is working towards improving current water management, increasing water supply sources, establishing water dams, building cascade dams in the city, and other activities, taking into account the economic benefit, purchasing power, and green development criteria.
Despite occupying just one percent of Earth’s land surface, cities house and feed almost 50 percent of the world’s population. Therefore, the main issues concerning water arise from population growth. Northeast Asia is one of the world’s leading regions in population growth. Common challenges faced by the cities of this region include water sources, water quality, water loss in distribution networks, excessive use of groundwater resources, inadequate sewage networks and wastewater treatment systems, and runoff from urban surfaces. With increasing population growth, the urban water supply is becoming a critical issue. This primarily relates to the need for very high reliability, security of supply, and the mix of social and economic needs for water.

**GOOD PRACTICES**

There are many examples of good practices for solving these issues and challenges. Let’s look at some of the best practices from Northeast Asian cities.

**CHINA**

China is a heavily populated country with very high water consumption. A resolution was issued in 1998 to ensure water supply and reduce ineffective consumption. As a result of implementation of this resolution across all cities of China, Beijing’s
water consumption declined from 4.8 billion m$^3$ tons per year in 1980 to 3.6 billion m$^3$ tons per year in 2010, saving 1.2 billion m$^3$ tons of water per year. China has also learned to optimize its usage of natural water streams. There are high-water-level years and low-water-level years. There are many practices related to water levels, such as cultivating plants, that consume less water in low-water-level years.

JAPAN

The city of Fukuoka in Japan is protecting the headwaters of rivers and increasing their streamflow. The only river that runs through the city supplies only one-third of total drinking water. In order to increase its water supply the city of Fukuoka cooperated with neighboring cities to establish a water fund. The quality of water was deteriorating because of increasing levels of pollution in the forest area near the headwaters of the river. Therefore, in order to improve the quality of water, the city of Fukuoka implemented a project to establish a special fund by collecting one Japanese yen per one ton of water. Half a yen was collected as a water fee paid by citizens, and the other half a yen was collected from the city budget. Currently, about 100 million yen is spent on protection and clean-up of forest areas near the headwaters of the river, and on other activities such as reforestation of areas near the riverbed. The private sector and the citizenry voluntarily participate in these activities by donating more than half of the funds. Thereby, they are protecting not only the water supply but the forests as well.

NORTH KOREA

North Korea adopted a policy to reduce consumption of underground water, reduce aggregate networks, and promote partial, stand-alone networks. Water in cities, villages, and settlement areas is supplied from independent water treatment and purification facilities that store water using a gravity-fed system.

SOUTH KOREA

Best practice in South Korea is related to water quality. ARISU is an organization responsible for water quality that has
accumulated many best practices over the years. Let’s highlight one of them. In order to supply citizens with high-quality water, they add new indicators every year. The number of quality indicators increased from 33 in 1993 to 163 in 2010-2012. They have received numerous international awards and much recognition for their efforts to guarantee a high-quality water supply. For example, in 2009, they received the UN’s public service award. The city of Seoul has established eight indicators for the protection of citizen health. Three of them are directly related to health, and the remaining five are related to water quality.

RUSSIA

In order to reduce water consumption and establish financial independence for water organizations, Russia is utilizing various economic strategies. Upon implementation of this policy, compensation for the costs incurred by water supply organizations increased by 90-95 percent.

WATER RESOURCES MANAGEMENT IN MONGOLIA

It was decided that water-related issues need to be addressed by an integrated management plan for river basin areas. To do so, Mongolia was divided into 29 river basin areas with the objective of addressing issues independently for each river basin area. A water management plan was drawn up for each of these river basin areas. Most cities of Mongolia are located along riverbanks. Therefore, water management plans for river basin areas apply to urban water issues, including city water supplies and water treatment and purification facilities. However, addressing and solving all of these issues with a single management plan is a difficult and complicated task. For example, urban water supply encompasses not only supply of water, but also other socio-economic aspects associated with it. Therefore, cities need to have their own water management plans, which align with their specific requirements and distinct characteristics. Thus, an integrated urban water resources management plan is needed for large cities.
Over many years, Ulaanbaatar has accumulated a large amount of sludge. The engineering methods used to accumulate sludge date back to the 20th century, when the initial construction of the city’s sewage, piping, and other infrastructure took place. Ulaanbaatar city has thus far accumulated 15 hectares of sludge that sits in the drying beds in the middle of the city without any further reprocessing. The strong odor coming from the sludge-drying beds is a source of discomfort for citizens residing in nearby areas and has a negative impact on the economy. Due to the numerous pollutants and bacteria contained in the sludge, it can act as a source of disease and contamination, and pose a threat to citizens’ health. With each passing year, the strong odor coming from the sludge is becoming more widespread. Inability to reprocess the accumulated sludge has turned into a critical problem with each passing year. Since sludge emits large amounts of methane gas, it can be used for generation of energy. In addition, sludge is 70 percent moisture at the time of disposal, and this moisture can be reused as well. This sludge issue is common in other cities of the country. Therefore, this issue demands a 21st century solution. Hidden and unseen sludge is being accumulated not only in the central water treatment, refinery, and purification facilities, but in other sewage piping networks as well. This issue is, again, a byproduct of the unsustainable and inadequate engineering methods of the 20th century. Therefore, Mongolia is in critical need of new solutions for sludge treatment and reprocessing.
In order to address this problem, a task force has been appointed by the city. After much research and consideration, the task force decided to use the Janicki Bioenergy Omni Processor to address this issue of sludge, in particular the issue of processing sludge. Currently, stakeholders and interested parties are discussing on how to use this technology in the Mongolian context. The Asian Development Bank is supporting this initiative. This technology will reprocess the sludge and produce water, energy, and heating. Currently, the task force is generating a business model for introducing products from the sludge processing plant into economic circulation. By reprocessing sludge, an opportunity is created to turn waste into a resource.

In addition, traditional pit latrines used in ger district areas are heavily polluting the soil and pose a risk of contaminating water sources as well. Therefore, new and alternative solutions to replace traditional pit latrines are required to avoid and eliminate these risks.
As the Green Growth Strategy progresses, financial mechanisms to carry out necessary strategic projects are required. Particularly, for a country with abundant solar and wind energy resources, Mongolia holds enormous potential for green development. The South Gobi region alone is estimated to have over 300,000 megawatts of potential wind electricity, enough to supply several Ulaanbaatar-size cities with sustainable energy. Despite sufficient solar and wind resources, Mongolia lacks the funds to carry out major green projects without financial assistance. Developing and sustaining a renewable energy resource is the result of expansive market research, oversight, planning, and investments; therefore, these are a crucial element of the discussion of green growth.

Moderator:
Mr. Jargalsaikhan D., Economist

Panel:

Mr. Arnaud Heckmann - Senior Urban Development Specialist, Asian Development Bank
Mr. Tuyen D. Nguyen - Resident Representative, International Finance Corporation
Mr. Bold M. - Chair, Sustainable Financing Steering Committee, Mongolian Banking Association
Ms. Tuul G. - Director of Eco-Banking Division, Khas Bank
Mr. Leo Hyungkun Park - Financial Institutions Specialist, Green Climate Fund
Mr. Petar Gjorgiev - Office Director, Mongolia KFW, Promotional Bank
URBAN GREEN GROWTH
FINANCING MECHANISMS:
OPPORTUNITIES AND CHALLENGES

Mr. Arnaud Heckmann: I do not have a specifically prepared speech, so I will just share my ideas with you. As mentioned in the yesterday’s discussion, our main goal is to develop the ger district. Our project is committed to developing infrastructure and creating sub-centers in the ger districts. By establishing sub-centers in the districts, we aim to slow the process of centralization in Ulaanbaatar. Obviously, the project doesn’t cover all ger districts. It involves some of them, and in these ger districts we’re establishing sub-centers to improve the living standards and conditions. Moreover, we’re implementing low-cost housing projects. Apart from being low cost these apartments need to fit in with the city’s overall appearance and plan. In carrying out such projects, we need to take into account the city’s future development and infrastructure plans. As Mr. Jargalsaihan, the chair of the panel, earlier noted, when we’re developing these projects, we should seriously consider efficient utilization of financial instruments. In the initial design stage of our project, we paid much attention to ensuring the project’s contribution to the city. We’re currently working on establishing a special fund to create an eco-district. The Municipality, the Asian Development Bank, and other donor organizations could support this initiative. I think the private sector also should join us in this effort. We need to create a partnership for this fund. By creating various partnerships and encouraging multilateral participation, we could create a fund that could serve as a source of funding for other projects. This would ensure the effectiveness of projects, and would gain support from local and national citizens.

Moderator: Do you have any ideas on how to establish this fund?

Mr. Arnaud Heckmann: Yes. We could establish this fund
through a partnership of donor organizations and commercial banks. Then the fund’s money could be used in financing different initiatives aimed at developing ger districts.

