



Private Sector Opportunities for a Green and Resilient Reconstruction in Ukraine

Synthesis Report

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Abbreviations and Acronyms

CPSD	Country Private Sector Diagnostic
CSA	Climate-smart agriculture
DPS	Deferred payment structure
EU	European Union
FDI	Foreign direct investment
FIT	feed-in-tariff
GDP	Gross domestic product
GHG	Greenhouse gas
GW	Gigawatts
IBRD	International Bank for Reconstruction and Development
ICT	Information and communication technology
IDP	Internally displaced people
IFC	International Finance Corporation
IMF	International Monetary Fund
MW	Megawatt
MWh	Megawatt-hour
NBU	National Bank of Ukraine
OECD	Organization for Economic Cooperation and Development
PPP	Public-private partnership
PSO	Public service organization
PV	Photovoltaic
RDNA	Rapid Damage and Needs Assessment
RES	Renewable energy sources
SPS	Sanitary and Phytosanitary
SOE	State-owned enterprise
UAH	Ukrainian hryvnia
UNDP	United National Development Program
JSC UZ	Joint-Stock Company Ukrzaliznytsia
VAT	value-added tax

Executive Summary

Russia's invasion has radically altered Ukraine's economy, which will emerge from the military invasion transformed. The dissolution of the country's longstanding financial and trade ties with Russia, coupled with its ambitious drive toward European Union (EU) membership, is fundamentally altering Ukraine's role in the regional and global economy. While a rapid and sustainable recovery will require strategically mobilizing scarce public resources to crowd in private investment, this process must focus not only on the reconstruction of existing value chains, but also on the development of new industries and infrastructure that reflect Ukraine's deepening integration with European and transatlantic markets.

During the invasion, the role of the public sector expanded while the private sector contracted, both in absolute terms and as a share of gross domestic product (GDP). Due to the extraordinary demands placed on the defense budget, public debt increased while the private sector accumulated financial assets. In this context, the right policies, incentives and risk management tools could make private financing available to support a green and resilient reconstruction. To unlock these opportunities, the authorities will need to strategically allocate scarce public resources while implementing extensive reforms to increase competition, lower transaction costs, and encourage the entry of foreign firms and the acquisition of new technologies. While these actions by the authorities could provide necessary conditions, the actual private sector financing response also requires other conditions that are beyond the scope of this report, including conducive macroeconomic developments and external guarantees for security and governance.

While the projections are subject to considerable uncertainty, this report presents two scenarios projecting the extent to which the private sector may be able to finance the reconstruction needs identified in the second Rapid Damage and Needs Assessment (RDNA2).¹ Note that private-sector financing for a green and resilient reconstruction is distinct from compensation for damages, an issue not discussed in this report. The first scenario assumes that the Ukrainian government implements no major economic reforms and that the state's relationship with the private sector essentially reverts to its pre-invasion status quo as described in the World Bank Group (WBG) 2021 Country Private Sector Diagnostic (CPSD) for Ukraine (WBG 2021). Under the second scenario, the government implements an extensive pro-competition reform program, while intervening to alleviate distortions in specific sectors, supported by favorable macroeconomic conditions. While the reform-and-intervention scenario's priorities vary across sectors, pro-competition reform would entail a broad effort to scale back the presence of state-owned enterprises (SOEs) while encouraging collaboration between the public and private sectors, eliminating regulatory obstacles that inhibit the creation or expansion of competitive markets, and accelerating the alignment of domestic laws and regulations with EU standards and global best practices. International development partners could play an important role in supporting the identified reform measures and risk mitigation, such as guarantees for private investors. While risk mitigation is important the instruments are not discussed in detail in this report.

1 This report is based on data collected for the second RDNA2 that the World Bank, the government of Ukraine, the European Commission and the United Nations Development Program (UNDP) jointly prepared. The RDNA2 provides estimates of damages, losses and needs caused by Russia's invasion of Ukraine between February 2022 and February 2023 (World Bank et al. 2023). The RDNA2 does not assess damages from the destruction of the Nova Kakhovka hydroelectric dam, which caused catastrophic flooding across a large area of southern Ukraine.

In addition to identifying the role for private finance in meeting recovery needs this report provides a detailed analysis of private sector investment opportunities in selected sectors going beyond the recovery needs identified in the RDNA2. This includes development of additional capacities needed for green transition of Ukraine and supporting the country's goal to integrate fully into the European and global supply chains, specifically by increasing trade (export) and modernizing domestic production. These opportunities are particularly significant in the transport and energy sectors (Table 2). In areas where the private sector is projected to fully cover the identified needs – such as the commerce and metal sectors – this report did not seek to identify further investment opportunities. Under the second scenario, reforms increase private sector opportunities to address investment needs identified in the RDNA2 as well as other private sector opportunities.

In the absence of reforms and interventions, the analysis assumes that the private sector would resume investing in the same sectors as it did prior to Russia's invasion, with no clear path toward structural change. Under this status quo scenario, private financing is projected to cover a large share of the identified reconstruction needs for the 2023–2033 period in the agricultural sector (over 80 percent), industry and commerce (77 percent), and banking (63 percent), but much smaller shares (just over 30 percent) in the telecommunications and housing sectors (Table 2). In the infrastructure sectors where assets are largely publicly owned and operated, private investors could mobilize less than \$4 billion² in financing for RDNA2 needs over the period. Continuing a pre-invasion investment pattern, an additional \$38 billion in infrastructure investment opportunities could also become available over the period that would not be related to the reconstruction needs identified in the RDNA2 (Table 2).

Implementing the reforms and interventions identified in this report (Table 1) could increase total opportunities offered by Ukraine's green and resilient reconstruction from \$172 billion to \$412 billion for private financing during the RDNA2 period (2023-2033, Table 2).

In agriculture and food processing, public investment combined with policy reforms to crowd in private investment could allow the private sector to fully cover the reconstruction needs identified in the RDNA2 while triggering an additional \$16 billion in private investment (Chapter 1). Private financing opportunities in food processing and agriculture are closely related to the recovery of agriculture and the EU accession process. Key interventions include: (i) creating an efficient land market through continued liberalization of land sale and strengthening of institutions for land governance, (ii) establishing a framework to enable private-sector participation in the irrigation subsector, (iii) maintaining free trade agreements with EU and opening new markets for agricultural products, and (iv) demining and decontaminating agricultural land affected by the invasion.

In transportation and logistics, public investment and policy reforms could increase private investment opportunities from \$9 billion to \$47 billion while accelerating the adoption of climate-smart technologies. Key interventions include: (i) concessioning selected water transport and railway assets, (ii) reformulating the road network and introducing public-private partnerships (PPPs) in the road subsector, (iii) establishing new business models for fleet renewal, (iv) reformulating the airport network and airport concessions, and (v) aligning transportation and logistics regulations with EU regulations.

In energy and extractives, policy reforms could enable the private sector to invest \$36 billion in the RDNA2 reconstruction needs covering

2 All dollar amounts in this report are in US dollars.

76 percent of the needs, while unlocking \$132 billion in additional investment opportunities. Key interventions include: (i) wholesale electricity market reform, (ii) tariff reform in electricity generation, transmission, distribution and end-users of electricity and district heating, (iii) tariff reform in gas to enable district heating switching to renewable fuels, (iv) auctions for renewables-based electricity and hybrid energy storage and generation, and (v) alignment with EU standards.

Private investment opportunities in the social sectors are concentrated in rebuilding and improving the country's damaged and dilapidated housing stock. Ukraine's housing stock is 95 percent privately owned, and most investments will be made by households.³ Market failures discourage corporate investment. During 2023–2033, pilot projects to allow corporate investment in housing could lay the groundwork for more comprehensive reforms over the medium term. Corporate investment in water and sanitation, health, education, and municipal services will also be tested through pilot projects during the period. However, even these pilot projects will require sector-specific reforms, as well as the support of local communities and potentially complementary public funding.

Reforms in the financial sector and the pension sector are crucial to mobilize resources for domestic corporate investment. The banking sector requires reforms to the insolvency and debt-resolution systems, as well as measures to accelerate the digital transformation and modernize financial market infrastructure. The banking sector would also benefit from stronger creditor rights, the development of a market for distressed assets, and enhanced regulatory

oversight to encourage competition. In parallel, reforms that facilitate the establishment of private pension systems and open a wider range of sectors to institutional investors could rapidly increase the private financing available to support a green and resilient reconstruction.

The macroeconomic assumptions reveal the importance of mobilizing domestic private resource mobilization to meet the corporate demand for private financing. The report argues that the banking and pension sectors can provide financing of more than 5 percent of GDP to the corporate sector per year during the 2023–2033 period (Chapter 5). Including the banking and pension sectors and part of the projected foreign direct investment (FDI) net inflows of 4.8 percent of GDP, Ukraine may be able to mobilize 20 percent of GDP in private investment for a green and resilient reconstruction in 2027 as included in the International Monetary Fund (IMF) baseline scenario published in March 2023 (IMF 2023a). The first review of the IMF program (IMF 2023c) revised the projection for the private investment to GDP ratio in 2027 to 15.9 percent. The analysis presented in this report suggests that these amounts of financing could be available for mobilization if the Ukrainian government implements the right combination of targeted public investment, reforms, and interventions, including providing risk mitigation for private investors, supported by international development partners. While the reforms are critical, they may not be sufficient conditions for unlocking private financing for a green and resilient reconstruction in Ukraine. Nevertheless, the reform effort and the size of possible private investment support Ukraine's planning process and its engagement with development partners and potential investors.

3 Some of the multifamily apartment buildings are on the balance sheet of the municipalities and are to be repaired and maintained in public areas by municipalities.

Table 1 Critical Reforms and Interventions to Mobilize Private Financing for a Green and Resilient Reconstruction in Ukraine 2023–2033

Sectors	Reforms and Interventions
Commercial sectors	
Agriculture, food and beverages ⁴	<ul style="list-style-type: none"> • Complete the agricultural land-reform process, and build institutional capacity for land governance • Ensure access to affordable financing, including through digitizing and simplifying crop receipts • Adopt international sanitary and phytosanitary (SPS) standards and trade-facilitation mechanisms • Enable adoption of climate-smart agricultural (CSA) technologies • Reimburse value-added taxes (VAT) to exporters in a timely manner
Industry and commerce	
Base metals and metal products	<ul style="list-style-type: none"> • Ensure competitive access to iron ore to attract new investors and pass confidence-building measures for existing investors
Engineering and machine building	<ul style="list-style-type: none"> • Privatize large non-military SOEs • Integrate into EU value chains • Align regulations with the EU Agreement on Conformity Assessment and Acceptance of industrial products to obtain “industrial visa-free” access to EU markets
Retail	<ul style="list-style-type: none"> • No sector-specific reforms
Tourism	<ul style="list-style-type: none"> • Update the obsolete licensing requirements for tour operators and create modern insurance mechanisms • Abolish the mandatory categorization of hotels and create self-regulating organizations • Create a regulatory framework for destination management organizations at the national, regional, and local levels
Infrastructure	
Transport	
Road	<ul style="list-style-type: none"> • Reevaluate the management of the road network and the potential introduction of PPPs • Liberalize international passenger road transport
Rail	<ul style="list-style-type: none"> • Deregulate the railway subsector and approve regulatory changes to allow the private business to enter the market • Continue the process of adopting the standard European gauge
Maritime and inland waterways	<ul style="list-style-type: none"> • Privatize water-transportation SOEs, particularly those involved in managing the Danube ports • Create concession agreements for seaports and river infrastructure
Airports	<ul style="list-style-type: none"> • Optimize the airport network • Create concession agreements for airports
Urban transport	<ul style="list-style-type: none"> • Promote the renewal and electrification of the public transport fleet • Introduce asset separation and/or aggregation models for fleet renewal • Establish risk-sharing contractual arrangements between operators and the government

4 The food and beverage sector is combined with agriculture as SPS standards and trade facilitation applies to both sectors. In the report food and beverages are discussed as an industrial sector, following the RDNA2 sector classification.

Sectors	Reforms and Interventions
Intermodal transport and logistics	<ul style="list-style-type: none"> Expand the multimodal network to focus on westward routes Implement a transparent and competitive tariff system through independent regulation
Energy and extractives	
Electricity generation	<ul style="list-style-type: none"> Revise the maximum and minimum price caps for different segments of the wholesale market to allow for free price formation Reduce household electricity costs through energy efficiency and conservation, and social assistance Implement auctions of electricity from renewable energy sources (RES) and from hybrid renewable energy with energy storage
Energy storage	<ul style="list-style-type: none"> Ensure the financial viability of energy storage by allowing multiple revenues sources (e. g., balancing and ancillary services markets)
Electricity transmission	<ul style="list-style-type: none"> Implement measures to prevent debt accumulation at Ukrenergo Allow commercial financing of or private participation in Ukrenergo Allow private investment in the construction of independent high-voltage lines
District heating	<ul style="list-style-type: none"> Offer demand-side incentives to improve energy efficiency and energy conservation Implement cost-recovery tariffs with incentives to switch to efficient district heating Allow commercial financing and/or private participation in modernizing and operating district heating systems
Electricity distribution	<ul style="list-style-type: none"> Revise regulatory asset-base tariff to allow cost recovery of investments
Extractives	<ul style="list-style-type: none"> Improve environmental, social, and governance practices by increasing transparency around licensing and the environmental impact assessments Implement the Ukrainian subsoil law and methodologies and new lists of strategic and critical raw materials Allow biomethane exports and implement guarantees of origin
Telecommunications, postal services, and broadcasting	
Telecom and digital	<ul style="list-style-type: none"> Simplify procedures to enable the rollout of 5G Further expand internet access by mandating infrastructure-sharing arrangements and verifying that restrictions on internet resources are clearly defined Update the regulatory framework for radio spectrum allocation to increase frequencies available for mobile communications Integrate Ukraine into the EU roaming space and ensure that new players can access the market Adopt a formal policy enabling the outsourcing of e-government services through a competitive bidding process
Postal	<ul style="list-style-type: none"> Facilitate competition in postal services Enable private sector participation in Ukrposhta

