

# Ukraine's reconstruction should prioritise a distributed, low-carbon energy system



*Destroyed transmission line, Siversk, May 2022. Photo by Kurekaoru*

Ukraine can achieve a sustainable and climate-neutral reconstruction by accelerating the phase-out of fossil fuels (especially imports), improving energy efficiency and prioritising decentralised renewable energy sources. Ukraine aims to transition to 100 per cent renewable energy sources and safely decommission its nuclear power plants by 2050. To achieve these goals, future investments in the energy sector must be underpinned by a policy of zero tolerance toward fossil fuels.

Since Russia began its wave of missile attacks on Ukraine's electricity infrastructure in the autumn of 2022, the rapid delivery of diesel and petrol generators for critical facilities in Ukraine has been vital. Encouragingly, even during this emergency period, Ukrainian municipalities together with non-governmental organisations have shown they are willing and able to implement green energy reconstruction

For more information

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projects. This practice must be scaled up as the conflict continues.<sup>1</sup> Before the next winter sets in, preparations for sustainable, long-term and far-reaching solutions must begin with immediate effect.

## National Recovery Plan Blueprint

There is an understanding among international partners that Ukraine's National Recovery Plan must be the overarching recovery framework to ensure the country takes strong ownership of the rebuilding process. Ukraine's National Recovery Plan Blueprint<sup>2</sup> was presented at the Ukraine Recovery Conference in Lugano in July 2022. The Energy Security section of the plan states that 'Ukraine will support Europe's energy security and zero-carbon transition'. But the strategy has already drawn criticism. According to Ukrainian civil society organisation Ecoaction, 'the section on energy provides no comprehensive, truly green and sustainable vision of the energy transition'.<sup>3</sup> It is concerning that the Blueprint proposes new oil and gas projects alongside the development of renewables, the construction of new nuclear and hydropower capacity, and the production of hydrogen from renewable energy sources with the aim of fully integrating into the EU energy system.

The National Recovery Plan Blueprint should:

- Make clear provision for accelerating the development of the renewable energy sector, which would strengthen energy security and ensure decentralisation of the energy system.
- Scale back plans for hydrogen production and export to the EU. The promise of a major hydrogen market in the EU has prompted the Ukrainian government to plan increased nuclear capacity and fossil fuel production in the domestic market, which would hamper decarbonisation efforts. Until the decarbonisation goals of the domestic market are met, energy should be exported to the EU in a way that minimises energy losses during technological processes and transmission while maximising economic benefits.
- Prioritise renewable energy sources over fossil gas to support decarbonisation and energy transition in the heating sector. Efficient solutions based on the use of heat pumps should be introduced as a matter of urgency. Plans to expand natural gas capacity should be abandoned.
- Ensure a just transition for monofunctional regions, including coal-mining towns, as part of efforts to abandon the use of coal in the electricity and heating sectors.
- Provide financial support for the ambitious, fast-tracked energy efficiency targets in the buildings sector. The timeframe for the transition to EU requirements for nearly zero-energy buildings must be prioritised before relevant projects are implemented.

According to the second Rapid Damage and Needs Assessment (RDNA2), jointly conducted by the World Bank, the government of Ukraine, the European Union and the United Nations, one of the five key recovery and reconstruction investment priorities for 2023 is energy infrastructure. This consists of 'restoration and

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<sup>1</sup> Ecoaction, [Solar to the rescue: photovoltaic energy systems can support Ukrainian communities and cities during the emergency response and in the longer term](#), Ecoaction, February 2023.

<sup>2</sup> Ukraine Recovery Conference, [Ukraine's Recovery Plan Blueprint](#), Ukraine Recovery Conference, July 2022.

<sup>3</sup> Ecoaction, [Analysis of Ukraine's Post-War Recovery Plan Blueprint and Ecoaction's Recommendations](#), Ecoaction, 15 July 2022.

repair of transmission and distribution lines and restoration and decentralization of generation capacity, including development of renewables and protection of the power grid'.<sup>4</sup>

According to the assessment, the 'postwar context will present an opportunity to rethink energy sector priorities in Ukraine, while also balancing the need for fast provision of enabling services with the need to build back better'. It also advises that '[c]areful planning will be required to ensure no-regret investments'. The assessment further states that 'Ukraine will need to adopt a build back better approach with policies that align its energy model with the EU energy strategy and move toward a decarbonized economy'.