Mr. Tuyen D. Nguyen: The International Finance Corporation (IFC) is a member of The World Bank group. We finance and provide consulting to private sector ventures and projects in developing countries, in partnership with private investors. Without supporting the private sector, it is impossible to achieve economic growth and development. Therefore, we run various projects aimed at enhancing management capacity and introducing cutting-edge technologies to the country. In terms of Mongolia, paying special attention to the overall development prospect, we’re carrying out projects focused on developing infrastructure. Particularly, we’re cooperating with the commercial banks and the Mongolian Bankers Association on developing a risk management system for lending for green development. Thus, prior to granting a loan, we assess the environmental and social risks. Specifically, Khas Bank has been our main partner for sustainable energy financing and risk assessment. There are many opportunities for lending in infrastructure and other sectors. When lending, we are more interested in businesses and companies that support energy efficiency. For instance, we financed the Salkhit wind farm.

Of course, each nation wants to fulfill its social and commercial objectives. We have discussed considering green growth in developing the agricultural and industrial sectors.

When we talk about the green economy, there will be certain objectives that will be socially oriented and may not have the element that generates profit. Therefore, such projects tend to need funding from the public sector. But there are other types of projects that are more commercially oriented. When setting objectives, we need to consider the social benefits. Prior to seeking financial support for a certain project, we need to assess whether that project is beneficial to society. Only then will it be possible to attract funding from private and other financial sources.

In terms of the agricultural sector, after discussions with ministry officials and members of Parliament, I learned that there are two main issues that demand swift action. First of all, the parties concurred that there is demand for financing for projects committed to green development in which specific objectives,
such as satisfying all social members’ need and improving their living standards, are highly prioritized. We also agreed that projects on water and energy should be considered first for financing. Due to the political sensitivity the rates for water and energy remain low. The issue of increasing the accessibility of low cost water and energy is a serious matter for Mongolia, too. Because water and energy expenses are too high for vulnerable groups of Mongolia, it is obvious that the government always tries to keep the daily costs of these resources low. That is why the government of Mongolia grants subsidies to the water and energy sectors. However, this effort does not encourage the people to practice efficiency and the economical usage of water and energy. Consequently, not enough revenue is generated in the system, and therefore, the system does not have enough resources to pay for cleaner energy.

Due to the government subsidies and the inadequate metering system for water and electricity, households do not have an incentive to save water and electricity. This needs to be changed. Apart from promoting efficient consumption of traditional energy, there is a need to support renewable energy. For instance, instead of granting government subsidies indiscriminately, such subsidies should be more focused on the most vulnerable groups with the lowest income level. I think everyone would agree that creating a special target group for government subsidies is a much more efficient way of allotting state funds. The private sector should be encouraged to enter this sector through various subsidies and grants.

Moderator: The speaker noted that the social and commercial objectives should be considered separately.

Mr. Bold M.: I would like to briefly introduce how we are working towards green development within the commercial banking sector. All commercial banks of Mongolia joined together and established the Mongolian Bankers Association. This year, the Association commenced administering the Sustainable Finance Principle, which is considered to be an advanced method and good practice within the region.

The commercial banks are keen on financing and sponsoring projects dedicated to green development and social welfare. This initiative commenced after two years of development.
with assistance from the IFC and the Dutch Development Bank. The main principle of this initiative is that we place strict criteria for loan applicants on how their projects will impact the environment. When a project is submitted to the Bank, we assess it against green development criteria. For instance, we investigate how the loan applicant will manage the waste disposal issue. Especially when it comes to construction projects, we set strict requirements for construction companies to create greenery prior to giving out a loan. Our loan criteria for construction companies include a minimum 20 percent of the total construction site to be a green zone, in compliance with the policies of the government of Mongolia and Ulaanbaatar Municipality on increasing green zones.

If the loan applicant fails to meet this requirement, the loan interest will be higher or, alternatively, banks will refuse to provide the loan. Another method of promoting green development is to require companies engaged in the construction, manufacturing, and agriculture and mining sectors to comply with green development standards. This initiative has been undertaken by all commercial banks of Mongolia. The banks even compete with one another to achieve leadership in this regard. They are organizing events and competitions on efficient and economic consumption of water and electricity and reducing carbon emissions. The bank that achieves the highest results within this priority will receive an award at the end of this year. We’re putting our best efforts into leading and setting an example for other businesses in the private sector. The commercial banks of Mongolia are planning to establish a green development fund. Discussions are being held to create such a fund and finance projects focused on efficient consumption of energy, energy efficient equipment, and renewable energy. Thus, I would like to welcome international organizations, international financial institutions, and international development agencies interested in cooperating with us on this initiative.

Moderator: Could you please elaborate on your bank’s operations?

Ms. Tuul G.: Our Bank finances renewable energy projects and projects focused on efficient energy consumption. We also
grant micro-financing for manufacturers engaged in making energy-efficient products. Loans are also granted to energy-efficient apartment construction projects. The main criterion for small and medium-sized business loan applicants are the financing for environment-friendly projects. In addition, we are also interested in projects with up-to-date technology and efficient use of energy. We have been supporting and granting short-term loans to small and medium-sized enterprises for the past 10 years.

I would like to talk about the problems and difficulties we encounter in financing green development and green business projects. The common problem, which most commercial banks encounter today, is the high rate of loan interest for businesses. It’s necessary to set low interest rates for projects committed to green initiatives. The so-called green projects require up-to-date technology and energy-efficient equipment. However, these technologies are usually very expensive, making the overall cost of the project high. These projects require loans with the lowest possible interest rate. But it is not possible for us to lower the interest rate, as the loan interest rate set by the Bank of Mongolia remains high.

International financial organizations are lending to businesses that support green development. For example, we grant loans by obtaining financing from the Sustainable Energy Facilities. By providing funds from this credit line, we are learning a great deal about eco-projects and energy-efficient projects. The projects that obtained financing from our bank produce high efficiency. We need to assess project-implementing companies not only by what profit they are making, but also by what social benefits and what environmental benefits they’re producing through these projects. Thus, we need assessment criteria and mechanisms for these companies. However, in today’s circumstances, where we need to work much harder for a little profit, there are only a few projects that have managed to receive this sort of funding. Nevertheless, I hope that this number will increase in the future.

In conclusion, I agree with the moderator on the fact that opportunities for long-term bank loans are limited for businesses.

Mr. Leo Hyungkun Park: I would like to thank the Ulaanbaatar Municipality, The Asia Foundation, Zorig Foundation, and Khas Bank for inviting me to this meeting. I thank especially you, Mayor
Bat-Uul, for your cooperation with us. I would like to introduce you to my organization, as most of you might not be familiar with it.

Green Climate Fund (GCF) was established in 2013 as an operating entity of the Financial Mechanism of the United Nation’s Framework Convention on Climate Change. We are engaged in financing of various projects committed to reducing negative effects of climate change in developing countries. Last year alone, we received proposals for projects worth 10 billion USD from over 30 countries, of which 6 billion USD have been awarded. As of today, we have granted attestation certificates to 20 organizations. We cooperate with Mongolia through the Asian Development Bank, the European Reconstruction Development Bank, and the United Nations Development Program. Also we cooperate with Deutsche Bank and American and African financial organizations. Here I would like to emphasize that we are open to cooperate with all organizations that run activities in Mongolia. We are not direct financers, but we run financing operations through agent organizations. Therefore, I would like to note that organizations interested in obtaining attestation from our organization are welcome to submit their proposals. Together with governments, we are working on capacity building. For our applicants, we organize training and experience sharing after selection. Many private and public organizations from different countries apply to us. We opened applications in May-June 2015, and the selection will take place in November. In our view, several public organizations and four to five private companies will qualify this time.

I would like to speak about our activities in Mongolia. The Ulaanbaatar Municipality has submitted several projects that we find very interesting. We are working on those projects with the Mongolian Ministry of Environment, Green Development, and Tourism. If the Ministry, after being introduced to the projects submitted to our Fund by the public and private sectors, will issue a non-objection letter, then our Fund will work on facilitating those projects.

In terms of funding, the Fund offers the following four products. First, project grants, second, concessional loans, third, investment in ownership, and forth, issuance of loan guarantees.

Options may include project financing for risk valuations and loan analysis, investment via ownership for qualifying bank
loan criteria and loans for project implementations. We’re currently negotiating with several organizations on financing a number of projects.

It should be noted that applications and supporting materials for project financing are required to be submitted 12 weeks prior to the board meeting of the Fund. Lastly, I would like to encourage Mongolian organizations to actively participate and implement their projects.

Mr. Petar Gjorgiev: It is my pleasure to share with you the European experience. First of all, I would like to say to the few things about our organization. KFW is a German government-owned development bank. The bank finances projects dedicated for development of the states of the German Federation. The bank was first established to help reconstruct the German economy after World War II. Since then, the bank has provided financial support for the further development of Germany.

Having accumulated decades of experience, KFW provides grants and loan financing not only to German organizations, but also to many international organizations from different countries. Within Germany, KFW has been financing 15 major independent projects committed to national, social, and economic development. Apart from Germany, we grant soft loans and funding for commercially beneficial projects in developing and emerging markets.

