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PACIFIC

MONGOLIA

World Bank Group

COUNTRY CLIMATE AND DEVELOPMENT REPORT

2024

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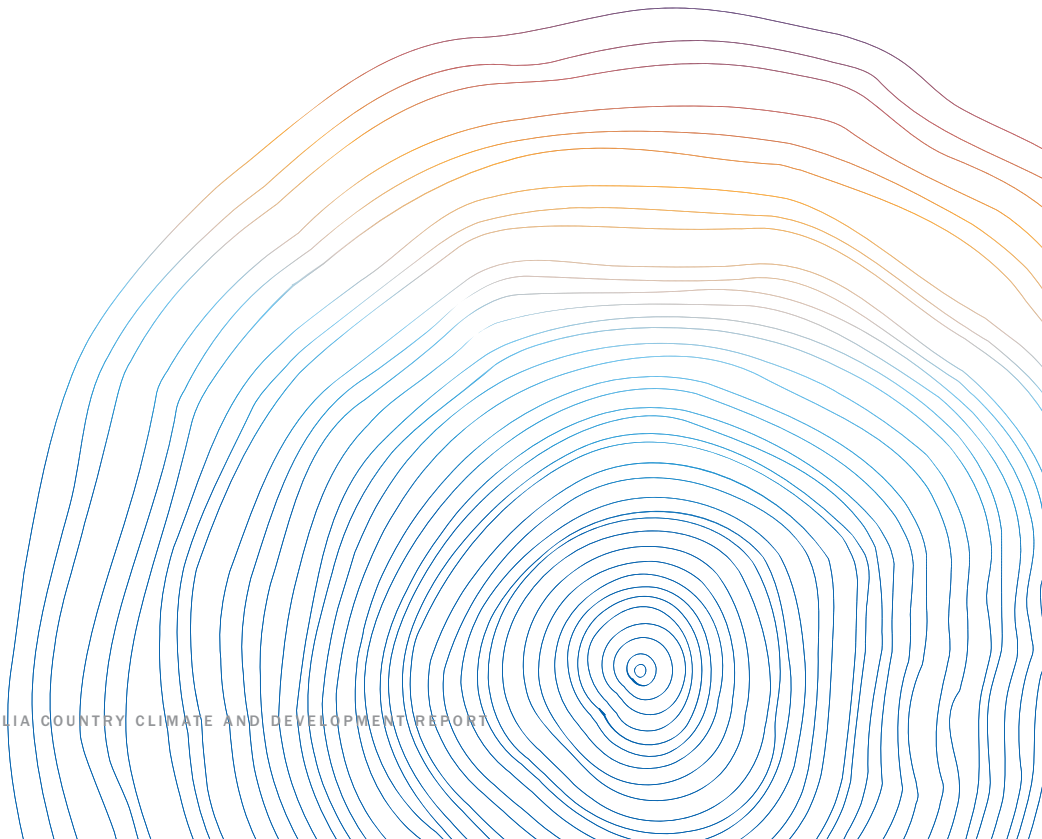
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ABBREVIATIONS AND ACRONYMS

ASP	Adaptive Social Protection
AUES	Altai-Ulyastai Energy System
BOM	Bank of Mongolia
BTI	Billion Tree Initiative
BTNM	Billion Tree National Movement
BUR	Biennial Update Report
CBAM	Carbon Border Adjustment Mechanism
CCDR	Country Climate and Development Report
CCRCC	Climate Change Research and Coordination Center
CCS	Carbon Capture and Storage
CDM	Clean Development Mechanism
CER	Certified Emission Reduction Credit
CES	Central Energy System
CHP	Combined Heat and Power
DALY	Disability-Adjusted Life Year
DH	District Heating
DRFI	Disaster Risk Financing and Insurance
DRM	Disaster Risk Management
EES	Eastern Energy System
EPC	Energy Performance Contracting
ERC	Energy Regulatory Commission
ESCO	Energy Service Company
ESG	Environmental, Social, and Governance
EU	European Union
EV	Electric Vehicle
FA	Forestry Agency
FAO	Food and Agriculture Organization
FDI	Foreign Direct Investment
FHF	Future Heritage Fund
FSC	Fiscal Stability Council
FSF	Fiscal Stabilization Fund
FUG	Forest User Group
GCF	Green Climate Fund
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Greenhouse Gas
GIZ	German Agency for International Cooperation (Deutsche Gesellschaft fur Internationale Zusammenarbeit, GIZ)
GoM	Government of Mongolia
HOB	Heat-Only Boiler
IAAC	Independent Authority Against Corruption
IBLI	Index-Based Livestock Insurance
ICMA	International Capital Market Association
IFI	International Financial Institution
ILO	International Labour Organization
IMF	International Monetary Fund
IoF	Irrigation of the Future
IPS	Investment Policy Statement
IRENA	International Renewable Energy Agency
ISCO	International Classification of Occupations
ITMO	Internationally Transferable Mitigation Outcome
IWRM	Integrated Water Resource Management
JCM	Joint-Crediting Mechanism
JETP	Just Energy Transition Partnership
LDF	Local Development Fund
MCUD	Ministry of Construction and Urban Development
MED	Ministry of Economy and Development
MET	Ministry of Environment and Tourism
MMHI	Ministry of Mining and Heavy Industries
MNAO	Mongolia National Audit Office
MOE	Ministry of Energy
MOF	Ministry of Finance
MOFALI	Ministry of Agriculture and Light Industries
MRV	Measurement, Reporting, and Verification
MSFA	Mongolian Sustainable Finance Association
NAP	National Adaptation Plan
NBFI	Non-Bank Financial Institution
NCC	National Climate Committee
NDCs	Nationally Determined Contributions
NEL	Nuclear Energy Law
NEMA	National Emergency Management Agency
NGO	Nongovernmental Organization
NPV	Net Present Value
NRP	New Recovery Plan
NSFR	National Sustainable Finance Roadmap
NSO	National Statistics Office
OT	Oyu Tolgoi
PEFA	Public Expenditure and Financial Accountability
PFM	Public Financial Management
PIM	Public Investment Management
PISA	Program for International Student Assessment
PPP	Public-Private Partnership
PV	Photovoltaic
RBA	River Basin Authority
RBO	River Basin Organization
RCP	Representative Concentration Pathway
REE	Rare Earth Element
SDGs	Sustainable Development Goals
SEFIL	Strategic Entities Foreign Investment Law
SES	Southern Energy System
SIRM	Systemic Investor Response Mechanism
SMEs	Small and Medium Enterprises
SNG	Subnational Government
SOE	State-Owned Enterprise
STEM	Science, Technology, Engineering, and Mathematics
SWF	Sovereign Wealth Fund
TCM	Transition Critical Mineral
VAT	Value Added Tax
UB	Ulaanbaatar
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
WES	Western Energy System
WHO	World Health Organization
WSS	Water Supply and Sewerage

INTRODUCTION



1

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1—4

The Mongolia Country Climate and Development Report (CCDR) offers evidence-based analysis and recommendations for achieving sustainable economic development amidst climate change challenges and the accelerating global low-carbon transition.



Mongolia's development prospects are uniquely challenged by both the impacts of climate change and the global shift toward a low-carbon economy. Households in Mongolia are highly vulnerable to natural disasters such as dzuds—marked by severe snowfall and extreme cold—and floods. These events are likely to increase in frequency and intensity, jeopardizing development achievements. Moreover, as the world increasingly adopts low-carbon practices and the demand for Mongolia's coal, especially from China, wanes, the urgency to transition the economy from its reliance on coal intensifies. It is critical to diversify the economy and bolster its climate resilience to avert significant negative impacts on economic growth, government revenue, exports, and, most importantly, efforts to reduce poverty.

The country's efforts toward decarbonization pose significant challenges given the structurally high-emission intensity of its economy. While it is not a significant contributor to global emissions, Mongolia's economy is the most greenhouse gas (GHG) intensive globally[1] and it has the ninth highest per capita emittions of GHGs. Mongolia's unconditional Nationally Determined Contribution (NDC) target is to reduce GHG emissions by 22.7 percent compared to a baseline case by 2030, which would still represent a 122 percent increase in GHG emissions since 2010.[2] Also, the country set a slightly higher conditional NDC target (27.2 percent reduction compared to baseline) if carbon capture or waste-to-energy technologies are made available, and when factoring in forests, the target increases further to 44.9 percent from the baseline. As of now, Mongolia has yet to set a net-zero emission target.

1 Excluding recent warzones and small island nations.

2 Following 2010–2015 trends, the baseline includes a near doubling of emissions between 2015 and 2030. Half of the proposed reduction would come from the energy sector.

Table 1

Different measures of Mongolia's carbon footprint

COUNTRY	GHG EMISSIONS PER CAPITA (tCO_2e per capita)	CARBON INTENSITY (tCO_2e per US$ million of GDP)	TOTAL GHG EMISSIONS ($MtCO_2e$)	ANNUAL GHG EMISSIONS GROWTH RATE (% between 2010 and -2021)
China	9.1	721	12,792	2.2
Indonesia	5.4	1,252	1,485	0.4
Kazakhstan	16.8	1,665	318	0.1
Malaysia	11.2	983	366	13.8
Mongolia	**23.7**	**5,224**	**79**	**3.0**
Philippines	2.1	603	238	4.0
Singapore	12.4	170	67	1.4
Thailand	6.4	888	449	2.2
United States	16.8	242	5,565	−0.4

Source: Climate Watch. 2021. GHG Emissions. Washington, DC: World Resources Institute.
Note: Greenhouse gas includes greenhouse gas emissions and removals from land use, land use change, and forestry.

While challenging, climate action also presents Mongolia with opportunities to achieve important development benefits. By simultaneously pursuing decarbonization and enhancing climate resilience, Mongolia can address climate risks and secure developmental advances. A climate change-compatible development strategy requires dedicated efforts to reduce reliance on coal for energy, decrease the size of extensive livestock herds, and better manage land and water resources. Implementing these strategies could yield considerable benefits, such as reduced air pollution, which is crucial for public health improvement and a more sustainable livestock industry that preserves the traditional nomadic lifestyle of herders. Additionally, there is potential for policies that guide the economy toward a more sustainable path, taking advantage of the global shift toward green practices to encourage economic diversification, for example, into mining of green minerals.

The effects of climate risks and the shift away from coal will have diverse impacts across different regions, communities, and socioeconomic levels. Climate-related challenges intensify the already vulnerable conditions of herders and coal miners, who will encounter significant obstacles in finding new employment as the focus shifts to sustainable livestock methods and moves away from coal reliance. Moreover, those in rural and ger[3] districts of Ulaanbaatar (UB) are at greater risk of suffering from the increased frequency of dzuds and floods. Therefore, it is crucial to employ a people-centered, spatially aware, and place-based approach when analyzing the hurdles of the green transition and in the subsequent crafting of effective policies.

The report assesses the critical interconnections between Mongolia's development ambitions and climate change action and identifies ways to transition to a more economically diversified, inclusive, and resilient development path. It highlights key climate and transition risks affecting Mongolia's future development and proposes a pathway to enhance climate mitigation and adaptation. Various modelling techniques and approaches are employed to evaluate the extent of Mongolia's exposure to climate change and the associated social and economic impacts and transition risks. These results then inform sector- and economy-wide policy options to reduce the economic dependence on coal and carbon-intensive energy generation and better manage water and agricultural resources. The report also makes a case for strengthening policies to enhance resilience to climate change and ensure a just transition, particularly for the most vulnerable. Recognizing that green transition will come with a cost, the report goes on to identify public and private sector investment needs, constraints, and financing opportunities for a climate-resilient, low-carbon growth path.

The remainder of the report is structured as follows: Section 2 delves into the linkages between development and climate in Mongolia and presents model-based findings on the economic and poverty impacts of climate change under different scenarios. **Section 3** covers four in-depth sectoral analyses. The first two mainly focus on adaptation to climate change in the agriculture and water sectors. The third considers prospects for the

3 A ger is a portable, circular tent that may be further insulated by a variety of materials. It is traditional to Mongolia.

extraction sector, while the fourth sectoral analysis focuses on decarbonizing power and heat generation. **Section 4** shifts the focus to how the government can boost resilience for climate-vulnerable populations. **Section 5** outlines options for mobilizing private and public financing and private investments to support the green transition. **Section 6** examines the existing institutional and governance structure for climate action and proposes recommendations to improve its effectiveness, and **Section 7** concludes with a framework for prioritizing the policy actions outlined in this report.

Figure 1 CCDR at a glance



CLIMATE RISKS TO DEVELOPMENT



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2



2.1. ROBUST DEVELOPMENT PROGRESS WITH LINGERING CHALLENGES

Over the past two decades, Mongolia has relied heavily on mining-led growth. Mongolia has emerged as one of the world's fastest-growing economies, boasting an average annual growth rate of 6.3 percent since 2004, surpassing the global average of 2.9 percent and the high-income economies' average of 1.7 percent, leading to substantial economic convergence (Figure 2). However, unlike the manufacturing and services-led economies of other emerging markets economies in East Asia such as ASEAN-5 countries,[4] Mongolia's economic progress has been largely forged in its coal and copper mines and tethered tightly to demand from China. Once an agrarian economy, today, mining makes up about one-quarter of GDP (Figure 4), serves as the primary exporting sector, and is the main recipient of foreign direct investment (FDI).

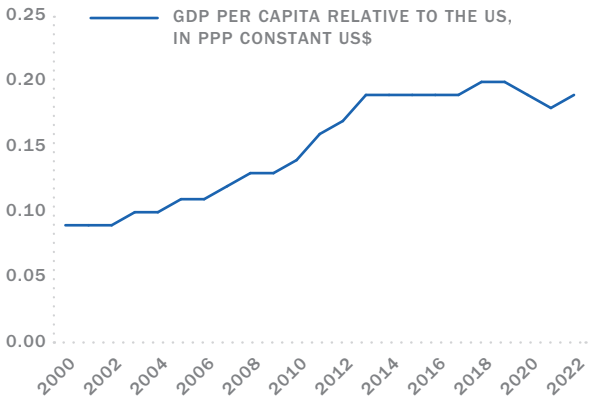
Mongolia's heavy reliance on mining has left its economy undiversified and prone to macroeconomic instability. As substantial resources have been allocated to mining, economic diversification in non-mining sectors has been stifled, impeding the creation of high-quality jobs and heightening vulnerability to external shocks. Moreover, significant fluctuations in mining production and prices have contributed to pronounced macroeconomic volatility (Figure 5), further compounded by procyclical macro policies (World Bank 2020a). For instance, historically, fiscal expenditures have risen during economic expansions, exacerbating economic cycles and constraining the accumulation of fiscal buffers for use during downturns.[5] This carbon-intensive growth has also been associated with local pollution and adverse health impacts as cheap coal is used heavily as energy source and for heating purposes (Section 3.4).

4 ASEAN-5 comprises Indonesia, Malaysia, the Philippines, Singapore, and Thailand.

5 The precarity of Mongolia's growth model was evident when, in 2015, the country was designated an upper-middle-income country and, within a year, was reclassified as a lower-middle-income country following a confluence of commodity market shocks and macro-fiscal mismanagement. Most recently, the zero-COVID policy in China resulted in border restrictions that mostly halted coal exports and dealt a severe blow to the economy.

Figure 2

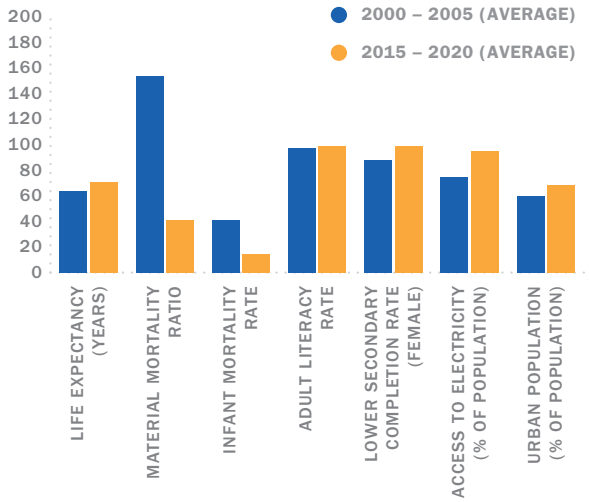
Mongolia's growth model has supported economic convergence



Source: World Bank World Development Indicators (WDI).

Figure 3

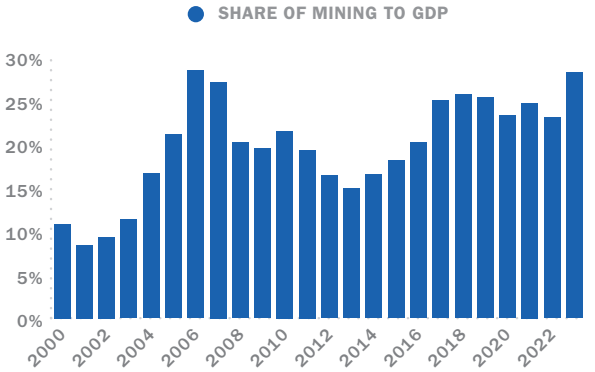
Mongolia's development outcomes have improved along with strong growth



Source: World Bank, based on WDI.

Figure 4

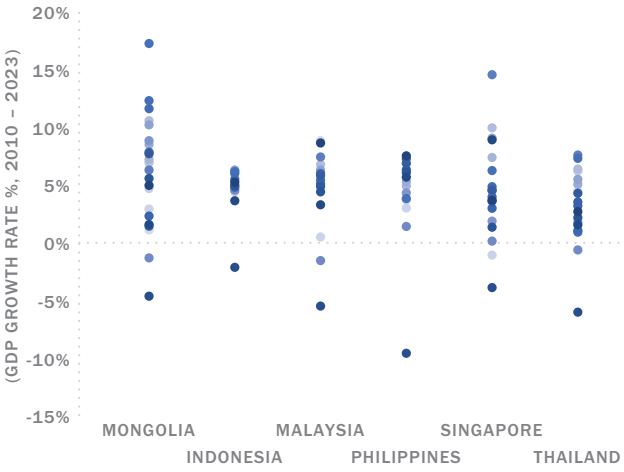
But the mining sector's contribution to growth has increased substantially over the past two decades…



Source: National Statistics Office (NSO).

Figure 5

…resulting in economic growth rates more volatile than ASEAN-5 countries
(GDP growth rate %, 2010–2023)



Source: World Bank, based on WDI.

Development outcomes have improved alongside robust economic growth and rapid urbanization. By and large, the pace of economic growth has been accompanied by a notable improvement in the quality of life for the average Mongolian. Poverty rates have steadily declined to 27.1 percent of the population according to the official national poverty line. The country has also seen gains in human capital (Figure 3). Mongolians are living seven years longer than they did two decades ago, and maternal mortality rates were reduced by more than threefold during the same period. Beyond improvements in health outcomes, the country has seen gains in education outcomes, with, for instance, more children completing lower secondary

school at rates similar to high-income economies. Access to electricity and financial inclusion have also seen significant improvements over the last two decades with virtually all Mongolians currently having access to electricity and owning a bank account. These gains coincide with rapid urbanization, as over half of the country's population now resides in the capital, UB.

However, Mongolia still faces persistent development challenges. There are significant health issues linked to pollution (Section 2.3). During winter, UB ranks among the most air-polluted cities globally, where on the coldest days of the year, daily average of PM2.5 pollution levels reaches 687 μg/m^3—27 times the level the World Health Organization (WHO) recommends as safe.[6] With increasing migration to cities, and UB in particular, this challenge will only get exacerbated. Also, the country exhibits one of the world's widest life expectancy gender gaps, with men living significantly fewer years than women. The quality of education can still be improved, as evidenced by Mongolia's relatively low ranking in the 2022 PISA survey,[7] and the labor force participation rate, particularly for women, remains markedly low and has been declining. Furthermore, close to 20 percent of Mongolians still do not have access to basic drinking water services and only 70 percent have access to basic sanitation services.

Mongolia aims to steer the economy toward a growth model that is more diversified, inclusive, and greener. At its core, Mongolia's *Vision 2050*, a three-phased overarching development plan, prioritizes inclusive growth through reforms that advance poverty alleviation, gender equality, economic diversification, and a green transition. In the plan, the Government of Mongolia (GoM) has laid out its objective to reduce reliance on low value-added mining and prioritize manufacturing, transport and logistics, tourism, and creative sectors together with higher value-added mining and agriculture. Notably, green development is included as a stand-alone pillar, signaling its importance in Mongolia's future development. Under the pillar, the GoM restates its commitment to tackling climate change and emphasizes the importance of proper resource management as part of its climate change adaptation efforts. After the launch of *Vision 2050* and following the economic shock of the COVID-19 pandemic, the GoM introduced the New Recovery Plan (NRP), a complementary medium-term development plan, to not only address the economic and social impacts of the pandemic but also lay the foundations needed for achieving the longer-term green development objectives set under *Vision 2050*. More recently, the President of Mongolia announced the Billion Tree National Movement (BTNM) at COP26 to reduce GHG emissions as well as to combat desertification (Box 10), and a Climate Change Framework Law—expected to cover institutional arrangements for the climate change policy agenda, including provisions on financing—is currently under preparation (Section 6).

6 https://www.unicef.org/mongolia/environment-air-pollution.

7 While students in Mongolia scored higher in mathematics than other ASEAN-5 countries such as the Philippines, Indonesia, Malaysia and Thailand, they did not perform as well in reading and science according to Program for International Student Assessment (PISA) 2022 results.



2.2. HOW A CHANGING CLIMATE WILL AFFECT MONGOLIA

Mongolia is becoming warmer, with much more volatile rainfall and snowfall patterns. Average surface temperatures in the past decade in Mongolia were 2.3°C higher than they were in 1901–1910, indicated by the transition from blue to orange bars in Figure 6, while average maximum and minimum temperatures have increased by the same amount. Because of Mongolia's latitude and landlocked status, these temperature increases are much higher than the global average (around 1.3°C) and much of the rise in temperatures has happened since 1980. Between 1901–1910 and 2013–2022, average annual precipitation increased from 226 mm to 236 mm (as indicated by the progressively darker blue bars in Figure 6). However, the substantial increase in the variability of precipitation is of more concern, with the standard deviation of annual precipitation over the first and last 30 years of the data increasing from 5.8 mm to 37.4 mm.

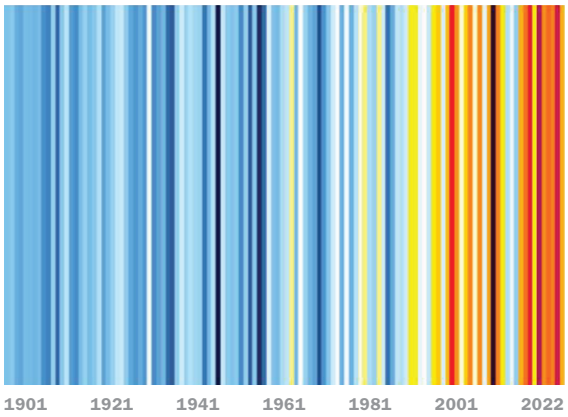
Climate change will make natural hazards such as dzuds and floods more frequent and intense. Dzuds have occurred in one out of five years since 2000. By mid-century, they could be as common as once every three years.[8] The severity of dzuds will also increase, potentially doubling by 2100. If livestock herds remain at today's size and no adaptation measures are taken, average annual losses from dzuds could be around 4.1 million animals (about 5.8 percent of the stock) by 2050 and 6.8 million by 2100 (9.6 percent of total livestock). Thus, cases like the 2023 harsh winter and the 2024 dzud (Figure 7) could become the new normal and extreme cases like the 2010 dzud that killed 22 percent of stock of animals could become even worse (World Bank 2024a). At the same time, floods that have historically occurred once every three years in Mongolia have become more frequent over the past decade. Around 18 percent of the population in the three largest cities is exposed to flooding. Many schools, hospitals, and other pieces of key urban infrastructure are in flood-prone areas, increasing the vulnerability of urban residents to the impacts of flooding, particularly those in ger areas (World Bank 2022d). Unpredictable rainfall patterns will continue to increase flooding in Mongolia.

8 This section uses data from multiple sources with their own scenarios and units of measurement. The high-emission scenario in the CCDR should be interpreted as lying between RCP6.0 and RCP8.5, with expected average global warming of 3.5°C–4°C by 2100. Dzud frequency is anticipated to increase by 40 percent and intensity potentially to double by 2100. In the absence of adaptation measures, livestock mortality rates are adjusted accordingly. Further analysis is provided in MET (2018).

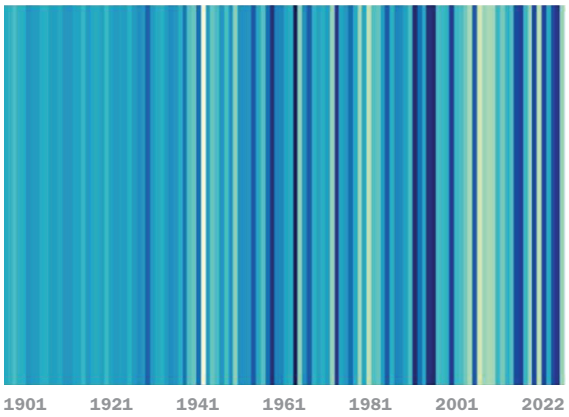
Figure 6

Temperature and precipitation patterns in Mongolia

OBSERVED ANNUAL AVERAGE MEAN SURFACE AIR TEMPERATURE, 1901 – 2022
MONGOLIA



OBSERVED ANNUAL PRECIPITATION, 1901 – 2022
MONGOLIA



Source: World Bank CCKP, https://climateknowledgeportal.worldbank.org/overview.
Note: In the left-hand pane, blue represents cooler temperatures and orange warmer temperatures over a range of approximately 4°C. In the right-hand pane, darker colors indicate more precipitation over a range of approximately 120 mm.

BOX 1

The modeling in this report

This report uses a set of modelling tools to address the specific issues raised.

MINDSET is a post-Keynesian macroeconomic model developed by the World Bank. It focuses primarily on the demand side of the economy. The model assumes that the economy operates below full capacity, meaning that more resources (such as labor) may be brought into production when needed, and captures positive and negative multiplier effects. MINDSET is based on the recent global GLORIA database, which allows for a high level of sectoral and labor market disaggregation in the model.

For estimating distributional impacts, a **microsimulation model** was constructed using data from the 2022 Mongolia Household Socio-Economic Survey. The model assesses employment choices and changes in individual earnings, household income, and consumption, using employment, income, and price results from MINDSET.

The energy sector analysis used the **PLEXOS** energy simulation engine to model the development of the power sector in Mongolia. PLEXOS represents every generating unit and transmission line in a power system and schedules assets to meet system load on a least-cost basis. Analysis of heating is derived from a report by International Renewable Energy Agency (IRENA).

The land use model analyzed the impacts of alternative land use configurations in maximizing value added and carbon sequestration in grazing, agriculture, and forestry using the optimization approach described in Damania et al. (2023) and Polasky et al. (2023). The analysis relies on the **InVEST** model from the Natural Capital Project (Sharp et al. 2020).

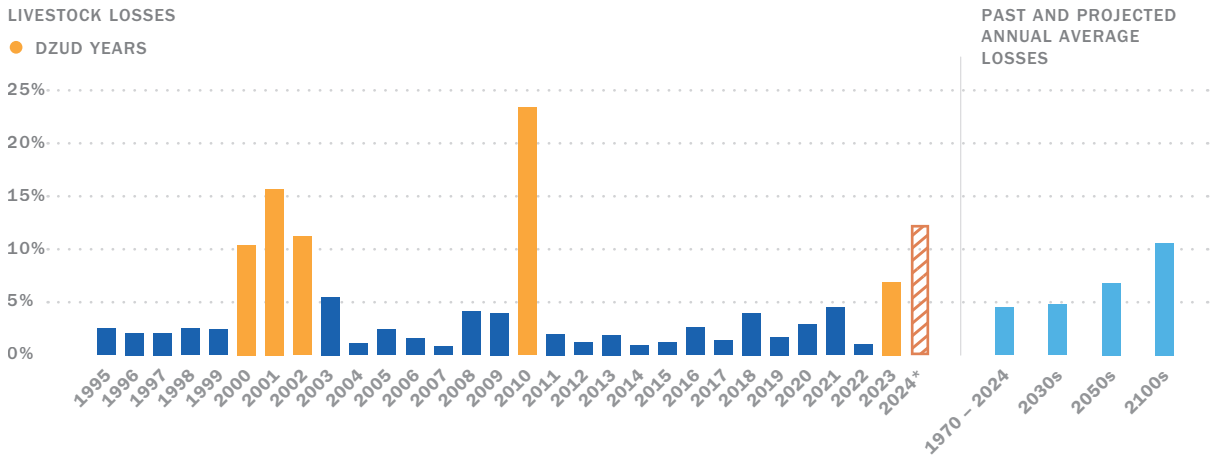
The models are used to assess four main scenarios:

- The **Shock Scenario** is a 'plausible worst-case' outcome that is used to demonstrate the risks that Mongolia is exposed to. It is based on a hypothetical three-year period that includes dzuds equivalent to those in 2000–2002 in terms of animal mortality, coinciding with a phasedown of coal exports as China decarbonizes its steel production. The final year also includes a large flood, equivalent to the that occurred in 1966.
- The **Impact Scenario** assumes no large shocks, but climate change affects Mongolia's economy through the following channels: gradually worsening winters, increased incidence of smaller floods, loss of outdoor labor productivity, changes in agricultural yields, and impacts on tourism. It is based on warming of 3.5–4°C by 2100 (between Representative Concentration Pathway [RCP] 6.0 and RCP8.5).
- The **Adaptation Scenario** is developed from the Impact Scenario. It includes investment in irrigation that reduces the impact of dzuds by around half. It also includes investment to reduce the impacts of floods, which is highly effective at climate-proofing new infrastructure.
- The **Mitigation Scenario** assesses how Mongolia could reduce its own emissions. All four models described above contribute to this scenario. The scenario includes transformation of the heating and electricity sectors, land use reform, accelerated electrification of transport, and a modest carbon tax (up to US$30/tCO$_2$) on other sectors.

Each scenario is compared to a **Reference Scenario** that is based on business-as-usual trends, in the period up to 2050. The models are also used for more specific analyses at sectoral level in Section 3.

Figure 7

Livestock losses (as percent of total) are expected to increase as winters become more intense



Source: World Bank, estimations and forecasts based on data from NSO.
Note: The hatched red bar in 2024 indicates expected loss.

Given its dependence on coal exports, the global drive toward decarbonization could also affect Mongolia. Coal accounted for more than half of Mongolia's exports in 2022, with 90 percent of these exports going to China (Section 3.3). Although exports from Mongolia are critically important to the country, they make up a small proportion of China's total coal consumption. Mongolian coal is used for steel production rather than electricity generation and so is not immediately vulnerable to displacement from wind and solar power. However, accelerated action by China to decarbonize its steel sector could lead to a rapid loss of coal production in Mongolia.

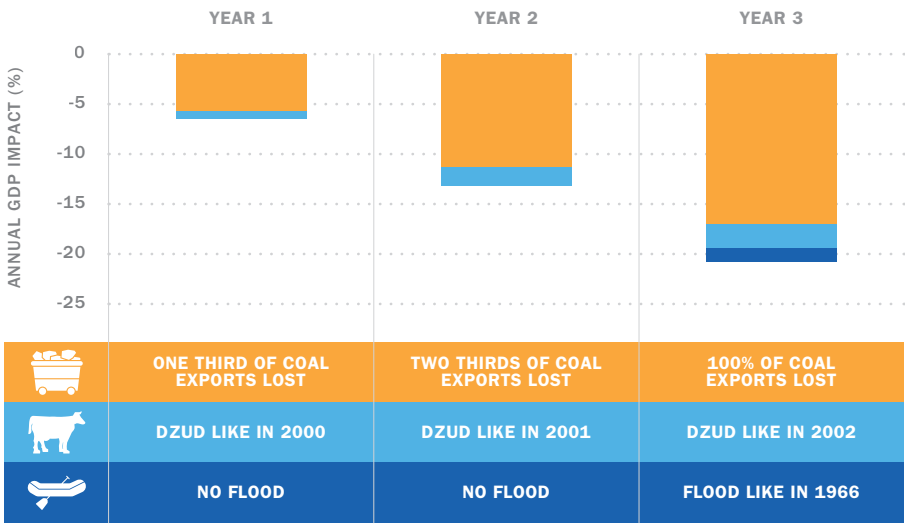
The risks to Mongolia are thus substantial; under a 'plausible worst-case scenario', as much as 20 percent of Mongolia's GDP is at risk. Plausible worst-case scenarios are being increasingly recognized as key planning tools (Trust et al. 2024). They may not occur but are used to explore critical risks to a country and identify ways in which these risks could be managed. The Shock Scenario described in Box 1 could see a convergence of several severe events, including consecutive dzuds (as was last experienced in 2000–2002), extensive flooding (akin to the 1966 events in UB), and a loss of coal exports to China (due to unforeseen mitigation policies; Section 3.3), all happening in rapid succession.[9] All the major sectors in Mongolia's economy would be affected. GDP losses could reach 20 percent over the three-year period and 14 percent of people would be unemployed or unable to work (Figure 8). Although some of the effects would be temporary, a loss of export earnings would put pressure on the *tugrug* at a time when food imports would become necessary. Similarly, revenue losses from mining activities would put considerable pressure on public balances, as would the support to herders (Section 5.2). The loss of welfare would be substantial and there could be a risk of financial crisis, further increasing losses in GDP and real incomes.

