Low Carbon Ukraine
Policy advice on low-carbon policies for Ukraine

IKI Internationale Klimaschutzinitiative

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Effects of the Russian invasion of Ukraine on climate and energy policies in the European Union's Eastern Partnership and Central Asian countries

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About Low Carbon Ukraine

Low Carbon Ukraine is a project that continuously supports the Ukrainian government with demand-driven analyses and policy proposals to promote the transition towards a low-carbon economy.

This project is part of the International Climate Initiative (IKI) and is funded by the German Federal Ministry for the Environment, Nature Conservation, Nuclear Safety, and Consumer Protection (BMUV) on the basis of a decision adopted by the German Bundestag.

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Note from the OECD Secretariat

This paper presents the analyses of the impact of the war in Ukraine on climate and energy policies in eight countries of the European Union's Eastern Partnership and Central Asia: Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Tajikistan, and Uzbekistan.

The presentation of the impact channels for climate policies in Section 2 is followed by the analysis of global and regional trends in Sections 3. Section 4 contains eight in-depth country analysis chapters which present energy and climate profile of each country along with short- and longer term effect on climate policies. The final Section 5 presents the conclusions and proposes some policy recommendations for pursuing and sharpening the strategies towards decarbonisation in the region.

The paper was prepared by Berlin Economics as part of a project "Low Carbon Ukraine" that continuously supports the Ukrainian government with demand-driven analyses and policy proposals to promote the transition towards a low-carbon economy. This project is part of the International Climate Initiative (IKI) and is funded by the German Federal Ministry for the Environment, Nature Conservation, Nuclear Safety, and Consumer Protection (BMUV) on the basis of a decision adopted by the German Bundestag.

The papers served as a basis for the discussion at the annual meeting of the GREEN Action Task Force 30 June – 1 July 2022, in Tbilisi, Georgia under Agenda Item 4.

Key findings

- Globally, countries will face strong incentives to lower domestic consumption of fossil fuels due to high and unpredictable prices and supply issues, such as increased demand for non-Russian fossil fuels.
- Global policy pressures will also continue towards more ambitious climate policies due to strong evidence of climate change impacts, even in short term.
- Exporters of energy and/or metals will be incentivised to increase exports but may be constrained by capacity or logistical difficulties.
- Countries with closer ties to Russia may have access to discounted energy imports, weakening incentives to conserve energy or invest in renewables.
- However, this is counteracted by a new energy security paradigm emerging in the region. Domestic renewable energy sources already provide, and will continue to provide, an attractive alternative to increasingly price-volatile fossil fuel import dependency.
- A weaker global and regional macroeconomic situation will lead to a more challenging context for ambitious domestic climate policy in the region, especially due to difficulties to finance climate-related investment from domestic sources and difficulties to access international finance.
- At the same time, reduced growth may lead to fewer emissions in the short run.

Executive summary

Prior to the Russian invasion of Ukraine, the climate policies of the European Union's Eastern Partnership and Central Asian countries were driven by the global efforts to reduce GHG emissions, national efforts identified in Nationally Determined Contributions (NDCs) or other strategic documents, as well as the recovery from the Covid-19 pandemic combined with the goals of building robust, resilient, and sustainable economies.

The Russian invasion created major policy challenges and has already led to a geopolitical and geoeconomic reconfiguration due to the decoupling of OECD countries from Russia. This new situation has already materialised through sanctions on Russia by OECD countries (and Russian countersanctions) as well as trade disruption and skyrocketing energy and commodity prices.

The paper identifies four impact channels that might lead to alterations to countries' energy and climate policies:

First, energy price developments severely affect the assessed countries' economies. Russia is a major exporter of oil, oil products, natural gas, coal, and nuclear fuel. The start of the war led to an increase in global crude oil prices while the price of Russian Ural crude has decreased compared to the beginning of the war, resulting in a high discount rate for Russian oil. The price of natural gas and coal has risen even more compared to the oil price.

Second, the price increase for food and metals has had a crucial impact on the assessed economies, and the rest of the world, as Ukraine and Russia are major producers of a variety of metals and agricultural goods. Transport of products from Ukraine faces severe disruptions due to military actions on the country's territory and Russia's blockade of the trading routes. Russian steel has been partially sanctioned by the EU whereas Russia itself has implemented an export ban for several agricultural commodities. The impact of the shortage of food exports available on the market will particularly affect low-income countries that depend on imports from Russia or Ukraine. Conversely, many of the assessed countries are reliant on metals and mining for large parts of their GDP and exports, and higher prices might incentivise production increases in the short-to-mid-term, which could adversely impact emissions and climate policies.

Third, the global macroeconomic situation for most economies has changed drastically. Prior to the invasion, countries were in the process of recovering from the Covid-19 pandemic, whilst facing supply constraints and inflationary pressures due to compromised supply chains. Since the invasion, the economic outlook for most economies has been revised downwards due to trade disruptions, high food prices, and insecurity of energy supplies.

A weaker regional macroeconomic situation complicates more ambitious national climate policies in the region as public debt significantly increased since the Covid 19 pandemic. This aggravates financing of climate-related investments from domestic

sources. Concurrently, however, lower growth may lead to lower emissions in the short term but could come at the expense of improving economic and social conditions.

Fourth, since the invasion, further policy pressure has been exerted on the countries under analysis since OECD member states are aiming to reduce dependence on Russian energy supply. In the short term, this means increasing domestic energy production or trying to diversify energy carrier import partners; in the long term, it means reducing overall fossil fuel consumption by increasing decarbonisation efforts.

The eight assessed countries are located in close proximity to Russia and share a common Soviet history. These old but strong ties are still partly intact, and Russia supplies a significant part of the energy mix and parts of the countries' energy infrastructures are even Russian-owned. However, the countries differ in terms of sectoral energy consumption and predominant energy sources. All countries cover a significant share of its energy supply with oil products, and most countries (except Kyrgyzstan and Tajikistan) are relatively natural gas intensive. Kazakhstan is heavily reliant on coal, Kyrgyzstan and Tajikistan rely on a mix of coal and hydropower, which also plays an important role in Georgia and to a lesser extent in Armenia. In the Central Asian countries, coal is mostly domestically extracted, while Armenia, Georgia and Moldova have almost no domestic fossil fuel production.

The short-term effects of the war in Ukraine are broadly comparable across the countries. Higher fossil fuel prices are putting pressure on consumer price subsidies and tariffs in several countries in the region, in particularly those which would like to lower their dependence on Russia, as the gap between domestic energy prices and world prices significantly increases. Countries that may face higher fossil fuel import prices, and especially those implementing retail tariff reform as a result of unsustainable consumer price subsidies, will have greater incentives to invest in energy efficiency and renewable energy.

A somewhat complex set of incentives is faced by countries maintaining strong relations with Russia. These countries may face lower fossil prices, which weakens incentives to reduce fossil consumption. However remaining price risks and political uncertainty in long-term relations with Russia have already led to the emergence of a new energy security paradigm emphasising the risk of dependency on fossil imports from a single supplier.

At the same time, energy exporters – most notably Azerbaijan and Kazakhstan – currently enjoy significant windfall revenues due to high oil and gas prices. This increases the incentive to further expand export volumes either by increasing production, if faster extraction is possible, or through conserving energy domestically as the opportunity cost of foregone export revenues has increased. However, export transmission capacity is limited, so that an expansion of production cannot be directly translated into more exports.

The new energy security paradigm, high long-term fossil fuel prices, and increased price uncertainty are expected to continue driving the expansion of renewable energy sources in the medium- to long-term. Although none of the countries in the region, with

the exception of Moldova and Ukraine, have policies officially aimed at reducing their dependence on fossil fuels from Russia, many countries are working to strengthen their energy independence. Increasing energy efficiency efforts and domestic energy production, in particular from renewable energy sources, provide an attractive alternative. This holds especially true for Moldova, Georgia, as well as Ukraine, which have applied for membership in the EU and, therefore, need to implement more stringent EU regulation.

While the analysis highlights heterogeneity across countries in the region, the main picture that emerges from this paper is that the balance of economic incentives arising from the economic and political upheaval caused by Russia's war against Ukraine could support rather than counteract decarbonisation efforts.

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1. Introduction

Russia's invasion of Ukraine has resulted in catastrophic consequences for Ukraine, the most important of which are the lives lost and the humanitarian crisis associated with the huge numbers of besieged and displaced people.[1] According to the UN, more than 6.8 million refugees have fled Ukraine since the beginning of the war.[2] There are also significant economic implications. Recent estimates of damage to the infrastructure total USD 105.5 bn[3] and, beyond bare figures, mean vast destruction to of thousands of homes, civilian infrastructure, agricultural land and practically all other features of a country. Whilst Ukraine is clearly and without any comparability the victim, the war has also led to massive geopolitical and economic consequences beyond Ukraine. The impacts are global, but in virtue to its historical and geographical proximity of particular relevance for the region of the European Union's Eastern Partnership and Central Asia[4] that once, together with Russia, were part of the former Soviet Union.

Although this paper is solely concerned with the impact of the war on climate and energy policies, the region's climate policies are still also influenced by factors from the previous period before February 2022, i.e.:

1. The global push for more ambitious climate policies which followed the Paris Agreement and the decisions at subsequent UNFCCC's Conferences of the Parties.

2. The impacts of the Covid-19 pandemic and related economic recovery efforts.

The global push for more ambitious climate policies resulted in many countries in the region submitting updated Nationally Determined Contributions (NDCs) and long-term emissions targets. Efforts notwithstanding, most countries in the region still had relatively conservative climate targets.[5] Intended emissions reductions were mainly possible due to the massive decrease in economic activity in the 1990s following the collapse of the Soviet Union. Concerns regarding the negative impacts of emission reduction measures on economic growth and the welfare of poorer households often held back the climate ambition of countries. High investment costs for green assets coupled with often difficult access to financing have been adding to the lack of fast progress.

The economic fallout caused by the Covid-19 pandemic also impacted climate policies: Production outages or reductions caused by national lockdowns and similar regulations led to reduced economic output, in effect limiting the ability of states and private sector alike to conduct climate-related policies. At the same time, economic recovery measures even in advanced economies in most cases only very partially contained measures with a positive

[1] Office Of The High Commissioner For Human Rights, 2022, 'Ukraine: civilian casualty update 27 May 2022'.
[2] UNHCR, 2022, 'Situation Ukraine Refugee Situation'.
[3] Kyiv School of Economics (KSE), 2022, 'Direct damage caused to Ukraine's infrastructure during the war has reached over $105.5 billion'.
[4] This paper looks at Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Tajikistan, and Uzbekistan.
[5] Herrick, D., Michalak, K., Neuweg, I., & Prívarová, M., 2022, 'Aligning short-term recovery measures with longer-term climate and environmental objectives in Eastern Europe, Caucasus and Central Asia', pp. 15-21.

environmental impact.[6] In transition countries, recovery measures were in most cases severely limited due to constraints on public finances.

However, the global trend and pressure for more ambitious climate targets continued, also accelerated by undeniable evidence of serious the climate change impacts on humanity. One clear lesson of the Covid-19 pandemic was the necessity of energy decarbonisation in addition to supply chain resilience, stability, and security. In the COP process, this discursive consensus is being transformed into commitment to policy reform and investment.

The war in Ukraine has now radically altered and accelerated geopolitical and geoeconomic reorganisations. As a result of the war and economic sanctions impost by the West, the economic decoupling between Russia and the West creates a new economic constellation, marked by separations of markets and interrupted trade relations. Especially, but not exclusively, the traditional energy supply channels are affected, with huge shockwaves of rising prices and supply insecurity posing massive policy challenges. Countries in the European Union's Eastern Partnership and Central Asia are also strongly affected by drops in demand from Russia for their products and impacts in flows of people and money, including remittances.[7]

[6] Herrick, D., Michalak, K., Neuweg, I., & Prívarová, M., 2022, 'Aligning short-term recovery measures with longer-term climate and environmental objectives in Eastern Europe, Caucasus and Central Asia', OECD, pp. 15-21.
[7] Guicci, R., 2022, 'Economic implications for Moldova, Georgia and Armenia of the war in Ukraine and the sanctions against Russia. A comparative analysis', German Economic Team.

2. Impact channels for climate policy

This section aims to identify the most relevant drivers and pressures on climate-related policies of the EU's Eastern Partnership and Central Asia countries resulting from the Russian invasion of Ukraine and possible future developments. The impact of war in Ukraine on the countries of the EU's Eastern Partnership and Central Asia often differs substantially. Key criteria in this regard is dependent on each country's individual energy mix profile, export profile, existing climate policy, political decisions regarding the conflict and macroeconomic impact of the conflict. As these differ considerably among the countries (some are exporters of fossil energy and other importers, some retain close ties with Russia and others do not, etc.), there should be a rather wide divergence among the effects of the war on their climate-related policy.

In general, four impact channels on climate-related policies can be identified:

- Energy prices
- Prices for metals and foodstuffs
- Macroeconomic situation
- International policy developments related to climate change

2.1. Energy prices

Russia is a major global exporter of fossil fuels. It is the world's largest exporter of natural gas (19.9% of global exports in 2021), second largest exporter of oil (12.3%) and third largest exporter of coal (17.8%),[8] holding substantial shares of known reserves of natural gas and coal. Russia's invasion of Ukraine triggered several steps by the United States and the European Union to end dependence on fossil fuels from Russia. One of the first decisions was to halt the opening of the Nord Stream 2 natural gas pipeline. The EU has also prepared a comprehensive "REPower EU" plan to end fossil fuel imports from Russia by 2027, with a financing of EUR 300 bn.[9] Some countries also took steps to impose embargos on imports of fossil fuels from Russia. At the same time, Russia has threatened to cut natural gas supplies to some EU countries if payments are not made in rubles, and actually stopped supplying Poland, Bulgaria, Finland, as well as companies in the Netherlands, Denmark, and Germany which refused to do so.[10]

This decoupling of a large share of the world economy from a major fossil fuel supplier has had a substantial effect on energy prices:

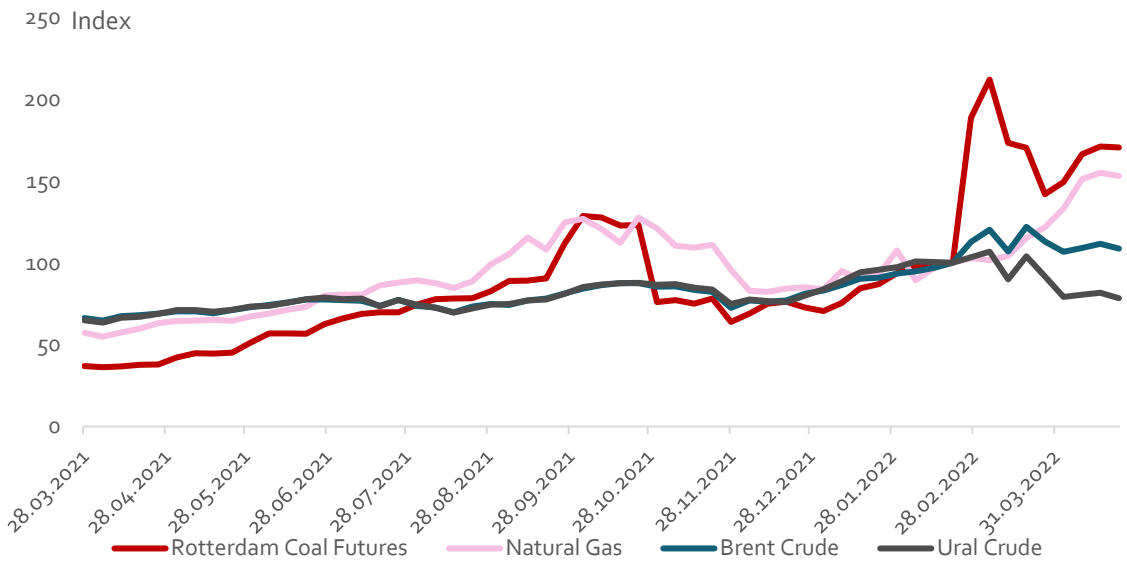
- The price of internationally traded oil (e.g. Brent crude) increased,
- The price of Russian Ural crude has decreased compared to the beginning of the war, with a high discount rate in comparison to other global oil benchmarks

[8] Saha, D., Bilek, P., Cherviachenko, I., von Mettenheim, M., Stubbe, R., 2022, 'Economic reasons for a green reconstruction programme for Ukraine'.
[9] European Commission, 2022, 'REPowerEU: A plan to rapidly reduce dependence on Russian fossil fuels and fast forward the green transition'.
[10] Partridge, J., 2022, 'Russia cuts gas supplies to Netherlands and firms in Denmark and Germany', The Guardian.

- The price of natural gas has proportionately risen more compared to the price of crude oil (North Sea oil), but volatility and price increases have differed by geographical location
- Coal futures' even more pronounced spike has been driven by unexpectedly high demand, constrained production, and supply chain disruptions.

Along with the currently visible spike in prices, uncertainty about future prices has become extreme.

Figure 2.1. Prices for selected energy carriers (20.02.2022 = 100)



Source: Investing.com

The rise in prices and price uncertainty for energy create major implications for the energy and climate policy of countries. Generally, the domestic use of fossil fuels is disincentivised by the expectation or risk of higher prices. This can push countries towards saving fossil fuels and investing in energy efficiency and/or increasing the share of renewables in their energy mix. This holds even for producers of fossil fuels in the region. Less domestic usage implies more potential for export at attractive prices if transport infrastructure capacity is available. In that case, fossil-rich countries may face incentives to increase extraction and exports. Existing consumer subsidies of fossil fuel, which are widespread in the countries analysed here and often a key impediment for energy efficiency and other measures towards decarbonisation, will also come under strong financial pressure from higher prices.

A slightly more complex set of incentives is faced by countries maintaining strong relations with Russia. In the short run, these countries may even face lower fossil prices, correspondingly weakening incentives to reduce fossil consumption. Nevertheless, these countries are not exempt from price risks. Looking at the developments in international and local discourses, we see an emerging "new energy security paradigm". Energy trade has become increasingly influenced by political rather than commercial considerations. Russia is widely seen by analysts and countries as using its fossil exports for political purposes. In consequence, coupled with the experience of supply chain disruptions during the Covid-19 pandemic, countries are reassessing their dependencies in energy imports, especially for Russian supply. Whereas in the short run this may mean diversifying imports and creating additional import infrastructure for fossil fuels

(e.g. the new LNG terminals under construction in Germany), in the longer term it mostly favours replacing fossil imports with domestic energy production through renewable energy sources. Even countries maintaining good relations with Russia at present hence face incentives to decarbonise in order to improve their security of supply.

And while the substitution of Russia as a source for fossil fuels may lead to other energy-exporting countries to at least consider increasing extraction, the global combustion emissions impact of a pure substitution of extraction of fossil fuels in Russia by extraction elsewhere could likely remain largely neutral, except for differences in extraction- and transmission-related emissions.