Our cooperation with Mongolia runs through the banking sector. We are more supportive of projects committed to environment protection and social welfare. Being aware of the two specific issues of energy efficiency and biodiversity, KFW is rendering financial assistance and soft loans for this type of activities. We are granting loans on concessional terms and conditions to the final clients through the government of Mongolia. Preparations to implement projects worth 130 million Euros for Mongolia are now under way. These include projects on improving the efficiency of the existing power stations and strengthening national parks and protected areas.

Moderator: All representatives have taken their chance to make a speech. Now I would like to ask everyone to keep their talk brief and on topic.
There are thousands of needs and demands in Mongolia, of course. But what are the priorities to be addressed first? The answer is the issue of reducing the cost of apartments and building low-cost apartments. As of today, there are 30,000 unsold apartments in Ulaanbaatar, while there are 170,000 households dreaming of having apartments.

Apartments need to be connected with the water and sewage systems. Many Mongolians and residents of Ulaanbaatar would like more comfortable toilets. There are many people living in ger districts in the suburbs of Ulaanbaatar who have outdoor toilets. How do we manage this issue?

The water treatment facility is in very severe condition today. A few months ago, when the water needed to be switched off for apartments temporarily due to water treatment facility repair work, people showed resistance. At that time, that was a signal that if we don’t repair the facility we will drown in our waste. The repair work was performed by switching off the water during the nighttime.

In conclusion, we, the residents of Ulaanbaatar, realized that we live in very difficult conditions. Meanwhile, the issue of imposing a new city tax has been raised in Ulaanbaatar. People still do not understand what kind of tax this will be. If this city tax is approved, there will be a financial resource by which the problems encountered by the city can be resolved. The above-mentioned problems could be definitely resolved if we raised a fund through a city taxation measure, such as imposing a one percent tax on tobacco and alcohol.

Also, there is much talk about bonds of the Development Bank. Multiple partnerships and cooperation are needed for this project. There are many projects and many good ideas. But the question is, “How can we finance them?”

Many people seek financing from organizations attending this meeting, or request credit guarantees from the government. Unfortunately, as of now, the government of Mongolia is not capable of issuing credit guarantees to any organization. In such case, the Ulaanbaatar Municipality has nowhere to go and nobody to approach. When the Ulaanbaatar Municipality needs a loan, the government fails to issue the credit guarantee. Therefore, the city doesn’t have funding for its important projects. In short, the city has a limited budget. It’s impossible to carry out so many works with such a limited budget. What, then, should we do?
Is there any chance to obtain funding without the government’s involvement?

Is there any chance of obtaining a repayment guarantee from any other organizations? Also, is there any chance to implement syndicated loans in Mongolia? As far as I understand, these issues cannot be resolved at this moment. Therefore, I would like to invite all of you to ask your questions considering these aspects.

Mr. Bat-Erdene T., Deputy Mayor for Ecology and Green Development: The topic we are discussing here is the most important and pressing one. Without financial resources, we cannot move forward all of these wonderful projects and initiatives. There is limited possibility to resolve the numerous problems of the city all at once. People who made speeches earlier have mentioned that there are examples of Mongolian banks rendering grants through technical assistance.

Then, can the Ulaanbaatar city administration directly access such assistance? Or is the city required to get the assistance through an international organization or secondary agent? Is it possible to establish direct contact? The people attending this meeting are all representatives of international organizations experienced in working in Ulaanbaatar. So, I would like to know from all of you, for instance from the German development bank, what is the simplest way of obtaining financing for the green projects of Ulaanbaatar? Is there any example of grants provided for the development of Ulaanbaatar? Would it be possible for you to support us if the city were to request assistance for green projects? The dramatic expansion of Ulaanbaatar creates greater needs and demands too. Compared to other cities, we are confident of our repayment, as Ulaanbaatar is the biggest consumer, and the biggest basis for green development.

Mr. Arnaud Heckmann: A great deal of funding has been made. If there is a potential project, Ulaanbaatar city can submit their proposal to us through the Ministry of Finance. I would like to note that there is a possibility for grant assistance to Ulaanbaatar if the Ministry of Environment, Green Development, and Tourism issues a recommendation letter for the project too.

In order to obtain a soft loan, a guarantee from the
government is required. But there is no such guarantee at this moment.

Moderator: Is such a guarantee mandatory?

Mr. Arnaud Heckmann: Yes. We, as the lender, absolutely require a government guarantee of repayment.

Moderator: Is it possible for Ulaanbaatar city to issue the guarantee?

Mr. Arnaud Heckmann: I think it is not possible. Mongolia is a member country of the Asian Development Bank. The government of Mongolia represents Mongolia in the ADB. That is why the government is required to issue the repayment guarantee. This is because Ulaanbaatar city is not a member of the ADB. Any private company, as well as the city mayor’s office, needs the government’s guarantee in order to get a loan from us.

Moderator: Even though Ulaanbaatar city is not as big as other Asian cities, do you have any experience in rendering technical assistance to cities like Ulaanbaatar for issuing city bonds?

Mr. Arnaud Heckmann: We do not have such experience. The Asian Development Bank and other banks have a loan product called a city bond. They have experiences in rendering technical assistance.

Mr. Tuyen D. Nguyen: In addition to this, I know that the World Bank conducted research on the lending capability of cities at the request of a small city office. In general, the lending capabilities of cities are not very high. In case of concrete projects such as a new water treatment facility or solid waste processing plant, there are possibilities to obtain funding. There are three requirements. Firstly, a sustainable policy should be in place. For instance, how much would one cubic meter of water from the water treatment facility cost, a clear policy on what should be done with the wastewater, on so on. Secondly, it’s necessary to assess the purchasing power or the capacity to repay. Thirdly, revenue collection mechanisms
should be in place. Currently, the costs for water and energy are very low. The government subsidizes water and energy. Therefore, the policy on energy should be reformed. Lastly, I would say the Ulaanbaatar Municipality should introduce their potential and beneficial projects to the government and seek funding.

Moderator: I think we need to shift to a system where government subsidizes only the vulnerable groups, and where the remaining groups with higher incomes pay the full cost.

What percentage of all taxes collected throughout the nation is given to Ulaanbaatar city?

Mr. Bat-Erdene T., Deputy Mayor for Ecology and Green Development: We all know that Mongolia has a consolidated budget. The Ulaanbaatar city budget comes from taxes. The city uses the budget for subsidies. The government also sets a budget for Ulaanbaatar Municipality from the consolidated national budget. Recently, Ulaanbaatar Municipality has been making efforts in forming its budget by increasing the categories of taxes. One such effort is the city tax introduced by the Ulaanbaatar Municipality for the first time. The rate and amount of the Ulaanbaatar city tax will be approved by the Ulaanbaatar Citizens Representative’s Khural to be held in three days. In general, we have agreed that increasing tax categories is our primary method of increasing city revenues.

Moderator: Is there anything to add regarding the water and electricity supply policy and the amendments to be made to the water and electricity rate policies?

Mr. Bat-Erdene T., Deputy Mayor for Ecology and Green Development: Water is free in Ulaanbaatar. We charge only for water distribution service. As indicated in the report, this is the main reason why the Water Authority runs an unprofitable operation. Therefore, in order to protect the world, nature, and the environment, it is necessary for us to raise the prices of some things, even by a small amount. Personally, I think water must have a price. In case of electricity, it’s the prerogative of the central government.
Moderator: Any other questions?

Mr. Arnaud Heckmann: In addition to the city bond, we can establish a city fund. I think that establishing a city fund is a much easier way to raise city funding. A city bond is a quite complicated system. Instead, having a city fund is a much easier system for project financing. A city fund can be raised through loans and financing from commercial banks and international organizations. One thing is that the Ulaanbaatar Municipality has been developing its Strategic Plan and Master Plan, which involve ger districts for the first time. This is the first time ever that ger districts have been considered in the Master Plan for developing Ulaanbaatar. Some may criticize it, some may praise it, but I think that it is a great success that a master plan outlining the future development course of Ulaanbaatar has been put on paper now. It’s vital to develop ger districts along with Ulaanbaatar’s downtown areas.

Ms. Bayarmaa A., Vice Director, Mongolian Business Council: Is there any possibility to obtain financing through the Clean Development Mechanism?

Mr. Leo Hyungkun Park: The Clean Development Mechanism is a credit line granted to the private sector. This mechanism is based on a policy, and we grant funding depending on the policy that is being adhered to. As of today, we have not granted any financing under the Clean Development Mechanism. We are not able to make direct financing. We make the final decision only after the projects have gone through assessments by the attested organizations. The Clean Development Mechanism finds it difficult to fund projects directly, as most of the projects requesting funds are not able to run profitable business operations immediately. Take for instance the projects aimed at reducing tariffs. Implementing organizations, as well as financial organizations, are usually not really interested in these types of projects. Even if the projects target reducing carbon emissions, we are still unable to directly finance it. Nevertheless, we are working on this matter.

Ms. Shinee, Ecological Sequestration Trust: In order to identify something as “green,” we definitely need to change attitudes. Are there any policies on improving young people’s
awareness of these matters and encouraging them to undertake initiatives for introducing new technologies or greening the city?

