

## SECTOR ASSESSMENT (SUMMARY): MULTISECTOR

### A. Mongolia's Economy

1. Mongolia's economy is highly dependent on its mining industry and foreign direct investment (FDI). A deceleration in gross domestic product growth from 17.3% in 2011 to 1.2% in 2016, prompted by a worsening external environment is characterized by plummeting FDI, falling commodity prices, and growth moderation in the People's Republic of China. Against this background, necessary tightening of macroeconomic policies has exacerbated the slowdown in the context of deteriorating financial stability. Higher commodity prices and the return of FDI inflows to two large mining projects are expected to limit gross domestic product losses in 2017. Economic growth started to recover in 2017, reaching 5.8% in the first three quarters; and is forecast to grow by 4.0% for the full 12 months, and 3.0% in 2018. The implementation of an International Monetary Fund program, which aims to stabilize the economy, restore debt sustainability, and improve fiscal and monetary management, will boost growth in the medium term.<sup>1</sup> The proposed program is part of the International Monetary Fund economic stabilization program and will provide fiscal support while also (i) avoiding the economic and social costs of not undertaking effective measures to address air pollution in Ulaanbaatar, which is a long-term burden on the already weak national economy; and (ii) promoting fiscal savings through rationalization of necessary urgent measures (while the actual direct cost of the actions to be implemented will be modest).

### B. Sector Performance, Problems, and Opportunities

#### 1. Air Pollution

2. Mongolia's capital city, Ulaanbaatar, accounts for two-thirds of the urban population, which keeps growing partly because of the impacts of global climate change in the vast countryside: more frequent and more intense natural disasters, coupled with poor pasture management practices, are causing nomadic herders to lose their livelihoods and seek opportunity for a better life in the capital. Despite the inflow of people, the city core has expanded only marginally to accommodate the new migrants and the upgrading or extension of basic urban services is also limited.<sup>2</sup> Combined, these factors have reshaped the geography of the capital city and generated a vast peri-urban area, named *ger* areas, which are now home to an estimated 219,000 households, or 800,000 people (there were approximately 350,000 people in 2000). These areas lack basic urban services such as water supply, sanitation, and district heating.<sup>3</sup>

3. In *ger* areas, most households rely on the combustion of raw coal (or solid waste, for the poorest) for heating and cooking, while government buildings mostly rely on highly polluting and inefficient coal-fired heat-only boilers (HOBs).<sup>4</sup> These highly polluting energy systems are the

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<sup>1</sup> In May 2017, the IMF approved a 3-year Extended Fund Facility (EFF) for Mongolia of \$434.3 million to support the country's economic reform program. ADB and other financing partners have committed to provide further budgetary support linked to policy commitments and project support for a total financing package totaling approximately \$5.5 billion. ADB is coordinating closely with the IMF and other development partners on the EFF.

<sup>2</sup> In 2003, the government began giving each Mongolian citizen a plot of land of about 700 square meters. For the migrants to Ulaanbaatar, it was an opportunity to settle in the city's periphery, often using their *gers* (traditional tents) for housing.

<sup>3</sup> Asian Development Bank (ADB) ongoing investment in urban redevelopment which comprises a \$320 million loan supports the Ulaanbaatar city master plan to redevelop the capital city *ger* areas by upgrading existing urban subcenters in *ger* areas as catalysts for redevelopment and economic growth.

<sup>4</sup> Most of the raw coal burned in *ger* area households is low-quality coal from the Baganuur mine. This coal is characterized by high levels of contaminants (e.g., sulfur, ash, volatile organics, and moisture) and has a low energy

largest sources of air pollution affecting the whole city; they contribute to an estimated 80% of ambient concentrations of inhalable particulate matter of less than 2.5 micrometers in diameter (PM<sub>2.5</sub>). An increasing number of private vehicles and highly polluting public transport buses in Ulaanbaatar's central core, where jobs and services are concentrated, are thought to be responsible for 10% of ambient PM<sub>2.5</sub>. Coal burning in the combined heat and power plants generating electricity and heat for the city contributes to an additional 5%–6%, and resuspension of dust from unpaved *ger* roads and fly ash from combined heat and power plants adds the remaining 4%–5%. Moreover, the city's topography and climate are conducive to poor air quality. Ulaanbaatar is surrounded by mountains which, in combination with cold, dry air in the autumn and winter months, trap the air near the surface in and around the city, preventing dispersion of the pollution. Ulaanbaatar had the world's highest annual average level of fine particulate matter of 10 micrometers or less in diameter in a 2010 study by the World Health Organization. As of December 2016, levels of the harmful PM<sub>2.5</sub> were nearly nine times the World Health Organization's recommended limits. These levels of ambient air pollution pose serious public health risks. Estimates suggest that 10% of deaths in Ulaanbaatar in 2013 resulted from air pollution complications.<sup>5</sup> Children are particularly vulnerable to pollution impacts such as reduced fetal growth, preterm birth, pneumonia, impaired brain development, and reduced lung function leading to acute and chronic respiratory diseases.<sup>6</sup>