2.2. Prices for metals and foodstuffs

Another crucial economic impact of the war in Ukraine is on the availability and prices of metals and food staples. Both Russia and Ukraine are major producers in both areas. Production and exports of both steel and agricultural goods from Ukraine are strongly affected by the war due the country's historical role as a major steel producer and as the breadbasket of Europe and the world. Russian steel has been partially, but arguably incompletely, sanctioned by the EU,[11] whereas Russia itself has implemented an export ban for several agricultural commodities.[12]

Figure 2.2. Prices for steel and wheat (20.02.2022 = 100)

Source: Investing.com

In consequence, global steel and food prices have experienced a sharp rise since the beginning of the war in Ukraine. The impact of the shortage of food exports available on the market may be especially disastrous for low-income countries dependent on imports from Russia or Ukraine

[11] Zinchenko, S., 2022, 'Why sanctions against Russian steel export didn't work'. GMK Center.
[12] 'Russian Federation bans exports of wheat, maize and other cereals to Armenia, Kazakhstan and Kyrgyzstan until 30 June 2022', Food Price Monitoring and Analysis (FPMA), Food and Agriculture Organization of the United Nations (FAO), 2022.

(the situation has created follow-on effects of other countries such as India restricting exports to ensure sufficient domestic availability).

Yet, this also creates implications for climate-related policies: steel-producing countries other than Russia may be incentivised to increase production, leading to increases of national CO_2 emissions as conventional steel production is a major emitter of CO_2. Depending on the technology and inputs used, this could have varying effects on global CO_2 emissions as well.

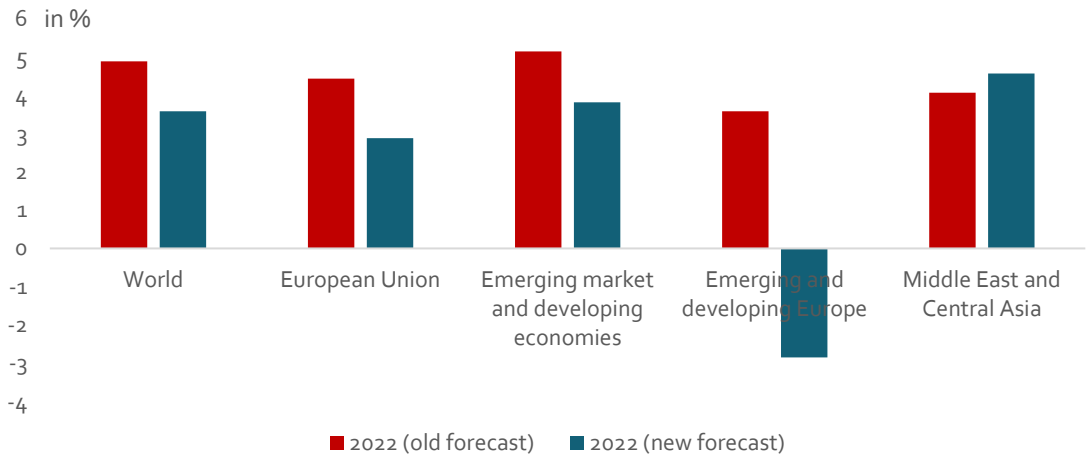
The situation would be somewhat different for countries dependent on food imports: Increasing agricultural production can imply increased environmental impacts, such as deforestation and an increased use of fertilisers and water for irrigation and hence a more permanent negative climate impact going beyond simple shifting of emissions between countries. However, this would only be the case if the shock to food prices extends beyond the very short run (in which no large-scale increase of food production is possible). It is therefore considered that the food price will not be a channel to significantly affect climate-related policies and outcomes.

2.3. Macroeconomic situation

Economic forecasts around the globe have been marked down quite substantially since the beginning of the war. The global economy, still vulnerable in its ongoing and partial recovery from Covid-19 was already marked by supply restrictions and inflationary pressures due to constrained supply chains. Now, with a major breakdown of economic relations between Russia and Europe and the US, as well as existing and potential major supply disruptions on energy, metals and food, economic growth will be considerably weakened in the coming years, with the future outlook looking very pessimistic.

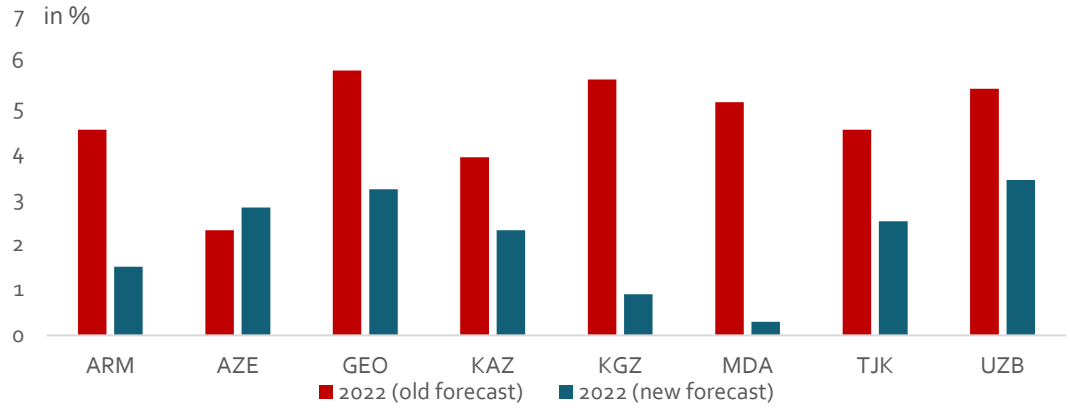
Regional growth forecasts have been of course most strongly affected for emerging and developing Europe (Belarus, Moldova, Russia, and Ukraine) but are significant across the board. The notable exception here is the Middle Eastern, and to some extent Central Asia region with an improved growth forecast. This is however clearly attributable to the fossil exporting countries alone. Indeed, analysis show that the only country under analysis here with an improved growth forecast is Azerbaijan, based on domestic production of fossil fuel and their exports (Figure 2.4.).

Figure 2.3. Impact of the war in Ukraine on GDP growth in 2022, major regions



Source: IMF World Economic Outlook November 2021 (old forecast) and April 2022 (new forecast)

Figure 2.4. Impact of the war in Ukraine on GDP growth in 2022, countries under analysis



Source: IMF World Economic Outlook November 2021 (old forecast) and April 2022 (new forecast)

For many countries in the EU Eastern Partnership and Central Asia (especially Moldova and Kyrgyzstan, but also essentially all others except Azerbaijan), the shock of the war and the related international sanctions on Russia will be immense. Before the war, Russia and Ukraine were major destinations for the exports of their goods while many countries of the region had significant dependencies on remittances from Russia. While many of these consequences are of vast economic importance, not all of them affect climate and energy-related policies, the focus of this paper.

The instability of the region has already had an impact on access to foreign capital for investments. It will become yet more difficult if the war continues, especially for Georgia and Moldova with frozen conflicts with Russia. Declining growth, which accumulates the impacts of the COVID-19 pandemic and the impacts of war, will imply rising unemployment and rising public budget deficits, restricting the countries abilities to spend on climate-related policies.

Certainly, in some cases the lower economic activity will lead to reduced GHG emissions in the short run. Rising inflation will disincentivise any policies that may lead to increased consumer prices for energy (such as much needed phasing out of energy price subsidies, which are still commonplace in the region and will come under much pressure due to rising market prices). And access to capital issues will be a strong hindrance to many climate policies that require investment in improving existing assets or replacing them by new technologies.

2.4. Policy pressures

Before the war in Ukraine, the international policy process, including the decisions of the UNFCCC COPs, had become a major driver for decarbonisation policies around the world, including in the EU Eastern Partnership countries and Central Asia. Their more ambitious commitments and efforts have been supported by donor countries and international financial institutions (IFIs). At the same time, the EU's proposed Carbon Border Adjustment Mechanism was becoming a policy driver for decarbonisation in countries trading with the EU before even being implemented.

Now, the OECD countries are striving for more independence from Russia's fossil fuels. While this includes resorting to domestically available fossil fuels in the short run, the approach is clearly aimed at reducing fossil usage altogether in the medium term, combining energy independence from Russia with decarbonisation.

It is likely that other countries, including in EU's Eastern Partnership and Central Asia, will be incentivised and lobbied to go along with this approach, as there will be increased international attention to this group of countries. This holds especially true for Moldova and Georgia (as well as Ukraine as part of the reconstruction efforts), which have applied for membership in the EU. EU Membership would entail a major drive towards increasing climate policy ambition by having to implement many pieces of regulation and institutions, most notably the EU Emissions Trading System. Even though, there is also a risk that a securitisation of foreign policy might lead to more focus on "classical" security policy issues. The close linkage between security and energy policy seems to suggest that the new geopolitical situation will incentivise more climate ambition rather than less, even if pursued through the objective of energy independence.

2.5. Analytical approach

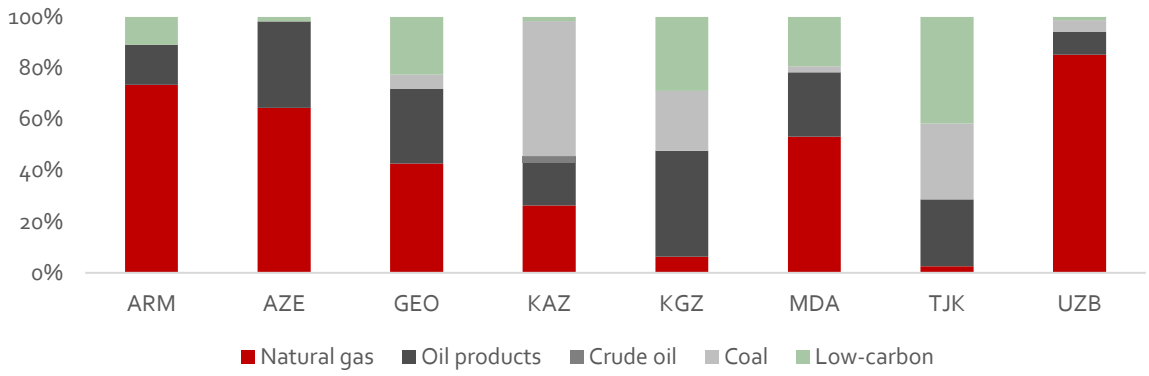
The following regional and country chapters make use of the impact channels presented above. For each country, the analysis presents a short profile of its consumption, production, and trade of fossil fuels and energy-intensive commodities and the existing climate-related policies. Subsequently the analysis shows the impact on climate-related policies in two time-horizons:

- Short-term: This analysis will focus on already observable and updated growth forecasts and effects of the current incentives on climate policy by analysing the policy changes and debates taking place since the beginning of the war.
- Medium to long term: This analysis will use the short profile of each country to deduce what longer-term impacts are likely due to the country's economic and political situation.

3. Comparison of countries and regional trends

The countries in the EU's Eastern Partnership and Central Asia region are quite diverse with regard to the setup of their energy sectors and climate ambitions. While some countries – specifically Azerbaijan, Kazakhstan, and Uzbekistan – are net exporters of fossil fuels, other countries are net importers.

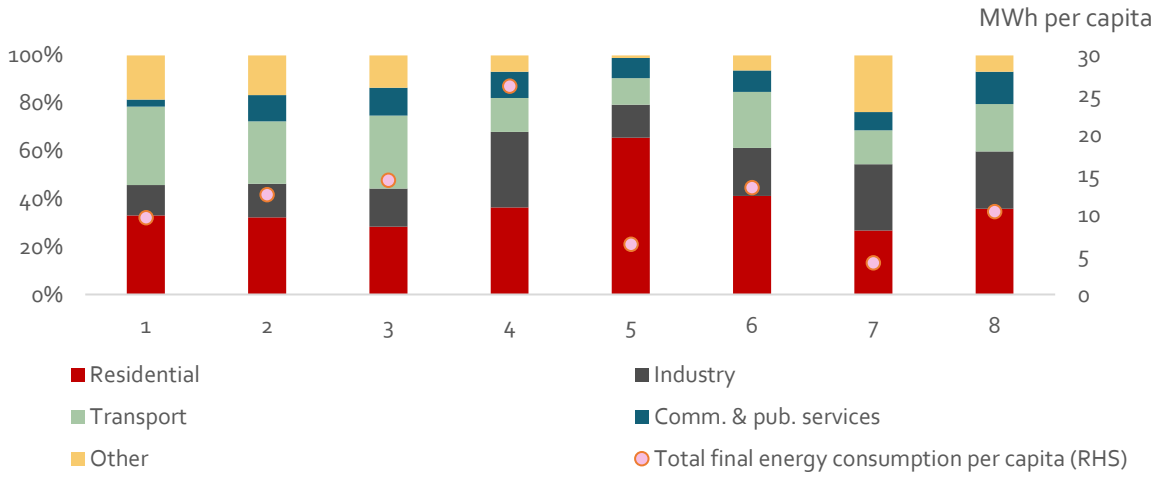
Figure 3.1. Share of sectoral total energy supply



Source: IEA

Countries also vary quite substantially in the type of energy carriers consumed (Figure 3.1.) as well as the distribution of final sectoral consumption (Figure 3.2.). While all countries use some oil products and most countries (except Kyrgyzstan and Tajikistan) are relatively gas intensive, Kazakhstan is very coal intensive. Kyrgyzstan and Tajikistan rely on a mix of coal and hydropower, which also plays an important role in Georgia and to a lesser extent in Armenia. Moldova is consuming a sizeable amount of biomass. Energy consumption per capita also varies quite significantly between 4 MWh (Tajikistan) and 26 MWh (Kazakhstan) per year (Figure 3.2., RHS). For comparison, Germany consumes around 31 MWh per capita.

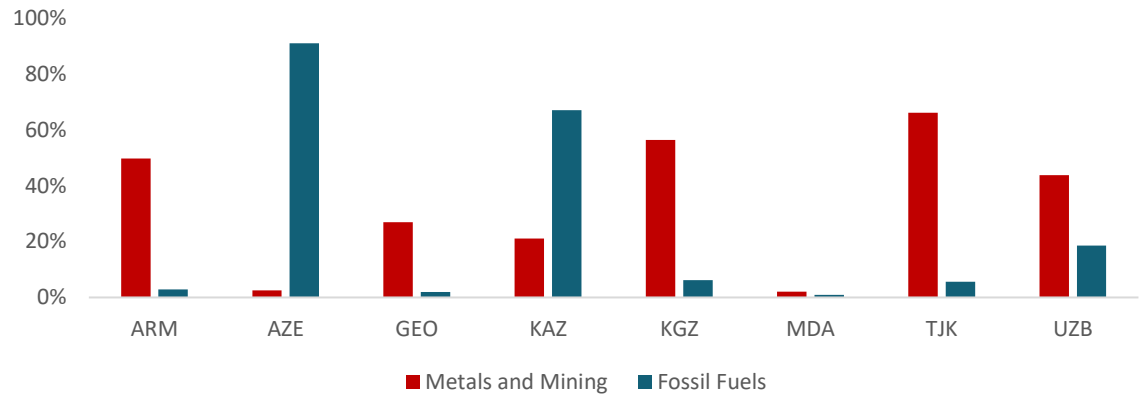
Figure 3.2. Share of sectoral total final energy consumption and energy consumption per capita



Source: IEA, World Bank World Development Indicators

The countries under analysis vary significantly in terms of the composition of their economic sectors, but besides Moldova, all rely heavily on either oil, gas or their metals and mining sectors for export revenue (Figure 3.3.). In Armenia, Kyrgyzstan, Tajikistan and Uzbekistan, the metals and mining sectors account for between 44%-66% of all trade by value and contribute significantly to the countries' GDP.

Figure 3.3. Share of selected sectors in total exports (% of value)



Source: UN Comtrade

Some of the analysed countries are also already important producers of a variety of critical minerals, which will be fundamental to enabling the energy transition to low carbon technologies, or of metals and minerals which are likely to see increased demand in the future. Kazakhstan is by far the largest global producer of uranium, demand for which will increase as more nuclear plants are commissioned globally. Tajikistan is the second largest producer of antimony, a metal classified as critical by EU and US, and the region is also crucial in terms of a range of other metals, including the more well-established copper and iron sectors.

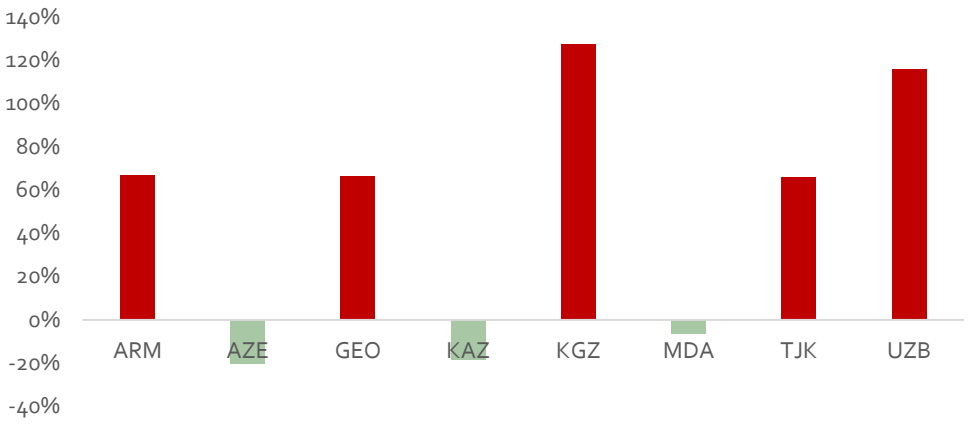
Given the mineral-intensive requirements of the energy transition, as well rapidly increasing prices across a broad range of minerals, some of the assessed countries might be inclined to further boost their mineral production to capture some of the windfall profits. The mining sector and its downstream industries (e.g. ferro-alloys, copper smelting, aluminium refining) have however traditionally been major emitters of GHGs and their operations have often had adverse effects on local societies and environments. As such, any major expansions of the extractive sectors under current working regimes and with existing technologies could exacerbate historical ills and negatively affect climate targets and policies.

Nonetheless, given the nature of mining economics, including complex fiscal regimes, long lead times and uncertainty regarding metal prices and demand, governments might be wary to expand their mining sector production. While there is some co-movement of traded commodity prices, metallic commodity price volatility often prevents efficient long-term planning. Countries might also be constrained by decreasing ore grades, high CAPEX requirements and lack of investments, which might mean the focus would rather be to increase efficiency at existing operations, including technological upgrading which could signal lower emission.

Climate ambitions expressed as the change in GHG emissions implied in countries' 2030 NDC targets vis-à-vis 2018 GHG emissions are also significantly different between countries (Figure 3.4.). Most allow themselves to increase emissions quite substantially as they expect to continue recovering from post-Soviet GDP collapse on a non-decarbonised growth path in the medium

term. Among the countries studied, only Azerbaijan, Kazakhstan, and Moldova currently have a real emissions reduction target in absolute terms.