**World Bank Official in Ulaanbaatar:** The World Bank is currently funding a project on this matter. The project is more focused on utilizing digital technology to promote new initiatives and new solutions.

**Mr. Arnaud Heckmann:** I would like to say one thing on encouraging youth participation. I would say we are all young-minded. We cooperate widely with organizations engaged with civil and social matters. Despite the complaints that sometimes we are not answering e-mails, I would like to emphasize that young people should approach us if they have good ideas and introduce their projects to us. We are open to you.

**Moderator:** Let’s take one last question and give the meeting chairs the opportunity to speak.

**Mr. Bat-Erdene, SAG Consulting:** I wonder what are the best international practices in low-cost apartment construction? What is the experience of granting mortgage loans to low-income households? In my view, projects are under implementation in this direction. For example, there is a mortgage program for disabled persons and elders. But what types of projects are there for low-income people in general?

**Ms. Tuul G.:** We are engaged in granting loans for low-cost apartment construction, especially the construction in ger districts. We have been implementing the low-interest mortgage loan program, but this project has not been successful. The lesson we learned from this project is that we must lower the interest rate of the loans. In June, we applied to the Green Climate Fund to become a certified organization. If we are admitted and attested by the GCF, then we will be able to implement low-interest mortgage loan programs, especially for energy-efficient, ger district apartment construction projects, by 2016.

**Moderator:** Is there any practice of mortgage loans for low-income households within KFW Bank?
Mr. Petar Gjorgiev: To add to the previous speeches, a loan instrument with the lowest expense is needed for low-income people. Even though there are possibilities to run such projects, such projects must be short-term, with the lowest expense. I think we need inspirational leaders like Steve Jobs. We need people with leadership skills who will present the real needs of the people, initiate, and lead others. Specific information is needed, such as: What is the exact number of such apartments needed? What is the exact number of households with low-income status? How many of them are interested to purchase apartments through mortgage loans? We can talk and work on what type of credit line is suitable for Mongolia only after exact and clear information, including the above-mentioned, is available.

Mr. Bat-Erdene T., Deputy Mayor for Ecology and Green Development: I’ve never agreed with the concept of low-cost apartments. Arnaud mentioned this in his presentation yesterday, and Bat-Erdene, SAG Consulting, just asked about this too. There is no such thing as a low-cost apartment. We are talking about apartments for low-income people. It is not an issue of providing people with low-cost apartments that are built using cheap construction materials. We are talking about policies and mechanisms focused on involving people in mortgage loans despite their low income. We should not talk about building low-cost apartments.

Mr. Tuyen D. Nguyen: I would like to add two things. We understand apartment blocks like Viva city as low-cost apartments for middle-income people. There is another concept of social housing for vulnerable groups in society. Therefore, this type of apartments for low-income households should also be built.

Mr. Arnaud Heckmann: Apartments for low-income people does not mean low-cost apartments. Instead, it is more focused on providing low-income people with apartments with reasonable prices through different measures and mechanisms such as tax privileges. So it does not mean building low-cost apartments with the cheapest prices. In addition, the government needs to build the kind of apartments referred to as public housing for low-income people. Poor and vulnerable groups can be provided
with housing this way. And of course, we should not forget that these housing units should also meet environmental standards.

**Moderator:** Well, we all have talked about the financial mechanisms for green development of cities. We have discussed the possibilities of financing it locally and internationally. Also, we debated how much it would cost to get such funding. We also learned, that aside from seeking funding from abroad, we could also tap local funding opportunities. Now, I would like to express my thanks to all of you for attending this meeting. The topics and subjects we’ve just touched upon are not over with today’s meeting. I think this is just the beginning.

I believe that our discussion today will further expand and succeed. Thank you.
The Future of sustainable urban development lies in the hands of eco-cities and cooperation among these eco-cities for a greener future. As non-renewable energy resources deplete, the demand for clean and renewable energy resources increases, paving the path for technological advancements ideal for sustainability and cleaner production. As a result of this collaboration, both incremental and systemic innovations within Northeast Asian Cities to promote and implement green growth strategies become a practical approach. The Green Growth Development Strategy Mongolia is an example of a step-by-step approach to achieving an eco-urban environment for future generations.

Closing remarks: Eco-Cities – The Future of Northeast Asian Cities
Mr. Bat-Erdene T., Deputy Mayor for Ecology and Green Development
Distinguished delegates, friends, and colleagues,

As all of you know, one of the many important issues discussed at the first NEA Mayors’ Forum held last year in Ulaanbaatar was urban green development.

In order to debate this important matter more intensely and exchange our opinions, the municipal administration of Ulaanbaatar initiated this thematic meeting, and now we have had two days of successful discussions.

I would like to express our thankfulness to mayors and municipal administrations from Seoul, Ulan-Ude, Elista, Niigata, Shenzhen, Karamay, Hulanbuir, Haikou, Erdenet, and Darkhan cities for sending their delegates to this forum in support of our initiative.

You have made significant contributions to the forum by bringing your best experts on urban green development to this meeting.

Also, I would like to thank international organizations for their close attention to urban green development, for their active attendance at the forum, and for presenting speeches full of valuable information.

I think we have achieved the goals set for the forum, which was very timely.

We have discussed many topics and worked intensely during the last two days and have made a tremendous contribution to urban green development.
Now, the Ulaanbaatar city municipal administration will be responsible for the compilation of presentations, discussions, and conclusions of the forum and sharing them with you.

Yesterday, we distributed to all of you the draft joint statement, and we received several inputs today and yesterday, which were incorporated in the joint statement.

Mayor of Ulaanbaatar E. Bat-Uul will attend COP 21 (Conference of the Parties), the United Nations Climate Change Conference in Paris this coming December, at the invitation of the mayor of Paris. Therefore, we have proposed in our joint statement that Mr. Bat-Uul inform the world of the outcomes of our meeting. I hope delegates will have no objection to this.

And now I would like to ask you to adopt our joint statement by giving it a round of applause. Thank you for supporting the joint statement.

The Ulaanbaatar municipal administration will be continuously sharing with you our thoughts on the follow-up activities and outcomes of our forum meeting.

In closing my speech, I would like to express my deep gratitude to The Asia Foundation, the World Bank, the Zorig Foundation, the Ministry of Foreign Affairs, and the interpreters for helping us in the preparation and excellent organization of the meeting.

Goodbye, and see you next time!
The participants of the Thematic Meeting of the Northeast Asian Mayors’ Forum on Urban Green Growth, convened in Ulaanbaatar, the capital city of Mongolia, on 21-22 September 2015, express our sincere gratitude to the Ulaanbaatar city administration for its timely initiative and for the excellent organization and warm hospitality. The Thematic Meeting, coming after the launching of this forum a year ago in the same city, has met to share information and learn from the advances made in the respective cities of Northeast Asia.

The main theme of this meeting was “urban green growth.” The participants exchanged views and experiences of cities in the Northeast Asia region on this subject, and acknowledged the role of cities in Northeast Asia first in contributing to the problem and then in finding solutions that are applicable at once both to cities in Northeast Asia and more broadly to cities outside this region. Topics discussed in this Forum include:

- Urban Green Growth Challenges, Trends, and Strategies
- Green Infrastructure
- Green Living and Education
- Clean and Sustainable Energy in Cities
- Energy-Efficient Housing and Construction in Cities
- Sustainable Water Management in Cities
- Urban Green Growth Financing Mechanisms: Opportunities and Challenges

The participants are grateful to The Asia Foundation, the Zorig Foundation, UNESCAP, GGGI, UNDP, UNEP, NEASPEC, ADB, the World Bank, IFC, GIZ, JICA and others for their outstanding contributions and excellent presentations, which made the Forum discussion rich and fruitful.

The timing of the Forum, when the SDGs are to be launched in a few days and amid the heightened pace of preparations for COP21, were not lost on the participants. While the problems are complex, the cities in Northeast Asia are well on their way to finding solutions and sharing them with the rest of the world. In this context, both SDG 11, dealing with making cities and human
settlements inclusive, safe, resilient, and sustainable, as well as the contribution of the Northeast Asian cities to global climate change and the remedial measures put in place, became a major part of the discussions.

The cities discussed their attempts at launching ambitious projects aimed at tackling urban sprawl and improving recycling as they fight against waste and polluting transport. They are prioritizing public transport, refurbishing buildings, and improving energy efficiency. These activities, however, will only have a lasting impact when social equity and quality of life are addressed and the cities are working to solve these issues as well.

The Paris Climate Conference is an opportunity for governments to come together and adopt bold decisions needed to put the world on the right path. This requires a closer dialogue between and among cities, as well as between cities and national governments, through a more regular exchange of expertise and good practices. The Northeast Asian cities are firm in their resolve to do what is necessary in their respective cities.

The participants have asked Mayor Erdene Bat-Uul of Ulaanbaatar to present the major findings and conclusions of the Thematic Meeting of the Northeast Asian Mayors Forum to the COP21 delegates when he attends the Paris Climate Conference.