Sectors	Reforms and Interventions
Broadcasting	<ul style="list-style-type: none"> • Attract commercial financing, and ultimately allow more private sector participation in public broadcasting • Safeguard media freedom
Water supply and sanitation	<ul style="list-style-type: none"> • Develop a comprehensive sector strategy • Streamline sector regulations and legislation • Reform sector governance to address market fragmentation • Aggregate sector providers where feasible while clarifying the ownership of water and sanitation assets • Reform tariffs to ensure cost-recovery and promote investment sustainability
Irrigation	<ul style="list-style-type: none"> • Complete the adoption of reforms to enable more private investment in water delivery and on-farm water management • Implement relevant laws on irrigation and water-user organizations • Improve institutional coordination
Social sectors	
Housing	<ul style="list-style-type: none"> • Develop a sectoral policy framework and supporting legislation • Update or replace outdated regulations, including the Housing Code • Streamline urban planning and land-allocation procedures • Harmonize construction materials rules with EU standards • Create an enabling environment for the production of green materials in line with EU standards • Adopt investor protections and other investment policy reforms to attract foreign investment in the construction sector • Strengthen creditor rights and establish an effective collateral enforcement mechanism • Develop an effective mortgage market • Create an enabling legal environment for the rental market
Municipal services	<ul style="list-style-type: none"> • Mandate the use of standard e-procurement systems by all subnational governments • Review subsidized SOEs and establish a program for commercializing their activities • Implement legislative reforms to allow transparent and predictable decisions on rezoning land for private-sector development and PPPs
Health	<ul style="list-style-type: none"> • Improve transparency of medical licensing • Strengthen rules around state inspections • Close policy gaps that limit the adoption of e-health technologies • Modernize regulations on telehealth services and data-sharing protocols • Create an electronic medical records system • Build the capacity to implement PPPs in the health sector
Education	<ul style="list-style-type: none"> • Revise the PPP framework to incentivize private-sector participation in education-related construction of education assets

Sectors	Reforms and Interventions
Financial sector	
Finance and banking	<ul style="list-style-type: none"> Strengthen the credibility of financial supervision through consistent regulator enforcement Facilitate resolution of non-performing loans and strengthen creditor rights Bolster insolvency and debt-resolution mechanisms by adopting effective enforcement measures such as foreclosure and collateral sales Develop the market for distressed assets and asset-resolution companies Modernize capital-market infrastructure Prepare state-owned banks for privatization, or provide incentives for these banks to sell their assets Develop the insurance market and improve the supervision of insurance companies Promote financial literacy and strengthen consumer protections
Pensions	<ul style="list-style-type: none"> Adopt and enforce the legislation on state regulation of capital and commodity markets and the mandatory pension system Implement international standards for asset management and pension supervision

Table 2: Ukraine's RDNA2 needs and projected private sector financing opportunities 2023-2033 (\$ billions in 2023 prices)

	RDNA2	Private sector opportunities			
		Non-reform scenario		Reform and intervention scenario	
		Addressing RDNA needs	Other opportunities ^d	Addressing RDNA needs	Other opportunities ^d
Part I: Commercial sectors					
Agriculture	29.7	24.2	-	29.7	4.9
Industry and commerce	23.2	17.8	-	18.1	11.5
Industry	18.6	13.2	-	13.5	11.5
Commerce	4.6	4.6	-	4.6	-
Tourism	6.9	-	5.1	-	5.1
Part II: Infrastructure					
Transport ^a	92.1	0.2	8.6	6.6	40.6
Road transport	50.7	-	5.6	5.1	14.9
Rail	27.8	-	1.4	-	1.8
Maritime and inland waterway transport	0.4	0.1	-	0.1	8.2
Airports	1.7	0.1	-	0.4	0.4
Urban transport, including sharing services	4.6	-	1.6	1.1	14.4
Intermodal transport and logistics	-	-	-	-	0.9

Table 2 continues on the next page.

	RDNA2	Private sector opportunities			
		Non-reform scenario		Reform and intervention scenario	
		Addressing RDNA needs	Other opportunities ^d	Addressing RDNA needs	Other opportunities ^d
Part II: Infrastructure					
Energy and extractives	47.0	2.2	28.5	35.6	131.7
Electricity generation	28.2 ^b	1.8	0.7	25.0	72.1
Energy storage	1.7 ^c	0.1	0.1	1.5	7.0
Electricity transmission	3.7 ^b	-	-	0.3	3.0
Electricity distribution	3.7 ^b	0.3	-	3.1	0.7
District heating	2.5	-	4.9	1.7	14.2
Extractives	7.3	-	22.8	4.0	34.7
Telecommunications, postal and broadcasting	4.5	1.4	1.2	4.3	4.8
Telecommunications and digital	2.3	0.2	1.1	2.0	3.4
Postal	2.1	1.2	0.1	2.1	0.6
Broadcasting	0.1	-	-	0.1	0.8
Water and sanitation	7.1	-	0.2	-	0.3
Irrigation	8.9	-	-	-	-

Part III: Private social investment opportunities

Housing	68.6	22.5	45.1	30.2	60.4
Municipal services	5.7	0.2	-	0.8	-
Health	16.4	-	-	-	0.2
Education	10.7	-	-	-	0.3

Part IV: Domestic private finance resource mobilization

Finance and banking	6.8	4.3	10.8	4.3	22.7
Social protection, pensions	41.8	-	-	-	-
TOTAL (includes cross-cutting 41.2)	410.6	72.7	99.3	129.6	282.4

- The RDNA2 includes needs to replace damaged private vehicles (\$6.8 billion), that are not included in the transport sector assessment.
- IFC estimates (WBG 2023 forthcoming)
- Lithium-ion battery energy storage
- Private sector opportunities that are not related to damages included in the RDNA2. In the transport sector these are related to (i) underreported damages of private assets (using extrapolation of the reported data, e.g. railway and urban transport fleet) and (ii) opportunities not related to damages but required to maintain the same level of service (i.e. fleet renewal and infrastructure reconstruction) or improving efficiency and resilience of transport systems (i.e. investment opportunities in new infrastructure or assets, etc.). In the energy and extractive sectors, the World Bank Group team estimated private sector opportunities based on energy demand and supply projections elaborated by the team taking into account Ukraine's energy strategy and estimates by the IMF, IBRD, European Network of Transmission System Operators for Electricity, European Network of Transmission System Operators for Gas, European Union, International Energy Agency, International Renewable Energy Agency, Energy Community and the European Union Agency for the Cooperation of Energy Regulators. These estimates are indicative and could vary significantly depending on assumptions used. Other opportunities (beyond RDNA2) are estimated taking into account government of Ukraine's goals for the development of energy and extractive sectors. The main difference from the RDNA2 is that the estimate of the baseline projection includes Ukraine's goals (e.g., nuclear, natural gas, biomethane, exports, etc.) although the report's projections are below the figures of the government of Ukraine energy strategy. This concerns especially the reform and intervention scenario which varies from the energy strategy in the areas of 10 GW wind, 5 GW electrolyzer, 2 GW peaker and 2 GW lithium-ion 2-hour battery energy storage. These investment opportunities include development of new or modernization of existing infrastructure and assets as well as development of local renewable energy equipment manufacturing capacity. (WBG, 2023 forthcoming).

Note: Conditions and assumptions underpinning the scenario analysis are discussed in Section 1.2 and in the forthcoming Sector Assessments (WBG 2023 forthcoming).

Source: RDNA2 and World Bank Group (2023 forthcoming).

CHAPTER 1

Country Context and Cross-Cutting Issues

This report explores the potential for private capital mobilization and examines the private sector's role in financing a green and resilient recovery in Ukraine. Private sector financing for Ukraine's green resilient recovery needs is distinct from compensation for damage, which is not discussed in this report. The analysis in this report applies the WBG's cascade approach which seeks to maximize the impact of scarce public resources. The cascade approach seeks to mobilize commercial finance, enabled by upstream reforms where necessary. In the Ukrainian context, this approach requires understanding the state's role in the economy, the market failures and constraints present in different sectors, and the types of private financing available to support the recovery. The EU accession process offers unique opportunities to mitigate country risk, which is projected to remain elevated even after the end of Russia's invasion. The assessment evaluates the sectors and industries best positioned to drive a green and resilient recovery and highlights reforms and interventions that can catalyze private investment in an environment of scarce public resources. The report synthesizes detailed sector assessments that are scheduled to be published by the WBG in November 2023.

The report presents an analysis of private investment opportunities under two alternative scenarios. Both scenarios assume broader macroeconomic and external developments (Section 1.2). In addition, the first scenario assumes that no major structural economic reforms are implemented and that the state's relationship with the private sector essentially reverts to its pre-invasion status quo. Under the

second scenario, the government implements an extensive pro-competition reform program while intervening to alleviate distortions in specific sectors. Under this scenario, economic growth and returning refugees offer a supportive environment for the adoption of pro-competition policies. While these actions by the authorities could provide necessary environment, the actual private sector financing response also requires other conditions that are beyond the scope of this report, including conducive macroeconomic developments as well as external guarantees for security and governance.

1.1 Recent Developments

Russia's invasion of Ukraine has triggered a massive social, humanitarian, economic, and energy crisis. By June 2023, nearly one-third of Ukraine's population had been forced to flee their homes. An estimated 6.3 million Ukrainians remain refugees,⁵ while another 5.1 million are internally displaced people (IDP) (UNHCR 2023a; IOM 2023).⁶ While Ukraine's economy contracted by a staggering 29.1 percent in 2022, it is expected to grow by 2 percent in 2023, according to World Bank projections published in June 2023 (World Bank 2023a). According to preliminary estimates by the World Bank, the headcount poverty rate increased from 5.5 percent in 2021 to 24.1 percent in 2022, indicating that the invasion has pushed an additional 7.1 million people below the poverty line, reversing 15 years of progress on poverty reduction (World Bank 2023b).⁷ As of February 24, 2023, direct damages from the invasion have totaled \$134.7 billion, while economic losses have reached

5 The number accounts for the number of refugees registered globally as of July 2023 and does not include those who were refugees before that date.

6 The figure for IDP include returnees.

7 Data are based on the WBG's global poverty line for upper middle-income countries of \$6.85 per person per day.

\$289.1 billion, resulting in total reconstruction needs of \$411 billion (RDNA2). These estimates include neither the destruction of the Nova Kakhovka hydroelectric dam on June 6, 2023 nor the subsequent flooding that devastated a large area of southern Ukraine. Updated damage and loss estimates are therefore expected to be significantly higher.

Despite the massive impact of the ongoing invasion, sound economic policies and large-scale external support have helped stabilize the Ukrainian economy. An expansion of public sector expenditure has been accommodated by private sector financial savings, and a four-year IMF program was launched in March 2023 (IMF 2023a). Long-term growth is projected to stabilize at 4 percent under the baseline scenario and 5 percent under an upside scenario, and private investment is projected to recover. The current account is projected to turn to a deficit in 2023, and the deficit is projected to reach 6.7 percent of GDP in 2025, but it is projected to narrow thereafter. FDI inflows are projected to reach 2.4 percent of GDP in 2025, before increasing to 4.8 percent of GDP in 2027, fully financing the current-account deficit (IMF 2023a).

Russia's invasion has permanently transformed the Ukrainian economy, and the restoration of sustainable macroeconomic policies should not be interpreted as a return to pre-invasion conditions. The constraints identified in the Ukraine Country Private Sector Diagnostic (WBG 2021) have evolved (Figure 1). The

severing of Ukraine's financial and commercial ties with Russia, combined with its simultaneous pivot to European and transatlantic markets,⁸ represents a lasting westward shift in the country's economic center of gravity.⁹ Meanwhile, internal and external displacement has altered Ukraine's population patterns in ways that will endure long after the invasion. In parallel, the EU accession process is driving sweeping reforms to economic governance, competition policy, and public-sector transparency.¹⁰ EU accession also offers access to vast financial resources, including the Green Deal and other programs designed to catalyze the transition to low-carbon growth. While the alignment of Ukrainian legislation with the EU *Acquis Communautaire* is still in its early stages, it has had an encouraging dynamic that is anchoring the private sector's expectations about the country's future legal framework. The decentralization reforms adopted and implemented since 2014 have greatly strengthened the role of local governments in planning, financing, and investment decisions to improve local accountability and service delivery. The government of Ukraine is committed to engaging local governments in developing place-based reconstruction strategies and plans, and it will support local authorities in the implementation of agreed projects. Russia's invasion will likely have a lasting impact on Ukraine's political economy, strengthening social cohesion and reframing the social contract between citizens and the state at both the national and subnational level.

8 The change in the direction of trade also has an impact on the composition of exports, as exports to Russia and Belarus are more complex than exports to the EU.

9 This process started following Russia's actions with respect to Crimea in 2014, but it accelerated dramatically after the invasion in February 2022.

10 The political criteria of EU accession include specific demands to ensure the rule of law. The European Commission in its Communication COM(2022)407 in June 2022 identified the steps Ukraine needs to follow to start formal negotiations: (i) enact and implement legislation on a selection procedure for judges (in line with Venice Commission); (ii) finalize the procedures to establish the High Qualification Commission of Judges of Ukraine; (iii) further strengthen efforts to fight corruption, in particular at higher levels of government; (iv) ensure that anti-money laundering legislation is in compliance with the standards of the Financial Action Task Force (FATF); and (v) implement the anti-oligarch law in a legally sound manner, taking into consideration the forthcoming opinion of the Venice Commission on the relevant legislation. Two more conditions relate to securing the independence of media and rights of minorities. Link: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52022DC0407>.

Figure 1 Update on the Constraints on Private Sector Growth Identified in 2021 Country Private Sector Diagnostic



Source: WBG (2023, forthcoming).

1.2 Private Sector Investment Projections

Following IMF macroeconomic projections (IMF 2023a) and considering the needs identified in the RDNA2, this report quantifies the role of the private sector in meeting the country's needs. The report uses the same time period as the RDNA2 (2023–2033) and follows the same sectoral classification. The report divides the economy into commercial sectors such as agriculture and

telecommunications, infrastructure sectors such as transportation and logistics, and social sectors such as housing and education. The report also discusses banking and pensions, as reforms in these areas could help mobilize additional domestic private resources. When banking and pensions are included, Ukraine may be able to mobilize 15.3 percent of GDP in domestic private financing for a green and resilient reconstruction in 2027 (IMF 2023a).¹¹

11 The IMF projects a private investment to GDP ratio of 20.1 percent in 2027 and an FDI-to-GDP ratio of 4.8 percent in the same year (IMF 2023a). Assuming projected FDI fully contributes to gross fixed capital formation, domestic resources will contribute 15.3 percent of GDP to private investment in 2027 under the baseline projection. The IMF report published in June 2023 (2023c) revised the private-investment-to-GDP ratio from 20.1 to 15.9 percent, while FDI was revised up from 4.8 to 5.0 percent of GDP, suggesting that only 10.9 percent of domestic resource mobilization would finance private investment. The revisions left the projected growth rate unchanged, implying more efficient investment and a lower incremental capital output ratio (ICOR). The revised scenario makes financing external to the firm, including bank lending, even more important than the baseline, since financing external to the firm contributes disproportionately to productivity and growth (Rajan and Zingales 1998).

