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Towards Sustainable Management of Natural and Built Capital for a Greener, Diversified, and Resilient Economy

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Towards Sustainable Management of Natural and Built Capital for a Greener, Diversified, and Resilient Economy

Policy Note for Mongolia

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ACRONYMS AND ABBREVIATIONS

B2B	Back-to-Back
CHP	combined heat and power plant
CITA	Communication and Information Technology Authority
CMREC	China-Mongolia-Russia Economic Corridor
CRC	Communications Regulatory Commission
DH	district heating
EBA	Strengthen the Enabling Business of Agriculture
EE	Energy efficiency
ERC	Energy Regulatory Commission
ESG	environmental, social and governance
FMD	foot-and-mouth disease
GASR	General Authority for State Registration
GHG	greenhouse gas
GOM	Government of Mongolia
HPS	hydroelectric pumped storage
ICNC	Information Communication Network Company
ICT	information and communication technology
IFI	International Monetary Fund
ILM	integrated landscape management
IPP	Independent Power Producer
IT	information technology
LDF	Local Development Fund
MOF	Ministry of Finance
MOFA	Ministry of Foreign Affairs
NAPSI	North Asia Power Sector Interconnection
NDC	National Dispatch Center
NMC	National Water Committee
NOAA	National Oceanic and Atmospheric Administration
PIM	public investment management
PM	particulate matter
PPA	Power Purchase Agreement
PPR	peste des petits ruminants
PWC	Private Water Company
RBA	River Basin Authority
RBMSPP	River Basin Multi-Stakeholder Platform
RE	renewable energy
SLP	Sustainable Livelihoods Program
TOD	Transit-oriented development
UB	Ulaanbaatar
UK	United Kingdom
WASH	water, sanitation and hygiene

1. BACKGROUND AND INTRODUCTION

Mongolia is endowed with rich natural resources, including its vast pastureland, unspoiled nature, and world-class mineral deposits. Mongolia also has a long tradition of livestock farming, producing, for example, world-class leather and cashmere products. It's strategically located between the two major economies—China and Russia—and along major regional economic corridors connecting to Central Asia and beyond that. This location, if leveraged well¹, can be used for trading competitively and building a sustainable economy. Mongolia's vast potential for wind and solar energy and its strategic location close to large market opportunities for renewable energy (RE) can also be exploited to support the country's green development vision.

Despite such strategic opportunities, Mongolia's economy is characterized by its heavy reliance on mining, unsustainable exploitation of natural resources (including water, minerals, pasture²), poor livestock farming, unplanned urban development, and poor infrastructure connectivity with associated urban congestion and higher cost of infrastructure services. Mongolia also suffers from heavy pollution (of water and air, especially in its major urban areas³) and flashfloods. These challenges will be exacerbated by climate change impacts and other disaster risks such as *dzuds* and earthquakes. The government recognizes these challenges and has developed key strategies to position Mongolia on a sustainable development pathway for a more diversified, resilient and greener economy. Accordingly, Mongolia's Sustainable Development Vision 2030 and Vision 2050 as well as its international commitments such as those under the Paris Agreement and the 2030 Agenda for Sustainable Development are efforts in the right direction. These high-level visions however must be accompanied by appropriate policies, regulations, implementation plans as well as enforcement capacity to achieve them.

The COVID-19 pandemic further exacerbates the challenges that Mongolia faces to achieve its medium- and long-term goals. In agriculture, food production, distribution and processing are affected, undermining agriculture jobs, agri-SMEs and food security. In the urban space, provision of municipal services (such as water supply, waste management, mobility, electricity, and gas) and other essentials like food and medical supplies could be interrupted, undermining public safety and compounding risks to human health. In the transport sector, passenger and freight logistics could be affected, with implications on the trucking sector and SMEs. In the energy sector, the slowdown is expected to impact electricity consumption and revenue of electricity companies. The lockdown and social distancing measures as well as demand for relevant commodities could affect the mining sector, undermining the country's earnings. In the digital development sector, the COVID-19 pandemic has highlighted the importance of ensuring that individuals, businesses, and governments can connect to affordable and reliable internet as the lifeblood of the service sector. Finally, private capital will likely be more risk averse in the medium term, as existing assets become distressed and risk-reward calculations change, adding to Mongolia's challenge to attract private financing for infrastructure. Therefore, important policy adjustments are needed to properly respond to ongoing impacts of the pandemic as well as to position Mongolia's economic recovery on a strong and sustainable footing, not losing sight of the long-term goals.

¹ Leveraging its location and comparative advantage requires strong economic connectivity covering both physical (e.g., roads, rails and ICT) and institutional (harmonized policies, regulations and standards at and behind borders) connectivity.

² Both pastureland and farmland suffer from severe land degradation. With average overstocking of 2.3 times above the carrying capacity, nearly 65 percent of the rangelands are degraded relative to their ecological potential, and almost 7 percent suffer from desertification.

³ The capital UB is one of the most polluted cities in the world.

2. KEY POLICY RECOMMENDATIONS

This policy note identifies **four key priority reform areas** to achieve these objectives, as well as specific policy options to address them. The policy recommendations are grouped into two categories:

- (i) **Immediate short-term recommendations**—which include actions needed in the next 6 months to a year to deal with emergency issues caused by the pandemic, including ensuring adequate food supply, uninterrupted provision of municipal services and import-export, and employment.
- (ii) **Medium-term recommendations**—which include institutional and structural reform actions to lay strong foundation for Mongolia’s sustainable use and management of its natural resources and built capital for its economic recovery and long-term vision of building a greener, and more diversified and resilient economy.

Promote rural development, and safe, sustainable agri-food systems—Mongolia’s agriculture holds a strong promise to support the country’s vision of a more diversified and resilient economy. Its vast pastureland and farmland and a long tradition of livestock farming, if accompanied with appropriate livestock and crop production model and supported by the right business environment and infrastructure connectivity, could create high-quality jobs, and high-quality products for export market and domestic consumption. Today, Mongolia’s agriculture sector suffers from animal health issues, overstocked livestock population against limited capacity of its pasture, unsustainable crop production system, inadequate value creation along the supply chain, and poor logistics connectivity and associated high transport cost. The current head-based livestock subsidies, emphasizing quantity over quality, exacerbate overstocking challenges. At the same time, public service delivery for animal health, breeding, and R&D are underfunded. In terms of infrastructure services in rural areas, including transport, electricity and gas, ICT and WASH), both quantity and quality are inadequate. For example, in the water supply and sanitation sector, while the urban population enjoys near universal access to basic water services (94%), only half of the rural population (56 per cent) had access to the same level of services in 2015⁴. On the sanitation front, while 66% of the urban population had access to basic sanitation services, only about 41% had access to the same level of services in rural areas. Similar stories hold for access to transport, electricity and ICT.

Key policy recommendations in the immediate short-term⁵ and medium-term⁶ include:

Immediate short-term policies	Medium-term policies
<ul style="list-style-type: none"> (i) Offer time-limited short-term cash transfers, input subsidies, lower import tariffs, and output incentives to producers and agri-SMEs (ii) Support agriculture labor mobility and safe return to work (iii) Facilitate imports (such as seeds and fertilizers, machinery, etc.) and exports (such as meat, wool and cashmere), including ensuring smooth functioning of 	<ul style="list-style-type: none"> (i) Align agricultural subsidies and incentives to focus on quality improvements and achieving sanitary and phytosanitary compliance. For example, decouple the head-based livestock subsidy and instead incentivize quality over quantity (ii) Improve public services in the agriculture sector by increasing spending and expanding public services for plant and animal health, breeding,

⁴ WHO/UNICEF JMP 2015

⁵ Actions needed in the next 6 months to a year to address emergency issues caused by COVID-19 pandemic, to ensure adequate food supplies, import-export, and employment in the agriculture sector.

⁶ To position Mongolia’s economic recovery on greener, and more diversified and resilient economy footing, not losing sight of the nation’s medium and long-term vision.

<p>freight logistics—both at the port and in the country—and transport corridors</p> <p>(iv) Use public works program for job creation in rural areas and establish strong foundation for sustainable economic recovery. It is important to identify shovel-ready projects that can create as many unskilled labor jobs as possible while at the same time contribute to maintaining adequate food supply (and food reserves); facilitate import-export; and ensure safe water supply, sanitation and hygiene (WASH) services in rural areas. Examples include large scale soil and water conservation activities, community water supply and sanitation activities, rural ICT and other CDD (Community Driven Development) activities⁷. As the Local Development Fund is already an effective means of transferring funds to local communities and generating local wage-earning opportunities, the Fund could also be used as a mechanism to facilitate small-scale public works activities for men and women.</p>	<p>advisory, and R&D. Investigate the option of e-vouchers for producers to access public services</p> <p>(iii) Improve institutions and legislation governing pastureland management</p> <p>(iv) Implement measures to improve food safety in livestock product supply chains</p> <p>(v) Invest in digital agriculture initiatives, such as climate smart, e-commerce, smart agriculture</p> <p>(vi) Implement a clear set of performance targets for all water sector service providers and implement a transparent and appropriate tariff mechanism</p> <p>(vii) Implement pollution fee models that incorporate polluter pays principles and support economic incentives to promote pollution reduction</p> <p>(viii) Promote and attract private sector investments (both domestic and FDI) in priority subsectors such as cattle farming, dairy farming, and meat processing</p>
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Promote sustainable urbanization and services provision—Mongolia has seen steady urbanization over the past two decades, with the proportion of urban population increasing from about 57% in 2000 to 69% in 2018, well above the regional average. Despite the vast size of the country, urbanization in Mongolia is dominated by a few urban centers. UB alone accounts for about 46% of the total population and 66% of the national GDP. Mongolia’s urbanization is characterized by uncoordinated development; urban sprawl and associated impacts like poor connectivity/accessibility, congestion and pollution (of air and water) as well as high cost of infrastructure services; and vulnerability to several risks and disasters due to unplanned urban expansion into high-risk prone areas and lack of proper drainage infrastructure. For example, UB is one of the highest polluted major cities in the world, undermining public health and its competitiveness. Generous land rights, outdated urban policies and limited capacity for planning and enforcement have resulted in the expansion of unplanned *ger* settlements, hosting more than half of the population in UB, Erdenet and Darkhan in these areas.⁸ Due to high cost of infrastructure, urban residents lack access to municipal services such as water supply and sanitation, waste management, gas and electricity, roads, etc. Recent World Bank study shows access to urban amenities in major cities in 2018 was poor, as only 59% had access to public transport, 60% enjoyed access to hospitals, 48% to schools,

⁷ Other CDD activities could include soil and water conservation, protection of water sources, drainage and construction of community water points and marketplaces.

⁸ Ger areas have been the main driver of urban expansion in the three main cities of UB, Erdenet and Darkhan, accounting for 83% of the urban footprint expansion between 2000 and 2019 in Erdenet, 77% in Darkhan and 81% in Ulaanbaatar. The analysis was conducted using the most recently available data from Landsat 8 satellite imagery (2019) and population statistics from the Mongolian Statistical Information Service (2018).

and 19% had access to public spaces.⁹ Where such services are provided, they are done with significantly higher cost. These urban forms are characteristics of carbon intensive lifestyle, leading to significantly higher GHG emissions. Mongolia’s cities are also home to large concentrations of poverty (about 64 percent (and about 42% in UB alone), according to the recent World Bank report)¹⁰.

Key policy recommendations in the immediate short-term and medium-term include:

Immediate short-term policies	Medium-term policies
<ul style="list-style-type: none"> (i) Offer time-limited and short-term cash transfers and subsidies to urban poor, SMEs, utility companies (for water and wastewater, solid waste, electricity and gas) and public transport companies to ensure continuous essential supplies and services (ii) Prioritize investments in emergency urban infrastructure maintenance and public education to ensure uninterrupted municipal services provision and raise hygiene awareness (e.g., urban roads and rail, WASH, solid waste management, and digital infrastructure such as e-commerce) (iii) Support urban communities through public works programs such as construction/ maintenance of sidewalks, service roads, drainage infrastructure, and retrofitting of public buildings. It’s important to adopt a ‘<i>build back better, greener and more resilient</i>’ model while undertaking these public works projects to ensure they are fit for purpose, resilient to climate change impacts and low-carbon. 	<ul style="list-style-type: none"> (i) Update urban development law (and enforce its implementation) to incorporate principles of smaller block sizes and compact urban growth with special focus on increasing population density close to main public transport corridors and near employment centers; polycentric cities with mixed land uses and low-carbon public transport and active mobility possibilities (e.g. biking, walking); and prioritize infill growth on vacant and underutilized lands and urban regeneration at financially viable densities. (ii) Improve hazard mapping of flood prone areas in cities, including delineating fragile areas that should remain protected or public land, and invest in seismic resilience, especially in UB city. Mongolian cities are developed in high-risk regions and are thus vulnerable to a range of natural hazards and climate risks.¹¹ Records indicate a significant increase in seismic activity around UB with over 2000 earthquakes of up to 4.2 magnitude on Richter scale between 1976 and 2010. Many public buildings are old and need to be retrofitted to withstand severe events. Mongolia’s cities also regularly experience flashfloods and <i>dzuds</i>, particularly exposing low-income <i>ger</i> households located in river basins, hill slopes and flood drain pathways.¹² (iii) Improve integrated urban planning with a view to increasing access to services¹³ and aligning its implementation with sectoral plans. Strengthen mechanisms for cross-sector coordination between urban planning department and sectoral departments in cities to ensure provision of new urban amenities and services are aligned with the city’s Master Plan.

⁹ Estimates based on ongoing World Bank study on Cities and Climate Change. The location of urban amenities was obtained from different planning departments of Ulaanbaatar, Erdenet and Darkhan in 2019. When information was missing, additional data was obtained from [OpenStreetMap](#).

¹⁰ World Bank (2020). *Mongolia Poverty Update*. In terms of numbers, UB has the largest share of the urban poor (378.2 thousand). <https://www.worldbank.org/en/country/mongolia/publication/mongolia-poverty-update>

¹¹ Ministry of Environment and Tourism of Mongolia (2018). Mongolia’s Third National Communication to the UNFCC.

¹² World Bank (2015).

¹³ Including addressing spatial inequality in access to jobs and municipal services in *ger* areas and others.

	<p>(iv) Update green urban planning standards, norms and codes as well as urban development legislations. The government’s recent adoption of the integrated electronic land management system that will integrate the land cadastral data, electronic planning, land valuation/ tax/payment, and land monitoring systems, as part of the SMART Government initiative is an excellent initiative. The system is expected to bring transparency by allowing citizens to receive real-time updates, supervise land management activities, and reduce bureaucracy and land related disputes.¹⁴ Proper implementation of this new system is important by completing and digitizing land/property data, upgrading the system to include all of the attributes and data required by UB and other cities, integrating the General Authority for State Registration (GASR) system which registers ownership of private property, and by agreeing on national mapping and other geospatial data standards to upgrade/integrate land information from other agencies and municipalities.</p> <p>(v) Undertake policies and investments to support competitiveness of SME sector such as clustering; establishment of industrial parks; skill development based on best practice examples; as well as improving the environmental performance of polluting urban industries, relocating them and regenerating urban land on a targeted basis. SMEs in urban areas face many challenges such as access to credit, infrastructure, markets, and wastewater treatment facilities. Improving SME competitiveness can be an important strategy for job growth and poverty reduction in UB and other urban areas.¹⁵</p> <p>(vi) Support measures to improve urban water supply and sanitation, including waste management; and air quality improvement programs in cities. Develop a strong WASH program—aligned with the country’s SDGs—to ensure adequate coverage of WASH services in urban areas and satellite cities. Investments in renewable energy (RE), energy efficiency (EE) in urban areas; scale up EE measures targeted at improving housing insulation in ger areas and phasing out fossil fuels for electricity generated with clean sources.</p>
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¹⁴ Business Council of Mongolia, News Wire Issue 622, 27 March 2020.

¹⁵ This strategy is well demonstrated in other countries. See for instance, https://www.ilo.org/global/about-the-ilo/newsroom/news/WCMS_218252/lang--en/index.htm

Sustainable natural resources management and environment— Mongolia has vast natural resources (world-class minerals, pasture and water) and unspoiled natural landscapes to build green, resilient and sustainable economy—including sustainable mining and livestock farming, sustainable and safe food systems, and a unique nature-based tourism. However, unsustainable exploitation of natural resources will undermine Mongolia’s ability to build a more diversified and sustainable economy in the long run. The mining sector generates disproportionately higher revenues to support Mongolia’s economy. However, there are growing signs that mining activities come with significant impact on the environment, contributing to the pressures on rangeland, community health, and over-abstraction and pollution of scarce water resources. Mongolia’s water resources are adequate on average at the national level. Nonetheless, given the big geographic coverage and low population density, its spatial and temporal distribution is a huge challenge. In other words, adequate amount of water is not available in places where large population and economic activities are concentrated, such as UB and in the Gobi Desert where scarce groundwater resources are being exploited to support the country’s large mining activities, pitting local communities against large miners. Although river basin authorities have been formed and integrated river basin management plans prepared, their implementation is far from adequate owing to the lack of prioritization, funding constraints and poor enforcement of regulations. In addition, while a large portion of the country’s territory is under different kinds of protections (such as special and strictly protected areas, nature reserves and national parks, and natural monuments), not all designated areas have management plans, and significant habitats and migration corridors remain protected. Mongolia’s unplanned urban development approach has also enabled large migration of rural population to major cities like UB where they are settled in underserved *ger* areas. *Ger* area residents mostly depend on burning poor quality coal for heating during long winter months resulting in high levels of air pollution. Long commutes to work and traffic jams also contribute to air pollution and GHG emissions. The Government recognizes these challenges and has approved a series of important strategic policies focused on ecological balance, social stability and climate resilience. The objectives of these policies are closely linked to Mongolia’s NDC under the Paris Agreement¹⁶.

Key policy recommendations in the immediate short-term and medium-term include:

Immediate short-term policies	Medium-term policies
<ul style="list-style-type: none"> (i) Ensure continued supervision and enforcement of protected areas by supporting local communities and relevant government agencies, including use of remote sensing technologies and ICT (ii) Offer time-limited and short-term cash transfers and subsidies to SMEs involved in eco-tourism (e.g., to travel companies, hotels, etc.) (iii) Employ large scale afforestation and watershed management/ landscape protection programs as part of public works program to create jobs. These offer good examples of nature-based solutions to address environmental issues as well as to 	<ul style="list-style-type: none"> (i) Undertake comprehensive assessment of cumulative environmental and social impacts of mining activities to alleviate unsustainable exploitation of mineral resources. High-level multi-sector task force is needed to steer a science-based assessment with continuous stakeholder feedback of the cumulative impact of mining activities, and the carrying capacity of the land and communities for expansion based on explicit costs, benefits, and societal preferences¹⁷. Moreover, planning for safe mine closures is needed to manage and mitigate environment legacy issues and social impacts. (ii) Promote use of nature-based tourism to contribute to Mongolia’s economic recovery and

¹⁶ https://www.international-climate-initiative.com/en/news/article/mongolia_has_started_to_implement_its_ndcs/

¹⁷ Considering the possibilities for enhancing environmental protection and restoration activities and the effectiveness of offset mechanisms.