9 Although designed as an extreme outcome, worse outcomes are possible. For example, climate change is expected to make dzuds and floods more intense, but this is not factored into the scenario.

More frequent and severe extreme weather events caused by climate change could directly affect the health of the population and require more resilient health systems (Section 4.1) (World Bank Group and Asian Development Bank 2021). Changes in temperature and precipitation patterns can influence the distribution and prevalence of diseases, posing challenges to the health system in terms of disease surveillance, prevention, and response. Severe dzud events also profoundly affect herders, who heavily rely on livestock, often leading to food shortages and malnutrition (UNICEF Mongolia, FAO and IFPRI 2023). For example, the 2010 dzud resulted in food insecurity and slowed the growth trajectory of exposed children from herding households (Groppo and Schindler 2014). These extreme weather events can reduce access of vulnerable population to basic health care services, as well as necessary emergency care, given the current weak capacity of emergency care in remote areas. Moreover, climate change-related events are associated with psychological distress, worsened mental health (particularly among people with preexisting mental health conditions), and higher suicide rates (Charlson et al. 2021). Dzuds also contribute to 'distress migration' to UB, where many herders live in ger areas with inadequate sanitation and exposure to indoor and outdoor air pollution (World Bank 2024b).

Figure 8

Impacts of the plausible worst-case scenario on economic indicators (% from baseline)



Source: World Bank, calculations based on simulations from the MINDSET macroeconomic model.

Although a warming climate could benefit parts of Mongolia's economy, the benefits would not come close to offsetting the risks. Despite a higher risk of climate events, Mongolia is only considered moderately vulnerable to climate change.[10] Given Mongolia's cold winters, warmer temperatures could provide some benefits, with analysis suggesting that both agricultural production (Section 3.1) and tourism could be better off (Roson and Sartori 2016.[11] These benefits could offset expected negative climate effects of heat stress on labor productivity. Overall, a macroeconomic assessment of the Impact Scenario described in Box 1, which excludes the possibility

10 Mongolia is ranked 48 out of 180 countries in the 2021 (Germanwatch 2021).

11 For much of the year, Mongolia's cold climate and remoteness will still make tourism a niche sector. However, in summer a small increase in tourism could be possible, for example, if warmer countries become less attractive as destinations.

of large climate shocks and any loss of coal exports, suggests only small negative average impacts of up to 1 percent of GDP. However, this estimate does not reflect Mongolia's exposure to large, and potentially compounding, economic shocks, which could, as shown Figure 8, severely affect the country's development trajectory.

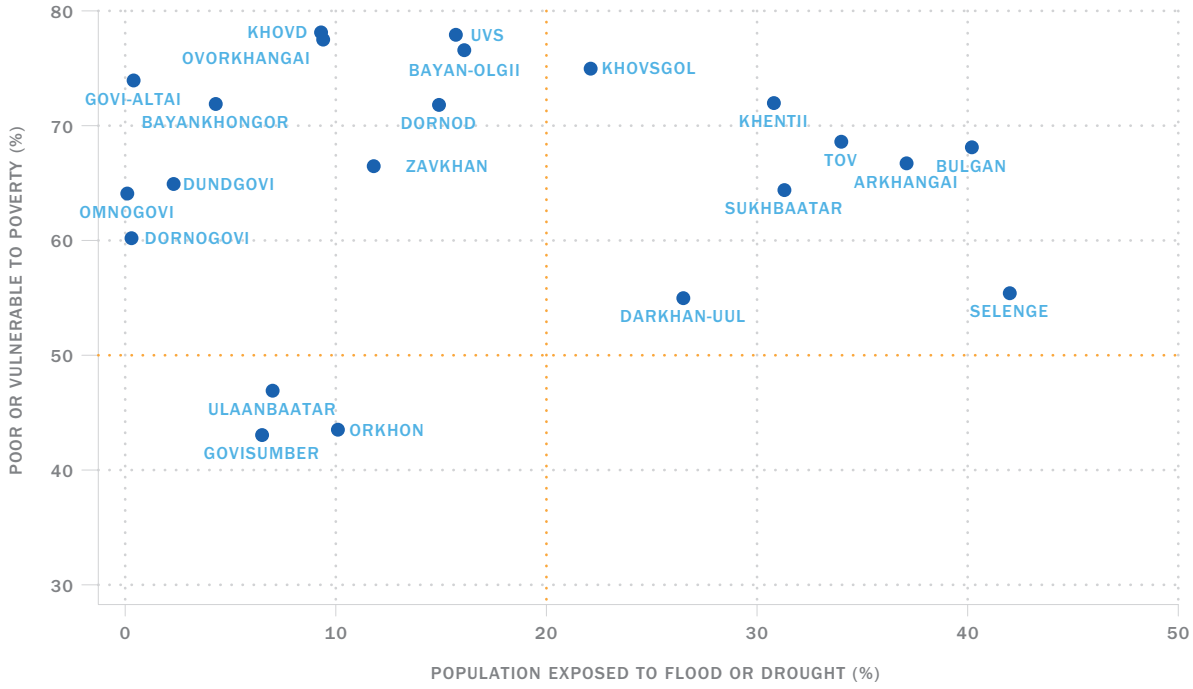
The poorest are likely to be the most vulnerable to climate hazards. The employment impacts of climate change may be modest, with some increases in the number of lower-middle-income service sector jobs (plus some higher-income construction jobs if adaptation measures are implemented). However, there is a high concentration of poverty and economic vulnerability in some of the provinces with the highest rates of exposure to climate hazards (also including droughts). For example, Selenge, Bulgan, Tov, Arkhangai, and Khentii aimags (top-right quadrant of Figure 9) face a high rate of climate risk and have populations of which more than half are either poor or vulnerable to being poor.[12] Even in places with lower exposure to climate risk (especially UB), the rate of economic vulnerability is substantial, suggesting that even small shocks could push many households below the poverty line. Mongolia stands out among regional peers for having almost an even split between vulnerability that is structural or 'poverty induced' (56 percent) versus transient or 'risk induced' (44 percent), suggesting that a low overall base of assets—physical, human, and community—is likely to be as important a driver of vulnerability in the country as exposure to shocks.[13]

12 Aimag is an administrative subdivision, further divided into soums. Mongolia is divided into 21 aimags and 330 soums. The exact threshold used to define vulnerability to poverty here is 1.5 times the poverty line.

13 The large share attributable to structural vulnerability in the case of Mongolia implies that strategies to build resilience must transcend efforts to provide protection from shocks through social protection and include broader-based efforts to boost the level and quality of physical and human capital (infrastructure, health, education, and so on).

Figure 9

Some places with the highest exposure to climate hazards are also among the poorest



Source: Poverty and vulnerability to poverty rates are based on the 2022 round of the Mongolia Household Socio-Economic Survey (HSES 2022). Province-level measure of population shares exposed to flood or drought is from the data in Doan et al. (2023).
Note: The risk threshold for floods is an inundation depth of at least 0.5 m for a flood event with a return period of 100 years. The threshold for floods is at least 30 percent of cropland or grassland affected in any season in rural areas in a flood event with a return period of 40 years.

Well-designed and targeted adaptation measures could reduce the scale of climate impacts and, more importantly, exposure to climate-related risk. The impacts of future dzuds could be reduced by irrigation measures that would increase crop yields and allow herders to store hay in the winter (Section 3.1). Although there is some uncertainty about how much of the impacts from dzuds could be offset by better adaptation measures, a previous modelling exercise suggests up to 50 percent (GIZ 2023). The impacts of future floods could also be reduced through careful urban planning, enforcement of building regulations, and climate-proofing of infrastructure (Section 4.1). The risk of damages to new infrastructure could be reduced substantially at a relatively low cost with planning, but it is more difficult to climate-proof existing infrastructure. To minimize costs, it is critical to identify which infrastructure would be vulnerable. Overall, the Adaptation Scenario (Box 1) finds that the impacts of climate change could be reduced by one-quarter by improving irrigation and protecting against floods.[14] These climate adaptation measures would mostly be relatively low cost.[15] Much more importantly, alongside diversification from coal exports to China, the climate adaptation measures will reduce Mongolia's exposure to the high-impact, climate-related risks identified in the Shock Scenario and create a more resilient economy.

Adaptation and managing climate risks should be priorities for the Mongolian government. The plausible worst-case scenario is not a prediction of what will happen, but it does highlight that, while climate impacts may be relatively benign, climate change is exposing Mongolia's economy to risks, with the poorest likely to be most affected. The modelling results also point to interventions that could improve resilience. For example, irrigation and better water management (Section 3.2) could reduce the impacts of dzuds and floods. Economic diversification would reduce reliance on exporting coal to China (Section 3.3). An enhanced disaster risk management (DRM) and financing system (Section 4.1) could reduce the risk of financial contagion.

14 Estimates derived from World Bank (2017).

15 Costs derived from World Bank (2019).



2.3. DECARBONIZATION IN MONGOLIA WILL BE CHALLENGING BUT WOULD HAVE STRONG HEALTH BENEFITS

Although Mongolia's GHG emission levels are low, its GDP is highly carbon intensive. Mongolia accounts for only 0.12 percent of global GHG emissions. However, excluding recent warzones and small island nations, it has the most GHG-intensive economy in the world. Per unit of GDP, it produces 4 times more than China's emissions and 15 times more than the US[16] (Figure 10A). The production and use of coal, mainly for electricity and heating, accounts for 45 percent of total emissions (Figure 10B) and agriculture accounts for another 40 percent of emissions, mostly from animal herds. Since 2011, Mongolia's GHG emissions have increased by 3 percent annually on average. This is because although this rate of emissions growth remains below the average rate of economic growth, the gap between them has narrowed compared to the 1994–2010 period, suggesting limited progress in terms of decoupling GHG emissions.[17]

Decarbonizing heating and power will be a substantial challenge. Combined heat and power (CHP) plants will need to be replaced with electrified district heating (DH), alongside a rapid expansion of renewable electricity generation. Even so, some coal may still be needed in 2050. There remain substantial issues related to grid balancing and financing the large investments needed. However, complete decarbonization of heating and a large reduction in power sector emissions is possible. Section 3.4 of this report discusses how Mongolia could phase out coal for heating and electricity generation.

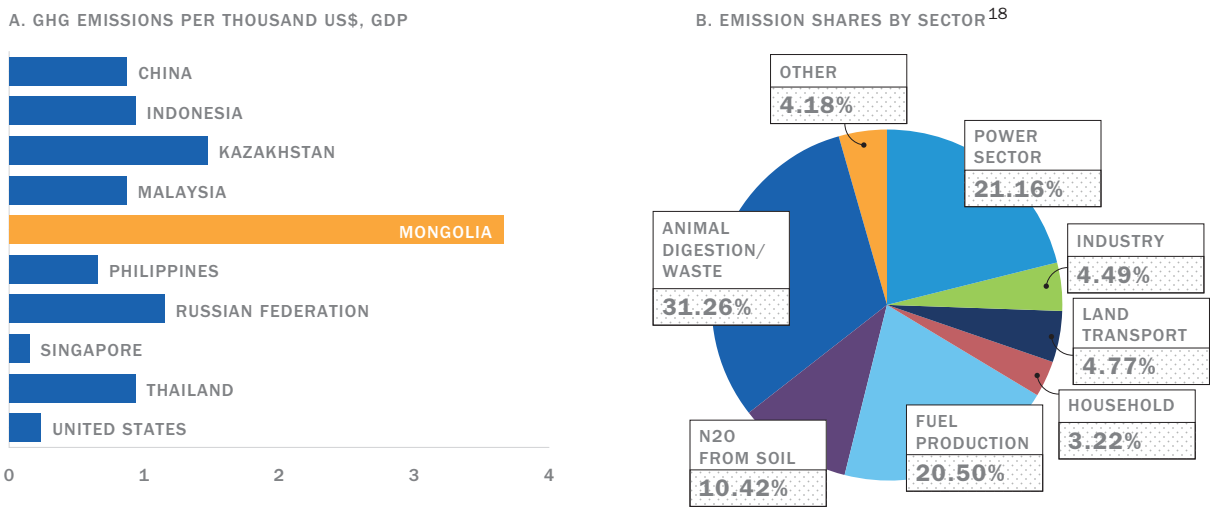
16 Excluding LULUCF emissions. The ratios are 7 and 22 if LULUCF emissions are included.

17 In 2022 emissions were 10 percent below pre-COVID levels, but this was due to lower economic activity rather than policy efforts to reduce emissions.

Reducing emissions from livestock will also be difficult, but there is substantial scope for increasing carbon sequestration from forests and better management of land resources. Achieving emission reductions will not come without challenges. Consistent with the NDC commitment, a reduction in the livestock herd size is an essential step for sustaining grazing practices, but it comes with livelihood consequences unless managed well. The land use model employed in this report shows that it is possible to increase direct economic returns from grazing, forestry, and crop production along with carbon storage through changes in land use patterns. Overall, a 6 percent increase in carbon sinks may be feasible with no detriment to economic value added. Section 3.1 presents a deeper discussion on options for a more sustainable agricultural sector.

Figure 10

Mongolia's carbon-intensive economy



Source: World Bank, calculations based on the EDGAR database and WDIs. Excludes land use, land-use change and forestry (LULUCF) emissions.

Proactive policy measures could reduce emissions in other sectors such as transport and manufacturing. While agriculture and coal production/consumption account for most emissions, road transport emissions have been growing. However, given Mongolia's tendency to import secondhand vehicles, notably from Japan, emission trends in transport will follow those in other countries. Tightening regulatory emission standards could affect the types of cars imported, while building charging infrastructure could enhance the attraction and adoption of electric vehicles (EVs), including e-buses. However, for electrification to have significant impacts on net transport emission levels, the power sector would have to move away from coal. Expanding and improving public transportation systems could reduce the number of private vehicles on the road, further cutting emissions. Additionally, prioritizing rail transport over road transport for freight could further decrease GHG emissions. In industry and other sectors with smaller emission levels, it will be more difficult to reduce emissions through regulation because of regulatory transaction costs. Here, carbon pricing could have an important role (likely in the form of a carbon tax) in improving efficiency and incentivizing the uptake of low-carbon technologies (see Section 5.2).

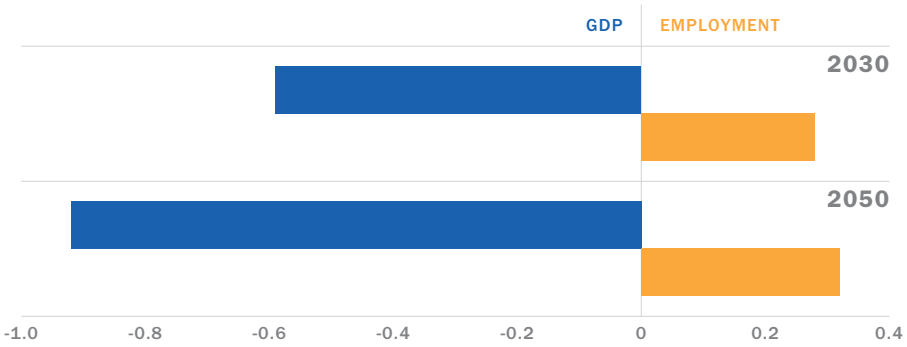
18 The other category mostly comprises unspecified emissions and waste.

Despite the scale of the challenge, decarbonization need not come at a high cost to GDP. Figure 11 shows the results from the macroeconomic models for the Mitigation Scenario, with full decarbonization of heating and ambitious decarbonization of electricity generation (see Section 3.4), accelerated EV deployment, and a modest carbon tax that rises from US$10/tCO$_2$ in 2030 to US$30/tCO$_2$ by 2050 (with revenues returned to households). The required investment is substantial, worth 3.4 percent of GDP annually up to 2050 just for power and heating (compared to 2.2 percent of GDP in the baseline; Section 3.4). Financing this investment remains a major challenge. However, the impact on GDP need not be substantial (Figure 11). Furthermore, the shift to a more labor-intensive economy could lead to slightly higher labor demand and job creation, both in 2030 and 2050.[19] Most of the additional jobs would result from the large investment needed in renewable energy and would be in the construction and transport sectors.

19 The impact of a carbon tax on mineral exports (mainly copper) is highly uncertain because the outcome depends on global commodity markets. If Mongolia's copper export prices remain below global prices (as assumed in the modelling), then export volumes would not change. However, if the carbon tax pushes Mongolia's copper export prices above global prices, a large reduction in exports is possible. We assume that in such a situation copper extraction would be exempted from the carbon tax. If not, macro outcomes could be substantially worse.

Figure 11

Impacts on GDP and employment in the Mitigation Scenario (% from baseline)



Source: World Bank, calculations using the MINDSET model

Poorer households may face slightly greater welfare losses from decarbonization policies, but these effects could be offset by recycling some of the carbon tax revenues into targeted household transfers. While coal mining will face sizable relative reductions in employment and wages, decreases in labor income are generally expected to be marginal in the short term. Price effects, however, could be more substantial, with an overall 2.1 percent increase in prices in the Mitigation Scenario compared to the baseline. Higher prices reduce household purchasing power, accounting for much of the overall decline in household welfare in the short term. The poorest 20 percent of households will face a 4.4 percent reduction in overall consumption compared to a 3.6 percent reduction for the richest 20 percent. Appropriate use of the revenues, for example, through direct cash transfers to vulnerable groups, could offset these regressive impacts.

Reducing coal consumption would dramatically improve air quality and public health in Mongolia. Widespread use of coal in urban areas means that air pollution levels in Mongolia are well above WHO-recommended thresholds. Average levels of PM2.5, which causes the most severe health impacts, exceeded long-term WHO targets by a factor of 7 in 2019; on the coldest days the levels were more than 100 times the WHO target (GBD

Collaborative Network 2021; WHO 2021. Concentrations of other pollutants also remain well above recommended thresholds. Air pollution is one of the top 10 risk factors driving death and disability in Mongolia (Chimed-Ochir, Delgermaa, and Takahashi 2022), ranking the country as the ninth worst in the world (Sang et al. 2022). In UB alone, in 2014, PM2.5 exposure was estimated to be responsible for 1,400 deaths (1 in 10) and 40,000 disability-adjusted life years (DALYs).[20] A 2011 World Bank study found that exposure to PM2.5 and PM10 in UB increased daily hospital admissions for cardiovascular disease by approximately 9 percent over the normal level of hospitalization (World Bank 2011).

The estimated economic benefits of reduced air pollution would outweigh the economic costs of decarbonization. The 2011 World Bank study estimated that the health care cost of air pollution in UB ranged from 18.8 to 27.9 percent of UB's GDP and 8.8 to 13.1 percent of national GDP in 2008.[21] Surveys have shown substantial costs to both employers and employees from workplace absence resulting from air pollution (UNICEF 2020). The cost of illness-related absences was disproportionately higher for female workers, especially those with young children, and impacts on unborn children are severe (Vinha and Tiwari 2024). The 2011 World Bank study found that a reduction in PM2.5 concentration of 200 $\mu g/m^3$ would lead to a decrease in all-cause mortality of 28 percent. Considering just electrifying heating in ger areas could reduce PM2.5 concentrations by 120 $\mu g/m^3$ in the decarbonization scenario modelled above. Even a 'moderate improvement pathway' would decrease annual DALY and death burdens by up to 40 percent. The health benefits could be substantial; although not included in the macroeconomic modelling, the benefits from electrifying heating in the ger areas alone would outweigh the reported loss of GDP.[22]

By combining mitigation and adaptation measures, Mongolia could see substantial social and economic benefits from developing a low-carbon, climate-resilient economy. Although there remain significant challenges in how to finance energy sector investment (Section 3.4), the macroeconomic cost in terms of GDP of transitioning to a low-carbon economy is manageable. Furthermore, measures such as building irrigation, flood defenses, and diversifying mining exports will reduce Mongolia's exposure to significant economic risk and build a more resilient economy. New opportunities could open for exporting critical minerals (notably more copper). Most importantly, the public health and economic benefits of improved air quality could be considerable, allowing Mongolians to live longer and healthier lives.

20 The figures include 42 percent of all stroke deaths, 27 percent of all ischemic heart disease deaths, 24 percent of all lung cancer deaths, 19 percent of all chronic obstructive pulmonary disease deaths, and about one-third all acute lower respiratory infection deaths in children. See Hill et al. (2017).

21 Estimates are based on a value of statistical life that was estimated from a willingness-to-pay survey.

22 Figures adjusted to 2022 prices, from World Bank (2011).

CLIMATE AND DEVELOPMENT IN KEY SECTORS



3

PAGE
20—51

Mongolia's climate and development agendas are particularly intertwined in the land, water, mining, and energy sectors. As outlined in Section 2, agriculture, water, mining, and energy are not only the foundations of the country's development model but also pivotal for a successful green transition. The key lies in recognizing the tensions between climate and development and identifying the reforms that will put these sectors onto sustainable trajectories. This section delves into each of these sectors, offering policy recommendations to chart a course for sustainable development. Sections 3.1 and 3.2 focus on improving resilience to the physical impacts of climate change—while harnessing mitigation opportunities—in agriculture and water. Section 3.3 explores the outlook for the extractive sector which may be affected by shifting external factors, while Section 3.4 focuses on decarbonizing power and heat generation.



3.1. FOOD SYSTEMS, LAND USE, AND RESTORATION

A worsening spiral of vulnerability, low productivity, and emission intensities

The agrifood system is important for Mongolia's economy but is characterized by a vicious cycle of low productivity and high vulnerability to climate extremes. Approximately one-third of Mongolia's labor force is employed in the country's agrifood system (FAO 2024b), which accounts for 13 percent of GDP (World Bank 2024a), and livestock accounts for about 80 percent of gross agricultural output and one-quarter of all jobs (FAO 2024c). The country's harsh, cold, and dry continental climate; extreme weather condition; short growing seasons; and long snowy winters impose severe limitations on farmers and herders. Under the predominant extensive pastoral system, with long winter months and extreme cold conditions, large ruminants

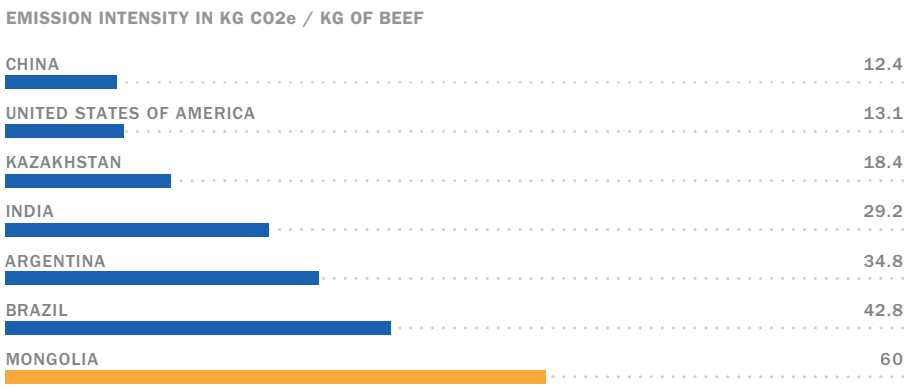
like cattle take an average of two to three years longer than global meat producers to reach the culling weight (UNCTAD 2021). This is because of weight loss during winters, cultural reluctance to cull young animals, and the need for regular income flows from animal products such as milk and wool. Moreover, culling is limited to a single season unlike in nontraditional systems, resulting in greater accumulation of animals. Current livestock numbers vastly exceed carrying capacity of Mongolia's rangelands, and herd sizes are further increasing. As a result, overgrazed pastures, reduced fodder availability, and poor animal health and hygiene have contributed to deteriorating nutritional status and productivity of livestock.[23]

Climate vulnerability of the agrifood sector is in turn exacerbating high-emission intensity. Harsh climates and extreme climate events like dzuds exert pressure on productivity and increase animal mortality. More animals and resources are required to maintain production volumes under the predominately pastoral system. Emission intensities of livestock products in Mongolia are much higher than other meat-producing countries and have remained relatively stable in the last 30 years (Figure 12).

23 The rangeland degradation witnessed 30 percent decline of fodder yield from 284 kg/ha in 2011 to 198 kg/ha in 2020 meeting only 41 percent of the total livestock needs in 2021. Since 1990, the average slaughter weight of sheep and goats declined by 11 percent and that of cattle by 4 percent; milk yield decreased by almost one-third (ADB 2022a). Mongolia's carcass weight of cattle at 1,283 hg/animal is much lower compared to peers, and wheat, which is Mongolia's most produced crop, covering 83 percent of Mongolia's arable land, is characterized by a significant yield gap (1,122 kg/ha), compared to peers (2,549 kg/ha). Background paper: "Inclusive, Resilient, and Competitive Agricultural Sector in Mongolia: Key Lessons from Comparator Countries".

Figure 12

Emission intensities of beef in Mongolia relative to other countries (2021)



Source: FAO 2024a.

Enteric fermentation in livestock and manure management together contribute to 58 percent of agriculture emissions. Rangelands (mostly grasslands) comprise roughly 80 percent of Mongolia's territory and 96 percent of agricultural land (World Bank 2022a). Two-thirds of rangelands are degraded, and a tenth are fully degraded due to growing livestock numbers and historical climate change. Degraded soils are a prominent source of GHG emissions from the agrifood sector.[24]

Meanwhile, Mongolia's sizable forests have been and continue to have the potential to act as powerful carbon sinks, but this will require strengthened management. Mongolia was until very recently a net carbon sink thanks to its large forest stocks, but carbon sequestration has not kept up with rapidly rising emissions. Forests cover around 17.5 million ha, accounting for slightly above 9 percent of Mongolia's land area. The boreal forests in the north-central parts and the saxaul forests in the south-west

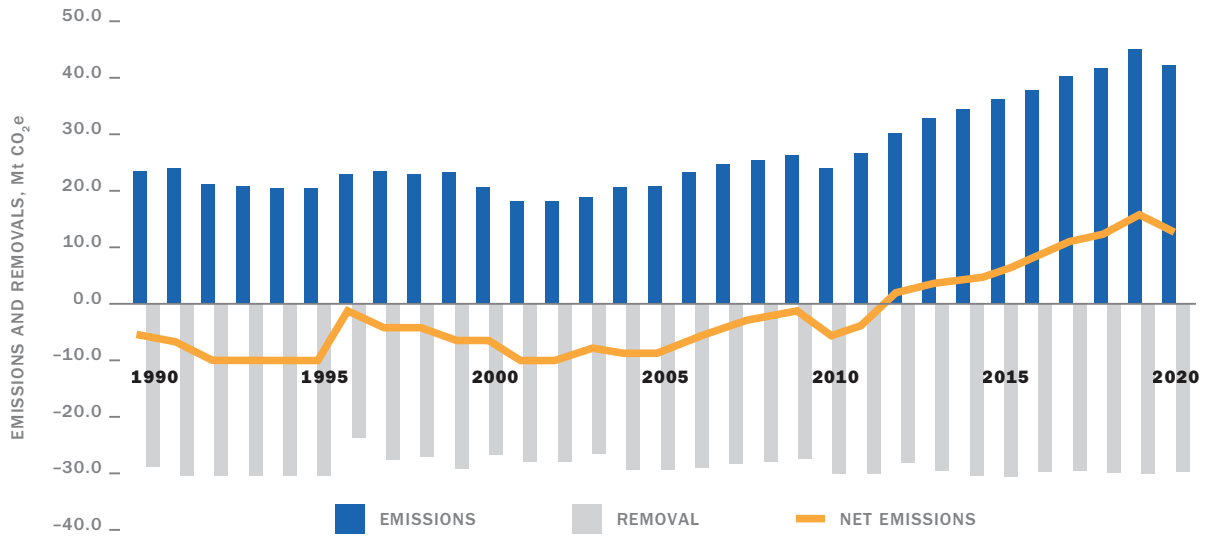
24 Degraded pasturelands are also increasing the probability of wildlife and domestic animals sharing reduced grazing grounds, particularly during winter, raising the risk of disease transmission among animals and to humans.

parts are the two important forest systems. These contribute to maintaining biodiversity, ecosystems, and livelihoods in the north and reducing soil erosion and land degradation in the south. According to Mongolia's NDC, until the early 2010s, GHG emissions coming mostly from agriculture and energy were more than offset by the natural process of absorption of the country's forests (Figure 13). This situation has changed as development has led to increasing emissions from livestock, now the first source of GHG emissions in the country, and energy. However, forest management has faced challenges.[25] It is estimated that, between 2000 and 2020, Mongolia experienced a net change of –264,000 ha (–3.4 percent) in tree cover due to fires, overgrazing, pests, and illegal logging. To combat climate change and desertification, the GoM has an ambitious plan to plant a billon trees by 2030, under the BTNM (Box 10), and restore, reforest, and afforest 1.2 million ha of land (Oyunsan 2023).

25 According to the first National Forest Inventory, the main boreal forest management challenges are as follows: wildfires and pests; overgrazing in regeneration areas; understocking (that is, there is less than 50 percent of standing volume of well-stocked forests); overaged growing stock (31 percent of the volume in stocked production forest is above the optimal age); underutilization of the forest resources; forest growth is less than half the rate of well-managed boreal forest; and less than one-quarter of the annual biomass growth is being cut, resulting in overaged stands with self-thinned dead trees increasing the risks of wildfires and pest outbreaks.

Figure 13

Mongolia's total and net GHG emissions and removals, 1990 to 2020



Source: Mongolia's NDC to the United Nations Framework Convention on Climate Change (UNFCCC).

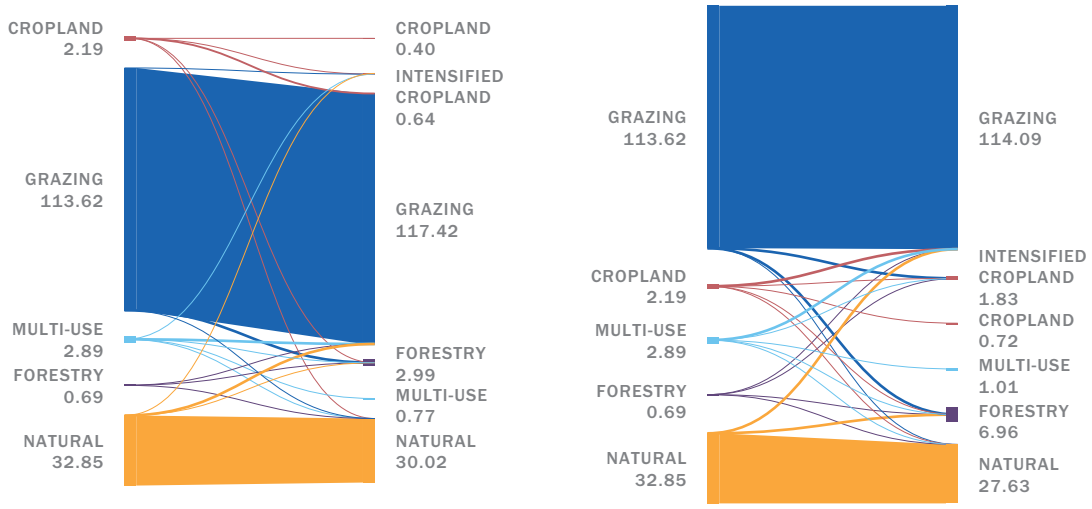
Climate change will lead to a long-term decline in grazing productivity that leads to further increases in GHG emissions. Models show that modest warming could increase crop productivity in the short term. However, warming also leads to greater evaporation, exacerbating water shortages and further reducing grassland productivity. By 2050, model results show a decline in grassland productivity, with larger productivity declines in climate scenarios associated with greater warming. In addition, climate change will increase the intensity and frequency of extreme events such as dzuds with negative impacts on grazing (see Section 2.2). Moreover, if no action is taken, agrifood system emissions will increase further, as livestock numbers rise, rangelands degrade even further, and pre- and post-production activities gain more importance in the agrifood value chain. Additionally, climate change is likely to increase the incidence and severity of wildfires, as well as the prevalence of pest and diseases, thereby affecting forests, crops, and livestock.