## Ukraine's Energy Strategy

On 21 April 2023, the Cabinet of Ministers of Ukraine adopted the Energy Strategy of Ukraine until 2050. Tabled by the Ministry of Energy, the strategy aims to achieve climate neutrality in the energy sector by 2050. According to the Minister of Energy, this will be realised through 'the development of modern and safe nuclear generation, renewable energy sources, and the modernisation and automation of transmission and distribution systems'. In the context of Russia's attacks on Ukraine's energy infrastructure, which have exposed the vulnerabilities of the country's highly centralised energy system, the strategy earmarks decentralised generation as a way of improving stability. Aimed at implementing the strategy, an action plan is also being finalised for the post-war reconstruction and development of the country.<sup>5</sup> However, based on our observations and those of our partner organisations, the process of developing the strategy and the accompanying action plan lacked transparency, they were adopted behind closed doors without public consultation.

## How have the EBRD and the EU supported Ukraine's energy sector?

Since the beginning of Russia's full-scale invasion of Ukraine, the EBRD has provided a cumulative EUR 520 million to Ukraine's electricity transmission system operator Ukrenergo and a EUR 500 million package to Ukraine's state-owned oil and gas company Naftogaz.<sup>6</sup>

On 23 November 2022, as part of the Ukrenergo Transmission Network Emergency Restoration project,<sup>7</sup> the EBRD approved a sovereign guaranteed loan of up to EUR 300 million<sup>8</sup> to Ukrenergo.<sup>9</sup> Of this amount, EUR 150 million has been allocated for procuring equipment for emergency repairs to Ukraine's damaged power transmission grid, and a further EUR 150 million for capital structure support to strengthen the resilience of

<sup>4</sup> World Bank, Government of Ukraine, European Union, United Nations, [Rapid Damage and Needs Assessment](#), *World Bank Group*, March 2023.

<sup>5</sup> Ministry of Economy of Ukraine, [Національний енергетичний і кліматичний план України має стати частиною повоєнного відновлення країни](#), - Юлія Свириденко | Міністерство економіки України ([me.gov.ua](http://me.gov.ua)), *Ministry of Economy of Ukraine*, accessed 4 May 2023.

<sup>6</sup> Vanora Bennett, [EBRD President reaffirms strategic commitment to Ukraine on visit to Kyiv](#), *European Bank for Reconstruction and Development*, 21 April 2023.

<sup>7</sup> European Bank for Reconstruction and Development, [Ukrenergo Transmission Network Emergency Restoration](#), *European Bank for Reconstruction and Development*, accessed 5 May 2023.

<sup>8</sup> The total cost of the project is EUR 372 million, since the loan will also be complemented by an investment grant of up to EUR 72 million to be provided by the Netherlands via the EBRD Crisis Response Special Fund.

<sup>9</sup> Ukrenergo, a 100 per cent state-owned company, has a natural monopoly as Ukraine's sole electricity transmission system operator.

the company and its operations.<sup>10</sup> The category B project aims to ensure that Ukrenergo secures energy supply to residents and businesses throughout the country, stabilises the national energy system and strengthens its ability to maintain commercial flows with the European Network of Transmission System Operators (ENTSO-E). According to the project summary, the EBRD's Board of Directors has granted a derogation from the Bank's Environmental and Social Policy due to the ongoing war, which limits the ability of the Bank to carry out environmental and social due diligence and to implement and monitor the project.

Although these project adjustments – aimed at addressing the urgent needs of the country's energy system in the wake of the devastation caused by Russia's full-scale invasion – are somewhat understandable, after more than a year of war, the 'greening' of the emergency response must now begin in earnest. An analysis by the Generators of Hope campaign highlighted the importance of ensuring deliveries of diesel and petrol generators reach critical facilities or public 'points of resilience'.<sup>11</sup> However, fossil fuel generators, which are expensive to run and depend on the availability of fuel, are not sustainable from a long-term perspective or on a large scale. In the first half of 2022, the cost of electricity from diesel generators paid by Ukrainians during outage hours was EUR 0.76 to 0.80 per kilowatt hour (kWh). This is seven times higher than the price paid for electricity (EUR 0.11 per kWh) by Ukrainian non-household consumers and five times higher than the price paid (EUR 0.15 per kWh) by non-household consumers in Germany during the same period.<sup>12</sup> A study by Low Carbon Ukraine, implemented by economic consultancy Berlin Economics, found that a cost-optimal system for Ukraine's public facilities should involve a mix of solar photovoltaic panels, battery storage systems and limited diesel generation, and that installing diesel generators alone can be 40 per cent more expensive due to fuel costs.<sup>13</sup>

Solar energy systems involving some form of storage are now urgently needed. They would provide a high level of energy autonomy and resilience – allowing Ukrainian communities to better cope with the many challenges they now face – and help save precious financial resources. Encouragingly, renewables-based systems like these are already being installed around the country. Building on this momentum, experts and civil society organisations are advocating for the introduction of diverse and alternative solutions such as renewable sources, particularly solar electricity, as part of the emergency solution for critical infrastructure in the next one to two years. The immediate goal is to provide an emergency electricity supply throughout 2023 while also contributing to more decentralised energy production and resilience based on sustainable and climate-neutral technologies.