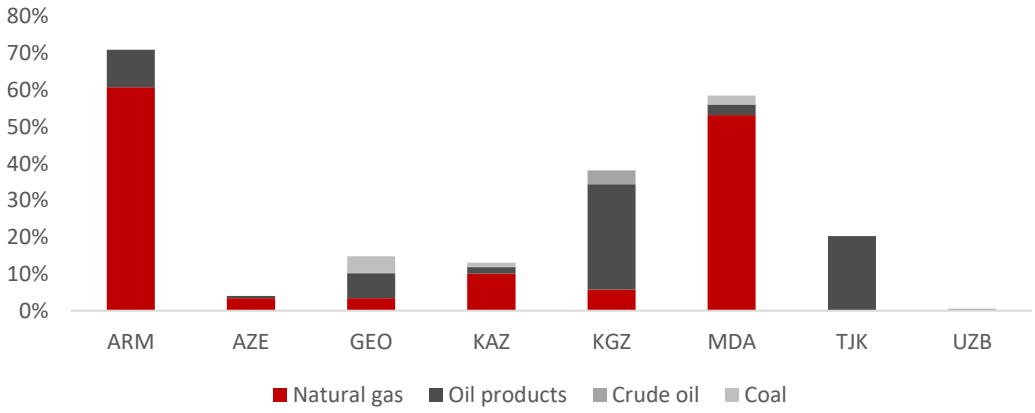
Figure 3.4. Unconditional GHG emission targets: 2030 NDC target vs. last available year



Source: UNFCCC, EDGAR, own calculations

Despite great variation in countries' energy system configuration and climate ambition, important similarities can be observed. All countries are in geographical proximity to Russia, have been a part of the former Soviet Union and remain dependent on fossil fuel imports from Russia to a varying degree, with the exception of Uzbekistan and Azerbaijan (Figure 3.5.). Kazakhstan is dependent on fossil fuel export routes for natural gas, coal, and oil via Russia. Moreover, Russian companies own important parts of the energy infrastructure in several countries studied here.

Figure 3.5. Russian fossil fuel imports as share of Total Energy Supply (TES)



Source: IEA, UN Comtrade

Short-term effects of the war in Ukraine on energy and climate policy in the EU's Eastern Partnership and Central Asia are broadly comparable across the countries studied:

Higher fossil energy prices exert pressure on consumer price subsidies and tariffs in several countries in the region as domestic energy prices and global market prices diverge substantially. Those countries facing higher prices for fossil fuel imports will have higher incentives to invest in energy efficiency and renewable energy. This can also create opportunities in those countries that pursue retail tariff reform as a consequence of unsustainable consumer price subsidies.

Energy exporters may have a higher incentive to increase export volumes if spare capacity exists. However, only very limited additional export capacity exists for Azerbaijan and Kazakhstan thus limiting increased exports in the short-term without construction of new export infrastructure. Increased exports could occur either through increased production if faster extraction is possible or through conserving energy domestically as the opportunity cost of foregone export revenues increases. Increasing pipeline capacity might be feasible in the medium term, however, it is questionable whether such huge investment is warranted in the context of price uncertainty and a long-run global trend towards decarbonisation.

At the same time, countries including Moldova and Tajikistan are scrambling to diversify hydrocarbon supply to increase energy security. The outlook for nuclear expansion plans, as pursued by Armenia, Uzbekistan and Kazakhstan, on the other hand, might become more uncertain, particularly as Rosatom was expected to be involved in the construction.

Policy discussions are being reshaped in light of global developments, with a new energy security paradigm emerging in the region. Against the backdrop of more expensive and increasingly price-volatile fossil fuel imports and the continued dependence on a dominant supplier, Russia, domestic renewable energy sources provide an attractive alternative.

The new energy security paradigm, long-term elevated fossil fuel prices, and heightened price uncertainty are expected to continue driving the expansion of renewable energy sources (RES) in the medium to long run. Although with the exception of Moldova, none of the countries of the region pursue policies with the official aim of reducing their reliance on fossil fuels from Russia, many countries work towards strengthening energy independence. Energy security considerations, beside the economic rationale, might also foster deeper regional integration of energy systems, particularly electricity grids which will play an ever-larger role with increasing electrification. The emergency synchronisation of the Moldovan and Ukrainian grid with the Continental European synchronised area of ENTSO-E is an example in that direction.

Central Asian regional integration, for example, already promises significant economic gains due to complementarities in seasonal generation capacities. [13] The value of integration will rise further with increasing renewable penetration. New energy security considerations might add additional impetus to this development. In the medium to long term, some degree of regional integration could also be expected in the Southern Caucasus region, subject to political agreement. While varying across countries, the link between energy security and the deployment of renewable capacity has already been articulated by various governments.

A key barrier, particularly for large-scale renewable expansion, as well as deeper decarbonisation in other sectors are the large up-front costs for such investment, prohibitive cost of capital and difficult access to international financing. To tap into the opportunities in terms of long-term energy security, cost reductions, and price certainty, countries will have to signal clear commitment to an ambitious and credible decarbonisation path, provide the right regulatory and legal environment for renewable investors, resolve fiscal pressure from unsustainable consumer price subsidies and receive adequate support from partner countries and international financial institutions. When emphasising these points, as well as the important co-benefits, including environmental, social, health and economic aspects, the assessed countries now all have the opportunity to move their energy systems in the right direction.

[13] German Economic Team (GET), 2021, 'The benefits of regional electricity trade for Uzbekistan - A 2030 scenario analysis, Berlin Economics.

4. Individual Country Analysis

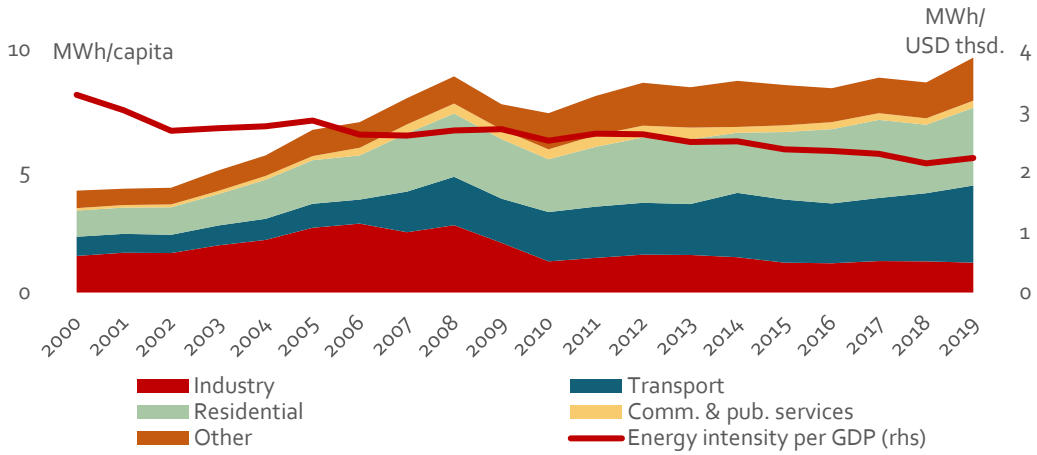
4.1. Armenia

Table 4.1. Energy balance & RUS imports (ARM)

PJ, avg. 2017-2019	Consumption	Production	Imports (RUS share)	Exports
Crude oil	-	-	-	-
Oil products	18	-	18 (65%)	-
Natural gas	86	-	85 (83%)	-
Coal	0.1	-	0.1 (56%)	-
Low carbon	13	13	-	-

Source: IEA, UN Comtrade, own calculations

Figure 4.1. Energy intensity per capita & GDP (ARM)



Source: IEA, World Bank, own calculations

Energy and Climate Profile: High reliance on Russian fuel endangers Armenia's future

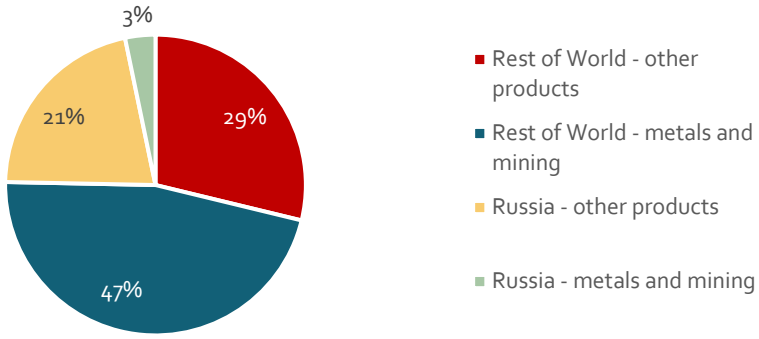
Armenia's energy sector is powered mostly by natural gas, the country's lone aging nuclear power plant (ANPP) and hydroelectricity, with natural gas acting as the primary energy carrier in total final consumption. Given the lack of domestic hydrocarbon production, and absence of refineries, Armenia's energy mix is highly dependent on imports of natural gas and oil products, which come primarily from Russia. Import prices were set by a long-term supply agreement of USD 165 per thousand cubic meters of gas, roughly on par with other post-Soviet states, but below European market prices. While the contract was initially due to expire in 2022 the status of an extension is currently unclear. Armenia has one of the lowest shares of oil in its total energy supply and consumption, and much of the automotive fleet runs on natural gas.

Low carbon energy is supplied mostly by the ANPP, which was initially set for decommissioning in 2017, but whose lifetime was extended. Plans exist to construct a new nuclear power plant. All nuclear fuel is imported from Russia. Roughly 30% of Armenia's electricity also comes from hydropower, with solar and wind contributing minor shares. The government signed the Energy

Sector Development Strategic programme in 2021 which prioritises the rollout of renewable energy, energy efficiency and electricity grid interconnections with Armenia's neighbours.

Armenia's economy and export composition are heavily dependent on the metals and mining sectors, which accounted for approximately 50% of export value between 2017 and 2019, as well as close to 11% of GDP (Figure 4.2.). The main metallic production is concentrated around copper ore, gold and ferroalloys, with some production of molybdenum and zinc present as well.

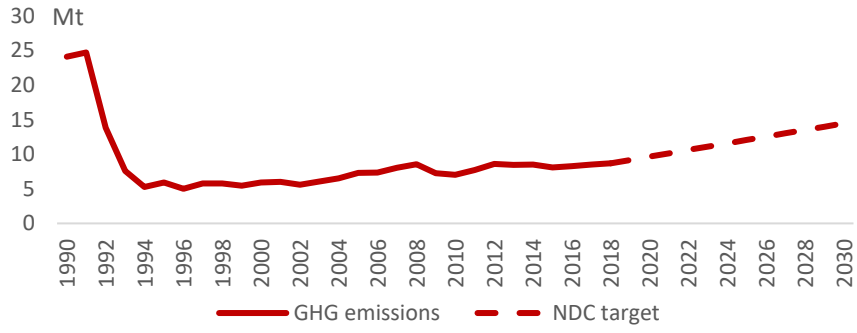
Figure 4.2. Exports shares by value (avg 2017-2019) (ARM)



Source: UN Comtrade

Armenia's has approved an updated NDC in 2021, setting a 40% unconditional GHG emissions reduction target by 2030 (compared to 1990 levels) (Figure 4.3.). Much like its neighbour Georgia, the 1990 emissions baseline preceded the dissolution of the Soviet Union and the subsequent economic collapse, meaning that Armenia's GHG target means higher emissions than today's levels.

Figure 4.3. GHG emissions & NDC targets (ARM)



Source: UNFCCC, EDGAR, own calculations

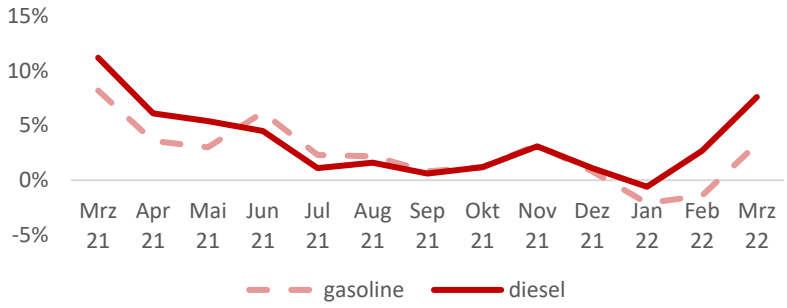
Armenia can therefore increase its emissions significantly compared to 2018 levels and still meet its pre-set climate targets. A suite of options is currently being investigated to allow Armenia to boost its electricity exports with neighbouring countries. Fossil-fuel subsidies in Armenia are amongst the lowest in the region on a per-capita basis, amounting to only USD 4 per capita in 2020 and are only provided to electricity generation, not to importers of fossil fuels.[14]

[14] OECD, 2022, 'Fossil-fuel subsidies in the EU's Eastern Partner countries: How governments supported fossil fuels in 2020'.

Short-term effects: Varied as natural gas prices are still governed by cheap contracts

The IMF has downgraded Armenia's growth forecast from 4.5% to 1.5% compared to its last World Economic Outlook, and both government revenues and expenditures are expected to be lower by 0.8% and 2.2% of GDP, respectively.[15][16] Rising international hydrocarbon prices have so far had mixed results. While diesel prices have increased substantially since the onset of the war, the effect on overall consumer transport has been relatively minor given the prevalence of natural gas-powered vehicles (Figure 4.4.). Retail natural gas prices were raised on average by 4% by the Public Services Regulatory Commission[17], but the import tariff of natural gas by Gazprom Armenia remains unchanged since the start of the war.

Figure 4.4. Fuel price inflation (m-o-m) (ARM)



Source: Statistical Committee of the Republic of Armenia

Armenia's short-, mid- and long-term climate policy will depend heavily on energy security, its relations with Russia and regional neighbours. In late March, the government approved the energy efficiency and renewable energy programme for 2022-2030 which highlights energy security as a key driver for change, including setting a target of 15% solar of energy generation by 2030. This amounts to 1000MW of solar PV capacity to be built and constructing 300MW of battery storage.[18] Initial plans exist for the first stage of implementation which would see the tendering of five 120MW solar PV projects. In mid-April a programme was also approved to support energy efficient renovations of apartments and residential buildings.[19]

While Russia financed a USD 300 million modernisation of the ANPP last year and expressed readiness to replace the facility in 2036, in early May Armenia signed a memorandum with the United States on increasing co-operation in nuclear industries, paving the way for further activities.[20] Another pressing issue is the renegotiation of the long-term gas supply with Russia. Given the dependence of Armenia on gas, and on Russian imports in general, higher contract prices would massively increase costs and would necessitate a much quicker build-up of renewable capacity. Armenia could also continue to accelerate copper production, including conversations around domestic value-addition if prices remain high, which could signal much

[15] International Monetary Fund (IMF), 2021, 'World Economic Outlook: Recovery during a Pandemic—Health Concerns, Supply Disruptions, Price Pressures'.
[16] International Monetary Fund (IMF), 2022, 'World Economic Outlook: War Sets Back the Global Recovery'.
[17] 'Gas Prices Raised In Armenia', Azatutyun, 2022.
[18] Republic of Armenia, 'Energy For 2022-2030 Recognition Of 2022-2030 International Energy (2022-2024)', 2022, Yerevan.
[19] Republic of Armenia, 'RA Government Decision On Approval Of State Support Program For Energy Efficient Repair Of Apartments And Individual Residential Houses', 2022,Yerevan.
[20] 'Armenia Eyes U.S. Boost To Energy Security', Azatutyun, 2022.

higher industrial emissions in the future. Copper production by tonnage peaked in 2019 and decreased in 2020 and 2021, indicating some spare capacity.

Long-term effects: Climate policy and electricity exports conditional on energy security

Armenia's natural gas sectors is dominated by Gazprom Armenia, a fully vertically integrated monopoly who imports all of Armenia's natural gas and owns all the gas infrastructure in the country and long-term impacts on climate policy will therefore be high affected by energy security consideration.[21] Armenia has signalled its intention to boost electricity exports significantly through the construction of the "North-South Corridor", which would increase interconnections with Iran and Georgia, and would allow Armenia to export electricity to Russia, and to the Eurasian Economic Union electricity market after 2025. Given the nature of Armenia's energy infrastructure, this would however mean larger utilisation of its hydro, renewable, nuclear and natural gas fired plants, the last of which is expected to lead to increased emissions. The government forecasts that while by 2030 low carbon electricity could meet 75% of domestic demand, the share of exported low carbon electricity will drop from 60% in 2019 to 51% in 2030.[22] If new, longer-term natural gas supply contracts with Russia are however significantly costlier and move towards global and European averages, Armenia's chances of producing competitively priced electricity for the EAEU markets would diminish.

Impacts on consumers, especially in terms of transportation could have mixed results on climate policy. As a large proportion of Armenia's road fleet is powered by natural gas, higher imported gas prices or sustained high levels of fossil fuel prices might incentivise a shift to electromobility (assuming increase in affordability vis-à-vis Armenia's economy) but might also lead to government intervention in the form of subsidies or social protection for consumers more broadly. While Armenia's rates of fossil fuels subsidisation are very low compared to other regional partners, higher imported fossil fuel prices could mean protective measures by the government ensure price shocks do not highly affect consumers. Much therefore depends on Armenia's relationship with Russia and the contracts it can negotiate.

Some uncertainty for longer term climate policy and emissions targets could also stem from the plans to replace the ANPP with a new facility. Russia's financing of the recent upkeep, supply of 100% of the nuclear fuel needed and plans to construct a new NPP in 2036 all increase Armenia's dependence on Russia's nuclear industry. Nonetheless a recent memorandum of understanding signed with the US on civilian nuclear power co-operation might pave the way for an alternative to Russia. Nonetheless, if ANPP is not replaced with a new facility, Armenia would either have to drastically ramp up its renewable capacity but might also opt for the construction of dirtier solutions which would deepen dependence given the lack of domestic hydrocarbon production, which could once again be conditional on expectations of natural gas price increase vis-à-vis long-term contracts with Russia. Given the longer timeframes, information and analysis is still forthcoming.

[21] A gas-to-electricity swap agreement exists with Iran, wherein natural gas is sent to Armenia and the converted electricity is sent back to Iran. Russian natural gas is therefore fully responsible for Armenia's domestic consumption.

[22] Republic of Armenia, 'Energy For 2022-2030 Recognition Of 2022-2030 International Energy (2022-2024)', 2022, Yerevan.