The participants convey their profound thanks to the citizens of Ulaanbaatar for their hospitality, and congratulate them on their outstanding achievements in making their city modern, efficient, and prosperous.
**LIST OF DELEGATIONS**

**NIIGATA**

- **Furuki Takeyoshi**
  - Deputy Governor, City of Niigata

- **Okatsu Takao**
  - Director of Strategy and Planning, City of Niigata

- **Koseki Tomoko**
  - Director of Foreign Relations, City of Niigata

**SEOUL**

- **Park Won-soon**
  - Mayor

- **Nam Gwan Pyo**
  - Ambassador

- **Jang Hyug-Jae**
  - Head of Planning and Coordination Department

- **Seo Jeong Hyup**
  - Secretary to the Mayor

- **Kim Hyon Sik**
  - Director of Environmental Energy Planning Department

- **Chung Hun Jai**
  - Director of International Relations, and Cooperation Department

- **Lee Yung Ki**
  - Media Director

- **Kim Jong Cheon**
  - Secretariat of Political Affairs

- **Lee Jun Hyeong**
  - Secretary

- **Kim Mi Sun**
  - Director of Asia Department

- **Kang Hyun Seon**
  - Secretary

- **Jeong Hyung Cheol**
  - Senior Officer of International Relations Department

- **Ahn Eun Kyoung**
  - English-Korean Interpreter

- **Lee Yong Seop**
  - Photographer

- **Lee Sang Hwa**
  - Photographer

- **Baek Woon Seok**
  - Director of International Relations Department

- **Kim Myeong Je**
  - Officer of Asia Department
Thematic Meeting on Urban Green Growth

Shin Hyun Joo  Officer of Asia Department

KARAMAY

Liu Botao  Deputy Mayor
Wei Tianfeng  Party Committee Secretary, Wuerhe District
Zeng Huanbin  Deputy Director, Planning Bureau
Wu Xiankui  Deputy Inspector, Construction Bureau
Wang Haiyan  Vice Chairman, Karamay City Association for Friendship with Foreign Cities
Tan Zhenhai  Deputy General Manager, Xinjiang Petroleum Engineering
Li Yueeting  General Manager, Xinjiang Zheng Tong Industrial

SHENZHEN

Ai Xue Feng  Deputy Mayor
Wang Yu Weng  Head of the City Foreign Relations Department in Charge of Friendly Relationship with Other Cities
Yan Gui Cheng  Head of the City Foreign Relations Department in Charge of Asian Affairs
Li Yun Yuan  Deputy Head of the City Planning Department
Chen Peng  Secretary to the Deputy Mayor
Wai Shin  Officer at the Foreign Relations Department

HAIKOU

Mr. Han Bin  Head of Delegation
Ms. Wei Hong  Delegate
Ms. Lin Bin  Delegate
Mr. Gu Pin  Delegate
Mr. Guo Zhenfu  Delegate
Northeast Asian Mayors’ Forum

Forum Summary

HAILAAR/HULANBUIR

Cui Xin Yu  
Deputy Secretary General of Hulanbuir City Mayor’s Office

Wang Yi  
Head of the Foreign Relations Department

Shang Yong Ming  
Deputy Secretary General of Hulanbuir District Governor’s Office

Xu Hai Chang  
Head of the Foreign Relations Department

Sa Ri Na  
Head of the Translation Bureau at the Hulanbuir City Foreign Relations Department

Su Ri Ya  
Translator/Interpreter at the Translation Bureau at the Hulanbuir City Foreign Relations Department

ULAN UDE

Golkov A.  
Mayor

Sangadiev Zandra Gendenovich  
1st Deputy Governor

ELISTA

Namruev Vicheslav Khozikovich  
Elista City Mayor, Head of the Elista City Citizens’ Representative Meeting

Mandjiey Badma Ivanovich  
Deputy Mayor of Elista City Mayor

Malmakov Igor Petrovich  
Member of the Elista City Citizens’ Representative Meeting

Budaev Valerii Kuterovich  
Member of the Elista City Citizens’ Representative Meeting

Ariyasova Oksana Nikolaevna  
Head of the Elista City Citizens’ Representative Meeting Office

Purbeev Oleg Dordjevich  
Advisor to the Elista City Mayor

Tsedenov Oleg Borisovich  
Advisor to the Elista City Mayor
BIOGRAPHIES OF KEYNOTE SPEAKERS, MODERATORS, AND PRESENTERS
Bat-Uul Erdene  
*Capital City Governor and*  
*Mayor of Ulaanbaatar, Mongolia*

Mr. Bat-Uul Erdene is a prominent Mongolian politician and is the Governor of the Capital City and the Mayor of Ulaanbaatar city. He was appointed as Mayor of Ulaanbaatar on August 7, 2012, by the Capital City’s Citizen’s Representative Khural. He was elected multiple times to Parliament in 1990, 1996, 2004, and 2008, representing the Democratic Party. He served as chairman of the Democratic Party from 1990 to 1992, and as the party’s general secretary from 1992 to 1996. In 1988, Bat-Uul was part of an organized political group that in December 1989 would become the first group to articulate dissent against the ruling Communist Party – the Mongolian People’s Revolutionary Party. Bat-Uul was one of the leaders of Mongolia’s 1990 democratic revolution. He was awarded the title of Hero of Mongolia for his role in the 1990 democratic revolution on December 10, 2009. He received his education from Mongolian National University.

Battsereg Namdag  
*Minister of Environment, Green Development, and Tourism, Mongolia*

Mr. Battsereg is Minister of the Ministry of Environment, Green Development, and Tourism of Mongolia. He was first elected as a member of the Parliament of Mongolia in 1996, and re-elected in 2012. Prior to his current position, he worked as deputy finance minister from 2007-2009, and an advisor to deputy prime minister and minister of education from 2004-2007. Mr. Battsereg also serves as head of the Parliament Committee of Mongolia-France and Mongolia-Finland Diplomatic Relationships. He received his bachelor’s degree from Ural Polytechnic University in Russia in 1982, and graduated from the Management Academy of Mongolia in 1993.
Mr. Park Won-soon is in his second term as mayor of Seoul, South Korea. He has been in office since 2011. He joined the Democratic United Party in 2012. Mr. Park founded numerous non-profit civic organizations such as Hope Institute in 2006, Beautiful Foundation in 2000, and People’s Solidarity for Participatory Democracy in 1994. Prior to working as a mayor, he worked as a human rights lawyer and defended many political activists in the 1980s and 1990s. He worked as a public prosecutor in the Daegu District Court in Gyeongsang Province from 1982 to 1983. Returning to Seoul from Daegu, he launched his private law practice. Mr. Park was arrested for participating in a student rally against the militant dictatorship of President Park Chung-hee shortly after entering Seoul National University, imprisoned for four months, and expelled from the university. Later, he earned his bachelor's degree at Dankook University, an international law degree at the London School of Economics, and a political science degree at the University of London, and he became a visiting research fellow in the Human Rights Program at Harvard Law School, Cambridge Massachusetts, USA.

Dr. Oyun Sanjaasuren is a member of the Parliament of Mongolia. She was elected first in 1998 and re-elected in 2000, 2004, 2008, and 2012. She served as minister of foreign affairs from 2007 to 2008 and minister of environment and green development from 2012 to 2014. From 2004 to 2008, she held the positions of vice speaker of the Parliament, leader of the Democratic Coalition Parliamentary Caucus, and chairman of the Subcommittee on Millennium Development Goals and Poverty Reduction. Dr. Oyun is the founder and leader of the Civil Will Green Party of Mongolia. She also heads the Zorig Foundation, a prominent Mongolian NGO that is widely known through its activities and programs for the advancement of democracy, the promotion of good governance, youth, and education, and community development. Dr. Oyun contributes actively to the cause of children with disabilities as the chair of the Special
Northeast Asian Mayors’ Forum
Biographies of Keynote Speakers, Moderators, and Presenters

Olympics Committee of Mongolia. Oyun is currently the president of the United Nations Environment Assembly of the United Nations Environment Program (2014-2016 term). She is also a member of the World Economic Forum’s Global Agenda Council on Water Security. She holds a PhD in earth sciences from Cambridge University, UK, and pursued a career in the mining industry before entering politics.