Actions to enhance land use efficiency could help mitigate the potential impacts of climate change. The land use efficiency model employed in this report shows that efficient land allocation could allow for simultaneous increases in carbon storage and direct economic returns (Figure 14). Increases in agroforestry, and to a lesser extent in intensively managed cropland, have the potential to enhance the value of land-based economic activity (note that these changes occur on a relatively small portion of the land, with grazing lands continuing to dominate land use). With the right set of policies and investments, Mongolia can boost its nature-based carbon sinks, with associated co-benefits deriving from sustainable forest management and the promotion of local timber and non-timber value chains. These changes would only need to occur on a relatively small portion of the land, with grazing lands continuing to dominate land use. A reallocation of land use could increase carbon storage by around 6 percent. It is estimated that this would help offset 14 percent of methane emissions from livestock. An increase in productive forest lands, accompanied by increases in cropland and relatively slight increases in pastureland, could also lead to large economic gains. The model shows that net economic returns could more than double without loss of carbon storage (~144 percent increase; right panel of Figure 14). The degree to which carbon storage and net economic value increase is a function of climate change.[26] However, gains from efficient land allocation could largely overcome climate change impacts.

26 Climate change reduces grassland productivity, and the production possibility frontier will contract inward meaning smaller potential efficiency gains relative to the current outcome are possible.

Figure 14

Land use transitions in million ha from current land use to land use on the efficiency frontier



Source: Results from the InVEST model, by Hawthorne et al 2024, for the Mongolia CCDR.
Note: BPM = best management practices. The figure on the left shows the transition from current land use to the land use point on the efficiency frontier that maximizes the carbon storage increase without loss of net economic value. The figure on the right shows the transition from current land use to the land use point on the efficiency frontier that maximizes net economic value without loss of carbon storage. Forests in Mongolia are present under the 'forestry' and the 'natural land' category.

Beyond improvements in land use allocation, sustainable agriculture intensification and increase of agriculture product/value chain complexity are essential for a successful transition to low-carbon and resilient agrifood systems in Mongolia. Managing livestock herds is desirable given that livestock numbers are above carrying capacity of rangelands. At some point, if overgrazing continues, soil resilience will be broken down and the ecosystem could tip into a lower-productivity equilibrium, or even desertification, from which it cannot recover naturally. Managing numbers offers a double dividend in terms of incomes and sustainability. However, simply reducing livestock numbers without accompanying improvements in livestock productivity, increased value realization, and diversification of herder income sources will be perceived as jeopardy to herders' livelihoods. Promoting productivity-enhancing climate-smart practices, modernizing agriculture value chains, and linking extensive pastoral systems with commercially oriented semi-intensive and intensive livestock production models (for example, feedlots) can support and anchor the low-carbon and resilient livestock sector transition. For the crop sector, adoption of climate-smart practices and 'frontier technologies' such as greenhouses, protected agriculture, and precision agriculture will encourage multi-season or year-long production, reduce food-loss and waste, and mitigate GHG emissions.

Policy and institutional failures

Sectoral and fiscal policies in the agrifood sector have favored production volumes and neglected productivity, inclusion, and environmental outcomes. Between 2010 and 2020, subsidies accounted for 57 percent of total agriculture spending and represented about 0.4 percent of GDP in 2023. These subsidies were largely output oriented and benefited livestock herders with large herds, hence incentivizing the growth in livestock numbers and resulting in ecosystem degradation and growing GHG emissions. In recent years, these subsidies have been replaced with input-oriented subsidized loans from commercial banks for producers or enterprises engaged in specified value chains, without linking them to sustainable agriculture practices. These revisions, however, do not guarantee productivity and resilience outcomes as was the case with output-based product subsidies.[27] In addition, aimags and soums do not receive adequate allocation for public infrastructure works and extension services, making services effectively nonexistent locally, thereby limiting training and uptake of climate-smart practices among farmers and herders (Chuluunbaatar, Annor-Frempong, and Gombodorj 2017). While interventions to manage negative environmental externalities were introduced, such as the livestock head tax whose revenues are earmarked for rangeland and livestock management activities (World Bank 2022a), implementation of these activities and pasture restoration have progressed slowly due to limited monitoring. In April 2024, the Mongolian Parliament passed legislation with the aim of safeguarding the traditional livestock sector from the detrimental impacts of climate change. This law is a proactive measure, focusing on mitigation, adaptation, and resilience though confirming the use of subsidized loans to herders,

27 Several shortcomings in the subsidized loan program, including weak input markets, the absence of extension systems, poor targeting, and potential leakage, could lead to misallocation of resources and inefficient credit use by herders and farmers. Additionally, growing concerns about the transparency, accountability, and loan performance of the system have emerged.

their associations, and cooperatives. The coming months will be crucial in assessing the effectiveness of the law, linking commercial bank loans to climate outcomes.

Technical and scientific knowledge in the forestry sectors is also low. While Mongolia has a multitiered administrative structure for forest management, resources are needed to enhance its capacity. Forest agencies at the aimag level typically oversee regional coordination and planning and budgeting of forestry activities, while inter-soum and soum forest units are responsible for local forestry planning, allocation of logging rights, and community mobilization. In recent years, forest user groups (FUGs) have emerged as important stakeholders and are charged with protecting forests from illegal logging and wildfires and implementing small-scale afforestation and reforestation activities. As of 2018, 1,281 FUGs were managing 3.3 million ha of forests (MET 2018). However, agriculture and forestry extension services in Mongolia are nascent.

Despite its potential, private investment in the agrifood and forestry sectors remains very limited.[28] Sustainable agrifood systems and forestry value chains offer opportunities for private investment. Private entities, including through public-private partnerships (PPPs), could invest in the provision of climate-smart technologies, such as improved and climate-resilient breeds and seeds; improved plant and animal health and biosecurity; improved water/input use efficiency; and modernized processing, energy efficient, storage, logistics systems. There are also emerging opportunities in novel green products and value chains, including niche/specialized meat, dairy products, and crops, alongside certified environment-friendly agricultural goods, that cater to progressively expanding environmentally conscious markets building on successful examples from the cashmere sector (for example, 'Sustainable Fiber', 'Mongolian Noble Fiber'). In forestry, the overstocked and overaged boreal forest plantations could contribute to local timber and energy value chains, replacing illegal or poorly managed harvesting and hence contributing to net carbon sequestration that can in turn generate resources through carbon markets.[29] However, the sector grapples with pervasive market inefficiencies[30] and the difficult task of complying with rigorous international standards. In forestry, there is limited understanding of the carbon sequestration potential of forests, and it is necessary to build the required institutions for permanence, which are essential building blocks for high-integrity carbon credits. Compounding these challenges is the limited availability of finance due to the high risk associated with volatile weather and price shocks.

28 Private investment averaged 1.2 percent of agricultural GDP and 16 percent of public agricultural expenditures from 2010 to 2019 (World Bank 2022b). Forestry investments remain limited to philanthropic motives.

29 These wood products could then be used as a substitute for other products with a high-carbon footprint such as metals, plastics, and brick. Low-quality production can be used for fuel switches or conversion of some fossil fuel fired boilers.

30 Key issues include excessive marketing costs, inefficient price transmission resulting from poorly functioning market, inadequate market structure, uncompetitive behavior of agents, and informal costs along the value chain referred to as the market development gap by Food and Agriculture Organization's (FAO) Monitoring and Analyzing Food and Agricultural Policies (MAFAP) program.

THE REPORT RECOMMENDS

1. **Reform agricultural incentives and taxes.** There are three key priorities here. First is to condition the program of subsidized loans on the uptake of climate-smart practices, improved stocking management and planning, sustainable grassland management, and enhanced product quality while strengthening investment in public goods, such as research and development (R&D) and agriculture extension services.[31] Second is to reorient other direct subsidies toward less distorting government support measures, such as decoupled income support or payments for eco-services.[32] Third is a redesign of the livestock head tax to better mobilize resources at the local level and internalize the environmental costs of overgrazing. A redesigned tax would include simple and science-based criteria for setting the taxation rate. Compliance and enforcement of the tax could be enhanced by improving local governance capacity and raising awareness among taxpayers on the benefits. Small-scale herders need special consideration and support to minimize negative impacts and tax avoidance. The herders could be compensated through income support schemes or by way of payment vouchers.

2. **Provide technical assistance and investments to enhance productivity and increase product commercial offtake rates of dominant livestock production systems.** Productivity can be improved through selective breeding strategies (climate-resilient breeds and low CH_4 emitting animals), ration balancing (grazing with feed supplementation), and nutritional diet for livestock. Nutritious diets can be implemented through a network of fodder, forage, and hay production storage sites and strategically located feed-hubs in aimags, which can promote good animal husbandry, particularly around winter herding practices, and enhanced animal health and hygiene management. These measures will enable herders to increase offtake rates, move the culling period forward to under three years for cattle and to less than 12 months for sheep and goat, and reduce emissions while enhancing productivity by linking dominant pastoral systems to semi-intensive and intensive models. To overcome the risk that incremental investments in green agriculture technologies are not compensated by higher prices and profits for producers, it will be important to support partnerships between producers and innovative commercial models for improved access to markets, including (international) markets, for example, by expanding the uptake of 'Sustainable Fiber', 'Mongolian Noble Fiber' quality certification, and 'Responsible Nomads Code of Practices for sustainable nomadic livestock production'.

3. **Diversify Mongolia's agrifood sector and develop new green agrifood value chains for improved competitiveness.** Mongolia's high dependency on food imports makes the country vulnerable to external shocks and crises, such as pandemics or food price increases due to the Russian Federation's invasion of Ukraine. Efforts to diversify crop production, which are in line

31 Agricultural extension services provide farmers with information, training, and support to improve their practices and increase productivity. They aim to empower farmers with the knowledge and skills needed for sustainable agricultural development.

32 Decoupled income support programs are often designed to stabilize farmers' incomes and provide financial security, especially during times of market volatility or adverse conditions. This approach aims to minimize distortions in agricultural markets and encourage farmers to make production decisions based on factors other than subsidies, such as market demand, efficiency, and environmental sustainability. Payments for eco-services can include the provision of clean water, soil conservation, carbon sequestration, biodiversity conservation, and other environmental benefits that contribute to the overall health and sustainability of ecosystems.

with the 'national campaign for food supply and food security', should focus on efficient water use (including expanding improved irrigation, see Section 3.2), nutrient management, pest and disease control, and soil conservation, particularly erosion mitigation. Likewise, for improving export competitiveness, PPPs and investments in value addition, processing facilities, packaging and labeling according to international markets, and trade logistics will be required (see Section 5.3 for more details). Investment in quality infrastructure, for example, conformity assessment, testing, inspection, and certification of Mongolian products against the requirements of importing countries can be a tool to promote Mongolian exports (World Bank 2023). In particular, reducing the emissions and environmental footprint of Mongolia's animal products may offer an opportunity to market 'green labeled products' in meat, wool, and cashmere value chains to international buyers.

4. **Improve the cooperation between the development of combined forestry and pasture user groups to foster agreement on how forest areas can be restored.** Unless overgrazing is controlled in forest regeneration and plantation areas, the planted areas will fail. When the plantations are new and newly fenced, the initial plantings will survive but over time the fences might be cut or the plantations burned to increase the amount of pasture available. If the overgrazing and fire can be kept out of forest areas, it is likely that reforestation would occur through natural regeneration, avoiding costly replanting. At the same time, there are significant opportunities to improve forest conditions through silvicultural thinning and maintenance. This can provide income-generating activities for local communities and opportunities for private sector investment in processing capacity.

5. **Identify cost-effective locations for tree planting, landscape-level forest restoration, and fire management and mobilize private sector finance.** Large-scale tree planting and reforestation programs are expensive and complex undertakings that require many years to implement and long-term maintenance. If unplanned, planting may occur where it is easiest but not where it is most appropriate or needed. Key issues to be addressed, under the leadership of the country's forestry administration, include enhancing forest fire early warning detection and prevention systems, improving forest extension services particularly with respect to managing the nexus between rangeland and forests, as well as implementing Mongolia's reforestation and afforestation plans. Private sector investments and carbon financing can be leveraged to provide critical resources for windbreaks, agroforestry, as well as conventional afforestation and reforestation efforts (see also Section 5.4). However, it will be necessary to develop the capacity and tools to assess the carbon baseline, growth, removals, permanence and leakage to support the development of voluntary or regulated carbon markets. Moreover, balancing carbon sequestration with biodiversity goals may be important for long-term sustainability.

6. **Enhance seed processing capacity.** Appropriate tree species, quality seeds/saplings, and planting techniques are underdeveloped, as are demonstration plots and resources for training forest agencies and FUGs. Reafforestation

requires good quality planting stock and this needs to be raised from seeds of known origin, sourced from good quality or plus trees. Seeds, once collected, need to be treated, stored, and tested correctly. The traceability of the origin of seed sources is increasingly important with the changing climate. It is necessary to plant good quality seedlings of the right species with the right provenance in the right location. It is therefore important that seed processing capacity is enhanced.



3.2. WATER DEMAND AND SUPPLY

A growing mismatch between water demand and availability

Mongolia's varied geography presents a wide spectrum of water availability from the Gobi Desert to glaciers and grassland. Precipitation within Mongolia is nonuniform, ranging from a yearly average of 350 mm in the north to 80 mm in the south. While overall the country has a high water endowment, there are important spatial heterogeneities that lead to local hotspots of water insecurity in the country's key economic centers: UB and the Gobi region. Two specificities set Mongolia apart. First, the country relies heavily on groundwater for both household (99 percent of drinking water comes from groundwater) and industrial use, despite having plentiful surface water. This heavy reliance on groundwater stems from the spatial mismatch between where surface water is available and where it is needed and the extreme climate through the year (permafrost, seasonal freezing, and droughts) which makes surface water a less reliable source. Second, Mongolia has set itself high requirements for maintaining ecological flows—the amount of water that needs to be retained in the environment to maintain ecosystem services. However, these need to be updated and prioritized and require improved enforcement (Box 2).

BOX 2

Securing the pillars of Mongolia's water security: Groundwater and healthy environmental flows

Groundwater is critical to Mongolia's water supply, and its importance will continue to grow with increasing water demand. With the uncertainty brought on by climate change, managing groundwater sustainably in both quantity and quality is a first-order priority. This involves investing in research to better understand the interactions between surface water and groundwater as well as improving the monitoring and measuring of abstraction and quality. Failure to do so will not only constrain resource use but could have consequences for maintaining ecological flows, which is the amount of water (for example, within river basins, lakes, or wetlands) that needs to be retained in the environment to sustain ecosystems.[33] Given the pipeline of large water infrastructure projects, monitoring ecological flows is critical to reducing the risk of ecological disasters.[34]

Using integrated water resources management (IWRM), Mongolia has been committed to maintaining high ecological flow requirements. For example, Mongolia aims to maintain 90–95 percent of the long-term average ecological flows of the Tuul River Basin.[35] High ecological flow requirements reflect the country's unique ecosystem of lakes and wetlands that sustain a range of wildlife and ecosystem services (including carbon sinks).

Mongolia sets ecological flow targets in the river basin IWRM plans (RB IWRMP) that are approved by the Ministry of Environment and Tourism (MET). However, RB IWRMPs have been approved for only 5 of the 29 river basins. The rest are either being drafted or have not commenced due to lack of funds.[36] Not only are flows not monitored, but current hydrological stations need to be more fully automated and integrated with existing data collected by river basin authorities (RBAs). This needs to be prioritized since such gaps in data undermine Mongolia's capacity to manage its water resources.

With a changing climate, existing pressures on Mongolia's water resources are likely to increase with a growing mismatch between water needs and availability. Climate change will lead to higher temperatures in Mongolia (Section 2.2), reducing the size of glaciers (and affecting river flows) while also increasing evaporation and soil dryness. While precipitation is likely to increase nationally, models show that there is considerable uncertainty on the impact of climate change on water availability and expected spatial and temporal mismatch at the subnational level.[37] For this reason, the CCDR is focusing on no-regret types of intervention to address on climate risks. Those include better management of water resources along the floods to drought spectrum.

Water use in agriculture will likely increase, especially if overgrazing continues unchecked while a booming mining industry in the south and eastern parts of the country is going to increasingly involve greater water

33 Recent global research showed that, by 2050, environmental flow limits will be reached for approximately 42 to 79 percent of the watersheds in which there is groundwater pumping worldwide, and this will generally occur before substantial losses in groundwater storage are experienced (de Graaf et al. 2019).

34 While environmental flows are considered part of the water use and supply balance assessment for water transfer projects, the GoM does not require or monitor them, making the quality of these assessments challenging. Large water projects such as The Blue Horse Program, which is in its initial phase, have yet to conduct such analysis.

35 The basis for those percentages is a 1999 report (Davaa and Myagmarjav 1999) that provided the allowable water use from upper, middle, and lower parts of rivers. The 2013 IWRM acknowledged the urgent need for environmental flow requirements to be updated, and that "knowledge is lacking on the required environmental flow in rivers to maintain healthy ecological conditions" (IWRM 2013, p. 134 and 148).

36 Other than these 10-year plans, the environmental flows are not set, mentioned, or required anywhere else. (See p. 128, challenge 4.3 of the national IWRMP report 2013).

37 While this is not unusual for climate models, the confidence is particularly low in the case of Mongolia. A Global Change Assessment Model (GCAM)l analysis was undertaken as part of this CCDR and the range of water supply projections, including at the regional level, from the individual GCMs is very large in each scenario.

withdrawals and water pollution risks. Agriculture accounts for the most water use in Mongolia, with irrigation and livestock accounting for 30 percent and 24 percent of water consumption, respectively (ADB 2020a; 2030 WRG 2014). Overgrazing not only affects topsoil quality and causes erosion but also has an impact on the soil's capacity to retain water, affecting water conservation in grassland areas. Consequently, demand for irrigation, including for fodder, may expand over time, increasing the use of surface water and groundwater resources (Gautam et al. 2022). Meanwhile, the mining sector, which today accounts for 13 percent of water consumption, is likely to exert growing pressure on water supply. It is estimated that by 2030, the water demand-supply gap will reach 35 percent in the Nyalga Shivee Ovoo region and 60 percent in Tavan Tolgoi (ADB 2020a), due to the planned expansion of coal-focused industries. The areas of concentrated mining have negligible reserves of surface water, and these industries are heavily dependent on groundwater from aquifers that have little to no recharge (2030 WRG 2014). Bulk water transfers, from the north to the south, are being considered but will require significant investments and likely cause irreversible impacts on the livelihoods of herders and smallholders and on the availability of potable water for human and animal consumption in source areas.

Measures to maintain and improve water quality are critical as climate change and growth increase the pressure on ground and surface waters. Around half of the population lives in UB where water and sanitation access are limited: 59 percent of residents have piped water supply and only 20 percent have piped sanitation. As areas around UB are expected to become more populated, limited water sanitation infrastructure is going to be further stressed. For example, extreme precipitation in August 2023 damaged roads, bridges, check dams, and electricity transmission lines, adversely affecting more than 100,000 people (about 8 percent of the city's population), due to inadequate urban planning and drainage (UNOCHA 2023). Furthermore, groundwater is the predominant source of water for domestic use in UB. However, during the winter months, when the Tuul River freezes, the groundwater levels drop critically. Efforts to ease the pressures on groundwater are constrained by surface water quality, which does not meet consumption standards due to inadequate planning, regulation, and contamination from untreated domestic waste because of the lack of sanitation and wastewater management infrastructure. The current reference list of pollutants, their permissible levels, and tariff per pollutant do not reflect actual pollution damage by factories. Moreover, the list does not specify high-polluting light industries such as tanneries, carpet producers, and other service entities such as hairdressers, saunas, and spas. Further deterioration in water quality is expected in the absence of reforms (2030 WRG 2014).



Water is insufficiently valued across its uses, compromising the sector's financial sustainability and climate-resilient water resource management. Water usage fee collections are insufficient. The agriculture sector is de facto exempted from the water use fee payment.[38] Furthermore, the water supply and sewerage (WSS) operators, typically state-owned enterprises (SOEs), are unable to generate sufficient revenue to cover significant repairs and upgrades, which fall on budget-constrained central and/or local governments. Even though 35 percent of the collected water use fee is allocated for water resource protection activities, this revenue stream is not earmarked and thus can be diverted to finance other priorities.

Water quality is recognized as a priority but, despite the legal introduction of a water pollution fee, implementation has faced hurdles. Before the Water Pollution Fee Law passed in 2019, mining companies paid a wastewater charge but the fee did not account for the level of contaminants present in their discharge. The new law addresses this gap and creates another source of government revenue while encouraging mines to invest in on-site wastewater treatment plants.[39] However, the current reference list of pollutants, their permissible levels, and tariff per pollutant do not reflect actual pollution damages caused by factories.[40] Also, since the law came into effect, implementation has been challenging. First, it is difficult to determine exactly how much a firm is polluting and the type and quantity of contaminants. And second, mining firms, with contracts finalized before the law's passing, claim that their activities should not be subject to pollution fees.

In the context of increasing climatic and non-climatic uncertainties, Mongolia has the opportunity to reduce water insecurity using low-risk or no-regret solutions. These include (a) managing freshwater demand; (b) enhancing the efficiency of water use (through pricing, fees, and technological improvements) while simultaneously improving service delivery; (c) replacing freshwater with treated wastewater where feasible; and (d) focusing on issues of water quality and ensuring water availability for ecological flows such as maintaining baseflows in rivers and soil moisture. These challenges will require a multipronged approach to balance immediate and longer-term needs and risks and coordinated efforts in infrastructure, nature-based solutions, and regulation.

The institutional setup of the water sector is complex and fragmented and faces resource constraints. While MET is the lead ministry for water, funding is spread across multiple ministries, including the Ministry of Construction and Urban Development (MCUD) which has the largest allocation, and the Ministry of Agriculture and Light Industries (MOFALI). The decision-making power is devolved to the local organizations. The Water Authority operates under MET and is responsible for RBAs, but it lacks support from other ministries, agencies, or local government to conduct activities. To overcome

38 This is because of a subtle and complicated differentiation in the Law on Water on what is water use (for profit-generating activities) and water consumption (for non-commercial purposes).

39 The Water Pollution Fee Law was enacted in 2019 and introduced the 'polluter pays' principle by imposing water pollution fee to the polluting industries and entities. The fee is calculated based on the wastewater volume and effluent quality discharged both into the environment and to the central network. The collected fee is redistributed to the water protection, pollution reduction, treatment plant operation improvements, and upgrade activities.

40 For example, it does not specify requirements for high-polluting light industries such as tanneries, carpet producers, and service entities like hairdressers, sauna, and spa. These high-polluting light industries and service entities are categorized into the classification 'Other' which has the lowest effluent quality requirements.

those challenges, river basin organizations (RBOs) were created and have the key responsibility of implementing effective interventions based on IWRM but many are yet to become effective, lacking funding and struggling with communication between the line ministries and local governments and having to deal with several aimag governments.[41] A National Water Council was established to coordinate sector activities but is not yet fully effective. While monitoring is carried out, making information on water trends, quality, and planned and completed investments more readily available remains a challenge. Interministerial and cross-sectoral coordination remains a central issue and is of priority considering the planned scaling-up of investment in the sector.

THE REPORT RECOMMENDS

1. **Improve agricultural water use efficiency by rehabilitating existing irrigation infrastructure, implementing demand management instruments, integrating livestock water points with livestock extension, and involving herders in the management of rangelands.** As the government plans an increase in irrigated lands from 54,000 ha to 120,000 ha by 2030, existing infrastructure on currently irrigated plots has been inadequately maintained. To address this maintenance problem, a performance assessment of operators (public or private) should be undertaken using an approach that encompasses the whole operational ecosystem—policy, governance, technical, and financial dimensions—to improve practices and performance outcomes such as the irrigation of the future (IoF) framework (World Bank 2022a). Such an approach goes beyond the more traditional performance assessment that has focused on the hydraulic performance of infrastructure to help identify and prioritize the core problems, set relevant indicators for ongoing performance tracking, and provide an assessment of the challenges in tackling the problems. While the government moves forward with expanding irrigation, there are opportunities to complement these efforts by introducing less water-intensive production processes such as climate-resilient seeds, soil improvements, and pasture rotation methods—measures that would also help with ecological flows (World Bank 2011). Additionally, water meters, licenses, and fees could also be considered to improve efficiency in irrigation. For livestock, upgraded and integrated services at water points where herder populations can access livestock extension services (such as veterinary care and improved livestock varieties) and social services (such as payments made to the poorest) could help address the vulnerability of small-scale herders (see also Section 4.2). Remote sensing technology could be utilized to assess the operationality and use of water points as well as the status of small rivers and springs. This data could then be used to inform herders of suitable watering locations. Finally, improving the capacity of pasture user management groups, as well as of the government, to work in public-community partnerships for enhancing soil water management in rangelands could reduce pressure on irrigation for fodder.

41 RBOs are responsible for preparing and implementing river basin management plans, protecting water resources, promoting habitat conservation, and ensuring effective water use. The first of which was established on the Tuul River Basin in 2012. Each RBO consists of an operational group of 5–12 water professionals (that make up the RBA) along with the representatives from government, stakeholders, and water users (that make up the River Basin Council (RBC)) (ADB 2020b).

2. **Conduct a review of options to improve the management of water usage fees and the implementation of the water pollution fee**. The revenue potential of water usage fees, and by extension their ultimate objective of contributing to the financing of the water system, lies in how effectively these fees are collected and channeled into water system rehabilitation and investment projects. To accelerate the implementation of the water pollution fee, it will be key to collect polluters' information on a consolidated database, scale up systematic monitoring, ensure collaboration between MET and MCUD on the adequate and transparent redistribution of the fee, and help local governments effectively build out their data collection and reporting initiatives. Embarking on a review of challenges on both fronts could help incubate a set of feasible solutions.

3. **Manage climate risks across the drought to floods spectrum starting with ensuring that environmental flows are sufficiently considered ahead of irrigation and storage infrastructure expansion.** UB will need flooding protection infrastructure to manage climate risks but, on the water supply side, there are also opportunities to develop solutions to connect aquifer recharge to flood risk management, responding to Mongolia's climate context.[42] On the abstraction side, there is a need to better manage volumes in the context of climate risks and droughts (especially in the UB and Gobi regions) and caps could be envisioned.

4. **Increase use of treated wastewater in urban industries and extend water kiosks in rural areas to help increase access to water for domestic use.** Treating domestic wastewater is economically feasible in areas where population density is high, including in UB. Several options are available, and understanding their actual feasibility is needed. The first is for improving water use efficiency of CHP plants in UB and substituting their use of fresh groundwater with treated wastewater, to free up fresh groundwater for domestic use. While requiring substantial investments, they can be cost-effective over the long term, if managed well. Similarly, reusing treated wastewater for industrial use in UB would require construction of decentralized cluster-based industrial wastewater treatment plants that could be co-financed by industries; this needs to be accompanied by updating regulations related to water quality and improving efforts to monitor and enforce regulations related to effluent release by firms. In rural areas, the dispersion of people and their pastoral lifestyle renders piped water and sanitation nonviable. Water kiosks can provide safe and reliable water; they can be fitted with technology to monitor quality and use and potentially integrated with other services that benefit local populations.

5. **For the mining sector, reducing pressures on freshwater sources by augmenting wastewater in operations and improving efficiency in water use while gradually reducing freshwater water use in mining over time constitute low-risk options and their feasibility should be explored.** To speed up implementation of the Water Pollution Fee Law, the government is making amendments for collecting polluters' information into a consolidated database, ensuring collaboration between MET and MCUD on the adequate

42 See He et al. (2021). See Fan (2023) on the piloting of Managed Aquifer Recharge (MAR) in the Baganuur project and key recommendations to expand and Batzaya and Rongchang (2021) on the feasibility and benefits of rainwater harvesting for mining in Mongolia.

redistribution of the fee. The effluent quality standard (MNS 6561:2015) is also being modified, with additional and more vital water quality requirements expected (Seureca Veolia 2023). While these are promising starts, more needs to be done to reduce pressure on freshwater resources by exploring the feasibility of wastewater use in mining operation and reducing freshwater use over time, including making water quality standards more stringent.

6. **Strengthen coordination, capacities (especially at subnational levels), and information management and transparency to enable improved local management as well as better coordination around a critical resource.** Multistakeholder platforms at the national and local levels seem to be an appropriate mechanism to accelerate a decentralized governance system and IWRM core values. These platforms should reflect priorities of all actors and cross-sectoral stakeholders and set an environment where decision-making, planning, and coordination are discussed.



3.3. MINING AND THE GLOBAL CLIMATE TRANSITION

The importance of coal to Mongolia's economy

Mining plays a critical role in the Mongolian economy, and its significance has steadily increased since the mid-2000s. Over the past decade, mining, predominantly in copper and coal, has accounted on average for nearly one-quarter of the economy, with coal alone representing one-third of that share (Figure 15A). Mining activities have also been the recipient of over 70 percent of FDI, represented more than 90 percent of export revenues, and contributed over one-fifth of government revenues. FDI inflows aimed at developing infrastructure and production capacities have recently increased substantially. These investments supported the development of the underground mine stage of Oyu Tolgoi (OT), one of the largest copper mines globally, and the construction of railway transport lines to predominantly facilitate coal exports.

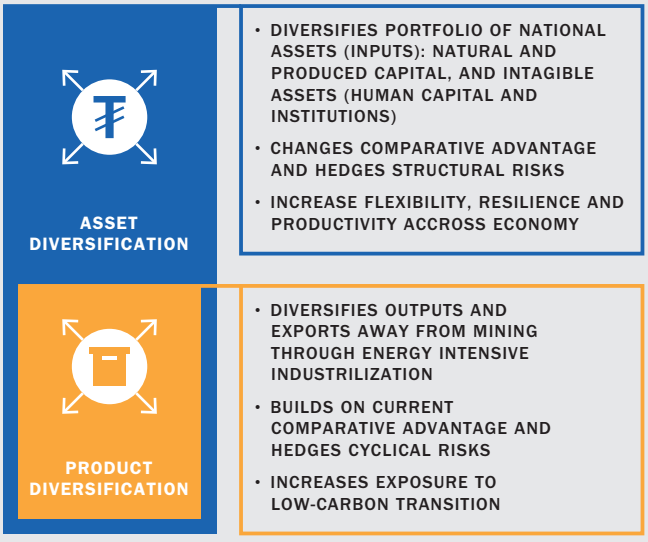
BOX 3 Key challenges to economic diversification

The CCDR focuses on diversification within the mining sector, but broader economic diversification is needed. Mongolia's economy suffers from substantial macroeconomic volatility, which hampers investment and labor productivity. This volatility is driven by fluctuating commodity prices and fiscal, monetary, and exchange rate policies that often amplify external shocks. Volatility deters investment, adversely affecting expected returns, innovation, and labor productivity. Capital has become concentrated in the mining sector and there has been a shift in labor from high-productivity tradable goods to lower-productivity, non-tradable services. Additionally, Mongolia's dependence on natural and produced capital has neglected the development of human and institutional capital (Figure B.2). Despite investments in health and education, a lack of suitable investment means that there is an insufficient number of well-paying jobs for high-skilled workers. This mismatch between educational outcomes and job market needs leads to high unemployment and emigration of skilled labor. Inefficient public investment management (PIM) and weak governance exacerbate these issues.

The World Bank's 2020 Mongolia Country Economic Memorandum identifies three key challenges to economic diversification in the country: excessive macroeconomic volatility, negative productivity growth, and an overreliance on natural and produced capital over human and institutional capital. Enhancing macroeconomic management, reforming the business environment, and leveraging Mongolia's intangible assets are vital for diversification (Figure B.1). Effective macro policies could stabilize the economy against commodity price fluctuations, while business climate reforms would open Mongolia to FDI. Diversification also demands labor market improvements, talent retention, migration policies, and transparent policy making.