<p>improve rural services. Mongolia can build on existing programs such as the Sustainable Livelihood Program (SLP-3) and the Local Development Fund (LDF) that have systems in place covering most of Mongolia’s districts and a mechanism to pay based on performance.</p> <p>(iv) Support proper collection, treatment and safe disposal of COVID-19 related medical equipment and plastic waste.</p>	<p>diversification and sustainable management of natural resources, plus enable the private sector to play key role. Revenues generated from nature-based tourism could be reinvested in further improving NRM, creating a sustainable financing model.</p> <p>(iii) Review the adequacy of the current framework for protected area management and implementation of action plans to close the gap between the stated policy intent and implementation. An integrated landscape management (ILM) approach to NRM that involves multiple sectors and stakeholders at landscape level is recommended to ensure Mongolia’s long-term development and the well-being of its people. Proper prioritization and implementation of river basin management plans aligned with the new concept of ILM is important.</p> <p>(iv) For air pollution, evidence-based policymaking and focus on implementation are two key recommendations. Accordingly, the “National Program on Reduction of Air and Environment Pollution” adopted by the Government in 2017 and the National Action Plan prepared subsequently for implementation must be updated. Where measures are costed, their benefits assessed, and where they are prioritized, they must be implemented. The advanced stoves program must be continued in the interim while a comprehensive action plan for air quality management¹⁸ should be adopted and implemented in the long run. Investments in priority RE and EE projects, as well as those of district heating expansion and heat loss prevention, must be pursued.</p> <p>(v) Adopt green, resilient and climate proof filters in the country’s development model. Mongolia faces many challenges in achieving its climate and sustainability targets. Key barriers include lack of green/climate finance instruments and long-term funding, need for policy and regulatory alignment to support and promote sustainability agenda, and insufficient capacity of regulators as well as financial intermediaries. Sustainable finance can support economic development in terms of better resilience and risk management of the financial market through the integration of climate and</p>
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¹⁸ This should be informed by comprehensive assessment including source inventory and apportionment, and atmospheric modelling is also needed to assess developments in air quality and pollution levels (with focus in UB), supported by sufficiently dense network of automated samplers. While currently energy-related sources dominate contribution to air pollution in UB, it can be expected that the relative importance of other sources such as industries, transport, and emissions from the combined heat and power plants could be higher.

	environmental, social and governance (ESG) considerations and promoting financial flows to support environmentally friendly projects and business activities (green projects).
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Sustainable infrastructure and connectivity—Mongolia is a vast country, but major economic activities and most of the population are concentrated in a few places. Being a land locked country with more than six times the size of the UK and less than half the population of London presents unique infrastructure challenges. On the other hand, lack of critical infrastructure (transport, energy and digital) is considered a major constraint to Mongolia’s connectivity and economic diversification aspirations. Potential for economic diversification has been identified in mining beneficiation and value addition, livestock sector, business tourism, service industry, and renewable energy for export. Each of these sectors requires transport, energy and digital infrastructure. However, with average transport distances of more than 600km, logistics costs as a percentage of GDP approximately 30% and some of the lowest contributions from the infrastructure sector to GDP, Mongolia needs a different approach to developing much needed infrastructure. A ‘build and they shall come’ approach for each infrastructure sector is sub-optimal.

Key policy recommendations in the immediate short-term and medium-term include:

Immediate short-term policies	Medium-term policies
<ul style="list-style-type: none"> (i) Support freight logistics (including warehouse and storage facilities, processing and packaging, and distribution) and public transport systems to ensure uninterrupted provision of necessary supplies and essential personnel (e.g., health professionals, public safety and security staff, etc.) (ii) Expedite use of ICT tools (e.g., by increasing internet access in the rural areas, broadband traffic for essential public service delivery and increased infrastructural readiness for government officials to work remotely) and digitization of priority public services relevant to COVID-19 (e.g., health, education, transport) to promote efficient and transparent provision of services, including e-commerce (iii) Identify and support least cost and last-mile infrastructure and connectivity projects (in energy, heat and gas, water supply and sanitation, transport and ICT) that have large returns on investment and create jobs aligned with the “build back better, greener and more resilient” model. Some examples could include introduction of natural gas, expanding district heating, replacing coal-fired stoves and boilers, constructing transmission lines to connect mining loads and improving energy efficiency--e.g. 	<ul style="list-style-type: none"> (i) Prioritize infrastructure investments by looking at key economic value chains and target infrastructure constraints specific to these value chains. This includes focusing on developing a medium-term strategic plan with a priority list of projects which is realistic, based on a rigorous economic and financial assessment of investment needs. Instead of projects being proposed by line ministries on an ad-hoc basis, the medium-term and subsequently annual plans should be informed by the national master plan and linked to the Public Investment Plan process. In the transport sector, prioritize investments that help to enhance competitiveness of traded goods generally by selectively piggy backing on rail investments needed for coal, while relying on upgrading the road network as far as possible. In the mining sector, investments that harness unmet demand from mines and mineral processing for uninterruptible grid-supplied electricity should be prioritized. Similarly, for the energy sector, upgrading, modernization and expansion will be needed to sustain economic growth. Regional energy cooperation and trade presents huge opportunities. (ii) Promote use of private financing for infrastructure by improving the regulatory framework and investment climate, leveraging big mining investments, and reforming tariffs to

<p>through retrofitting of public and residential buildings.</p>	<p>create sustainable revenue streams. This includes: (i) reducing the long Concessions list to a pipeline of 10-20 well-considered PPP projects with economic value and financial viability, and bringing together financially viable projects from other “lists” and departments such as those projects under CMREC and Erdenes Mongol so there is one master list of possible investments for private sector participation; (ii) ensuring the projects on the list are well-prepared and competitively tendered, including with budget to hire outside advisors as needed; (iii) continuing to harmonize the Law on Concessions with the budgeting process, where all potential projects are put through the same screening process for financial viability; (iv) developing policies and regulatory instruments that promote advance planning of mining infrastructure with stakeholders and which maximize the scope for such infrastructure to be multi-purpose; (v) carrying out energy pricing reforms to increase efficiency and lower cost of service delivery, and attract private investment to the sector; and (vi) integrate Erdenes Mongol’s plans for identifying, selecting and financing infrastructure projects into national planning of infrastructure (pending the outcome of the proposed review in (iii) below).</p> <p>(iii) Reassess the Mongolia’s policy of taking equity in strategic mineral deposits to ensure the optimal use of scarce public financial resources. In principle the State equity policy should capture mineral resource rents for the benefit of the nation, however, the returns on equity take a long time to materialize and are subject to great uncertainty. If the State relies more on the private sector and less on the public sector to finance the sector a significant amount of public funds can be freed up to use on public infrastructure to support diversification of the economy. Better access to reliable public infrastructure would lower mining costs, increase mining profits and associated royalty and income tax payments, and the infrastructure could still earn a reasonable rate of financial return from user fees. Privately financed mining projects can also contribute to financing shared infrastructure, which is open to multiple use and users, based on the avoided cost of building dedicated infrastructure.</p> <p>(iv) Reduce institutional fragmentation in the selection and approval process for key</p>
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	<p>infrastructure investments, including with respect to the strategic trans-Mongolian corridor. To enhance Mongolia's strategic position between Russia and China, a more operational institutional framework for promoting the Trans-Mongolian corridor needs to be designed. This should include specific mechanisms for regional traffic observation, marketing of the corridor, addressing logistics and trade facilitation bottlenecks, challenges of interoperability and challenges associated with trade attracting alternative financing and instruments for developing critical infrastructure needed for regional transit. Moreover, to address the institutional fragmentation, a central unit composed of representation from various infrastructure ministries but led by Ministry of Finance is needed to ensure coordination, good planning and prudent spending.</p>
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3. ANNEXES: SECTOR-SPECIFIC NOTES

1) TRANSFORMING MONGOLIAN AGRICULTURE THROUGH GROWTH, RESILIENCE, AND COMPETITIVENESS

Executive Summary

Agriculture growth is hampered by the sector's inability to produce a variety of high-quality products that meet sanitary and phytosanitary standards that satisfy international market requirements as well as the local demand of an increasing urban population with an emerging middle class. To stabilize their incomes, agriculture producers emphasize quantity over quality. Cattle overstocking has resulted in widespread pasture degradation, which in turn reduces animals' nutrition status and meat quality while increasing their susceptibility to diseases, thus intensifying the quality and income challenges. Crop productivity has been increasing, but weak nutrient management and soil erosion have degraded farmlands' soil productivity. The government's support system has been exacerbating these challenges by coupling subsidies with quantitative variables and giving soft loan programs without incentivizing agricultural producers and SMEs to invest in better animal health and quality improvements. Fulfilling sanitary and phytosanitary standards will become even more important as Covid19 will lead to stricter requirements in export markets.

This note identifies three sets of recommendations to break the vicious cycle and steer onto a path of sustainable growth for high quality, value added agri-food products that satisfy markets' food safety requirements.

- (1) Align public spending with transformation objectives for the agri-food sector and leverage private investment;
- (2) Promote sustainable and safe agri-food systems;
- (3) Meet market demand for quality and safety of food products.

Context

Mongolia's agriculture sector contributes significantly to income generation and holds considerable export potential. Agriculture accounts for about 12 percent of GDP and employs one third of the workforce. The livestock sector represents about 90 percent of agricultural production. Meat and milk are the primary products of the livestock sector, with 61 percent of livestock output and 7 percent of the country's GDP. Agriculture constitutes 7 percent of total exports, which makes it the second-largest export sector after mining. Historically, the crop sector contributes less to Mongolia's agriculture. The Government has successfully been implementing policies to increase domestic production of wheat, potatoes, vegetables, and fruit to expand supply and reduce import dependency. It is expected that COVID-19 will lead to bottlenecks in imports of rice, fruits, and vegetables. COVID-19 also affects exports through supply chain disruptions, trade restrictions, and increased food safety barriers.

The sector is essential for poverty reduction and food security. Mongolia is a low-middle income country. However, in 2018, nearly one-third (28.4 percent) of the population lived in poverty. Food insecurity and malnutrition are prevalent, with 50.2 percent of households experiencing moderate or severe food insecurity. Rising unemployment because of the economic shocks caused by COVID-19 will increase poverty and is threatening food security. Mongolia is self-sufficient in meat, but import bottlenecks in rice, fruits, and vegetables will negatively affect the availability of plant products and nutrition. About 20

percent of all households are herding households. The pastoral and nomadic background in Mongolia is associated with a high intake of proteins and carbohydrates from meat and milk products and little dietary diversity, leaving the population increasingly susceptible to nutrient deficiencies and excess weight gain. Rapid urbanization resulted in over two thirds of the population living in urban centers. About half of the population resides in the capital city of Ulaanbaatar. An urban middle class is emerging, demanding high quality, safe food products. Increasing awareness about the link between diet and health creates demand for safe and good quality food, especially animal food products.

Mongolia's vast pastureland (110 million hectares) and pastoral production system imply a comparative advantage for a grass-fed livestock production that can produce large quantities of organically bred and fed livestock. Despite the tremendous potential for meat exports, only about 10 percent of this potential is currently realized, mostly because the meat products do not meet the quality and safety standards of export markets. The ongoing COVID-19 pandemic will make food safety requirements more stringent, and the public sector will have to support food business operators to achieve food safety compliance both at the domestic and international levels.

The large and increasing livestock population reached 66.8 million heads in 2018 and, together with unsustainable pasture management practices, deteriorated the pastureland and nutrition status of animals. Nutritional deficiency, in turn, reduces livestock productivity, meat quality, and increases the susceptibility to diseases. It also makes the animals more prone to die from adverse weather events such as *dzuds*, droughts or floods.

Head-based livestock subsidies have exacerbated the problems from cattle overstocking, emphasizing quantity over quality. At the same time, public service delivery for animal health, breeding, and research and development are underfunded. This public expenditure structure does not adequately support the Government's priorities of increasing commercialization and exports of high-quality and safe meat products to increase income among herders and generate growth and employment in the livestock product value chain.

Public services for agriculture, such as plant and animal health, breeding, and research & development, have been underfunded since the collapse of the Soviet Union. Existing veterinary service programs lack human, physical, and monetary resources to adequately address the control of infectious diseases and support comprehensive herd health programs.

The COVID-19 pandemic around the world is impacting not only food trade, food supply chains, and markets but also people's lives, livelihoods, and nutrition. Mongolia is severely affected due to declining revenues from traditional mineral exports, weakening global demand due to rising unemployment, disruptions in transportation of goods and services, and reduction in labor migration both domestically and internationally. Mongolia is taking steps to maintain functioning food value chains by (i) lowering import tariffs; (ii) increasing access to finance for food importers; (iii) maintaining food reserves, so the supermarket shelves are currently well-stocked. However, the livestock and agriculture SMEs are under considerable pressure because of supply disruptions, lack of access to finance, and delayed payments by buyers. Agri-exports, particularly meat, cashmere, and wool, are facing weak demands as global demand falls with higher worldwide income losses. The outlook presents an increasing bankruptcy/default risk among SMEs in the short-term and weaker growth projections over the next 18 months.

Key Challenges and Recommendations

Key Challenge 1: Agriculture Financing

To harness the agri-food sector for poverty reduction and growth, Mongolia wants to use its public resources to strengthen the sector's enabling environment in production. Such measures will help attract private investments in the sector, which will bring about quality improvements in the meat and crop value chains, thus generating sustainable, market-driven income gains for producers. Presently, Mongolia's quantity-based wool and hide/skin as well as wheat subsidies provide short-term financial support to producers but lack strategic orientation towards attracting private sector investments and do not contribute to improved long-term food security or economic efficiency goals in the sector. The disregard for quality and increased productivity have depressed demand for R&D, extension services, and discouraged innovation and diversification into higher-value products with potential for employment generation and productivity growth. Increased labor costs negatively affect the profitability of labor-intensive crops, especially vegetable and fruit production, inevitably calling for agriculture modernization and use of technologies. There is a weak regulatory framework to develop a market for value chain financing (VCF), and there is need to design third party collateral management services and VCF electronic finance platforms.

Recommendations:

- a) **Align public spending with transformation objectives in the agriculture sector.** Undertake a comprehensive review of the subsidy system and formulate suggestions for aligning agriculture spending with priorities. Decouple support measures from quantitative variables and design incentives around quality improvements and achieving sanitary and phytosanitary compliance. To address short-term threats for food security and poverty of farmers and herders caused by COVID-19 disruptions, short-term cash transfers, input subsidies, and output incentives may be needed to maintain the sector viability during the economic crisis.
- b) **Improve public services to the agriculture sector** by increasing spending and expanding public services for plant and animal health, breeding, advisory, and research & development. Investigate the option of e-vouchers for producers to access public services.
- c) **Invest in digital agriculture initiatives** that improve productivity and resource use efficiency as well as food governance and agriculture risk management.
- d) **Develop vision and strategy for targeting and attracting investors** in those agri sub sectors that offer win-win for Mongolia and the investor, implement it continuously and persistently.
- e) **Create stronger, efficient and transparent regulatory environment** for VCF and build capacities of both financial institutions as well as the private sector.

Key Challenge 2: Sustainable Agriculture Growth and Resilience

Both pastureland and farmland suffer from severe land degradation. With average overstocking of 2.3 times above the carrying capacity, nearly 65 percent of the rangelands are degraded relative to their ecological potential, and almost 7 percent suffer from desertification. Decreased fodder availability leads to inadequate nutritional reserves. A deficient nutrition status causes low productivity and makes animals vulnerable to climate variability and extreme weather events such as *dzuds*, causing high mortality rates. Crop production has been increasing, but inadequate fertilization and nutrient management, together with varying degrees of soil erosion, threaten future productivity gains in the crop sector. Water supply is insufficient in some areas, and it is uncertain how climate change will affect the long-term availability of water for agriculture. The agriculture sector heavily contributes to climate change. It is the second largest (43 percent) source of greenhouse gas (GHG) emissions after the energy sector (50 percent). Integrated landscape management approaches, including sustainable approaches to pasture and livestock

management, will be needed to restore land, improve its agri-system services, and sustain food production and livelihoods.

Recommendations: Promote Sustainable and Safe Agri-Food Systems

- a) **Develop integrated landscape management systems** in production landscapes to enhance soil and water conservation, climate change mitigation, food security, and sustainable rural livelihoods. This includes designing conducive policies and institutions to enable landscape planning that will support sustainable agriculture development goals and land restoration targets.
- b) **Design innovative payments for agro-ecological services** that promote sustainable and safe agri-food systems. Review agriculture public expenditure mechanisms and develop a national policy on payments for agriculture that strengthens sustainability in agri-production systems and land and water resources (link to cluster I).
- c) **Identify and prioritize green agri-food investments** that promote sustainable food production practices and ecologically responsible agri-food value chains.
- d) **Improve institutions and legislation governing the pastureland management**, including a pasture management law.

Key Challenge 3: Commercialization of the Sector

Mongolia has a comparative advantage for meat products as well as hides/skins, wool and wool products, and dairy products. However, it is estimated that the country realizes only about 10 percent of its meat export potential. Insufficient quality and amount of value-added processing, together with processors' limited capacity in building sustainable supply chains, product development, marketing, and sales promotion hinder market access.

Poor food hygiene and sanitary and phytosanitary conditions further hamper agriculture sector competitiveness and reduce export potential. Major disease outbreaks, including foot-and-mouth disease (FMD), peste des petits ruminants (PPR), endemic diseases such as brucellosis, anthrax, and high levels of parasitism are not under control. Pairing that with limited knowledge of food safety requirements impairs the ability of Mongolian producers to provide high-quality meat products for the export market. Food safety programs are operating, but there is no effective control of residues (drugs, pesticides, etc.) or foodborne zoonoses (fascioliasis, cysticercosis, tuberculosis, echinococcosis, etc.) because of lack of clear policy, inadequate monitoring and surveillance, and scattered vaccination. In addition, frequent changes in export quotas especially for meat, import quotas for milk as well as cumbersome process of quota allocation make the exporters and importers vulnerable and uncompetitive leading to the loss of contracts and business reputation.

Market systems and infrastructure, including grading systems and facilities, are under-developed. Logistics infrastructure, such as storage, cooling, and transportation, also limit the capacity for exports and local consumption.