Meloney C. Lindberg
Country Representative, The Asia Foundation Mongolia

Ms. Meloney C. Lindberg is The Asia Foundation’s country representative in Mongolia, where she has served since 2009. Ms. Lindberg previously served as The Asia Foundation’s deputy country representative in Sri Lanka, where her focus was on the management of rule-of-law programming. She was also The Asia Foundation’s deputy country representative in Afghanistan from 2004 to 2008, where she managed diverse programs related to the advancement of women and girls through education initiatives, and worked with local Afghan organizations to pilot an awareness-raising program for community leaders on women’s rights within an Islamic perspective. In 2002-2004, Ms. Lindberg was deputy country representative in the Philippines where she worked on good-governance and rule-of-law programs. Prior to joining The Asia Foundation, Ms. Lindberg worked for the consulting firm Development Alternatives, Inc. (DAI) managing a multi-country study of women’s organizations in post-conflict settings for USAID’s Center for Development Information and Evaluation. She earned a Bachelor’s degree in international studies from Miami University, and a master’s degree in international and intercultural management from the School for International Training, World Learning in Brattleboro, Vermont, USA.
Kilaparti Ramakrishna
Director, UNESCAP-ENEA

Dr. Kilaparti Ramakrishna is director of the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) East and Northeast Asia Office in Incheon, Republic of Korea. Before joining ESCAP, Dr. Ramakrishna, an internationally-known climate policy leader and environmental lawyer, was with the Woods Hole Research Center (WHRC) in a three-fold position: holder of the Sara Shallenberger Brown Chair in Environmental Law and Policy, director of the WHRC Policy Program, and vice president. He is a lead author of current – and many previous – assessments by the Intergovernmental Panel on Climate Change (IPCC). In addition, Dr. Ramakrishna has taught at a number of law schools, including the Fletcher School of Law and Diplomacy, Harvard Law School, Boston University and Boston College Law Schools, and at Yale University. He holds bachelor’s degrees in law and sciences and master’s and doctorate degrees in international environmental law. He received his academic training in sciences and law in India, and also from Harvard Law School, Cambridge, Massachusetts, USA.

Bat-Erdene Togooch
Deputy Mayor of Ulaanbaatar, Ecology and Green Development, Mongolia

Mr. Bat-Erdene is deputy mayor for Ecology and Green Development of Ulaanbaatar. He has been serving the Ulaanbaatar city municipality since 2013. His department is working towards providing a comfortable and safe environment for residents, and tackling environmental and green development challenges. Before joining the Ulaanbaatar city municipality, he served as head of administration of the Secretariat of the Democratic Party from 2005 to 2006, and he has been a member of the Executive Committee of the Democratic Party since 2010, and a member of the Capital City’s Citizen’s Representative Khural since 2012. He earned his bachelor’s and master’s degrees from Otgontenger University in Ulaanbaatar, Mongolia.
Enkhbold Nergui  
_Ulaanbaatar Clean Air Project, PMU Director_

Mr. Enkhbold is the director of UBCAP PMU, a position he has held since March 2013. As an executive and a member of the project steering committee, Mr. Enkhbold is responsible for overall project implementation activities, coordinating efforts with the World Bank and across Mongolian government agencies and the municipality of Ulaanbaatar. His career began in 2000 as a project coordinator for the United Overseas Textile Corporation Barrege in the USA. In his role as a director of the Project Management Unit of the Ulaanbaatar Clean Air Project, he oversees the stove-switching program, the quality assurance monitoring system based on participatory approaches, constructive engagement between decision makers and donor organizations, and communications and coordination among other projects in Ulaanbaatar, Mongolia. Mr. Enkhbold acquired his professional economic training from Santa Monica College, California, USA.

Mutsumi Sato  
_Chief Representative, JICA Mongolia_

Mr. Mutsumi Sato is the chief representative for the Japan International Cooperation Agency (JICA) in Mongolia. Prior to being appointed as chief representative in Mongolia, he worked from 2013 to 2015 at the East Asia Division of the East and Central Asia and the Caucasus Department at JICA headquarters as a director and a senior advisor to the general director. Mr. Sato graduated from Hokkaido University Faculty of Law in March 1993.

Dr. Kwangik Wang,  
_Research Fellow, Korea Research Institute for Human Settlement, Korea_

Dr. Wang is a research fellow at the Korea Research Institute for Human Settlement. He served as researcher at the Korea National Housing Corporation, research assistant at Tokyo University, and research intern at the New York State Emergency Management Office. His research interest include smart green city policy and planning, the theory of urban structure, urban environmental and energy policy related to climate change, land use planning, and
GIS. He earned his bachelor’s degree in landscape architecture from Kyunghee University, South Korea, and his master’s degree in regional planning from State University of New York at Albany, New York, USA. He received his PhD in urban engineering from Tokyo University, Tokyo, Japan. His research papers include *Smart Zero Carbon City Technology Proposal, Vitalization Policy of Green City and Home, and Research on Planning and Management of Low Carbon Green Growth Oriented Urban Park.*

**Chuluun Togtokh**  
*Director of the Institute for Sustainable Development, National University of Mongolia*

Dr. Chuluun is the director of the Institute for Sustainable Development at the National University of Mongolia. He is a member of the International Council for Science (ICSU) Regional Committee for Asia and the Pacific. Dr. Chuluun’s research activities address sustainability, adaptation, and green development of social-ecological systems at local, national, regional, and global scales. He worked as a director general of the Department for Green Development Planning and Policy of the Ministry of Environment and Green Development (2012-2013), science advisor to the Minister of Environment and Green Development (2013-2014), vice director general of the Department for Urban Development of the Ministry of Construction and Urban Development (2004-2006), and advisor to the president of the Mongolian Academy of Sciences (1991). Dr. Chuluun is an initiator and leader of the Green Development Policy, adopted by the Parliament of Mongolia on June 13, 2014.

**Thomas Eriksson**  
*Deputy Resident Representative, UNDP, Mongolia*

Mr. Thomas Eriksson is deputy resident representative of UNDP Mongolia. Prior to his current appointment, he served as policy advisor and team leader in the Capacity Development Group, Bureau of Development Policy, UNDP, New York; chief of the directorate, Bureau of Management, UNDP, New York; results-based planning advisor, UNDP, New York; and program analyst, UNDP, in Pretoria, South Africa and in Bonn, Germany. Mr. Eriksson’s publications include *UNDP Handbook on Planning Monitoring and*
Evaluating for Development Results, UNDP Capacity Development Practice Note and Policy Note on Measuring Capacity, UNDP. He holds an international master of business administration (MBA) degree from Gothenburg University, Sweden, and also completed studies in Rijksuniversitet Gent, Belgium; École Supérieure de Commerce, Grenoble, France; and the University of Wales, Swansea, United Kingdom.

Arnaud Heckmann
Senior Urban Development Specialist, ADB

Mr. Arnaud Heckmann is a senior urban development specialist in the Asian Development Bank’s East Asia Department working on several urban development and technical assistance projects in China and Mongolia. He is a member of the Urban Committee of Practice and the focal point for inclusive cities. Before joining ADB, he worked with various international organizations (World Bank, AfD, and OECD) as project manager on the design of urban and regional infrastructure, urban prospective analysis, and development scenarios formulation. He holds a master’s degree in comparative development research from the EHESS-School of High Study in Social Science, a master’s degree in human geography from Toulouse University, and a diploma in Chinese language from Paris University, France.

Kim Ki-joon
Senior Transport Specialist, ADB

Mr. Kim Ki-joon is a senior transport specialist at the Asian Development Bank. Since he joined the Asian Development Bank in 2010, he has been working on sustainable urban transport loan projects that involve bus rapid transit (BRT); non motorized transport in Lanzhou, Yichang, Jangxi-Ji’an in the PRC; and urban transport projects in Ulaanbaatar, Mongolia. Before joining ADB, Mr. Kim was the president and owner of Teri-Systematica, a transport planning and engineering consultancy firm in South Korea. Mr. Kim has over 25 years of professional experience and academic research in the transport sector in South Korea and the United Kingdom, and he has also worked with public and private institutions on various transport and urban transport projects. He was involved in major urban reform projects in Seoul such as the
Seoul Bus Reform, Cheongaecheon River Rehabilitation, City Plaza Design, CBD Pedestrian Stripe Project, and several projects that involved demolitions of fly-overs and elevated urban expressways in Seoul CBD area.

Guojun Song
President of Environmental Policy and Planning Institute, Renmin University, China

Dr. Song Guojun is a professor at the Department of Environmental Economics and Management of Renmin University of China, and serves as the president of the Environmental Policy and Planning Institute under the department. Professor Song has a deep understanding of China’s environmental policy and management conditions, and integrated knowledge of how to promote China’s environmental policy and management system. Professor Song has considerable experience leading research projects for the Chinese government, the Ministry of Environmental Protection of China in particular, and has published many high-quality papers, including *Environmental Policy Analysis*. After graduating from college in 1983, he received his master’s degree in environmental planning and management from Peking University, and his doctorate in environmental economics from Renmin University of China.