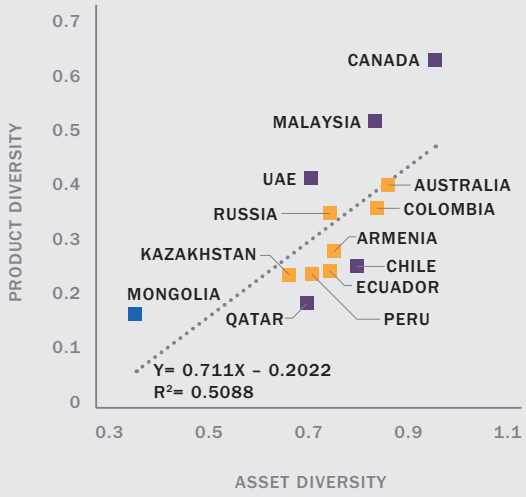
Figure B.1

Asset diversification can facilitate product diversification



Source: Adapted from World Bank 2020a and World Bank 2023.

Figure B.2 Mongolia lags in assets and product diversification

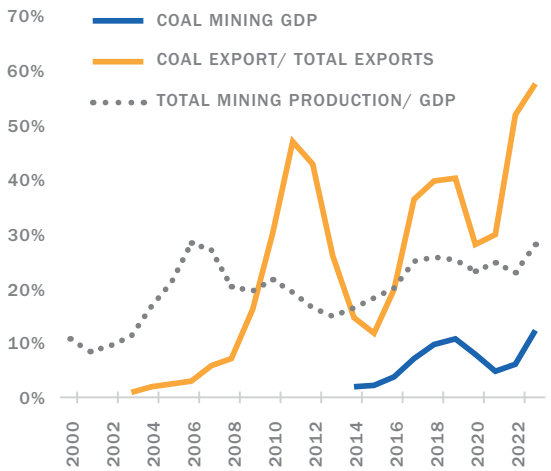


Source: Adapted from World Bank 2020a and World Bank 2023.

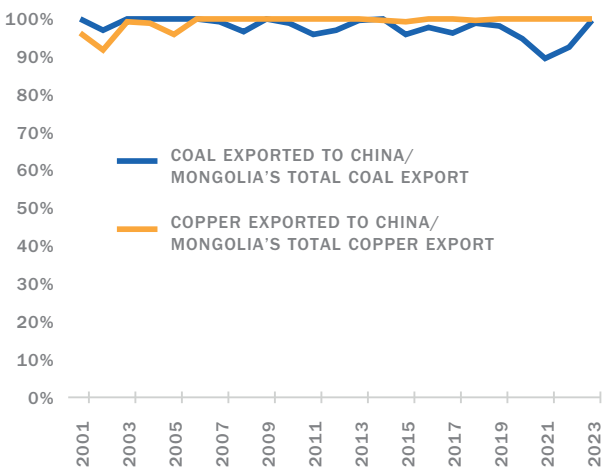
The mining sector is highly dependent on China. More than 90 percent of Mongolia's coal and copper exports go to China (Figure 15B). A combination of geographical proximity and the high cost of transporting bulky goods has meant that China has historically been the main destination for Mongolia's mining exports. Rapidly increasing demand from China has therefore driven growth in the Mongolian extractives sector. However, this heavy reliance on the Chinese market also brings significant risks. For example, heightened hygiene protocols at border ports, driven by China's zero-COVID-19 policy, led to a temporary but severe disruption to Mongolian exports. Coal exports, in particular, operated at about half their prepandemic volumes for over a year, resulting in considerable balance of payments pressures.

Figure 15 Significance of the mining sector in Mongolia and its dependence on China's demand

A. SIGNIFICANCE OF COAL TO THE MONGOLIAN ECONOMY



B. DEPENDENCE ON CHINA'S DEMAND FOR MINERALS



Source: Mongolian Custom's General Administration.

The prospects for Mongolia's mining sector depend on the pace of the global and especially China's low-carbon transition. Global efforts to reduce GHG emissions would reduce coal demand, but many of the technologies required for decarbonization also require inputs of valuable minerals. This deep dive explores both the risks and opportunities to Mongolia from a global low-carbon transition. It finds that Mongolia faces substantial risks from the 2040s, which could be partly offset by developing or expanding extractive capabilities for non-coal mineral resources.

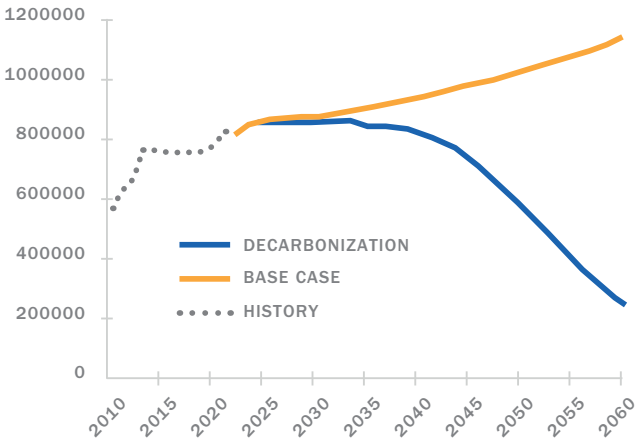
While about three-quarters of Mongolia's domestic coal production is exported to China, Mongolia's exports of high-quality coking coal make up a small share of China's total consumption. Coking coal is used mostly in steel production. Mongolia is China's top external coal supplier but likely accounts for less than 5 percent of China's overall coal consumption. Although Mongolia's reserves could supply coal for more than 100 years, a relatively small change in coal demand from China could have a substantial impact on production volumes.

A lack of technological alternatives means that coal will be needed for steel production into the 2030s, but demand could decline thereafter. Steel demand in China will likely continue to grow in the medium term, even so at a slower pace as recent demand reductions from the Chinese property sector are being offset by higher demand for steel for car manufacturing (EV) and infrastructure investment, including in the power sector (wind turbines, grid, and so on), flood protection and urban infrastructure, and higher steel exports. For now, most additional demand will be met using coal-based technology. However, if China is to meet its own carbon neutrality goals, electricity and, potentially, hydrogen-based technologies will gradually displace coal-based production over time. Model projections based on China's stated projections suggest that, by 2050, decarbonization could reduce coal use in Chinese steel production by 45 percent, with a more pronounced decline following (Figure 16A). In such a scenario, current coal production levels in Mongolia would surpass long-term capacity needs by 30 percent. New (and forthcoming) infrastructures connecting coal mines to trading routes thus face the risk of becoming stranded assets. It is also possible that China would prioritize domestic production if demand for coking coal started to decline.

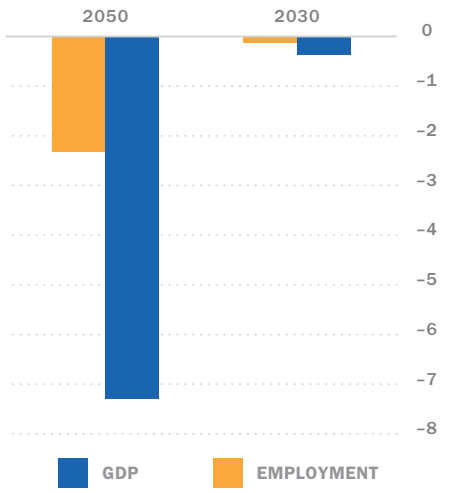
Figure 16

How future coal demand could impact the economy

A.COAL DEMAND PROJECTIONS (MILLION TONS)



B. GDP AND EMPLOYMENT IMPACTS FROM COAL EXPORT LOSS (% FROM BASELINE IN 2050)



Source: World Bank, calculations based on the E3ME-FTT model in left-hand pane and the MINDSET model in right-hand pane.

A loss of coal exports would have a substantial impact on GDP and employment in Mongolia. The MINDSET macroeconomic model (Box 1) estimates the impacts of a scenario in which demand for Mongolian coal in China decreases in line with overall Chinese demand in Figure 16A. The model finds that the resulting reduction in coal exports would lead to losses of up to 7.2 percent in Mongolian GDP. If the labor market is not able to respond, for example, by retraining displaced workers, total employment could fall by up to 2.3 percent (see also Section 4.2), although increased automation may in any case reduce the number of jobs in mining by the 2040s. The scale of the impacts reflects the importance of exporting coal to China for Mongolia. If Chinese demand for Mongolian coal fell rapidly, for example, due to border restrictions or conversion of nearby steel plants to electric or hydrogen-based production, it is likely that a severe recession would occur. The model results in Section 2.2 assess such a scenario.

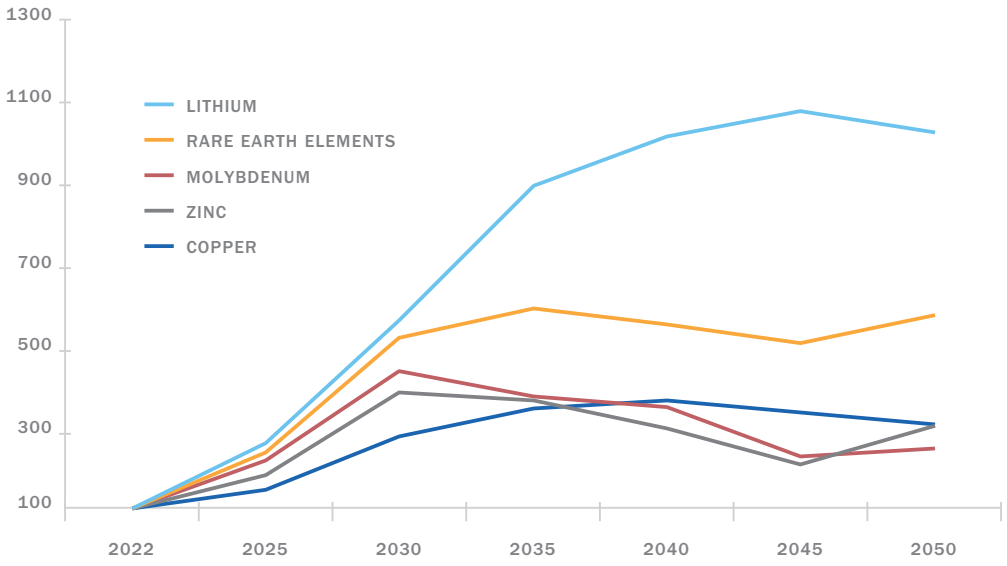
The potential for copper to offset some of the lost coal production

A global low-carbon transition would increase demand for other minerals, some of which Mongolia could exploit, contingent upon its ability to effectively transport its products to market. Model projections suggest that the low-carbon transition could increase demand for a range of valuable minerals by factors of 2 to 5 (Figure 17). If lithium remains the dominant chemical in batteries, its demand could increase by even more. There is therefore an opportunity for Mongolia to expand non-energy mining production if it can match its domestic supply to global demand. Mongolia's geographical position will remain a challenge for getting its minerals to buyers; airborne exports of minerals will likely be impossible and, as a landlocked country, its exports must pass through either China or Russia. Trade fragmentation thus could be a challenge for Mongolia in the future.

The largest opportunity for increased mining production in Mongolia is in copper. Copper is already Mongolia's second-largest mineral industry, and it is poised for significant expansion. Expansion of the OT copper mine, one of the world's largest, from open-pit mining to underground operations could more than double its 2023 annual production by 2025 and continue expanding henceforth. The OT operation is anticipated to continue until at least 2055.

Figure 17

Possible global growth in transition minerals, 2022 = 100



Source: IEA 2021.

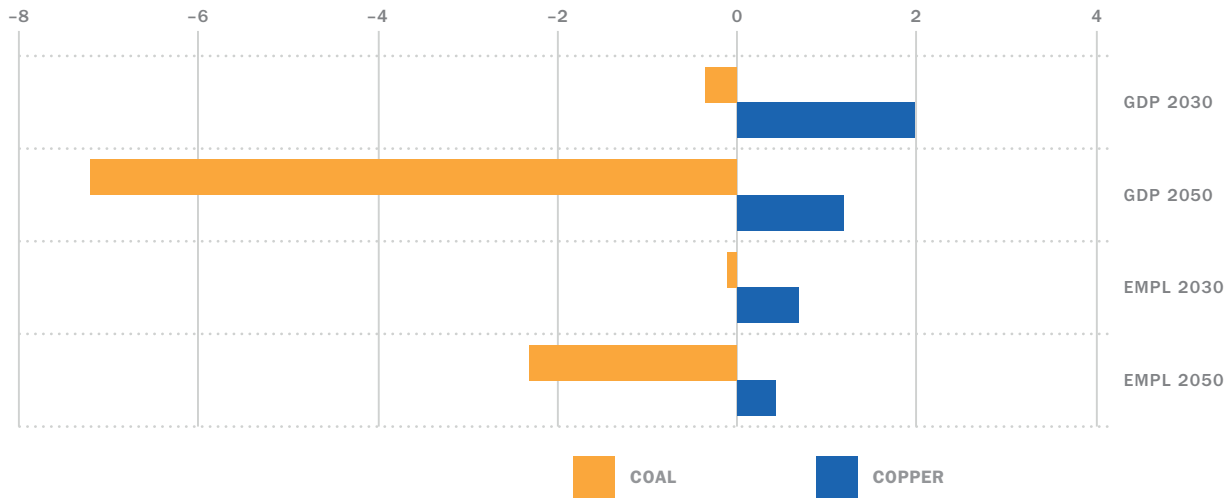
Transporting copper is easier than transporting coal, but water scarcity could hamper further production expansion. Copper has a higher value-to-weight ratio than coal, which allows Mongolian copper to remain competitive in China and other international markets, even if geographically distant. However, as discussed in Section 3.2, water security poses a central challenge to copper production. The OT mine (and Tavan Tolgoi coal mine) is located in the water-stressed South Gobi region. Industrial water use in the South Gobi relies on the slowly renewing groundwater reserves because of the lack of surface water in the region. Projections suggest that, by 2030, mining activities could consume up to 98 percent of the South Gobi's water resources.

Increased copper exports could offset some of the production value lost from coal. The potential benefits from copper expansion depend on how much of the global market Mongolia could capture, which in turn depends on addressing water scarcity and other limiting factors. Figure 18 shows the impacts if Mongolia maintains its current global market share of copper exports in meeting enhanced global demand. By 2030, the GDP impacts of additional copper exports could exceed those from the loss of coal revenues. However, by 2050, the value from additional copper exports would only cover one-fifth of the losses from coal.

Initial investment in uranium could boost the Mongolian economy, but long-term production will not offset the potential loss of coal exports without further policy reform. Decarbonization efforts and heightened energy security concerns could increase the use of nuclear energy. Global uranium demand is projected to increase by 28 percent by 2030 and to double by 2040 (World Nuclear Foundation 2023). Mongolia's 2009 Nuclear Energy Law (NEL) established a framework for uranium exploration and mining. In 2023, Mongolia and a state-backed French company agreed to cooperate on the commercialization of the Zuuvch-Ovoo deposit; the initial investment (more than 10 percent of current GDP) could boost the Mongolian economy, but annual revenues would remain smaller than those of coal and copper. However, Zuuvch-Ovoo's large uranium deposits (estimated at US$7.8 trillion in value) could allow for further production expansion. To expand foreign partnerships on uranium mining, Mongolia could loosen current governance restrictions. Current rules mandate a 51 percent stake in any project that extracts radioactive materials in which the Mongolian government financed exploration (and a 34 percent stake otherwise). These restrictions could prevent future partnerships in uranium and other minerals.

Figure 18

GDP and employment impacts from changes in coal and copper production (%)



Source: World Bank, calculations based on the MINDSET model.

Possibilities for increased production of other minerals

Growth in other critical mineral extraction will make at most a small contribution to Mongolia's economy. Mongolia has already established mining operations in zinc and molybdenum, but each represents less than 2 percent of mineral exports and has limited growth potential. Zinc extraction is already well developed, and the discovery of further large commercially viable deposits is unlikely. Molybdenum is a by-product of copper mining and production volumes are closely tied to those of copper. In 2023, small-scale lithium exploration began alongside the uranium cooperation agreement with France. The resulting surveys should indicate whether lithium mining

is worth pursuing in the South Gobi salt beds. However, other countries are also increasing lithium production and doubts are growing about whether lithium will remain dominant in battery technology.

The potential for developing rare earth extraction in Mongolia is tempered by uncertainties regarding the quality and commercial viability of deposits. The mining of rare earth elements (REEs) in Mongolia has attracted international attention and in 2023 the US signed a memorandum of understanding with Mongolia to cooperate on REE commercialization. However, commercial viability is not yet clear. Despite awareness of deposits in the Gobi Desert, Southern and Western Mongolia since 2013, limited exploration has taken place, with just three deposits undergoing initial exploration and only one advancing to a prefeasibility study. The preliminary assessments suggest that the quality of Mongolia's REE deposits is at best average by international standards. If REE deposits turn out to be commercially viable, there will still be substantial challenges to creating the industry in Mongolia. Deposits are in remote locations without the requisite infrastructure, necessitating substantial investments in transportation links and complex logistics for domestic processing or exporting of REEs.

Regulatory uncertainty may be deterring external investment. The investment climate within Mongolia's mining sector has been notably unstable since 2000, with multiple revisions to mining laws between 2011 and 2022. For example, the Strategic Entities Foreign Investment Law (SEFIL, 2012) mandated parliamentary approval for foreign investments exceeding US$70 million, which effectively blocked foreign acquisition of a firm with Mongolian operations. The law precipitated a sharp decline in FDI in 2015–2017, which contributed to a balance of payments crisis that was only alleviated by a joint International Monetary Fund (IMF)-World Bank budget support lending program (World Bank 2024c). Disputes regarding the structure of foreign investment and ownership in Mongolian mining operations, including over the OT mine, have amplified investor uncertainty in long-term projects. The use of the NEL to increase the government's stake in the Dornod uranium deposit has also deterred investors.

New mining operations must be sustainable and in line with global environmental and social standards. In the past, Mongolia has faced some shortcomings in conducting thorough social impact assessments before issuing mining licenses. Additionally, mining activities, such as land appropriation, fencing, water use, and infrastructure development, have affected mobile pastoralists. The lack of transparent engagement with local communities has frequently led to public outcry from households adversely affected by forced displacement and rapid resettlements (Sternberg and Ahearn 2023). Consequently, expanding mining operations could undermine Mongolia's economic development if environmental, social, and governance (ESG) standards are not followed. Potential downsides include risks to the environment (land and water pollution), human health (mining runoffs into agricultural and settlement areas and drinking sources), the vitality of communities (co-habitat of traditional livestock farming and mining or a

resettlement), and governance (corporate governance, transparency, and diversity). There is a global consensus that the low-carbon transition must include ESG considerations and Mongolia's position is additionally sensitive because of its current reliance on coal. With multinational companies increasingly paying attention to their supply chains, it will become difficult to attract inward investment to the sector if ESG standards are not visibly adhered to.

Mongolia may seize opportunities in developing a digital services industry for the mining sector. Following the example of Chile, Mongolia could further develop its mining expertise to build an export-oriented services industry (World Bank 2023). Chile became a hub for mining engineering services with the arrival of international mining companies in the 1990s. These companies brought engineering experience when they set up operations in Chile. Supporting firms progressively built capacity and established a strong local presence. They established centers of excellence for the copper industry based in Chile, which now serve as lead offices for developing copper projects worldwide. Some Mongolian mining companies are already offering international consulting services. Encouraging the development of local expertise could further boost the sector.[43]

THE REPORT RECOMMENDS

1. **Prepare for an eventual reduction in demand for coking coal and position the country as a global supplier of other minerals and related services.** The prospects for coal demand depend on China and preparations for an eventual coal phase-out should begin now (Section 3.4). Expanded copper production could offset some of the losses from coal, as could development of a mining services industry. Prospects for expanding production of other minerals are less clear but could attract FDI into the country.

2. **Accelerate mineral exploration to reduce uncertainties for investors.** The quality of deposits of several important minerals, including rare earths, remains unclear. Until commercial viability is established, it will be difficult to attract private sector investment. Delaying exploration risks missing the opportunity to set up operations while demand and prices are high.

3. **Foster a favorable investment climate for cooperation with foreign companies to expand mining production, including in alternative minerals.** Section 5.3 provides detailed recommendations to address constraints on private sector investment, including in the mining sector. It focuses, among others, on policies to enhance the investment regulatory framework, such as developing a new and clearly articulated investment policy.

43 Development of a mining services sector would also require substantial efforts to upgrade the country's digital skills and infrastructure (World Bank 2023).



3.4. ENERGY SECTOR TRANSITION

The current coal-based energy and heating system

Coal dominates energy supply in Mongolia, resulting in high levels of local air pollution and GHG emissions. Coal accounted for 70.8 percent of total energy supply and 96.3 percent of energy production in 2021. Coal is primarily used for power generation and space heating. Coal-fired CHP plants generate 90 percent of domestic electricity[44] and 92 percent of DH. Heat-only boilers (HOBs) supply the remaining DH needs, while coal is also used for most households without access to DH services, causing local air pollution with severe health consequences. As noted in Section 2.3, the health impacts of burning coal are responsible for 1 in 10 deaths in urban areas, providing a clear incentive to reduce emissions. A continuation of highly GHG-intensive development also risks locking Mongolia out of the global finance that it needs for climate and non-climate investment (Section 5).

Space heating is a critical energy service in Mongolia, essential for livelihoods and economic activities. With average ambient temperatures reaching –30°C in winter and a heating season that lasts eight months, heating services is one of the biggest uses of energy in Mongolia, comprising 35 percent of final energy demand. DH systems powered by CHP plants and HOBs supply heat in urban areas, and small cities are supplied by small HOBs. In the gers or detached houses, heating stoves fueled by coal or wood are used. Only about 25 percent of the population have access to DH services. Over 70 percent of the population use individual stoves for heating purposes, while the remaining 5 percent use small central heating systems.

Mongolia's electricity sector relies on CHP plants and imports from Russia and China to meet its electricity needs. Domestic power generation makes up 80 percent of total electricity supply, with the rest imported from Russia and China. Mongolia has five regional power systems. The Central Energy System (CES) accounts for over 80 percent of total electricity demand. The other systems are the (a) Western Energy System (WES), (b) Eastern Energy System (EES), (c) Altai-Uliastai Energy System (AUES), and (d) Southern

44 The other 10 percent comes from renewable energy sources.

Energy System (SES). The large OT copper and gold mines and the Nariin Sukhait coal mine in the South Gobi region are not connected to the Mongolia power grid, relying on power imports from China.

Sizable and growing subsidies to households, financed by a mix of cross-subsidies and fiscal spending, have created distortions that hinder climate change mitigation efforts. In 2022, the average residential tariff for electricity in Mongolia was estimated to be 40 percent below cost recovery and subsidies were worth 3.5 percent of GDP. The lack of cost recovery not only undermines the financial sustainability of the sector but also impedes efforts to enhance energy efficiency and investments in renewable energy. The combination of low tariffs and subsidies incentivizes emissions-intensive energy consumption while stifling the pipeline of renewable energy projects. Furthermore, these subsidies are regressive, with wealthier households receiving more benefits than poorer households.[45] In contrast to residential tariffs, average non-residential tariffs for business and industrial sectors currently align closely with cost recovery levels.

Upcoming investments in power and heat generation offer an opportunity to reduce coal use. As the second-largest contributor of GHG emissions in Mongolia, the energy sector would need to reduce its emissions to meet these targets. Much of Mongolia's electricity and heating infrastructure needs to be replaced and new capacity is required urgently to meet growing demand. Mongolia has a potential 400 GW of wind and 700 GW of solar power generation capacity but only a few projects have been developed, in part because of a lack of high-voltage transmission lines from the south of Mongolia to UB. Primary and secondary heating networks also need rehabilitation and upgrades to reduce system losses. About 50 percent of heat transmission pipelines are in poor technical condition, while distribution networks require major rehabilitation and replacement. Near-term investment decisions will thus need to be compatible with the NDC and, ultimately, could determine Mongolia's compliance with Paris Agreement targets, without creating stranded assets. This deep dive assesses a pathway to meet these targets, using an established energy system model (Box 1).

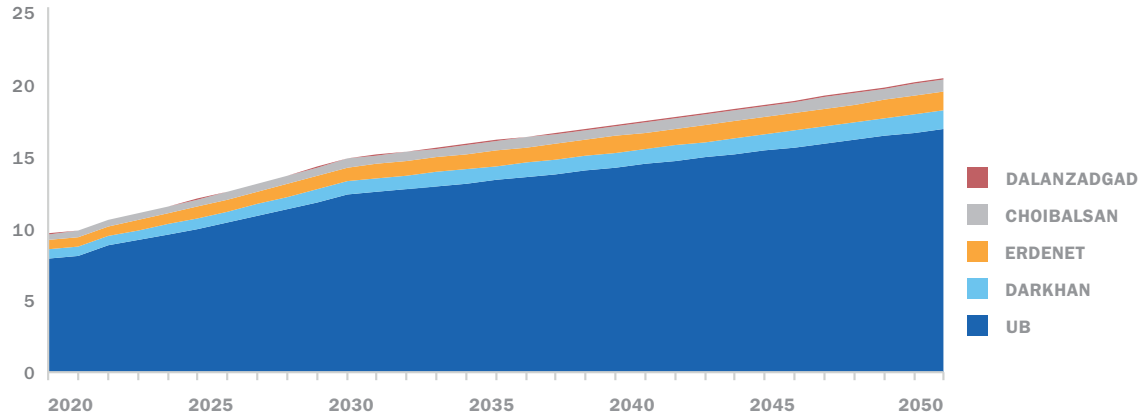
Future scenarios of heat and power generation

Heat demand will gradually increase, requiring a rapid rollout of clean heating technologies to meet climate targets. The scenario for decarbonizing heating follows the net-zero scenario developed by IRENA (IRENA 2023). In the scenario, heat demand increases over time, despite substantial energy efficiency improvements (and climate warming). A net-zero pathway was compared to a reference case of business as usual. In the net-zero scenario, CHPs are replaced by advanced renewable and clean heating technologies (Figure 19). Electric HOBs and air water heat pumps will be supported by dedicated wind and solar plants (Figure 20). Emissions fall to near-zero levels in the 2040s and net-zero by 2050.

45 Wealthier households have higher average demand for electricity and DH due to greater access to and higher spending on central energy. See World Bank background note "Mongolia Electricity and District Heating Sector Analysis and Pathways Toward Financial Stability."

Figure 19

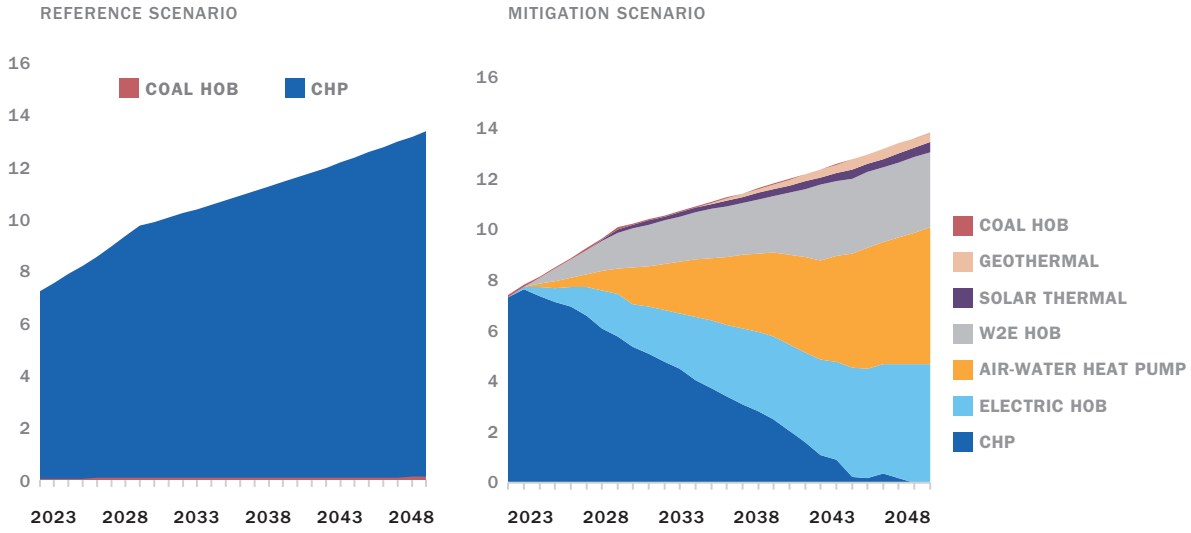
Annual heating demand, TWh



Source: World Bank, calculations based on the PLEXOS model.

Figure 20

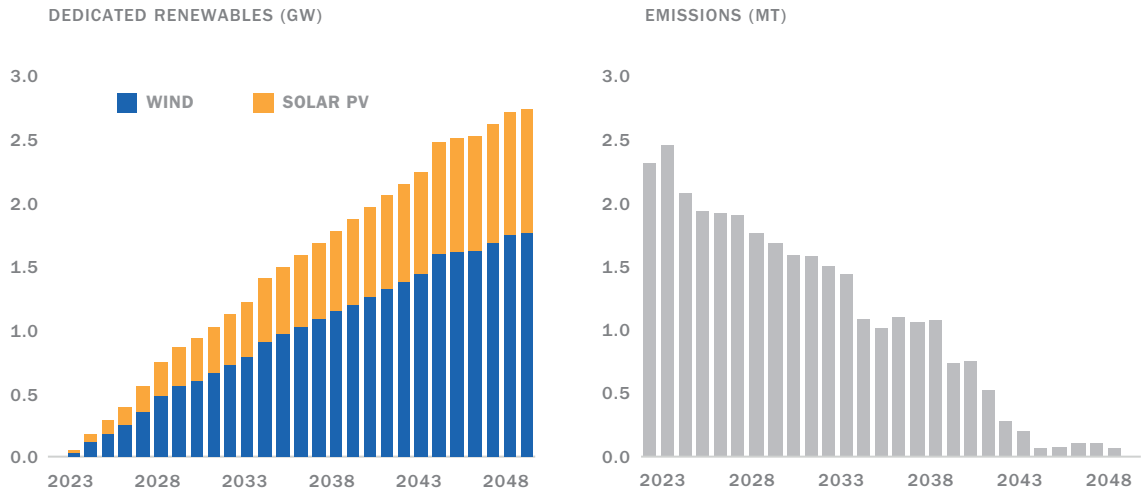
Heat generation by technology in the Reference and Mitigation Scenarios (TWh)



Source: World Bank, calculations based on the PLEXOS model.

Figure 21

Additional renewables and heat sector emission levels in the Mitigation Scenario

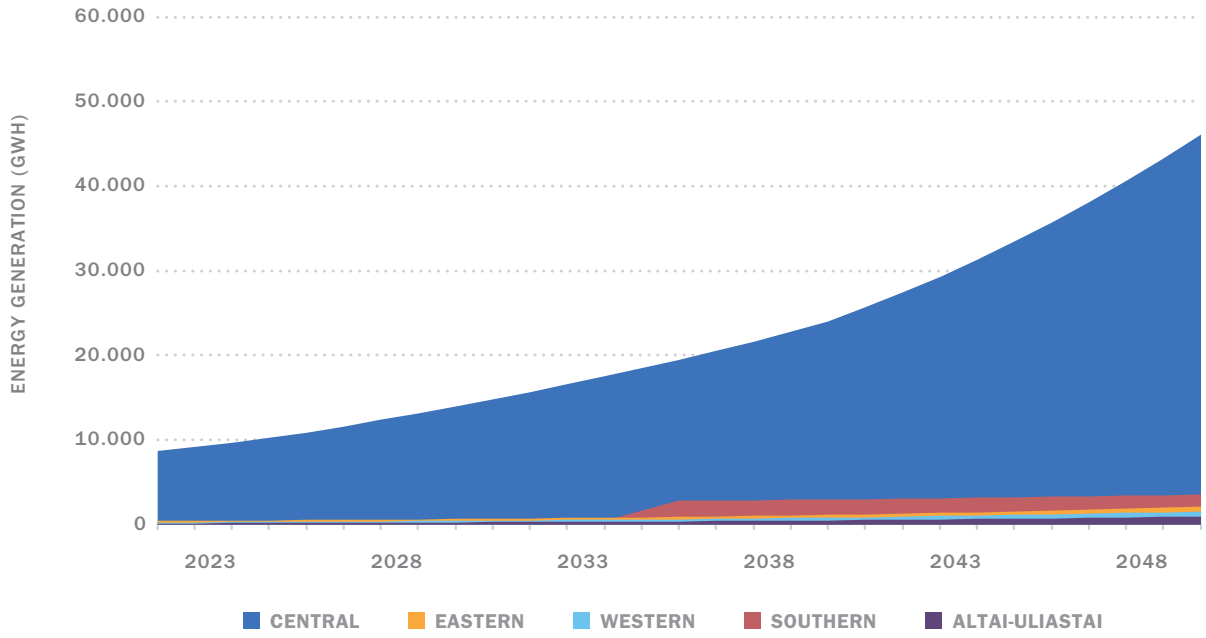


Source: World Bank, calculations based on the PLEXOS model.