## Green principles to guide the recovery of Ukraine's energy sector

### Completely phase out fossil fuels

Decarbonising the energy sector is a key step toward achieving Ukraine's energy security and climate goals. The Energy Strategy of Ukraine until 2050 should clearly define the timing and pace of decarbonisation and

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<sup>10</sup> The EBRD loan is supported by a donor-funded guarantee provided by the United States through the EBRD Crisis Response Special Fund. The guarantee covers 50 per cent of exposure in the event local commercial financiers are unable to provide a risk-sharing mechanism.

<sup>11</sup> Ecoaction, [Solar to the rescue: photovoltaic energy systems can support Ukrainian communities and cities during the emergency response and in the longer term](#), Ecoaction, February 2023.

<sup>12</sup> Ibid.

<sup>13</sup> Low Carbon Ukraine, [Keeping the lights on in times of grid outages: Solar PV panels, battery storage systems and diesel generators](#), Berlin Economics, 24 February 2023.

develop appropriate plans for the key economic sectors. Further dependence on fossil fuels would undermine Ukraine's energy security and limit the effective use of investments and assistance to develop modern sustainable technologies.

### **Accelerate energy efficiency**

Shortly before the full-scale war, the government approved the National Action Plan on Energy Efficiency until 2030, which stipulates that primary and final energy consumption in Ukraine should not exceed 91.5 million and 50.5 million tonnes of oil equivalent, respectively. Due to Russia's military aggression, energy consumption in Ukraine has significantly decreased.

If, during the massive reconstruction of enterprises and residential buildings, there should be a requirement to meet higher energy efficiency standards (e.g. class A residential buildings), these national energy efficiency targets should be revised and increased.

### **Prioritise decentralised renewable energy generation**

Small-scale energy generation systems can provide electricity to communities independently of the central power grid, regardless of its condition. In Ukraine, generation from renewable sources accounts for only 2.5 per cent of all installed renewable energy capacity. However, the EU's Fourth Energy Package, which Ukraine is obliged to implement under the EU-Ukraine Association Agreement, stipulates the development of distributed generation.

Over the past five years, renewable energy technologies have become the cheapest source of energy worldwide. Therefore, developing renewable energy sources is justified not only from an environmental standpoint, but also economically. The growth of renewable energy sources will generate new jobs in the technology sector and reduce energy dependence, which is a priority outlined in the Energy Security Strategy of Ukraine approved by the government in 2021.

### **Ensure just transition for regions dependent on fossil fuel production**

In Ukraine, there are towns and regions whose economies entirely depend on enterprises that extract, process and use hydrocarbons. The process of transitioning from fossil fuels must be fair on people who stand to lose their longstanding jobs. This means that local economies must become sufficiently diverse to create new employment opportunities.

The process of just transition in coal regions, which has progressed in recent years at national and local levels, should continue. Most Ukrainian coal-mining towns are located in the Donetsk and Luhansk regions, which are currently facing active hostilities. In the post-war period, these communities can be restored in a more sustainable way that leaves no room for fossil fuels, providing an example of successful green reconstruction.

### **Gradually abandon nuclear energy**

Russia's nuclear terrorism has demonstrated how dangerous centralised electricity production can be: the seizure of nuclear power plants and the operation of power units under fire pose numerous and unjustified threats not only to the local population, but also to Ukraine, Europe and the wider world.

Decentralisation requires large nuclear power plants to be phased out and safely decommissioned. To prevent risks associated with the use of nuclear energy in the future, decommissioning plans should be developed for individual units at existing nuclear power plants. The ultimate aim is to gradually close all such facilities by 2040 in line with the terms of valid licences.

### Stay cautious about repurposing gas infrastructure

The EBRD is focused on emergency response in Ukraine, which sets the tone of the dialogue between the Bank and other stakeholders. Yet in the meantime, the donor community's public discussion on Ukraine's reconstruction has been evolving and underscores the need to talk about mid- and long-term reconstruction now. Political signals made by Ukrainian parties to the discussion will, to a large extent, shape the country's future. At the same time, Ukraine's political leadership and government are testing partners' interest in supporting different initiatives. The role of gas and gas infrastructure in Ukraine after the war is one of the most contested topics.

Ukraine has traditionally served as a key transit route for Russian gas exports to Europe. But over the past decade, Russia gradually reduced the usage of the Ukrainian pipeline and channelled it via alternative supply routes.<sup>14</sup> Current gas transit through the country's pipeline is 10 times less than the gas transmission system is designed to handle. As a result, revenue to the state budget from the transit fee dropped by 35 per cent, also reducing financial capacity to maintain the pipeline. As the EU will completely stop the flow of Russian gas to its members by 2027,<sup>15</sup> and Ukraine plays only a limited role in the Trans-Balkan pipeline reverse gas flow,<sup>16</sup> there is great uncertainty over the future of Ukraine's gas infrastructure assets.