Ai Xue Feng
Deputy Mayor of Shenzhen, Guangdong Province

Mr. Ai Xue Feng is vice mayor of Shenzhen, Guangdong province, China. Prior to this position, he served as mayor of Shaoguan city, Guangdong province and acting mayor of Shaoguan city, Guangdong province, and he served in the Hong Kong and Macao Affairs Office of the State Council. He was with the China Construction Bank and was an assistant engineer at Liaoning Provincial Printing Technologies Research Institute. Mr. Ai Xue Feng graduated from Northeastern University in Boston, Massachusetts, USA, with a degree in computer science, and studied monetary banking in People’s Bank of China Postgraduate Program, China. He also holds a master’s degree in economics.
Altantsetseg Sodnomtseren  
*Partnership for Action on Green Economy National Coordinator, UNEP*

Ms. Altantsetseg works as the PAGE national coordinator at the United Nations Environment Program (UNEP). She has over 15 years of experience as a project manager, consultant, and researcher in policy and strategic analysis, public administration, and program development and implementation. Prior to joining PAGE, she managed three projects at the National Statistical Office of Mongolia, funded by the World Bank and UNDP, and worked as an international relations director at the National University of Mongolia. She also founded, and served on the boards of, the Asia Research Center, the Mongolian Association of State Alumni, and other non-governmental organizations focusing on science and technology, education, youth development, disadvantaged people, rural development, and women’s entrepreneurship. Ms. Altantsetseg holds a BA from Voronej Pedagogic University in Russia and an MBA from Swinburne University of Technology, Australia. She also completed a graduate program in environmental economics and management at Wageningen University, Netherlands, was a Humphrey fellow at Pennsylvania State University, USA, and was an international policy fellow at the Open Society Institute, Hungary.

Amgalan Altangerel  
*Project Director, Education for Sustainable Development for All, Swiss Development Corporation (SDC)*

Amgalan has been working as a project director for Education for Sustainable Development for All, funded by SDC. Before his current position, he worked as a project coordinator for Straightening of Ministry of Economic Development in Negotiation of Trade and Investment Agreements, by GIZ. Amgalan has over 10 years of experience in private sectors such as service, trade, and production, and he has over 10 years of experience in development cooperation. He received his engineering diploma from State Technical University of Mongolia, and his bachelor’s degree in translation and diplomacy from the School of Foreign Service of the National University of Mongolia.
Ms. Lakshmii is the director general at the Economic Policy and Competitiveness Research Center and the director of the Mongolia Economic Forum NGO. Prior to this position, she was the head of the marketing department of Migma LLC and the managing director of BMW Mongolia. From 2004 to 2008 she served as a board member of the Mongolian-German Association of Mongolian Alumnae. She graduated from the University of Applied Sciences in Berlin, Germany, and International Management and Finance of Mongolia. Since 2011, she has been a PhD candidate at the RWTH Aachen University, Germany.

Mr. Alexander Golkov was elected as the mayor the city of Ulan-Ude in December 2012. In March 2009, he became chairman of the Ulan-Ude City Council of Deputies of the IV convocation, and chairman of the Committee on Finance and Economic Affairs and Budget. After serving as a deputy of the Ulan-Ude City Council for four years, he was elected as chairman of the Ulan-Ude City Council of Deputies in 2007. In 2001-2007, he led the work of the Directorate of the Union of Industrialists and Entrepreneurs of the Republic of Buryatia. He is a member of the presidium of the regional political council of the United Russia party, first deputy chairman of the Union and Coordination Council of the Union of Representative Bodies of Local Municipal Authorities of the Russian Federation. Mr. Golkov graduated from the East Siberian Technological Institute and did his graduate studies at the Moscow State University of Instrument Engineering and Computer Science, Russia.
Badamdamdın Ragchaa
President of Mongolian Wind Energy Association

Dr. Badamdamdın has been serving as president of the Mongolian Wind Energy Association since 2012. Prior to this appointment, he held positions as advisor and CEO at various private sector companies including Terra Global, Khan Global, and Mon-Atom LLC. He was elected as a member of the Parliament of Mongolia twice, in 1996-2000 and in 2004-2008. During his term as a member of Parliament, he also chaired the Standing Committee on Budget. Dr. Badamdamdın holds an undergraduate degree in physics from the Mongolian National University, and also acquired his PhD in physics from Moscow International Information Academy, Russia.

Enebish Namjil
Professor at the National University of Mongolia

Dr. Enebish is a professor at the School of Engineering and Applied Sciences at the National University of Mongolia. In 1978, he joined the State Physics Department of the Institute of Physics and Technology of Mongolia. For the period 1978-1994, he carried out a number of projects in solar cells using mono and polycrystalline silicon and EFG-ribbon silicon materials, which greatly contributed to the development of solar photovoltaic applications in Mongolia. From 1994 to 2012, he held numerous senior-level positions at the Ministry of Infrastructure and the Ministry of Mineral Resources and Energy of Mongolia, and at the National Renewable Energy Centre, and he made many key contributions to the promotion of renewable energy applications in Mongolia. From 2010 to 2013, Dr. Enebish worked as senior renewable energy technology r&d analyst at the Bonn-based Innovation and Technology Centre of the International Renewable Energy Agency in Abu Dhabi, UAE. He is the author of over 150 technical and research papers and books on various aspects of renewable energy technology development. He received his BA and MS degrees in semiconductor physics from the Saint Petersburg State Electrotechnical University of Russia in 1978, and a doctorate in physics and mathematics from the Institute of Automation & Control Processes, Russian Academy of Sciences, in 1994.
Gankhuyag Dagva  
*Executive Director, Clean Energy Asia, Newcom Group*

Dr. Gankhuyag is the executive director of Clean Energy Asia and has worked for the Newcom Group since 2006. Before joining the Newcom Group, he worked at Mongolian National University as a professor and a departmental dean. He has managed Salkhit Wind Farm since 2006, where he has gained experience and knowledge in infrastructure, energy project management and its technical details, contracts, and the legal environment of manufacturing and financing. Dr. Gankhuyag also led projects to develop large-scale wind and solar power plants in Umnugobi. He earned his bachelor’s and master’s degree at Mongolian National University, and his PhD in economics at the International Development School, Nagoya University, in Japan.

Furuki Takeyoshi  
*Vice Mayor of the City of Niigata*

Mr. Furuki has been serving as vice mayor of the city of Niigata since April 2015. Prior to this position, he was general manager of the Urban Development Support Division, and the Urban Regeneration Department of the Urban Renaissance Agency. Mr. Furuki also served as a vice mayor of Kagoshima city in 2009. In 2007-2008, Mr. Furuki was a chief of the Urban Transport Project Office, the Urban Transport Facilities Division, the City and Regional Development Bureau, the Ministry of Land, Infrastructure, Transport, and Tourism. He graduated from Hokkaido University Graduate School of Engineering specializing in civil engineering in 1985.

Otgonbaatar Dorjgotov  
*Head of the Project and Cooperation Department, Ulaanbaatar City Governor’s Office*

Mr. Otgonbaatar has been working as head of the Project and Cooperation Department of the Ulaanbaatar City Governor’s Office since 2013. He is in charge of international projects and programs funded by the World Bank, the Asian Development Bank, KOICA, The Asia Foundation, and JICA. He is also responsible for overseeing projects and programs implemented in the capital city.
for the last two years focused on ger area re-development and bus rapid transit projects funded by ADB. For the period from 2011 to 2013, he was working as the specialist in charge of the Foreign Relations and Investment Department of the Ministry of Education, Culture, and Science of Mongolia. He holds a master’s degree in public administration from Yonsei University of South Korea.

Ruth Erlbeck  
*Regional Program Director of Urban Nexus Project, GIZ*

Ms. Ruth Erlbeck works as a regional project director for the Urban Nexus Project of the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ). She has been working for GIZ since 2006. Before joining GIZ, she worked for various international organizations such as INDE and DED. She is an experienced professional with many years of experience in diverse areas including household energy, small and medium enterprises, and low-cost housing. Her work focused on Latin American countries such as Ecuador, Colombia, Venezuela, and Mexico, and other developing countries such as Mongolia and Ethiopia. During her work at GIZ she led the Integrated Urban Development Program, which implements the Ulaanbaatar School Buildings Thermo-technical Retrofitting.

Jennifer Butz  
*Country Portfolio Director, Global Green Growth Institute*

Ms. Jennifer Butz is a country portfolio director of GGGi’s Green Growth Planning and Implementation workstream. She has provided technical and strategic leadership to diversified development and democracy programs in more than 25 nations in the Balkans, Asia, and Eastern Europe, and in Mexico and the US. Ms. Butz has led country programs in Albania and Mongolia, synthesizing theories with a broad range of stakeholders to gather data and analyze policies and trends to monitor and evaluate programs and plan forward strategically. She has designed, written, and won more than $60 million in grants and cooperative agreements. Ms. Butz has developed tools and program materials to promote effective governance and market systems through improved citizen engagement with local government, political parties, businesses, and media. Ms. Butz has been awarded
the Polar Star by the President of Mongolia, been granted an honorary professor post at the Mongolian State University for Agricultural and Bio-technical Sciences, and was awarded the Mother Theresa Award of Virtue for Democracy & Peace Building from the Republic of Albania.

**Liu Botao**  
*Karamay Vice Mayor*

Mr. Botao is a member of the Karamay Municipal People's Government Party Leadership Group, vice mayor, and member of the CPC Party Committee of Karamay Municipality and Xinjiang Oilfield Company. Mr. Botao is responsible for urban construction and management, administrative enforcement, land and resources management, environmental protection earthquake, water supply and drainage, greening, and environmental sanitation. Prior to his current position he was deputy general manager, Road and Bridge Construction Engineering Company; member of Xinjiang Petroleum Administration Bureau Construction Engineering Corp CPC Party Committee; deputy general manager, deputy secretary of Karamay Construction Bureau CPC Party Committee; and director of Karamay Construction Bureau.