Electricity demand will grow rapidly, and it will be difficult to phase out coal completely by 2050. Electricity demand is projected to increase from 10,000 GWh to 50,000 GWh by 2050 (including OT mine connection in 2035) (Figure 21). With falling renewable costs, some of this demand will be met by wind and solar power, but the reference case includes more coal-fired power generation (Figure 22). A fully electrified heating system could further increase required capacity by 10 percent by 2050.

Figure 22

Mongolia's electricity demand forecast toward 2050 (by energy systems)

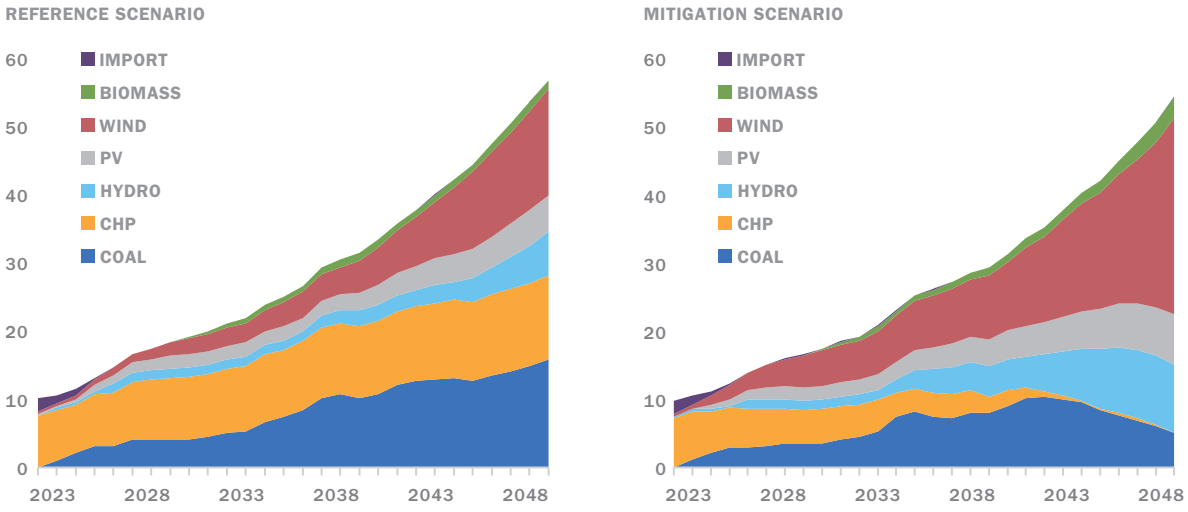


Source: World Bank, calculations based on the PLEXOS model.

In the Mitigation Scenario, power sector emissions fall by 80 percent by 2050 compared to the reference case. This scenario includes the phasing out of coal-fired CHP plants as discussed above, which creates a substantial gap in electricity generation capacity. This gap is met mostly by wind power, with increases in solar and hydro as well. Mongolia has extensive renewable energy potential that could in principle easily cover domestic energy demand but suffers from a lack of options to maintain grid stability. The share of coal-fired generation therefore falls but does not reach zero by 2050, with some coal-fired plants serving as backup for intermittent wind and solar generation (Figure 23). Nevertheless, emission levels are stabilized and fall in the 2040s (Figure 24).

Figure 23

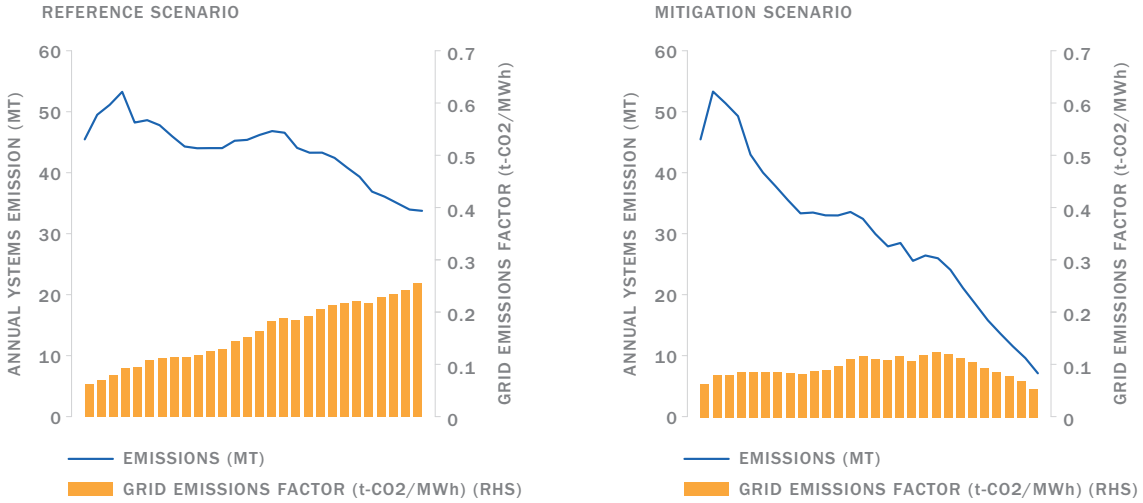
Electricity generation shares in the reference case and Mitigation Scenario (TWh)



Source: World Bank, calculations based on the PLEXOS model.

Figure 24

Emission levels and carbon intensities in Reference and Mitigation Scenarios



Source: World Bank, calculations based on the PLEXOS model.

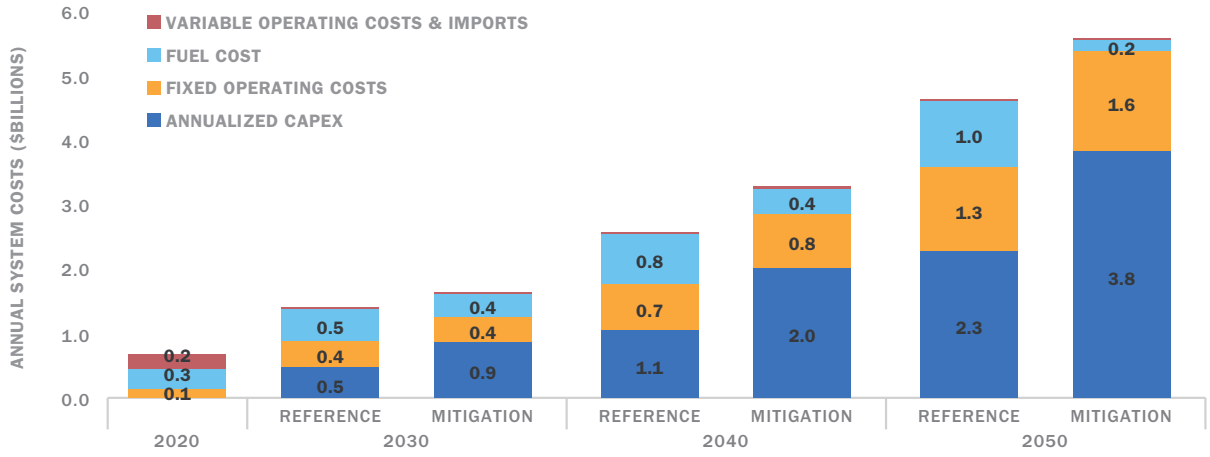
A fully decarbonized power sector would require further technological advances. By design, the decarbonization scenario does not meet net-zero emissions by 2050, and Mongolia does not currently have a net-zero target. However, net-zero emissions by 2050 could be possible if other conditions were met. For example, if carbon capture and storage (CCS) becomes viable, the remaining emissions from coal could be captured. Further rapid fall in solar prices and/or storage technologies could make overgeneration[46] and curtailment commercially feasible or allow a higher renewable share of generation. There may be some potential for geothermal heating, but exploration is first needed. Alternatively, additional interconnectors could be built to Russia and China to facilitate more electricity imports or a new gas pipeline passing close to UB could support system flexibility with lower (but non-zero) emissions. These options are currently too uncertain to consider in the modelling but could be revisited in future.

46 There is a potential for photovoltaic (PV) systems to produce more energy than can be used at one time, called overgeneration. This leads system operators to curtail PV generation, reducing its economic and environmental benefits.

Energy system costs will increase by 2050 even in the reference case, with a higher cost increase in the decarbonization scenario, but the higher costs in the Mitigation Scenario suggest some trade-offs with other potential development needs. It is challenging to separate heating and electricity generation costs because of the high share of CHP in Mongolia. However, with little space for further CHP investment, power sector system costs will increase in both the reference case and decarbonization scenario, both in real terms and as a share of GDP. Reductions in renewable costs mean that the power sector cost increases are broadly similar in the reference case and decarbonization scenario. In contrast, heating costs increase only slowly in the reference case but there is a larger increase in the decarbonization scenario. By 2050, the combined impact means that energy system costs will be US$1 billion higher each year in the decarbonization scenario (1.5 percent of projected GDP) than in the reference case. Much of the additional cost will be annual investment expenditure, which increases from 2.2 percent of GDP in the baseline to 3.4 percent in the decarbonization scenario (Figure 25).

Figure 25

Annual heating and power system costs in the Reference and Mitigation Scenarios



Source: World Bank, calculations based on the PLEXOS model.

In addition to the health benefits of clean energy, Mongolia's vast renewable energy potential could eventually open up long-term export opportunities, provided that institutional and infrastructural barriers are addressed. As discussed in Section 2.3, air pollution is responsible for up to 1 in 10 deaths in UB, so a shift to renewable energy would have major health benefits. There are also further potential opportunities for Mongolia. With resources capable of producing 700 GW of solar and 400 GW of wind energy, Mongolia could generate around 300 times more energy than it consumes from variable energy sources (World Bank 2020a). There is therefore the long-term potential to export surplus power. Realizing this potential would require developing cross-country interconnection power systems (either bilaterally or at regional level[47]) or progressively building new export-oriented technologies, including green hydrogen export production (World Bank 2020a). However, current power shortages would first need to be overcome, market reform would be needed, substantial new infrastructure built, and potential geopolitical challenges managed.

47 For example, through the North Asia Power Sector Interconnection project (NASIP), which is an initiative to connect the power systems of China, Mongolia, Russia, the Republic of Korea, and Japan.

THE REPORT RECOMMENDS

1. **Invest in energy efficiency measures and promote heat pumps to reduce current energy system pressures and lay the foundations for low-carbon development.** Energy efficiency, including minimizing grid and network losses, offers a way to reduce demand while simultaneously reducing household bills. Energy efficiency is a critical component of IRENA's analysis of the heating sector and decarbonizing heating by 2050 will likely be impossible without efficiency measures. The largest energy efficiency gains may come from a well-managed relocation of families from gers to apartments, ensuring that *ger-to-apartment* redevelopment programs are planned and implemented by applying environmental and social risk management approach, including consultation with relevant stakeholders. Energy efficiency must thus be considered as part of Mongolia's broader development strategy. Over time, heat pumps and smart grid technologies[48] will play an important role in providing heating services while limiting electricity generation requirements. Especially in the case of heat pumps, building installation capacity will be critical to reforming the wider energy system.

2. **Integrate energy storage and improve grid capacity and flexibility to facilitate wind and solar deployment; consider using mines as anchor customers for new renewable energy transmission.** The scale-up of variable renewable energy in Mongolia is hindered by the lack of interregional transmission lines and modernized grid control systems. To effectively develop the renewable energy potential in the south of the country, major investments in transmission will be required as well as improvements in system flexibility. The GoM could consider establishing large solar and wind power plants for supply of indigenous power to big mining operations such as the one in South Gobi (World Bank 2020a) and renewable energy requirements could potentially be added to mining licenses; distributed systems more generally may allow renewables to develop without full transmission capacity.[49] This would require careful execution to avoid energy fluctuations and safeguard sufficient and stable energy for the industry. Integration of smart grid technologies and generation automation within plants would also help manage the power network, which could come under considerable stress in dzuds and harsh winters. Heating networks should also be upgraded and reinforced to increase capacity and limit losses.

3. **Implement long-term system planning that is compatible with a net-zero energy sector.** System planning must be systematic and continuous, integrating sector changes such as in technological updates, system conditions, power flows, and demand variations (including due to climate change effects). This will require capacity building for sector institutions and approval authorities and a clear planning scheme based on international best practice.

48 Implementing smart grid technologies and smart metering can optimize the energy sector by enhancing energy efficiency and integrating renewable energy sources.

49 Distributed generation refers to the generation of electricity from many small energy sources rather than a few large, centralized power plants. This approach involves generating power close to where it will be used, often on-site or nearby, rather than transmitting it over long distances from large power plants.

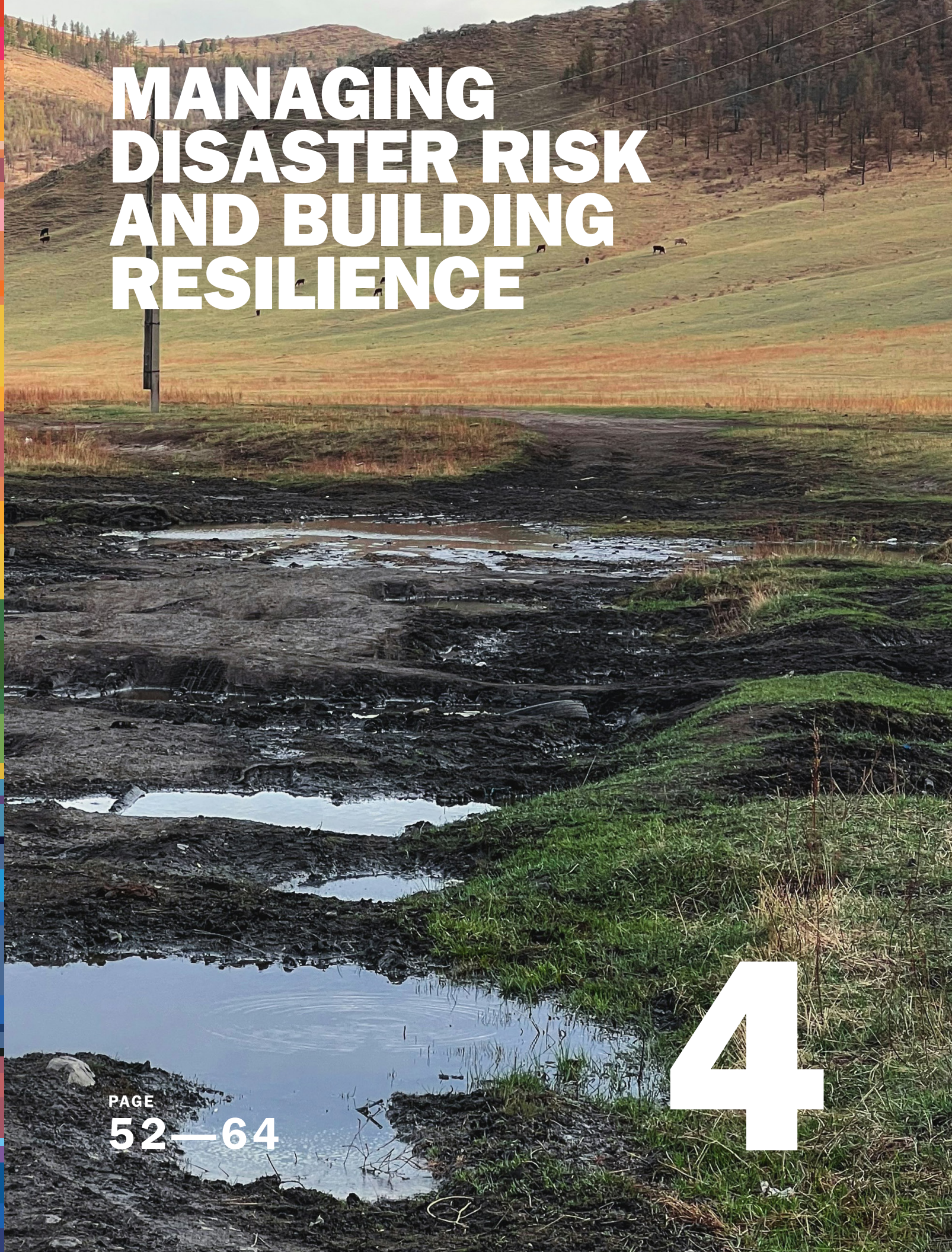
4. **Implement electricity and heating tariff reform to reduce subsidies and increase tariffs gradually to reach full cost recovery by 2030.** This recommendation is consistent with the government's aims and could reduce household energy subsidies by 55 percent by 2030. Further tariff reform, including additional consumption block tariffs and greater differentiation in rates across blocks, could reduce regressivity and ensure that a larger share of subsidies is received by poorer households. The remaining household subsidies could be financed by cross-subsidies between non-residential and residential customers. Financial savings could also be used to compensate poor and vulnerable households directly; given the absence of a well-developed social registry, geographical targeting could be used to ensure that the households most in need receive adequate support.

5. **Clearly define the focus of public and private sectors for the development of renewable energy.** The government should focus on facilitating private investment in renewable energy generation and use public financing or PPPs, where feasible, to enhance renewable energy networks, and rehabilitate and modernize existing systems to ensure supply efficiency and lower cost of services (World Bank 2020a). Additionally, improvement plans to enhance the commercial viability of current distribution utilities are needed.

6. **Address energy market constraints to attract private sector investment.** The scale of investment required for the energy transition is formidable. By accessing international and private financial markets, Mongolia could leverage concessional and climate financing to reduce domestic investment costs (Section 5.4). Implementing market reforms will help in this process. Mongolia could further attract private investments by establishing a fair and competitive market that is acceptable to international donors and provides favorable market conditions for investors from abroad. New generation capacity should be procured through competitive procurement processes such as energy auctions, and regulatory audits should be carried out regularly to ensure efficient and responsible operation of utilities. Clarifying guidelines for licensing and enhanced arbitration would help. A complete transition from the current single-buyer model toward a competitive market by 2030 could further boost private sector participation.

7. **Monitor global technology developments and emerging markets and invest in well-targeted R&D to identify solutions tailored to the unique conditions in Mongolia.** In the medium term, the government should closely monitor global technology developments and markets and, through pilots, be prepared to scale up once the renewable energy technology landscape matures further and prices fall. Also, to boost innovations on distributed generation and heating (and go beyond putting rooftop solar PVs), especially for areas that are off-grid and have high emissions per capita (for example, the ger areas), R&D would be catalytic.[50]

50 Nongovernmental organizations (NGOs) such as Gerhub (which partners with top universities and institutions globally in the fields of architecture, design, and engineering) focus on researching and developing innovative energy solutions in ger areas.



MANAGING DISASTER RISK AND BUILDING RESILIENCE

4

PAGE
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4.1. MAKING DISASTER RISK MANAGEMENT (DRM) FORWARD LOOKING AND FIT-FOR-PURPOSE

Mongolia currently lacks a comprehensive approach to disaster risk reduction and management. Mongolia's key legal framework and plans include the Law of Disaster Protection and the recently approved National Adaptation Plan (NAP).[51] However, in practice, current laws and policies predominantly focus on disaster preparedness and emergency response but do not adequately cover disaster risk reduction, financing, or insurance—and where measures do exist, implementation is generally weak.[52] There is a need to strengthen physical and financial resilience by comprehensively integrating disaster risk reduction into the budget process and supporting the development of the natural disaster insurance market and other disaster risk financing and insurance (DRFI) instruments for households (including herders, see also Section 3.1), businesses, and the GoM.[53]

The country's infrastructure and planning processes are ill suited to withstand natural hazards and climate change. Vulnerability has been compounded by unplanned urban sprawl; in some cases, informal housing is being constructed on hillsides, near gullies, and other locations prone to disaster risks such as floods and landslides (International Organization for Migration 2019. The use of resilient building codes and design and construction standards for infrastructure systems can help mitigate the impacts of natural hazards, in particular flooding events, which are expected to be more frequent with climate change (Section 2.1). Also, measures will be needed to improve exposure data collection and analysis at the national and local levels. This will provide a foundation to inform land use planning, zoning, and building capacity of national and local government officials to assess vulnerability of critical infrastructure, including bridges, schools, and hospitals. Moreover, scaling up effective DRM strategies, including early warning systems (equipped with digital tools and sensors for real-time weather monitoring) and community preparedness programs, can enhance Mongolia's overall resilience to natural hazards and climate change impacts and help better protect its human capital.[54]

51 The Law of Disaster Protection requires all levels of government (including subnational governments [SNGs]) and disaster protection units to have disaster protection plans and disaster mitigation measures. The NAP aims to support medium- to long-term climate change adaptation planning and budgeting for priority sectors such as agriculture, forestry, and water resource management. Most recently, a Disaster Risk Management manual was prepared by the government in December 2023 which contains disaster risk reduction strategies and prevention activities to equip disaster risk reduction councils with essential skills for adapting to climate change and integrating disaster risk reduction strategies into their duties.

52 For example, the Law on Disaster Protection requires that all government and corporate entities spend at least 1.0 and 1.5 percent of their annual production and service costs on disaster protection and risk reduction measures, respectively. However, there is no enforcement or incentive mechanism, and most entities do not comply. Similarly, index-based livestock and wheat insurance programs for households have been implemented for several years, but premiums remain high and uptake low, despite ongoing public subsidies.

53 There are also coordination issues between the national agency and SNGs that pose challenges especially in terms of ensuring adequate subnational preparedness efforts (see Section 6).

54 Disaster Risk Reduction in Mongolia, Status Report (July 2019) https://reliefweb.int/report/mongolia/disaster-risk-reduction-mongolia-status-report-july-2019. Disaster Management Reference Handbook (May 2022) https://reliefweb.int/report/mongolia/disaster-management-reference-handbook-may-2022-mongolia

The current legal framework for DRM provides some financing instruments to manage natural disaster contingency liability risks, but the instruments need to be recalibrated to make them fit for purpose. Following a natural disaster, the GoM can draw on four sources to finance short-term emergency response and recovery efforts through the National Emergency Management Agency (NEMA): (a) treasury cash reserves, (b) within-year budget reallocation, (c) the Government Reserve Fund, and (d) Fiscal Stabilization Fund (FSF) drawdowns. The first two provide the quickest disbursements but are usually modest amounts and insufficient to finance a comprehensive disaster response. The Government Reserve Fund provides more resources but is limited to 1 percent of GDP (Law on Government Special Funds 2019). There is a risk that the fund, earmarked for multiple uses, may be exhausted if a disaster hits later in the fiscal year. Finally, even though the Law on Fiscal Stability (2010) permits a drawdown from the FSF in the event of a natural disaster, such a drawdown is permitted only if the additional budget spending required to respond to the disaster exceeds 5 percent of GDP (Article 8.1.2), with the required drawdown at least 1 percent of GDP (Article 16.3.3). There are two issues here. First, the FSF drawdown threshold is likely set too high, given that it would not be triggered even for a 1-in-250-year disaster (a disaster with projected losses of 3.7 percent of GDP). Second, the two articles above appear overly prescriptive and could lead to misinterpretation and delays in releasing FSF funding to respond to a disaster.

Mongolia has the foundations for adaptive social protection (ASP), which can play a key role in enhancing resilience, but several gaps exist. ASP involves using the social protection system to build the resilience of poor and vulnerable households and help them prepare for, cope, and adapt to shocks. Specifically, ASP programs are designed to scale up in response to shocks, helping households meet their basic needs in the short term while strengthening their resilience in the medium and longer term by reducing negative coping strategies and safeguarding human capital and livelihoods.[55] While Mongolia has a foundation for ASP in place, as revealed by its strong COVID-19 response, a recent World Bank assessment (World Bank 2024b) identified several gaps and areas for improvement. Integration of ASP principles into existing laws (including the draft DRM Strategy) and disaster risk financing could be improved.[56] Data and systems essential for identifying potential beneficiaries of ASP are generally well developed, but links between databases that are maintained by different agencies could be strengthened. For example, a unified social registry—called the Integrated Household Database—was created in 2023 but does not yet include information from databases related to health insurance, social assistance, and public service information.[57] Moreover, not all data are up-to-date, and access to real-time information on poor and vulnerable households and herders' assets is lacking.

Finally, shortcomings in the regulatory framework undermine the development of the disaster risk insurance market. The Disaster Protection Law requires all legal entities (that is, government agencies and private companies) to have insurance against the risk of a natural disaster. However, the

55 Negative coping strategies in response to economic shocks can include, for example, selling productive assets, reducing essential expenses such as food, health care, or education, and taking on high-interest loans.

56 International evidence shows that it is more cost-effective to invest in preparedness rather than response (World Bank forthcoming 2024a).

57 It currently incorporates administrative information from seven databases—civil registry (marriage, death, birth), property, motor vehicles, livestock census, tax, social insurance, and the NSO's Population and Household Registration Database.

regulatory framework regarding DRM and risk transfer needs strengthening, with the draft Disaster Risk Insurance bill yet to be finalized and enacted into law. This has limited the development of the private risk insurance market, particularly in areas such as flood and earthquake insurance products. It has also impeded the scaling-up of hybrid social insurance initiatives, such as the index-based livestock and wheat insurance programs (with only 11 percent of herders insured as of 2022 in the case of livestock insurance).

THE REPORT RECOMMENDS

Adopt a comprehensive and proactive approach to DRM and DRFI, including a wider range of risk management instruments to strengthen the nation's resilience to natural disasters. International good practice recommends that national DRM legislative frameworks comprise disaster risk governance for prevention, risk reduction, preparedness, response, recovery, and rehabilitation. Given the increasing frequency and magnitude of natural disasters, there is a need to better integrate disaster risk reduction measures into development planning and investment as well as the budget process (including fiscal planning, the PIM framework, and fiscal risk analysis);[58] collect better data on vulnerability; and enhance preparedness by considering different risk retention instruments based on a comprehensive assessment of the physical risks to the country's public finances, private sector, and households. Finalization of a national DRM strategy could provide the overarching strategic approach to enhance DRM and DRFI and together with the Climate Change Framework Law under preparation (see Section 6) help promote coordination across line ministries and agencies. This should be complemented by efforts to strengthen the enabling policy, legal, and institutional environment and develop and implement priority DRFI solutions following a risk layering approach (Figure 26). Specific steps include the following:

1. **Augment and recalibrate disaster response financing:**[59] (a) explore the possibility to reform the Law on Fiscal Stability to lower the threshold for natural disaster damages required to make a drawdown from the FSF and clarify the conditions for drawing down on the FSF to respond to a natural disaster; (b) analyze the 1.0 percent (government) and 1.5 percent (private sector) budget provisions of the Law on Disaster Protection, the amount of pre-disaster funding it could and does provide, if the percentages require adjustment, and how to improve enforcement of the law; (c) establish a contingent financing facility with support from multilateral and/or bilateral development partners and regional platforms to secure affordable and adequate access to finance for post-disaster response and recovery; and (d) implement sovereign risk transfer programs through partnership with the local insurance industry, regional risk pooling mechanisms, and international reinsurance and capital markets.

58 For example, a special Dzud Resilience window within the Local Development Fund (LDF) could be established, with appropriate science-based allocation mechanisms.

59 Note that before exploring legal reforms to adjust different budgetary instruments, there is need to undertake analysis to quantify the climate-related contingent liability of the government and the funding gap as well as a value-for-money analysis to support risk-informed decision-making on the most cost-effective combination of financial instruments for the government to use (optimal risk layering strategy).

2. **Ensure resilience of critical infrastructure, improve early warning systems, and increase public awareness about disaster risk reduction.** Updating and enforcing building codes and standards to ensure the resilience of critical infrastructure[60] and promoting sustainable land use planning to reduce exposure to natural hazards are essential measures to reduce vulnerability. Investing in improving early warning systems and emergency communication infrastructure to provide timely and accurate information to the public, especially for rural communities, is crucial for enhancing preparedness and response capabilities. Moreover, increasing public awareness through education and training programs on disaster preparedness and response can empower communities to be more resilient in the face of disasters.

3. **Develop the insurance market for public and private assets:** (a) finalize and implement the Disaster Risk Insurance bill and (b) strengthen the capacity of the Financial Regulatory Commission to support the development of disaster risk insurance products by domestic insurers.

4. **Integrate the principles of ASP into existing emergency response laws, strategies, contingency plans, and the draft DRM Strategy.** This includes recognition of the role of ASP in contingency frameworks, the potential links between the early warning system and triggers for social protection, and the role of the Ministry of Labor and Social Protection within the National Emergency Committee and relevant subnational structures for disaster response.[61]

5. **Further develop the systems for ASP:** (a) expand the Integrated Household Database by including information related to health insurance, social assistance, and public services; (b) improve the frequency of updates to ensure it is complete and accurate and thus ready for use in future shocks; (c) improve access to real-time information on disaster impacts; (d) strengthen the household welfare assessment methodologies; and (e) consider establishing a framework for temporarily scaling up the coverage and benefits of social assistance programs in response to shocks.[62]

6. **Build resilience in the health system to enhance adaptation and preparedness measures to respond effectively to climate-related health risks.** This includes developing early warning systems, training health care professionals on climate-related health impacts and integrating climate change considerations into health policies and programs (that is, integrating mental health services into disaster preparedness and response plans). Innovative approaches including telemedicine (Flodgren et al. 2015) and drone delivery of medicine (Mukherji et al. 2020) could potentially improve access to essential health care services and medicine in remote areas.

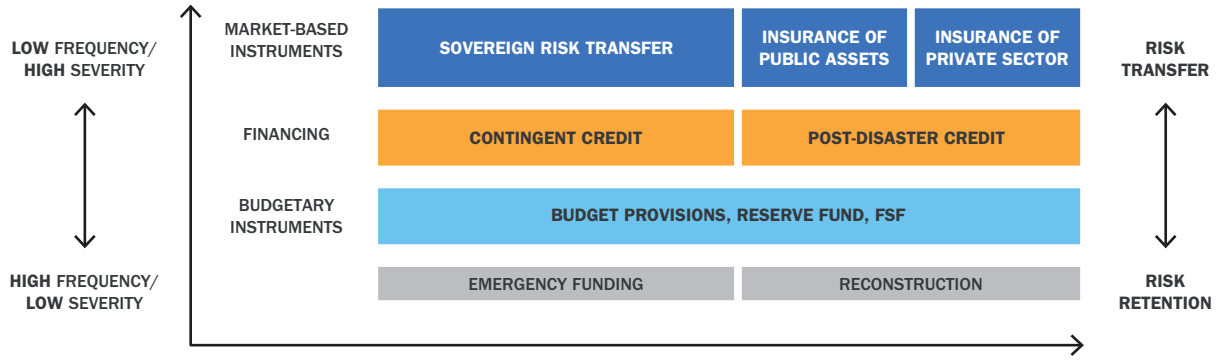
60 Public enforcement of building codes can be supplemented by educated banks and private insurers who are key in ensuring only compliant buildings that are eligible for financing and therefore provide a strong private sector-led incentive to comply.<?> International evidence shows that it is more cost-effective to invest in preparedness rather than response (World Bank forthcoming 2024a).

61 Relatedly, laws could incorporate mechanisms such as granting three-months' worth of transfers in a lump-sum payment to herders who receive social assistance in affected areas when a dzud is predicted, thereby allowing them to better cope with the eventual impact on livestock.

62 For example, when a dzud is predicted, herders in high-risk soums that are beneficiaries of the Child Money Program, Food Stamp Program, and/or the Social Welfare Pension could be given the option to receive three-months' worth of transfers in a lump-sum payment in October (that is, payments for October, November, and December) and/or in January (that is, payments for January, February, and March) instead of receiving the regular monthly benefits.

Figure 26

A risk-layered approach can increase the effectiveness of public disaster risk finance



Source: Adapted from World Bank Group 2014.