The analysis presented in the sector-specific chapters is subject to important caveats.¹² First, the private financing opportunities described reflect numerous assumptions and are merely indicative of the possible impact of alternative policies. While the specified reforms and interventions would be necessary to create these opportunities, they would not be sufficient to mobilize the amount of private financing estimated in the report. Under any scenario, multiple factors outside the scope of the analysis would influence investment decisions. Economic growth, sound macroeconomic management, governance reforms, and conducive trade and investment policies as well as risk mitigation instruments delivered by international development partners will be crucial to attract private financing from both domestic and foreign sources. Second, the estimates presented are based on information available as of May 31, 2023. Given the rapidly evolving context of the invasion and the uncertainty regarding the ultimate extent of invasion-related damages and losses, the analysis will require subsequent updates to remain accurate.

The sector-specific projections assess whether private investment can effectively address the needs outlined in the RDNA2. Private financing requires: (a) private ownership or private management of public or formerly public assets; and (b) cost recovery for investors. Even without reforms, these conditions are largely met in the agriculture, commerce, industry, tourism, and banking sectors. There are, however, subsectors such as engineering and machine-building that are profitable but that cannot attract private investment due to the dominant market position of state-owned enterprises (SOEs). Moreover, price controls inhibit investment in sectors that are already largely private, such as renewable energy. The housing sector is a special case: as private reconstruction financing is expected to originate mostly from households, projections for this sector are based on household investment in housing as a share of GDP.

Reforms and interventions are projected to increase the share of private financing to address the needs outlined in the RDNA2 as well as increase opportunities for other private investments beyond the scope of the needs identified in the RDNA2. These reforms and interventions include:

- a. *Measures that increase opportunities for the private sector to manage or utilize state assets.* These measures tend to be sector-specific, ranging from port and airport concessions to the mobilization of private capital and the eventual privatization of SOE, such as electricity distribution system operators, Kharkiv combined heat and power plant and Centerenergo.
- b. *Adjustment of controlled prices.* For example, revising maximum and minimum price caps on the different wholesale market segments to ensure free price formation will further its process of integration in the EU electricity markets, demand reduction, investments and energy security.
- c. *Public investment.* For example, public investment in irrigation and the demining of land will expand the scope for private agricultural investment.
- d. *Public sector capacity to address regulatory issues.* State capacity is required to prepare assets for PPPs, enforce competition policy, and administer creditor rights. The administration of these types of measures is a public policy issue that is not addressed in this report.
- e. *Pilot projects to explore private investment opportunities in state-dominated sectors.* These sectors include water and sanitation, education, and health.

Sector-specific assumptions and projections will be elaborated in the second volume of the report (Sector Assessments), which is scheduled to be published in November 2023. Despite

12 Further information on the projections in the transport and energy sectors is included in sections 3.1 and 3.2.

the uncertainty generated by Russia's invasion and the limited availability of risk-mitigation instruments, the report offers estimates and projections designed to inform decision-making both in the public and private sector. The government is currently developing both a medium-term plan (2024–2027) and a long-term strategy for the country's key economic sectors designed to anchor policy expectations as Ukraine's economic shifts toward European

and transatlantic markets. This report identifies reforms and interventions that could expand opportunities for private investment and growth in each of the identified sectors, supporting the government's planning process during a pivotal phase in Ukraine's economic development. The reforms and projections aim to support this planning process but they are not sufficient for the realization of private financing for Ukraine's green and resilient reconstruction.

CHAPTER 2

The Commercial Sectors

Prior to Russia's invasion of Ukraine, private firms dominated most commercial sectors, though distortions often inhibited open competition. While the private sector is projected to play a major role in supporting a green and resilient reconstruction in these sectors, reforms will be vital to ensure an efficient allocation of resources. As documented in the 2021 Country Private Sector Diagnostic, monopolistic or oligopolistic conditions prevailed in multiple key markets, and while reform efforts are ongoing, continued efficiency gains will be crucial to maximize the commercial sectors' contribution to growth, exports, and employment.

2.1 Agriculture

Prior to Russia's invasion, the agricultural sector¹³ employed about 17 percent of the labor force, contributed 11 percent to GDP, and was growing steadily at an annual rate of 4 percent (RDNA2 and State Statistics Service of Ukraine 2023a and 2023b). If agro-processing is included, the sector's share of GDP was some 15 percent. Moreover, the agriculture, food, and beverages industry accounted for almost a quarter of FDI, and agricultural products peaked at 49.1 percent of merchandise exports in 2020.¹⁴ Reforms implemented in 2021 introduced a private land market for certain types of transactions, which empowered farmers and local communities to leverage the value of their land while attracting more private investment in agriculture.¹⁵ Pre-invasion Ukraine ranked among the top 10 global producers and exporters of grains and oilseeds,

oil and meal, and livestock products, with agricultural exports reaching about 400 million people around the world.¹⁶

In Kharkiv, Luhansk, Donetsk, Zaporizhzhia, and Kherson oblasts (regions), the invasion has directly impacted areas that were responsible for about 38 percent of agricultural production in 2021 (EU4Business et al. 2022). During the 2021/2022 marketing year, these regions produced 32 percent of Ukraine's wheat, 29 percent of its sunflower seeds, 26 percent of its barley, 25 percent of its vegetables, 23 percent of its honey, 20 percent of its pigs, and 16 percent of its eggs. Due to invasion-related delays, 6 percent of the corn crop went unharvested in February 2023. In 2022, the planting area for winter wheat declined by 25 percent, and many farmers switched to oilseed crops.

In the 2022/23 harvest year, production volumes for major grains and oilseeds fell by an estimated 35 percent relative to the previous year, and the gap between export prices and farmgate prices widened (Figure 1 and EU4Business et al. 2022). Higher prices for fertilizer and other inputs, coupled with input-supply disruptions, reduced crop yields. Meanwhile, lower farmgate prices discouraged the production and even harvesting of some outputs (e.g., corn), and the invasion reduced the available planting and harvesting areas. Land damage and contamination due to mines, unexploded ordnance, artillery fire, and the movement of heavy military equipment have also weighed on production. The 35 percent drop in production value (EU4Business

13 Including fisheries and forestry.

14 After the invasion, in 2022, agricultural products represented 57.2 percent of Ukraine's goods exports, a historically high share. Based on trade data from the NBU for the years 2011 to 2022.

15 By September 2022, over 12,000 land contracts had been signed covering an area of almost 280,000 hectares.

16 For 2021/22, Ukraine ranked first in worldwide exports of sunflower, second in sunflower oil, and fourth in barley.

et al. 2022) and 45 percent drop in farmgate prices for major grains and oilseeds (RDNA2) reduced farmer revenue by 80 percent in 2022. Following Russia's invasion, global wheat prices increased significantly and did not return to pre-invasion levels until the second half of 2022, yet prices in Ukraine remain far below pre-invasion levels (Figure 2).¹⁷

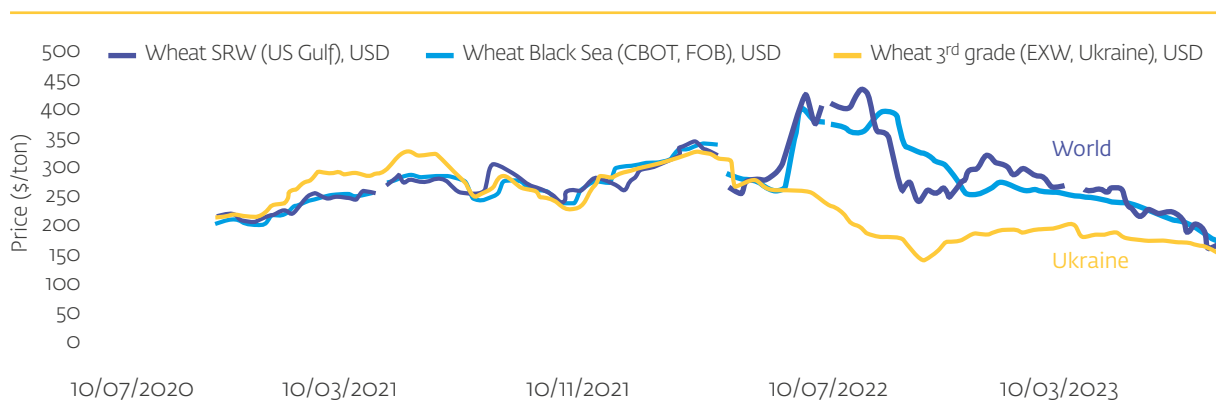
Logistical and transport challenges increased export costs by an estimated 400–500 percent. Before Russia's invasion in 2022, a significant share of goods was exported via ports, and about 86 percent of agricultural products were seaborne.¹⁸ From late February to July 2022, Ukraine's major ports were blockaded, and, even while Russia participated in the Black Sea Grain Initiative (July 2022 to July 2023), Ukraine's ports operated well below their maximum capacity. Meanwhile, invasion-related congestion in the Black Sea has further slowed the delivery of Ukrainian exports.¹⁹ Railway transportation has been increasing, but multiple factors limit its growth, including the low capacity of railway border crossings with European countries and

the difference in gauge width between Ukraine and the EU. Higher costs of alternative forms of transportation have impacted the profitability of agriculture, as transportation of bulk goods is not economical.

The invasion caused agricultural exports receipts to plunge by an estimated 15.6 percent in 2022 (National Bank Ukraine 2023a). Grain exports fell from a pre-invasion average of 5 million tons per month to just 500,000 tons per month in the first few months of 2022 (EU4Business et al. 2022). The port blockade cost Ukraine an estimated \$170 million per day in lost trade opportunities (EU4Business et al. 2022). The Cabinet of Ministers' restrictions on wheat and barley exports have been lifted since June 2022,²⁰ and exports of select products to Europe increased sharply during the year, but exports to all other regions fell, contributing to an ongoing food crisis across much of the world (Figure 3).

Farmers and other private-sector stakeholders face a range of challenges, including inadequate access to inputs, logistical constraints, changes

Figure 2: Evolution of Global and Ukrainian Wheat Prices (\$/ton)



Source: IFC elaboration based on data from APK-Inform.

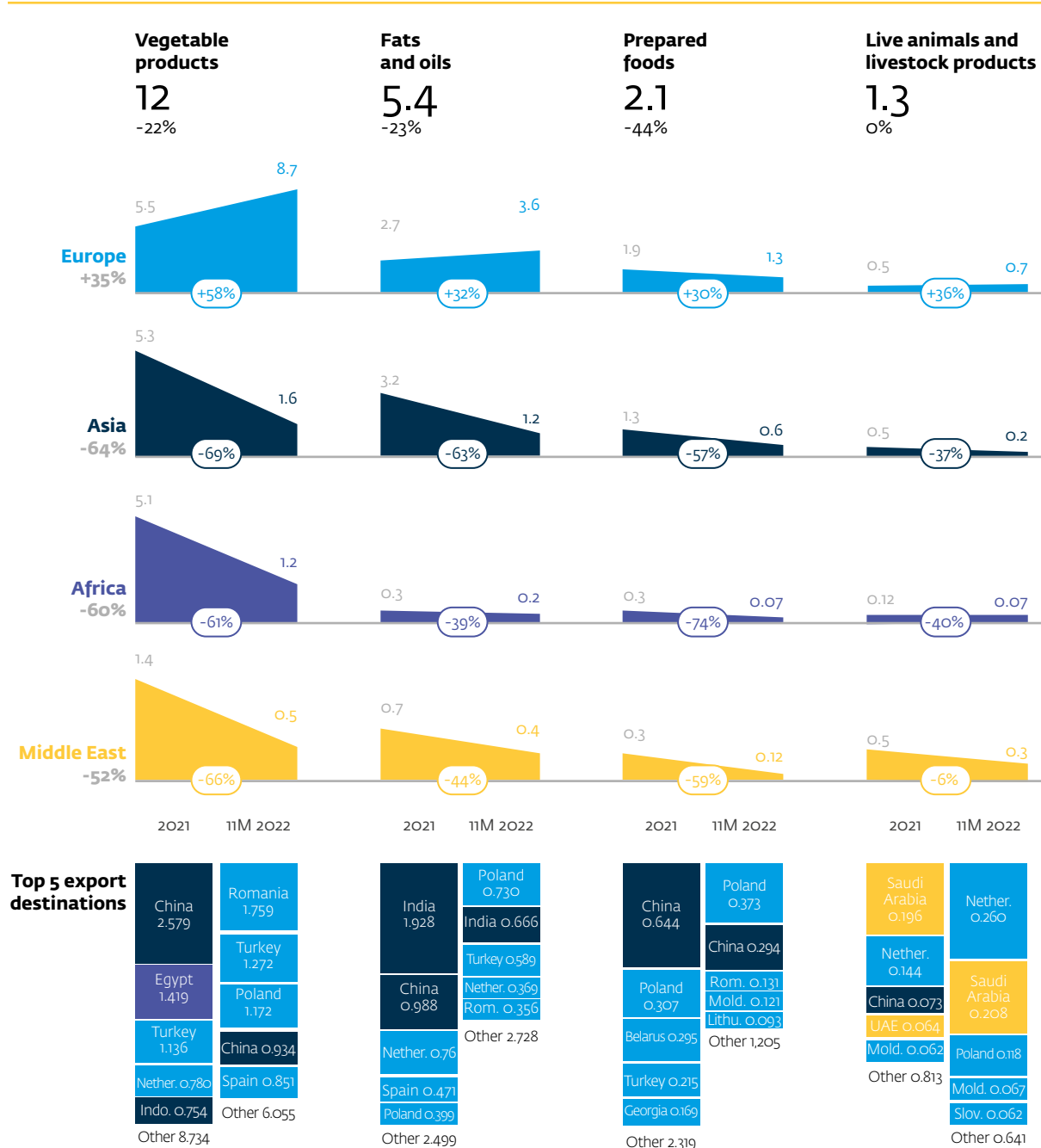
17 Farmgate prices are determined by free-on-board export prices, as well as the costs of post-harvest, logistics, and freight—all of which increased drastically last year. For wheat, export prices were above farmgate prices for Ukrainian wheat exports by \$32 per ton in 2021, and \$147 per ton in 2022. Ukrainian farmers got \$156 per ton for wheat shipped to Saudi Arabia in 2022, while Russian farmers got \$252 and German farmers got \$310 (Striewe 2022).