**Batjargal Zamba**  
*Advisor, United Nations Environmental Assembly of UNEP*

Dr. Batjargal Zamba currently is working as an advisor to the Office of the President of the United Nations Environmental Assembly of UNEP. Dr. Batjargal has more than 30 years of experience working for Mongolian government agencies dealing with environmental protection, nature conservation, and hydrometeorological hazards. He has been engaged in international cooperation activities and has worked with numerous foreign agencies. Dr. Batjargal is the author of more than 100 research papers and articles on meteorology, climate, water resources, disaster risk reduction, nature conservation, and environmental and social sciences. He received his PhD in physics and mathematics in 1978 from the Hydrometeorological State University, in St. Petersburg, Russia.
Dr. Dorjsuren  
*Representative, Water Resource Group, IFC*

Dr. Dorjsuren has been representing the Water Resources Group (2030WRG), IFC in Mongolia since 2013. In 2013, he founded the Freshwater Institute, Mongolia, which focuses on research and policy to promote fresh water sources and ecologically friendly consumption for sustainable development. Dr. Dorjsuren has been working as an environmental consultant for over 15 years and gained diverse experience in various mining and infrastructure projects in Mongolia. His company, Eco Trade Environmental Consulting, worked on environmental baseline survey and environmental impact assessment for the Oyu Tolgoi, Tavan Tolgoi, Boroo, Mardai, and Ukhaa Khudag mine projects, and other infrastructure projects. Dr. Dorjsuren also contributed to numerous crucial strategy and policy documents. He received his engineering diploma in hydrogeological engineering from the Mongolian University of Science and Technology in 1990.

Batimaa Punsalmaa  
*Team Leader, Mongolian Water Security Assessment, ADB TA Project*

Ms. Batimaa is the team leader of the Mongolian Water Security Assessment. Her field of expertise is water resources and climate change, including integrated water resources management plan preparation, research on surface-water resources and quality, application of IWRM in the management and development of water and related resources, training and capacity building in watershed management, establishment of gauging stations, climate variability impacts, adaptation, and vulnerability assessment. She served as climate change and disaster program officer for the UNDP country office in Mongolia, national team coordinator of Strengthening Integrated Water Resources Management in Mongolia, principle investigator of Potential Impacts of Climate Change, Vulnerability and Adaptation Assessment for Grassland Ecosystem and Livestock Sector in Mongolia, project manager of technology needs assessment in the energy sector in Mongolia, GEF Enabling Activity Phase II, WB, project manager of the preparation of Initial National Communication to the UNFCCC, GEF Enabling Activity Phase I,
UNEP. She has written more than 30 books, about 100 articles, technical reports, and working papers on water resources, IWRM, water quality, and climate change issues.

Oyunterel Tsedevdamba  
*Member of Parliament of Mongolia*

Ms. Oyunterel Tsedevdamba is a member of Parliament of Mongolia elected in 2012. She served as minister of culture, sports and Tourism from 2012 to 2014. She is also president of the Democratic Women’s Union of Mongolia. Prior to her political career, Ms. Oyunterel served as an advisor on human rights and public participation to Mongolian President Elbegdorj Tsakhia from 2009 to 2010. During her 14 years in public service, Ms. Oyunterel has worked on the country’s privatization efforts and social insurance reform, and served as an advisor to the prime minister and a member of Parliament. As the co-founder and executive director of the Liberty Center, a human rights watchdog, she has developed a reputation as a tireless advocate for democracy and gender equality in Mongolia. As the co-founder and president of the Local Solutions Foundation, she is actively educating the Mongolian public on environmental health. She earned her bachelor’s degree from Ekatheringburg Institute of National Economy in Russia, and received her master’s degree in International Policy Studies from Stanford University in Palo Alto, California, USA.

Jargalsaikhan Dambadarjaa  
*Journalist, De Facto*

Mr. Jargalsaikhan Dambadarjaa (known as Jargal DeFacto) is an independent economist and media representative of Mongolia. He is the host of *DeFacto*, a weekly television talk show broadcast on Eagle News, MNB, and NTV in Mongolia, featuring distinguished Mongolian- and English-speaking guests from across the globe. Since 2009, Mr. Jargalsaikhan has been writing weekly articles on the current economic, political, and social issues in the country, which are printed in Mongolian and English daily newspapers. His volunteer and board positions include Mongolians for Fair Taxes and Wise Spending, Mongolian Taxpayers Association (president), Mongolian National Committee
for Pacific Economic Cooperation (general secretary), Mongolian Association of State Alumni – MASA (president), Moscow State University Mongolian Alumni (president), and The Economic Club of Ulaanbaatar (president). He earned his bachelor’s degree at Moscow State University in the Soviet Union and received his MBA from the University of Denver, Colorado, USA.

Tuyen D. Nguyen
*Resident Representative, Mongolia, International Finance Corporation, World Bank Group*

Mr. Tuyen Nguyen is the International Finance Corporation resident representative for Mongolia, based in Ulaanbaatar. Mr. Nguyen joined IFC in 2006, starting in Hanoi, Vietnam, and was most recently the IFC head of office for Ho Chi Minh City, where he also led investments for its Manufacturing, Agribusiness, and Services (MAS) department in the Mekong (Cambodia, Lao PDR, Thailand, and Vietnam). Prior to IFC, Mr. Nguyen worked in the private sector unit of the Asian Development Bank, based in Manila, covering investments in financial institutions throughout Asia. He holds a BA from Yale, and an MA-MBA from the SAIS-Wharton program, in the United States.

Bold Magvan
*Chief Executive Officer, XacBank*

Mr. Bold Magvan was appointed as the chief executive officer in July 2014. Mr. Bold has been with XacBank and its holding company, TenGer Financial Group, since 2005. Prior to his current appointment, Mr. Bold worked as the CEO and an executive director of TenGer Financial Group from 2011 to 2014, and as the CEO of XacBank from 2009 to 2011, and the president from 2005-2009. Mr. Bold is a senior banking professional with almost 30 years of experience, including his engagements with global financial institutions such as the World Bank and the International Monetary Fund. From 1996 to 2000, Mr. Bold was the deputy governor of the Bank of Mongolia (Central Bank). In his prior professional career, he served as a chief executive officer of the Mongolian Export-Import Bank, a member of the boards of the International Investment Bank and the International Bank for Economic Cooperation in the Russian Federation, and an
advisor for Da Afghanistan Bank (Central Bank), Islamic State of Afghanistan. Bold served as the vice president and president of the Mongolian Bankers Association in 2007-2011, and as the President in 2011-2014. Bold currently serves also as the honorary consul of the Republic of Iceland in Mongolia. Bold holds a master’s degree in international affairs with a major in economic policy management from Columbia University, New York, USA.

Tuul Galzagd
Director of Eco Banking Department, XacBank

Ms. Tuul Galzagd, director of the Eco Banking Department at XacBank, is a banking professional with over 16 years of experience with financial institutions in Mongolia. Previously Ms. Tuul served as the chief executive officer at MTND LLC, the first privately held pension fund in Mongolia, and as a director of Ulaanbaatar regional branches. She joined XacBank in 2001 following its creation through the merger of two microfinance projects internationally funded by UNDP and USAID. Over the course of her career at XacBank, Ms. Tuul has overseen branches, developed banking policies, and helped to grow the organization from a small micro-loan enterprise to one of the largest banks in Mongolia. Her background working with international partners, in addition to her role in creation of the first eco-focused loan packages in Mongolia, has equipped her to manage a range of projects that harness both environmental standards and private sector actors to introduce energy-efficient approaches and clean energy to Ulaanbaatar.

Leo Hyoungkun Park
Financial Institutions Specialist at Green Climate Fund

Mr. Leo Hyoungkun Park is a financial institutions specialist at GCF. Mr. Park serves as a liaison between the Private Sector Facility and financial institutions and private sector entities. Before working with the Fund, Mr. Park spent a majority of his career in project and climate change finance while with the Korea Development Bank in Seoul and New York. He also worked at Korea’s Presidential Committee on Green Growth as a carbon market specialist, and volunteered in Morocco with the Korea International Cooperation Agency (KOICA). Mr. Park has a bachelor’s of science in computer
and business studies from the University of Warwick (UK) and a master’s degree in business administration from New York University (USA).

Petar Gjorgiev
*Office Director, Mongolia KfW, Promotional Bank*

Mr. Gjorgiev is head of the KfW office in Ulaanbaatar, Mongolia. Prior to this appointment, he served as Project Manager at KfW Promotional Bank, Urban and Regional Development Team in Russia, Ukraine, and Moldova from 2011 to 2015. From 2002 to 2011, Mr. Gjorgiev was a head of the KfW office in Skopje, Macedonia, and supported KfW Promotional Bank’s portfolio and operations in Bulgaria, Albania, and Kosovo. He holds a bachelor’s degree in German and English language, and a master’s degree in business administration from Staffordshire University in the United Kingdom.