

Support to the Government of Ukraine on updating its Nationally Determined Contribution

EXECUTIVE SUMMARY FOR POLICY MAKERS



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General Project Information

This Final Report aims to summarize the final results of the [comprehensive support](#), including all the technical reports produced within the project scope to inform different stages of the Ukrainian NDC development as well as describing the entire stakeholder engagement process, provided by the EBRD project “Support to the Government of Ukraine on updating its Nationally Determined Contribution (NDC)” implemented from November 2018 to September 2021 and funded by Sweden.

The EBRD project had the main objective of **supporting the Government of Ukraine in enhancing its climate ambition** by updating its [first NDC](#) (submitted by the GoU to the UNFCCC on 19 September 2016) by i) providing and informing the entire NDC development process – from preparation to consultation and submission – with necessary and appropriate technical information and analysis, produced by national and international experts and based on science and the best available information and data; ii) expanding the scope of the NDC beyond the energy system to an economy-wide analysis as well as covering both mitigation and adaptation; and iii) designing and supporting the consultation processes with a broad range of stakeholders.

During its lifetime, the project provided the Ministry of Environmental Protection and Natural Resources of Ukraine, as the key state authority in charge of compliance with the UNFCCC and Paris Agreement provisions, with support in updating the NDC, ensuring the following principles: i) the technical support is informed by the **best available information and science for achieving optimal emissions to meet the goal of net-zero emissions** in the second half of the century, taking into account the country context, including the feasibility and cost; ii) the technical analysis and its results, including the modelling, are based on science and real data, and the scenarios are developed using international best practices, especially regarding the definition of economy-wide decarbonization pathways; and iii) the stakeholder consultation and engagement process is transparent, inclusive and continuous.

Ukraine’s updated NDC Development Process

This report aims to present **Ukraine’s updated NDC development process** and is not the updated Ukrainian NDC itself as adopted by the GoU in July 2021. **The [updated NDC of Ukraine](#) is the outcome of an extensive stakeholder consultation and political discussion.** It is informed by the project’s technical analysis and reports, but it is not entirely consistent with the Paris-aligned pathway proposed within this project. *It is important that the reader distinguishes between what was proposed as a result of the technical analysis presented here and what has been adopted by the GoU as its updated NDC. This highlights the nature of the NDC, which is ultimately a political decision that has legal standing and therefore requires the raising of political ambitions.*

For more information, see Section 1 of the Final Report.

Ukraine General Information

Ukraine is a sovereign, independent, democratic, social state with rule of law. It is one of the largest countries in Europe and is located in Central-Eastern Europe with a territory of 603,550 sq. km, covering 5.7% of Europe, with a population of **44.1 mln people** (2020).

Ukraine is a **low-middle-income country** with a current GDP of **155.6 bln US dollars** and a current (2020) nominal GDP per capita of **3,727 US dollars**. In 2020, the life expectancy at birth in Ukraine was **71.35 years**. According to the latest **National Inventory**, in 2019, the level of only CO₂ emissions per capita was **5.0 metric tons**, and **7.5 tons** of CO₂-eq. per capita (including LULUCF).

National Legislative Framework

The **EU–Ukraine Association Agreement** was ratified by the Parliament of Ukraine and the European Parliament simultaneously in September 2014 and entered into force in September 2017; it has become the core legislative document that defines Ukraine economy-wide policy ever since. The Association Agreement, in its scope and thematic coverage, is the biggest international legal document in the history of Ukraine and the biggest international agreement with a third country ever concluded by the EU. It serves as a strategic guideline for systematic socio-economic reforms in Ukraine and defines the format of relations between Ukraine and the EU on the basis of “political association and economic integration”.

Ukraine is a party to the Paris Agreement, the UNFCCC and its Kyoto Protocol. Since achieving independence, Ukraine has made a significant contribution to the global GHG emission reduction. As of 2019, Ukraine had reduced its GHG emissions by 62.4% compared with its 1990 level including LULUCF and by 64% excluding LULUCF. Ukraine adopted and submitted its INDC on 16 September 2015 (later, in September 2016, this INDC became the first NDC). Ukraine defined its **first NDC target** as not to exceed 60% of the 1990 greenhouse gas emission level in 2030. In July 2021, Ukraine submitted its **updated NDC target** “that corresponds to an economy-wide absolute GHG **reduction of 65% by 2030, compared to the 1990 GHG emissions level**. By 2030, Ukraine plans to create a baseline for adaptation to climate change in order to increase resilience and reduce vulnerability to climate change, as foreseen in Article 7 of the Paris Agreement.”