Recommendation: Meet Market Demand for Quality and Safety of Food Products

- a) **Strengthen the Enabling Business of Agriculture (EBA)**. Studies on EBA to critically examine the efficiency of the policy and regulatory environment for the growth of livestock and agriculture businesses in identifying and prioritizing reforms for improving the investment attractiveness and competitiveness of the sector. These include the review of regulations of agricultural input markets, access to finance, product quality, sanitary and phytosanitary standards, as well as trucking licenses. EBA indicators will allow Mongolia to benchmark itself against internationally accepted 'good

- practices' that can be used for reforms and serves as a resource for governments, investors, researchers, and others interested in enabling countries' agribusiness environment of countries.
- b) **Review the modalities of agri-SME support** through the SME development fund and identify opportunities to channel support in a way that minimizes distortions in the credit market and maximizes loan performance. Providing subsidized loans on a competitive basis for investments in productivity and quality improvements, including food safety measures, will provide incentives to the private sector to increase animal health and the quality of meat and meat products.
 - c) **Improve food safety in livestock supply chains** by reviewing the food safety regulatory system, strengthening laboratory capacity to meet international standards (links to recommendation 1.3 above), and institutionalizing risk-based supervision frameworks, including animal health information systems and traceability systems. Include a review of the “import conditions” of destination markets of both existing markets/products as well as potential markets/products. The goal is to create a gap analysis between the import conditions requirements in destination markets with the ability of Mongolia to meet those conditions (at the level of production/processing/quality infrastructure). The Government can harness the private sector to improve animal health and food safety within its value chains, including through veterinary and vaccination services (related to recommendation 1.3). Public-private partnerships can support coordinated action of herders, traders, and processors in the meat value chain to remove constraints and identify opportunities for meeting market demand for high-quality and safe meat products. Technical assistance to herders, traders, meat markets, and processors will increase the volume of meat products meeting quality and safety standards. Private or public quality assurance schemes can help with branding high-quality meat products produced under sustainable management practices.
 - d) **Improve regulations on allocation of quotas** by making them more transparent, remove unnecessary stages in getting export permits for agri products and conduct proper consultations with private sector before changing regulations or making policy decisions that may have adverse effects on business environment

2) MANAGING NATURAL RESOURCES FOR SUSTAINABLE GROWTH

Executive Summary

Natural resources are at the core of Mongolia's development and the well-being of its population and provide ecosystem services in support of key economic sectors. One of the country's greatest assets is the relatively unspoiled nature of its ecosystems that harbor significant biodiversity. Mongolia's unique natural and cultural sites provide a solid foundation for a sustainable tourism industry that could support economic growth and diversification, and improve local livelihoods. This natural endowment is, however, being impoverished because of land degradation due to overgrazing, the impact of climate change that further fragilizes ecosystems as well as industrial activities (mining).

Key Challenge 1: Meeting the Implementation Gap for Sustainable Ecosystems. While a large portion of the territory is under protection, not all designated areas have management plans; and significant habitats and migration corridors are unprotected and underfunded.

Recommendation: Review the adequacy of the framework for protected areas management, and implement an action plan to close the gap between the stated policy intent and implementation, including allocation of enhanced budgetary resources in line with the importance of the resources at stake.

Key Challenge 2: The Potential for Nature-Based Tourism Has Not Been Comprehensively Assessed. Many of the country's key natural and cultural sites of significance are under threat from unmanaged development. Hence, the potential of nature-based tourism to contribute to wealth generation as well as rural livelihoods is left unrealized.

Recommendation: The government should rapidly review key potential touristic sites in the country and develop an improved management framework and action plan, focusing on the most vulnerable sites to the impact of COVID-19.

Key Challenge 3: Managing Mining Resources in Line with the Green Development Policy. The Mongolian economy is heavily dependent on the mining sector, but there are signs that mining activities come with an impact on the environment. This is happening without a comprehensive country-wide environmental and social impact assessment of the cumulative impacts of mining.

Recommendation: The government could establish a high-level multi-sector task force to steer a science-based assessment of the cumulative environmental and social impacts of mining activities.

Context

Natural resources are at the core of Mongolia's development and the well-being of its population. They are the basis for key economic activities, and provide ecosystem services — including clean water, food, fodder — in support of vital sectors, agriculture, pastoralism, mining and tourism. At the same time, labor intensive sectors such as agriculture are important for building resilience to the on-going Covid-19 pandemic, and other shocks. Mongolia is also the least densely populated country in the world. Consequently, one of the country's greatest, and undervalued, assets is the relatively unspoiled nature of its ecosystems that harbor significant biodiversity, with iconic and globally significant species such as the

Snow Leopard, the Black Tailed Gazelle, or the Gold Eagle. This natural endowment is, however, being impoverished because of land degradation due to overgrazing, the impact of climate change that further fragilizes ecosystems, and industrial activities (mining). The use of mercury in gold extraction from small scale and artisanal mining is also a concern. Finally, tourism itself is putting a pressure on ecosystems. This is despite a relatively large part of the country – nearly thirty percent – under some form of conservation designation, building on a long tradition of protected areas.

The protected areas system is fragmented, and lacks strong overall policy and regulatory framework, with many critical habitats not covered. Those that are lack the appropriate management plans and financial, human and technical capacity. This has provided limited incentives for agencies and local communities to protect areas for long-term sustainable use. For tourism to continue increasing its role in Mongolia’s economy, the country’s natural and cultural assets must be utilized and conserved in a manner that is both environmentally sustainable and economically viable.

Mongolia’s unique natural and cultural sites provide a solid foundation for a sustainable tourism industry that could support economic growth and diversification and improve local livelihoods. Mongolia’s relatively undisturbed ecosystems support a living nomadic culture and provide habitat for a variety of wildlife, including several globally endangered species. Most international tourists come to Mongolia to experience these nature-based attractions. At the core of the problem is a lack of nature-based development planning to better distribute economic activities and minimize negative impacts.

Nature-based tourism can help utilize resources to generate funding to support their preservation and support livelihoods. The development of such activities is usually based on effective cooperation between relevant authorities and local businesses, and requires effective mechanisms for public-private partnerships. International practices show that it is essential to involve local communities and ensure that they receive social and economic benefits from the sustainable uses of local resources. For example, ecosystem management by herder groups including maintaining water resources, pasture management and the establishment of buffer strips can all lead to limiting land degradation, improving the long-term land capacity of the land to support productive activities, and building resilience and reducing community vulnerability in the event of extreme climate events such as a *dzuds*, droughts and floods which have grown in frequency and severity over the last six decades.

Nature-based tourism has the potential to bring multiple benefits to Mongolia, including:

- Diversifying sources of economic growth: tourism offers an opportunity to increase the share of the service sector in Mongolia and reduce dependence on resource extraction – tourism is also a key source of foreign exchange.
- Provide supplemental income for local communities, many of which rely solely on herding and other agricultural activities. Effectively planned and well-managed sustainable tourism has the potential to spread benefits to local communities, supplement their income and sustain their traditional culture and lifestyle.
- Support the preservation and sustainable management of valuable natural and cultural resources, offsetting the negative environmental impacts of mining and agriculture.

Key Challenges and Recommendations

Key Challenge 1: Implementation Gap for Sustainable Ecosystems

While a large portion of the territory is under protection – with local, special, and strictly protected areas, nature reserves and national parks, and natural monuments – not all designated areas have management plans; and significant habitats and migration corridors are not protected, with budgetary constraints in part due to the inability of individual protected areas to use revenues from entrance fees on conservation related activities.

Recommendation:

Given the importance of natural resources management for the long-term sustainable development of Mongolia and the well-being of its people, it would be important to rapidly review the adequacy of the framework for protected area management, and implement an action plan to close the gap between the stated policy intent and implementation. This would include a critical review and resolution of any overlaps between licenses and natural habitats; review of critical habitats not under protection; development of management plans for all existing areas under nominal protection and increased management effectiveness; policy harmonization between the central and local levels of protection for a well-managed protected areas system; and, last but not least, allocation of enhanced budgetary resources in line with the importance of the resources at stake.

Key Challenge 2: The Potential for Nature-Based Tourism Has Not Been Comprehensively Assessed

Many of the country's key natural and cultural sites of significance are under threat from unmanaged development, with tourists' visits concentrated in certain spots, while many attractive areas remain inaccessible and underdeveloped, with significant infrastructure gaps. There are also direct threats to sites from conflicting uses of the territory, such as mining developments, logging, and other extractive activities. Illegal trade in wildlife and cultural artifacts also contribute to site degradation and wildlife loss. This results in part from a lack of knowledge from decision-makers regarding both ecosystem values, and potential of nature-based tourism to monetize this value and contribute to wealth generation as well as rural livelihoods, if well managed. Consequently, low priority has been accorded to biodiversity conservation in policies, planning, and budgetary allocations. Moreover, these resources are at risk from the global impact of COVID-19, and may be at even greater risk if their value is not taken into consideration in efforts to support economic recovery. Indeed, tourism is a significant contribution to GDP – estimated at over 11% in 2017 – and employing over 120,000 people and will need to be supported to bounce back from the crisis.

Recommendation:

The GoM should rapidly engage in a review of the key potential touristic sites in the country and develop an improved management framework and action plan, focusing on the most vulnerable sites to the impact of COVID-19. Activities would include review and update of the list of key touristic nature-based attractions in the country, selecting those with potential for further development; economic analysis of potential for revenue generation, with projections for the future under different growth and development scenarios; landscape-based analysis of the selected areas, identifying different land-uses and drafting integrated management plans to conciliate the different activities; review of basic infrastructure needs (both touristic and for protected area management), as well as management strengthening needs

(monitoring of the area, communications, patrolling, and others); and integrated plan for development of priority areas, with the goal of tourism development, benefit-sharing, improved management and conservation of the nature-based attractions.

Key Challenge 3: Management of Mining Resources in Line with the Green Development Policy

The Mongolian economy is heavily dependent on the mining sector, with large projects generating very large revenues, and considerable unexploited reserves. Mongolia joined the Extractives Industries Transparency Initiative and has been successful in meeting its reporting commitments under the Initiative with support from the World Bank. Mongolia is also engaged in a project supported by grant funding from the Global Environment Facility through UNEP and UNIDO to reduce the use and impact of mercury for artisanal gold mining. There are however signs that mining activities come with a wide range of impacts on the environment: contributing to the pressures on rangeland; community health; and abstraction and pollution of water resources. This is happening without a comprehensive country-wide environmental and social impact assessment of the cumulative impacts of mining, and expected impacts and management options under various growth scenarios. This leaves decision-makers and citizens the tools necessary to understand and manage the cumulative impact and future growth of resource extraction.

Recommendation:

The Government could establish a high-level multi-sector task force to steer a science-based assessment with continuous stakeholder feedback of the cumulative impact of mining activities, and the carrying capacity of the land and communities for expansion, based on explicit costs, benefits, and societal preferences, taking into account the possibilities for enhancing environmental protection, restoration activities and the effectiveness of offset mechanisms. Moreover, planning ahead for mine closures is needed to manage and mitigate environment legacy issues and social impacts. This would represent a long-lasting legacy of the Government to future decision-makers and the people of Mongolia.

3) ENSURING A WATER SECURE FUTURE

Executive Summary

Mongolia's vulnerability to climate change and the unique characteristics of the country's water resources have the potential to significantly undermine efforts to sustain economic growth and development. Increasing urbanization and reliance on mining-driven economy, coupled with a lack of available data and information, accentuate competition among users and increase the risk of impacts on the economy. Areas most at risk are predominantly the economic hub of Ulaanbaatar and the mining hub in the Southern Gobi region. Scarce resources are increasingly vulnerable to pollution, potentially undermining the resources. Priority recommendations in addressing these challenges include: (i) **Strengthening Water Governance at the River Basin Level** through the continued development of programs and platforms that can support more inclusive and active stakeholder participation, increase accountability, and promote partnerships between the public and private sectors; (ii) **Improving Data and Information for Decision Making** by implementing a consolidated and comprehensive national data exchange platform that integrates data across government agencies and other stakeholders; and, (iii) **Developing a Capital Investment Plan and Sustainable Development Pathways** to identify options to meet the forecast demand and supply projections and inform a long term, cost efficient investment framework for ensuring national water security in Mongolia.

Context

Mongolia faces a challenging water future. Water stress scenarios are already evident, despite Mongolia's relatively rich endowment of water resources. High per capita water resources availability mask shortages caused by high spatial and temporal variability and the disconnect between demands and sources of supply, both of which create local conditions of scarcity and threaten sustained growth and development. Existing water resources are also increasingly vulnerable to pollution that further exacerbates conditions of scarcity and undermine the resource.

Compounding these issues, Mongolia is one of the countries most vulnerable to the impacts of climate change, due to its geographic location and the state of socioeconomic development. Adding additional complexity to issues associated with the development and management of water resources is the transboundary nature of the resource in Mongolia, with all surface waters and many aquifers traversing international borders with Russia and China.

As the country transitions to an increasingly urbanized and mining-driven economy, a lack of available water could significantly impact the country's social and economic development. A lack of data and information also increase the risk of potential water-related conflicts between local communities and industrial users. Areas most at risk are predominantly the economic hub of Ulaanbaatar and the mining hub in the Southern Gobi region.

In Ulaanbaatar, a hydro-economic analysis of supply-demand scenarios suggest that water demand will not be met with the available water resources by 2021 under high and medium water demand scenarios. By 2030, a water demand supply gap is estimated in all scenarios. It is assumed that all surface water resources will be utilized and that the current groundwater yield will remain until 2030. If this is not the case, the water supply demand gap is expected to occur earlier and higher across all scenarios.

In the Southern Gobi region, perceived competition and future water demands have the potential to accentuate tensions between mining companies, herders and local communities dependent on groundwater resources. Although there are a wide range of measures to reduce potential water demand and augment water supply, these need to be carefully considered in terms of the economic implications and the willingness to use non-renewable groundwater reserves.

Specific measures are required to ensure that water users have the water they need in the right place, at the right time, in the right amount, and of the right quality. These measures need to include long-term infrastructure requirements and capital planning, along with the enabling legal and institutional framework and promotion of public private partnerships. In addition, such efforts need to be supported by the necessary data and information management systems and a set of financial and economic instruments to improve performance, increase monitoring and accountability, streamline coordination, and inform interventions to address institutional capacity and skills development.

Key Challenges and Recommendations

Key Challenge 1: Water Governance at the River Basin Level

Integrated water resources management was formally introduced in 2012. The legal framework defines extensive responsibilities to stakeholders the river basin level. By law, Mongolia is divided into 29 river basins, each administered by one of the 21 government River Basin Administrations (RBA). RBAs are supported by a multi stakeholder River Basin Multi-Stakeholder Platforms (RBMSP) representing the general public, private sector, civil society, academics, and environmental stakeholders at the basin level. Such arrangements are particularly important in areas where perceived competition of scarce resources and future water demands have the potential to accentuate tensions between various stakeholders. A performance evaluation system was implemented in 2017 to measure performance of the RBAs, with performance linked to financial incentives.

Although the legal foundations have been set, there is a need to strengthen the capacity and accountability of the RBAs and the RBMSPs. Many of these have not performed to the levels expected in the past, undermining efforts to improve sustainability and sector performance, particularly in the mining intensive Southern Gobi region and the capital Ulaanbaatar. There is also a need to improve the transparency and accountability, encourage a process of continuous improvement, and ensure the country's natural endowment and scarce resources are managed sustainability.

Recommendation:

Support established platforms and develop programs to ensure sustainable, inclusive and active stakeholder participation as part of river basin management and water governance. Public platforms should be operationalized to encourage the exchange of information, increase accountability, and promote partnerships between the public and private sectors by facilitating the continued development of integrated water resources management plans and monitoring their implementation. These plans and platforms should be integrated to provide a national perspective and oversight of the challenges, successes, constraints, and lessons learned.

Key Challenge 2: Data and Information or Decision Making

An effective response to Mongolia's water challenge has historically been hampered by a limited co-operation and trust between communities, the private sector, civil society, and the government. In addition, the national water policy and development of integrated water resources basin plans have not yet translated into effective actions at the local levels. Inconsistently applied water pricing, lack of understanding of regulatory requirements by industry, and limited national and local-level capacity to implement and enforce policies are some of the barriers which have undermined progress. Compounding these challenges is the fact that data related to water resources is inconsistently collected across clusters and geographies in the country, ultimately undermining the credibility of available data for decision making.

Recommendation:

Implement a consolidated and comprehensive national data exchange platform. This should integrate data from the full range of government agencies and other stakeholders, include hydrological data relating to both surface and ground water resources, along with meteorological data, to inform forecasting and planning, increase transparency and accountability and improve monitoring and enforcement.

Key Challenge 3: Capital Investment Planning and Sustainable Development Pathways

Infrastructure investments relating to water resources development in Mongolia are challenging. The high spatial and temporal variability of water availability, low population densities, and the disconnect between sources of demand and supply results in high capital costs and significant operational and maintenance costs. These challenges are exemplified by the proposed Orkhon-Gobi Surface Water Transfer Scheme. This national project has been identified as a potential solution to bridging the gap between demand and supply in the Southern Gobi region, providing significant additional supply to meet the future demands from large mining investments as well as valuable supplies to communities along the pipeline route. However, the proposed capital investments are subject to significant variation in the absence of detailed assessments, and need to be considered within the context of a comprehensive options assessment that considers the broader implications (i.e. financial costs, cost efficiency, technical effectiveness, impacts on human health, air quality, climate change, habitats and biodiversity). The full life cycle costs associated with operation and maintenance also needs to be carefully accounted for to ensure the most efficient deployment of scarce public resources and potential financial modalities. Such considerations need to be weighed against the implications associated with further development of non-renewable groundwater resources, and offsets that could be achieved through improving incentives for water efficiency measures.

Recommendation:

Prepare a consolidated assessment of water resource research and development options to meet the forecast demand and supply projections that can inform a long-term investment planning framework for ensuring national water security in Mongolia.

4) ENSURING SUSTAINABLE WATER SUPPLY AND SANITATION

Executive Summary

The provision of safe, secure and equitable water, sanitation and hygiene (WASH) services are core elements of sustainable development. The range of services they provide underpin poverty reduction, economic growth, and environmental sustainability, with profound wider socio-economic impacts, particularly for women and girls. In Mongolia the provision of services has improved significantly but still exhibits high levels of inequality, even within urban areas. Many of these challenges have been highlighted by the COVID-19 pandemic. Short term measures to address the challenges should focus on ensuring water and sanitation utilities and service providers maintain operations and remain financially viable, while a medium-term focus should be on improving service delivery and ensuring financial sustainability of the sector. Financial sustainability should be underpinned by improving sector performance and accountability through implementation of a range of transparent indicators to benchmark performance and improve operational efficiency, inform comprehensive planning and financial strategies, while identifying interventions to address low institutional capacity and skills development. Finally, ensuring implementation of the revised water pollution fee model adopted in May 2019 would improve the circular economy through increasing wastewater treatment, improving associated capacities for pollution prevention and control, while also encouraging more wastewater reuse through fit-for-purpose wastewater treatment suited for reuse opportunities.