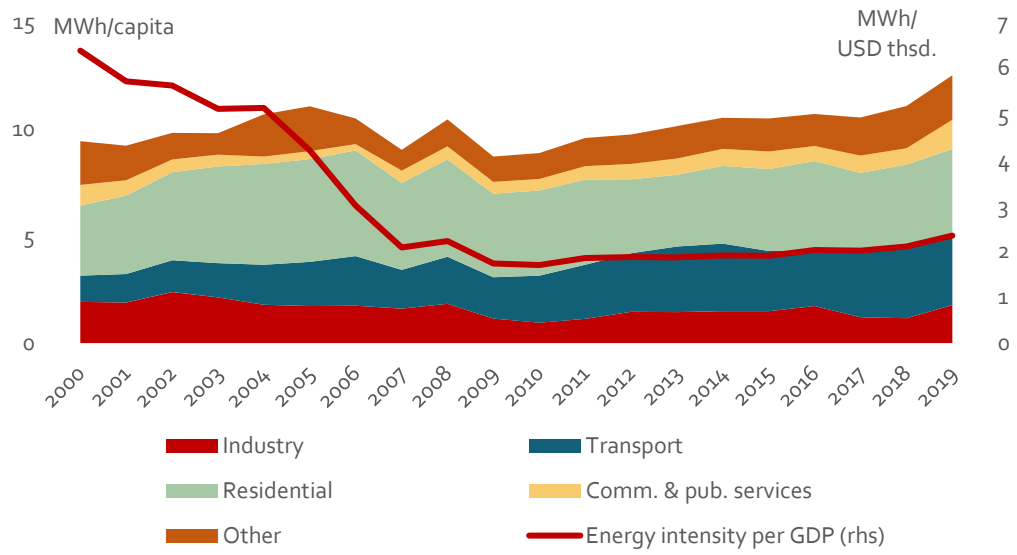
4.2. Azerbaijan

Table 4.2. Energy balance & RUS imports (AZE)

PJ, avg. 2017-2019	Consumption	Production	Imports (RUS share)	Exports
Crude oil	-	1,675	-	1,409
Oil products	212	247	15 (23%)	50
Natural gas	404	725	76 (28%)	398
Coal	-	-	-	-
Low carbon	11	11	-	-

Source: IEA, UN Comtrade, own calculations

Figure 4.5. Energy intensity per capita & GDP (AZE)



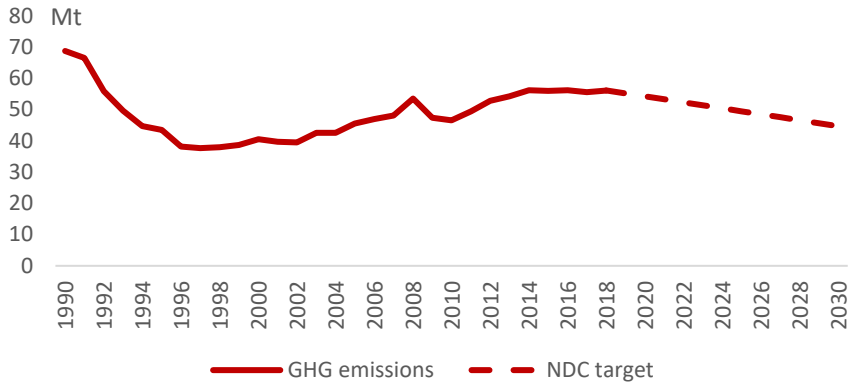
Source: IEA, World Bank, own calculations Table 2: Energy balance & RUS imports (AZE)

Energy and climate profile: Energy exporter with moderate climate ambitions

Azerbaijan is a major oil producer which exports crude oil through the Baku-Tbilisi-Ceyhan pipeline via Georgia and Turkey (~80% of exports) as well as the Georgian Supsa terminal and the Russian port of Novorossiysk on the Black Sea. Natural gas is mainly exported via the Southern Gas Corridor (Southern Caucasus Pipeline and Trans Anatolian Natural Gas Pipeline) to Georgia, Turkey, and Europe. Minerals and metals do not constitute a significant part of Azerbaijan's export basket.

The domestic energy system is dominated by natural gas, mainly used for electricity and heat generation, while oil products are predominantly used as road fuels.

Figure 4.6. GHG emissions & NDC targets (AZE)



Source: UNFCCC, EDGAR, own calculations

GHG emissions have increased significantly since the turn of the century. However, Azerbaijan plans to decrease GHG emissions by 35% until 2030 vs. 1990 emissions according to the country's NDC, which means a 20% reduction vs. 2018 levels (Figure 4.6.). The country also aims to achieve a 30% renewable share in the energy system by 2030. Currently, Azerbaijan has about 1 GW of installed hydropower capacity and negligible amounts of solar and wind. Two large projects for a solar farm (230 MW) and a wind farm (240 MW) have recently entered the construction phase and most recently the country has signed a Memorandum with Masdar to develop up to 10 GW of solar, onshore and offshore wind. Azerbaijan has also prepared a roadmap together with the World Bank and IFC for harnessing Azerbaijan's vast offshore wind potential (157 GW technical potential).[23]

Short-term effects: High fossil prices signal windfall profits for Azerbaijan

Azerbaijan is expected to enjoy massive windfall revenues due to increased oil and gas prices. Government revenues for 2022 alone have been revised upward by 11.5% of GDP, affording Azerbaijan an expected 2022 budget surplus of 20% of GDP (12% in 2023). 24[25] Discussions on headline energy and climate policy have not been substantially affected since February, and Azerbaijan is proceeding with its current plans and strategies.

Since Russia's invasion of Ukraine, the European Union is playing an increasingly central role in Armenia-Azerbaijan negotiations.[26] This includes investment support to both sides, with a EUR 2 billion package to Azerbaijan including investments in renewable energy and energy efficiency.[27]

[23] World Bank (2022). *Offshore Wind Roadmap for Azerbaijan*. World Bank, Washington, DC.
[24] International Monetary Fund (IMF), 2021, 'World Economic Outlook: Recovery during a Pandemic—Health Concerns, Supply Disruptions, Price Pressures'.
[25] International Monetary Fund (IMF), 2022, 'World Economic Outlook: War Sets Back the Global Recovery'.
[26] Isayev, H., Kucera, J., & Mejlumyan, A., 2022, 'EU emerges as major player in Armenia-Azerbaijan negotiations', Eurasianet.
[27] 'Bilateral agreement between EU and Azerbaijan to open doors for new co-op opportunities – ambassador', Azernews, 2022.

Long-term effects: Renewables expansion likely to drive down emissions

Higher prices for oil and natural gas, especially on European export markets, incentivises Azerbaijan to increase extraction for exports of fossil fuels. However, export capacities are virtually fully utilised, and construction of additional oil or gas pipelines remains subject to uncertainties about long-term demand and price levels. Increasing fossil fuel production – in a scenario where additional pipeline capacity is constructed – could lead to higher domestic process emissions in the long run.

However, in a similar scenario where additional export infrastructure is available in the long run – exports could also be increased through drastically reducing domestic fossil fuel consumption instead of additional exploration. Azerbaijan has significant renewable energy potential, especially for offshore wind, and an impressive pipeline of renewable energy projects under consideration. Closer cooperation with the EU on energy sector investments, abundant windfall revenues from fossil fuel exports, and a higher opportunity cost of domestic oil and gas consumption could give additional impetus for ramping up renewable energy investment in the country.

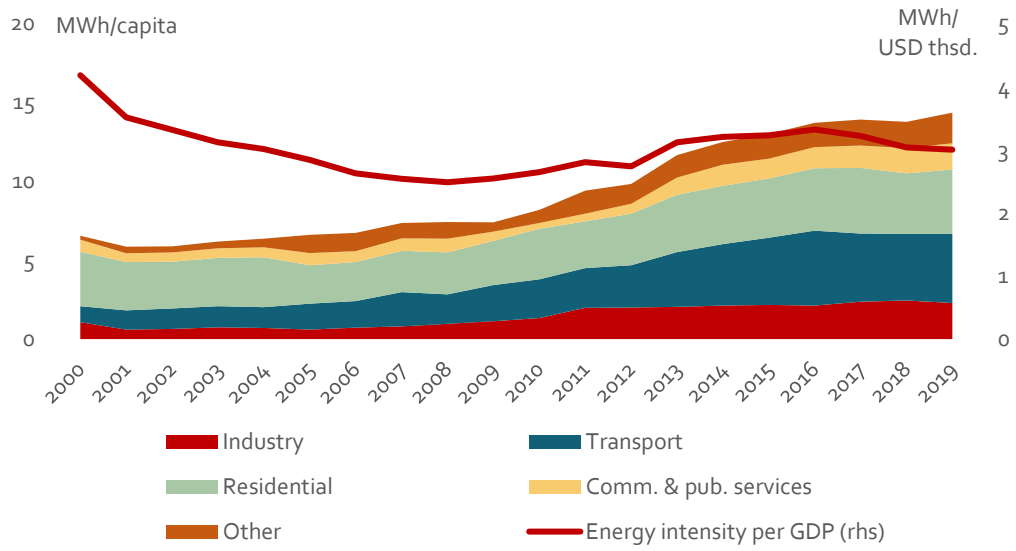
4.3. Georgia

Table 4.3. Energy balance & RUS imports (GEO)

PJ, avg. 2017-2019	Consumption	Production	Imports (RUS share)	Exports
Crude oil	-	1	1 (13%)	3
Oil products	61	1	63 (23%)	2
Natural gas	90	0	99 (7%)	-
Coal	12	2	10 (95%)	0
Low carbon	47	47	-	-

Source: IEA, UN Comtrade, own calculations

Figure 4.7. Energy intensity per capita & GDP (GEO)

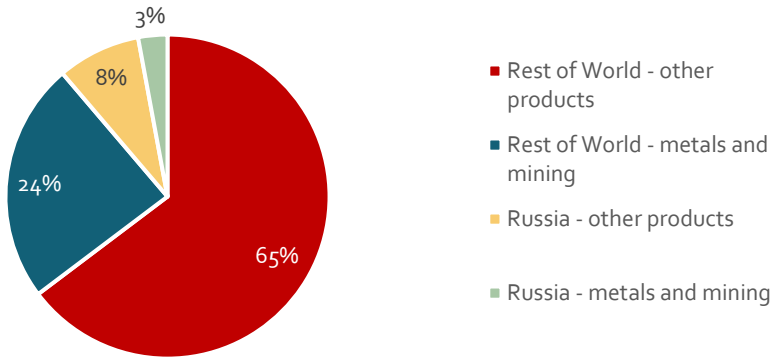


Source: IEA, UN Comtrade, own calculations

Energy and climate profile: Georgia is an energy importer with modest climate ambitions

Natural gas is imported mainly from Azerbaijan and primarily used for residential heating. Oil products are imported from diversified sources and primarily used as road fuels. Particularly during the winter months when hydropower generation is low, Georgia also imports electricity from its neighbours, primarily from Russia and Azerbaijan. The country notably also serves as a transit country for Azerbaijan's oil and gas exports, which grants it preferential import prices for natural gas. Georgia still produces negligible amounts of coal and crude oil. Domestic energy production is dominated by large hydropower electricity generation.

Figure 4.8. Exports shares by value (avg 2017-2019) (GEO)

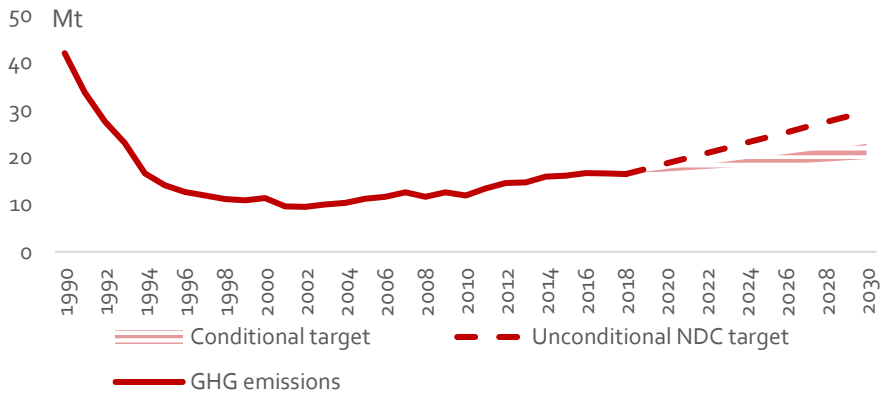


Source: UN Comtrade

The ten-year network development plan foresees to more than double electricity generation capacities until 2030, mainly with additional hydro, wind and solar power. However, implementation of many projects is currently stalled due to delays in the introduction of the new market model, tightening of government policy on Power Purchase Agreements (PPAs) guarantees in 2016, problems with construction permits and strong local opposition against new large hydropower projects due to negative environmental impacts.

Georgia also exports regionally important volumes of energy-intensive mineral products, such as ferroalloys produced from domestic manganese ore, copper ores and concentrates, and nitrogenous fertilisers (Figure 4.8.). Georgia aims for an unconditional 2030 NDC target of -35% vs. 1990 and a conditional NDC target of -50% to -57%. This effectively means a 78% increase of emissions in the unconditional case and a 18% to 37% increase of emissions in the conditional case vs. 2018 (Figure 4.9.). The government is currently developing a long-term low emission development strategy as well as the Integrated National Energy and Climate Plan (NECP).

Figure 4.9. GHG emissions & NDC targets (GEO)

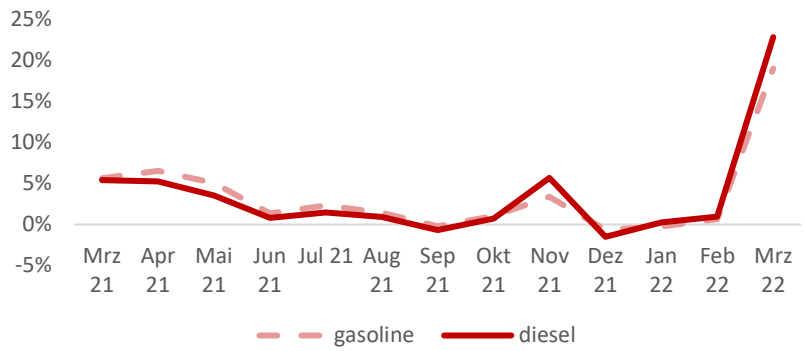


Source: UNFCCC, EDGAR, own calculations

Short-term effects: Higher road fuel prices & reassessment of energy security

Natural gas prices are mainly dependent on undisclosed long-term contracts with Azerbaijan. Thus, Georgia is expected not to be immediately affected by increased global natural gas prices. Gasoline and diesel prices, on the other hand, which make up a significant share of household expenditure, have increased by 19% and 23% in March 2022 respectively (Figure 4.10.). The economic impact of the war in Ukraine is sizeable: Access to capital might be constrained due to higher country risk and the possibility of a contentious referendum and thus risk of conflict intensification in South Ossetia. Furthermore, the IMF has revised downward 2022 real GDP growth outlook for Georgia from +5.8% to +3.2% (see Annex, Figure A.4.) which might also have a slight dampening effect on emissions growth in the short-term.

Figure 4.10. Fuel price inflation (m-o-m) (GEO)



Source: National Statistics Office of Georgia

On the other hand, increased global prices for metals and minerals provide incentives for increased ferroalloys, copper and fertiliser production if spare capacities exist, which could increase domestic emissions in the short- to medium term.

Since February 2022, Georgian public and political discourse has primarily been focused on Russia's role in the Georgian electricity sector. While the primary reason for increased electricity imports from Russia in 2021 has been the rehabilitation works at the largest hydropower plant Enguri, the episode has nonetheless highlighted Georgia's continued energy dependence on its northern neighbour. The government has announced its intention to build new large hydropower plants including Khudoni, Nenskra, and Namakhvani, despite the latter project having recently been abandoned by the investor in the wake of prolonged civil protests against its construction.[28] New proposals for support schemes and revenue sharing arrangements between central and local authorities are currently being developed, to attract private investors and mitigate local resistance. Overall, short-term effects are moderately increasing incentives to reduce consumption of road fuels and pursue additional investments in domestic renewable electricity generation capacities, which could positively impact emissions and climate policy.

Long-term effects: Increased impetus for renewables expansion

Georgia's headline climate targets will most likely remain unchanged, subject to the upcoming long-term low emission development strategy. Oil product consumption is unlikely to be substantially affected due to low elasticity of demand. If road fuel prices remain elevated over a

[28] Civil. (2022). Garibashvili Wants State to Build Large HPPs.

longer period, this could incentivise a limited substitution for more fuel-efficient vehicles, electromobility and public transport. Expected effects for natural gas consumption are mixed. On the one hand, Georgia will continue benefitting from preferential Azeri import prices. This could hand Georgia a competitive advantage in gas-intensive industries, e.g., incentivising increased fertiliser production for export. On the other hand, natural gas will have a higher market value, which could incentivise reduced domestic consumption via increased energy efficiency measures and renewables expansion.

The ongoing reassessment of energy security, particularly regarding electricity import dependence on Russia, is likely to give additional impetus for domestic expansion of renewable electricity generation capacities. It remains to be seen whether Georgia will continue relying predominantly on hydropower development or diversify renewable investments including wind and solar power.

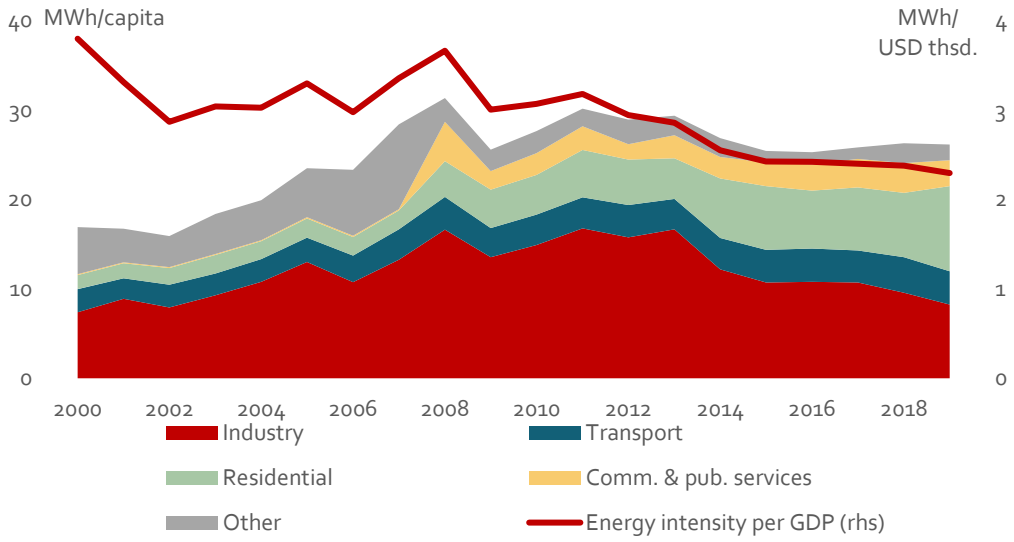
4.4. Kazakhstan

Table 4.4. Energy balance & RUS imports (KAZ)

PJ, avg. 2017-2019	Consumption	Production	Imports (RUS share)	Exports
Crude oil	75	3,791	1 (93%)	2,914
Oil products	466	623	60(83%)	217
Natural gas	736	1,309	431 (65%)	1,057
Coal	1,478	1,927	33(100%)	495
Low carbon	45	45	-	-

Source: IEA, UN Comtrade, own calculations

Figure 4.11. Energy intensity per capita & GDP (KAZ)

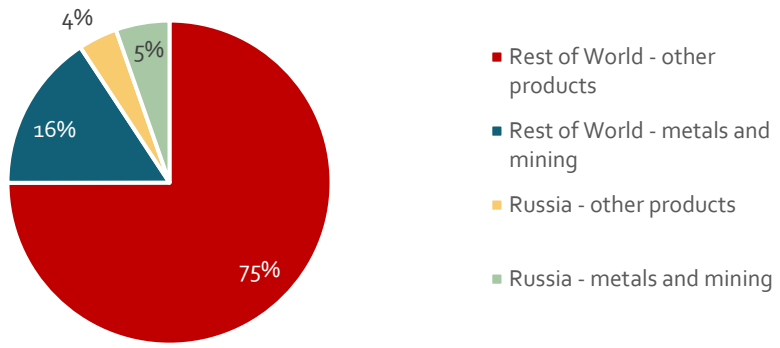


Source: IEA, World Bank, own calculations

<u>Energy and climate profile: Kazakhstan is an energy exporter with a highly energy-intensive economy and moderate climate ambitions</u>

Kazakhstan is amongst the largest producers and exporters of crude oil, natural gas, coal, and the world's largest exporter of uranium ore. Roughly 80% of crude oil exports are transported through Russia via the CPC pipeline, while two thirds of natural gas exports flow to or via Russia with the remainder destined for China. Kazakh coal is also largely exported via Russian railway and ports on the Baltic and Black Sea. Furthermore, the country exports substantial amounts of other metals and minerals such as ferroalloys, copper, zinc, and aluminium (Figure 4.12.).