18 Based on data provided by the National Bank of Ukraine. Agricultural products refers to HS-2 codes from 01 to 23.

19 The ports of Mykolaiv, which are among the largest in the country, remain blocked. The Black Sea Grain Initiative, which allowed grain exports from Ukraine through the Black Sea under an agreement between the United Nations, Türkiye, Ukraine, and Russia, was terminated unilaterally by Russia on July 17, 2023.

20 Rye, oats, buckwheat, millet, and sugar, as well as live cattle, frozen beef, meat, and meat offal remain restricted.

Figure 3: Selected Ukrainian Agricultural Exports, 2021 and January–November 2022 (\$ billions)



Source: EU4Business et al, 2022.

in crop structure, and obstacles to carrying out technical operations. Input shortages and rising prices for fuel, seeds, plant protection products, and fertilizers are negatively impacting production, and prepaid inputs in invasion-affected areas are not being delivered. In some parts of the country, applying fertilizer and plant-protection products has become impossible, and many farmers are switching to less-profitable crops that require fewer inputs. The 2023 growing

season and subsequent seasons will likely entail significant losses for farmers as they struggle to procure inputs. The planting area for winter crops has already decreased by 38 percent. Vegetable production, about 25 percent of which is concentrated in the southern and eastern regions temporarily not under government control, is shifting to the western and central regions (EU4Business et al 2022). Damage to energy infrastructure poses an especially significant

challenge, as the storage and processing of vegetables and fruits requires a reliable and consistent source of electricity. The disruptive impact of the invasion, combined with rising prices of veterinary drugs and a lack of access to certain areas, has contributed to livestock losses. The invasion has complicated hay and silage preparation, limited the flow of raw materials to processing plants, and disrupted the supply of electricity at key stages in the production process, sharply reducing livestock and poultry production.

As of February 24, 2023, the invasion is estimated to have caused \$8.7 billion in direct damage to the agriculture sector, with aggregate losses totaling \$31.5 billion (RDNA2). Damage to machinery and equipment represented 53 percent of the total, followed by stolen inputs and outputs (23 percent) and damaged storage facilities (15 percent) (RDNA2). Invasion-related damage increased almost fourfold between June 2022 and February 2023 due to increasing damage and the rising value of damaged assets (RDNA2). Almost half (46 percent) of total losses resulted from falling farmgate prices for export-oriented commodities such as wheat, barley, corn, and sunflower seeds, while another 44 percent reflected diminished production of annual and perennial crops (RDNA2). Reduced livestock and fishery production accounted for 6 percent of total losses, and increased production costs were responsible for 3 percent.

Concessional lending from the government has expanded, and bank funding is growing. In 2022, \$194 million in public spending on the state's "Affordable Loans 5-7-9%" program mobilized \$1.5 billion in agricultural loans, about half of which were partially guaranteed by the government. The program provided loans to about 7,000 farmers,

most of whom were small-scale producers.²¹ Bank lending to firms in the agriculture, forestry, and fisheries sector grew by 44 percent in nominal terms, while loans to food producers increased by 13 percent (EU4Business et al. 2022). Demand for investment-project financing is limited as farmers prioritize working capital. EU pre-accession assistance may become available after 2027 if Ukraine successfully aligns its legal framework for agriculture and rural development with the EU Acquis.²²

Over the longer term, the transition to CSA presents a wide range of attractive financing opportunities both for the public and private sectors. A tailored climate-policy framework aligned with EU regulations and initiatives such as the Common Agricultural Policy and the Green Deal can help support business-to-business decarbonization efforts and advance the country's long-term climate agenda. The private sector could invest in CSA technologies to increase the sector's competitiveness in the EU and other markets that apply carbon pricing. Moreover, climate-smart fertilizers, no-till practices, and efficient data tools can cut emissions while helping build resilience to shocks. However, financial constraints, limited knowledge and workforce skills, and inadequate irrigation, transportation, and logistics infrastructure can limit CSA uptake, especially among small-scale producers, and the invasion has exacerbated all of these challenges. Invasion-related disruptions also affected foreign equipment and solutions providers, who already faced high import tariffs. The ongoing land-reform process has yielded important gains, but effective implementation remains critical.

Hostilities will continue to affect decisions related to crops for the duration of the invasion. Narrowing margins and transportation issues have prompted farmers to shift from grains to

21 Government of Ukraine data provided to the IBRD as part of the implementation support for the Program-for-Results on "Accelerating Private Sector Investments in Agriculture" (P166941).

22 Ukraine's government must establish the administrative structures required for EU's Common Agricultural Policy (CAP), including extending the registration of farms in the state agrarian registry, expanding the state farm-support fund into a compatible paying agency, and establishing reliable systems for managing EU funds, as well as improving integration and data quality of the Land Parcel Identification System. Similarly, the government must develop the legal framework for a common-market organization that addresses market interventions and other key issues.

Table 3: Agricultural Risks and Risk-Mitigation Instruments

Risk	Definition	Impact on the sector	Mitigation measure
Country	Change in legislation	Delays in implementing land reform	No sector specific measures available
Macroeconomic	Inflation, exchange rate	Volatile input prices and farmgate prices	Hedging instruments for agricultural commodities
Climate change	Adverse/extreme weather events	More frequent droughts	CSA technologies and practices; investments in expanding and modernizing the irrigation system, insurance (for example, crop insurances)
Commercial	Mismatch between projected and actual revenues or end costs	Uncertainty regarding future prices (e.g., at the time of harvest)	Contract agriculture agreements
Execution	A failure to fully implement programs and policies on schedule	Slow adoption of CSA technologies and practices	Agricultural extension services that provide information on best practices and demonstrate their effectiveness

Note: Sector-specific measures only.

Source: IFC elaboration.

oil-producing plants such as sunflower, rapeseed, and soy. However, the sudden pivot to vegetable oil could overwhelm local processing capacity, and vegetable-oil exports would ultimately encounter issues similar to those facing grain exports.

In September 2022, the Ukrainian and Polish governments signed a deal to create a pipeline capable of transporting 2 million tons of vegetable oil per year for export via the port of Gdansk. While this is a positive step, greater certainty around export routes and logistics remains critical to attract investment in agriculture.

Reforms are urgently needed to mitigate the elevated risks facing the agricultural sector. Creating an efficient land market through continued liberalization of land sales and strengthening of institutions for land governance is recommended. Stronger protections for land rights could encourage investments in soil quality and enable landowners to borrow against equity. Measures to prevent the excessive concentration of

land ownership will also be necessary to maintain competition while leveraging economies of scale. Risks and sector-specific mitigation measures are presented below (Table 2).

Based on historical data, private funding could cover around 80 percent of the agriculture sector's recovery and reconstruction needs, but government supported credit instruments will play a vital role in mobilizing private capital. The government must also provide essential public goods such as food safety regulations, sanitary and phytosanitary measures, laboratories, certifications, and compliance verification, as well as other enabling factors such as agricultural research, agrometeorological information, and a range of physical and digital infrastructure, inter alia. Estimates suggest that with reforms, private financing could increase by about 30 percent in 2023–2026 and by about 50 percent in 2027–2033 (WBG 2023 forthcoming). To attract private financing, the

government must continue to liberalize the land market; reform the irrigation subsector; ensure consistent access to the EU market and open new markets for agricultural products; maintain an efficient fiscal regime, including timely VAT reimbursements for exporters; simplify and digitize the issuance of crop receipts; provide public credit guarantees, interest-rate compensation, and matching grants; promote the adoption of CSA technologies in the context of EU accession; support the land decontamination process; and upgrade the public administrative framework for utilizing EU pre-accession funds.

2.2 Industry and Commerce

Industry and commerce represent a combined share of about a third of GDP. In 2021, wholesale and retail commerce and the major industrial segments—the food and beverages industry, metal production, and engineering and machine building—accounted for 22.3 percent of national employment and 34.6 percent of commercial employment (3 million workers), 19 percent of capital investment, and 47 percent of merchandise exports (State Statistics Services of Ukraine 2023f). Prior to Russia’s invasion, the industrial sector was largely composed of Soviet legacy assets that had been privatized but that remained integrated into post-Soviet value chains. Since 2014, Ukraine had been slowly disconnecting from these markets, albeit with mixed results. The 2021 Country Private Sector Diagnostic highlighted constraints on private sector development in manufacturing, including a lack of competition, the distortive presence of SOEs in the machine-building industry, limited access to finance, and outdated infrastructure. Despite these constraints, new industrial segments have emerged, including automotive manufacturing and information technology, as well as defense and aerospace. In contrast, the Ukrainian commercial sector, including retail trade, is modern, efficient, and rapidly growing.

The invasion inflicted enormous damage and losses on industry and commerce. Damages are

estimated at \$10.9 billion (RDNA2). Population displacement reduced domestic demand, while the diminished capacity of seaports and overburdened rail networks limited access to foreign markets. Missile strikes on energy infrastructure forced enterprises to suspend operations, decrease production, and/or invest in costly energy generation, storage, and efficiency measures. Moreover, the ongoing invasion continues to increase the total damages and losses suffered by industry and commerce.

However, Ukraine’s private sector has demonstrated a remarkable degree of resilience. After the initial shock had passed, many businesses resumed operations, and some were able to reallocate their assets to safer regions. Business surveys conducted during the first half of 2023 revealed that managers were more optimistic than pessimistic, both in the industry and commerce sectors. Fuel shortages lasted only a couple of months, and the electricity crisis that began in October and November 2022 prompted firms to adapt and innovate. New facilities are still being established, particularly in the commerce sector: eight new shopping malls opened in 2022, and another seven are projected to open in 2023. Limited access to export markets has created new incentives to invest in processing capacity and other forms of domestic value addition. The EU accession process has created opportunities to leverage Ukraine’s strong industrial capabilities in areas such as agricultural machinery and automotive manufacturing. Moreover, the emergence of new businesses focused on military applications will offer unique opportunities during the reconstruction, as products such as drones and heavy trucks can be repurposed for civilian use and export markets.

In addition to the uncertainty generated by the invasion, industry and commerce are subject to multiple domestic and external challenges. Metal production, for example, is highly vulnerable to blackouts. Ore mining also uses a significant amount of electricity, and some facilities such as

the Kametsal plant and Sukha Balka mine have decreased production due to shortages. The food industry is closely tied to the agricultural sector, which faces decreased production volumes and price volatility. Processed foods are also vulnerable to potential EU import restrictions. The exodus of educated professionals caused by the invasion may hinder the development of engineering, machine-building, and other industries that require skilled labor.²³ In addition, these sectors are highly vulnerable to attacks targeting infrastructure and productive assets.

Private investment opportunities in the industry and commerce sectors are estimated at \$18.1 billion,²⁴ covering almost 80 percent of the sectors' combined reconstruction needs of \$23.2 billion, in addition to significant opportunities unrelated to reconstruction (WBG 2023 forthcoming). Under the current framework, the private sector will be unable to address the damage suffered by SOEs in the engineering and machine-building industry, but further privatization or other reforms could enable private investors to fully cover the costs involved in the recovery. Reforms in metal production could promote competition and diversification in this sector. Even without additional reforms, private investors could finance the reconstruction needs of the agri-food and commercial sectors. The agri-food industry also presents \$11.5 billion in investment opportunities not directly related to reconstruction (WBG 2023 forthcoming).

2.3 Culture and Tourism

The tourism sector has significant development potential in urban and rural areas across almost all regions of Ukraine, but investment opportunities are unrelated to reconstruction. The invasion has caused \$2.6 billion in damage to the culture and tourism sector, and reconstruction needs are estimated at \$6.9 billion (RDNA2). Cultural assets have suffered most of the damage, and the private sector has a limited capacity to rebuild those assets. Prior to the invasion, and with the exception of the pandemic-induced shock in 2020, operating profits in hotels and accommodation were robust, exceeding 25 percent in 2019 and 17 percent in 2021.²⁵ However, the tourism sector is constrained by outdated and dysfunctional regulations, inconsistent policies, and a weak state-level institutional framework, which discourage investment. In addition to investment in infrastructure, both general and sector-specific, tourism development will require a comprehensive, systematic, and balanced approach to attracting investment based around a clearly defined brand identity and a coherent marketing strategy. Based on interviews with managers of firms operating in the sector, tourism offers \$5 billion in private investment opportunities, though none of these opportunities addresses reconstruction needs identified by the RDNA2.

23 The United Nations High Commissioner for Refugees' (UNHCR) third Regional Intentions Survey (2023b) included refugees from Ukraine, most of whom are female. It found that over half of respondents had either a master's degree or doctorate (29 percent) or a specialized degree (26 percent), while 19 percent had a technical or vocational degree, and 13 percent had a bachelor's degree. Similarly, the UNHCR's Regional Protection Profiling & Monitoring (2023c) found that 14 percent of refugees had a master's degree or higher, 22 percent had a specialized degree, 30 percent had a vocational qualification, and 12 percent had a bachelor's degree.

24 Assuming reforms and interventions (Table 2).

25 State Statistics Services 2023h.

CHAPTER 3

Infrastructure

Infrastructure is vital to the development of all other economic sectors, and Russia's invasion has badly damaged Ukraine's transport, energy, telecommunications, water and sanitation, and irrigation systems. Because the transport and energy sectors contribute disproportionately to climate change, a green and resilient reconstruction will accelerate economy-wide growth while also significantly reducing greenhouse gas (GHG) emissions. By engaging the private sector in financing and managing infrastructure, the government can magnify the impact of its limited resources while enhancing the allocative and technical efficiency of essential public services.