Context

Mongolia's low population density and increasing urbanization creates a unique set of challenges for addressing sustainable water supply and sanitation services. Many of these challenges have been highlighted and accentuated by the COVID-19 pandemic. The provision of safe water, sanitation and hygiene (WASH) services play an essential role in protecting human health during all infectious disease outbreaks, including the current pandemic. Safely managed WASH services are also critical during the recovery phase of a disease outbreak to mitigate secondary impacts on community livelihoods and wellbeing. These secondary impacts—which could include disruptions to supply chains or the inability to pay bills, among others — have negative impacts on the continuity and quality of water and sanitation services, the ability of affected households to access and pay for WASH services and the ability of schools, workplaces and other public spaces to maintain effective hygiene protocols when they re-open.

Safe and equitable water, sanitation and hygiene (WASH) services underpin poverty reduction, economic growth and environmental sustainability, with profound wider socio-economic impacts, particularly for women and girls. These include lower disease burden, improved nutrition, reduced stunting, improved quality of life, increased attendance of girls at school, healthier living environments, better environmental stewardship, increased job opportunities and wages, improved competitiveness of cities, as well as other economic and social gains to broader society. While the urban population enjoys near universal access to basic water services (94 per cent)¹⁹, only half of the rural population had access to the same level of services (56 per cent) in 2015. However, there is a high degree of variability in such services and existing inequity in water access even within the urban landscape. Our most recent urban tariff analysis, for instance, highlighted that average annual consumption per household in apartment

¹⁹ WHO/UNICEF JMP 2015

buildings is 100 CuM, whereas in ger areas in the urban center of UB, it amounts to only 11 CuM, equivalent to per capital water consumption of less than 8 lpcd. Access to improved sanitation in urban areas of Mongolia has remained nearly constant from 1995 to 2015, while access in rural areas has doubled over the same period. This notwithstanding, the disparity between levels of access to sanitation in urban and rural areas is significant: with 66 percent of the urban population having access to basic sanitation services compared to only 41 percent in rural areas.

Mongolia faces significant challenges with urbanization and continuing pressure on environmental sustainability resulting in environmental degradation and pollution, particularly in ger areas. The concentration of nearly half the population and development around urban centers, such as Ulaanbaatar, Darkhan and Erdenet, adds to disparities in the level of access to water and sanitation between urban cities and rural areas. Extreme temperatures affect the design, construction, and operation, particularly those associated with sanitation systems and the processes that take place within them. Consequently, designs and processes that work well elsewhere generally need to be modified, often with prohibitively high or complex costs. For example, freezing of pipes or tanks can be prevented by “heat tapes” or cables, but the cost of electricity to operate them is usually quite high. Thus, the choice of feasible, cost-effective systems is limited.

Water security and forecast gaps between supply and demand have the potential to undermine sustained economic development and social progress. A hydro-economic analysis of supply-demand scenarios suggest that water demand in Ulaanbaatar will not be met with the available water resources by 2021 under high and medium water demand scenarios. By 2030, a water demand supply gap is estimated in all scenarios. It is assumed that all surface water resources will be utilized and that the current groundwater yield will remain until 2030. If this is not the case, the water supply demand gap is expected to occur earlier and higher across all scenarios. Furthermore, the current system for establishing urban tariffs does not allow for full recovery of operational and maintenance expenditures, or the depreciation of assets at historical costs. There are also opportunities to improve the financial and non-financial incentives to promote improved efficiencies and water conservation measures. The absence of such provisions has the potential to undermine efforts to ensure social equity, financial sustainability and resource conservation.

The infrastructure platform for providing water supply and sanitation services needs significant investment in order to meet current demands and ensure environmental protection. The wastewater treatment plants are operating beyond the design capacity in terms of quantity and quality of effluents. Despite progress, enhancements to and enforcement of the existing regulatory regime is needed to ensure continued services that meet the aspirations of the society and secure public health outcomes.

Key Challenges and Recommendations

Key Challenge 1: Service Delivery and Financial Viability of Water Supply, Sanitation and Hygiene (WASH) Service

Safely managed water supply, sanitation and hygiene (WASH) services are an essential part of promoting social equity and economic development, while also preventing diseases and protecting human health. This is particularly important during infectious disease outbreaks, including those such as the COVID-19 pandemic. Strong and self-financing water service providers are a critical component for successful implementation. The selected technologies should be the least complex and costly that will provide the desired level of services; this will generally be the most cost-effective and sustainable option.

However, costs to users and to providers over the entire life of the facilities must be considered. Experience shows that water service providers work best within a commercial framework, balancing investments with revenues, but require a strong regulatory framework. These need to be positioned and managed within a holistic framework that considers the incentives for resource protection, as well as accountability for service delivery. Sanitation, including on-site sanitation, should be considered as a system, not just a facility, that accounts for the entire service chain, including management of the waste from collection to containment to conveyance to treatment and potential reuse to final disposal.

Ensuring a sustainable financing framework is central to long term sustainability. Water tariff levels are established by the Water Sector Regulatory Commission, using a methodology which was approved in January 2018 and has recently been revised. The methodology is based on the estimated revenue required for the “safe and technically stable” operations and maintenance of the water supply system, based on actual costs. However, the current tariff structure does not provide incentives to improve efficiency or discourage high consumption. For example, water charges in Ulaanbaatar follow a flat (or single step) volumetric structure, with the charge being directly proportional to the level of consumption. This does not differentiate high consumption and prevents higher revenue generation from large consumers. With service providers unable to meet full operational cost (i.e., operational expenditure plus depreciation) based on current tariffs there is a lack of investment in the sector, potential increased burden on public sector resources, and the risk of continued deterioration of services. There is also a need to integrate a water use fee in the urban water tariff for all consumers receiving water services to ensure water resource management is unified with the core objective of water service delivery. Linked to this is the need to ensure the water use fees are collected and ringfenced for use in water resources management itself. During the post-COVID pandemic, the liquidity of service providers needs to be ensured for continuous provision of quality water and sanitation services. Otherwise, ability of the affected households to access and pay for WASH services may be impacted.

Recommendation:

In the immediate post-COVID response there is a need to support water and sanitation utilities and service providers to ensure they maintain and restore operations and remain financially viable. For example, help maintain availability of water and wastewater treatment chemicals and electricity fuel for pumping and treating water, meet minimum staffing levels, and provide hygiene and transmission protection for staff. This would also include help monitoring and supporting cash reserves and providing financial respite for agencies unable to recover fees. Longer term interventions should focus on implementing a transparent and appropriate tariff mechanism that allows for cost recovery of operation and maintenance costs, with an increasing block tariff structure that can help move water services providers from public to corporate entities, enhance financial and technical compliance, provide incentives to improve performance and to set water tariffs at levels which strengthen independent oversight and regulatory bodies.

Key Challenge 2: Sectoral Performance and Accountability

Several important reforms have been implemented across the water sector over the past decade. These include a range of institutional reforms aimed at improving the management of water resources and the quality of water related services, the introduction of the National Water Committee (NMC), government-led River Basin Authorities (RBA), multi-stakeholder River Basin Multi-Stakeholder Platforms (RBMSPs), along with a range of public agencies and private entities mandated with decision-making as well as operational responsibilities.

Despite improvements, the water sector remains fragmented. This is particularly evident in responsibilities related to water resource management, which are poorly integrated with water supply mandates in the city. Challenges include those around coordination, comprehensive planning and financial strategies, monitoring and regulatory control, low institutional capacity and skills, among others. Strengthening the establishment and operationalization of formal institutional and management arrangements underpin sustainable ongoing water use and reduce the economic and social risks associated with investments in new water infrastructure.

For example, in Ulaanbaatar the Water Supply and Sewerage Authority of Ulaanbaatar – USUG – has end-to-end responsibility for water abstraction, treatment and retail distribution through the central network. USUG also supplies a significant volume of wholesale water (up to 60% of total volume produced) to another public entity – OSNAAUG – and Private Water Companies (PWCs) for onward retail distribution in the city. It is also solely responsible for supply to the *ger* areas, through kiosks fed by both tankers and the network. Altogether, USUG, OSNAAUG and PWCs provide services to approximately 79% of the population in the water supply service area: 44.5% of these receive water through connections to the central network while 34% receive services through kiosks. The balance population, approximately 21% and mainly residents of *ger* areas, rely on private bore wells for water.

Recommendation:

Develop and implement a clear set of performance targets for all water sector service providers. The foundations for water resources have been provided through the governance framework while simple indicators for service providers – non-revenue water, staff per 1000 connections, operational cost per unit and cost recovery should be formalized. These performance targets should be linked to incentive mechanisms in order to improve performance, increase accountability, streamline coordination, inform comprehensive planning and financial strategies, monitoring and regulatory control, and identify interventions to address low institutional capacity and skills development.

Key Challenge 3: Implementing a Comprehensive Pollution Control Program

The Mongolian parliament adopted a Water Pollution Fee Law in 2012, which was revised in May 2019. However, implementation has remained challenging due to a complex system of estimating pollution with limited technical capacity. Realization of the ambition and intent behind the Law requires implementable water pollution fee models that incorporate polluter pays principles, support economic incentives for water users to promote pollution reduction, and employ practical methodologies to estimate pollution levels in wastewater discharge. In addition to pollution reduction, this will further promote the practice of treated wastewater reuse among large water users such as power plants, beverage companies, public commercial utilities, and mining companies. It will also encourage the treatment of wastewater on site with the potential to supply willing offtakers, thereby avoiding network discharge service fees or pollution and compensation fees.

Recommendation:

Implementation of water pollution fee models that incorporate polluter pays principles, support economic incentives for water users to promote pollution reduction, and employ practical methodologies to estimate pollution levels in wastewater discharge. Such implementation would drive greater wastewater treatment, supporting increased capacity of the laboratories for estimating pollution levels. In addition, there is a need for more wastewater reuse through fit-for-purpose treatment of wastewater suited to particular reuse opportunities.

5) MANAGING AIR QUALITY IMPERATIVES FOR BETTER HEALTH

Executive Summary

Ulaanbaatar is one of the most polluted cities in the world, with significant health impact on the population. The impact is most severely felt on the most vulnerable: children and the elderly, and the poorest households. Much of the Particulate Matter (PM) pollution originates from the city's low-income *ger* districts where coal and wood are burned for heat and cooking in traditional *ger* tents and small houses. While the stoves replacement program has led to reduction of ambient PM concentrations by about 50% since 2011, pollution levels remain high above Mongolian and WHO standards for air quality and residents continue to experience poor air quality and premature deaths.

Key Challenge 1: Implementation is Key. Measures proposed in the “National Program on Reduction of Air and Environment Pollution” adopted by the Government in 2017, and the National Action Plan for its implementation are not prioritized or costed.

Recommendation: The National Action Plan needs to be revisited as a matter of priority, where measures are costed; their benefits assessed; and where they are prioritized and financed appropriately. Advanced stoves need to continue to be promoted in the short term, and a comprehensive action plan for air quality management needs to be adopted and implemented for the longer-term.

Key Challenge 2: Data and Interventions Outside Ulaanbaatar. Efforts to date to understand and to mitigate ambient air pollution have focused on Ulaanbaatar.

Recommendation: A sufficiently dense network of automated samplers should be supported for analysis of PM_{2.5} and other pollutants in all aimag centers, and health implications for the affected population should be assessed and measures implemented to reduce ambient air pollution.

Key Challenge 3: Linking Policy to Science-based Evidence. The best science-based and technical information needs to inform policymaking for the most effective and efficient reduction of exposure to particulate matter.

Recommendation: A new comprehensive assessment including source inventory, source apportionment, and atmospheric modelling, is needed to assess developments. This in turn should rely on an assessment and benchmarking of the air pollution monitoring network in UB, regarding data quality and reliability. Further rigorous emissions testing is required to support source inventory and modelling.

Context

Population growth caused mainly by rural-to-urban migration to Ulaanbaatar (UB) has led to a major increase in the city's air pollution emissions with high level of particulate matter (PM), making UB one of the most highly polluted capitals in the world. This has a significant health impact on the UB population and associated societal cost, with the impact being particularly felt on the most vulnerable: children and the elderly, and the poorest households. Much of UB's population growth has been in informal settlements, in the city's low-income *ger* districts where coal and wood are burned for heat and cooking in traditional *ger* tents and small houses. Other, comparatively much smaller, contributions to air pollution include public and private transport, coal-fueled power plants, small water heating boilers and heat-only boilers. Windblown dust and dust suspended by traffic is a significant source of coarse particles.

A World Bank desk study recently reviewed and updated the analysis of 2008/9 that was the basis for the Ulaanbaatar Clean Air Project, in support of the government’s stoves replacement program. This confirmed that the current and continuing severe air pollution with high particulate matter concentration in Ulaanbaatar in winter continues to be predominantly a household energy problem due to space heating and cooking in the *ger* areas, where households live in traditional ger tents and small houses. Other sources of pollution including vehicle traffic and road dust also need to be controlled, but they contribute significantly less to the problem currently.

The analysis of PM monitoring data for UB for the period 2011-2018 also shows that the ambient PM concentrations have been reduced by about 50% as an average over the city. The reduction took place mainly during the 2012-2014 period, at the same time as the household stove replacement programs have provided most of the *ger* households with improved stoves. This is a remarkable improvement in air quality over a short time span. The stove replacement program was the only significant intervention taking place at that time, and can therefore be credited for this achievement that would need to be sustained so that this positive impact is not reversed.

However, pollution levels even after this reduction remain high above Mongolian and WHO standards for air quality and residents continue to experience poor air quality. As a consequence, air pollution continues to lead to premature deaths, and residents do not yet feel the desired positive health outcomes. These negative health effects can be compounded by COVID-19 as there is growing evidence of a strong correlation between confirmed cases of COVID-19 and levels of PM.

Sustained efforts combining various pollution reduction measures will be required to reach levels where people are truly seeing an improvement in air quality with health benefits. This would include the adoption of a science-based air quality management plan, with, in the short-term continuous support to advanced combinations of stoves/fuel and including support to modern heating appliances for *ger* residents, and generally improving services in the *ger* areas; relocation of residents; residential energy efficiency measures; improved road paving; green transport; power generation; SME and industry etc. Effective the 2019/20 winter, the government has enacted a ban on raw coal in Ulaanbaatar, and has supported the delivery of refined coal briquettes at scale through a state-owned company.

Key Challenges and Recommendations

Key Challenge 1: Implementation of Reforms

There is a strong existing policy framework for sustainable development in Mongolia. The Parliament approved a Green Development Policy in 2014, and the government adopted an Action Plan for its implementation in 2016. Though comprehensive in principle, in practice they suffer from an implementation gap, listing a large number of measures that are not prioritized, and more often than not, not budgeted. This is also the case for the “National Program on Reduction of Air and Environment Pollution” adopted by the government in 2017, and the National Action Plan for its implementation consequently adopted by the Ministry of Environment and Tourism, the estimated implementation cost of which is higher than past expenditures available.

Recommendation:

- a) The National Program on Reduction of Air and Environment Pollution and its Action Plan represent a good starting point to implement measures for pollution reduction as it is comprehensive and

received broad stakeholder support. However, in practice, it is not specific enough to offer a guide for action. The National Action Plan needs to be revisited as a matter of priority, where measures are costed; their benefits assessed; and where they are prioritized and financed appropriately.

- b) Overall damage cost to society needs to be revisited, as a basis to ensure adequate budgetary support for pollution reduction.
- c) The replacement of stoves by advanced stoves needs to be continuously promoted in the short term. In particular this entails enforcing and strengthening the clean stoves standard as appropriate. Non-performing stoves should also be eliminated from the marketplace.
- d) Beyond that, bringing down pollution levels significantly and sustainably will require the development of a comprehensive action plan, to include a suite of complementary pollution reduction measures, as well as improved coordination of local and national agency's mandates and activities as well as strengthening of regulations and enforcement to promote and enforce compliance.

Key Challenge 2: Data and Interventions Outside Ulaanbaatar

Efforts to date to understand and to some extent to mitigate ambient air pollution have focused on Ulaanbaatar. This is understandable given the large number of affected people, but leaves out a potentially significant number of people affected by the substantial fraction of emissions occurring in other cities outside the capital.

Recommendation:

In view of the paucity of data regarding the situation in the other urban centers in the country outside of Ulaanbaatar, it is recommended to ensure that a sufficiently dense network of automated samplers be supported for analysis of PM_{2.5} and other pollutants in all aimag centers, and that the health implications for the affected population be assessed and measures implemented to reduce ambient air pollution, following the experience of Ulaanbaatar.

Key Challenge 3: Linking Policy to Science-based Evidence

There is no doubt that the long-term solution to air pollution in Ulaanbaatar lies with providing *ger* area residents with clean heating solutions. Meanwhile, taking into account infrastructure and fiscal constraints, continuing to improve the quality of the stove/fuel combination is a priority in the short-term. There has been debate regarding the effectiveness of the stove replacement program, or whether so-called clean fuel would render the choice of stove a non-issue. What is most important, however, is that emissions depend on the combination of stove type and fuel type which has not been thoroughly assessed to date.

Recommendation:

A number of recommendations are proposed to strengthen policies to improve air quality, in particular in Ulaanbaatar, and to reduce particulate matter exposure in the most effective and efficient way:

- a) A science-based assessment of sources of pollution and their contribution to ambient concentrations, taking into account all sectors, has not been done in a comprehensive manner since the efforts supported by the World Bank in 2009. An update, including source inventory, source

apportionment, and atmospheric modelling, to assess developments is needed. Such work would allow a much better estimate of the contributions to PM levels from sources such as road traffic and could evaluate if other sources such as small industrial emissions are becoming significant. This full review and update of the Air Quality Management Plan for UB ought also to assess health impacts of air pollution and health benefits expected from the implementation of abatement measures and should estimate cost-effectiveness against set targets needed to meet WHO interim or Mongolia air quality standards.

- b) There should be an assessment and benchmarking of the air pollution monitoring network in UB, regarding data quality and reliability, in support of the above. After an initial assessment, a regular audit process should be initiated which could be conducted in partnership with other donors/countries in the region.
- c) Further work on abatement options should closely follow ongoing developments. While at present it is clear that heating sources predominantly contribute to air pollution in UB, it can be expected that the relative importance of industrial sources, in particular, will grow unless otherwise controlled. In addition, transport and emissions from the combined heat and power plants would have to be further controlled as well.
- d) Further emission testing of various stoves with various fuels is needed to confirm the emissions reduction potential of coal briquettes with traditional, improved and advanced stoves. Such emissions testing should be carried out by the Stove Emission and Efficiency Testing laboratory in UB which has the capacity to do so and is the best possible representation of local conditions and cooking and heating practices.
- e) The small water heating boilers, also referred to as domestic low-pressure boilers, are poorly studied and characterized. They need to be inventoried together with better understanding of patterns of use, efficiency, and fuel consumption. The traditional as well as improved models also need to be tested and evaluated for emissions, as they are found mostly in the houses of higher income *ger* households consuming more fuel.