4.2. BEYOND DISASTER RISKS: BUILDING RESILIENCE FOR THE MOST VULNERABLE

The case of coal miners and their communities

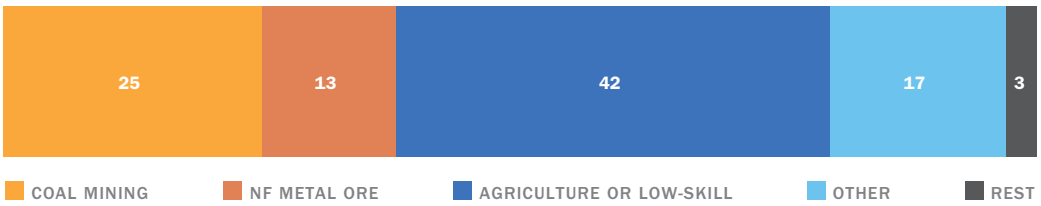
While economically vital, Mongolia's coal mining sector employs only 2 percent of the workforce as of 2022 (about 24,000 workers).[63] Analysis suggests a moderate direct impact of a drop in coal production on coal sector employment—a 10 percent drop in coal production translates to about 2,000 fewer coal mining workers (Giles et al. 2024). However, the overall impact on employment across sectors would be non-negligible (Section 2.3). Indeed, given that mining is a significant source of tax revenues for the government, a drop in coal production would also reduce tax revenues, affecting the ability of the public sector to provide tax revenue funded services across the board. Further, a decrease in coal production will accelerate as coal mines cease production with the low-carbon transition in China and Mongolia.

63 The whole mining and quarrying sector (ISIC-B) employed around 60,300 workers in 2022. The Labor Force Survey is used to estimate the workforce employed in each of the subsectors. Aside from coal mines, a similar scale of workforce is employed in the mining of non-ferrous metal ores, including about 11,200 copper mine workers. Other workers are employed in the extraction of crude petroleum and natural gas, other mining and quarrying, and mining support service activities. Compared to the average non-farm worker in Mongolia, coal miners are less likely to be college educated but more likely to have completed technical and vocational education. Less than 10 percent of coal miners are women. With a median age of 37 years, coal miners are slightly younger than the average Mongolian worker. A negligible share (~1 percent) is 55 years or older.

Former coal miners may face reemployment challenges due to skill mismatch; while the similar copper mining industry offers opportunities, it demands more advanced skills for complex tasks.[64] Most former coal miners transition into low-skilled fields such as agriculture, wholesale and retail trade, transportation and storage, and construction or remain in coal. Only 13 percent transition to non-ferrous metal ore (including copper) mining and 17 percent to other industries (Figure 27).[65] This suggests the need for coal miners to acquire more transferable skills for broader reemployment options. Moreover, mining's relatively high wages suggest that miners may face a reduction in standard of living if they transition to other sectors.

Figure 27

Destination sectors of former coal mine workers



Source: World Bank estimates based on the 2022 Mongolian Labor Force Survey.

The transition away from coal production may also have adverse spillover effects on local communities. Beyond the broader impacts of ceasing coal production on the upstream and downstream sectors (such as coal transportation), as discussed in Section 3.3, coal mining closures affect other local workers and households. Consistent with international evidence,[66] recent data show the opening of a coal mine in Mongolia is associated with a significant shift away from low-return agriculture and new jobs in non-tradable personal services (Giles et al. 2024). For every 10 jobs created in mining, about 4 jobs are lost in agriculture and 9 jobs are created in services. Conversely, closing coal mines is likely to interrupt or even reverse the transition out of the agricultural sector and lead to disruptions in employment in the service sector, affecting these communities' well-being (see Box 4).

64 Manual dexterity is a dominant skill in coal mining jobs: While 72 percent of coal miners hold International Classification of Occupations (ISCO) level 2 jobs, only 57 percent of copper miners do. Over 30 percent of copper mining jobs require complex tasks (ISCO level 4), compared to just 19 percent in coal.

65 The latter is less than half the share of former copper non-ferrous metal ore miners (including copper miners) who move to other industries, including manufacturing.

66 Within the main coal-producing regions of Germany (Oei, Brauers, and Herpich 2019) and Poland (Honorati, Ferré, and Gajderowicz 2023), where coal mines do not employ large shares of the labor force, the transition from coal has had a disruptive effect on employment of service sector workers with downturns in the local economy, echoing similar market-driven effects on coal-producing communities of West Virginia in the US during the 1980s (Black, Daniel, and Sanders 2002).

BOX 4

Lessons from the closure of the Nalaikh Mine in 1992

The Nalaikh Mine, the first coal mine operation in Mongolia, was closed abruptly in late 1992 following its financial distress and a devastating fatal accident of methane gas explosion. After the mine closure, more than 1,500 workers were left unemployed, and their families were pushed into economic hardships and poverty.

Without a proper overall social protection and employment system in place, policy measures were absent to support the unemployed and their families under the backdrop of an overall economic crisis in the country in the early 1990s.[67] Instead, the unemployed miners resorted to informal mining in underground shafts during cold seasons, as the market demand for high-quality coal continued to rise in response to the heating needs of households in UB. However, informal mining was characterized by frequent fatal accidents causing deaths and disabilities, hazardous child labor exploitation, environmental degradation and heightened community safety concerns. According to media reports, during 1992–2017, 735 miners suffered from mining accidents, of which 234 miners died and many remained with permanent disability. Young people of prime working age and minors were primarily affected by these accidents and fatalities.

Only after nearly 25 years has the situation in Nalaikh district started to improve, and some jobs in non-mining sectors started to emerge, while the government policy on prohibiting raw coal use (since mid-2022) has resulted in a substantial reduction of informal small-scale mining operations.

THE REPORT RECOMMENDS

1. **Effectively support the reintegration of laid-off coal mine workers and those indirectly affected in coal-producing communities.** While coal mining employs a relatively small number of workers in Mongolia, achieving a just transition requires careful planning and support, especially since many miners are not close to retirement age and will need new jobs. International experience shows that early planning and preparation, such as individual worker profiling and skills audits, in the pre-layoff period is useful (World Bank 2018). Based on this information, tailored reskilling/upskilling interventions aligned with labor demand[68] and combined with public employment services and mobility support can help facilitate a smooth transition. Such policies should also include workers indirectly affected.

67 Only in 2011, the government provided compensation equal to two months of statutory minimum wage to about 1,700 miners, including former employees of Naliakh Coal Mine and those of other smaller-scale mines which were also closed during initial period of economic transition.

68 Relevant priority sectors as identified in the NRP and Vision 2050, such as value-added manufacturing of minerals-based production, light and food industries, logistics networks, and tourism, may offer potential opportunities.

2. **Develop targeted social assistance, local collaboration, and partnerships to support the transition of coal-producing communities.** Coal mine closures can generate detrimental spillovers for the economy and labor markets of coal-producing communities. Unemployment insurance can help laid-off workers cope initially, but it is unlikely to adequately compensate affected workers,[69] and in this regard, severance pay may play a more prominent role. In addition to unemployment insurance and severance pay, it is essential to implement area-based and means-tested social assistance for affected workers, particularly non-mining workers ineligible for or not covered by unemployment insurance, as well as households in coal-producing communities. This support is crucial in mitigating immediate economic consequences and facilitating a smoother transition during the post-layoff period. Expanding the entrepreneurship support program in such a community will be also needed. Early planning for coordinating smoother transition should pay attention to the impact of mining closures on other local business activities and the livelihoods of community members and respond to their emerging challenges and needs. Setting up partnerships between government, industry, and community stakeholders to help leverage resources, expertise, and support to affected workers and communities alike would be crucial.

The case of herders

Climate stress amplifies already precarious socioeconomic conditions of pastoral households. An exponential increase in animal numbers over time, combined with climate change and disasters, has led to a decline in feed supply to 41 percent (~2 sheep share pastures sufficient for a single sheep). This causes frequent social tensions within and across communities. Maximizing herd size is a primary coping mechanism for individual herders, who are often in debt and hope to repay loans with incomes from cashmere markets, further exacerbating overgrazing (Sneath 2012).

The lack of legal and regulatory measures on pasture management perpetuates behaviors that increase inequality. Small herders constitute about half of all pastoralists in Mongolia but own only 12 percent of total livestock (ADB 2022a). Excessive animal accumulation disproportionately stresses farmers with small herds (Fernández-Giménez et al. 2015). Although the current Land Law enables the formation of pasture user agreements, it does not mandate it and is not integrated into the country's governance system. Where such agreements exist, they are often promoted by international projects, and enforcement is weak.

To date, most herders have not joined formal herder groups, which threatens the long-term viability of initiatives and inhibits inclusive locally led climate action. Herder participation in formalized herder group initiatives has hovered around 15–20 percent of the local herder population in project soums (CPR 2023). Herder group members often participate in multiple donor initiatives, overlapping into different groups and projects. The issue of inclusion has implications for the success of such initiatives.

69 In Mongolia, benefits for workers with less than five years of employment are below the International Labour Organization's (ILO) minimum standard of 50 percent, and they are paid out for only 76 days compared to the minimum of 26 weeks set in the ILO convention.

At the same time, herders may face significant challenges finding new jobs due to climate change and the shift toward sustainable livestock practices (Section 3.1). Herders' education levels are lower than average[70] and most who leave herding do not find work involving more complex tasks (only 10 percent are employed in ISCO skill level 3 or 4 jobs). Instead, they remain inactive (most have reached retirement age) or in low-skilled agricultural, manufacturing, and retail jobs.[71] This can pose a significant challenge in rural areas if the sector's transition is fast paced, considering herders account for 23.0 percent of the nation's workforce and 41.5 percent of the employment in non-UB areas.[72]



THE REPORT RECOMMENDS

1. **Enhance the resilience of herders to adopt improved pastureland and herd management practices through legal/regulatory change mandating appropriate governance structures and proper incentives, strong outreach, and capacity building at the local level, with targeted livelihood support.** During the devastating 2010 dzud, herders that participated in herder groups had better access to information networks to make proactive decisions to protect their herds. Programs that offer a combination of incentives including cash support, access to markets, unified stock selling points, veterinary care, and intensive outreach have proven successful in enforcing pasture use agreements and reducing collective herd sizes while preserving or increasing herder incomes (CPR 2023). Such programs need to be scaled and institutionalized for broader impacts.

2. **Social protection and labor market policies can be further developed for herders to support the sustainable transition of the sector while building human capital.** While herders account for a large share of total employment compared with coal miners, the sector's transition will require clear political consensus and grassroots support and will likely take longer and be less dramatic given that herding activities will not cease to exist. Active labor market programs such as public employment services, entrepreneurship programs, and reskilling programs, paired with mobility support, can be offered to herders who are willing to opt for a labor market transition into new and better jobs. Proper means-tested social assistance support may be provided to those who are less likely to acquire new skills and move to new sectors, especially older workers. Furthermore, certain herders may require upskilling to effectively adapt to the sector's evolving demands, particularly in adopting more sustainable practices that entail increased technology integration.

3. **Promote disaster preparedness and index-based livestock insurance (IBLI).** Studies have shown that US$1 invested in anticipatory action[73] in Mongolia's agrifood sector would yield benefits of US$7.1 and that antic-

70 According to 2022 Labor Force Survey data, about 60 percent have only lower secondary education or below versus 20 percent of average workers. Herders below age 35 are better educated than older generations, with 56 percent completing at least upper secondary education. These young herders' higher education levels may provide more opportunities for reskilling.

71 Based on data from the 2022 Labor Force Survey.

72 According to the 2022 Labor Force Survey. Herders also accounted for 93 percent of agricultural workers.

73 'Anticipatory action is defined as acting ahead of predicted hazards to prevent or reduce acute humanitarian impacts before they fully unfold.' (FAO 2023).

ipatory action before a dzud event reduces animal mortality by four cattle per household on average (FAO 2023). Hence, the government should invest more in preparedness through stockpiling emergency feed and being ready to supply herders at the beginning of winter. Further, an effective early warning system for dzuds can help improve preparedness (see also Section 4.1). Despite its challenges, such as limited participation (only 10.8 percent of herding households were insured in 2023[74]), the IBLI program offers a framework for expanding insurance options in the agricultural sector.[75] The development of a wider arching index-based insurance, which would not only cover livestock but also crops and other natural resources, could help enhance resilience further. Given the specific challenge of dzuds and the associated major losses of livestock and income, a specific index-based dzud insurance scheme may be warranted.

Making resilience work at the local level

Rural residents, particularly those reliant on traditional herding lifestyle, and urban residents in informal ger settlements have a lower ability to cope and experience impacts from climate change more intensely. Extreme winter events are correlated with sizable permanent out-migration from affected provinces for up to two years after the event, disproportionately affecting pastoralist households (Roeckert and Kraehnert 2022). Consequently, the concentration of migrants from rural areas in UB has increased over the last 20 years. Migrants are often left out of public services, which can exacerbate cyclical poverty. Exclusion from health systems can result in conditions left untreated for months and leave mothers with unsafe and unsanitary childbirth conditions (IFRC 2021; UNICEF 2011).

The continued growth of low-density urban sprawl, driven by the expansion of ger areas in Mongolia's three largest cities (UB, Erdenet, and Darkhan), has exacerbated climate risks. Largely stemming from Mongolia's generous land allocation law and lack of affordable housing, about 75–85 percent of the urban footprint expansion in the three cities are due to ger areas, and by 2018, about half of the population in the three cities lived in ger areas. This continued growth is ill suited for low-carbon and climate-resilient development in Mongolia's cities. Scenario analysis conducted by the World Bank on the two secondary cities, Erdenet and Darkhan, shows that alternative housing typologies and development strategies can be both climate resilient and cost-effective (Box 5).

74 Data from the National Statistical Office.

75 Introduced in 2006 with technical assistance from the World Bank, IBLI increased the resilience of the livestock sector—with evidence showing faster recovery for insured households compared to uninsured ones (Bertram-Huemmer and Kraehnert 2018). To further scale and improve its effectiveness, the IBLI's current design needs careful assessment. For instance, the current default value for reimbursement is based on soum-level livestock mortality rates and does not reflect an individual herder's losses unless the mortality rate exceeds 6 percent. This could be rendering the scheme less effective and thereby may explain the low insurance uptake.

BOX 5 Climate-resilient housing: Identifying alternative housing typologies and development strategies

Business-as-usual housing development in Mongolia is characterized by two features. High-rise housing is the most common type of formal developer-built housing in the heart of city centers. On the other hand, self-built, poor-quality, detached homes are the most common in the ger districts where land for housing is provided without any public infrastructure (water, drainage, electricity, sanitation, heat, and urban spaces) and where municipalities initiate investments in public infrastructure only after dwellings have been built.

Using a housing scenario analysis, high-rise housing development was compared with an alternative of single detached and duplex houses for lower-income households, mixed with low-rise housing and shop houses. The analysis was conducted for Erdenet and Darkhan, where GHG emissions were reduced by 19 percent and 23 percent, respectively, in the alternative scenario. The alternative also contributed to 20.7 percent reductions in energy consumption in Erdenet and 26.7 percent in Darkhan per household per year. The alternative scenario was 32.4 percent less expensive to build compared to a high-rise housing development and offered residents a more vibrant, habitable, and climate-resilient urban environment.

The analysis also compared two scenarios: one with land allocation and ex post investment in public infrastructure and other where initial investments in public infrastructure were made with a gradual construction of single detached and duplex households. GHG emissions under the alternative were reduced by 46 percent in Erdenet and 47 percent in Darkhan per year per household. The alternative also greatly reduced the cost of public infrastructure services per capita compared to the current approach (61 percent cheaper per household).

Source: World Bank 2024e.

THE REPORT RECOMMENDS

1. **Build trust in the climate agenda by employing public participation.** Transitioning to a less carbon-intensive economy will require trust between government and citizens. Ensuring public access to context-appropriate climate information and broadening mechanisms for public participation in climate policies can help with trust building, especially with nomadic herders, indigenous communities, and youth.[76]

2. **Promote economic diversification strategies in low-carbon sectors and improve public services in rural areas.** Increasing livelihood opportunities in renewable energy, forestry, or green tourism would relieve pressure on herder livelihoods. Further research into the right economic models to ensure herders benefit economically, borrowing lessons from best practices globally, is an important next step.

3. **Support key cities to undertake measures that reduce emissions and build urban resilience.** While urban decarbonization will depend on the efficiency of national policies, key cities in Mongolia would need to undertake requisite mitigation and adaptation measures. These include implementing risk-sensitive urban planning that favors compact, transit-oriented urban growth; investing in resilient and green urban infrastructure; providing incentives for greater energy efficiency and resilience of buildings; and improving solid waste management.

4. **Provide capacity support to develop climate-resilient planning and local-level monitoring and evaluation.** Integrating climate and resilience indicators in local governance performance measures can be a promising avenue to accelerate local climate actions and climate-smart investments. This must be accompanied by improved support to strengthen the capabilities of local government (see also Section 4).

5. **Ensure that all parts of society, including women and youth, are well prepared to benefit from economic diversification and green jobs.** This can be achieved through targeted retraining initiatives for individuals in high-carbon sectors. Although Mongolia has good representation of women in science, technology, engineering, and mathematics (STEM) fields—54.7 percent of graduates in natural sciences, mathematics, and statistics; 29.9 percent in engineering, manufacturing, and design; and 27.8 percent in information and communication technology (ICT)—women face employment barriers often driven by social norms and expectations. Therefore, policies are necessary to support women in adapting to the economic impacts of climate change, ensuring they are not left behind and enabling their participation in a green economy (World Bank 2024d). For instance, enhancing access to STEM education and vocational training in green sectors for women and youth will better prepare them for employment opportunities as Mongolia transitions to a low-carbon economy.

76 Additionally, including climate change knowledge in school curricula early on could facilitate climate-safe occupational and consumer choices later in life.

FINANCING THE TRANSITION



5

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65—81



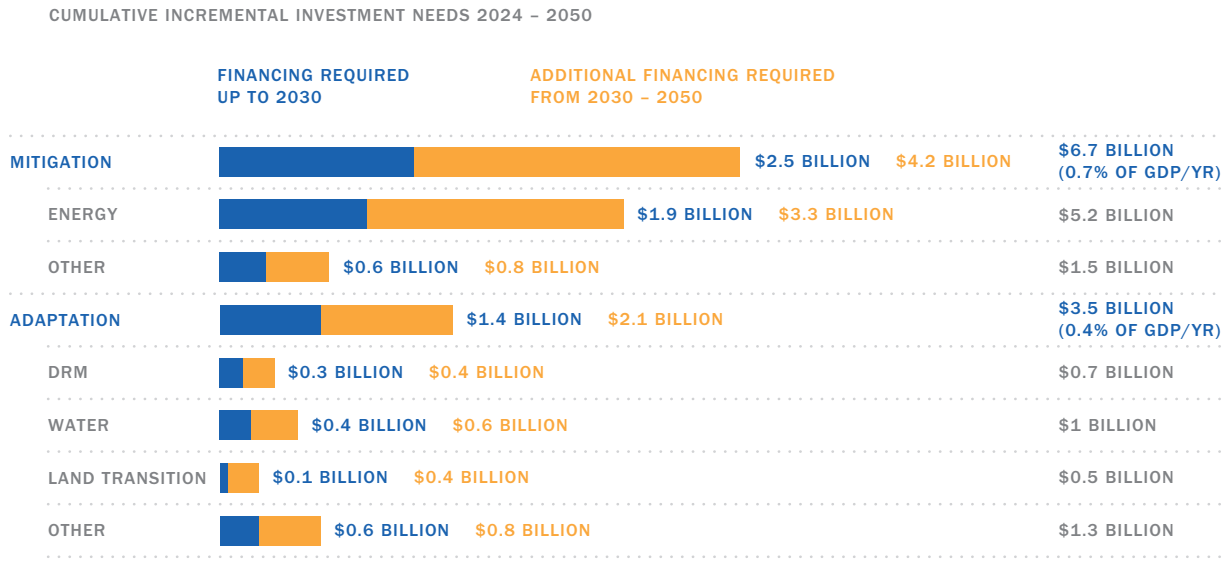
5.1. THE CLIMATE INVESTMENT NEEDS

The green transition requires significant investments

This CCDR estimates that the measures to respond to climate change outlined in this report require US$10.2 billion (net present value [NPV]) additional investment from the private and public sectors over the next 25 years. This is an *additional* investment from public and private sources needed for the climate adaptation and mitigation measures outlined in this analysis, relative to the current business-as-usual scenario of existing policies and investments already in place to achieve climate goals. The sectoral analyses in this report identified needs for new investment, although it is often difficult to produce quantitative estimates because of (a) separating climate investment from broader economic development needs and (b) accessing necessary data. Despite these caveats, Figure 28 presents an estimate of the additional investment needed. Mitigation measures account for about 70 percent of the total financing required, with adaptation measures accounting for the rest. About half of the investment needs come from the energy sector. All the estimates are first orders of magnitude and should be interpreted with caution, due to uncertainties about the future evolution of technologies, costs, and other parameters, including the magnitude of climate projections, business and household behaviors, and government policies.

Figure 28

The green transition requires US$10.2 billion (NPV) in incremental investment between 2024 and 2050



Source: Based on authors' estimates, complemented by those from GoM and GIZ.
Note: Estimates are in NPV terms, with a 6 percent discount rate used for future investments. Investments are incremental, relative to the reference scenario of current policies or investments already in place and planned. Estimates for energy mitigation measures are from the economic modelling in Section 3.4, estimates for land transition costs are from Section 3.1,and estimates for other mitigation measures are from the GoM's 2020 NDC report (GoM 2019). Estimates for adaptation measures related to flooding are taken from GIZ (2023) and other adaptation-related measures costs come from GoM (2019).

Mongolia's climate transformation, as detailed in this report, can be financed through combined efforts from both private and public sectors. Considering the significant financing required for mitigation and adaptation across various sectors, contributions from both private and public sources will be essential.[77] In addition to structural reforms aimed at encouraging private investments in green sectors (Section 5.3), leveraging green finance is crucial for Mongolia's climate transition. Creating fiscal space and mobilizing public funds will necessitate sectoral fiscal reforms, including the elimination of fossil fuel subsidies and the progressive implementation of carbon pricing. Moreover, reforms aimed at enhancing the fiscal framework and the efficiency of fiscal policy—both spending and revenue—while safeguarding lower-income households, are essential. In addition, given relatively limited depth of domestic capital markets and persistent current account deficit, Mongolia will need to pay attention to attracting external financing, both FDI and debt financing.

77 Deciding whether to finance green transition investments publicly or privately involves evaluating factors such as the nature of the project (public goods, market failures, and social equity), profitability, market demand, scalability, and the expertise of private firms. Public financing is suitable for projects with broad societal benefits, long-term horizons, and significant positive environmental impacts, while private financing fits profitable, scalable projects with strong market demand. Hybrid models like PPPs and blended finance can leverage both sectors' strengths. Note that the report does not recommend that any specific sectoral investment be fully or primarily financed by either the public or private sector alone.



5.2. CREATING THE FISCAL SPACE NEEDED FOR LOW-CARBON AND CLIMATE-RESILIENT TRANSITION

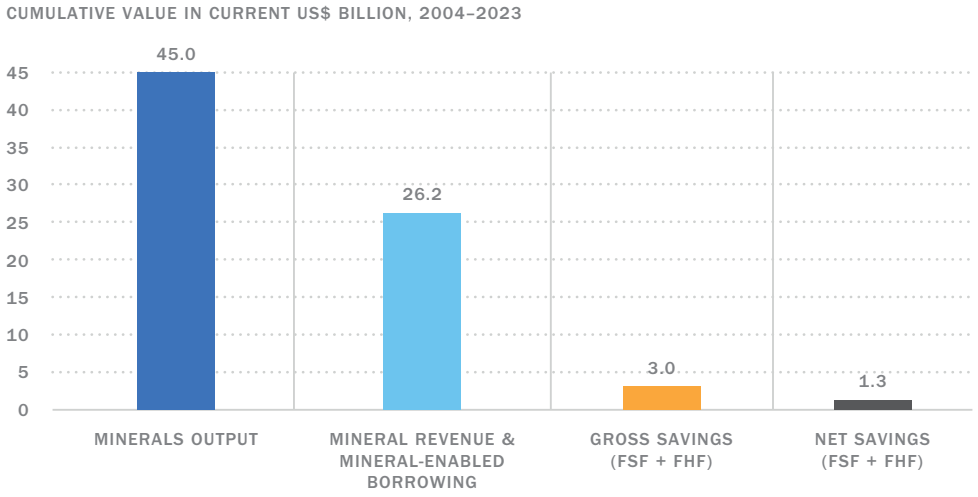
Public financing for climate change adaptation and mitigation is not tracked systematically but is likely to be very limited. Explicit budget funding for climate change has been small, although there may be under-counting in the absence of tracking green and climate-related expenditures. Public investments that could be clearly identified as related to climate change amounted to only 0.3 percent of GDP in 2022, of which two-thirds were financed by development partners (including loans and grants) primarily focused on renewable energy and biodiversity. More significant funds from the national budget have been allocated to the National Program for Combating Air Pollution (0.06 percent of GDP). A substantial increase in public financing is key in supporting ongoing climate initiatives as well as in closing the financing gap needed for Mongolia's green transition on both mitigation (mainly in renewable energy, Section 3.4) and adaptation (especially in agriculture, water, and DRM, see Sections 3.1, 3.2, and 4).

Weak implementation of the fiscal framework has led to limited fiscal buffers, constraining the space for green spending. This weak fiscal framework not only exacerbates the historically procyclical nature of fiscal policy, amplifying economic volatility, but also constrains the buildup of fiscal buffers and compromises fiscal sustainability due to deficiencies in Mongolia's fiscal rules (see IMF 2022; World Bank 2020a, 2024c). Out of every dollar of mineral wealth that has been generated during the past 20 years, Mongolia has consumed over 97 cents and saved less than 3 cents through its two sovereign wealth funds (SWFs)—FSF and Future Heritage Fund (FHF) (Figure 29). This has been facilitated by frequent changes to both the fiscal and the SWF accumulation and withdrawal rules, which have resulted in lower accumulations in the SWFs and higher current spending, ultimately leaving limited fiscal space to climate-transition-related spending (for a detailed discussion, see World Bank 2024c).[78]

78 Despite these shortcomings, the authorities are considering creating other SWFs designed to support domestic economic development via investments in strategic infrastructure and industries. While the new SWFs could provide an effective vehicle to convert the nation's mining wealth into investments that boost economic diversification and long-term productivity, a strong governance framework will be key to achieving the funds' objectives and avoiding potential pitfalls. See World Bank (2021) for more details.

Figure 29

Out of every dollar of mineral output, Mongolia has consumed over 97 cents and saved less than 3 cents



Source: World Bank, calculations based on Ministry of Finance (MOF) data.
Note: Since 2004, Mongolia has produced US$45.0 billion in mineral outputs. At that time, taxes and royalties amounted to US$14.8 billion. In addition, the GoM borrowed US$11.4 billion, mostly by leveraging its mineral revenue. Since 2011, some of these revenues have been saved in the FSF and FHF: US$3.2 billion was deposited and US$2.0 billion was withdrawn from these two funds, leaving a net saving of US$1.3 billion. 2023 data are preliminary.

Enhancing fiscal expenditure efficiency could generate fiscal space and prevent current spending levels from crowding out climate-related expenditures. Social assistance more than doubled during the pandemic and is now among the highest in the world, and implicit and explicit subsidies in the energy and agriculture sectors are fiscally expensive (see Sections 3.1 and 3.4). Mongolia's aging population is exerting substantial long-term pressure on the budget, with the fiscal cost of the pension system projected to rise to unsustainable levels by 2050 in a scenario without significant pension reforms (for details on pensions simulations see World Bank forthcoming 2024c).

Despite recent improvements, issues remain in public investment, compromising the efficiency and effectiveness of green projects.[79] In recent years, the passage of the 2023 PPP law and several amendments to the Integrated Budget Law[80] have established a legal framework that—if implemented fully—should strengthen the PIM framework and create better conditions for improved fiscal sustainability and transparency. However, persistent weaknesses in the PIM framework continue to constrain public investment efficiency. This is primarily due to (a) the fragmentation of the PIM framework, (b) underdeveloped medium-term budget planning, and (c) weak project appraisal and selection practices. This leads to poor project prioritization, overcommitment, variable quality of investments, and delays and cost overruns in execution (World Bank 2024c).

79 Mongolia's PIM efficiency gap narrowed from 54 percent in 2016 to 41 percent in 2023 (IMF 2023), but considerable room remains for improvement. The efficiency gap is the difference between Mongolia's composite score for public investment outputs and outcomes compared to the efficiency frontier (the score for the most efficient country with the same level of capital stock per capita).

80 These include, among others, a more comprehensive definition of public investment, mandatory pre-screening of project proposals for budget financing, a legal requirement to fund ongoing projects adequately before introducing new ones, and semi-automated assessments of demand justification in the health and education sectors.

Boosting revenue mobilization is crucial to generate the necessary funds for pivotal investments in the green transition. Although tax expenditures are relatively low compared to global standards, they are still significant at 2.8 percent of GDP (9.5 percent of tax revenues in 2022). Furthermore, at 10 percent, Mongolia's value added tax (VAT) rate is one of the lowest in the world, with net revenue collection reduced further due to the 2-percentage point VAT rebate to citizens. At the sectoral level, the livestock head tax suffers from poor administration and low compliance (Section 3.1) and both water usage fee and water pollution fee collections remain weak (Section 3.2).

Simultaneously, Mongolia's transition to a low-carbon economy opens up opportunities for new revenue sources, with carbon taxation being particularly promising. However, the country's prospect for implementation of a domestic carbon tax (and carbon pricing in general) is constrained, among others, by a lack of institutional coordination and low capacity for data collection and monitoring (Box 6). Also, a portion of revenues collected by an eventual carbon tax should be reallocated to provide income support or fund reskilling programs for workers to offset the adverse effects of decarbonization initiatives.

BOX 6

Advancing domestic carbon pricing to incentivize greener consumption and production

In addition to generating revenue, domestic carbon pricing is vital as it offers economic incentives for businesses and individuals to reduce their carbon footprint. In Mongolia, the development of domestic carbon pricing is still in its nascent stages, and the government is primarily focusing on building capacity for economic impact modelling associated with implementing a carbon tax.[81] The country has, however, gained some exposure to international carbon markets, as outlined in Box 8.

Mongolia's prospect for domestic carbon pricing development is constrained by a lack of institutional coordination, political economy, and low capacity for data collection and monitoring. Mongolia does not have an institutional framework that includes a decision-making body to coordinate the sectoral policy actions and responsibilities of line ministries on carbon pricing initiatives. In addition, Mongolia does not have a comprehensive policy on climate change beyond the NDC (see Section 6), and it lacks regulations and procedures for carbon pricing. For example, there are no clear procedures for authorizing projects to participate in carbon markets, defining eligible activities under the NDCs, using internationally transferable mitigation outcomes (ITMOs),[82] adjusting carbon credit transfers (as outlined in the Paris Rulebook[83]), and for measurement, reporting, and verification (MRV) GHG reductions consistent with international requirements (as outlined in Article 6 of the Paris Agreement).

81 This project is led by German Agency for International Cooperation (Deutsche Gesellschaft fur Internationale Zusammenarbeit, GIZ) with the collaboration of the MED, MET, and Bank of Mongolia (BOM).

82 ITMOs are a form of carbon credit where climate change mitigation outcomes can be transferred to other countries or to parties in other countries. They present innovative way to channel investments into low-carbon projects and achieve carbon mitigation cost effectively.

83 The 'Paris rulebook' refers to the set of guidelines and rules established under the Paris Agreement.



Before the implementation of a carbon price in Mongolia, the following actions should be considered:

- Undertake a detailed analysis to determine the appropriate design and potential impact of a domestic carbon pricing system. A thorough cost-benefit analysis is vital for ensuring that carbon pricing reduces GHG emissions but in a way that is aligned with broader policy objectives. This analysis should evaluate the effects of domestic carbon pricing mechanisms (carbon markets or taxes) on the welfare of low-income households and the competitiveness of various regions and industries, highlighting potential policy complementarities or trade-offs.[84]

- Develop a comprehensive carbon pricing policy. Enhance carbon pricing policy coherence by crafting a comprehensive strategy in alignment with the NRP, the NDCs, and the Vision 2050 climate neutrality objective. Clearly delineate the scope and sectors covered by carbon pricing mechanisms and design a precise roadmap for phased implementation to reduce uncertainty for potential private sector investors.