3.1 Transport²⁶

Ukraine's transport sector is complex and diverse, but decades of underinvestment and limited strategic planning have slowed its development and undermined its efficiency. In 2016–2021, the sector contributed an average of 6.2 percent of GDP, though this share dropped to 5.4 percent in 2021 (State Statistics Services of Ukraine 2023a). Transportation employs 961,000 workers, 28 percent of whom work in the railway system, 22 percent in road freight, 20 percent in logistics, and 10 percent in urban mobility (State Statistics Services of Ukraine 2023b and c). In 2021, the transport sector received \$1.6 billion in capital investment, with about 7 percent coming from state and local government budgets, 8 percent

from local credit funds and investments, 3 percent from foreign investors, and nearly 80 percent from domestic transportation firms (State Statistics Services of Ukraine 2023d).

Aging vehicles and low emissions standards contribute to high levels of pollution and GHG emissions. Even before the invasion, Ukraine's highly inefficient transport sector weighed on its economic competitiveness (WBG 2021). In 2020, despite the economic slowdown caused by the pandemic, the transport sector emitted the equivalent of 31.8 metric tons of CO₂, representing 10 percent of the country's GHG emissions. Road transport was responsible for 73.5 percent of these emissions, and in 2021 road transport generated 26.6 tons of suspended particulates (State Statistics Services of Ukraine 2023e). In addition, the off-road transportation of agricultural machinery and industrial equipment accounts for 18.6 percent of sectoral emissions (UNFCCC 2022). A green and resilient recovery will entail shifting a portion of transport services from roads to railways and waterways while also decarbonizing road transport through fleet modernization, electric mobility, and transit-oriented urban development.

Ukraine has an extensive but largely undermaintained transport network. The density of highways in Ukraine (14.3 km/1,000 km²) is comparable to the EU average (19 km/1,000 km²), but the density

²⁶ This section discusses both private sector opportunities that are related to damages identified in the RDNA2 and other investment opportunities in this sector. Other investment opportunities are related to (i) underreported damages of private assets (using extrapolation of the reported data, e.g. railway and urban transport fleet) and (ii) opportunities not related to damages but required to maintain the same level of service (i.e. fleet renewal and infrastructure reconstruction) or improving efficiency and resilience of transport systems (i.e. investment opportunities in new infrastructure or assets, etc.). These estimates take into account the National Transport Strategy of Ukraine 2030, the Sustainable Logistics Strategy 2030, the Ukraine's Recovery Plan Blueprint and the project cost estimates by the State Organization Agency on Support of Public-Private Partnership, the Ministry for Communities, Territories and Infrastructure Development of Ukraine, and the World Bank.

of all roads is significantly lower (281 v. 1,172 km/1,000 km²), indicating insufficient regional and local connectivity (Ministry of Infrastructure 2020; European Road Federation 2022; CIA World Factbook n.d.).²⁷ About 51 percent of the network does not meet national rough-road requirements, and 39 percent fails to meet strength requirements. In 2018, Ukraine scored just 2.4 out of 7 on the Organization for Economic Cooperation and Development's (OECD)'s index of perceived road quality (OECD 2018). Road freight accounts for almost 70 percent of all domestic cargo by weight, or about 12 percent of all ton-kilometers (World Bank 2018). Road transport plays a crucial role in moving agricultural products such as grains, vegetables, and fruits to consumers, processing facilities, and export points. The top commodities carried by trucks include metal ore and other mining products (41 percent), agricultural products, food, beverages, and tobacco (24 percent), and chemical products (10 percent) (World Bank 2018). The electrification of road transport is still in its early stages. Electric vehicles represent a small share of total vehicles and are concentrated in larger cities, while about 90 percent of charging stations are slow charging.

The railway system is extensive but outdated. The country has about 21,700 km of rail lines, 47 percent of which are electrified. Rail serves as the backbone for long-distance freight transport, accounting for 54 percent of freight turnover and 27 percent of passenger transportation in 2019 (World Bank 2018; Ernst & Young 2021). The Ukrainian railway system is the fourth largest in Eurasia in terms of cargo traffic, with freight-traffic volume per kilometer being 3–5 times higher than that of other European countries (Castalia 2023).

The state railway company, Ukrzaliznytsia JSC has a near monopoly on passenger and cargo transport, which stifles competition and hinders the entry of private firms. Nontransparent tariffs and long delivery times encourage the use of road transportation as an alternative to rail. The existing network of transshipment terminals is inadequate and fragmented (IFC 2021).²⁸

Ukraine's seaports are crucial links to global markets, while the country's inland waterways are underutilized. Ukraine has 18 international seaports, including five in Crimea and 13 on the mainland. Prior to Russia's invasion, the four largest seaports—Pivdennyi, Odesa, Mykolayiv, and Chornomorsk—accounted for about 80 percent of total capacity. The government had successfully tendered concessions for two smaller seaports, Olvia and Kherson, and had started preparing for the third, Chornomorsk. River transport on the Dnipro was primarily used to connect major manufacturing and agricultural centers with seaports,²⁹ while shipping on the Danube was limited before the invasion but started to play a vital role once the Black Sea ports were blocked. Most of Ukraine's registered river shipping fleet is outdated, and in 2020 the average vessel was 36 years old, exceeding the maximum age for entry into EU ports.

Prior to Russia's invasion, the aviation sector was an important driver of Ukraine's economy, contributing 1.1 percent to GDP and generating 146,000 jobs (IATA 2018). The country has 20 commercial airports, most of which are owned by the state or municipalities, as well as five privately owned airport terminals. Prior to the invasion, the government was weighing various options to secure capital investments in airports, and in 2021 it began

27 Density of highways and roads is calculated as length of motorways or roads (km) / area of Ukraine or the EU * 1000 km. All roads include motorways, main and national roads, secondary, regional, and local roads.

28 Six private players operate 11 out of 16 multimodal hubs, while Liski, a state-owned subsidiary of JSC Ukrzaliznytsia, operates the other 5.

29 Since the invasion navigation on Dnipro has been limited due to its proximity to the frontline. In June 2023 Kakhovska dam on Dnipro River was destroyed causing massive flooding and likely long-term interruption of Dnipro navigation. However, while this report was being prepared no information was available to assess the level of damage and consequences for transport sector.

preparing several for partial or full concessions. However, regulatory barriers exist to prevent bankable investment projects in the airport sector.

In 2021, 70 percent of Ukraine's population lived in urban areas, which have extensive but poorly maintained transport networks. Productivity and service-quality indicators for the country's passenger transportation networks lag EU standards due to outdated infrastructure, low fares, and poor revenue oversight. Urban transport services are supervised by subnational (local) governments and delivered by a mix of public and private operators. These operators tend to have narrow margins, as they bear the demand risk associated with government-regulated tariffs, but lack a proper compensatory framework. An inability to secure long-term financing and the uncertainty associated with the business model inhibit investment in climate-smart technologies (World Bank 2023a). Municipal financing is available for urban transportation if the city has sufficient borrowing capacity, but this capacity was already limited before the invasion.

The transport sector has the economy's largest reconstruction needs at an estimated \$92 billion.³⁰ Damages are estimated at \$36 billion, primarily to road infrastructure (63.7 percent), followed by rail infrastructure and rolling stock (19.2 percent), private vehicles (10.2 percent), and urban transport systems (5.2 percent) (RDNA2). The actual damage caused by the invasion may be even higher due to limitations in assessing damage to private transportation and logistics assets.

Losses are estimated at \$32 billion, highlighting the transport sector's critical importance to domestic and international trade. The blockade of Ukrainian Black Sea ports has severely compromised exports, leading to massive financial losses. The Black Sea Grain Initiative, which facilitated the maritime exportation of 36.5 million tons of Ukrainian grain during

July 22, 2022 - July 17, 2023, has helped mitigate about \$1.3 billion in losses. However, even before the initiative was terminated by Russia in July 2023, it did not encompass other forms of cargo, which have historically been three times larger by tonnage than Ukraine's seaborne grain exports. The EU's Solidarity Lanes Initiative, which ships goods by rail, has been instrumental in providing alternative trade routes for these goods, but its precise impact has not yet been determined.

Russia's invasion of Ukraine has forced Ukraine to reconsider the transport network, while at the same time offering an opportunity to develop a more resilient transport system. Ukraine's progressive integration into European and transatlantic markets and value chains will require the restoration, upgrading, and expansion of multiple transport modes, as well as wholly new investments in transportation systems and infrastructure. Restoring access in invasion-affected areas will not always entail rebuilding systems as they existed before the invasion. Meanwhile, policymakers must strengthen the resilience of the national transport sector and invest in efficient, low-carbon infrastructure. To mobilize the funding necessary to accomplish these objectives, the government will need to augment its limited fiscal resources through active engagement with the private sector. The extent of private finance will depend on the implementation of priority reforms and the availability of appropriate de-risking mechanisms. As the public sector's capacity to invest directly in public infrastructure is limited, the government must expand service-delivery models that involve the private sector, such as PPPs, concessions, joint ventures, performance-based contracts, and commercial loans. At the same time, the extent of private sector investment will depend on the ability to address various risks, such as availability of third-party infrastructure, material loss and damages, demand and revenue risks, access to finance, etc.

³⁰ Damages are largest in the housing sector, but reconstruction needs are largest in the transport sector.

Box 1 Mobilizing Private Financing for Public Investment under a Deferred Payment Structure

A deferred Payment Structures (DPS) can attract private contractors and mobilize financing for public investment projects where risk allocation is challenging for private sector debt and equity. In emerging markets jurisdictions, DPS programs have been used to finance highly complex projects, including multibillion-dollar expansions of metro systems and roads in Latin America and the Caribbean.

Under DPS programs, granting authorities accept bids from the private sector for the construction, operation and maintenance of public infrastructure projects, and private contractors perform discrete tasks (based on milestones) in exchange for a stream of long-term deferred payment rights granted by the government. As each phase of the project is completed, contractors sell these payment rights to generate liquidity for the next phase, and the process repeats itself until the project is complete. Such future payment streams, which can come 10–15 years after the completion of the project, are either authorized directly by the government or through a trust backed by the government. When structured in a bankable manner, these government-backed payment

obligations can be bundled and sold to institutional investors in a customary securitization transaction.

In Ukraine, the infrastructure concession would need to be structured on a DPS basis, and the government would need to commit to multi-year payments backed by payment support from foreign donor governments and development partners. At the start of the project, the foreign partners would need to commit to the bulk of the obligations to the certificate holders. However, over time, as Ukraine's sovereign creditworthiness improves and its payment capacity is restored, the government could assume a larger share of the payment obligations under terms agreed upon in advance and embedded in the language of the trust documentation. Consequently, implementing a DPS in Ukraine would require especially close collaboration between the government, financial markets, and the international community. Because this report does not include financing mechanisms that require a guarantee from the government or its development partners, DPS arrangements are not included in the estimates for private financing.

In the road sector, the introduction of PPPs and concessions could enable the private sector to mobilize the \$5 billion in reconstruction financing estimated by the RDNA2 (about 10 percent of the identified road financing needs) while also creating \$4 billion in additional road-related PPP opportunities.³¹ In a context of heightened risks, private investors will likely hesitate to make long-term commitments, and the government may need to take the lead in the early stages of reconstruction. DPSs can enable the public sector to attract private financing even in an uncertain environment, but establishing these structures will require securing substantial donor support. While the private sector has historically managed the long-distance passenger and cargo commercial road fleet, over \$8 billion will be required to modernize vehicles and

improve emission standards. Reforms will be necessary to align road transport regulations with EU standards.

Shifting the focus of passenger and cargo transport from roads to rail and waterway transport can yield sector-wide gains in decarbonization and overall efficiency. In the railway sector, the government will need to continue increasing the efficiency of UZ's operations and opening new segments to private-sector involvement. While public ownership of railroad infrastructure will remain necessary, the authorities can reform the tariff system, liberalize the railroad transportation market by allowing international operators to participate in it. Establishing connectivity with EU supply chains, including through the gradual development of the standard European gauge (1,435mm)

31 Total private sector opportunities in the road sector beyond the RDNA2 needs are \$15 billion (Table 2 and World Bank Group 2023, forthcoming).

infrastructure in Ukraine, will be critical to Ukraine's economic realignment. To further integrate the railway network and logistics centers into the EU, the government should consider developing a system of transshipment terminals linked to the EU by the standard European gauge. While adopting a new standard gauge is a massive and expensive undertaking that should remain within the purview of the public sector, the private sector can assume the risks involved in developing the logistics terminals. The private sector can also play an important role in deploying new rolling stock to meet the requirements of the standard European gauge.³² The railway sector offers about \$2 billion in private investment opportunities, if an enabling environment for the private sector is created. Leveraging these opportunities could accelerate the development of multimodal logistics services (WBG 2023 forthcoming).

Privatization and infrastructure investment will be vital to mobilize private investment in water transport. The government should continue the process for tendering seaport concessions that began prior to the invasion. No immediate regulatory changes are needed to resume the concession of seaports, though further reforms may be required to keep port operations competitive. Further privatization of stevedoring companies and concessioning ports along the Danube will increase the capacity of an underutilized waterway with direct access to EU markets. Modernizing infrastructure along inland waterways will require public investment, though the government should work with private firms to identify opportunities for PPPs, concessions, and similar arrangements. For example, a PPP could support the modernization of infrastructure along the Dnipro. Fleet renewal and investments in port infrastructure could attract over \$8 billion in private financing, and most opportunities would be unrelated to reconstruction.³³

Regulatory reforms could unlock \$0.9 billion in private investment opportunities in the airport system (WBG 2023, forthcoming). The government will need to develop a master plan for reconfiguration the airport network that includes strategies for attracting private financing. Creating an airport development fund similar to the existing road fund could help finance the redevelopment of regional airports over the medium and long term. The EU Green Deal's objectives for reducing CO₂ emissions from aviation could offer opportunities to attract multilateral financing for new airport infrastructure and catalyze the participation of private airlines in the system's recovery.

Establishing a new regulatory framework for urban transportation and exploring alternative financing models could create \$15.5 billion in investment opportunities in urban transport (WBG 2023 forthcoming). Renewing the outdated and highly polluting vehicle fleet will require: (i) developing new business models that allow for the aggregation of demand and/or the separation of asset ownership; (ii) technical and financial support for the transition to zero-emissions technologies by public and private operators; and (iii) regulatory reforms to allow the establishment of long-term performance-based arrangements between private operators and public transport authorities.

The transport sector is vulnerable to various risks and will require complex regulatory reforms and financial guarantees to attract private investment. The insecurity of assets, the inability to forecast demand, an unreliable energy supply with unpredictable costs, incomplete compliance with EU regulations, and the uncertainty surrounding the reform process will remain key risks for the private sector.