Figure 4.12. Exports shares by value (avg 2017-2019) (KAZ)

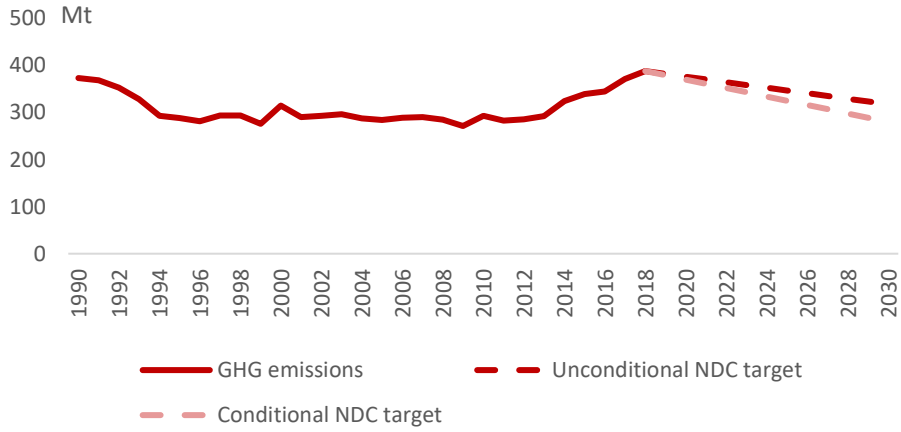


Source: UN Comtrade

Despite own production, Kazakhstan imports significant amounts of natural gas from Russia and Uzbekistan to meet demand in its northern and central regions not connected to the domestic pipeline system. Pipeline extensions are currently underway to connect additional consumers including in the capital Nur-Sultan and the northern provinces to the domestic grid. Kazakhstan also pursues an active gasification policy with additional coal-fired thermal power plants scheduled to switch to natural gas in the coming years.

Due to low and subsidised fuel prices, Kazakhstan has one of the most energy-intensive economies in the region on a per capita basis (Figure 4.11., Figure 3.2.). The country's energy mix is dominated by coal, primarily used for electricity and heat generation, followed by natural gas and oil.

Figure 4.13. GHG emissions & NDC targets (KAZ)



Source: UNFCCC, own calculations

Recent development of some solar PV and onshore wind capacity has somewhat increased renewable electricity generation, which remains, however, at a low absolute level. The country plans a substantial reduction of coal-fired electricity generation by further expanding renewable electricity and gas-fired power plants. Furthermore, the government is also contemplating nuclear power as a potential option for increased low-carbon electricity generation.

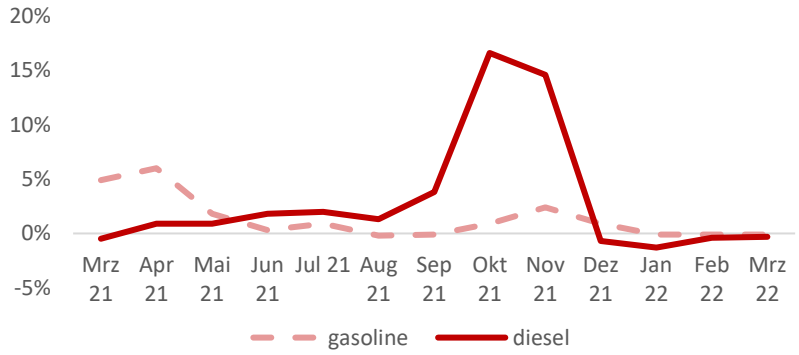
Kazakhstan aims for an unconditional 2030 NDC target of -15% vs. 1990 and a conditional NDC target of -25%. This effectively means an 18% and 28% decrease of emissions vs. 2018 in the conditional and unconditional case, respectively (Figure 4.13.). In the long-term, Kazakhstan aims for climate neutrality, i.e., net-zero emissions, by 2060, requiring significantly accelerated emission reductions after 2030.

Kazakhstan has in place an Emissions Trading Scheme (ETS) since 2013 albeit with a very low carbon price of just over 1 USD/tCO2 due to excess allowances in the system. The government is currently developing a programme for energy efficiency as well as a strategy for achieving 2060 climate neutrality.

Short-term effects: Pressure on domestic fuel subsidies might incentivise energy conservation and investments in energy efficiency

Significant economic linkages with Russia have exposed Kazakhstan to contagion from the economic downturn of their northern neighbour via supply chain disruptions, reduced business confidence and higher currency volatility. Accordingly, the IMF has revised downward the 2022 real GDP growth outlook for Kazakhstan from +3.9% to +2.3% despite positive price effects from increased fossil fuel export prices (see Annex, Figure A.5.). The high prices of oil, gas, and coal are expected, however, to prop up budget revenues, resulting in a revised budget deficit of only -0.5% for 2022 and 2023 (vs. -1.5% for 2022 and -0.8% for 2023 according to previous projections).[29][30] This means that emissions might rise moderately slower without affecting the financial capacity of the government to support green investments.

Figure 4.14. Fuel price inflation (m-o-m) (KAZ)



Source: Bureau of National statistics of the Republic of Kazakhstan

On the other hand, increased global prices for metals and minerals provide incentives for increased metals mining and processing if spare capacities exist, which has the potential to increase domestic emissions in the short- to medium term.

Being largely sheltered from global fossil fuel price developments due to domestic fuel production, fuel price subsidies, and direct price interventions, the short-term impact of war in Ukraine on consumer fuel prices has virtually been non-existent (Figure 4.14.). After the violent protests in January 2022, the government has nominally fixed gasoline, diesel, and LPG prices for 180 days. Meanwhile, exports of road fuels are currently banned to prevent price arbitrage.

[29] International Monetary Fund (IMF), 2021, 'World Economic Outlook: Recovery during a Pandemic—Health Concerns, Supply Disruptions, Price Pressures'.
[30] International Monetary Fund (IMF), 2022, 'World Economic Outlook: War Sets Back the Global Recovery'.

Natural gas consumer prices have also been nominally fixed in February 2022 until 2024. However, due to rapidly increasing domestic gas consumption – a direct result of low subsidised gas prices – and stable gas production, gas exports are expected to drop significantly, making a domestic gas price increase, reportedly in the magnitude of 60%, "inevitable" as domestic price subsidies are linked to falling export revenues.[31] In other words, the now higher opportunity cost of foregone export revenues has increased the incentives for energy conservation and investments in energy efficiency which can only efficiently be mobilised via higher domestic consumer prices.

In the electricity sector, low prices have contributed to rising electricity demand by semi-legal crypto miners in recent years. In general, low prices, increasing demand and depreciated power plants have led to increasing reliance on electricity imports from Russia. Against the backdrop of the uncertain relationship with Russia and the need for balancing increasing shares of renewable electricity generation, discussions about a unified Central Asian electricity system have regained increasing attention.[32]

Long-term effects: Moderately increased incentives for decarbonisation

The growing spread between nominally fixed domestic prices and global markets increases incentives for more ambitious energy and climate policies. While politically sensitive, fuel price subsidies are becoming fiscally unsustainable. Price liberalisation and replacing tariffs by targeted subsidies can resolve fiscal shortfalls and improve incentives for energy efficiency and renewable energy investments.

A major expansion of fossil fuel production seems unlikely as increased extraction of natural gas appears not to be feasible and increased oil production would come at the expense of reinjecting more – and thus producing less – natural gas.[33]

Overall, long-term incentives for decarbonisation seem to be moderately increased as export of potentially conserved oil and natural gas becomes relatively more attractive[34], domestic price subsidies are perceived as increasingly unsustainable while windfall revenues from fossil fuel exports allow for investments into energy efficiency and renewable energy expansion. However, no changes in concrete policy decisions are observable so far.

[31] 'В Казахстане анонсировали «неизбежное» повышение цены на газ', Fergana, 2022.
[32] 'Kazakhstan's green energy transition needs new maneuvering generation capacity', New Europe, 2022.
[33] Pirani, S. (2019). *Central Asian Gas: prospects for the 2020s*. Oxford Institute for Energy Studies.

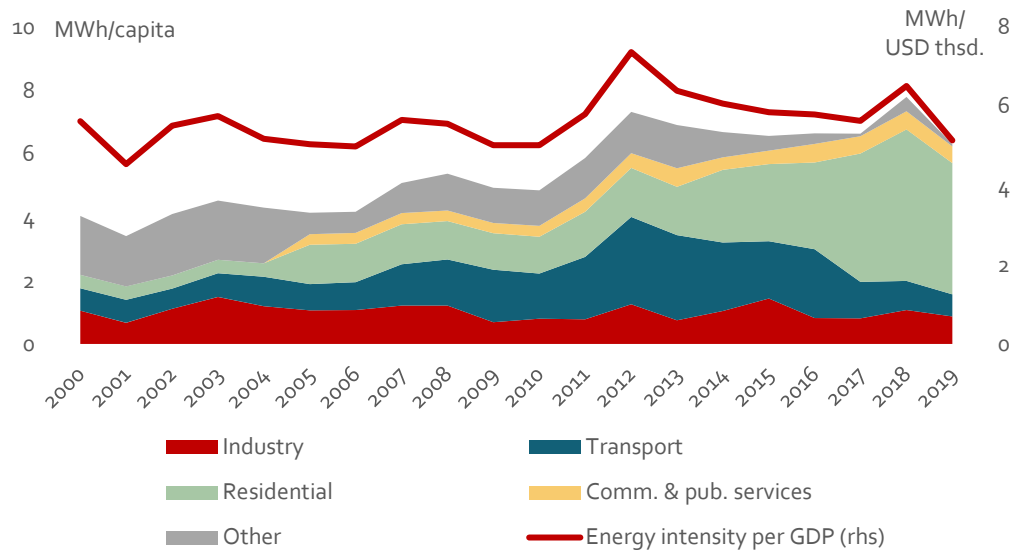
4.5. Kyrgyzstan

Table 4.5. Energy balance & RUS imports (KGZ)

PJ, avg. 2017-2019	Consumption	Production	Imports (RUS share)	Exports
Crude oil	-	9	12 (57%)	2
Oil products	73	18	59 (85%)	5
Natural gas	11	1	12 (89%)	-
Coal	41	35	19 (0%)	13
Low carbon	51	51	-	-

Source: IEA, UN Comtrade, own calculations

Figure 4.15. Energy intensity per capita & GDP (KGZ)

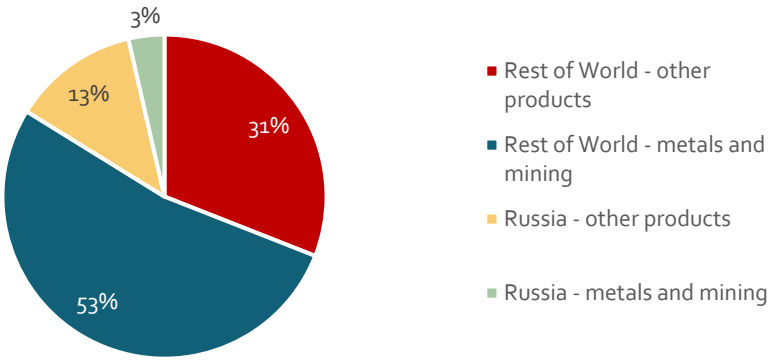


Source: IEA, World Bank, own calculations

Energy and climate profile: Kyrgyzstan depends heavily on Russian energy imports and has modest climate ambitions

Oil covers around 41% of the country's total energy supply and is mainly used in the transport and buildings sectors. 83% of petroleum products and 89% of natural gas are imported from Russia, making the country heavily dependent on Russian fossil fuel imports. Kyrgyzstan is a mountainous country which, due to its rich water resources, can cover around 90% of its electricity supply with hydropower. In winter months, when hydropower generation declines, the country relies on coal-fired electricity generation. Domestic extraction enables the country to cover 85% of coal consumption, mainly in the residential, agricultural and industrial sectors. The energy sector is financially unsustainable due to non-cost-covering tariffs, leaving the sector in a poor state.

Figure 4.16. Exports shares by value (avg 2017-2019) (KGZ)

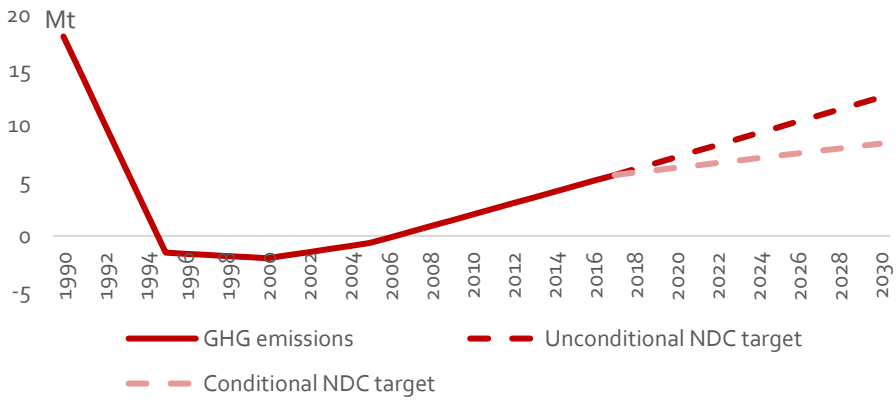


Source: UN Comtrade

Metals and mining cover around 56% of the export basket, mainly due to Kyrgyzstan's high gold production, but a range of other minerals are also mined (Figure 4.16.).

The government emphasises energy security, energy efficiency and sustainable development in its strategy. Improving energy security by expanding coal production and energy efficiency is considered important due to fluctuations in hydropower generation, dependence on imported hydrocarbons, and outdated, inefficient infrastructure.[35] As a member of the Eurasian Economic Union, Kyrgyzstan will become part of the common energy market.

Figure 4.17. GHG emissions & NDC targets (KGZ)



Source: UNFCCC, own calculations
Note: UNFCCC provides GHG emissions data for Kyrgyzstan only for 1990, 1995, 2000, 2005 and 2017 so we have linearly interpolated the remaining years

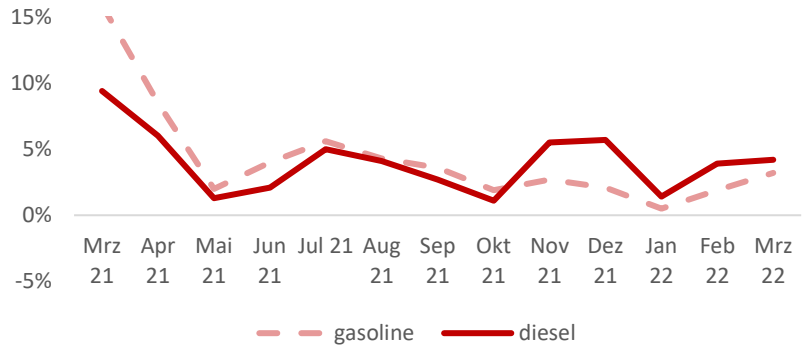
The severe economic decline in the 1990s in combination with a large LULUCF sector led to negative GHG emissions from 1995 until around 2007. In the updated NDC, Kyrgyzstan aims for an unconditional 2030 NDC target of -16% and a conditional NDC target of -44% vs. the 2030 business-as-usual (BAU) scenario. However, this effectively implies an increase by 127% in the unconditional case and a 52% increase in the conditional case vs. 2017 (Figure 4.17.). The increase is due to assumed increase in GDP and the expansion of coal production.

[35] IEA (2020). *Kyrgyzstan energy profile – Analysis - IEA*.

Short-term effects: Cheap Russian oil and new project for renewables

Remittances from Russia exceed 15% of GDP, making the country the most dependent on such transfers relative to GDP.[36] Such significant economic links have exposed Kyrgyzstan to the economic downturn in Russia. Accordingly, the IMF has revised downward the 2022 real GDP growth outlook for Kyrgyzstan from +5.6% to +0.9% (see Annex, Figure A.6.). Due to high prices for metals and minerals, Kyrgyzstan may have an incentive to expand gold production, but production has recently been affected by technical problems at the Kumtor mine, so expansion seems unlikely.[37] The economic downturn will lead to a reduction of GHG emissions in the short-term.

Figure 4.18. Fuel price inflation (m-o-m) (KGZ)



Source: National Statistical Committee of the Kyrgyz Republic

Most fossil fuel subsidies are used for electricity prices, so electricity tariffs are below cost recovery, and for petroleum products (see Annex, Figure A.1.). Due to cheaper oil from Russia, the IMF revised its forecasts for the budget deficit from -3.8% to -1.2% of GDP for 2022.

Kyrgyzstan relies heavily on energy imports from Russia. The import of oil products from Russia accounts for more than 5% of GDP (rising tendency).[38] Since 2016, Russia was exporting oil products to Kyrgyzstan without export duties keeping the prices low in regional comparison. Since the outbreak of the war, Kyrgyz gasoline prices remained low, reflecting relatively cheap oil from Russia and the government's decision to reduce retail prices (Figure 4.18.).[39]

While Kyrgyzstan is benefitting from cheap Russian oil, the dependence became more controversial in the past weeks and months. Since the outbreak of the war in Ukraine, Kyrgyzstan intensified talks towards sustainable development in the energy sector. In April 2022, the international energy forum "Transformation of the energy sector KG" was held in Bishkek, where the Kyrgyz Minister of Energy underlined the need for renewable promotion in the country "in view of the current political uncertainty". The government also signed memoranda of understanding with EcoEner (Spain) and Masdar (UAE) for solar and hydropower projects of 1 GW.[40]

[36] ADB, 2022, 'Asian Development Outlook: Recovery Continues Amid Global Headwinds'.
[37] Turgunbaeva, Aigerim (2022). Kyrgyzstan: Pit wall cracks raise questions over future of giant Kumtor gold mine
[38] ibid
[39] Kudryavzeva, T., 2022, 'Рынок ГСМ. Рекорды на нефтяном рынке привели к очередному росту цен', 24.kg.
[40] Masdar, 2022, 'Masdar agrees to explore renewable energy opportunities in Kyrgyzstan'.