## 2. Energy Sector

4. Mongolia's energy system is inextricably linked to the need for space heating because of the country's climate. The harsh winter features daytime temperatures ranging from –10° Celsius (C) to –30° C, and the temperature can drop to as low as –40° C at night. The heating season is unusually long at 8 months. Consequently, energy demand for heat load is more than double that for electricity. Since coal is the dominant source for electricity and heat generation in Mongolia, combined heat and power generation is the most suitable, efficient, and economical technology choice to provide both electricity and heat in Mongolia. However, existing facilities for providing heating and electricity (power plants and transmission and distribution lines) are energy inefficient and vulnerable because they are old and outdated.<sup>7</sup> The existing power transmission and distribution infrastructure is inefficient and unreliable because of lack of investment and maintenance, and is in urgent need of rehabilitation and upgrade. Also, there are many different innovative and cost-effective technologies available that could be used to meet future energy demands and complement and replace existing coal combustion.

## 3. Government's Sector Strategy

5. In November 2016, the government renewed the composition of the National Committee for Reduction of Air Pollution, and commissioned the National Program for Reducing Air and Environmental Pollution 2017–2025 and its implementation action plan (IAP). The national program, approved by the Cabinet on 20 March 2017, aims to update urban planning and increase

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content. As a result, burning raw coal produces significant emissions of particulates and sulfur dioxide. Because *gers* generally have short chimneys, the emissions are not easily dispersed and have a significant impact on the local air quality in *ger* areas.

<sup>5</sup> R. Allen and D. Tam. 2011. *Air Pollution Killing Ulaanbaatar (Mongolia) Residents*. Burnaby: Canada Simon Fraser University.

<sup>6</sup> United Nations Children's Fund. 2016. *Understanding and Addressing the Impact of Air Pollution on Children's Health in Mongolia*. Ulaanbaatar.

<sup>7</sup> Two of three coal-based combined heat and power (CHP) plants in Ulaanbaatar—CHP plant number 2 (CHP 2) and plant number 3 (CHP 3)—have operated for more than 45 years without proper emission control devices, and the largest plant, CHP plant number 4 (CHP 4), has operated for more than 25 years.

the quality of urban infrastructure. The IAP, by specifying accountable institutions, time frames, and costs, signals the government's commitment to tackling the air pollution problem. However, there is an opportunity to enhance the IAP's effectiveness by prioritizing actions which are coordinated among agencies and which are financially and economically viable and sustainable.

#### 4. Asian Development Bank Sector Experience and Assistance Program

6. Its wide and long-term involvement in the urban sector in Ulaanbaatar keeps the Asian Development Bank (ADB) in the forefront of development work for air quality improvement.<sup>8</sup> As noted earlier, only considerable investment in new urban infrastructure can solve air pollution issues in Ulaanbaatar. This includes upgrading electricity distribution grids in *ger* areas, expanding district heating and decentralized networks, introducing energy efficiency measures in buildings to reduce overall heating needs, expanding affordable housing, and promoting greener heating solutions in the near term. These long-term efforts by ADB, which are complemented by those of development partners such as the World Bank, United Nations Environment Program, and the Global Green Growth Institute, have to also be complemented by improvement in the governance system and by urgent measures to reduce air pollution levels and protect vulnerable segments of the population.

7. A two-tranche, stand-alone policy-based loan is proposed to reduce Ulaanbaatar's air pollution and greenhouse gas emissions under the national program framework by helping the government deliver its IAP commitments, prioritized based on cost-effectiveness. Pre-identified policy actions are grouped under three reform areas as follows.

8. **Reform area 1. Improved implementation action plan efficiency and air pollution control regulatory framework.** These policy actions are intended to support the implementation of the national program IAP by enhancing the legal and regulatory framework. The Government of Mongolia will amend the Law on Government Special Funds, Law on Air, and Law on Air Pollution Fees to authorize the allocation of pollution fees to a special fund for financing air quality improvement. The special fund would provide a source of financing for specific air quality improvement measures, such as incentives for cleaner fuels and stoves, education campaigns, clean energy development, and extension of district heating services. With technical assistance from ADB, the Ministry of Construction and Urban Development and Ministry of Energy will explore some of the commercially available heating and green building technologies to better understand their potential to meet Mongolia's energy needs and the technical and financial barriers to deploying them in Mongolia's climate.