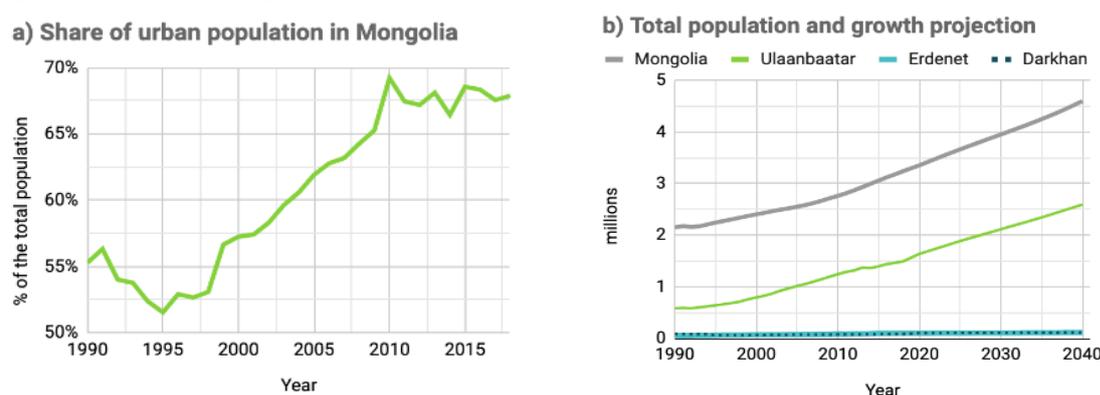
6) DEVELOPING LIVABLE AND RESILIENT URBANIZATION

Context

Over the last two decades, Mongolia has seen steady urbanization, with the proportion of urban population increasing from about 57% in 2000 to 69% in 2018 (Figure 1a), well above the average in East Asia. Urbanization in Mongolia is dominated by Ulaanbaatar which accounts for 46% of the total population and 66% of the national GDP. As such, much of the focus of urban policy and investments have been on the capital city.

The country's three largest cities, Ulaanbaatar, Erdenet and Darkhan, accounted for 76% of the urban population in 2018, and 73% of the country's GDP,²⁰ forming what is referred to as a *golden triangle*.²¹ By 2040, the population in the three main cities is expected to grow with the largest increase (74%) expected in Ulaanbaatar (Figure 1b)²². Generous land rights, outdated urban policies and limited capacity for planning and enforcement have resulted in the expansion of unplanned *ger* settlements which are home to more than half of the population in Ulaanbaatar, Erdenet and Darkhan.²³

Figure 1. Historic changes in urban population and projection by 2040



Source: Mongolian Statistical Information Service, 2019.

There is an increasing concentration of poverty in urban areas; highlighting the importance of cities for Mongolia's poverty reduction efforts. With two-thirds of the population living in cities, more than six out of ten poor people (63.5 percent of all the poor) now live in urban areas, particularly in Ulaanbaatar (41.8 percent).²⁴ Urban poverty reduction efforts have been dampened by stagnant wage growth in the poorest population group (ibid). Key constraints include access to jobs and employment; low wages, access to

²⁰ Mongolian Statistical Information Service, 2018.

²¹ GoGo Mongolia, 2018. "Golden Triangle of Development" to boost economy in Mongolia's central zone. <http://mongolia.gogo.mn/r/161715>

²² Mongolian Statistical Information Service, 2019. Renewed 2015-2045 population projection at regional & sub-regional level, medium scenario. This can be attributed to in-migration, increase in life expectancy, and fertility rate etc.

²³ The analysis was conducted using the most recently available data from Landsat 8 satellite imagery (2019) and population statistics from the Mongolian Statistical Information Service (2018).

²⁴ World Bank (2020). *Mongolia Poverty Update*. In terms of numbers, UB has the largest share of the urban poor (378.2 thousand). <https://www.worldbank.org/en/country/mongolia/publication/mongolia-poverty-update>

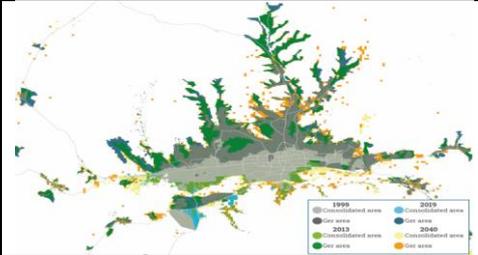
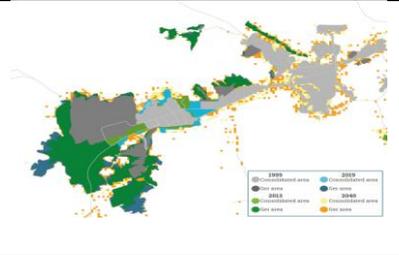
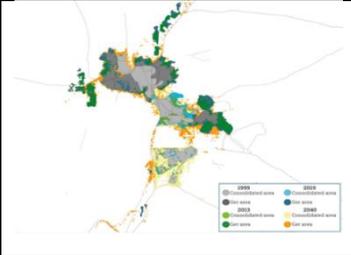
skills and education-- factors which are exacerbated by inadequate access to infrastructure and services. The incidence of poverty is highest among households living in *ger areas*.²⁵ Two out of five poor persons in urban areas is a child under the age of 15.²⁶

The Ministry of Construction and Urban Development, the main focal agency for urban policy in Mongolia, with support from development partners²⁷ is leading efforts to rethink urban strategy as part of a broader human settlement plan for Mongolia. Part of the motivation is to develop other regions to relieve the pressure from the capital city. The new administration has an opportunity to build on ongoing efforts by (i) addressing urban sprawl, sustainability issues and climate risks facing urban areas, (ii) enhancing efforts to promote jobs and urban employment to make urbanization work for a broader swath of its population, and (iii) improve the quality and delivery of urban services. Strengthening the current urban policy framework, technical capacity for planning, updating urban infrastructure standards and codes will be a critical for this process.

Key Challenges and Recommendations

Key Challenge 1: Urban Sprawl, Sustainability and Resilience

An important characteristic of Mongolia’s urban areas is low density urban sprawl (Maps 1-3).

Map 1. Urban sprawl in Ulaanbaatar.	Map 2. Urban sprawl in Erdenet	Map 3. Urban Sprawl in Darkhan
		
Source: World Bank, 2020 ²⁸	Source: World Bank, 2020 ²⁹	Source: World Bank, 2020 ³⁰

Between 1999 and 2019, Erdenet grew twice in size compared to its population growth and Darkhan’s urban footprint grew almost three times its population.³¹ This trend is expected to continue into 2040. **Ger areas have been the main driver of urban expansion in the three main cities.** 83% of the urban footprint expansion between 2000 and 2019 in Erdenet was due to new *ger areas*, this figure is 77% in

²⁵ These include unemployed household heads, less educated household heads, or those dependent on social transfers and private sector wages. Analysis based on National Statistical Office’s Household Socioeconomic Surveys (HSES) data from 2010, 2012 and 2014. Poverty is not concentrated solely in the fringe *ger areas*, though the poverty headcount is positively correlated with distance from the city center (World Bank, 2017). Ulaanbaatar’s poor are not exclusively migrants and also include non-migrants (ibid.).

²⁶ World Bank (2020). *Mongolia Poverty Update*.

²⁷ ADB and JICA; <https://www.adb.org/sites/default/files/project-documents/51106/51106-001-tar-en.pdf>

²⁸ Based on Landsat 8 satellite imagery (1999, 2013, 2019).

²⁹ Based on Landsat 8 satellite imagery (1999, 2013, 2019).

³⁰ Based on Landsat 8 satellite imagery (1999, 2013, 2019).

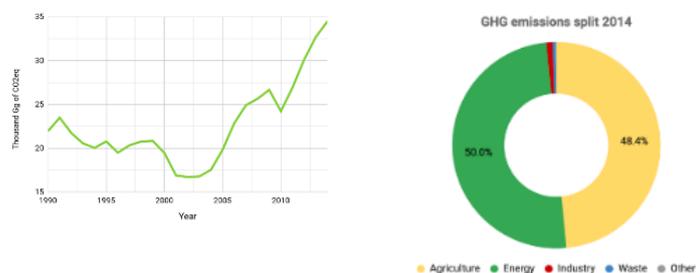
³¹ Estimates based on Landsat 8 satellite imagery, 1999, 2013, 2019, courtesy of the U.S Geological Survey, and projection to 2040 estimated for ongoing World Bank study.

Darkhan and 81% in Ulaanbaatar.³² Moreover urban form in Mongolian cities is characterized by large block sizes that inhibit connectivity and walkability. Urban design and the management of sprawl are critical as these have an impact on costs of infrastructure, service quality and delivery and Mongolia’s overall poverty reduction efforts. They also have an impact on the cities’ carbon footprint and Mongolia’s ability to meet its climate commitment as highlighted in its NDCs.

Mongolian cities have been following a highly carbon intensive growth path over the last two decades which needs to be reversed. Though city level data is limited, overall, GHG emissions in Mongolia doubled between 2000 and 2014, reaching 35,500 Gg CO₂eq per year by 2014. The energy sector, whose outputs are mostly consumed in cities, accounted for 50% of Mongolia’s total GHG emissions.³³ Emissions from industrial processes and waste sector have also been rising every year, due to rise in urban population (ibid.).

Air pollution is amongst the most critical health risks in urban areas and is positively correlated with GHG emissions. Although continuous air quality monitoring data is not readily available in secondary cities, they are at risk of facing similar issues as Ulaanbaatar in the long run. Mongolian cities historically emerged as monocentric industrial cities, and have large concentration of industrial activity, including associated risks from air and water pollution. Most need investments in improving water quality and waste-water treatment capacity. In Erdenet, mining activities have led to acid mine drainage/acid rock drainage, heavy metal contamination and leaching, pollution by process chemicals, erosion and sedimentation,³⁴ harming surrounding ecosystems.³⁵

Figure 2: GHG emissions (1990-2014) and by sector in 2014.



Source: Mongolian Statistical Information Service, 2018.

Moreover, Mongolian cities have developed in high-risk regions, and are thus vulnerable to a range of natural hazards and climate risks.³⁶ Recent monitoring records indicate a significant increase in seismic activity around Ulaanbaatar with over 2000 earthquakes with magnitudes of up to 4.2 being felt between 1976 and 2010. Many of the public buildings are old and need to be retrofitted to withstand a potential severe event. Mongolia’s cities also regularly experience rainfall variability due to climate change, floods

³² Estimates based on Landsat 8 satellite imagery, 1999, 2013, 2019, courtesy of the U.S Geological Survey.

³³ Mongolia’s National Inventory Report, 2017.

³⁴ SDWF. 2012. “Mining and Water Pollution.”

<http://www.safewater.org/PDFS/resourcesknowthefacts/%0AMining?and?Water?Pollution.pdf>.

³⁵ Ministry of Environment and Green Development, Orkhon River Basin Integrated Water Management Plan. Ulaanbaatar, 2012. P. 33.

³⁶ Ministry of Environment and Tourism of Mongolia (2018). Mongolia’s Third National Communication to the UNFCC.

and *dzuds*. Low-income *ger* households located in river basins, hill slopes and flood drain pathways, are particularly vulnerable.³⁷ With climate change, in-migration into the cities is expected to increase, exacerbating populations exposed to disaster and climate risks.

Recommendations

The government needs to promote policies that can support cities in leveraging the benefits of agglomeration and improving environmental sustainability and resilience of cities.

- a) Update the Urban Development Law to incorporate principles of compact urban growth, polycentric cities with mixed land uses; prioritize infill growth on vacant and underutilized land and urban regeneration at financially viable densities. These infill strategies coupled with Transit Oriented Development (which involve increasing population density close to main public transport corridors and reduce commuting distances) also have high potential for GHG reduction.
- b) Promote improved city design through smaller block sizes and compact growth strategies (such as development of housing near employment centers with mixed-uses, low-carbon public transport and active mobility possibilities (e.g. biking, walking).
- c) Improve hazard mapping of flood prone areas in cities; map fragile areas that should remain public land; improve monitoring of GHG emissions in urban areas including improvements in water and wastewater quality monitoring; invest in seismic resilience especially in Ulaanbaatar.
- d) Support measures to improve urban water quality, wastewater treatment, air quality monitoring in cities.
- e) Inhibit *ger* areas expansion and prioritize their redevelopment into mid to high density areas with mixed uses and full services; avoid new urban settlements in risk-prone areas and uncontrolled urban growth.
- f) Invest in renewable energy, energy efficiency in urban areas; continue phasing out unprocessed coal as a means for heating, replacing it with processed coal briquets; implement energy efficiency measures targeted at improving housing insulation in *ger* areas and phase out fossil fuels for electricity generated with clean sources.

Key Challenge 2: Job Growth and Employment Opportunities

A key issue for poverty reduction in Mongolia's cities is access to employment and job opportunities.

During the soviet industrialization period (1950 to 1989), migration into Ulaanbaatar was fostered to provide labor force to light industries, while secondary cities like Darkhan (1961) and Erdenet (1974) emerged as industrial cities, with a focus on manufacturing and mining.³⁸ Cities embraced a monocentric form concentrating jobs downtown and in the industrial zones which has impact on access to jobs. In Ulaanbaatar, Erdenet and Darkhan, average distance to work is twice from *ger* areas than from the apartment areas.³⁹ In Ulaanbaatar, an estimated 9% of people living in *ger* areas live less than one

³⁷ World Bank, 2015.

³⁸ Amarsaikhan, D. et al, 2009. Applications of remote sensing and geographic information systems for urban land-cover change studies in Mongolia. *Geocarto International*, volume 24, issue 4. DOI 10.1080/10106040802556173.

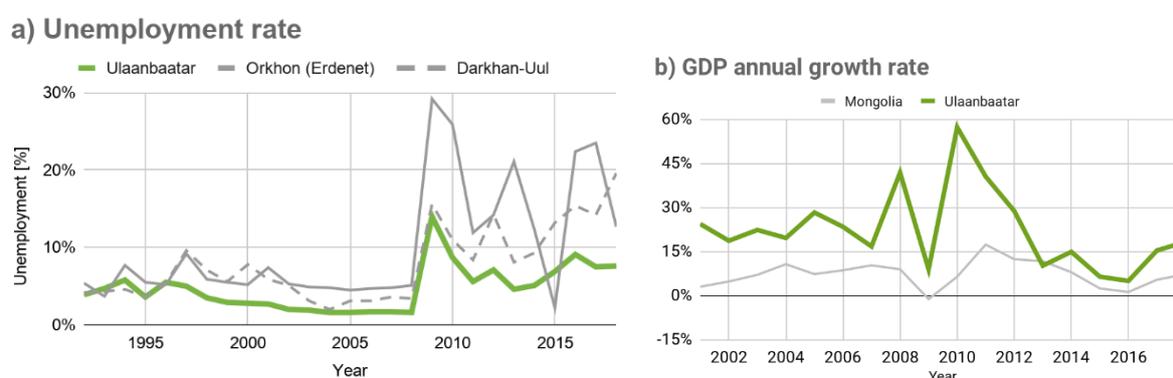
³⁹ Estimation based on population, roads and jobs location in each city using the method *spatial network analysis*. World Bank, ongoing study on Cities and Climate Change.

kilometer away from job hubs⁴⁰, but this figure is 84% for apartment dwellers in the consolidated areas. Similarly, in Erdenet spatial disparity is such that only 7% of *ger* inhabitants live less than a kilometer away from job hubs, as opposed to 100% in consolidated areas. In Darkhan, 30% of *ger* inhabitants have job opportunities within one kilometer. Thus, to improve access to jobs, the government must consider the spatial inequality between *ger* areas and the consolidated urban space in terms of accessibility to jobs.

Furthermore, there has been a persistent and substantial gender gap in labor force participation in urban areas. In the countryside, female participation tends to be high due to availability of agricultural work and the opportunity to combine family responsibilities at home. In contrast, in the urban areas where industry and services sectors dominate, female participation is lower, in part because many services and industry sector jobs are located away from home and are difficult to combine with family responsibilities. Even when women find jobs, they are more likely to be engaged in low-paying service jobs, typically in trade and public sectors.⁴¹

Economic diversification can also support urban employment and job creation. During the global economic recession of 2008, for instance, Erdenet and Darkhan were hit hard due to low economic diversification (Figure 3a). During this time, when the national GDP decreased by 1.3% Ulaanbaatar’s GDP grew by 8.9% (Figure 3b). The capital’s economic diversity, focused on services such as finance, trade, restaurants, transport –representing 58% of its economic output–, make it less dependent on the price variability of mining commodities in contrast to the rest of Mongolia.

Figure 3. Unemployment rate and GDP growth rate in Ulaanbaatar

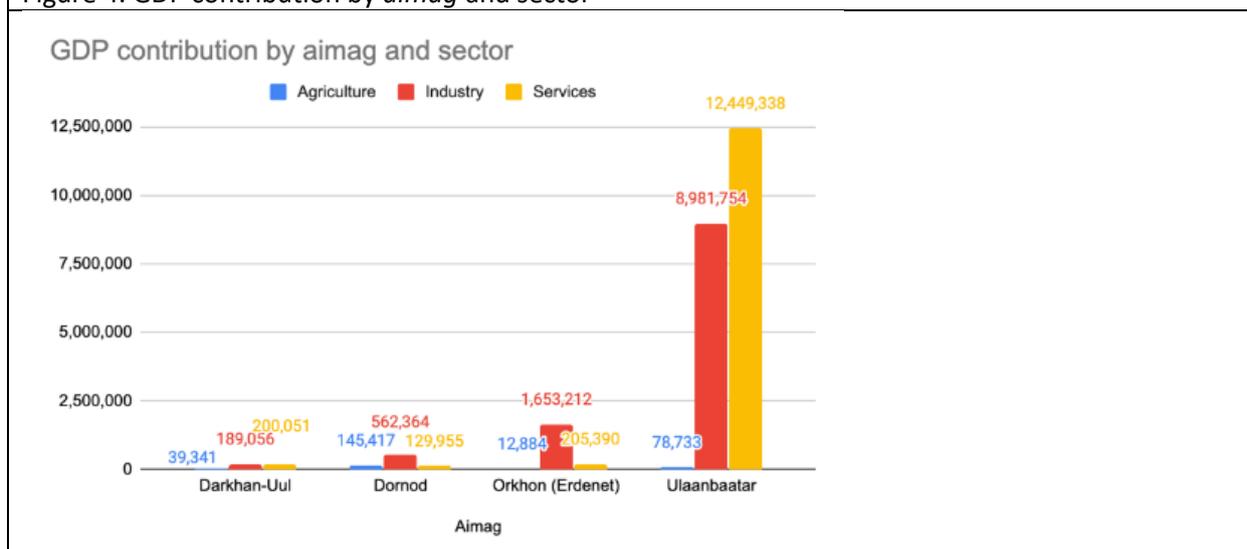


The services and industry sectors driving growth in Mongolian cities contributing about 54% and 45% of Mongolia’s GDP respectively and are concentrated in Ulaanbaatar (Figure 4).

⁴⁰ Estimated based on population data from the Mongolian Statistical Information Service, (2018) and Nighttime lights intensity from the National Oceanic and Atmospheric Administration (NOAA), “Nighttime Lights Version 1 VIIRS Day/Night Band”, (2015).