Kyrgyzstan is facing a severe downturn of economic activity due to close trade relations with Russia. Despite the fact that the country benefits from cheap oil, Kyrgyz authorities see an opportunity to intensify discussion to expand renewable capacity.

Long-term effects: Shifting the focus on domestic energy production

The current crisis led to a reassessment of energy security, particularly, concerning oil and gas import dependence. One of the major challenges is the diversification of the import of oil products due to logistics. However, the government will focus on domestic energy production which includes the expansion of renewable capacity. Increasing the share of renewables in the energy system and, at the same time, conduct energy efficiency measures will reduce dependence on energy imports.

Coal is a readily available fuel and might partly replace natural gas and oil where possible. The increase of global energy prices might even lead Kyrgyzstan to expand its domestic coal production to make use of high global energy prices. However, transport routes and transport prices might make sales on the world market difficult.

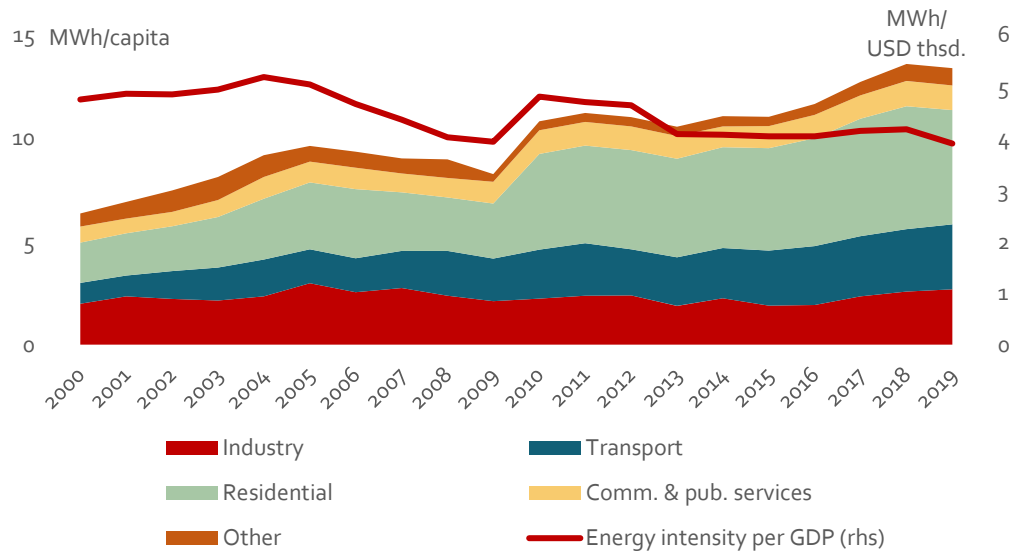
4.6. Moldova

Table 4.6. Energy balance & RUS imports (MDA)

PJ, avg. 2017-2019	Consumption	Production	Imports (RUS share)	Exports
Crude oil	-	-	-	-
Oil products	42	-	42 (12%)	1
Natural gas	88	-	88 (100%)	-
Coal	4	-	4 (97%)	-
Low carbon	32	32	-	-

Source: IEA, UN Comtrade, own calculations

Figure 4.19. Energy intensity per capita & GDP (MDA)



Source: IEA, World Bank, own calculations

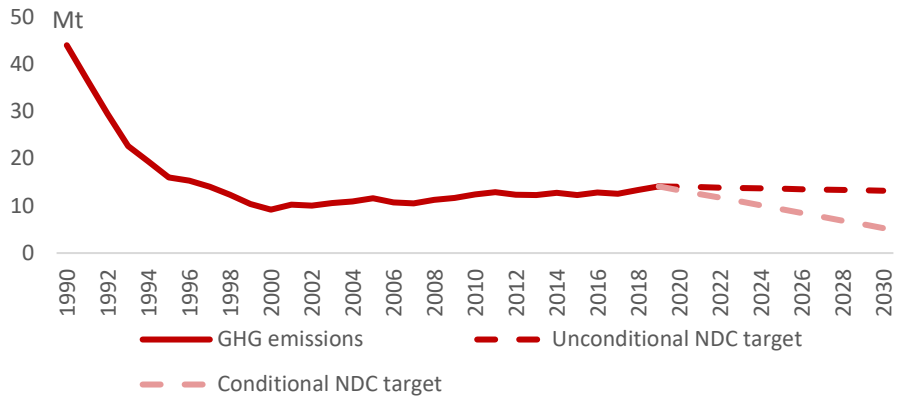
Energy and climate profile: Heavy dependence on Russian energy supply

Moldova is not rich in energy resources, so the country relies heavily on fossil fuel imports. Natural gas covers more than half of total energy supply and is entirely imported from Russia via Ukraine. Natural gas is mostly used for electricity and heat generation. A significant share of natural gas imports is used for electricity production at the Russian-owned gas-fired thermal power plant (MGRES) (located in the breakaway Transnistria region) which covers around 75% of Moldovan electricity consumption. The Transnistrian authorities receive the gas from Russia free of charge, allowing MGRES to produce at very low production costs. Due to lack of generation capacity in the country, MGRES has a dominant position in the electricity sector. Oil products are mostly imported from Romania, Belarus, and Russia. Metals and minerals steel,

constitute only around 2% of Moldova's export basket. In Transnistria, steel production plays a major economic role.[41]

The key objectives in the Energy Strategy of Moldova until 2030 imply an improvement of energy security, development of competitive energy markets, European integration, and climate change mitigation. According to upcoming renewable tenders from the government and the regulator, the capacity of wind, solar, biogas and hydropower plants is to be increased by 521 MW. There are also plans to build generation technologies that can provide balancing capacity, such as new gas turbines. In the gas sector, Moldova is striving to reduce its dependence on Russian gas.[42] Due to high energy intensity in the country, increasing energy efficiency is an important pillar to increase energy security.

Figure 4.20. GHG emissions & NDC targets (MDA)



Source: UNFCCC, own calculations

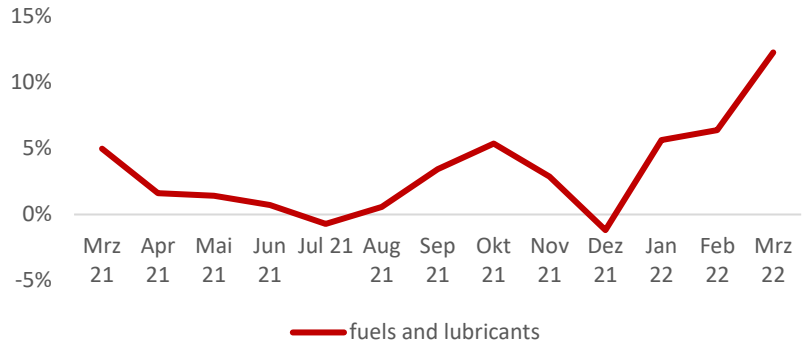
Moldova is one of the most vulnerable countries to climate change.[43] Moldova aims for an unconditional 2030 NDC target of -70% vs. 1990 and a conditional NDC target of -88% vs. 1990. This effectively means a 7% decrease of emissions in the unconditional case and a 63% decrease of emissions in the conditional case (Figure 4.20.).

Short-term effects: Higher gas prices, reassessment of energy security

The IMF has revised downward their 2022 real GDP growth outlook for Moldova due to the war in Ukraine from +5.1% to +0.3% due to inflow of Ukrainian refugees, trade disruptions with Ukraine and Russia, and decrease in remittances from Russia which might have a dampening effect on emissions growth in the short-term (see Annex, Figure A.7.).

[41] UN Comtrade only includes trade data for right bank Moldova. Trade data for Transnistria can be obtained from European Union Border Assistance Mission to Moldova and Ukraine (EUBAM)
[42] In the fall of 2021, a new gas pipeline from Romania came into operation, which could partially replace gas supplies from Russia, but at current European spot prices.
[43] 'ND-GAIN Country Index', Notre Dame Global Adaptation Initiative, 2022.

Figure 4.21. Fuel price inflation (m-o-m) (MDA)



Source: National Bureau of Statistics of the Republic of Moldova

Due to Moldova's dependence on natural gas imports, it is directly affected by energy price developments. Since the increase of gas prices in September 2021 and the dispute with Gazprom about the continuation of gas supply, Moldovan political discourse has primarily been focused on Russia's role in the gas sector. In the fall of 2021, Moldovagaz, which is majority owned by Gazprom, signed a five-year contract with Gazprom to continue gas supplies, which included a price formula partially tied to the gas spot price[44]. Therefore, gas wholesale prices quadrupled in Q1 2022 (y-o-y). The government reacted by compensating gas consumption for households and industry.[45] Similarly, the price for fuel already increased by 4-5% in the third quarter of 2021 but reached as much as a 12% boost after the invasion (Figure 4.21.). As a response, the government provided compensation for the acquisition of diesel used by agricultural producers.[46] Due to budgetary pressure, the IMF revised its outlook for the budget deficit for 2022 from -6% to -7.2%.

Preparations for an interruption of Russian gas supplies, either due to damage to the Ukrainian gas transit network or for political reasons, have already been made. Moldova is also coordinating closely with Romania to use Romanian gas storage facilities. In the electricity sector, European TSOs synchronised with the Ukrainian-Moldovan electricity systems in order to provide grid stability on 16 March 2022. This process was originally scheduled for 2023, but was brought forward by the war. This technical synchronisation opens up new options to import electricity from Romania. In a next step, the Moldovan and the Ukrainian markets plan to couple with ENTSO-E which will enable commercial electricity trade.

Moldova is facing severe challenges in its energy sector due to high dependence on Russian natural gas imports and increasing fossil fuel prices. This led the Moldovan authorities to focus more on contigency plans in the gas sector and EU energy integration, such as the ENTSO-E synchronisation.

Long-term effects: Expansion of renewables and improvement to energy efficiency

Moldova's headline climate targets will most likely remain unchanged and so will the priorities to reach the NDC goals in the energy sector: improving energy efficiency, increasing the use of

[44] In Q4 and Q1, the price formula is 30% linked to the gas spot price and 70% to the oil index, while in Q2 and Q3 it is the other way around.
[45] 'Guvernul va compensa până la 150 m3 de gaze pentru consumatorii casnici și 500 m3 pentru consumatorii non-casnici în sectorul privat', Guvernul Republicii Moldova, 2022.
[46] 'Agenția de Intervenție și Plăți pentru Agricultură', Government of Moldova, 2022.

renewables and promoting sustainable development of the energy areas. Firstly, high energy subsidies for electricity and natural gas will be harder to maintain amid skyrocketing energy prices. Secondly, Moldova's current path for EU integration inflicts policy pressure on the government to follow through with reforming energy markets. In the coming months, the government and the regulator will conduct tenders for renewable capacity which will reduce total emissions in the electricity system and increase energy security due to less dependence on MGRES.

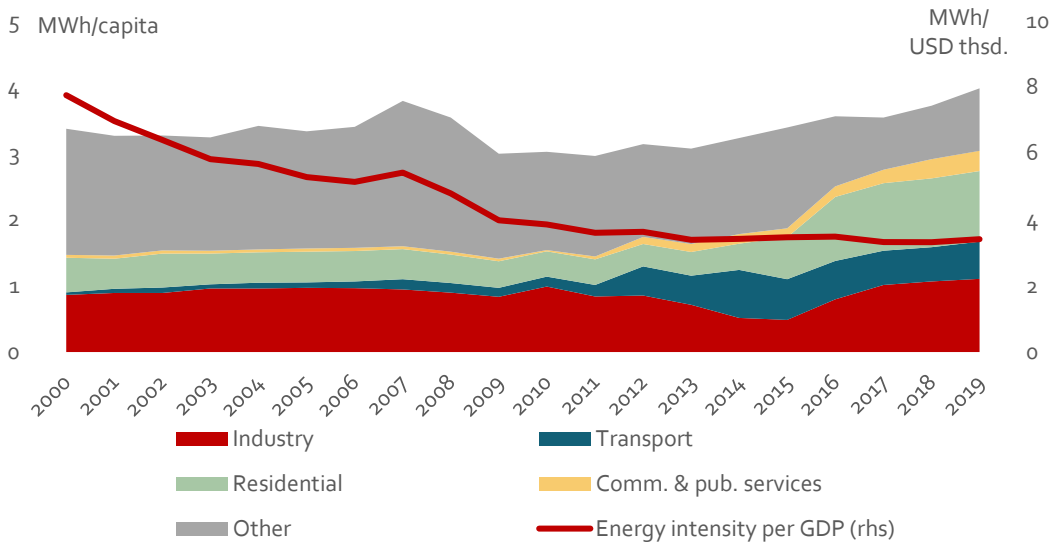
4.7. Tajikistan

Table 4.7. Energy balance & RUS imports (TJK)

PJ, avg. 2017-2019	Consumption	Production	Imports (RUS share)	Exports
Crude oil	0	1	2 (0%)	-
Oil products	41	1	40 (80%)	-
Natural gas	4	0	6 (0%)	-
Coal	47	47	0 (0%)	1
Low carbon	66	66	-	-

Source: IEA, UN Comtrade, own calculations

Figure 4.22. Energy intensity per capita & GDP (TJK)

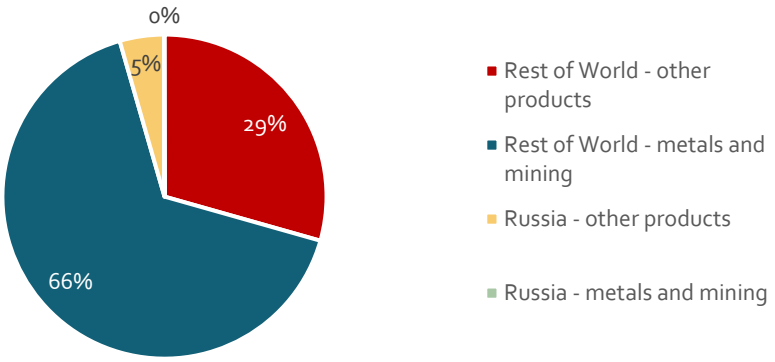


Source: EA, World Bank, own calculations

Energy and climate profile: Tajikistan relies on hydropower and has modest climate ambitions

The country is endowed with abundant water potential making hydropower the main source of energy in the country. It covers more than 90% of electricity generation in the country. The residential sector accounts for around half of electricity consumption, while the industry, mostly the Tajik Aluminium Company (Talco), consumes around 30% of electricity in the country. Due to the seasonality of hydropower, power shortages in winter are common. Coal usage in industry and residential buildings increased in previous years and is domestically produced. 80% of the country's petroleum products are imported from Russia without export duties. Natural gas, which covers only 3% of total energy supply, is imported from Kazakhstan. Oil and gas are used in the transport sector, industry and residential buildings.

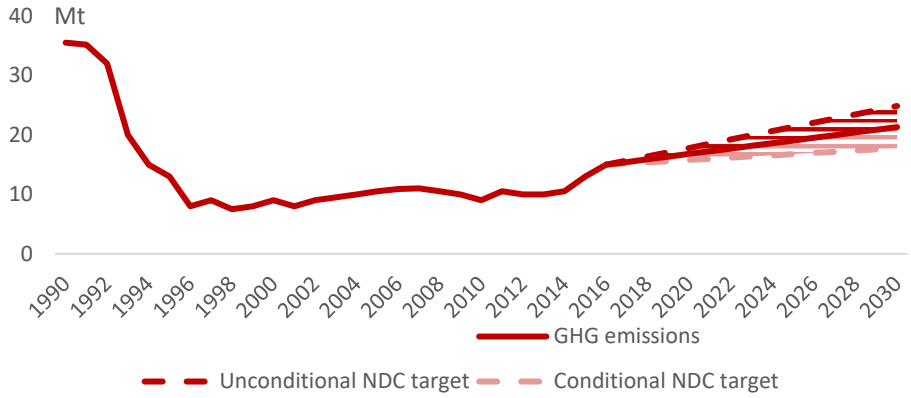
Figure 4.23. Exports shares by value (avg 2017-2019) (TJK)



Source: UN Comtrade

The country exports substantial amounts of minerals and metals, such as aluminium, mineral fuels, salt and antimony, accounting for around 66% of the export basket (Figure 4.23.).

Figure 4.24. GHG emissions & NDC targets (TJK)



Source: UNFCCC, own calculations

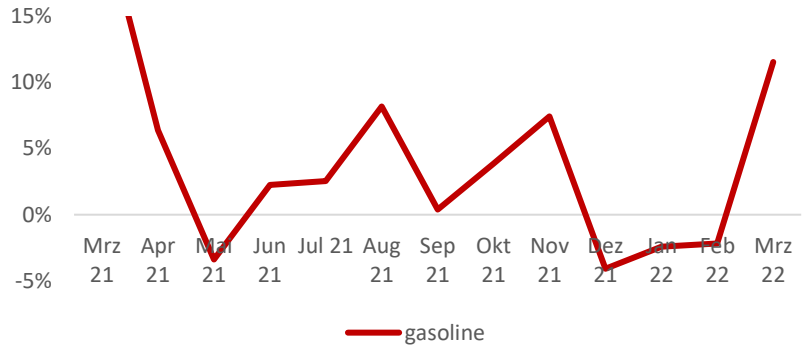
The Tajik government plans to diversify its energy supply, retrofit existing energy infrastructure, improve energy efficiency and increase regional integration. An important aspect is to make use of excess electricity in summer and guarantee electricity supply in winter when hydropower declines. Tajikistan will face significant environmental physical risks stemming from global climate change. Changing water discharges of the rivers, can lead to changing hydropower potential in the long term affecting directly the Tajik energy system. By reactivating regional cross-border electricity trade, Tajikistan could export electricity in summer and import in winter to other Central Asian countries.

Tajikistan aims for an unconditional 2030 NDC target of -30% to -40% and a conditional NDC target of -40% to -50% vs. 1990. However, this effectively implies an increase of 66% to 42% in the unconditional case and a 42% to 18% increase of emissions in the conditional case vs. 2016 (Figure 4.24.).

Short-term effects: Strong links to Russia affect Tajik economy

Strong economic links have exposed Tajikistan to the economic downturn in Russia. Accordingly, the IMF has lowered its forecast for Tajikistan's real GDP growth in 2022 from +4.5% to +2.5% due to a significant drop in remittances, higher food and energy prices as well as financial services and trade disruptions (see Annex, Figure A.8.). Slower economic growth is likely to exert downward pressure on GHG emissions. However, to make use of high prices of minerals and metals, Talco has an incentive to boost its production of aluminium, which would increase GHG emissions in the country.

Figure 4.25. Fuel price inflation (m-o-m) (TJK)



Source: Agency on Statistics under President of the Republic of Tajikistan

Due to electricity tariffs below cost-recovery, most Tajik fossil fuel subsidies of around 8% of GDP are used in the electricity system. The IMF expects a mild increase of the budget deficit from -2.5% to -3% of GDP for 2022.