9. It is important to increase the public's awareness of the links between air pollution and health, and the actions that individuals and household can take to reduce air pollution and mitigate the health risk from air pollution. Under tranche 1, the Ministry of Environment and Tourism (MET) and Municipality of Ulaanbaatar (MUB) will install exhibits at two of the existing information centers to expand the public's awareness of innovative heating and green building technologies that can be used to reduce emissions and exposure to air pollution, and improve comfort. In addition, in tranche 2 the MET will conduct education programs to educate citizens about the links between fuel use, air pollution, and health impacts, especially for children and pregnant women, in cooperation with the United Nations Children's Fund.

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<sup>8</sup> In February 2013, the country's parliament approved the Ulaanbaatar City Urban Development Master Plan 2020 and Development Directions 2030. The development of the new master plan was supported by ADB and marks a significant shift in policy. The plan integrates the *ger* areas into the city development strategy and infrastructure program for the first time.

10. The MET and MUB operate several air quality monitors in and around Ulaanbaatar, which are outdated and not well planned or integrated. To provide better information on pollution levels, the MET and MUB will develop a strategy to upgrade the emission and air quality monitoring networks. ADB will provide technical assistance to (i) support the development of the strategy and budget plan to be used for fundraising purposes; and (ii) ensure coordination with other development partners that are working in the area, most notably the Japanese International Cooperation Agency and the World Bank.

11. **Reform area 2. Key measures on air pollution reduction and health protection.** The policy actions guide future expenditures to prioritize cost-effective IAP actions for air pollution reduction and human health protection from air pollution.

12. One means of reducing emissions from polluting heating systems in the *ger* areas is to replace raw coal with processed semi-coke briquettes or lower emitting coal. This has the potential to significantly reduce both particulate and sulfur dioxide emissions by 75% or more. Another mechanism to reduce emissions is to provide district heating to replace coal-fired HOBs (small-to-medium sized boilers used in buildings to provide space heating). Out of the 228 HOBs identified for retirement, the government will ensure adequate budget to expand the district heating network and enable the retirement of 68 HOBs in 2017–2018 with an additional 71 scheduled for retirement in 2018–2019.

13. The high levels of winter air pollution pose significant health risks, including pneumonia. In Mongolia, pneumonia is a leading cause of childhood mortality and accounts for 51% of all-age respiratory disease hospital admissions.<sup>9</sup> Vaccination is an effective intervention that can significantly reduce the incidence of pneumonia among children under 5 years of age.<sup>10</sup> Indoor air pollution also poses significant health risks, especially for pregnant women and children. Two effective interventions to improve indoor air quality are insulation and air filtration systems (e.g., high efficiency particulate air filters). The addition of insulation not only reduces the heating needs for buildings, potentially reducing fuel use and the associated air pollution, it also reduces the intrusion of polluted outside air. Installing insulation and air filters on new and rehabilitated schools, hospitals, and kindergartens will enhance indoor air quality in buildings where children and elderly adults spend a significant portion of their day.

14. **Reform area 3: Mechanisms for environmentally sound and integrated urban, energy, and transport systems.** These policy actions create a framework for better planning and provide incentives for cleaner fuels and greener development. Specifically, several policy actions lay the foundation for greener redevelopment of the city, especially in *ger* areas, including (i) developing a plan to transition to low-sulfur transportation fuel that will reduce emissions and improve the effectiveness of advanced pollution controls; (ii) requiring the application of energy efficiency standards and prohibiting on-site coal combustion in government-owned and/or operated buildings; and (iii) integrating urban and energy master plans with coherent land-use policies that consider anticipated climate impacts. The remaining policy actions provide incentives, through sustainable financing mechanisms, for a shift towards a more efficient, safer, and greener building industry by creating and funding credit guarantee products for small and medium-sized enterprises that support air pollution reductions.

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<sup>9</sup> N. Sundaram et al. 2017. Cost-Effectiveness of 13-Valent Pneumococcal Conjugate Vaccination in Mongolia. *Vaccine* 35(7): 1055–63. doi: 10.1016/j.vaccine.2016.12.070.

<sup>10</sup> Efficacy rates are 82.5% for children under 5 years of age. The policy action to expand the pneumococcal conjugate vaccination program to a total of 40,000 children in Ulaanbaatar, approximately the number of children born in the city each year, will avoid approximately 444 incidences of pneumonia and 31 premature deaths.

### Problem Tree (Multisector)