⁴¹ Ibid.

Figure 4. GDP contribution by *aimag* and sector



Source: Mongolian Statistical Information Service, 2020

Improving the competitiveness of small and medium enterprises is an important poverty reduction strategy in urban areas. Mongolian cities are home to substantial number of small and medium enterprises. Data from the General Taxation Department indicates that out of 78,585 legal entities active in Mongolia, almost 70% of enterprises are in Ulaanbaatar, and about 86% or 67,612 of those are SMEs. An estimated 70% of the economically active population are employed in SMEs. SMEs in urban areas face many challenges such as access to credit, infrastructure, markets, wastewater treatment facilities, etc. Improving their competitiveness through instruments such as promotion of industrial clusters can be an important strategy for job creation and poverty reduction in UB and other urban areas.⁴² Improving their environmental performance would be critical to improving competitiveness of SMEs.

Recommendations

- Address the spatial inequality in access to jobs between consolidated and *ger* areas through creating job opportunities closer to where people live, reducing distances between employment and housing and hence lowering GHG and PM emissions.
- Support economic diversification in cities, especially in smaller cities such as Darkhan and Erdenet.
- Undertake policies and investments to support competitiveness of SME sector such as clustering, establishment of industrial parks, skills development based on best practice examples.
- Improve the environmental performance of polluting urban industries, relocate them and regenerate urban land on a targeted basis based on feasibility.
- Undertake technical studies to understand economic and spatial linkages between the three cities that can inform job creation opportunities.

Key Challenge 3: Limited Infrastructure and Service Provision

Another key challenge in urban areas is access to adequate infrastructure and services. In 2010, an estimated 38% of urban dwellers were connected to the district heating system, and between 37% and

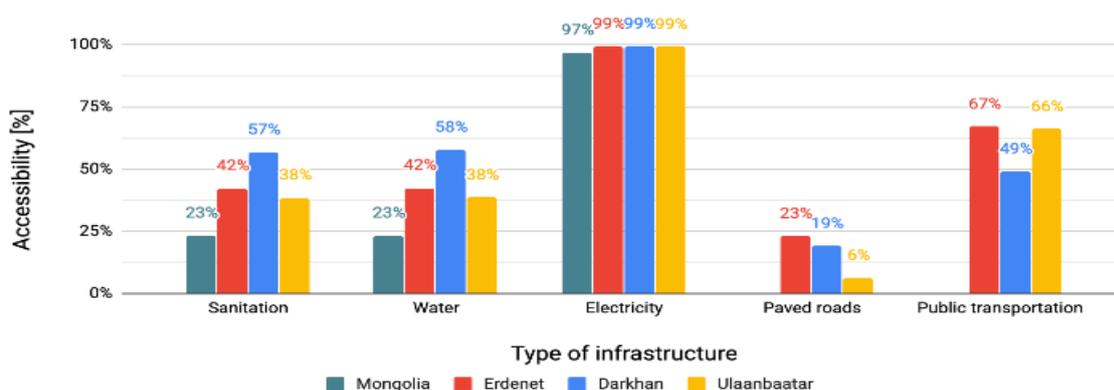
⁴² This strategy is well demonstrated in other countries. See for instance, https://www.ilo.org/global/about-the-ilo/newsroom/news/WCMS_218252/lang-en/index.htm

56% had access to basic sanitation and the water supply network (Figure 5).⁴³ In 2018, access to urban amenities in the major cities was still poor, as only 59% had access to public transport, 60% enjoyed access to hospitals, 48% schools, and 19% had access to public spaces.⁴⁴

In urban areas, the provision of public services is closely related to urban form. For instance, in Ulaanbaatar, the street network has developed incrementally without a clear strategy showing a disconnect between the existing street network and transport demands. Regardless of modality (car, bus, or walking), there are limited options in terms of moving about in the central area, forcing residents to travel longer distances. The result is poor connectivity and accessibility. *Ger* areas are poorly connected to the rest of the city. Here, the quality of roads is poor with only 10% of paved roads and public transportation comprising of buses that are mainly accessible on primary roads. This pattern is also prevalent in other cities.

Urban sprawl increases travel time, increases costs of infrastructure and public transport, hampers quality of public transit options, and decreases accessibility since riders are scattered and hard to reach. UB’s rapid motorization has deteriorated mobility and accessibility in the city (World Bank, 2015). The large block structure and lack of secondary roads, a common pattern in Mongolian cities, force most traffic onto very few roads, and given Ulaanbaatar’s high number of private cars, congestion mounts up quickly. Due to the central area’s large block pattern and the limited number of roads capable of carrying buses, many bus routes overlap with one another on key roads near the CBD. Access to paved roads is limited (only 6% in Ulaanbaatar, 19% in Darkhan and 23% in Erdenet). Dirt roads hinder access to public transportation and services such as solid waste and significantly downgrades equity in access to urban services.

Figure 5. Access to infrastructure in urban areas.



Source: World Bank (ongoing study based on data from Mongolian Statistical Information Service, 2018, 2010 census data).

⁴³ This is based on the most recently available data (2010) provided by the National Office of Statistics. It is likely that these figures have increased to 50% by 2018 based on the number of households located in *ger* areas from Landsat 8 satellite imagery (ongoing WB study).

⁴⁴ Estimates based on ongoing World Bank study on Cities and Climate Change. The location of urban amenities was obtained from different planning departments of Ulaanbaatar, Erdenet and Darkhan in 2019. When information was missing, additional data was obtained from [OpenStreetMap](https://www.openstreetmap.org/).

In the difficult task of prioritizing services, cities must ground their decisions on citizen preferences and effective management of their finances. However, Ulaanbaatar faces systemic challenges in its financial management (including tax system, revenue management and collection, regulatory system, investment planning and execution capacity etc.) that may be compromising an efficient and equitable allocation of financial resources.⁴⁵ For instance, the budget classification system and format of UB and its districts lack transparency, making it difficult for city leaders and taxpayers to understand the use of funds. Hence, the budgeting system needs to be made more transparent in accordance with international best practices (ibid). Moreover, there is limited coordination between urban master planning and sector planning which needs to be strengthened to improve service delivery.

Mongolia's urban development laws comprising of the Law on Land (1994), Housing Law, Law on Urban Development (1998, updated 2008 & 2015) and Law on Allocation of Land for Ownership (2002) provide the umbrella framework for urban planning in Mongolia. The framework largely prioritizes private ownership and fosters *ger* areas expansion.⁴⁶ The Law on Allocation of Land entitles each Mongolian citizen to own for free a plot of up to 0.07 hectares of land in Ulaanbaatar, 0.35 hectares of land in *aimag* centers like Erdenet and Darkhan, and up to 0.5 hectares in villages, for family needs.⁴⁷ Although *ger* areas existed and expanded during the soviet times, the fact that people now own the land has become a major barrier to transform *ger* areas into fully served neighborhoods. Land tenure security, administration and management continue to be hampered by multiple agencies responsible for land and property allocation and registration, incomplete and non-integrated cadaster/property registries, a complex registration process, and limited digital data and services. Land management is not undertaken in accordance with urban Master Plans due to weak legal control and overlapping mandates. As a result, buildings are built in unplanned areas or with different functions. The current urban planning codes, norms and standards were last updated in 2004 and need to be renewed. In the absence of updated planning codes, many infrastructures have failed to provide an appropriate level of services. The government's **recent adoption of the integrated electronic land management system** that will integrate the land cadaster data, electronic planning, land valuation/ tax/payment, and land monitoring systems, as part of the SMART Government initiative is a positive step. The system is expected to bring transparency by allowing citizens to receive real-time updates, supervise land management activities, and reduce bureaucracy and land related disputes.⁴⁸

There is substantial need to strengthen inter-sectoral coordination between sector agencies technical capacity for urban planning in Ulaanbaatar and secondary cities. For instance, there is a continued disconnect between land use and transport planning in urban areas. Transit oriented development (TOD) that is increasingly embraced as good planning practice in many cities, has not been integrated in any policy document or in the concepts of draft Master Plans currently under preparation. It is also important to link masterplans with investment plan so that major initiatives can be implemented. The Capital City has architects and engineers with GIS capacities and has an internal online database to systematically share, organize and update spatial information, but information is not easily accessible outside the government, limiting participation from the academia, private sector, non-governmental organizations or others. Secondary cities do not have a database which assembles disaggregated city level data, thus hindering collaboration across key stakeholders such as local government departments, academia,

⁴⁵ World Bank, 2013. City Finances of Ulaanbaatar.

⁴⁶ Byambadorj, Tserregmaa, 2019. (Re)constructing planning in face of uncertainty: Challenges for urban planning in Mongolia.

⁴⁷ Government of Mongolia, 2002. Law on Allocation of Land for Ownership.

⁴⁸ Business Council of Mongolia, News Wire Issue 622, 27 March 2020.

external consultants and others. It also limits evidence-based analysis and urban planning due to the lack of protocols and standards for spatial and tabular data generation, organization and sharing.

Recommendation

- a) Strengthen mechanisms for cross-sector coordination between urban planning department and sectoral departments in cities; strengthen coordination when planning the provision of new urban amenities and services, in order to define their location and capacities through evidence-based analysis and align them with the Master Plans of each city.
- b) Strengthen technical capacity for Master Planning at city level; Make Master Plans publicly available to facilitate public feedback and engagement
- c) Undertake location analysis of new employment and urban amenities to bridge the inequality gap between *ger* populations and inhabitants in consolidated areas. New employment and urban amenities should aim at improving proximity of the population to them.
- d) Improve urban planning with a view to increasing access to services. This will enhance efficiency and cost-effectiveness of service delivery and will also be important in including urban poor.
- e) Update Green urban planning standards, norms and codes; Urban Development Legislations
- f) Complete and digitize land/property data (i.e. not all land/properties are registered, especially the vast amount of State land has not been mapped or registered); upgrade the system to include all of the attributes and data required by UB and other cities, integrate the General Authority for State Registration (GASR) system which registers ownership of private property, and agree on national mapping and other geospatial data standards then upgrade/integrate land information from other agencies and municipalities.

7) DEVELOPING SUSTAINABLE INFRASTRUCTURE

Executive Summary

The spatial characteristics and recent fiscal challenges make it particularly challenging to provide the infrastructure needed to unlock the potential of alternative drivers of growth in Mongolia. The COVID-19 pandemic further complicates the prospects for developing critical infrastructure.

Overall Mongolia must take a value chain approach in which strategic corridors are developed and in which infrastructure is part of an overall set of interventions and only inserted to enable sectors. The piecemeal sector approach to developing transport, energy and digital infrastructure is sub-optimal.

To accelerate economic diversification, improving connectivity to key regional trading partners and adopting an evidence-based methodology in response to COVID-19 is crucial. In addition to much needed infrastructure, the Government of Mongolia also needs to implement several institutional reforms that would clarify roles and responsibilities for the infrastructure lines ministries, MoF, NDA; and MOFA with respect to regional economic corridors.

Context

A staged gateway review process and project implementation roadmap needs to be developed to support institutional reforms. To attract long term private financing, the government needs to develop a route map for addressing bottlenecks, pilot 2-3 genuine PPPs, and tackle shortfalls in public funding for infrastructure.

A. Mongolia's infrastructure challenges – infrastructure for connectivity, economic diversification, and post COVID-19

Even prior to the COVID-19 pandemic, lack of critical infrastructure (transport, energy and digital) was a major constraint to Mongolia's connectivity and economic diversification aspirations. Being a land locked country with some 3.0 million people inhabiting a territory of 1,564,000 square kilometers (more than six times the size of the United Kingdom and less than half the population of London) presents unique infrastructure challenges. Potential for economic diversification has been identified in mining beneficiation and value addition, livestock sector, business tourism, service industry, and renewable energy for export. Each of these sectors requires transport, energy and digital infrastructure. However, with average transport distances of more than 600km, logistics costs as a percentage of GDP approximately 30% and some of the lowest contributions from the infrastructure sector to GDP, Mongolia needs a different approach to developing much needed infrastructure. A *'build and they shall come'* approach for each infrastructure sector is sub-optimal.

For domestic infrastructure, Mongolia needs to adopt a value chain approach to identify infrastructure gaps and make selective interventions to unlock specific value chains to support economic diversification and improve its competitive advantage. Transport and Energy infrastructure needs to be inserted where the flows of economic drivers are highly concentrated. At the same time, Mongolia should take advantage of its vast indigenous resources in solar, wind and land and take the opportunity to transition to a greener energy supply and consumptions, in both power and transport sectors, to mitigate local air pollution climate change impacts. A fragmented approach to developing infrastructure will not contribute to an accelerated achievement of economic diversification and connectivity;

For infrastructure required for regional integration, Mongolia needs to adopt an aggressive but phased approach to augmenting the potential on the main economic corridors. As a landlocked country between China and Russia, Mongolia relies heavily on the relationships with its two neighbors. The three countries formalized their intentions to forge closer economic ties and develop infrastructure and industrial projects through the China-Mongolia-Russia Economic Corridor (CMREC). However, to date the impact has not yet materialized into tangible results. The main rail infrastructure connecting Russia and China through Mongolia remains in poor condition – a single track and diesel-powered railway line that is not suited for regional connectivity. The regional backbone for the telecommunications has been deployed to establish China-Mongolia-Russia line, but this needs to be further strengthened with more bandwidth or additional routes to cater to the increased broadband needs in Mongolia.

The COVID-19 pandemic further complicates efforts to develop infrastructure in Mongolia. As the backbone for moving people and freight from production to consumption, both passenger and freight logistics will be affected in the short, medium and long term. Travel behavior and transportation services will be changed for the long term. In the short term, this will affect distribution of essential consumer goods and supplies (including food and medical equipment, personal protective equipment, etc.). Transportation services will also affect various sectors that drive economic growth and the impact will be evident in trucking sector and SMEs. In the energy sector, the slowdown is expected to impact electricity consumption, which was estimated to grow at 6-7% in 2020 and in the following year, but it is still unclear by how much. The impact of reduced investments in infrastructure as resources are potentially diverted to COVID-19 response will curtail investments needed to achieve supply-demand balance. The ongoing COVID-19 crisis will cause a greater tightening of fiscal space as the government spends to support immediate health and social safety net needs, reducing its ability to fund infrastructure in the near term. At the same time, existing contracts with the private sector which have government payment obligations, such as the operating renewable energy projects under a feed-in tariff regime, will come under stress if the government finds itself lacking the liquidity to meet scheduled payments. This will be exacerbated by other macroeconomic conditions, such as currency depreciation, making payments even more expensive. The effects of COVID-19 will also impact pipeline projects and those under construction, causing delays to procurement, supply chains, and construction. In the digital development sector, the ongoing COVID-19 pandemic has highlighted the importance of ensuring that individuals, businesses, and governments can connect to affordable and reliable internet as the lifeblood of the service sector. Major issues have not been experienced yet for Mongolia as it has been relatively less affected by COVID-19. For contingency and business continuity purposes it is important for Mongolia to have increased internet access in the rural areas, broadband traffic especially in the health, education, other essential public service delivery, and increased infrastructural readiness for government officials to work remotely, etc. Finally, private capital will likely be more risk-averse in the medium term, as existing assets become distressed, and risk-reward calculations change, increasing the challenge for Mongolia to attract private financing for infrastructure.

B. Need for Stronger Institutions to Deliver Infrastructure

The fragmented institutional framework complicates project preparation and limits financing options. The process for initiating, selecting, preparing and implementing infrastructure projects makes it difficult to attract private investment and is not conducive to achieving value for money. Given the limited amount of funding and financing for infrastructure, projects must be carefully selected and prioritized so that scarce resources are deployed to the projects which can generate the most value or economic return. This should be the case regardless of whether the project is procured through traditional public procurement, PPPs or a combination. However, in Mongolia several bottlenecks in institutions complicate infrastructure development and financing/funding:

Project selection should stem from overall master planning, which sets out the government and sector’s strategic objectives and the investment needs to meet those objectives. Unfortunately, beyond high-level strategies such as the Strategic Development Vision 2030, the Three Pillar Plan, and the more recent Mongolia Vision 2050, Mongolia currently lacks a systematic method of planning or linkages between sector plans and national plans which is based on a rigorous economic assessment. Instead, projects are generally proposed by line ministries on an ad-hoc basis, without adequate links to the Public Investment Plan process.

The lack of systematic appraisals in the planning and design phases of investment projects inhibits the effective screening of projects for strategic relevance or feasibility. The process of capital investment planning in Mongolia is characterized by: i) project proposals submitted by line ministries with inconsistent linkages to sector or strategic planning, pre-determined as public or PPP financing, ii) insufficient project appraisals due to a lack of standard project selection and screening guidelines; and iii) weak linkage of capital budgeting and public investment management (PIM) planning and appraisal. For example, PPP capital projects in Mongolia are not undertaken for efficiency reasons, but to overcome budgetary constraints. Thus, projects are often put through the PPP process when the projects are not able to receive public budget support, suggesting that only projects of lower priority are procured as PPPs.

At the same time, a series of mega-projects which are part of the China-Mongolia-Russia Economic Corridor (CMREC), are under the responsibility of the Ministry of Foreign Affairs of Mongolia (MOFA). Some 32 projects along the CMREC are under the purview of MOFA. These include the central highway, the central railroad, and the energy grid. The rationale for this is that the projects are cross-border in nature, requiring international cooperation to move ahead, and need to be coordinated with additional “soft” infrastructure such as trade agreements, customs unions and other enabling regulations and institutions. However, housing the projects entirely within MOFA further fragments the government’s capacity to review and assess projects.

The NDA and the MOF have no formal coordination mechanism, which leads MOF to have minimal oversight over PIP and PPP projects. The MOF should play a more important role in the determination of the PIP and Concessions List in order to ensure fiscal affordability and manage fiscal risks. However, according to Budget Law, the NDA is responsible for receiving project proposals from the line ministries and agencies and carrying out the qualification and pre-screening to the proposals. The MOF then allocates budget to the projects. Similarly, for PPPs, the Concession Law states that the MOF’s role is limited to providing comments to the Concessions List prior to the government approval and execute concessions repayments. There is no guarantee that MOF’s comments will be addressed. The MOF is not involved in the procurement or contract signing processes, and only informed about PPP projects when the construction is complete, and any payment is due.

In addition to fragmentation, there is a lack of continuity of government agencies responsible for project development. For example, since the adoption of the Concession Law in 2010, the PPP Unit has been moved and restructured 5 times, resulting in frequent changes in personnel, and loss of accumulated knowledge and the institutional memory. Changes in office space and staff also result in loss of essential documents and databases. The Concession Law has had more than 20 amendments in relation to institutional structure and its function and power.