In the energy sector, Tajikistan is only reliant on Russian energy in the form petroleum products. In previous years, Russia has exported oil products to Tajikistan without export duties keeping prices relatively low. The sharp 12% increase in gasoline prices in March 2022 was due to the National Bank's decision to set new exchange rates of the US Dollar and Euro to the Somoni which led to an increase of fuel prices (Figure 4.25.).[47]

As a result of the current situation, Tajikistan has intensified talks with Iran on oil[48] and with Saudi Arabia[49] and Turkey[50] on energy cooperation. Tajikistan and Kazakhstan have been holding bilateral talks on import of oil products and liquefied petroleum gas from Kazakhstan.[51]

A large part of the Tajik hydropower capacity is currently under construction and relies on Ukrainian technology from Electrotyazhmash and Turboatom. Replacing Ukrainian technology with technology from other countries will be challenging.

[47] '*В Таджикистане подскочили цены на продовольствие и бензин*', Fergana, 2022.
[48] 'Таджикистан рассматривает возможности импорта иранских нефтепродуктов', Tajikistan Newsline, 2022.
[49] 'Таджикистан и Саудовская Аравия налаживают сотрудничество в сфере энергетики', EurAsia Daily, 2022.
[50] 'Таджикистан и Турция обсудили сотрудничество в сфере энергетики', Avesta, 2022.
[51] 'Таджикистан и Казахстан обсудили вопросы развития и расширения двустороннего сотрудничества в водно-энергетической сфере', Khovar, 2022.

Long-term effects: Reassessment of energy security; diversifying oil product imports

Tajikistan relies on the import of oil products from abroad. Despite preferential oil products supply contracts with Russia, which exempted Tajikistan from the export duty, authorities identified the reliance on Russia as the main supplier as a threat to energy security. Therefore, the government plans to diversify oil imports. This could strengthen energy trade with countries located outside the former Soviet space, such as Iran, but would also likely increase the price for oil products. Such a price increase might shift the focus of the government more towards energy efficiency and renewable energy. The expansion of Central Asian cross-border electricity trade might make use of hydro, solar and wind capacity in Tajikistan.

The massive increase in world coal prices could encourage the already planned expansion of coal production in order to sell coal at high prices on the world market. However, transport routes and transport prices might make coal sales on the world market difficult.

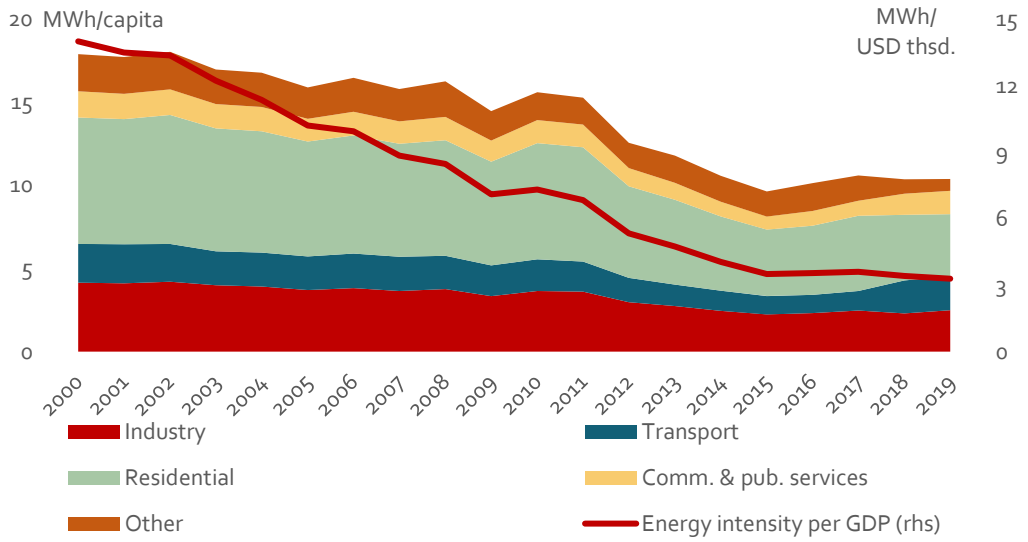
4.8. Uzbekistan

Table 4.8. Energy balance & RUS imports (UZB)

PJ, avg. 2017-2019	Consumption	Production	Imports (RUS share)	Exports
Crude oil	-	127	41 (10%)	-
Oil products	167	164	6 (68%)	3
Natural gas	1608	1966	0 (0%)	424
Coal	87	61	19 (0%)	-
Low carbon	25	25	-	-

Source: IEA, UN Comtrade, own calculations

Figure 4.26. Energy intensity per capita & GDP (UZB)



Source: IEA, World Bank, own calculations

Energy and climate profile: Natural gas plays a role in all aspects of Uzbekistan's economy

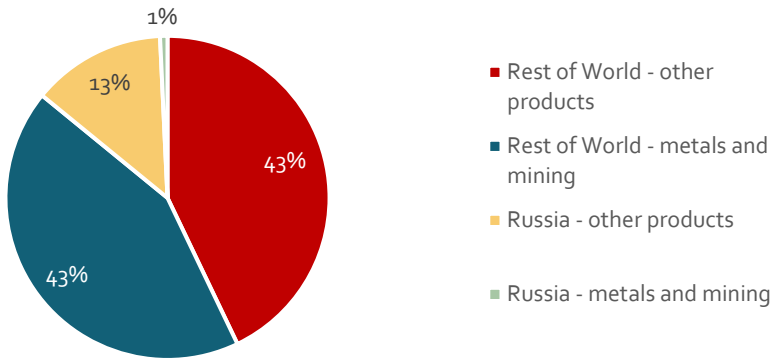
Uzbekistan is one of the world's largest producers of natural gas, which dominates both its total energy supply and total final consumption in all key sectors. While Uzbekistan also previously exported significant volumes of gas to China, Russia and Kazakhstan, exports have almost entirely tapered off as the government is prioritising using gas domestically. Conventional oil production has been steadily declining since the early 2000, most of which is refined domestically. Smaller quantities of both oil and oil products are also imported from neighboring countries and a varying extent Russia. The government has launched a USD 3.6 billion deep gas processing project which will produce 1.5 million tonnes per year of a range of oil and gas products with the expectation of subsituting over USD 1 billion annually.[52] Uzbekistan has seen some improvements in terms of energy efficiency, but the reliability of the energy grid has

[52] Reuters, Uzbekistan launches first gas-to-liquids plant, 2021

previously been an issue, which the government is looking to tackle by significantly ramping up capacity.

Considering the rising population and energy demand, the government announced plans to increase installed capacity almost 2.5-fold to 29.2GW and electricity generation 2-fold to 121 TWh by 2030, with project investment costs amounting to over USD 35 billion until 2030. While low carbon energy has historically played a minor role in Uzbekistan's energy mix, with only some capacity provided by hydropower, Uzbekistan aims to significantly ramp up capacity of solar and wind power, with a target of 20% of the energy mix by 2025. Targets by 2030 could be as high as 7 GW for solar PV and 5 GW for wind, if approved. Several projects have already been commissioned and more are currently in the process. This large-scale ramp up is also accompanied by a significant focus on the expansion and modernisation of the electricity grid. Uzbekistan has also started the construction of the country's first nuclear power plant, which is being constructed by Rosatom and is expected to be completed by 2028.

Figure 4.27. Exports shares by value (avg 2017-2019) (UZB)

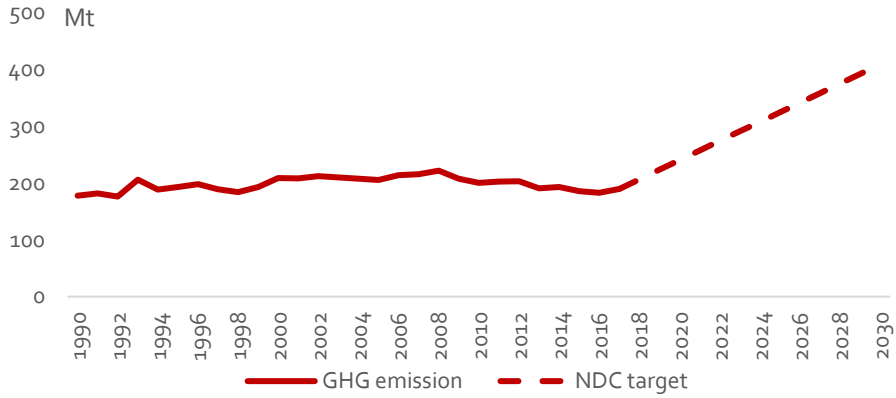


Source: UN Comtrade

Uzbekistan is a major producer and exporter of uranium and gold, with several other minerals, including copper, lead and zinc featuring in its export basket (Figure 4.27.). Mineral exports account for over 43% of all exported good by value, and for 5% of total GDP, one of the largest sectoral contributions. Higher commodity prices could encourage the government to attempt to ramp up production in the short-term in order to maximise export revenues, and in the mid-to-longer term in expectation of higher prices or a commodity super cycle brought on by the mineral requirements of the energy transition.

Uzbekistan's government published its NDC in late 2018, committing to decreasing specific GHG emissions per unit of GDP by 10% by 2030 from 2010 levels, which was further increased to a target of 35% per unit of GDP at COP26. Uzbekistan has relatively high fossil fuel subsidies, which amounted to over 6.6% of GDP in 2020, most of which went into the natural gas sector.

Figure 4.28. GHG emissions & NDC targets (UZB)



Source: UNFCCC, own calculations

Short-term effects: Uzbekistan looks to ramp up energy and natural gas production

The IMF has downgraded Uzbekistan's growth forecast for 2022 from 5.4% to 3.4% compared to its last World Economic Outlook, and both government revenues and expenditures are expected to be lower by 3.2% and 3.3% of GDP, respectively.[53][54] Rising fossil fuel prices have not had significant effects on climate and government policy so far. While the government has resumed exports of natural gas to China in May, there have been re-iterations that all exports will be phased out by 2024/2025 to accommodate domestic demand. While Uzbekistan's refineries produce the majority of the oil product needs of the country, roughly 22% of petrol is imported, most of which comes from Russia. Tied to the Kazakh January protests, the government previously increased subsidisation to the consumer fuel retail sector, with prices decreasing by 6-10% but recent reports at petrol stations have noted some increases in prices, although these have not been as significant as in the other assessed countries.[55] The government has recently re-iterated its commitment to dramatically decreasing fossil fuel subsidies but warned of the effect on consumer prices.[56] Subsidies have decreased from USD 9.0 billion in 2018 to USD 3.8 billion in 2020, but they still accounted for 6.6% of total GDP. Uzbekistan did however signal its intention to phase out fossil fuel subsidies completely at COP26 in 2021.

Worryingly for Uzbekistan's climate policy and environment, authorities have recently announced increased co-operation with USGS on the exploration of Uzbekistan's shale oil and gas resources.[57] If successful, fracking could further enable Uzbekistan to decrease its imports of oil products, saving significant funds under a scenario with persistently high oil prices. Nonetheless, these steps would be highly harmful to Uzbekistan's already fragile and water-stressed ecosystem, with the necessary water supply possibly endangering other sectors and leading to higher emissions. Details regarding the co-operation and possible plans are still forthcoming. On the flipside, the government has reconfirmed its commitment to the

[53] International Monetary Fund (IMF), 2021, 'World Economic Outlook: Recovery during a Pandemic—Health Concerns, Supply Disruptions, Price Pressures'.
[54] International Monetary Fund (IMF), 2022, 'World Economic Outlook: War Sets Back the Global Recovery'.
[55] 'Бензин начал дорожать', Autostrada, 2022.
[56] 'Uzbekistan Restarts Gas Exports To China', Oil Price, 2022.
[57] Lillis, J., 2022, 'США помогут Узбекистану в разведке сланцевого газа'.

decarbonisation of the economy, with ongoing PV solar project construction and the announcement of the first major (100 MW) wind farm.

In light of increased prices of uranium, the President has already encouraged further exploration, as well as the reforming of the state-owned NMMC, with the vision of eventually also focusing on domestic value-addition.[58] While the in-situ leaching processes utilised in Uzbekistan's uranium mining sector would not highly increase emissions, there is some potential of higher environmental and water pollution. Countries processing and enriching uranium could seek to engage further with Uzbekistan's uranium sector as an alternative to Russia's uranium sector.

Long-term effects: Impacts uncertain at the moment

The war in Ukraine is unlikely to have significant long-term impacts on Uzbekistan's climate policy or domestic energy ambitions. Despite higher natural gas prices, the growing needs of Uzbekistan's domestic energy sector will necessitate all increases in production to be channeled into local consumption. The government has also affirmed that higher profitability will be achieved through adding value to natural gas domestically by conversion into plastics and mineral fertilisers.[59] While increased natural gas production, flaring and emissions from the processing of gas will likely increase emissions, these plans have not changed due to the war.

The Uzbek government has also affirmed its commitments to continue the construction of the country's nuclear plant with Rosatom, despite risks of future sanctions and possible dependence on Russian nuclear fuel.[60]

[58] World Nuclear News, 2022, President calls for Uzbek exploration programme
[59] BNN Bloomberg, 2022, 'Uzbekistan Will Pump More Gas But Keep Most of It at Home'.
[60] Lillis, J., 2022, 'Uzbekistan: Nuclear deal with Russia still on the table despite sanctions', Eurasianet.

5. Conclusions and policy recommendations

5.1. Conclusions

While the analysis highlights the heterogeneity among the countries in the region, especially of energy importers vs. energy exporters, the emerging conclusions indicate that the balance of economic incentives arising from the economic and political upheaval caused by Russia's war against Ukraine are supporting rather than counteracting the drive towards a decarbonisation of countries.

The key driver towards decarbonisation of energy importing countries are the risks surrounding the prices and supply of fossil energies – the new energy security paradigm. Energy prices are experiencing strong hikes. Being dependent on crucial imports of vast magnitudes of commodities with such high price and supply risks is a huge economic vulnerability. It strongly favours building up and using (also through regional energy cooperation as possible in Central Asia) renewable energy sources wherever possible. Indeed, even for the countries maintaining close ties with Russia and having access to fossil fuel at discounted prices, the political and economic risks of this approach have become very visible and are noticed around the region. Whether this incentive is sufficient to lead to increased or at least continued efforts towards decarbonisation will be decided by two related factors: Firstly, the policy and institutional environment must be set such that investments in green technologies are encouraged and participation in markets is not artificially made difficult. Secondly, costs of capital are crucial as these investments often are characterised by relatively high up-front costs, with their economic viability mostly due to savings in operational costs over their life-cycle.

Whereas for energy exporters – most notably Azerbaijan and Kazakhstan in this paper – **incentives exist to increase extraction of fossil fuels to benefit from increased prices on the world market, the practical possibility of this is less certain.** Transmission capacities are the key limiting factor for increasing fossil fuel exports and whilst at least Azerbaijan could theoretically drive the expansion of pipeline capacity, it is questionable whether such huge investment is warranted in the context of price uncertainty and a long-run global trend towards decarbonisation. Even if extraction would increase in some countries, one should differentiate between the local and global climate impact: Whereas emissions related to extraction could rise locally, the global impact may well be neutral if the extraction only substitutes fossil exports of other countries (i.e. Russia) and on balance, no more fossil fuel is extracted or combusted globally.

Another common feature is increased pressure to reduce or withdraw subsidies to consumer prices or tariffs for energy. Energy price tariffs for consumers far below the market price are a common feature in many post-Soviet countries. Whilst indeed relieving income pressure for poorer households, they also counteract incentives towards energy efficiency and are hugely costly for public budgets. Most public budgets in the region are under increased pressure due to economic fallout of the war such as reductions in economic growth or remittance inflows. This increased pressure often leads to helping realise, how economically and fiscally wasteful these subsidies or tariffs are. Replacing them with targeted social transfers or minimum income (or other redistributive) schemes could often reconcile effective income assistance to poor households with desirable economic incentives towards energy efficiency.

5.2. Policy recommendations

Several preliminary policy recommendations follow from this analysis to provide a basis for discussion at the GREEN Action Task Force meeting:

- **Countries in the region should continue to pursue and sharpen strategies towards decarbonisation**. Increased deployment of RES in the power system, investments in energy efficiency in buildings and industry and the decarbonisation of industrial and transport sectors will reduce the vulnerability due to higher fossil prices and, for energy exporters, conserve the possibility to export valuable fuels rather than inefficiently burn them domestically.

- Countries should also replace energy price subsidies or consumer tariffs regulated far below market **value with more effective social policy instruments such as targeted social transfers or minimum income schemes**. This will save valuable fiscal resources in the budget, effectively support vulnerable households, and reduce energy inefficiency at the same time.

- **The international community – especially high-income countries – can and should support these countries in their efforts to decarbonise**. One key form of support should be **access to capital for investments in green technologies**. High costs of capital, often also only in the form of credits with a too short term to allow amortisation of assets, is a key restricting factor for green investments in most countries in the region.

- In addition**, international partners should continue their efforts to support necessary reform and decarbonisation policies by technical assistance and capacity-building measures.**

6. References

ADB (2022). *Asian Development Outlook: Recovery Continues Amid Global Headwinds*. Presentation.

Agenția de Intervenție și Plăți pentru Agricultură | Government of Moldova. Aipa.gov.md. (2022). Retrieved 3 June 2022, from http://aipa.gov.md/ro/content/în-atenția-producătorilor-agricoli-s-dat-start-depunerea-cererilor-de-solicitare.

Armenia Eyes U.S. Boost To Energy Security. «Ազատ Եվրոպա/Ազատություն» ռադիոկայան. (2022). Retrieved 3 June 2022, from https://www.azatutyun.am/a/31836019.html.

Azernews (2022). *Bilateral agreement between EU and Azerbaijan to open doors for new co-op opportunities – ambassador*. Retrieved 3 June 2022, from https://www.azernews.az/nation/194395.html.

BNN Bloomberg (2022). *Uzbekistan Will Pump More Gas But Keep Most of It at Home - BNN Bloomberg*. Retrieved 3 June 2022, from https://www.bnnbloomberg.ca/uzbekistan-will-pump-more-gas-but-keep-most-of-it-at-home-1.1742308.

Civil (2022). *Garibashvili Wants State to Build Large HPPs*. Retrieved 3 June 2022, from https://civil.ge/archives/488321.

European Commission (2022). *REPowerEU: A plan to rapidly reduce dependence on Russian fossil fuels and fast forward the green transition*. Retrieved from https://ec.europa.eu/commission/presscorner/detail/en/ip_22_3131

Gas Prices Raised In Armenia. «Ազատ Եվրոպա/Ազատություն» ռադիոկայան. (2022). Retrieved 3 June 2022, from https://www.azatutyun.am/a/31730223.html.