- Establish an institutional framework for carbon pricing with inclusive participation and transparency. The National Climate Committee (NCC) could be an inclusive decision-making body involving non-state actors, with the Ministry of Economy and Development (MED) responsible for carbon pricing strategy, policy development, and negotiation. Simultaneously, MET could provide cross-sectoral coordination and implementation, and the Climate Change Research and Coordination Center (CCRCC) could handle MRV and GHG inventory responsibilities. The Department of Evaluation within the MED could oversee the overall evaluation of the carbon pricing policy.

- Develop a revenue recycling strategy. Revenues collected from carbon pricing can be used to protect poor and vulnerable households (see Section 2.3) or help communities that have been affected by the shift away from fossil fuels (see Section 4). Alternatively, revenues could be used to reduce other distortionary taxes (for example, personal or corporate income taxes). Timilsina and Shrestha (2022) give a detailed discussion of different revenue recycling options. Effective communication on revenue use can help maintain public support for carbon pricing (Klenert et al. 2018).[85]

84 For instance, research indicates that a uniform carbon tax rate of US$15 per tonne of CO2e can significantly reduce emissions but may also impose considerable costs on sectoral production in developing countries, with GDP reductions ranging from 2.0 percent to 5.1 percent compared to a business-as-usual scenario (Nong, Simshauser, and Nguyen 2021).

85 A study on Thailand highlights the key role of cuts in existing income tax rates to mitigate the cost of the carbon tax, measured in terms of welfare loss (Timilsina and Shrestha 2002). Furthermore, a case study on Azerbaijan underscores the significance of reallocating carbon pricing revenues back to impacted sectors and promoting the adoption of energy-efficient technologies. This approach helps maintain industrial competitiveness and lowers carbon emissions simultaneously (Mukhtarov 2022). countries. They present innovative way to channel investments into low-carbon projects and achieve carbon mitigation cost effectively.

Mongolia's limited issuance of government securities in the domestic market and its absence of sovereign green bonds represent missed opportunities for capital mobilization in support of green initiatives. The Mongolia capital markets development focuses only on corporate debt and equity markets with a strong reliance on international investors, but issuance of sovereign bonds in the domestic market has remained almost nonexistent in recent years.[86] This hampers the potential to raise financing for green spending but also limits diversification of financing sources while leaving investors without benchmark interest rates and weakening monetary policy transmission. Also, the government has not issued green sovereign bonds, but it recently developed a framework for sustainable development goal (SDG) bonds and obtained second-party opinion from S&P Global Ratings of its alignment with the International Capital Market Association (ICMA) principles.

THE REPORT RECOMMENDS

1. **Improve the efficiency of fiscal spending.** This could involve reforms in four key areas. First, to create fiscal space for climate change-related spending, gradually return the relatively high social assistance spending back to pre-pandemic levels while improving current spending efficiency and making the system more adaptive with means-testing (World Bank 2024c). Complementary to this would be a dynamic and interoperable social protection system that is more progressive and shock responsive, using both administrative and survey data alongside community assessments to ensure that vulnerable rural households are not excluded. Second, enact parametric reforms to the pension system to reduce the state subsidy (World Bank 2024c). Third, decrease policy-induced price distortions, especially subsidies in agriculture and energy, complemented by well-targeted social protection programs (Sections 3.3 and 3.4). Fourth, increase the efficiency of public investment spending by strengthening the (a) medium-term budget framework, (b) project appraisal and prioritization, and (c) the regulatory environment for PPPs (Sections 3.3 and 3.4). The GoM could also integrate climate change considerations into the PIM system (Section 6).

2. **Enhance revenue mobilization.** This could involve reforms in three areas. First, increase revenue collection by raising the VAT rate, improving tax administration, and rationalizing tax expenditures. Second, improve the management of water usage fees and implementation of the Water Pollution Fee (Section 3.2), redesign livestock head tax to better mobilize resources at the local level, and internalize the environmental costs of overgrazing (Section 3.1).

3. **Implement a domestic carbon pricing system to complement the phasing out of subsidies for high-emission energy sources.** Unlike the proposed

86 The government restarted issuing domestic bonds in July 2022 (with the Deposit Insurance Corporation through a private placement); however, there have not been additional issuances since then.

energy subsidy reduction, carbon pricing would also affect businesses. Given Mongolia's limited institutional capacity, an upstream carbon tax would be preferable to an emission trading scheme. This approach would target carbon emissions directly at their source, such as coal mines, oil wells, and importers, and in the case of Mongolia, primarily affect SOEs. The dominance of SOEs hints at the political economy of carbon taxes, which would need to be navigated. Box 6 outlines recommended preparatory actions for implementing carbon pricing in Mongolia, while Box 7 details the experiences of Mexico and South Africa with their carbon pricing initiatives.

4. **Simplify—and adhere to—the fiscal rules and explicitly include escape clauses; strengthen the independence and capacity of the Fiscal Stability Council (FSC); combined, these measures would help make expenditure policy more countercyclical and free up more resources for the green transition.** Binding fiscal rules on natural resource wealth can lead to improved fiscal sustainability and development outcomes (see for example Grosse Steffen et al. 2021). However, this requires strong institutions, accountability, and checks and balances to avoid the rules being changed or circumvented for short-term political priorities. Simplifying the fiscal rules and explicitly including escape clauses would help make expenditure policy more countercyclical and free more resources for the climate change transition. Moreover, institutionalizing a more independent FSC with strengthened capacity (including staffing, budget, and power to access necessary information) is equally important for making fiscal policy more countercyclical.87 If properly implemented, this will also help enhance Mongolia's creditworthiness and lower country risk, contributing to lower financing costs for the necessary investment in climate resilience and emission reduction.

5. **Foster the development of domestic sovereign securities markets and explore opportunities for issuing sovereign green bonds on international markets.** Restarting domestic government bond issuance will not only expand access to resources for financing green initiatives but also enhance debt management through better diversification of funding sources. It will also allow the establishment of a benchmark interest rate in the market and improve monetary policy transmission. The government could also follow the example of other emerging market economies such as Indonesia and Fiji and start issuing green sovereign bonds.88 Indeed, there is growing global demand for green investments as investors increasingly prioritize ESG criteria in their portfolios. Sovereign green bonds can attract a broader investor base, including environmentally conscious investors and green bond funds. The heightened demand may result in lower yields or interest rates for sovereign green bonds compared to conventional bonds.

6. Harness concessional financing tied to climate initiatives. The GoM has just agreed on a 15-year partnership with The Nature Conservancy, an NGO, to jointly finance a project to preserve, among others, grasslands and forests in Mongolia. More could be done by further collaborating with other funds such as the Green Climate Fund (GCF), the Global Environment Facility (GEF, which operates the Special Climate Change Fund and the GEF-8 blended

87 Despite recent enhancements in the FSC structure, such as appointing its members for four years and assigning them the new mandate of providing macroeconomic forecasts for inclusion in the medium-term fiscal framework, the FSC still faces capacity constraints.

88 Indonesia has issued Sovereign and Retail Green Sukuk (Islamic finance) amounting to approximately US$3.9 billion between 2018 and 2021 (the largest issuance of any country) (World Bank Group 2023). In 2017, Fiji become the first emerging market to issue a sovereign green bond, raising FJD 100 million or US$50 million.

finance program), and other climate finance from international financial institutions (IFIs). A recent example from a heavily coal-dependent country is Indonesia's Just Energy Transition Partnership (JETP) signed in 2022, a fund of up to US$20 billion earmarked for investment in clean energy.[89]

BOX 7 Carbon pricing: Examples from Mexico and South Africa

Mexico's path toward adopting a carbon price started in the 1990s. However, it was not until 2013, following extensive consultations and debate, that Mexico became one of the first emerging countries to implement a carbon tax. This milestone was made possible, in large part, by the collaboration between the Ministries of Finance and Environment on the back of broader fiscal reforms following a change in government. Despite initial compromises and a lower-than-anticipated rate (US$3.5 per ton of CO_2e compared to the initial proposal of US$26), the tax has been sustainable and has contributed to a reduction in CO_2 emissions per unit of GDP in combination with other green policies.

Similarly, in South Africa, the process of introducing a carbon price took eight years of preparation and negotiations. The resulting bill, passed in 2019, included significant exemptions to garner support, with plans to gradually expand coverage and increase rates over time (the carbon tax rate was designed to increase annually by inflation plus 2 percent until 2022 and annually by inflation thereafter). This cautious approach balanced environmental goals with economic concerns by offering tax credits to incentivize energy-efficient investments while protecting consumers.

These experiences underscore the political complexities inherent in designing and implementing carbon pricing mechanisms. While international pressure and incentives may drive more countries to consider carbon pricing, success requires strategic support and patience. The experiences of early adopters like Mexico and South Africa highlight the importance of long-term planning, consensus building, and compromise in implementing carbon pricing policies.

Source: Summary based on Fritz and Vargas 2024.

89 Indonesia Just Energy Transition Partnership (JETP). https://www.undp.org/indonesia/projects/indonesia-just-energy-transition-partnership-jetp



5.3. SEIZING THE PRIVATE SECTOR OPPORTUNITIES IN THE GREEN TRANSITION

A challenging business environment is hampering economic opportunities emerging from the green transition. Despite commendable progress in streamlining the business registration process and enhancing investor aftercare via initiatives like the Investor Protection Council and Invest Mongolia, the business environment in the country still grapples with challenges. Macroeconomic volatility, emanating from commodity price fluctuations and amplified by procyclical macroeconomic management, discourages sustained investment (World Bank 2020a). Investment, including from foreign investors, is further hampered by the lack of an Investment Policy Statement (IPS), leading to uncertainty about Mongolia's investment objectives (World Bank 2022c), and by inadequate regulatory transparency and weak implementation of the Investment Law (IFC 2019).[90] High minimum capital requirements for foreign investors also prevent entry even when viable opportunities exist (World Bank 2022c). Political uncertainties, a cumbersome tax system, and uneven access to finance are the top obstacles as reported by firms (World Bank 2022c). Furthermore, navigating complex regulatory regimes and unpredictable bureaucratic processes compounds an already challenging business environment and undermines opportunities arising from the global and national green transition. For export- and import-reliant firms, weaknesses in infrastructure, low logistic competencies and quality, and the inability to meet international standards, together with weak enforcement of existing domestic standards, also represent significant constraints (World Bank 2023).[91]

Trends toward decarbonization offer opportunities for Mongolia to attract foreign investment if key constraints are addressed. Given shallow domestic capital markets, Mongolia will need to attract foreign financing. The climate crisis is changing the FDI landscape, with global investment patterns shifting out of pollution-intensive sectors into green sectors and 'transition critical' materials (TCMs). For example, annual copper production may need to triple to achieve the global climate targets by 2050. Mongolia's rich endowments of copper and, potentially, uranium (see Section 3.3 for details), coupled with its existing trade links and proximity to China, position it well to tap into green value chains.

90 Although the government has taken steps to address investor grievances through the Investor Protection Council, there have been four major investment state disputes cases against the Mongolian government concerning the revocation of mining licenses and bilateral investment treaty (BIT) contracts. (World Bank 2020b).

91 In addition to border delays, weaknesses in infrastructure, tracing and tracking, and logistics competencies are hindering Mongolia's progress compared to its peers. Significant improvements are needed in infrastructure and timeliness, as inadequate infrastructure at border ports and the connecting roads adds considerable costs to cross-border trade. Furthermore, deficiencies in cargo tracing and tracking, along with poor logistics competence, continue to place Mongolia behind most of its peers as indicated in the 2023 World Bank Logistic Performance Index.

At the global level, rapidly evolving climate-related trade and investment policies in other countries could limit Mongolia's export potential. While Mongolia is only lightly exposed to the EU's Carbon Border Adjustment Mechanism (CBAM), this could change later in the decade and hinder Mongolia's export potential if CBAM is expanded to a wider set of products than those currently covered or other countries with stronger trade links with Mongolia introduce CBAMs. [92] Mongolia's exports of agricultural goods, including cashmere and pet food made from livestock by-products, may be subject in the future to international trade policies that restrict carbon footprints during production due to climate concerns. Additionally, voluntary measures by international companies to reduce supply chain emissions could limit FDI inflows into Mongolia if it is unable to expand renewable energy supplies fast enough.

There are also emerging opportunities for the private sector related to energy efficiency in high-emission sectors, including through PPP projects. Apart from considering mandatory energy efficiency standards, Mongolia can address energy and transport inefficiencies by leveraging public funds with private sector capital to drive energy efficiency innovations in high-emitting sectors. For example, energy service companies (ESCOs)[93] can identify energy-saving opportunities within public facilities and implement energy-efficient solutions which would be financed using the cost savings generated from reduced energy consumption. PPP-based solutions, such as this, will not only bring in funding and regulatory support but also potentially foreign industry expertise and technology, which can enhance energy management practices for domestic enterprises and households.

There are specific opportunities for the private sector in the agriculture and energy sectors if institutional constraints can be overcome. For example, in agriculture, private entities could boost productivity or resilience by investing in feed, breeding, and animal health care services (see Section 3.1). This can reduce the GHG intensity of the sector. To avoid the perception that higher productivity will, however, lead to higher absolute GHG emissions, it will be crucial for Mongolia to have a strategy for long-term emissions reductions while allowing private sector participation in the development of a livestock sector that is aligned with Paris goals. There are also emerging opportunities in novel green products that cater to progressively expanding environmentally conscious markets. In the energy sector, substantial investment will be required in new renewable and grid capacity, with the long-term potential to export surplus power (see Section 5.3).

92 CBAM is a tool to put a fair price on the carbon emitted during the production of carbon-intensive goods that are entering the European Union (EU) and to encourage cleaner industrial production in non-EU countries. Under its first phase, the mechanism covers six goods: cement, aluminum, fertilizers, iron and steel, hydrogen, and electricity. https://taxation-customs.ec.europa.eu/carbon-border-adjustment-mechanism_en. Mongolia's direct exposure to the impact of the EU's CBAM during its first phase (Oct 2023–Dec 2025) is expected to be limited as Mongolia's direct export of the six goods covered by the mechanism to EU is negligible. Indeed, exports of these goods make up only 3 percent of Mongolia's exports basket (majority of it being iron ore and concentrates) and are mostly traded with China, not with the EU. However, more analysis is needed to determine the indirect impact of the CBAM on Mongolian exports through intermediate goods exported to China.

93 ESCOs offer comprehensive energy solutions, including the design and implementation of energy-saving projects. They focus on improving energy efficiency for their clients, often with a guarantee of energy savings which can finance the project costs. This performance-based approach transfers risk from the client to the ESCO, promoting energy efficiency and sustainability.

THE REPORT RECOMMENDS

1. **Improve the investment regulatory framework.** The forthcoming revised Investment Law falls short of fully addressing previous shortcomings and providing desired certainty to investors, particularly in ensuring investor protection, guarantees, grievance mechanisms, and market access. In addition to revising it, it would be critical to (a) eliminate the minimum capital requirement for foreign investors, (b) develop a new and clearly articulated investment policy that reaffirms the government's commitment to welcome foreign investment and to strengthen effective investor protection, and (c) fully operationalize the systemic investor response mechanism (SIRM) created in 2018.

2. **Undertake business environment reforms.** These should include[94] (a) business registration (increase data exchange and improve the system interoperability between the General Authority for State Registration, the local tax office, and the district social insurance department), (b) competition (amend and complete the existing Competition Law and secondary legislation in line with regional and international experience), and (c) insolvency and bankruptcy (adopt a revised Insolvency Law) and enforcement of contracts (revise the Civil Procedure Code with a view to support court automation, improve the flow of cases through stricter rules on time standards and introducing stricter rules on adjournments and continuances that can be granted).[95] In addition, strengthen the implementation of business regulatory reforms, by, for instance, preparing a business environment reform action plan with activities, milestones, responsibilities, and a periodic reporting mechanism.

3. **Enhance macroeconomic and fiscal management to reduce economic volatility.** The country's fiscal framework needs to be strengthened to enable fiscal policies to mitigate rather than amplify macroeconomic volatility, and thus attract more FDI and lower country risk, and hence financing costs (Section 5.2 expands on these recommendations).

4. **Use the newly enacted PPP Law (2023) as a platform to explore and expand innovative contracting and funding mechanisms to drive innovative solutions to improve energy efficiency.** This will include funding support for R&D and capacity building of the public sector, including, among others, the conduct of study tours in countries that have implemented similar contracting arrangements with the private sector (for example, energy performance contracting [EPC]).[96] Encouraging competition in the tendering process of PPP contracts could also attract more private stakeholders in climate-related projects.[97]

5. **Improve Mongolia's logistics to lower delivery costs for exporters and importers, particularly in green agricultural value chains.** Lower transport expenses would not only open new avenues for market expansion but also

94 For a more detailed list of recommendations, refer to World Bank (2022c).

95 Note that insolvency reforms could also increase access to finance (including by lowering interest rates) and help strengthen the resilience/recovery of borrowers and lenders in the face of climate change induced mass insolvencies.

96 The first-ever EPC model in the country for retrofitting residential buildings to improve energy efficiency in UB is set to be implemented in 2022–2027, covering 14,068 households. Capacity building for key stakeholders could also cover fiscal and contingent liability management, project preparation, better governance, and transparency around PPP contracts.

97 In the medium term, a small number of high priority, well-designed, and well-resourced projects could be identified to successfully demonstrate the capacity and credibility of the government. Strong confidence in the government will lead to higher interest from bidders and competition among financiers, resulting in better value for money in PPP projects. Once these pilot projects are transacted successfully and brought to financial close using exemplary practices and internationally recognized consulting support, lessons can be learned for future projects.

facilitate the emergence of new export products, particularly those heavily limited by logistics costs. For instance, improved logistics would help the private sector seize some of the opportunities identified in niche meat and dairy value chains which require efficient cold chain and transport networks. Additionally, it would mitigate the trade expenses associated with imported intermediate inputs, potentially benefiting downstream producers reliant on them. Reducing transport costs will also allow for lower trade-related costs for imported intermediate inputs and technology that are needed to scale up renewable energy. Enhancing PIM (see also Section 5.2) can play a crucial role in narrowing the infrastructure gap and improving the overall quality of Mongolia's transport networks.



5.4. MOBILIZING PRIVATE INVESTMENTS THROUGH GREEN FINANCE

Green finance in Mongolia remains relatively small but is experiencing rapid growth, with recent financing initiatives emerging and significant progress being made in establishing a comprehensive regulatory framework. Green loans account for a small fraction of total outstanding loans, with 3 percent of the total loan portfolio issued by commercial banks as of Q1 2024.[98] Mongolia achieved a milestone in 2023 with its first-ever green corporate bond issuance targeted at supporting projects in renewable energy, energy efficiency, green infrastructure, and climate-smart agriculture. Also, GCF, together with the support of other IFIs, is financing a blended scheme to offer affordable green mortgages in UB. Furthermore, strides have been made in developing a green taxonomy and regulatory framework. Mongolia adopted a green taxonomy in 2019, with an extended version approved under the Mongolia SDG taxonomy in 2023. This framework facilitates the provision of green loans and provides information on green loan categories and products. Additionally, Mongolia was among the first countries in the region to launch a climate financing strategy in 2022. In the same year, the Financial Stability Council approved the National Sustainable Finance Roadmap (NSFR), outlining targets for green financing.[99]

98 Note, however, that even in high-income countries the share of green loans is still very low. For instance, in the EU, green loans still represent less than 5 percent of total loans.

99 The Financial Stability Council includes the Finance Minister, the Bank of Mongolia (BOM) Governor, the Chairman of the Financial Regulatory Commission, and the Director of the Deposit Insurance Corporate. Under the NSFR, the government aims to progressively increase green lending to 10 percent and 5 percent by 2030 for banks and non-bank financial institutions (NBFIs), respectively.

Significant challenges persist in mobilizing green financing. High financing costs and a lack of accessible medium- and long-term funding options that align with the longer-term investment horizons of climate projects pose obstacles for firms, particularly small and medium enterprises (SMEs), seeking financing for green initiatives. Despite the establishment of a green taxonomy and framework, there are persistent information gaps on both the demand and supply sides of the market. Financiers struggle to assess potential green projects (including the alignment of these projects with environmental objectives), while businesses are often unaware of the range of financing instruments available to them. In addition, although Mongolia has initiated a voluntary reporting system for green loan data to regulators, the coverage and reporting of green loans remains incomplete, impeding a comprehensive understanding of the state of green financing in the country and hampering informed policy interventions. Beyond that, domestic financial institutions lack the necessary tools and expertise to effectively monitor and evaluate green projects. Limited awareness and understanding among lenders of local and international green finance policy frameworks further complicate the situation. Additionally, the issuance cost of green bonds tied to the requirement for external reviews, such as second-party opinions (green bond verifiers) recommended by global guidelines like the Green Bond Principles, could represent another barrier to the development of the green bond market. Lastly, although Mongolia has started engaging in international carbon markets, more needs to be done to improve existing institutional capacities to meet international standards for MRV (see Box 8 for more details).[100] Other attendant procedural requirements for administering carbon markets in an accurate and transparent manner are also lacking.

THE REPORT RECOMMENDS

In addition to addressing constraints hindering the private sector from fully capitalizing on opportunities presented by the green transition (Section 5.3) and rectifying price distortions in pivotal sectors (for example, stemming from substantial energy subsidies, Section 3.4), the advancement of green finance can be bolstered through the following measures:

1. **Enhance private sector access to long-term green funding by leveraging concessional funding to mobilize investors and financial intermediaries' resources through blended finance solutions.** Mongolia could actively explore opportunities to develop blended finance solutions such as the development of a climate finance fund and a guarantee mechanism to unlock green debt/equity sustainable linked loans in specific sectors such as renewable energy and climate-smart agriculture (see Section 3.1), focusing where possible on small- and medium-term enterprises. One solution implemented was the creation of a Climate Debt Fund in Brazil, with the aim of leveraging US$500 million in concessional funding to unlock US$1.9 billion in private

100 Mongolia currently engages in initiatives like the Japan-Mongolia joint-crediting mechanism (JCM) and various voluntary schemes, yet considerable capacity improvements are necessary for further advancement.

financing, specifically in the form of sustainability-linked finance for climate mitigation. This initiative also sought to enhance the private sector's ability to access high-quality carbon credit markets.

2. **Ensure that green loans issued are genuinely aligned with environmental objectives.** This could include (a) improving MRV capacities and engaging third-party experts or auditors; (b) setting up adequate baselines to provide a critical reference point that underpins the integrity and effectiveness of green loans; and (c) considering the practicality, cost-effectiveness, and feasibility of monitoring GHG emissions reductions from individual projects—in some cases, assessing the aggregate environmental impact of the loan portfolio by analyzing the combined GHG emissions reduction of all financed projects may be preferable.

3. **Develop the green corporate bond market by using de-risking measures.** Well-crafted credit enhancement policies, including considerations of suitability, timing, and the modality of the instrument for the country's context, could be considered to support the early stages of market development. These could include (a) guarantees, tax incentives, or green bond preparation support for issuers and investors and (b) adjustments to the capital adequacy requirements by assigning a lower risk weight to green loans or assets related to sustainable projects.[101] Other measures can include capacity building for green bond domestic verifiers and mandatory reporting of ESG sustainability assessments to the Mongolia Stock Exchange and regulators. In the medium term, policies to develop the secondary market for green bonds can also be considered.[102]

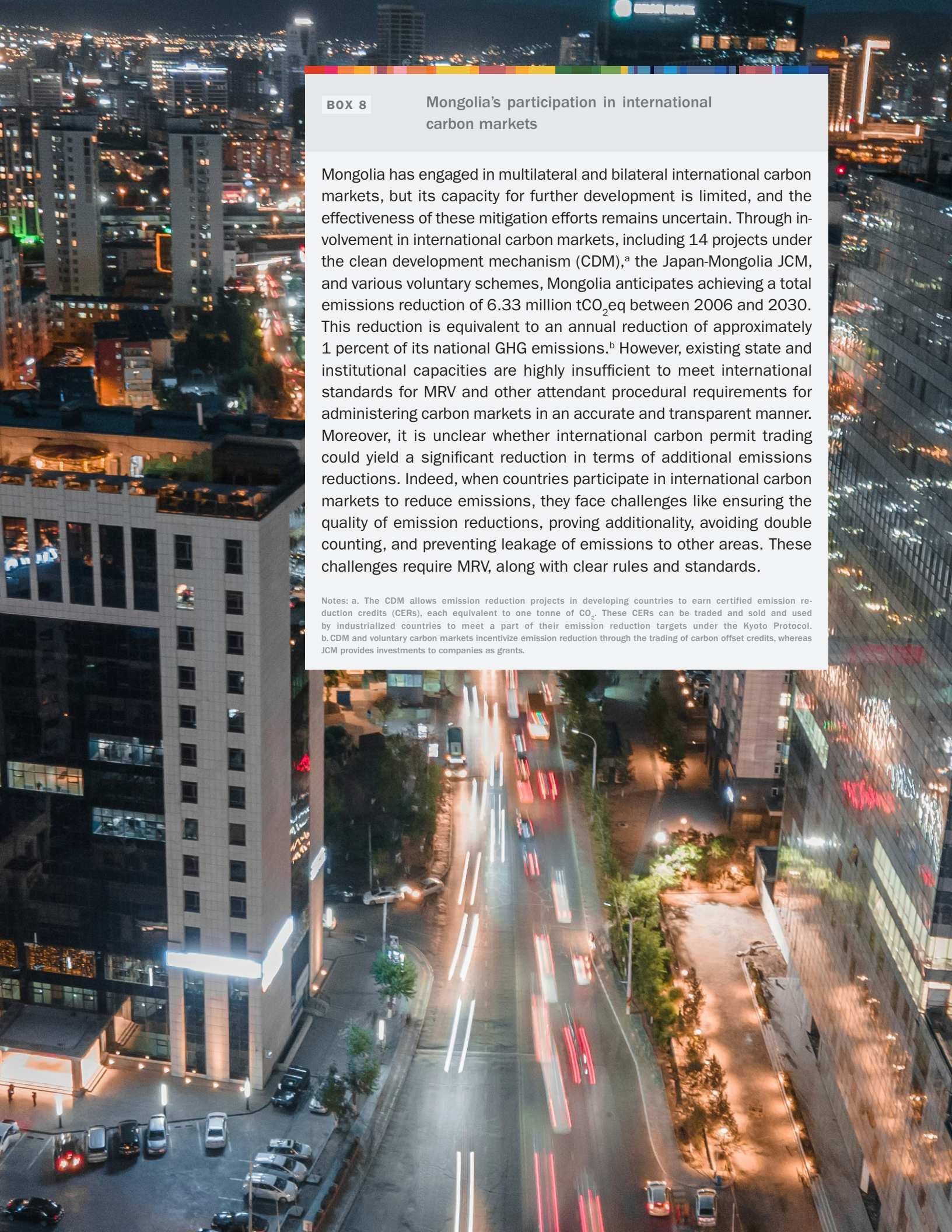
4. **Implement mandatory green data reporting to enhance the comprehensiveness of green finance.** While voluntary reporting to the central bank and the Financial Regulatory Commission shows elevated compliance rates among banks and NBFIs, introducing mandatory regulations will further improve compliance and bridge existing data gaps, empowering investors to make informed decisions.

5. **Develop the capacities of green finance intermediaries, regulators, and investors.** Initiatives could aim to support the design and structuring of green bond issuances, potentially covering early-stage project costs funded by bond proceeds and enhance the commercial viability and developmental impact of these projects. These efforts complement the coordination and promoting role of the Mongolian Sustainable Finance Association (MSFA). Additionally, capacity should be built around project screening to identify bankable climate-smart projects as well as risks around renewable projects.

6. **Enhance participation in international carbon markets to mobilize financing effectively and implement emission reduction projects.** Enhance MRV to meet international standards (see Box 8 for more details) and collaborate with development partners to improve adherence to these standards. Additionally, consider options to de-risk and attract potential international buyers, especially from countries with large savings/excess supply of funds seeking opportunities to offset their own emissions.

101 The central bank is already implementing some of these measures, including (a) reduction in the risk weight to 75 percent for loans issued for purchasing or building green housing (as defined in the green taxonomy) to ease the burden of capital adequacy ratio on banks and (b) payment of an additional 0.5 percent of interest rates to banks on their long-term US dollar swap agreements for loans classified under the green taxonomy.

102 The reintroduction of sovereign bond issuances would serve as a crucial anchor for the green corporate bond market by establishing a benchmark for interest rates within the market (see also Section 5.2). Deepening of the domestic capital market would allow local investors to channel long-term funding into infrastructure projects while matching the currency in which tariff is priced to the currency denomination of the financing would incentivize local investors.



BOX 8

Mongolia's participation in international carbon markets

Mongolia has engaged in multilateral and bilateral international carbon markets, but its capacity for further development is limited, and the effectiveness of these mitigation efforts remains uncertain. Through involvement in international carbon markets, including 14 projects under the clean development mechanism (CDM),[a] the Japan-Mongolia JCM, and various voluntary schemes, Mongolia anticipates achieving a total emissions reduction of 6.33 million tCO_2eq between 2006 and 2030. This reduction is equivalent to an annual reduction of approximately 1 percent of its national GHG emissions.[b] However, existing state and institutional capacities are highly insufficient to meet international standards for MRV and other attendant procedural requirements for administering carbon markets in an accurate and transparent manner. Moreover, it is unclear whether international carbon permit trading could yield a significant reduction in terms of additional emissions reductions. Indeed, when countries participate in international carbon markets to reduce emissions, they face challenges like ensuring the quality of emission reductions, proving additionality, avoiding double counting, and preventing leakage of emissions to other areas. These challenges require MRV, along with clear rules and standards.

Notes: a. The CDM allows emission reduction projects in developing countries to earn certified emission reduction credits (CERs), each equivalent to one tonne of CO_2. These CERs can be traded and sold and used by industrialized countries to meet a part of their emission reduction targets under the Kyoto Protocol. b. CDM and voluntary carbon markets incentivize emission reduction through the trading of carbon offset credits, whereas JCM provides investments to companies as grants.

POLICIES, INSTITUTIONS, AND REGULATORY FRAMEWORK



6

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Climate change commitments and broad policy intentions are increasingly reflected across key institutions and planning documents, but further efforts are needed to ensure consistency of policy goals. *Vision 2050* notes the risks from negative impacts of climate change and sets out climate priority actions in Objective 6 on 'green development' and Objective 7.3 on 'disaster risk prevention'. Section 5 of the *NRP* covers 'Recovery through Green Development'.[103] Additionally, a Low-Carbon Development Strategy is under preparation while an NAP was approved in March 2024. Despite the encouraging coverage of climate issues in these policy documents, some elements of these strategies, in particular of *Vision 2050,* might not be consistent with ambitions around a greener Mongolian economy. Indeed, *Vision 2050* highlights intentions around (a) strong reliance on coal exports, (b) the replacement and new construction of coal-based power plants, and (c) the development of oil refineries. Mongolia's NDC commitments cover the energy, agriculture, waste, construction, industrial processes, and transportation sectors. Additionally, the NDC outlines adaptation plans for the livestock sector and presents initiatives around enhancing disaster responses, improving public health management, and safeguarding livelihoods.

Several relevant laws are in place, reflecting important institutional foundations to address climate change, but implementation and enforcement challenges remain. Mongolia's overall development planning system has undergone significant changes in recent years, and this has left some important gaps in more detailed relevant sector plans.[104] However, while key legislation covering various facets of climate change mitigation and adaptation exists, certain laws—including the *Renewable Energy Law (2017), the Energy Conservation Law (2015),* and *The Environmental Protection Law (1995)*—require stronger implementing regulations or necessitate more adequate enforcement.[105]

Several key sector ministries and agencies are involved in mitigation and adaptation. The Ministry of Energy (MOE) and the Energy Regulatory Commission (ERC) are critical for the energy transition; MCUD plays a key role in enhancing energy efficiency related to construction as well as in increasing resilience in urban areas (for example, regarding flooding risks in UB which materialized in 2023). MOFALI oversees agricultural policies, which are critical for both adaptation and mitigation—including a number of related agencies. A Water Authority (reestablished in 2020) and the National Meteorology and Environmental Monitoring Agency are important implementing bodies under MET. A Forestry Agency (FA) was reestablished in 2022, linked to the Prime Minister and reporting to MET. NEMA is critical for the national-level disaster risk response.