Institutions responsible for project development lack the necessary capacity. For example, the current PPP Unit consists of five people: a department head, division head, two senior specialists and one specialist. Similarly, the unit under MOFA tasked with carrying out the CMREC projects is staffed with individuals who do not have skills and experience from infrastructure sectors. Because of its complex nature, infrastructure projects require advanced and specialized skills sets, such as finance, engineering, whole life asset management, legal and project, and management, which are not readily available in public

administration in Mongolia. Even governments with long-standing infrastructure finance experience hire external advisors as in most cases availability of the specialty skills are often lacking in the public sector. The NDA and MOFA have no disposable resources to hire external expertise or specialist consultants to supplement their work. Several international organizations, such as ADB, JICA, IFC, and GGGI provided capacity-building technical assistance to the government around infrastructure projects and PPPs. However, frequent institutional reorganization and low staff retainment rate hinder the impact of such capacity building.

Key Challenges and Recommendations

Key Challenge 1: Planning for Critical Infrastructure and Response to Impact Of COVID-19

In the short term the impact of COVID-19 on infrastructure and associated services will affect SMEs and sectors such as mining, livestock and tourism which rely heavily on transportation. In the energy sector, the pressing need is for ensuring reliable energy supply to enable essential services in the health care and food supply chains. A sustainable path to deal with the many, sometimes competing, objectives for the energy sector is a key element of the economic diversification agenda and post COVID-19 recovery.

Recommendations

In developing critical infrastructure, selectivity in key. Mongolia should target infrastructure constraints specific to priority value chains. Moreover, these should be focused spatially where they will lower logistics costs and enhance competitiveness the most.

- 1) ***Livestock - Development of the livestock sector should be supported by upgrading key parts and missing links of the 4,300 kilometers of roads connecting the 8 hubs with highest concentration of meat and milk (Uvs, Khovsgol, Arkhangai, Bulgan, Ovorkhangai, To'v, Hentii, and Sukhbaatar).*** The 8 hubs will reduce waste and ensure unbroken cold storage. All services associated with animal health and meat production can then be located within the hubs and small-scale mobile abattoirs with regulated activities introduced for each catchment. In addition, the hubs would also provide ancillary logistics services and value addition linked to meat, milks, and leather such as packaging, and stripping. A central hub at Bagakhangai should be developed into a freight village and take advantage of the proximity to major transport routes for export and domestic urban markets.
- 2) ***Energy - Upgrading, modernization and expansion will be needed to sustain economic growth. Regional energy cooperation and trade presents huge opportunities.*** The government will need to upgrade key parts of its energy infrastructure, including aging cogeneration plants and overloaded distribution networks. It needs to invest in new power transmission lines to allow demand growth along key economic corridors, such as Choir-Sainshand and Songino-Baganuur. It also should invest in utilization of its rich renewable energy (RE) resources to enable an energy transition to mitigate the environmental and social cost of coal use. The Government should pursue the opportunities for a Russia-China gas pipeline going through Mongolia and should seek electrical interconnection with China for power exchange and export of renewable energy on the longer term.
- 3) ***Mineral Value Chain - Selective infrastructure investments have the ability to unlock the latent potential of several mineral value chains.*** Ultimately, the State benefits as the tax base grows by lifting the infrastructure constraint which until now has limited mineral value chains to those projects that do not rely heavily on infrastructure or are able to absorb the high costs of self-supplied power and dedicated transportation.
 - ***Power - Prioritize power sector investments that unlock unmet demand from mines and mineral processing for uninterrupted grid-supplied electricity.*** Only 44 percent of current power

consumption by the mining and heavy industries sector is grid-supplied. The remaining 56 percent is supplied by mines with auto-generation or imported from China. This represents a huge potential to reduce the electricity/operating cost of the mining and heavy industries, and a huge untapped revenue base comprising mainly credit-worthy customers that rely on secure long-term offtake. Reliable power can be supplied in return for mines either directly investing in connections to the grid or by making payment for supply linked to the avoided cost of having to self-supply or use back-up. For the largest mines, there may be a preference to construct their own power supply or to attract private investment through Independent Power Producer (IPP) schemes, through auctions, in order to generate sufficient electricity for own use. As far as possible, such generation should be linked to the grid both to allow surplus power to be supplied to the grid and for the mines to benefit from back-up from the grid.

- ***Transport – Prioritize transport sector investments that help to enhance competitiveness of traded goods generally by selectively piggy-backing on rail investments needed for coal, while relying on upgrading the road network as far as possible.*** The government should re-examine its commitment to finance all current planned rail investments to export coal. While a shift from road to rail haulage for coal is long overdue and will generate transport cost savings and reduce ecological damage, there are mounting challenges to finance coal infrastructure, especially after cancelling the ETT IPO. Rail investments for coal exports should only proceed based on a full life of asset cost-benefit assessment which considers system-wide benefits from interconnections, cost-effective supply of minerals for domestic processing and opportunities for multiple uses and users. Moreover, appropriate weight should be assigned to stranded asset risk. This is more of a concern for thermal coal at present since demand for Mongolian coking coal is likely to remain firm in China in this decade. The prospects thereafter are less certain as demand for coal-reliant steel making reaches a plateau.

To support potential trade with its neighbors, the central railway line that is the backbone for connectivity between Mongolia, Russia and China needs to be upgraded in a phased manner. This should also include a clear priority to upgrade the signaling system and other technical systems on the railway infrastructure for the central economic corridor connecting China and Russia.

Key Challenge 2: Institutions and Regulations for Sustainable Infrastructure

The fragmented institutions and process for identifying, prioritizing and developing infrastructure projects limits opportunities for private finance and leads to sub-optimal utilization of limited public resources.

Recommendations

- (a) ***To enhance Mongolia’s strategic position between Russia and China, a more operational institutional framework for promoting the Trans-Mongolian corridor needs to be designed.*** This should include specific mechanisms for regional traffic observation, marketing of the corridor, addressing logistics and trade facilitation bottlenecks, challenges of interoperability and challenges associated with trade attracting alternative financing and instruments for developing critical infrastructure needed for regional transit.
- (b) ***To address the institutional constraints to infrastructure development, GoM needs to design a gateway review process for all public infrastructure.*** This will help to streamline the process of identification, selection, prioritization and delivery of critical infrastructure. It would also support decisions to assign the right staff to important projects. In addition, a roadmap for project implementation needs to be developed to ensure the right people and skills manage public projects.

- (c) **To address the institutional fragmentation, a central unit composed of representation from various infrastructure ministries but led by MoF is needed to ensure coordination, good planning, and prudent spending.** A small number of experienced staff could play a coordinating and steering role with different parts of governments, with ultimate approvals remaining the responsibility of MOF. Combined with NDA's function in developing national investment program and other strategic investment planning, the NDA can benefit from the close collaboration with the MOF and line ministries. However, the MOF should play a key "gatekeeper" role in approving projects, especially those representing large fiscal outlays.

Key Challenge 3: Financing Infrastructure

Attracting private investment and developing a path to sustainable funding for infrastructure due to macro-fiscal constraints and checkered history of private financing and PPPs, there is limited financing for urgently needed transport, energy and digital infrastructure. Therefore, the Government of Mongolia needs to diversify sources of funding and financing for infrastructure. The most likely additional sources of financing in the short to medium term are foreign debt and equity, possibly blended with ODA or leveraging mining investments.

Recommendations

- (a) **Sources of financing must be diversified.** This includes leveraging mining investments and revenues for public infrastructure. Transport infrastructure such as railways developed by mining companies may be shared with other public uses if feasible. In the medium-term the Government of Mongolia should aim to reduce the long Concessions list to a pipeline of 10-20 well-considered PPP projects with economic value and financial viability, and bringing together financially viable projects from other "lists" and departments such as those projects under CMREC and Erdenes Mongol so there is one master list of possible investments for private sector participation. To attract private investment and improve infrastructure investor confidence the government should champion development of 2-3 exemplar PPP projects that are well-prepared with appropriate risk allocation and robust long-term contracts and competitively tendered to the market. Likely candidates may include those associated with the mining sector as there is a clear revenue flow from the mining industry. This is important given recent PPP experience and impact on market confidence.
- (b) **Develop and build up local capital markets while continuing to improve the regulatory and investment climate to attract needed foreign capital in infrastructure, as local markets will be insufficient for some time.** The government should develop policies and regulatory instruments that promote advance planning of mining infrastructure with stakeholders and which maximize the scope for such infrastructure to be multi-purpose. It must continue to work on improving the investment climate for foreign investors, including by maintaining liberalization of sectors with private sector interest, and following sanctity of contracts and stability of the legal regime.
- (c) **Use scarce government resources only for projects which cannot attract private financing.** For example, in power, the government should sound a clear strategy to the market, supported with associated policy and regulatory framework for private investment in the energy sector, particularly in the power generation sector. Meanwhile limited government sources of funding (IFI or other sources) should be used only to support needed investments in power transmission and distribution to attract and leverage private sector investment in generation projects.
- (d) **Mongolia's policy of taking equity in strategic mineral deposits should be re-assessed by the government to determine if it is an optimal use of scarce public financial resources.** In principle the State equity policy should capture mineral resource rents for the benefit of the nation, however, the returns on equity take a long time to materialize and are subject to great uncertainty. If the State

relies more on the private sector and less on the public sector to finance the sector a significant amount of public funds can be freed up to use on public infrastructure to support diversification of the economy. Better access to reliable public infrastructure would lower mining costs, increase mining profits and associated royalty and income tax payments. On the other hand, the infrastructure could still earn a reasonable rate of financial return from user fees. Privately financed mining projects can also contribute to financing shared infrastructure, which is open to multiple use and users, based on the avoided cost of building dedicated infrastructure.

- (e) ***The government should carry out pricing reforms, while improving sector governance to increase efficiency and lower down cost of service delivery, to ensure cost recovery, self-financing of investment needs and long-term sector financial sustainability.*** On the consumption side, gradual tariff reform that will move toward using long-run marginal cost considerations to inform tariff setting as well as introduction of an automated periodic adjustment mechanisms that will assess efficient costs and investment needs and reflect them in tariff determination without need for regulatory processing is required. On the supply side, following least cost master plan for infrastructure expansion and introduction of auctions for concession arrangement instead of negotiated deal should be practiced to reduce cost of supply.

8) ENSURING SUSTAINABLE AND RELIABLE ENERGY SUPPLY

Executive Summary

With electricity demand expected to double before 2030 significant investments need to be made in order to balance supply and demand. This is an opportunity to scale up the utilization of the country's vast solar and wind energy resources and discontinue the heavy dependence on coal, which affects air quality in urban centers and causes greenhouse gas emissions. Not only does renewable energy (RE) present a clean alternative to coal for domestic power generation in the short term, but Mongolia's abundant RE resources could potentially be harnessed and exported to China, which in the medium and long term will need clean alternatives to coal to fuel its economic growth.

In order to choose a sustainable path to deal with the many, sometimes competing, objectives for the energy sector, the Government should adopt an Energy Sector Master Plan as a comprehensive roadmap for the sustainable development of Mongolia's energy sector and within that framework re-evaluate its commitment to establishing new coal-fired capacity at Baganuur and Tavan Tolgoi in the light of the alternatives presented from RE, which can be established quicker and with less risk of turning into stranded assets. The Government should facilitate private investments in RE generation and demand side energy efficiency while public financing (or PPP arrangements where feasible) should focus on network enhancement, including cross-border connection and system rehabilitation and modernization to ensure supply efficiency and lower cost of services.

Mines can serve as anchor customers for new transmission and RE generation facilities and presents an opportunity to leverage mining power demand and its capital investments in power infrastructure to expand the network to remote areas. The Government should carefully study the options of (i) establishing large solar and wind power plants for supply of indigenous power to the big mining operations in South Gobi and (ii) linking the Mongolia Central Energy System to the Chinese grid through establishing of a Back-to-Back (B2B) converter station that will allow power exchange between the two countries.

End-user tariffs for power and heat are among the lowest in Asia and cover only the short-run marginal cost. Over time tariff reform should progressively bring average tariff closer to cost-recovery while preserving affordability of identified low income households through targeted subsidies.

Context

Energy in Mongolia is almost entirely generated by coal-fired combined heat and power (CHP) plants with less than 10 percent coming from renewable hydro, wind and solar resources. During the last decade, electricity demand has doubled due to economic growth, industrial development, and increased electrification. However, domestic power generation capacity has only increased by 7% in the same period. In the absence of the needed additional generation capacity, the steadily increasing gap between demand and supply has been bridged through power imports from China and Russia, which in 2019 accounted for approximately 22 percent of electricity supply. This situation is rapidly becoming unsustainable, because the capacity of the connection grids to Russia is fully utilized in the winter evenings when demand is at its highest, and because China currently only exports power to a few large mines that are run in island mode without connection to the Mongolian grid. The recent economic slowdown due to the COVID-19 pandemic is expected to alleviate the fear of an impending power shortfall in winter of 2020/2021. However, it is too early to predict the size of the demand drop and the effect on medium-term growth of power demand in Mongolia.

Following decades of under-investment, most power and heat system assets are approaching or have already exceeded their normal retirement age and their deteriorating technical performance is leading to inefficient and unreliable operation and contributing to significant losses. Both frequency and duration of power outages in the Mongolian grid are high compared to neighboring countries, distribution grids are operating at capacity and new connections are either not possible or takes very long time especially for small businesses, which contributes to Mongolia’s ranking as 152nd out of 179 countries for the indicator “Getting Electricity” in the WB Doing Business 2020 index.

The high dependency on coal firing for heat and power supply is an environmental concern both in terms of air quality in urban centers and greenhouse gas emissions. Mongolia has abundant solar, wind and hydro potential with resource endowments of solar and wind generally concentrated in south and east, while hydro tends to be in the north. Not only does renewable energy (RE) present a clean alternative to coal for domestic power generation in the short term but Mongolia’s abundant RE resources could potentially be harnessed and exported to China, which in the medium and long term will need clean alternatives to coal to fuel its economic growth.

Mongolia’s largest industry is mining, which is highly energy-intensive and with many existing mining operations planning to expand, plans for opening of new mines as well as for downstream mineral processing activities, it is expected that power demand from the extractives sector will increase rapidly. Mines can serve as anchor customers for new transmission and RE generation facilities. This presents an opportunity to leverage mining power demand and its capital investments in power infrastructure to expand the network to remote areas.

In the past decade, electricity access in Mongolia has improved significantly. While the national electrification rate stood at 65 percent in 2005, today over 83 percent of all households, and all but one of the 331 soum centers, are connected to the national grid and their customers receive electricity at affordable prices. Unfortunately, the story is different when looking at heating, where less than a quarter of the population have access to central thermal energy provided by coal-fired CHP plants and boiler houses through district heating (DH) networks. Most households rely on decentralized coal-fired boilers or individual coal-burning stoves, which account for a large share of urban air pollution. Furthermore, the current DH primary and secondary network is insufficient, unreliable and deteriorating. The system is dilapidated, due to lack of investments for needed rehabilitation and upgrading in past decades, as concluded in the World Bank report on UB’s heating sector. DH network technical losses are above 19 percent, compared to 9 percent in Harbin the coldest provincial capital in China. It is estimated that 50 percent of the transmission pipelines are in poor technical condition, urgently requiring replacement.

Key Challenges and Recommendations

Key Challenge 1: A Sustainable Path for Mongolia’s Energy Sector

Moving forward, it is important to choose a sustainable path to deal with the many, sometimes competing, objectives for the energy sector: (i) meeting future heat and power demand growth in a mining-driven economy; (ii) ensuring sufficient capacity of power generation and transmission grid; (iii) ensuring predictability and cost-effectiveness of supply options; (iv) reducing air pollution related to coal-fired stoves and boilers; (v) limiting greenhouse gas emissions due to the high dependence on fossil fuels; (vi) addressing efficiency gaps and rehabilitation of aging infrastructure; (vii) improving grid flexibility, currently constrained by the prevalence of combined heat and power plants (CHPs); and (viii) improving the sector’s poor financial health such as by achieving cost-recovery tariffs.

Through support to Mongolian Energy Sector Masterplan (ESMP 2020) the World Bank has been helping the GoM to prioritize the governments’ sector development objectives through a set of effective investment plans using a least-cost metric. Three core objectives have been pursued: (i) continued access

to affordable energy by following a least-cost generation plan for future investments; (ii) assisting the country's energy transition to a greener development path by reducing dependence on coal; and (iii) leveraging private sector capital to ensure adequate levels of energy investments. ESMP 2020 foresees investment needs in the US\$3–4 billion range between now and 2030 depending on scenarios chosen.

Recommendation:

The government should adopt ESMP 2020 as a comprehensive plan for the sustainable development of Mongolia's energy sector. As a rule, all new major energy infrastructure investments should be initiated only if they are in accordance with Master Plan and contracting should, when possible follow a competitive selection rather than be the result of unsolicited proposals being negotiated on a bilateral basis. However, since both demand- and supply-side developments will continue to be in a constant state of flux, many prospective investments that have been identified in ESMP 2020 will need to have their economics and broader rationale re-evaluated periodically. The master planning will therefore need to be updated regularly, for instance every two to three years. This presents an opportunity to update demand forecasts, technology costs and other basic assumptions, and to introduce new projects that may turn out to be new least-cost options.

Key Challenge 2: Use of Renewable Energy Resources and Potential for Their Export

Despite the reliance on fossil fuels, Mongolia has a substantial renewable energy (RE) potential, which holds the promise to be a major domestic and export resource for a transition to a greener development path. The estimated exploitable resources of 700 GW of solar and 400 GW of wind means that Mongolia could generate around 300 times more than its present total power consumption from variable renewable sources. Tapping into the country's rich RE potential is in line with the priorities identified in the 2015 State Policy Paper on the Energy Sector, including: (i) enhancing energy security; (ii) improving the efficiency of the sector and creating favorable conditions for a market-based environment; (iii) introducing modern and clean technologies; and (iv) building the export capacity of the sector. Although developing export opportunities may take time, in the longer run (post-2030) power can be a major export product and growth driver for Mongolia, which is also recognized in the government's Vision 2050 policy document. At present China has a surplus of RE in Inner Mongolia so the short-term export options are limited. However, as more transmission infrastructure is constructed within China, the options of Mongolian RE exports will become increasingly more realistic not only to China but potentially also to other large industrialized countries in East Asia with limited RE resources — as envisaged in the North Asia Power Sector Interconnection (NAPSI or Asian Super Grid) project.

In terms of domestic consumption, the development of RE resources is constrained by the present limited absorption capacity in the grid. It will therefore not be technically feasible in the immediate future to connect all of those RE projects that have been permitted under existing licensing procedures (i.e. a total generation capacity of over 1.5 GW). It would also be uneconomical due to the high feed-in-tariffs that were previously in place and to which most of these projects believe they are entitled. To enhance RE absorption, it will be necessary to look carefully at battery and hydroelectric pumped storage (HPS) options.