Guicci, R. (2022). *Economic implications for Moldova, Georgia and Armenia of the war in Ukraine and the sanctions against Russia. A comparative analysis.* German Economic Team. Retrieved from https://www.german-economic-team.com/wp-content/uploads/2022/05/GET_ALL_PB_01_2022_en.pdf

Guvernul va compensa până la 150 m3 de gaze pentru consumatorii casnici și 500 m3 pentru consumatorii non-casnici în sectorul privat. Guvernul Republicii Moldova. (2022). Retrieved 3 June 2022, from https://gov.md/ro/content/guvernul-va-compensa-pana-la-150-m3-de-gaze-pentru-consumatorii-casnici-si-500-m3-pentru.

Herrick, D., Michalak, K., Neuweg, I., & Prívarová, M. (2022). *Aligning short-term recovery measures with longer-term climate and environmental objectives in Eastern Europe, Caucasus and Central Asia* (pp. 15-21). OECD. Retrieved from https://www.oecd.org/environment/outreach/ENVEPOCEAP(2021)4-GreenRecoveryEECCA.pdf

IEA (2020). *Kyrgyzstan energy profile – Analysis - IEA*. Retrieved 3 June 2022, from https://www.iea.org/reports/kyrgyzstan-energy-profile.

International Monetary Fund (IMF). (2021). *World Economic Outlook: Recovery during a Pandemic—Health Concerns, Supply Disruptions, Price Pressures*. Washington, DC: International Monetary Fund (IMF). Retrieved from

https://www.imf.org/en/Publications/WEO/Issues/2021/10/12/world-economic-outlook-october-2021

International Monetary Fund (IMF). (2022). *World Economic Outlook: War Sets Back the Global Recovery*. Washington, DC: International Monetary Fund (IMF). Retrieved from https://www.imf.org/en/Publications/WEO/Issues/2022/04/19/world-economic-outlook-april-2022

Isayev, H., Kucera, J., & Mejlumyan, A. (2022). *EU emerges as major player in Armenia-Azerbaijan negotiations*. Eurasianet. Retrieved 3 June 2022, from https://eurasianet.org/eu-emerges-as-major-player-in-armenia-azerbaijan-negotiations.

Kazakhstan's green energy transition needs new maneuvering generation capacity. New Europe. (2022). Retrieved 3 June 2022, from https://www.neweurope.eu/article/kazakhstans-green-energy-transition-needs-new-maneuvering-generation-capacity/.

Kudryavzeva, T. (2022). *Рынок ГСМ. Рекорды на нефтяном рынке привели к очередному росту цен*. 24.kg. Retrieved 3 June 2022, from https://24.kg/ekonomika/222780_ryinok_gsm_rekordyi_naneftyanom_ryinke_priveli_kocherednomu_rostu_tsen/.

Kyiv School of Economics (KSE) (2022). *Direct damage caused to Ukraine's infrastructure during the war has reached over $105.5 billion*. Retrieved 3 June 2022, from https://kse.ua/about-the-school/news/direct-damage-caused-to-ukraine-s-infrastructure-during-the-war-has-reached-over-105-5-billion/.

Lillis, J. (2022). *Uzbekistan: Nuclear deal with Russia still on the table despite sanctions*. Eurasianet. Retrieved 3 June 2022, from https://eurasianet.org/uzbekistan-nuclear-deal-with-russia-still-on-the-table-despite-sanctions.

Lillis, J. (2022). *США помогут Узбекистану в разведке сланцевого газа*. https://russian.eurasianet.org/сша-помогут-узбекистану-в-разведке-сланцевого-газа. Retrieved 3 June 2022, from https://russian.eurasianet.org сша-помогут-узбекистану-в-разведке-сланцевого-газа

Saha, D., Bilek, P., Cherviachenko, I., von Mettenheim, M., Stubbe, R. (2022). *Economic reasons for a green reconstruction programme for Ukraine*. Presentation. Low Carbon Ukraine, Berlin.

Masdar. (2022). *Masdar agrees to explore renewable energy opportunities in Kyrgyzstan*. Retrieved from https://news.masdar.ae/en/News/2022/04/15/12/08/Masdar-agrees-to-explore-renewable-energy-opportunities-in-Kyrgyzstan

ND-GAIN Country Index. Notre Dame Global Adaptation Initiative. (2022). Retrieved 3 June 2022, from https://gain.nd.edu/our-work/country-index/?fbclid=IwAR3LTsAlp3T-1zHMBslSShIevQTU1pilfovq4OoZv7iR4kNY8Kr2tJ1zaDo.

OECD. (2021). *Fossil-fuel subsidies in the EU's Eastern Partner countries: How governments supported fossil fuels in 2020*. OECD. Retrieved from https://www.oecd.org/countries/ukraine/Fossil-Fuel-Subsidies-in-the-EU%27s-Eastern-Partner-countries.pdf

Partridge, J. (2022). *Russia cuts gas supplies to Netherlands and firms in Denmark and Germany*.

The Guardian. Retrieved 8 June 2022, from https://www.theguardian.com/world/2022/may/31/russia-cuts-gas-supplies-dutch-state-trader-sanctions-war.

Pirani, S. (2019). *Central Asian Gas: prospects for the 2020s*. Oxford Institute for Energy Studies. Retrieved 10 June 2022, from https://www.oxfordenergy.org/publications/central-asian-gas-prospects-for-the-2020s/.

Republic of Armenia. RA Ministry Of Education In The Program Of The First Time Of The First Time (2022-2024) of the Energy Saving and Renewable Energy (2022). Yerevan.

Republic of Armenia. RA Government Decision On Approval Of State Support Program For Energy Efficient Repair Of Apartments And Individual Residential Houses (2022). Yerevan.

Russian Federation bans exports of wheat, maize and other cereals to Armenia, Kazakhstan and Kyrgyzstan until 30 June 2022 | Food Price Monitoring and Analysis (FPMA) | Food and Agriculture Organization of the United Nations. Fao.org. (2022). Retrieved 3 June 2022, from https://www.fao.org/giews/food-prices/food-policies/detail/en/c/1477294/.

Situation Ukraine Refugee Situation. UNHCR. (2022). Retrieved 3 June 2022, from https://data.unhcr.org/en/situations/ukraine.

Stiewe, C., & Zachmann, G. (2021). *The benefits of regional electricity trade for Uzbekistan - A 2030 scenario analysis*. Berlin: German Economic Team (GET).

Turgunbaeva, A. (2022). *Kyrgyzstan: Pit wall cracks raise questions over future of giant Kumtor gold mine*. Retrieved 10 June 2022, from https://www.intellinews.com/kyrgyzstan-pit-wall-cracks-raise-questions-over-future-of-giant-kumtor-gold-mine-246487/

Ukraine: civilian casualty update 27 May 2022. Office Of The High Commissioner For Human Rights (OHCHR). (2022). Retrieved 3 June 2022, from https://www.ohchr.org/en/news/2022/05/ukraine-civilian-casualty-update-27-may-2022.

Uzbekistan Restarts Gas Exports To China. Oil Price. (2022). Retrieved 3 June 2022, from https://oilprice.com/Latest-Energy-News/World-News/Uzbekistan-Restarts-Gas-Exports-To-China.html.

World Bank (2022). *Offshore Wind Roadmap for Azerbaijan*. World Bank, Washington, DC. Retrieved 10 June 2022, from https://documents1.worldbank.org/curated/en/099125006022242537/pdf/P175716oc9ba20078097880a6781b95d5eb.pdf.

Zinchenko, S. (2022). *Why sanctions against Russian steel export didn't work*. GMK Center. Retrieved 3 June 2022, from https://gmk.center/en/opinion/why-sanctions-against-russian-steel-export-didn-t-work/.

Бензин начал дорожать. Autostrada. (2022). Retrieved 3 June 2022, from https://www.autostrada.uz/benzin-nachal-dorozhat/.

В Казахстане анонсировали «неизбежное» повышение цены на газ. Fergana. (2022). Retrieved 3 June 2022, from https://fergana.agency/news/125931/.

В Таджикистане подскочили цены на продовольствие и бензин. Fergana. (2022). Retrieved

3 June 2022, from https://fergana.agency/news/125381/.

Таджикистан и Казахстан обсудили вопросы развития и расширения двустороннего сотрудничества в водно-энергетической сфере | НИАТ "Ховар". Khovar.tj. (2022). Retrieved 3 June 2022, from https://khovar.tj/rus/2022/02/tadzhikistan-i-kazahstan-obsudili-voprosy-razvitiya-i-rasshireniya-dvustoronnego-sotrudnichestva-v-vodno-energeticheskoj-sfere/.

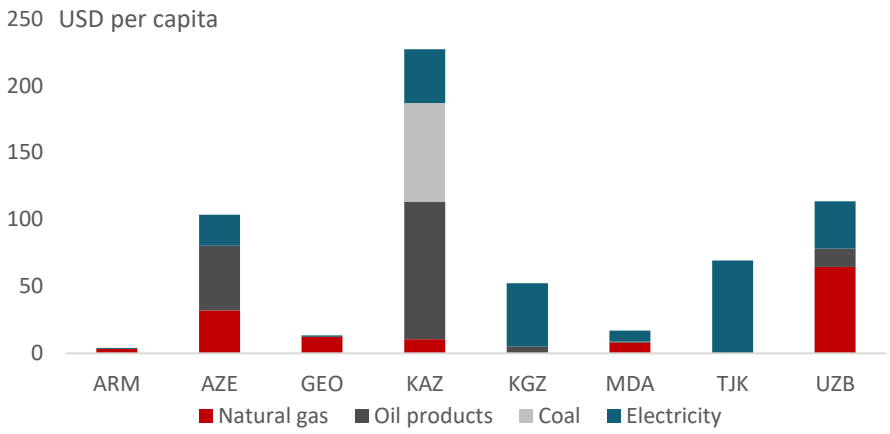
Таджикистан и Саудовская Аравия налаживают сотрудничество в сфере энергетики: EADaily. EurAsia Daily. (2022). Retrieved 3 June 2022, from https://eadaily.com/ru/news/2022/04/20/tadzhikistan-i-saudovskaya-araviya-nalazhivayut-sotrudnichestvo-v-sfere-energetiki.

Таджикистан и Турция обсудили сотрудничество в сфере энергетики - Avesta - информационное агентство. Avesta. (2022). Retrieved 3 June 2022, from https://avesta.tj/2022/05/04/tadzhikistan-i-turtsiya-obsudili-sotrudnichestvo-v-sfere-energetiki/.

Таджикистан рассматривает возможности импорта иранских нефтепродуктов. Tajikistan Newsline. (2022). Retrieved 3 June 2022, from https://newslinetj.com/ru/article/1054323/.

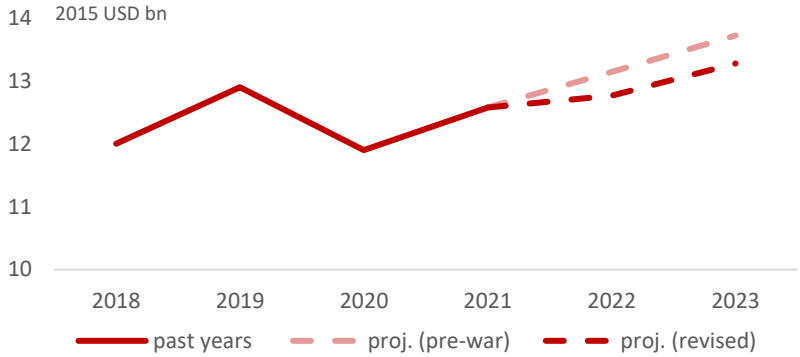
Annex A.

Figure A.1. Fossil fuel subsidies per capita, countries under analysis



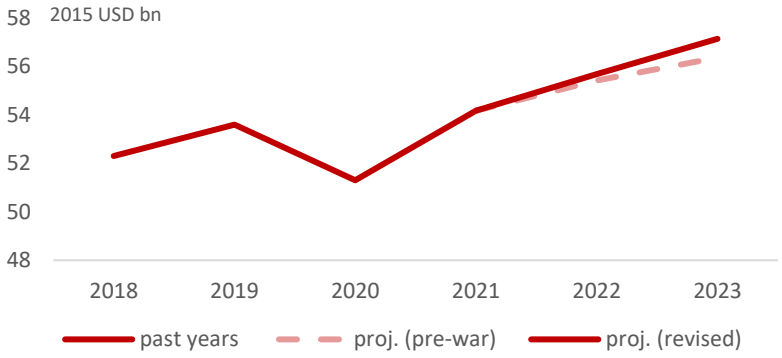
Source: fossilfuelsubsidytracker.org

Figure A.2. Real GDP outlook (ARM)



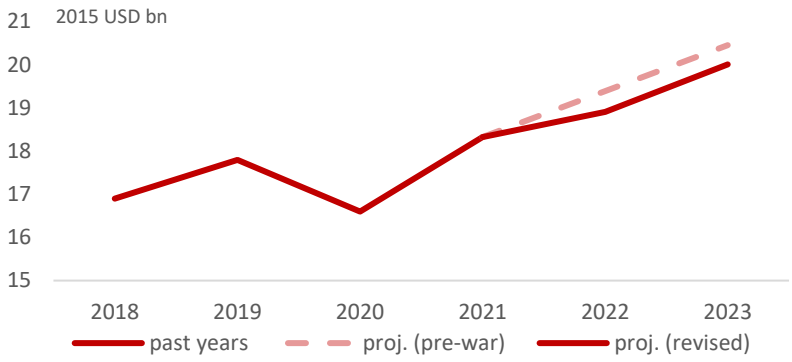
Source: IEA World Economic Outlook October 2021 & April 2022, World Bank database

Figure A.3. Real GDP outlook (AZE)



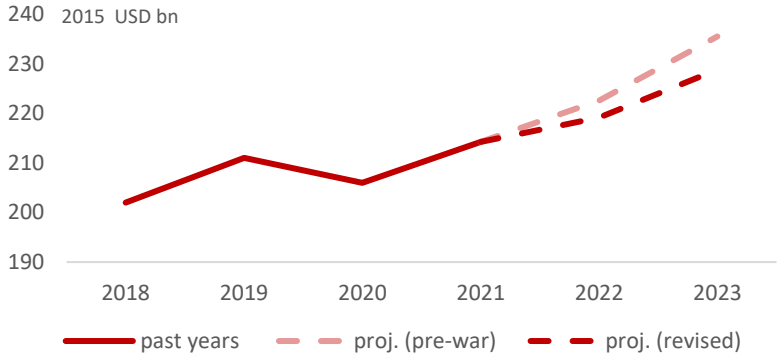
Source: IEA World Economic Outlook October 2021 & April 2022, World Bank database

Figure A.4. Real GDP outlook (GEO)



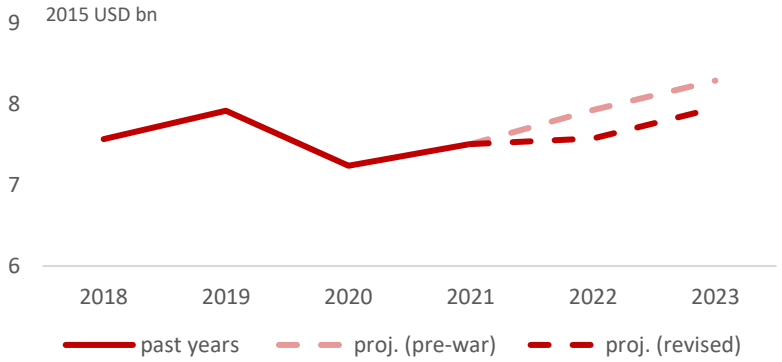
Source: IEA World Economic Outlook October 2021 & April 2022, World Bank database

Figure A.5. Real GDP outlook (KAZ)



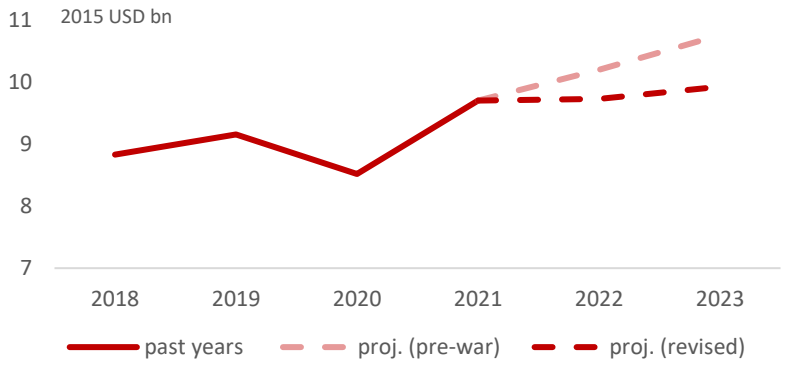
Source: IEA World Economic Outlook October 2021 & April 2022, World Bank database

Figure A.6. Real GDP outlook (KGZ)



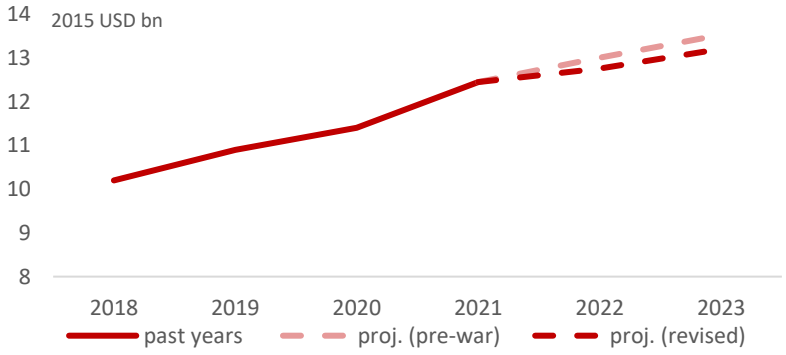
Source: IEA World Economic Outlook October 2021 & April 2022, World Bank database

Figure A.7. Real GDP outlook (MDA)



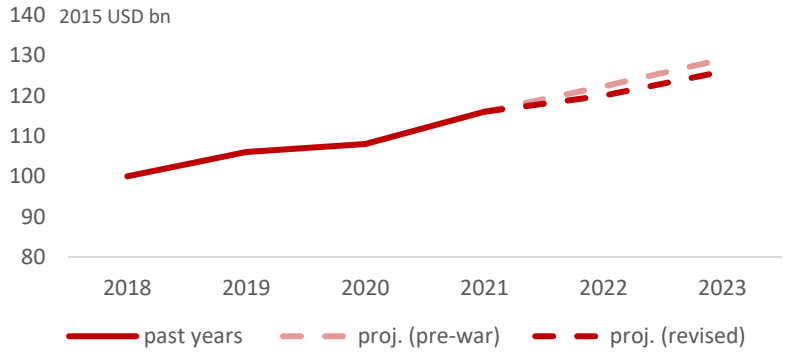
Source: IEA World Economic Outlook October 2021 & April 2022, World Bank database

Figure A.8. Real GDP outlook (TJK)



Source: IEA World Economic Outlook October 2021 & April 2022, World Bank database

Figure A.9. Real GDP outlook (UZB)



Source: IEA World Economic Outlook October 2021 & April 2022, World Bank database