32 While greenfield projects to change the rail gauge would be highly expensive, private participation is feasible. The government and its would-be partners in the private sector can learn from the experience of Rail Baltica, a private-sector initiative to integrate the Baltic countries into the European network.

33 In June 2023, the Kakhovska dam on Dnipro River was destroyed, causing massive flooding and likely long-term interruption of Dnipro navigation. As of the publication date of this report, however, no formal assessment has been made of the level of damage and consequences for the transport sector.

3.2 Energy and Extractives³⁴

The energy and extractives sectors are critical engines of economic growth in Ukraine and offer relatively high wages and export earnings, but they are also the country's largest sources of GHG emissions. In 2020, energy contributed 2.9 percent to GDP, while extractives contributed another 4.6 percent (State Statistics Service of Ukraine 2022). In 2021, the energy and extractives sectors employed 4 percent and 2.6 percent of the workforce, respectively. Wages in the energy and extractives sectors were 38 percent higher and 41 percent higher, respectively, than the national average. Together, the two sectors contributed 8.5 percent to total exports in 2020 (State Statistics Service 2022). However, these sectors also accounted for a combined 43 percent of Ukraine's GHG emissions in 2020 (Ministry of Environmental Protection and Natural Resources of Ukraine 2022).³⁵ While the GHG intensity of GDP in Ukraine fell by 86 percent between 1999 and 2019, it remains 2.5 times the global average and 4.6 times the average for Europe and Central Asia (Climate Watch n.d.).³⁶ Similarly, although the energy intensity of GDP fell by 60 percent between 1996 and 2020, it is still 1.5 times the global average and 1.9 times the average for European countries (IEA n.d.).³⁷

Ukraine has a diversified energy mix with significant potential to increase supply and improve efficiency. In 2020, the primary energy supply consisted of natural gas (28 percent), coal and peat (26 percent), nuclear (23 percent), oil (16 percent), and renewables (7 percent). In 2020, imports accounted for 36 percent of the primary energy supply (State Statistics Service of Ukraine 2021). Most recent estimates indicate Ukraine's notable technical RES potential with 83 gigawatts (GW) of photovoltaic (PV), 438 GW of onshore wind power, 250 GW of offshore wind power (NASU 2020 as quoted in Energy Charter 2022).³⁸ Ukraine's biomethane potential could replace its pre-invasion gas imports or supply 10-20 percent of EU's biomethane market (Amelin, et al. 2020; bne intelliNews 2023). The potential for energy savings is greatest in the industrial sector (33 percent) and the residential sector (30 percent), while the public sector offers considerable scope for efficiency gains (World Bank 2022b).

Ukraine is among the world's leading producers of a wide range of minerals. Although it covers only 0.4 percent of the Earth's surface, Ukraine contains an estimated 5 percent of the world's mineral resources (Liventseva 2022). These resources include metallic and non-metallic raw

34 In the energy and extractives sector, the World Bank Group team estimated private sector opportunities based on energy demand and supply projections elaborated by the team taking into account Ukraine's energy strategy and estimates by the IMF, IBRD, European Network of Transmission System Operators for Electricity, European Network of Transmission System Operators for Gas, European Union, International Energy Agency, International Renewable Energy Agency, Energy Community and the European Union Agency for the Cooperation of Energy Regulators. These estimates are indicative and could vary significantly depending on assumptions used. Other opportunities (beyond RDNA2) are estimated taking into account government of Ukraine's goals for the development of energy and extractives sectors. The main difference from the RDNA2 is that the estimate of the baseline projection includes Ukraine's goals (e.g., nuclear, natural gas, biomethane, exports, etc.) although the report's projections are below the figures of the government of Ukraine energy strategy. This concerns especially the reform and intervention scenario which varies from the energy strategy in the areas of 10 GW wind, 5 GW electrolyzer, 2 GW peaker and 2 GW lithium-ion 2-hour battery energy storage. These investment opportunities include development of new or modernization of existing infrastructure and assets as well as development of local renewable energy equipment manufacturing capacity. (WBG 2023 forthcoming).

35 Energy industries include emissions from stationary fuel combustion in production of electricity and heat by thermal power plants, combined heat and power plants, heating plants, heat and power plants of enterprises, waste incinerators, petroleum refineries and gas processing plants, and fuel combustion at the enterprises that are engaged in production of energy materials and other energy industries.

36 GHG data include land-use change and forestry (LUCF).

37 Total energy supply per unit of GDP in megajoules in 2017 purchasing-power-parity terms.

38 National Academy of Science of Ukraine (NASU), Institute of Renewable Energy. Atlas of energy potential of renewable energy sources of Ukraine/ ed. S.O.Kudia, Kyiv, 2020, ISBN 978-966-999-034-1 <https://www.ive.org.ua/wp-content/uploads/atlas.pdf>

Атлас енергетичного потенціалу відновлюваних джерел енергії України / за заг. ред. С.О. Кудрі. – Київ: Інститут відновлюваної енергетики НАН України, 2020. – 82 с.

Energy Charter. Task Force on Cooperation for Restoring the Ukrainian Energy Infrastructure project, Ukrainian Energy Sector evaluation and damage assessment – IV (as of November 24, 2022), Brussels, https://www.energycharter.org/fileadmin/DocumentsMedia/Occasional/2022_11_24_UA_sectoral_evaluation_and_damage_assessment_Version_IV.pdf

materials such as titanium, ball clays, ferro-manganese and ferro-silicomanganese alloys, gallium, lithium, graphite, and magnesium, as well as energy resources such as gas, oil and coal (Liventseva 2022; IEA 2020). Ukraine's lithium deposits are among the largest in Europe. Its proven reserves of titanium ores are among the ten largest worldwide, and it accounts for 6 percent of global titanium production (Ukrainian Geological Survey 2021).

As the government continues to reform the regulatory framework, private firms are playing an increasingly important role in the energy and extractives sectors. Ukraine became a Contracting Party to the Energy Community Treaty in 2011 (OECD 2021b; Osinska et al. 2022). By the end of 2019, the government's feed-in tariff (FIT) support had enabled foreign and domestic firms to invest \$10 billion in renewable energy, making it one of the five sectors with the largest amounts of investment³⁹ (Kozakevich 2020). Most segments of the electricity subsector are open to private investment, except for the large hydropower and nuclear power generation and transmission systems. However, policymakers aim to open these subsectors to some form of private-sector participation over the long term. The government currently limits the private sector from participating in district heating systems, except as an energy producer, though private-sector engagement is a long-term objective. In the extractives sector, private investment in mining has increased: e-auctions for 362 mining licenses generated 3.8 billion Ukrainian hryvnia in nominal prices (\$132 million in nominal prices) in public revenue between 2016 and 2022 (Ukrainian Geological Survey 2023).⁴⁰

Despite ongoing reform efforts, indicators of the operational performance of the energy and extractives sectors remain well below EU averages. Inefficiency in these sectors increases the cost of goods and services, while undermining Ukraine's international competitiveness. During 2000–2021, the country's renewable power generation capacity factor⁴¹ was significantly below the EU average, considering renewable energy capacity factors are limited by technical capability, location and other factors (IRENA 2022a). In 2018, the electricity transmission and distribution network had higher average technical losses, more frequent service interruptions, and longer periods without service than the average for a sample of European countries (Council of European Energy Regulators (CEER) 2020 and 2022).⁴² In 2020, the average length of service interruptions varied across distribution companies, ranging from just 1 minute to over 2,275 minutes (NEURC n.d.).

In 2017, the Ukrainian extractives sector's performance lagged European standards in terms of value realization, revenue management, and governance. Moreover, key weaknesses were observed in environmental, social and governance indicators (Natural Resource Governance Institute 2017; Suprun 2023; EPL 2023).

Weak governance and market mechanisms undermine the financial performance of the energy sector. Market mechanisms face challenges to proper functioning, especially in the electricity subsector, and private-sector participation is restricted in critical segments. Rather than promoting competition, low price caps in electricity wholesale markets discourage private

39 Assume dollar figures are nominal prices.

40 Assume hryvnia values are nominal prices.

41 Capacity factor is the ratio of the electrical energy produced by a generating unit over a period of time to the electrical energy that could have been produced at continuous full power operation during the same period.

42 Within CEER's 35 countries, including Ukraine, 31 countries include non-technical losses either in distribution (10 countries) or in both distribution and transmission (25 countries). Ukraine includes non-technical loss only in distribution. The year 2018 is the most recent data on transmission loss in the CEER report.

participation and fail to generate price signals that would spur investment and innovation. Since July 2023, the government has taken steps to increase the caps, for example, by up to €181/MWh or 7,200 UAH/MWh in the day-ahead and intraday markets. In June 2023, the average household tariff nearly doubled to €66 per MWh⁴³ but remained below the cumulated costs of generation, transmission, and distribution (GlobalPetrolPrices.com. n.d). Similar mismatches between costs and tariffs are evident in the district heating and gas sector (OECD 2021a and b).

PSO mechanism, introduced by the government in October 2021, reduces the financial viability of state-owned energy companies (OECD 2023). The mechanism itself is a hybrid of physical and financial models. In the fourth quarter of 2021, the new PSO model was projected to cost 0.6 billion hryvnia (\$28 million in 2023 prices) before VAT, but its actual cost was 3 billion hryvnia (\$136 million in 2023 prices) (OECD 2023).⁴⁴ Before doubling in June 2023 the highest household tariff was less than one-quarter of the average tariff in the EU. Under the latest version of the PSO for households, Energoatom and Ukrhydroenergo are expected to sell electricity at market price and cover price difference for households from their income. Ukrhydroenergo estimates that the financial compensation mechanism provides 30 percent of its total revenue (OECD 2023). Delays in holding auctions for renewable electricity generation and hybrid energy storage and generation continue to discourage private investment. Lower domestic gas prices and the PSOs assigned to the SOE Naftogaz further reduce cost-recovery in the sector.

Damage to the energy and extractives sectors have had a devastating impact on the Ukrainian economy. Total damage to the two sectors reached an estimated \$10.6 billion in February 2023, with invasion-related revenue losses exceeding \$27

billion. Moreover, the disruption of electricity, water, heating, telecommunications, and banking services has had deeply negative spillover effects across the economy. The public sector's estimated reconstruction and recovery needs total \$47 billion over 2023–2033. The power sector accounts for the largest share of reconstruction needs (78.8 percent), followed by fuel-oil infrastructure (7.2 percent), gas transportation and distribution networks (5.35 percent), district heating systems (5.3 percent), and coal mining operations (0.7 percent) (RDNA2).

Private firms have been a critical source of resilience in the energy and extractive sectors. In March 2023, the commercial energy operator DTEK installed 114 megawatts (MW) of wind-power capacity in southern Ukraine (DTEK 2023a), and in April Ukraine's first biomethane production plant connected to the gas network (Vodyanyi 2023). Other companies have relocated assets, established new facilities, and opened businesses elsewhere in Ukraine and in neighboring countries such as Poland and Romania. Despite the invasion, private firms in the raw materials industry continue to operate. In 2022, 89 licenses were issued, generating \$55 million in revenue (in 2023 prices) (Ukrainian Geological Survey 2023).

Attacks on critical energy infrastructure have highlighted the importance of decentralized and distributed generation and energy storage. The private sector, the government and development partners are deploying solar-power systems to prevent blackouts and protect critical infrastructure, and the solar PV market for the industry and commercial electricity consumers is growing. Cross-subsidization persists, with households paying regulated tariffs, while businesses pay market prices, which are often 2–3 times higher. Consequently, firms have started installing solar PV to offset consumption of grid

43 Regulation of the Cabinet of Ministers of Ukraine, link: https://zakon.rada.gov.ua/laws/show/544-2023-п#Text_39.0553 hryvnias per one euro as per official exchange rate by the National Bank of Ukraine on 1 June 2023

44 The dollar equivalents assume hryvnia values in 2021 prices, with adjustment to hryvnia values in 2023 and converted into dollars using 2023 exchange rate used in the RDNA2 (36.5686).

energy and increase price certainty in absence of FITs (PV Magazine 2022). The commercial and industrial sectors accounted for approximately 58 percent of electricity demand in 2020, creating considerable opportunities for suppliers of decentralized generating systems and energy-efficient technologies, including direct-current appliances and battery energy storage systems (BESS) (Eurostat 2023). Given the GHG content of grid electricity, distributed power generation from renewable energy sources could help firms reduce their carbon footprint, making them more competitive in EU markets.

Private digital technology firms are helping the energy industry protect against cyberattacks, enabling it to continue operating during the invasion. Centralized data security and remote accessibility are crucial to business continuity and disaster recovery. Prior to the invasion, Ukrenergo, upgraded its information and communication technology (ICT) and developed a business recovery plan, which helped it respond rapidly and modify its operations in response to the invasion. Working with ICT companies, Ukrenergo has successfully strengthened its security and productivity platforms, bolstering its resistance to continual cyberattacks (CEE Multi-Country News Center 2022).

The EU accession process is accelerating reforms in the energy and extractives sectors. The Ukrainian government implemented sweeping regulatory changes in 2022–23, passing new laws on the development of energy storage systems, promotions of the development of small distributed-generation systems and biomethane production, the liberalization of wholesale electricity tariffs, and the corporatization of the SOE Energoatom. The authorities also issued a decree increasing the electricity tariff for households and adopted new regulations on the

integrity and transparency of the wholesale energy market (Ukraine Recovery Conference 2023b). The successful implementation of these reforms can help ensure markets provide the right price signals, encourage efficient investment and help minimize costs. The private sector will be vital to a green and resilient recovery in Ukraine, but the magnitude of its contribution will be depend on the scope and scale of the government’s reforms.

Reconstruction needs include repairing damaged thermal power plants owned by the private company DTEK, which may finance the process with private resources. The government could unlock additional private financing by opening more elements of the energy and extractives sectors to private investment. Implementing market-oriented reforms in the energy and extractive sectors could enable private investment to cover as much as 76 percent of reconstruction needs.⁴⁵

Raising excessively low price caps and introducing competitive forward markets could promote private-sector participation and spur competition. The timely implementation of auctions for electricity from renewable energy sources and from hybrid renewable energy sources with energy storage could also attract private investors. These auctions could feature long-term agreements with a feed-in premium mechanism, which would pay the auction winner the price difference when the market price is lower than the auction contract price, and should require the winner to pay back the differences when the market price is higher than the contract price. This two-way arrangement can ensure benefit sharing with taxpayers.