An overall coordination mechanism for climate change has been established, but its effectiveness could be improved. In 2019, an NCC was established to provide integrated management for NDC implementation and climate change adaptation, but its composition and leadership has changed repeatedly.[106] In March 2023, the committee was revamped, comprising all ministries and a number of agencies reflecting its broad mandate, with the

103 Also, Section 6 of the Mongolian Five-year Development Guideline (adopted in 2020) includes targets on reducing GHG emissions by 12.3 percent by 2025 and enhancing climate change adaptation and resilience nationwide. Section 5 of the Government Action Plan for 2020–2024 (adopted in 2020) includes a section on 'green development policy', focused on reducing air and soil pollution, and GHG emissions.

104 With the adoption of the Law on Development policy, planning, and its management (2020), all mid- and longer-term development strategies and national programs became ineffective, including the Green Development Policy of Mongolia that had been approved in 2014 and set goals to 2020 and 2030 for equitable green development. The law requires a total of seven targeted development programs to be developed and approved but, so far, only the NRP has been approved and is under implementation. Currently, there are no approved sector-wide plans for key sectors such as energy or agriculture—this is expected to happen after the elections and the formation of a new government in 2024.

105 These key laws related to different climate change aspects include the Law on Air (2012, amended in 2023); Law on Environmental Protection (1995, amended in 2024); Law on Disaster Protection (2017, amended in 2023); Law on Energy Conservation (2015, amended in 2022); Law on Renewable Energy (2017, amended in 2022); and the Law on Forest (2012, amended in 2023); and a Law on Livestock Taxes (2021).

106 In 2019, the NCC was headed by the Minister of MET. In 2021, the GoM established a National Committee in Charge of Climate Change and Reduction of Desertification chaired by the Prime Minister, according to Government Resolution No.333. Now the NCC is chaired by the Deputy Prime Minister according to Government Resolution No.155 of 2023.

responsibility for (a) the integrated management of commitments to the UNFCCC and the United Nation (UN) Convention to combat desertification as well as (b) the BTNM (Box 10). So far, the committee met only once twice (once in 2023 and once in March 2024).

Organizationally, MET is the lead ministry for climate change but it has significant capacity constraints. MET's *Climate Change, Policy and Planning Department* currently has 11 full-time staff members, of which 3 are dedicated to climate change. Several agencies and centers report to MET, notably the CCRCC (see Box 9) and the Water Authority, while the FA currently has a dotted reporting line. Furthermore, MET appoints the Special Envoy on Climate Change.

BOX 9 **The Climate Change Research and Coordination Center (CCRCC)**

The CCRCC serves as a main node of climate expertise and initial MRV efforts in key sectors, albeit with some challenges. The CCRCC is a key knowledge hub for climate change; it prepares the Biennial Update Reports (BURs) for the UNFCCC and serves as the focal point for the GCF in Mongolia. However, the self-funding nature of the organization makes it dependent on variable donor support, which has led to challenges in staffing. Still, the CCRCC has established research collaborations with several university departments, which helps it tap into a broader knowledge base. At full potential, it could play a significant role in supporting cross-sectoral coordination on climate goals. The CCRCC, assigned as the main body for quality assurance, is also supporting initial efforts to establish an MRV system for the transport and construction sectors.

The government is taking important steps to address coordination challenges. While the overall system is still nascent, coordination involving subsets of ministries and agencies is ongoing. Notably, MET and MED coordinate in preparing the Climate Change Framework Law, and for its drafting, MET convened a working group involving all relevant line ministries as well as several governmental and nongovernmental agencies and individual experts. The President's Office has hosted coordination meetings on the NDCs, the development of BURs, and preparations for COP meetings. To address coordination challenges going forward, the GoM plans to establish climate change coordination groups in each relevant ministry as well as for each aimag, which will report both to the NCC and MET.

Organizational arrangements and cross-sectoral coordination are still evolving and are expected to be clarified by the Climate Change Framework Law that is under preparation. The law—currently still at the technical working group stage but planned to be approved in 2024—is expected to cover institutional arrangements for the climate change policy agenda, including the role and rules for the NCC, a proposed technical-level committee,

and an agency to support cross-sectoral coordination as well as provisions on financing, such as carbon finance. It is not yet clear to what extent the law will set long-term, intermediate, and sectoral targets; however, the new law must ensure that clear and measurable targets are set and that these are subsequently monitored and reported on closely and regularly.

In 2023, the MOF's PIM Regulations were revised and for the first time include energy efficiency and other green aspects as one of the seven selection criteria.[107] Including energy efficiency as an additional criterion is consistent with efforts by the MCUD. Indeed, the MCUD issued regulations that mandate energy efficiency ratings for new public and private buildings (rated A–D) and a requirement that new buildings have to meet at least a C standard. However, the path toward upgrading existing public buildings is not yet defined.[108]

SOEs play a key role in the power, mining, water, and transport sectors but currently face weak incentives to transition to more climate-compatible business practices. All existing fossil fuel power plants are SOEs, purchasing coal from likewise government-owned coal mines. Energy sector SOEs are jointly owned by the MOE (2/3) and the State Property Commission (1/3). SOEs are active in the mining sector and are major consumers of power as well as water. In the water sector, public companies are owned by SNGs (UB city and aimags), including bulk water supply and distribution. SOEs that are considered for public listing, in principle, should disclose exposure to climate change and other natural risks; however, it is not yet done in practice. Energy subsidies for consumers constrain the financial situation of energy sector SOEs (Section 3.4). The situation is similar in the water sector where tariffs and fees do not cover costs and constrain the ability of public utilities to service debts and invest in renewing and expanding the necessary infrastructure (Section 3.2).

SNGs are critical for agriculture, water, and urban development but so far have taken limited climate action due in part to institutional weaknesses and low capacity. Aimags and soum governments have agricultural divisions and units, respectively, and are responsible for local land and water management. In agriculture, an effective extension service is missing to support the transition away from an excessive herd size (see Section 3.1 for more details). In forestry, capacities of frontline units to carry out prevention and enforcement measures are limited, while top-level management has been reorganized numerous times—with a current more promising set-up as a dedicated FA. In the water sector, institutional responsibilities and systems are highly fragmented, and capacities and incentives for good sector management are limited. With regard to disaster risk preparedness and response, coordination between the national agency and SNGs poses challenges, especially in terms of ensuring adequate subnational preparedness efforts (see also Section 4). In terms of urban development, UB has gone through a building boom without adequate planning, especially around climate resilience.

107 For 2024, the construction of three new energy-efficient kindergardens is included in the budget as pilot projects.

108 The Government Agency for Policy and Coordination on State Property maintains an asset registry of public assets which includes all public buildings but does not yet include information on energy efficiency or other climate-related considerations.

Key policy choices to address climate change are constrained by a complex political economy. Important action has been taken on developing renewable energy and reforestation (Box 10). Despite this progress, political economy challenges will need to be considered to make reforms happen. In agriculture, crucial decisions regarding setting the tax rates on livestock—which aim to incentivize a reduction in livestock numbers (see Section 3.1 for more details)—are delegated to soum-level administrations. This approach shifts the responsibility for politically sensitive decisions to a more localized level. In the energy sector, citizens' concerns about the high cost of living as well as increased inequality (according to surveys) make substantial tariff increases challenging and the preparation of credible social protection measures as well as good communication important (see Section 4).

BOX 10 Examples of climate policy, implementation efforts and institutional enablers

Expansion of renewable power and energy efficiency investments. The most concrete climate policy targets exist for the expansion of renewable power: 20 percent of all generation by 2020 and 30 percent by 2030. The MOE has set up a Department for Renewable Power that coordinates efforts, including plans for various forms of storing power (batteries, pumped water, sand, and salt-based storage). In addition, investments in energy efficiency have gradually taken off, enabled by initial regulatory provisions created by MCUD as well as donor-funded subsidized loans to households. However, there is currently an impasse on how to revise the Law on Renewable Power and how to transition to an auction-based model. High energy subsidies/low power tariffs pose a general constraint to investments in renewables despite high potential as well as affect wider energy efficiency efforts.

Reforestation initiatives. At COP26, the President of Mongolia announced the BTNM to reduce GHG emissions as well as to combat desertification. The initiative is spearheaded by the President's Office and is guided and overseen by the newly (re-)established FA which has received an increasing budget allocation. Actual tree planting is funded by SOEs as well as other large companies and banks. Soum governments have designated land to be used but take limited responsibility for protecting trees from livestock. Accordingly, trees have had to be fenced in many locations—creating a substantial additional cost. Given the slow growth of trees in Mongolia's climate, the suitability of the program for carbon credits is not clear, which has dampened initial interest from commercial banks. Beyond the Billion Tree Initiative (BTI), the FA is also pursuing general afforestation, forest health initiatives, and better protection against illegal logging in the more forested northern areas of the country. While budget allocations have increased, frontline capacities and funding for these functions are still limited. While being a laudable concrete effort, it is yet unclear whether the

effectiveness and the efficiency of the BTNM are adequately assessed, monitored, and compared to alternative actions toward reforestation.

Generally, climate change institutional and implementation arrangements are affected by cross-cutting governance and public sector challenges, notably frequent institutional reorganizations and staffing changes that erode implementation capabilities critical for climate action. As highlighted in a recent assessment of civil service management in Mongolia (World Bank 2020), there has been "excessive resort to organizational restructuring to force the transfer of staff." Staff turnover in Mongolia reached levels that are unusual in public sectors (a peak of 22.3 percent turnover in 2019).[109] As climate change and related sectoral policies require deep technical knowledge, analytic capacity, and establishment of collaboration with other institutions, it is important to stabilize organizational structures to ensure that relevant staff are consistently hired on a meritocratic basis and promote management practices focused on results.

Although Mongolia has established certain institutional frameworks and procedures to foster accountability, there are still gaps hindering government's climate action initiatives. Generally, freedom of expression, media freedom, and access to information are comparatively good,[110] but larger-scale media outlets are not independent from political and economic interests (RSF 2023). Mongolia has seen notable advancements in public financial management (PFM) systems in recent years, as highlighted in the 2021 Public Expenditure and Financial Accountability (PEFA) assessment. Also, the nation has implemented the 'Glass Account' transparency legislation since 2015, primarily aimed at enhancing budget transparency. Additionally, it boasts a well-established Mongolia National Audit Office (MNAO) that extends its reach through regional structures in all 21 aimags and undertakes both financial and performance audits. Despite these strides, transparency challenges persist.[111] Furthermore, Mongolia's Independent Authority Against Corruption (IAAC) has only been partially effective in addressing these issues.

Strong accountability will be important for climate change actions, to ensure that allocated funds are used well and targets are being monitored and reported on. Given that few concrete sector or subsectoral climate targets have been set, information on actual progress and accountability for meeting targets is limited so far. More concrete actions and expected progress indicators are yet to be defined for many mitigation and adaptation areas. Also, as of now, little information is available to citizens or other stakeholders concerning flood risks or energy efficiency of apartments, to enable buyers to make informed choices. The MNAO has covered the BTNM as part of its regular financial audits of SOEs, which are contributing to the initiative, and it has raised concerns about the sustainability of the financial allocations made, noting that no clear structures for post-planting follow-up are in place in most cases.

109 While the Civil Service Law provides protection against politicization, this has not been consistently followed in practice.

110 The budget transparency score for Mongolia was 60 in 2021 (increasing by 7.1 percent from 2019 and 15 points higher than the global average of 45) according to the Open Budget Index.

111 Mongolia consistently ranks poorly on Transparency International's Corruption Perception Index (Transparency International 2023), scoring 33 out of 100 in 2023, with 0 being the lowest score.

THE REPORT RECOMMENDS

As the government works on finalizing the Climate Change Framework Law, the report recommends the following key measures to enhance and complement these efforts:

1. **Strengthen national and subnational coordination mechanisms that are workable and enable both strategic integration of climate change and technical level progress and delivery.** As the coordination set-up is being constructed, it should be well linked to existing governance and institutional structures and enable strategic integration and decision-making as well as practical working-level coordination and delivery.

2. **Establish measurable and specific targets—both long term and intermediate—and a monitoring and reporting systems for progress on adaptation and decarbonization, including an MRV system.** So far, progress on adaptation and mitigation has happened in a few areas, but overall progress on adaptation and resilience (notably reducing desertification) and addressing emission growth is yet to materialize. Setting specific targets will be important to monitor progress and support evidence-based decision-making.

3. **Ensure meritocratic hiring and promotions to maximize available expertise and leadership across relevant institutions (agriculture, energy, water, forestry, planning, and budgeting).** Climate change is a knowledge- and expertise-intensive policy domain, and it entails financially challenging choices. The government needs excellent staff in policy development as well as in implementation roles to advise decision-makers.

4. **Further strengthen the links between planning and (program-based) PFM, PIM, and public asset management systems, and systematically integrate climate considerations into capital and recurrent budget allocations; strengthen the capacity to assess costs and benefits of climate-related measures and estimate economic, social, and climate impacts.** After several important changes in recent years, it will be important to stabilize the planning process and focus on strengthening the alignment between planning and budgeting. This needs to be combined with good costing of adaptation and mitigation-related measures and estimation of short- and longer-term impacts—to identify priorities and trade-offs. This will also serve as a basis for potential mobilization of climate finance.[112]

5. **Mainstream climate considerations in SOE governance.** Develop a framework to integrate climate considerations into SOE business plans (across mining, energy, and transport) for all SOEs (listed and unlisted).

6. **Promote access to climate-related data and information.** Climate-related data and information need to be easily accessible to government agencies,

112 Project appraisal and prioritization is crucial to ensuring the most impactful and critical projects (including climate-related investments) are being funded (World Bank, forthcoming).

private sector organizations, academia, and civil society organizations to foster accountability, enable coordination, and facilitate monitoring of progress on environment- and climate-related targets.

7. **Strengthen stakeholders and citizens engagement to navigate the complex political economy of climate change.** The GoM will have to make some difficult choices on fossil fuel, water, and agricultural subsidies; citizens and businesses will need to be involved in the development, implementation, and monitoring of climate policies to get the incentives right and facilitate green transition across key economic sectors.



SUMMARY OF POLICY RECOMMENDATIONS



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The urgency of the climate crisis necessitates decisive and strategic policy action that effectively balances climate concerns with economic development objectives. Tackling this multifaceted challenge requires a comprehensive approach, integrating both sector-specific and cross-sectoral climate solutions to meet immediate needs while also addressing underlying structural issues in the medium and long term. The CCDR proposes a suite of policies designed to align and complement the government's current climate and development agenda. Progress hinges on a collaborative, whole-of-government approach that has already begun, albeit with challenges, to lay the groundwork for climate action and the transition to a more sustainable and resilient economy.

This section summarizes the key recommendations from the report, categorizing them by degree of urgency and impact on climate and development, and proposes a responsible government agency for their implementation. The CCDR takes a measured and pragmatic approach to policy recommendations, balancing feasibility and urgency while recognizing the relevance of those actions beneficial for Mongolia's own development. It therefore provides a framework for prioritization (Table 2). While all measures highlighted in this report are important, some are more urgent because inaction could further lock in carbon-intensive development patterns (for example, new investments in coal-fired power generation) or result in higher vulnerabilities that increase subsequent costs and financial risks. Most of these policies are already supported by ongoing initiatives and policy frameworks and require swift implementation. Other measures could be implemented gradually or deferred because of immediate financial constraints, declining costs of green technologies, the need for additional analysis, or the development of new institutional and policy frameworks. The CCDR indicates urgency by suggesting each action as either a short-term priority (by 2025) or a medium-term priority (by 2030). The filter 'climate impact' includes both mitigation and adaptation policies while 'development impact' highlights the degree of contribution of a given measure to the country's development goals. Recommendations are thus ranked as high and moderate. A responsible government agency is also associated with each recommendation. This section focuses on the most critical recommendations in the report (Table 3), with the full list of recommendations summarized in Annex 1.

Some of the proposed recommendations are aimed at addressing market failures (for example, open access), while others target existing policy failures or distortions. Market failures come in the form of public goods or common access resources, such as open access pasture lands and aquifers. Correcting these through appropriate regulatory and pricing instruments is important as it will help avert a worsening spiral of degradation. Examples of these interventions include installing water meters and establishing fees to improve efficiency in irrigation. Equally important is addressing policy failures and distortions, such as direct subsidies in agriculture and suboptimal thresholds for triggering disaster compensation. Policy failures can be pervasive and difficult to correct; therefore, the CCDR makes an explicit effort to identify the development co-benefits of such reforms.

It is important to note that, as in other countries, some of the recommendations are likely to be challenging, while others should be easier to pursue in terms of (a) political economy incentives and (b) institutional readiness. Generally, measures that increase costs for many and those that reduce revenues for established interests are more challenging to implement from an incentive perspective than those that offer greater short-term benefits or low costs. Institutional readiness matters, as the transitions from the 'reference' or 'business-as-usual scenario' to substantial decarbonization and strong adaptation respectively are complex to plan, regulate, and implement; some institutions/public sector functions will need to be newly created (such as MRV systems) and others require scaling up and strengthening (such as forestry units, agricultural extension services, capacities of local governments). When contemplating the approach to putting the recommendations into practice, it will be important to consider in particular how measures that are difficult but have a high impact can be facilitated, as well as to identify selected 'lower hanging fruit' to start and build traction.

TABLE 2

Prioritization framework for recommendations

TIME FRAME FOR ACTION	EXPECTED IMPACT	
	CLIMATE (MITIGATION OR ADAPTATION)	DEVELOPMENT
Short term (< 3 years)	High impact	High impact
Medium term (3–5 years)	Moderate impact	Moderate impact

Source: World Bank staff.

TABLE 3

Top 10 recommendations

RECOMMENDATIONS/ AGENCY WITH INDICATIVE RESPONSIBILITIES AND LEADING ROLES	DETAILED POLICY ACTIONS	TIME FRAME	CLIMATE	DEVELOPMENT
GETTING INCENTIVES AND PRICES RIGHT IN THE AGRICULTURE SECTOR				
Reform agricultural incentives and taxes (MOF and MED)	(i) Condition the program of subsidized loans on the uptake of climate-smart practices, improved stocking management and planning, sustainable grassland management, and enhanced product quality, while strengthening investment in public goods, such as R&D and agriculture extension services.			
	(ii) Reorient other direct subsidies toward less distorting government support measures, such as decoupled income support or payments for eco-services.			
	(iii) Redesign the livestock head tax to better mobilize resources at the local level and internalize the environmental costs of overgrazing.			

RECOMMENDATIONS/ AGENCY WITH INDICATIVE RESPONSIBILITIES AND LEADING ROLES	DETAILED POLICY ACTIONS	TIME FRAME	CLIMATE	DEVELOPMENT
OPTIMIZING WATER EFFICIENCY IN AGRICULTURE				
Improve agricultural water use efficiency (MOFALI and MET)	(i) Undertake a performance assessment of operators (public or private) to improve practices and performance outcomes such as the IoF framework.			
	(ii) Introduce less water-intensive production processes such as climate-resilient seeds, soil improvements, and pasture rotation methods.			
	(iii) Consider water meters installation, licenses, and fees to improve efficiency in irrigation.			
	(iv) Install upgraded and integrated services at water points where herder populations can access livestock extension services and social services.			
	(v) Use remote sensing technology to assess the operationality and use of water points as well as the status of small rivers and springs.			
	(vi) Improve the capacity of pasture user management groups, as well as of the government, to work in public-community partnerships to enhance soil water management in rangelands, which could reduce pressure on irrigation for fodder.			
GETTING PREPARED FOR THE REDUCTION IN COAL DEMAND				
Prepare for an eventual reduction in demand for coking coal and position the country as a global supplier of other minerals and related services (MED and MMHI)	(i) Develop a plan for an eventual reduction in coal extraction, including alternative employment options for displaced workers.			
	(ii) Ensure that an enhanced investment regulatory framework is appropriate for the specific requirements of the extraction sector.			
	(iii) Accelerate mineral exploration to reduce uncertainties for investors with regard to rare earths and other critical minerals.			
OPTIMIZING INCENTIVES IN THE ENERGY SECTOR				
Implement electricity and heating tariff reform to reduce subsidies (MOE and ERC)	(i) Increase tariffs gradually to reach full cost recovery by 2030.			
	(ii) Include additional consumption block tariffs and greater differentiation in rates across blocks to reduce regressivity and ensure that a larger share of subsidies is received by poorer households.			
	(iii) Use financial savings to compensate poor and vulnerable households directly; given the absence of a well-developed social registry, geographical targeting could be used to ensure that the households most in need receive adequate support.			
STRENGTHENING RESILIENCE TO CLIMATE CHANGE				
Augment and recalibrate disaster response financing (The Cabinet)	(i) Explore the possibility to reform the Law on Fiscal Stability to lower the threshold for natural disaster damages required to make a drawdown from the Fiscal Stability Fund (FSF), and clarify the conditions for drawing down on the FSF to respond to a natural disaster.			
	(ii) Analyze the budget provisions of the Law on Disaster Protection, the amount of pre-disaster funding it could and does provide, if the percentages require adjustment, and how to improve enforcement of the law.			
	(iii) Establish a contingent financing facility with support from development partners and regional platforms to secure affordable and adequate access to finance for post-disaster response and recovery.			
	(iv) Implement sovereign risk transfer programs through partnership with the local insurance industry, regional risk pooling mechanisms, and international reinsurance and capital markets.			

RECOMMENDATIONS/ AGENCY WITH INDICATIVE RESPONSIBILITIES AND LEADING ROLES	DETAILED POLICY ACTIONS	TIME FRAME	CLIMATE	DEVELOPMENT
BOOSTING DISASTER PREPAREDNESS IN RURAL AREAS				
Promote disaster preparedness and index-based livestock insurance (MOFALI)	(i) Invest more in preparedness through stockpiling emergency feed and being ready to supply herders at the beginning of winter. An effective early warning system for dzuds can help improve preparedness.			
	(ii) Develop a wider arching index-based insurance that would not only cover livestock but also crops and other natural resources, enhancing resilience further.			
	(iii) Given the specific challenge of dzuds and the associated major losses of livestock and income, a specific index-based dzud insurance scheme may be warranted.			
BUILDING FISCAL SPACE FOR GREEN SPENDING				
Improve the efficiency of fiscal spending to create space for climate spending (MOF)	(i) Gradually return the relatively high social assistance spending back to pre-pandemic levels while improving current spending efficiency and making the system more adaptive with means testing.			
	(ii) Enact parametric reforms to the pension system to reduce the state subsidy.			
	(iii) Decrease policy-induced price distortions, especially subsidies in energy and agriculture, complemented by well-targeted social protection programs.			
	(iv) Increase the efficiency of public investment spending by strengthening the medium-term budget framework, project appraisal and prioritization, and the regulatory environment for PPPs. The GoM could also integrate climate change considerations into the PIM system.			
MOBILIZING PRIVATE INVESTMENT TO FINANCE THE GREEN TRANSFORMATION				
Improve the investment regulatory framework to attract more private sector finance for the green transition (MED)	(i) Eliminate the minimum capital requirement for foreign investors.			
	(ii) Develop a new and clearly articulated investment policy (for instance, through an IPS) that reaffirms the government's commitment to welcome foreign investment and strengthen effective investor protection and fully operationalize the SIRM.			
IMPROVING ACCESS TO LONG-TERM GREEN FUNDING				
Enhance private sector access to long-term green funding by leveraging concessional funding (MED and BOM)	(i) Explore actively opportunities to develop blended finance solutions such as the development of a climate finance fund and a guarantee mechanism to unlock green debt/equity sustainable linked loans in specific sectors such as renewable energy and climate-smart agriculture, focusing where possible in small- and medium-term enterprises. The Climate Debt Fund in Brazil could be a good example to follow.			
MEASURING PROGRESS ON ADAPTATION AND MITIGATION EFFORTS				
Prioritize monitoring and reporting of adaptation and decarbonization efforts (MED and MET)	(i) Establish measurable and specific targets—both long term and intermediate—and a monitoring and reporting systems for progress on adaptation and decarbonization, including an MRV system.			

Note: MMHI = Ministry of Mining and Heavy Industries.

8 ANNEX

Prioritization of key recommendations

TIME FRAME FOR ACTION	EXPECTED IMPACT	
	CLIMATE (MITIGATION OR ADAPTATION)	DEVELOPMENT
Short term (< 3 years)	High impact	High impact
Medium term (3–5 years)	Moderate impact	Moderate impact

Source: World Bank staff.

Full list of recommendations

OBJECTIVES RECOMMENDATIONS	TIME FRAME	CLIMATE	DEVELOPMENT	AGENCY WITH INDICATIVE RESPONSIBILITIES AND LEADING ROLES
SECTION 3: CLIMATE AND DEVELOPMENT IN KEY SECTORS				
3.1. FOOD SYSTEMS, LAND USE, AND RESTORATION				
Reform agricultural incentives and taxes.				MED, MOF, and MOFALI
Provide technical assistance and investments to enhance productivity and increase product commercial offtake rates of dominant livestock production systems.				MED and MOFALI
Diversify Mongolia's agrifood sector and develop new green agrifood value chains.				MED and MOFALI
Improve the cooperation between and the development of combined forestry and pasture user groups to foster agreement on how forest areas can be restored.				MOFALI
Identify cost-effective locations for tree planting, landscape-level forest restoration and fire management, and mobilize private sector finance.				MET and MED
Enhance seed processing capacity to support reafforestation initiatives.				MET and MED
3.2. WATER				
Conduct a review of options to improve the management of water usage fees and the implementation of the Water Pollution Fee.				MET
Manage climate risks across the drought-to-floods spectrum, starting with ensuring that environmental flows are sufficiently considered upstream of irrigation and storage infrastructure expansion.				MET and MED
Improve agricultural water use efficiency by rehabilitating existing irrigation infrastructure, implementing demand-management instruments, integrating livestock water points with livestock extension, and involving herders in the management of rangelands.				MET and MOFALI
Increase use of treated wastewater in urban industries and extend water kiosks in rural areas to help increase access to water for domestic use.				MET and MED
For the mining sector, reducing pressures on freshwater sources by augmenting wastewater in operations, and improving efficiency in water use while gradually reducing freshwater water use in mining over time, constitute low-risk options and their feasibility should be explored.				MMHI and MED

OBJECTIVES RECOMMENDATIONS	TIME FRAME	CLIMATE	DEVELOPMENT	AGENCY WITH INDICATIVE RESPONSIBILITIES AND LEADING ROLES
Strengthen coordination, capacities (especially at subnational levels), and information management and transparency to enable improved local management as well as better coordination around a critical resource.				MET and MED
3.3. COAL TRANSITION AND MINING				
Prepare for an eventual reduction in demand for coking coal and position the country as a global supplier of other minerals and related services.				MED and MMHI
Accelerate mineral exploration to reduce uncertainties for investors.				MED and MMHI
Foster a favorable investment climate for cooperation with foreign companies to expand mining production, including in alternative minerals.				MED and MMHI
3.4. ENERGY				
Invest in energy efficiency measures to reduce current energy system pressures and lay the foundations for low-carbon development.				MOE and ERC
Integrate energy storage and improve grid capacity and flexibility to facilitate wind and solar deployment; consider using mines as anchor customers for new renewable energy transmission.				MOE and ERC
Implement long-term system planning that is compatible with a net-zero energy sector.				MOE and ERC
Implement electricity and heating tariff reform to reduce subsidies and increase tariffs gradually to reach full cost recovery by 2030.				MOE, ERC, and MOF
Clearly define the focus of public and private sectors for the development of renewable energy.				MOE, ERC, and MED
Address energy market constraints to attract private sector investment.				MOE, ERC, and MED
Monitor global technology developments and emerging markets and invest in well-targeted R&D to identify solutions tailored to the unique conditions in Mongolia.				MED and MOE
SECTION 4: MANAGING DISASTER RISK AND BUILDING RESILIENCE				
4.1. MAKING DISASTER RISK MANAGEMENT (DRM) FIT FOR PURPOSE				
Augment and recalibrate disaster response financing.				The Cabinet
Ensure resilience of critical infrastructure, improve early warning systems, and increase public awareness about disaster risk reduction.				The Cabinet
Develop the insurance market for public and private assets.				The Cabinet and FRC
Integrate the principles of ASP into existing emergency response laws, strategies, contingency plans, and the draft DRM Strategy.				The Cabinet and the BOM
Further develop the systems for ASP.				The Cabinet and the BOM
Build resilience in the health system to enhance adaptation and preparedness measures to respond effectively to climate-related health risks.				The Cabinet
4.2. BEYOND DISASTER RISKS: BUILDING RESILIENCE FOR THE MOST VULNERABLE				
Build trust by employing public participation.				The Cabinet
Promote economic diversification strategies in low-carbon sectors and improve public services in rural areas.				MED and MET
Support key cities to undertake measures that reduce emissions and build urban resilience.				The Cabinet
Provide capacity support to develop climate-resilient planning and local-level monitoring and evaluation.				MED and MET
Ensure that all parts of society, including women and youth, are well prepared to benefit from economic diversification and green jobs.				MLSP and MED

OBJECTIVES RECOMMENDATIONS	TIME FRAME	CLIMATE	DEVELOPMENT	AGENCY WITH INDICATIVE RESPONSIBILITIES AND LEADING ROLES
SECTION 5: FINANCING THE TRANSITION				
5.2. CREATING THE FISCAL SPACE NEEDED FOR LOW-CARBON AND CLIMATE-RESILIENT TRANSITION				
Improve the efficiency of fiscal spending.				MOF
Enhance revenue mobilization.				MOF
Implement a domestic carbon pricing system to complement the phasing out of subsidies for high-emission energy sources.				MED and MET
Simplify—and adhere to—the fiscal rules and explicitly include escape clauses; strengthen the independence and capacity of the FSC; combined, these measures would help make expenditure policy more countercyclical and free up more resources for the green transition.				The Cabinet/MOF
Foster the development of domestic sovereign securities markets and explore opportunities for issuing sovereign green bonds on international markets.				MOF
Harness concessional financing tied to climate initiatives.				The Cabinet
5.3. SEIZING THE PRIVATE SECTOR OPPORTUNITIES IN THE GREEN TRANSITION				
Improve the investment regulatory framework.				MED and the Cabinet
Undertake business environment reforms.				MED
Enhance macroeconomic and fiscal management to reduce economic volatility.				MED and MOF
Use the newly enacted PPP Law (2023) as a platform to explore and expand innovative contracting and funding mechanisms to drive innovative solutions to improving energy efficiency.				MED and MOE
Improve Mongolia's logistics to lower delivery costs for exporters and importers, particularly in green agricultural value chains.				MED and MRT
5.4. MOBILIZING PRIVATE INVESTMENTS THROUGH GREEN FINANCE				
Enhance private sector access to long-term green funding by leveraging concessional funding to mobilize investors' and financial intermediaries' resources through blended finance solutions.				MED
Ensure that green loans issued are genuinely aligned with environmental objectives.				BOM and FRC
Develop the green corporate bond market by using de-risking measures.				MED
Implement mandatory green data reporting to enhance the comprehensiveness of green finance.				BOM and FRC
Develop the capacities of green finance intermediaries, regulators, and investors.				BOM and FRC
Enhance participation in international carbon markets to mobilize financing effectively and implement emission reduction projects.				MED and MET
SECTION 6: POLICIES, INSTITUTIONS, AND REGULATORY FRAMEWORK				
Strengthen national and subnational coordination mechanisms that are workable and enable both strategic integration of climate change and technical level progress and delivery.				MED
Establish measurable and specific targets—both long term and intermediate—and a monitoring and reporting systems for progress on adaptation and decarbonization, including an MRV system.				MED and MET
Ensure meritocratic hiring and promotions to maximize available expertise and leadership across relevant institutions (agriculture, energy, water, forestry, planning, and budgeting).				The Cabinet

OBJECTIVES RECOMMENDATIONS	TIME FRAME	CLIMATE	DEVELOPMENT	AGENCY WITH INDICATIVE RESPONSIBILITIES AND LEADING ROLES
Further strengthen the links between planning and (program-based) PFM, PIM, and public asset management systems, and systematically integrate climate considerations into capital and recurrent budget allocations; strengthen the capacity to assess costs and benefits of climate-related measures and to estimate economic, social, and climate impacts.				MOF and MED
Mainstream climate considerations in SOE governance.				MED
Promote access to climate-related data and information.				NSO and MET
Strengthen stakeholders and citizens engagement to navigate the complex political economy of climate change.				MED

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