Recommendation:

The government should re-evaluate its commitment to establishing new coal-fired capacity at Baganuur and Tavan Tolgoi in the light of the alternatives presented by renewable energy, which can be established quicker and with less risk of turning into stranded assets – as long as suitable solutions for energy storage or import/export arrangements can be put in place. The government should carefully study the options of (i) establishing large solar and wind power plants for supply of indigenous power to the big mining

operations in South Gobi and (ii) linking the Mongolia Central Energy System to the Chinese grid through establishing of a Back-to-Back (B2B) converter station that will allow power exchange between the two countries in spite of the fact that their AC power systems are running on different synchronization. Finally, Mongolia should move to an auctioned approach for all new renewable energy plants. Auctioning is becoming a global standard and can be expected to yield significantly lower prices of solar and wind energy thereby facilitating transition to renewables.

Key Challenge 3: Financial Viability and Sustainability of Energy Market

Power supply and demand are cleared through a single-buyer mechanism with a zero-balance account.

Under this model, the National Dispatch Center (NDC) acts like a single-buyer and purchases electricity at a regulated tariff from generators and sells it to distribution companies. The model was initially set up as a temporary solution that would gradually transition to a more efficient multi-buyer model, but no changes were made in the past 19 years as further liberalization of the sector was put on hold. The single-buyer model's oversight is undertaken by the Energy Regulatory Commission (ERC). The conflicting responsibilities of the NDC and ERC lead to inefficiencies through non-economic dispatch patterns.

Substantial funding goes to compensate the revenue shortfalls of the zero-balance account. The current electricity market structure operates on a cash settlement system where distribution companies deposit collected electricity sales revenues into a zero-balance account from which generation and transmission companies are paid. When distribution companies reduce their deposits into the account in a case of collection shortfalls, thermal generation companies extend their payables to coal mines. This puts pressure on their operations as well or suspends payments to RE generators established as Independent Power Producers (IPPs), accumulating large arrears over time. Furthermore, commitments to Power Purchase Agreements (PPAs) with take-or-pay obligations present a cascading series of contingent liabilities for the government.

The average end-user tariffs for power and heat are among the lowest in Asia and cover only the short-run marginal cost. Bill collection rates are relatively high (~95%) but prevalent meter tampering practices contribute to commercial losses and further shrink the companies' margin. This has led to a financially strained power and heating sector, which depend on government equity for any major investment and direct or indirect government subsidies (e.g. by selling coal from state owned mines at prices lower than international market price) to cover operating expenditures. Furthermore, the electricity sector cross-subsidizes the heating sector, as a result of which the electricity tariffs have been adjusted upward several times to cover shortfalls in required revenues from the artificially low heating tariffs.

Recommendation:

The government should consider gradually implementation of a series of measures to increase the financial viability of the energy sector. This could include measures such as:

- a) Use government sources of funding (IFI or other sources) only to support needed investments in power transmission and distribution, while leaving generation projects which can attract private sector investment to the market. Certain transmission projects, such as a B2B converter can be financed using PPP models. This will reduce or eliminate the need for state funding (and possibly operational subsidies) to these projects;
- b) Putting competitive pressure on the Single Buyer through expanding opportunities for self-supply by large users. Transition from 'single buyer' to 'principal buyer' and improving dispatch of generation with more transparent rules and system improvements to reduce gap between planned and actual dispatch;
- c) Gradual tariff reform that will move toward using long-run marginal cost considerations to inform tariff setting as well as introduction of an automated periodic adjustment mechanisms that will

- assess efficient costs and reflect them in tariff determination without need for regulatory processing. Over time this system should progressively bring average tariff closer to cost-recovery while preserving affordability of identified low income households through targeted subsidies; and
- d) Improve targeting of remaining subsidies and progressively reduce cross-subsidies.

9) ADVANCING DIGITAL DEVELOPMENT

Executive Summary

Mongolia's long-term development policy under its Vision 2050 comprehensively recognizes the importance of information and communication technologies (ICT) for its development; and it includes an 'e-Mongolia' goal for the country. Mongolia's telecommunications market is already relatively competitive and liberalized with mobile penetration rates of 134.8%. The Government of Mongolia (GOM) has also undertaken various digital government initiatives to improve governance efficiency and improve public service; including a World Bank-financed SMART Government Project ending in 2021.

This note identifies the relevant use of ICT for 3 key development challenges and ongoing COVID-19 emergency in Mongolia. The recommendations also provide a more holistic 'e-Mongolia' and digital transformation perspective; and are proposed to be implemented in the short to medium term.

The first recommendation is to grow Mongolia's digital economy for economic diversification and resilience to cope with the impact of COVID-19 and impending Fourth Industrial Revolution. The priority issues to be addressed include developing a digital economy strategy and action plan for use across the government, strengthening the legal and regulatory enabling environment for digital economy, increasing digital literacy, and usage of digital public services among others.

The second recommendation is to strengthen digital infrastructure for COVID-19 and to help address widening urban and rural disparities. This includes priority activities for immediate strengthening of internet capacity and increasing internet access, improving last-mile connectivity, facilitating infrastructure sharing, and expanding 4G mobile connectivity in rural areas.

The third and final recommendation is to use digital government transformation for 'Good Governance' and public sector resilience. Priority activities include leveraging ICT for the public sector's immediate response to COVID-19, fast-tracking the digitalization of the 100 most important public services as well as ensuring cybersecurity of the public administration.

Context

The importance of ICT for development is well recognized in Mongolia's Vision 2050 document. Mongolia's long-term development policy under Vision 2050 includes comprehensive use of ICT for public sector reforms by promoting openness and information transparency; and reduce and eliminate corruption and bureaucracies with support of citizen participation. The government also envisions to transition to 'e-Mongolia' where public services are independent from people, time, distance, and bureaucracies. The vision also has extensive plans to develop the ICT industry by expanding research and development, building information technology (IT) clusters, improving its investment environment, increasing exports among others.

Mongolia's telecommunications market is relatively competitive and liberalized. Mongolia is ranked 118th out of all 193 economies in ITU's Regulatory Tracker for 2018. An independent regulator, the Communications Regulatory Commission (CRC), has been established in 2002. The incumbent operator, Telecom Mongolia, has gone through the full structural separation process: Telecom Mongolia became a service provider and Information Communication Network Company (ICNC, more commonly known as NetCom) assumed responsibility for the state-owned telecoms network. The country's mobile penetration rate was 134.8% (4G subscribers accounted for approximately 47%) in end of 2019 and the telecommunications market is currently served by four mobile operators. Fiber optic cables have been deployed relatively well over the country, with 36,000 km domestic backbone network and 6,300 km metropolitan area backhaul network as of 2019. The country had also established a Universal Service Obligation Fund since 2001 that has implemented over 100 projects for delivering ICT services and expand broadband networks to rural areas⁴⁹.

The government has also undertaken various digital government initiatives to improve governance efficiency and transparency and digitalize public services for its people and businesses. For example, a World Bank-financed SMART Government project (P130891; US\$20 million) was started in June 2014 by the Cabinet Secretariat to improve accessibility, transparency, and efficiency of public service in Mongolia. This project has sought to transform the government services and yield wide-range of benefits to people such as (i) improving the response time for citizen's queries to the 11-11 centers, application of e-Property registration; (ii) building enterprise architecture and disaster recovery centers for all government ministry and agencies' usage; and (iii) provide 39 online services on state registration, labor and welfare services for the citizens. The project has already delivered concrete benefits to citizens and GOM including reducing the time to register a property from 14 to 7 days and providing a national data center recovery center for improved resilience of government operations and services. The project will be completed by December 2021.

Key Challenges and Recommendations

This note identifies the relevant use of ICT for 3 key development challenges and the ongoing COVID-19 health emergency in Mongolia. ICT or digital technologies offers Mongolia unprecedented opportunities to address its key development challenges, and leapfrog and transform the country's development trajectory. The significant value of digitization to respond to national emergencies has also been make clear globally by the current COVID-19 health crisis.

The recommendations also provide a more holistic 'e-Mongolia' and digital transformation goal, and are proposed to be implemented in the short to medium term. The recommendations include ICT broadly at the level of digital connectivity, government and economy that will contribute more broadly to 'e-Mongolia'. Their timeline is also relatively limited due to the need for Mongolia to respond and recover from the global impact of COVID-19, and the rapid pace of new emerging technologies that are disrupting governments, economies, and societies globally.

⁴⁹ Communication and Information Technology Authority (CITA). 2019. *Broadband Infrastructure Development in Mongolia*. Available at: <https://www.itu.int/en/ITU-D/Regional-Presence/AsiaPacific/Documents/Events/2019/Aug-MIIT/1.8BROADBAND%20INFRASTRUCTURE%20DEVELOPMENT%20IN%20MONGOLIA.pdf>

Key Challenge 1: Unleashed Potential of Mongolia's Digital Economy for Economic Diversification and Resilience to Cope with the Impact COVID-19 and Impending Fourth Industrial Revolution

Mongolia already faces the long-term challenge of diversifying its economy as commodity exports account for more than a third of its GDP⁵⁰, but the COVID-19's impact has made this a far more urgent development issue. Mongolia faces not only the prospect of a financial shock and recession like most other countries, but also a jarring commodity shock⁵¹. Mongolia also needs to be prepared to cope with the expected impact of the Fourth Industrial Revolution which is unfolding at an exponential rather than a linear pace and is disrupting almost every industry in every country⁵².

Hence Mongolia should catalyze the growth of its digital economy as a development priority in response to these development challenges. The digital economy is not restricted to Mongolia's ICT sector, but rather encompasses the adoption of digital technology in all sectors of Mongolia's economy to drive economic growth, innovation, and other means of diversifying and transforming the economy.

To develop its digital economy, Mongolia has needs to address few priority issues. Broadband internet access is a basic prerequisite for a digitized economy, but Mongolia ranks 90th out of 141 countries surveyed in terms of broadband speeds through mobile phones. Mongolia's population also does not appear to be well-positioned to leverage the full potential of a digital economy. Individuals using the internet was merely 23.7% of population in 2018, which was much lower than the average of lower middle-income countries (34.7%) and EAP countries (excluding high-income countries: 51.2%).

Recommendations:

- a) **Develop a digital economy strategy and action plan that considers the eventual impact of COVID-19 on the global economy.** This should provide guidance to GOM on the market making opportunities, challenges, approaches, and socio-political implications arising from the digital transformation, and provide plans and actions to leverage the opportunities and mitigate the risks.
- b) **Strengthening the legal and regulatory enabling environment for digital economy.** It is important to review, establish, modernize, and implement the policy, legal, and regulatory frameworks, and institutional and data governance arrangements, effectively engage stakeholders, and promote the inclusion of women into the digital industry. The priority areas to be covered include refining its laws and regulations for e-commerce, e-payment, cashless society, digital taxation, data protection, cybercrimes and digital inclusion. There is also a need for a strong champion and institution from the highest-level of government to lead this cross-agency effort.
- c) **Increase digital literacy and usage of digital public services.** A mass program should be implemented to equip the citizens with the skills needed to live, learn, and work in a digitized society where communication and access to information is increasingly through digital technologies like internet platforms, social media, and mobile devices. The government can also fast-track its efforts to digitalize its public services to enable more citizens and businesses to use online channels for its interactions with the public sector, and serve as a driver for private sector role-modeling and digital innovation.

⁵⁰ World Bank. 2019. *Program and Learning Review of the Country Partnership Strategy for Mongolia for the Period FY13-FY18*.

⁵¹ World Bank. 2020. *East Asia and Pacific Economic Update, April 2020: East Asia and Pacific in the Time of COVID-19*. Available at: <https://openknowledge.worldbank.org/handle/10986/33477>

⁵² World Economic Forum. *The Fourth Industrial Revolution: what it means, how to respond*. Available at: <https://www.weforum.org/agenda/2016/01/the-fourth-industrial-revolution-what-it-means-and-how-to-respond/>

- d) **Create job opportunities in digital-related industries.** Training and hiring programs should be implemented in collaboration with the academia and the private sector. This will also facilitate the economic recovery after the COVID-19 pandemic is over.
- e) **Formulate digital transformation roadmaps for strategic industry sectors.** This aims to assist the private sector companies in effectively utilizing digital technologies to increase productivity and innovation. Digitalization will also help them be better prepared for future pandemics or any other national emergencies.

Key Challenge 2: Digital Infrastructure and Urban and Rural Disparities

There is a need to ensure access to quality internet services for Mongolia to respond to the ongoing COVID-19 crisis. The internet has been instrumental in supporting business continuity plans and operations in both the public and private sector through online communication, remote work, and other usages.

Mongolia’s Vision 2050 also notes the widening urban and rural disparities, and rising migration due to the lack of jobs and small markets in rural areas. It also notes how such inequalities can lead to social tensions and political and social instabilities.

Digital infrastructure, consisting mainly of reliable and fit-for-purpose mobile and fixed phone and broadband services, is an imperative for rural development. They provide access to information, commerce, communication, friends and entertainment – among myriad other things⁵³. Rural areas also face a ‘double’ digital divide as they typically lag in terms of digital connectivity for mobiles and internet, and rural inhabitants typically lack the basic knowledge and skills to be able to productively use the digital channel for personal and business use. They are also at higher risk of being negatively impacted by COVID-19 due to having lower access to public services, especially health and education.

The need for Mongolia to construct infrastructures to connect rural areas with urban markets is already recognized in Mongolia’s Vision 2050. Disparities in urban and rural connectivity are still significant despite Mongolia’s achievements in the telecommunications sector. For example, many *baghs* (rural subdistricts) are still relatively underserved. In addition, 62% of LTE subscribers are in Ulaanbaatar while only 38% are in the provinces. Therefore, the Vision 2050 document has relevant digital connectivity targets to (i) provide high speed internet connection for 90% of the population; and (ii) ensure that at least 70% of the rural populations use broadband internet services as Phase 2 (2021-2025) goals.

Recommendations:

- a) **Strengthen internet capacity and increasing internet access.** Various short-term actions can be undertaken; such as (i) unlocking of extra/unused spectrum on a temporary basis in congested areas to facilitate home-based-work; (ii) enhancing the capacity (bandwidth) of the backbone/backhaul, and (iii) arrangement of discounted bulk data plan for government officials to conduct videoconferences and work from home.
- b) **Improve last-mile connectivity.** Due to the urban-rural disparities in public services for education and health and to prepare the rural areas for future pandemics, the priority should go to local government

⁵³ Australian Government. *Why does digital infrastructure matter?* Available at: <https://www.industry.gov.au/data-and-publications/australias-tech-future/digital-infrastructure/why-does-digital-infrastructure-matter>

offices, schools, post offices, hospitals/clinics, etc. In doing so, it is important to seek an effective technology mix that caters both to local geographical conditions and to the most disadvantaged segments of society. Eleven *soums* out of 319 are still reliant on microwave and satellite connections, not directly connected to fiber optic backbone network. It is also imperative to prepare the rural areas for the public health crisis, such as by arranging discounted bulk data plan and videoconferencing facilities for government officials in these areas.

- c) **Facilitate infrastructure sharing for more efficient rural rollout** (between telecommunications operators, and between other infrastructure operators (e.g. transport, energy)). Examples include “dig-once” policy to effectively lay out fiber optics along highways, utilization of electricity transmission towers for mobile communications, utilization of surplus capacity of Optical Ground Wire (OPGW) deployed along electricity transmission lines. This can potentially lead to significant deployment cost reduction for rural connectivity.
- d) **Expand 4G mobile connectivity, especially in rural areas.** Mongolia’s Communications Regulatory Commission (CRC) could (i) review the spectrum plan and allocate more bandwidth for 4G services; (ii) allow the mobile operators to share their spectrums to enhance the utilization; and (iii) facilitate the dialogue between mobile operators for roaming agreements⁵⁴.
- e) **Stimulate broadband demands in rural areas to minimize the effects of a double digital divide.** Broadband use and demand can be “pulled” through various means; such as raising awareness of its possible benefits and making it available and affordable to users. The government could promote use of its existing digital public services, such as the e-property registration system and others, to its rural constituents. They could also initiate programs to encourage the growth of e-commerce and online-based freelancing work and provide support for rural-based businesses to digitalize their operations.

Key Challenge 3: Digital Government Transformation for ‘Good Governance’ and Public Sector Resilience

Governance is a cross-cutting root issue behind Mongolia’s key development challenges⁵⁵, and Mongolia’s Vision 2050 also recognizes the need for “Good Governance” as one of its 9 areas of focus. The vision has detailed plans and actions to use ICT for more efficient, effective and human-centered e-governance. As described above, the Vision 2050 also includes detailed plans for the use of ICT for openness, transparency, and public services to citizens and businesses.

There is also a need to increase the public sector’s resilience to health crisis and other emergencies. The current COVID-19 situation has demonstrated the need for governments around the world to be digitally enabled to continue operations and provide digital public services, and this is no exception for Mongolia.

Recommendations:

- a) **Leverage digital technology/ICT for the public sector’s immediate response to COVID-19.** The eventual long-term impact of this health crisis remains unclear and there is a need to Mongolia to prepare for future emergencies. The immediate priorities include developing and having ready ICT-based applications for mass messaging to the public symptom checking, contract tracing, etc.

⁵⁴ Commercially non-viable areas should be divided into the number of mobile operators. One operator should take responsibility in building necessary infrastructure and let other operators to use their services by roaming arrangement.

⁵⁵ World Bank. 2019. Program and Learning Review of the Country Partnership Strategy for Mongolia for the Period FY13-FY18.

The public sector also needs to leverage the digital channel for business continuity; especially in terms of basic videoconferencing and remote work for government officials, and access to existing shared back end applications such as shared document management systems to enable remote work. The immediate needs also include improving health systems and data and implementing emergency procedures (tentatively streamlined decision making and procurement), utilizing the existing government national and disaster recovery data center.

- b) **Fast-track the digitization of Mongolia's 100 most important public services (out of 490 total).** Mongolia has already digitalized some of its key public sector services, such as the e-property registration service under the ongoing SMART Government Project. Their digitalization needs to be fast-tracked to improve access, availability and resilience of public services to its citizens and businesses which will be particularly valuable during this or future emergencies. Digitalizing these services will also enable the government to provide improved services to the rural areas.
- c) **Ensure cybersecurity of the public sector administration and Mongolia's critical information infrastructure.** The public sector's ICT systems and applications need to be sufficiently cyber-secured to be protected from continual and evolving cyber threats. The country also needs to secure its critical information infrastructure that is necessary for the continuous delivery of essential services, such as central banks and health and education systems. In this area there is an immediate need for the country to have a national cybersecurity operations centers to monitor and safeguards its national digital assets.
- d) **Implement three strategic digital services on a single service window.** This can make a strong case for WOG approach and garner attention from other government agencies. Such services may include e-procurement for government employees, online business licensing platform, etc.
- e) **Establish an integrated, whole-of-government approach and platform for ICT use by the public sector.** This integrated approach will need an integrated digital platform where all the government agencies can develop and run their computing applications and/or services. Such a platform provides a common set of shared digital tools and functions such as developer tools, SMS notification gateway, geographic information system, service buses to connect different databases, business analytics, etc. This will enable the agencies to provide more efficient, secured and resilient applications and services for internal use by their officials, as well as for public services to citizens and businesses.