On the supply side, the authorities should adjust regulated tariffs to allow cost recovery in the electricity transmission, distribution and retail, district heating, and gas segments. Strengthening competition and performance

⁴⁵ Resolution of the Cabinet of Ministers of Ukraine No812 as of July 19, 2022 with latest amendment by the Resolution No896 as of August 8, 2023. On the approval of the procedure on public service obligations of natural gas market entities to ensure societal interests on the functioning of the natural gas market in relation to peculiarities of supplying natural gas to heat producers and to public institutions, link: <https://zakon.rada.gov.ua/laws/show/812-2022-%D0%BF#Text>

regulations will also be crucial to reduce costs and improve service quality. These regulations may include mandatory ceilings on technical and nontechnical losses; maximum service delivery interruptions, competitive procurement rules, or environmental, social, and governance standards.

On the demand side, the authorities should improve energy efficiency and promote conservation. Encouraging private investment in energy-efficient buildings may require complementary public financing, guarantees, green financing instruments, or long-term financing arrangements with interest payments waived until the energy savings materialize. The government should aim to contain non-commercial financing support at levels comparable to the EU average.

Allowing competitive private-sector participation in the energy and extractives sectors could improve their operational and financial performance while promoting innovation and expansion. The government could allow potential commercial financing in suitable forms for electricity transmission, large hydropower, nuclear power, and district heating system including biomethane.

Most of the above-mentioned measures are well aligned with EU standards and market practices. EU alignment will help increase private investors confidence in Ukraine, increasing energy security, resilience and export opportunities.

3.3 Telecommunications, Postal Services, and Broadcasting

Ukraine's telecommunications sector is a fast-growing strategic contributor to GDP: postal services are expanding into e-commerce and broadcasting remains a key source of news and information. In addition to offering well-paying jobs, the telecommunication sector is facilitating economic diversification and enabling the growth of high-value exports. In 2022, ICT service exports grew by 5.8 percent to \$7.5 billion, accounting for 13.2 percent of total exports and 46.7 percent of services exports (NBU 2023).

The telecommunications, postal services, and broadcasting sectors are largely private. The telecommunications sector offers relatively inexpensive internet services, but indicators of service quality lag the levels of EU members (Speedtest Global Index. n.d.). The Ukrainian digital sector ranked 2nd out of 35 European countries in the 2022 European Open Data Maturity report (European Commission n.d.) and 12th among 23 emerging European countries in the 2023 Information and Technology Competitiveness Index (Emerging Europe 2023). The country's postal services are digitalized and largely automated. The postal system provides money transfers, and the quality of postal services is comparable to the EU average (EIB n.d.; Nova Poshta. n.d.). The two dominant players are the privately owned Nova Poshta, which holds a 65 percent market share, and Ukrposhta, an SOE with a 25 percent market share. Ukraine is improving the quality of broadcasting services as part of the EU accession process.

As the invasion drove a large share of the population to relocate, increasing mobile connections offset a decline in fixed subscriptions. Network-sharing and redundancies offer opportunities for new players to enter the market. The EU accession process will solidify pro-competition policies and offer investors the opportunity to seek redress before the European Court of Justice. The government aims to increase the use of cloud technologies to deliver public services, possibly through a new PPP (National Council of Recovery of Ukraine from the Consequences of the War 2022). Cloud technologies have helped to ensure access to electricity and other critical utilities.

Postal services have remained strikingly resilient during the invasion. In 2022, Nova Poshta entered new markets in Poland and Lithuania. It launched air-mail services, modernized its infrastructure, and built new automated logistics centers, reducing costs, delivery times, GHG emissions, and other forms of pollution (Nova Poshta n.d.; The Odessa Journal 2023). Nova

Poshta became the first issuer of corporate bonds in Ukraine during the invasion. Meanwhile, other private postal and courier services companies have continued to grow (КАПІАТИ. n.d.).

Opportunities are available for new private broadcasting companies to enter the market. In February 2022, Ukraine's largest broadcasters and many other channels switched to broadcasting the official newscast. Before the invasion, Ukraine enforced legislation that limited the activities of oligarchs in broadcasting and other media (ITU 2022).

Public investment and regulatory reform can further improve competition in the telecommunications, postal services, and broadcasting sectors. Key measures include: (i) completing the rollout of 5G; (ii) updating the radio-spectrum regulations; (iii) protecting open internet access; (iv) mandating that infrastructure be shared with independent operators; and (v) leveling the competitive playing field. Further strengthening of media freedom could attract additional private investors. All three sectors can mobilize private finance through commercial finance, the establishment of PPPs, or the privatization of specific services and market segments.

3.4 Water and Sanitation Services

Prior to Russia's invasion, Ukraine's water supply and sanitation sector struggled to provide universal access and maintain high service quality, with negative effects on human health, the economy, and the environment. In 2021, more than 10 million people lacked access to safely managed water services, and more than 20 million people did not have access to centralized wastewater collection and treatment services. The country's water and sanitation infrastructure was in dire need of upgrades and rehabilitation. About 40 percent of the existing water supply networks were assessed as being in critical condition, 35 percent of the water treatment facilities required upgrading, and 23 percent of

pumping stations needed to be replaced. While the sector generates enormous economic and public health benefits, it accounted for only 0.35 percent of GDP and 0.85 percent of total industrial output in 2021 (Statistical Services of Ukraine, 2023g).

The private sector can participate in the water and sanitation sector through concessions or PPPs, but the engagement of private firms has been limited to date. Key obstacles to greater private-sector involvement in water and sanitation service delivery include fragmented sectoral governance arrangements, the absence of a long-term vision for the sector, and the weak financial viability of service providers. Most operators are small, with limited capacity to invest in and properly maintain existing infrastructure. The sector also lacks incentives for providers to consolidate the water and sanitation network or otherwise deliver services in a cost-effective way.

As a result of Russia's invasion, Ukraine's water and sanitation sector has sustained \$2.2 billion in direct damages and total reconstruction needs are estimated at \$7.1 billion. The scale of the sector's reconstruction offers opportunities to improve efficiency by increasing private-sector involvement. This assessment conservatively assumes limited initial opportunities for private financing to support the reconstruction of the water supply and sanitation sector, either with or without reforms. The identified private opportunities will likely take place on a pilot basis and include private investment in water and wastewater treatment facilities, water and sewage pumping stations, water supply and sewer networks, as well as water reuse and laboratory research. During 2023–2026, water-treatment facilities and sewage-treatment plants offer \$50 million and \$60 million in private investment opportunities, respectively. Over 2027–2033, the water and sanitation sector could mobilize an additional \$50 million in private investment, and implementing reforms to the policy and institutional framework could increase this figure

to \$155 million. Additional investment will be required to expand service coverage and ensure compliance with EU directives for drinking water and urban wastewater treatment.⁴⁶

3.5 Irrigation

Irrigation is crucial to the development of the agricultural sector, but prior to the invasion just 1.3 percent of Ukraine’s cropland was irrigated. Irrigation networks are concentrated in Zaporizhzhia, Odesa, Mykolaiv, Kherson, Dnipropetrovsk, and Crimea. These regions have been directly affected by the invasion, and some are temporarily not under government control, jeopardizing the entire Ukraine’s irrigation infrastructure. The invasion has compounded preexisting challenges in the irrigation sector. Following the fall of the Soviet Union, much of the country’s irrigation infrastructure fell into disrepair, and deep structural changes will be necessary to rehabilitate and expand irrigation systems. Pre-invasion estimates suggest that of the 2.2 million hectares of land equipped for irrigation, only a third can be irrigated without additional capital investment (World Bank 2022a). Climate change poses a serious threat to water availability, with especially significant implications for southern Ukraine, and irrigation could help bolster the resilience of farmers facing reduced rainfall. Modern irrigation systems are a form of climate-smart technology that brings economic benefits. For example, drip and pivot irrigation could help reclaim degraded land for agricultural use. An analysis of the country’s 20 major irrigation systems⁴⁷ between 2017 and 2021 shows that irrigation increased crop yields by between 6 and 52 percent, depending on the scheme and crop composition (WBG 2022).

Ukraine’s existing irrigation infrastructure is highly exposed to invasion-related risks, as most systems are in invasion-affected or areas temporarily not under government control. An analysis of the 20 largest irrigation systems shows that in 2022 the amount of land under irrigation fell by 35,500 hectares, or about 13.5 percent, relative to its 2017–2021 average (WBG 2022). The Kakhovka irrigation scheme in Kherson registered the largest drop in irrigation area. The Nova Kakhovka dam on the Dnipro, the Pechiney dam on the Svirsky Donets, and the Karachunov reservoir dam in Central Ukraine have all been damaged or destroyed, which could jeopardize the availability of water for current and future irrigation systems.

The private sector can support development of irrigation systems in large commercial farms, but further reforms will be necessary to expand the scope of private engagement. The irrigation sector is undergoing major legislative and institutional reforms that may ultimately allow for greater participation by private firms. However, making an irrigation service provider profitable is a challenge, and the international experience offers very few cases in which countries have succeeded in fully privatizing irrigation services. While PPPs in the irrigation sector are diverse and highly context-specific, Morocco and Spain offer examples of broadly successful arrangements from which Ukrainian policymakers could draw lessons. Privatizing existing irrigation schemes is unlikely to be commercially viable, especially if investments in rehabilitation, expansion, or upgrading are not subsidized. Nevertheless, private participation in irrigation could be feasible in systems built to serve large commercial farms, such as those in the Kharkiv oblast (Vidal et al. 2022).

⁴⁶ Ministry for Community and Territorial Development of Ukraine, 2022.

⁴⁷ Ministry for Community and Territorial Development of Ukraine, 2020.

CHAPTER 4

Private Investment Opportunities in the Social Sectors

Household savings accumulated since the start of the invasion can help finance investment in housing, municipal services, healthcare, and education, but the corporate private sector is expected to play only a limited role in these sectors over the next ten years. Engaging the corporate private sector in delivering these services requires a consensus among users to pay for the services delivered, possibly with public subsidies for low-income consumers. Because forging such a consensus takes time and requires pilot projects to build experience with PPPs and strengthen investor confidence, in the near term investment in the social sectors will be financed primarily by the public sector and by individual households.

4.1 Housing

Russia's invasion of Ukraine has destroyed or damaged more than 1.5 million housing units (WBG, et al 2023), or about 8 percent of the national housing stock, and 5.1 million internally displaced people (IOM 2023) are faced with finding temporary shelter. While the destruction of housing assets and internal population dislocation have occurred throughout the country, 82 percent of the direct damage has been concentrated in the eastern oblasts,⁴⁸ and 1.4 million multifamily apartment units have sustained nearly 90 percent of the damage (RDNA2). Damage to the housing sector severely weakened the ability of affected households to shelter from the elements and work productively, and, in many cases, destroyed a lifetime of

accumulated personal wealth. The invasion has also disrupted the housing value chain through increased physical risks, labor force displacement, income losses, and the rising cost of construction materials and transportation. Total housing reconstruction and recovery needs are estimated at \$68.6 billion over the next ten years, of which \$31.5 billion will be required in the next four years (RDNA2). This damage estimate is equivalent to about 8 years of pre-invasion construction output by value.⁴⁹ Imports of glass, which have historically come mainly from Belarus and Russia, have ceased, and damage to road and rail links has caused supply bottlenecks and severely strained the domestic production and distribution of materials such as cement and steel.

The invasion has triggered a crisis in an already stressed housing sector. About 80 percent of the country's housing units were built before 1980, with modest unit sizes and poor insulation. Many of these older units—especially privately co-owned multifamily apartment buildings—were showing signs of structural deterioration and inadequate maintenance and would not meet current seismic or energy-efficiency standards. Before the invasion, the housing market was developing slowly in much of the country, with the exception of the Kyiv area, and new housing construction was limited. The market for end-user mortgage financing was underdeveloped, and in 2021 the ratio of mortgage loans to house sales was low at just 5 percent. Some 10 percent of mortgages issued for house purchases were for

48 Donetsk, Luhansk, Kharkiv, and Kyiv oblasts.

49 Between 2000 and 2020, an average 8.33 million m² of residential floor space was built per year (Shcherbyna, 2022), equivalent to around 185,000 average-sized (45m²) residential units (WBG, 2023, forthcoming).

newly built properties on the primary market, while the remaining 90 percent were to purchase existing units on the secondary market.

About 95 percent of the housing stock is privately owned and largely debt-free following large-scale privatization in the early 1990s (RDNA2),⁵⁰ but the sector has suffered from underinvestment in social housing. In 2022, only 4 percent of the total population, and about 6–7 percent in larger cities, lived in social housing (Lomonosova and Fedoriv 2019). State co-financing programs have incentivized housing purchases over other forms of tenure. Ownership-focused policies have proven unsustainable while also undermining the development of rental housing, which suffers from a lack of protections for both tenants and landlords. Further legal and administrative reforms are needed to remove constraints on access to land and to streamline land-use zoning and rules. Preparation of comprehensive recovery plans is underway with additional support needed to supplement the resources of the smaller hromadas.

Private homeowners and small and medium domestic contractors will continue to dominate the housing sector during and after the invasion. A swift and efficient reconstruction process on the scale needed will require policy reforms, financial support from external partners, and the entry of larger regional developers and financial institutions. The entry of new firms will be vital to ensure a supply of design and supervision services, large-scale construction capacity, specialized technical and logistical capabilities, and the ability to raise finance. PPPs with for-profit and nonprofit developers to construct large-scale social housing could be supported by public subsidies through availability payments targeting low-income households, while mass unsubsidized rental or rent-to-buy housing could be made affordable

to middle-income and lower-middle-income households that may not be eligible for, or willing to apply for, long-term mortgage financing.

The extent of the private sector's participation in the reconstruction needs will depend on the implementation of reforms. Without reforms, private investment opportunities will amount to an estimated \$22.5 billion, equivalent to one-third of reconstruction needs. Reforms could boost private investment to \$30.2 billion, albeit still less than half of total needs (WBG 2023 forthcoming).⁵¹ Developing a housing policy framework is essential for improving housing quality, ensuring access to affordable housing, and increasing housing supply. Further streamlining urban planning and land administration will be crucial to improve efficiency, consistency, and transparency in land allocations and planning and site development decisions. Simplifying construction regulations and materials standards aligning them with EU norms, would encourage the development of domestic construction industry and the entry of regional contractors.