In 2023, it is forecasted that Ukraine will cover its heating season demand for gas with domestic production. However, once recovery begins, it will create a discrepancy between supply and demand. People who temporarily found refuge abroad will start to return home, increasing household electricity consumption. Meanwhile, as industrial activities ramp back up, non-household consumption will also increase. Hence, it is inevitable that Ukraine will need to import gas, unless the country pursues radical energy efficiency programmes in district heating and water heating and accelerates renewables deployment. Alternatively, the Ukrainian government may aim to substitute Russia as the EU's largest gas supplier and attempt to justify an increase in its domestic gas production.<sup>17</sup> This would further distance Ukraine from its climate-neutrality goal, as well as from energy transition in line with European Union policy.

To prolong the life of its extensive gas transmission infrastructure, the Ukrainian government claims plans for biomethane and hydrogen injections for export to energy-demanding economies like Germany. Now, these plans prioritise global trends over the post-war reality. Ukraine's energy reconstruction should be driven by domestic needs, such as fossil-free heating systems and the increased availability of electricity. In addition to these plans to repurpose gas infrastructure, Ukrainian officials have also stated there is a plan

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<sup>14</sup> Center for Strategic and International Studies, [The Role of Gas in Ukraine's Energy Future](#), CSIS, January 13, 2023.

<sup>15</sup> European Commission, [REPowerEU: A plan to rapidly reduce dependence on Russian fossil fuels and fast forward the green transition](#), *European Commission*, 18 May 2022.

<sup>16</sup> Aura Sabadus, ['Moldova, Ukraine backhaul to unlock Trans-Balkan gas corridor'](#), *Independent Commodity Intelligence Services*, 30 September 2022.

<sup>17</sup> Gabriel Gavin, ['Ukraine sells itself as the EU's new energy hub'](#), *Politico*, 24 May 2023.

to expand domestic gas production, which, again, shouldn't be incentivised by financial institutions like the EBRD if the Bank intends to be a driver of Ukraine's decarbonisation.

The EBRD's Energy Sector Strategy, if favourable to new gas projects in developing countries with energy security issues, may play out two scenarios in post-war Ukraine. First, it could create false expectations about retrofitting the country's pipeline for hydrogen transmission instead of focusing on energy efficiency and clean energy technologies loans. Second, it may lock Ukraine into a gas-based central heating system instead of pursuing building up renewables-based electricity mix and deploying technologies like heat pumps. After all, the implementation of energy and climate legislation is a prerequisite for Ukraine's accession to the EU.

## Recommendations for the EBRD on financing and policy

**Support Ukraine's European aspirations.** The European Union has taken a leading role in combating climate change, setting a range of stringent and negotiated targets to achieve carbon neutrality. Ukraine's plans should align with these commitments. The EBRD should make it clear that it expects Ukraine to develop and implement plans that are consistent with EU standards and that the Bank is ready to provide financial and technical assistance to realise these plans. This holds equally true for other EU environmental provisions, such as those related to pollution levels and the creation of nature protection areas.

**Provide financial instruments for renewable energy.** Financial instruments are urgently needed to support the deployment of renewable energy sources as part of efforts to rebuild public sector finances and critical social infrastructure, including hospitals, schools and water facilities. These instruments, which could involve a mix of investment guarantees, loans and grants, will be essential for enabling the country to move from emergency support to sustainable co-financing informed by clear project criteria and goals. It will also be important for communities to access preferential long-term loans and grants to help balance the power grid.

**Ready the grid for distributed production.** It is crucial to help Ukraine maintain and rebuild its electricity grid, which has been ruthlessly targeted by Russia's missile attacks. Equally, it will be important to consider how the grid can best respond and adapt to a future increase in local production and consumption. Far more attention should be given to bottlenecks in local distribution networks, which are preventing electricity systems transition to secure distributed production.

**Ensure construction standards are met.** Ukraine has been slow to adopt new construction standards for residential and public buildings aimed at prioritising renewables and energy efficiency. Although the government is set to introduce nearly zero-energy building standards, Ukrainian builders lack the practical knowledge required to implement these plans. There is also a need to build capacity among actors, from municipalities and control bodies to commercial construction companies. The EBRD must ensure that reconstruction projects apply best available practices and technologies to minimise energy use and integrate renewable energy production. By stimulating the market in this way, these measures will help to increase the knowledge and skills needed to build modern infrastructure.

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