4.2 Municipal Services

Ukraine's subnational governments face rising expenditure needs and plunging revenues.⁵² Chronic underinvestment had undermined the coverage and quality of basic local services even before the invasion. In 2020, a significant share of subnational spending went to cover payroll and other recurrent costs, while only a small percentage was allocated to investment. Enterprises owned by municipal governments are responsible for providing a range of services. Their heavy reliance on central grants and subsidies leads to inefficiency and inadequate asset maintenance, which in turn discourages household user payments, creating a vicious cycle of low revenues and low service quality.

50 Since the housing stock is largely privately owned most investments will be made by households. Since some of the multifamily apartment buildings are on the balance sheet of the municipalities they are to be repaired and maintained in public areas by municipalities.

51 In addition to addressing RDNA2 needs, the reform scenario projects \$60 billion in private investment in housing over 10 years.

52 The subchapter on municipal services excludes local transport, district heating systems, and water and sanitation services.

Russia's ongoing invasion has placed enormous stress on the municipal services sector, as subnational governments are at the forefront of urgent response and recovery efforts such as clearing debris, processing IDP, and maintaining basic public health and safety. The invasion has also undercut the prospects for sustaining traditional revenue streams such as property taxes, making it difficult for the largest cities to service their debts or access capital markets to invest in rebuilding municipal infrastructure and expanding services. The ability of smaller cities to take on debt is largely unknown.

From 2015 to 2020, Ukraine implemented numerous administrative and fiscal decentralization measures and governance reforms. As a result, the subnational regulatory framework is relatively robust, but it is also complex, fragmented across multiple pieces of legislation, and unevenly implemented across the country. The reforms have given local governments greater authority to manage their finances and to establish PPPs for providing public services and local infrastructure. To date, the use of PPPs has been limited to performance-based arrangements with private companies operating public assets and services under the oversight of subnational governments. Although the private sector does not currently own a significant share of subnational government assets, there are opportunities for future PPPs to engage in reconstruction activities and restore local service delivery. The private sector will play an important role in enhancing the efficiency of municipal services and supplementing their coverage and quality, both during reconstruction and over the long term.

Key barriers to private investment in municipal services include burdensome and opaque procedures for obtaining land and building permits, a lack of practical experience by subnational governments in managing different

PPP models, and the small market size of most municipalities. Targeted reforms could allow for greater private-sector participation. Subnational government should be required to use the standard e-procurement guidelines for the public sector, including the mandatory publication on e-government platforms of all pipeline projects, bidding documents, and contract awards. Capacity-building support should be offered, and sanctions for noncompliance with national regulations could be used. Subsidized SOEs should be comprehensively reviewed, and the government should establish an ongoing program to commercialize their activities in areas where they compete with the private sector. Finally, legislative reforms will be necessary to enable transparent and predictable decision-making by subnational governments in rezoning land for private-sector development or PPPs. Without reforms, an estimated \$0.2 billion in private financing could be mobilized for reconstruction over the next ten years. With reform, this estimate rises to \$0.8 billion, though it remains far below the anticipated reconstruction needs of \$5.7 billion (RDNA2 and WBG 2023, forthcoming)—underscoring the government's indispensable role in providing municipal services.

4.3 Health

Ukraine has one of the worst health profiles in Europe, with low average life expectancy and high rates of mortality, morbidity, and disability. Lost productivity due to poor health outcomes was a key contributing factor to the country's subpar economic performance prior to Russia's invasion of Ukraine. The invasion has caused approximately \$2.5 billion in damage to the health sector, and total losses are conservatively estimated at \$16.5 billion.⁵³ The actual level of damage is likely higher, given incomplete or missing reports on private facilities and those located in

53 This conservative estimate of total losses includes the removal of debris and the demolition of destroyed facilities, income losses among private providers, losses from the financing of facilities, and additional losses associated with reduced health due to forgone care and increased public health risks.

the temporarily occupied territories not under government control. The limited implementation of structural reforms and inadequate investment over the last several decades have resulted in an inefficient healthcare system that largely fails to deliver quality health services. The health sector's organizational and financing arrangements prioritize curative over preventive services, hospitals over ambulatory services, and specialists over primary care providers. Private-sector participation in healthcare is highly fragmented, with most services provided by a few large corporations based in and around Kyiv.

Several obstacles inhibit the private sector's participation in the health system, especially financing constraints and the limited use of private medical insurance. Regulations designed to ensure the quality of care are often ineffective, sanitary standards imposed on providers are opaque and overly complex, and e-health legislation is underdeveloped. These regulatory challenges are exacerbated by weak governance. In 2018, Ukraine launched a comprehensive health-sector reform program designed to increase the efficiency of health services by modernizing and transforming healthcare, including through greater private-sector participation. Establishing PPPs to build and manage health facilities could accelerate the reconstruction while reorganizing the facility network around a more balanced model that emphasizes primary care. In addition, health-service PPPs could improve the provision of medical imaging and laboratory services, which are essential for effective treatment.

Precisely identifying the problem to be addressed and clearly defining a satisfactory solution will be vital to the success of health-sector PPPs. Capacity-building support to government counterparts may be necessary to ensure that PPPs are technically and financially sound and implemented appropriately. Opportunities for pilot PPPs include a \$200 million hospital, \$10 million in diagnostic imaging services, and \$2 million in laboratory testing services (WBG, 2023 forthcoming).

4.4 Education

Private investors could play a critical role in rebuilding Ukraine's education system by providing funding, innovation, and expertise. The cost of reconstruction in the education sector is estimated at \$10.7 billion (RDNA2). Prior to the invasion, Ukraine had an extensive education system with relatively strong learning outcomes. Licensed private education providers are allowed to operate in Ukraine and are even subsidized in areas such as preschool and reskilling. However, the private sector plays only a modest overall role in the provision of education services.

Multiple constraints limit the private sector's ability to invest in the reconstruction and development of the education system. Ukraine's legislative framework would allow for PPPs to construct education facilities, but these arrangements are underutilized. Private providers lack incentives to participate in the construction of educational institutions. Russia's invasion of Ukraine has displaced around 4.6 million children while sharply reducing the ability of households to pay for education services (RDNA2). Meanwhile, regulatory standards for establishing private preschools are difficult to meet, especially for home-based providers. Internet disruptions limited the scope for innovative online solutions that can help address learning gaps and support displaced teachers and students. The sector also suffers from a general lack of cooperation between public authorities and the private providers at the national level.

The private sector can help the government improve access and quality at all levels of the education system. Establishing PPPs to rebuild education infrastructure and offering public financial support to families enrolling their children with private providers can accelerate the reconstruction of the education sector. To rebuild the capacity of the workforce, the private sector could partner with local education institutions to provide pedagogical support and work-integrated

training opportunities, expand the acceptance of alternative credentials, and employ data analytics to better manage the deployment of human resources. Mobilizing the private sector will be viable only in areas where there is sufficient stability to ensure the safety of the personnel and assets involved in reconstruction. Depending on

local construction requirements and other factors, pilot PPP projects for constructing early childhood education facilities for 1,000 places could offer \$100 million in investment opportunities, while investments in primary, lower secondary and upper schools could total as much as \$160 million (WBG 2023 forthcoming).

CHAPTER 5

Mobilizing Domestic Private Financing

Demand for private financing can be met by a combination of traditional sources. These include within-company financing equal to about 10 percent of GDP and cross-border financing equal to about 5 percent of GDP. The latter encompasses both FDI and portfolio investment. Household savings will boost private financing but will focus primarily on the housing sector. Domestic financial markets, including the banking and pension systems, are crucial to channeling domestic savings into corporate finance. The level of public trust in financial service providers will largely determine how effectively savings are mobilized.

5.1 Finance and Banking

Ukraine's financial sector is small and dominated by banks, with a small share of non-bank financial institutions and shallow capital markets. The total assets held by financial institutions regulated by the National Bank of Ukraine amounted to \$85.9 billion, 43 percent of GDP in 2021. Banks hold 88 percent of the financial assets, \$75 billion.⁵⁴ The small size of the financial sector limits access to credit. In surveys, almost half of private firms identify access to finance as a major constraint (World Bank 2019).

State-owned banks accounted for 50.6 percent of the banking sector in 2022. Privately owned Ukrainian banks, which represent 19.9 percent of the banking sector's assets, are generally small and highly fragmented. Foreign-owned banks represent 29.5 percent of the sector's assets and are larger than their domestic peers (NBU 2023c). During the invasion, indicators of the banking sector's health and stability deteriorated,

and the central bank revoked the licenses of six banks that were declared insolvent.

Despite limited physical damages, Russia's invasion has had a large indirect impact on the banking sector. The sector's losses are estimated at \$6.8 billion, driven by an increase in non-performing loans (RDNA2). Non-performing loans increased from 26.6 percent of total loans in February 2022 to 38.8 percent in March 2023 (NBU 2023d). Corporate and retail lending declined from 44 percent of total assets in 2021 to 37 percent in 2022 as demand faltered, provisioning increased, and overall risk appetite declined (NBU 2023c). Addressing both the impact of the invasion and the financial sector's legacy challenges will be crucial to enable the robust flow of financial resources necessary to support a green and resilient recovery.

The expanding use of digital financial services has enabled the payment system to continue functioning despite significant damage to physical assets in the banking sector. Digital financial services have mitigated an estimated 20 percent reduction in the number of branches and a 16 percent decline in the number of service points (NBU 2023c; S&P Global Ratings 2023). Deepening and expanding digital financial services, including fintech, will be vital to mobilize private financing. Financial inclusion exceeded 80 percent (World Bank 2021) before the invasion and could be further increased through fintech solutions, especially in the context of widespread population displacement. The country's well-functioning credit reporting system offers an opportunity to expand banking services to small and medium

54 Staff calculations based on NBU 2023b.

enterprises, and the nonbank financial sector has significant long-term growth potential.

Russia's invasion increased the operational risks faced by banks while macroeconomic conditions deteriorated. Timely action by the central bank provided commercial banks with guidance to manage risks. The central bank increased the policy rate from 10 percent to 25 percent in June 2022 (NBU 2022a) and devalued the hryvnia by 25 percent to 36.57 UAH/\$ in July 2022 (NBU 2022b). Banks tightened risk management as interest rates rose, and loan volumes have contracted. Due to the current circumstances, with reduced loan monitoring and bank oversight, the creditworthiness of borrowers will remain difficult to assess until the completion of a comprehensive asset-quality review.

The large footprint of state-owned banks and a weak debt-resolution framework distort private-sector participation and competition. State-owned banks account for about half of the banking sector's assets. Inefficient debt resolution and recovery processes negatively affect the risk appetite of lenders, and the recovery rate is low at just 9 percent (World Bank 2020). Poor enforcement of creditor rights results in wide risk premiums, weakening incentives to access banking services. In the absence of market-based instruments to manage risk, banks resorted to over-collateralizing, which limits the flow of credit into the economy and slows the growth of the private sector. In addition, the regulatory framework does not yet conform to internationally accepted standards, which reduces the financial sector's attractiveness to private investors.

Given an improving regulatory framework and rising demand for credit, Ukraine's financial sector has the potential to attract substantial private financing. Measures to strengthen creditor rights, increase competition, tighten financial-sector

supervision, and adopt international standards could boost the credit-to-GDP ratio from 16.1 percent in 2022 (IMF 2023c) to 56 percent in 2033, the average for low-and-middle-income countries in the Europe and Central Asia region in 2020 (World Development Indicators 2023). Further the authorities may opt for a significant reduction in state-owned banks' market share (e.g., through accelerating the privatization process or aligning incentives for investors to attract private capital to the sector while enabling such banks to downsize/rightsize their market shares). In this scenario, private financing for the banking sector could reach \$27 billion. Without reforms, private financing would amount to just \$15.1 billion, and the credit-to-GDP ratio would be 25.8 percent (IMF 2023c). Bank credit and other forms of financing that are external to the firm are particularly important for economic efficiency and growth (Rajan and Zingales 1998).

5.2 Pensions

Ukraine's small private pension subsector does not currently offer opportunities to mobilize financing for reconstruction, but it has considerable scope for development. The private pension system has been in place for 18 years, but by the end of 2022 the country's private pension funds managed just \$113 million, less than 0.1 percent of GDP.⁵⁵ Moreover, only 8.2 percent of the employed population participated in the pension system. Foreign engagement in private pensions is also limited to a single fund managing \$10.5 million (UAIB, 2022). Lack of trust in financial institutions is an important obstacle to the expansion of private pension funds, but the passage of several laws currently being considered by the regulators could help bolster public confidence. The laws under consideration deal with state regulation of capital and commodity markets, and implement international standards in asset management and pension supervision. If approved, these laws could strengthen Ukraine's

55 National Securities and Stock Market Commission (2023) and WBG (2023, forthcoming).

capital markets, opening a significant volume of assets for investment in a wide range of financial instruments. The development of private pension funds would allow for the creation of innovative pension products, and over time pension funds

could help mobilize domestic financial resources for a green and resilient reconstruction. Some eight years after the proposed reforms are implemented, the total stock of pension assets is projected to be about 7.3 percent of GDP in 2033.

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The report was prepared by a technical team at the IFC led by Johannes (Han) Herderschee (Senior Economist, CELCE) and the overview and infrastructure chapters were co-led by Patrick Avato (Principal Operations Officer, CN2UA). The team leaders also prepared the introduction and cross-cutting chapters. Authors of individual chapters and contributions to the final report are listed below. Team leaders benefited from contributions from Zeinab Partow, (Lead Economist, CERCD), Natsuko Toba (Economist, CERCD), Elleanor Robins (Senior Investment Officer, CNGBU), Victoria Tetyora (Associate Operations Officer, CEUA1), Vyacheslav Hordiyenko (Investment Officer, CN2UA), David Bassini Ortiz (Consultant, CELCE), Oleg Kudashov (Senior Investment Officer CTAPU), Anna Zvolikevych (Consultant, CELCE), Iryna Bondarenko (Consultant, CELCE), Svetlana Ignatiuc (Program Assistant, CEUPK), Tatyana Taran (Program Assistant, CEUVN), Tessa Coronado Ulloa (Executive Assistant, CELCE), and Milda Brazyste (Temporary, CEUVN).

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