In March 2021, Ukraine developed and adopted its *National Economic Strategy till 2030*, which defines the achievement of a net-zero emission pathway by 2060, among many other sectoral goals. In September 2019, Ukraine adopted national *Sustainable Development Goals* in accordance with the UN Sustainable Development Agenda. In September 2017, Ukraine submitted its long-term *Low Carbon Development Strategy till 2050* under the Paris Agreement. *Ukraine’s Energy Strategy* until 2035 is currently under revision. The country is working on various sectoral strategic policy documents that are aligned with, driven by or need to be aligned with the Paris Agreement and Ukraine’s NDC, including but not limited to the National Ecology Security and Climate Change Adaptation Strategy till 2030, National Waste Strategy, National Transport Strategy till 2030, National Forestry Strategy till 2035 and Just Transition of Coal Regions Concept till 2030.

EU Green Deal alignment dialogue has been conducted since 2020 between the EU and Ukraine with a view to developing the so-called Ukrainian Green Deal. This dialogue has also included

the initial CBAM discussions between the EU and Ukraine and some elements of green recovery approaches, including green recovery finance.

The Ukrainian *MRV system* has been developed and has been undergoing implementation since early 2020 within the EU–Ukraine Association Agreement framework. As the next step, the development of the Ukrainian domestic *Emission Trading Scheme* (ETS) legislation will take place in late 2021.

Ukraine's NDC Updating Process

The project introduced a legislative and stakeholder engagement/consultation process for updating the NDC development and supported it throughout the whole process (see Section 1 of this report for more details). To fulfil the Paris Agreement goal on sustainable development, the project proposed the NDC and SDG alignment process discussed in Section 5 of this report.

The project also analysed the UNFCCC and Paris Agreement provisions and the requirements for the NDC transparency framework and proposed a step for implementing NDC transparency on the national level (see Section 6 of this report for more details). It conducted separate track work on adaptation that was not part of the first Ukrainian NDC, formulated a national adaptation goal and proposed sectoral adaptation policies and measures, which are presented in Section 3 of this report.

The core of the project's technical analysis work consisted of macroeconomic projections and pathway modelling of GHG emissions based on four designed scenarios (see Section 2 of this report and the separate Report 3 and Report 4 for more details). This cornerstone work was followed by climate finance analysis, which is outlined in Section 4 of this report.

The following key macroeconomic parameters were applied for further GHG emission pathway scenario modelling.

Long-term economic projection

Indicators	2021–2030	2031–2040	2041–2050
GDP growth rate in %, average for period	3.8	3.5	3.2
Mining and quarrying , growth rate in %, average for period	2.0	1.2	0.6
Manufacturing , growth rate in %, average for period	4.5	4.2	3.8
Industry , growth rate in %, average for period	3.5	3.2	2.9
Construction , growth rate in %, average for period	5.0	4.3	3.9
Services , share of GDP, average for period, %	52.7	54.3	55.7
Agriculture , share of GDP, average for period, %	9.3	8.2	7.3

Long-term demographic projection

Indicators	2018	2030	2040	2050
Population , mln	42.4*	39.7	37.7	35.6
Average life expectancy , both genders, years	72.2	73.9	75.3	76.7
Average population age , both genders, years	40.5	42.7	44.4	45.4
Share of working-age population , both genders, %	51.1	48.4	47.5	43.0
Number of retired per working persons , both genders, persons	0.99	1.14	1.24	1.49
Share of rural population , %	32.6	31.6	30.2	28.6

* The population is aligned with data reported by the State Statistics Service of Ukraine and does not include the annexed territory of the Republic of Crimea. For the purpose of the NDC, these numbers have been correspondingly adjusted.

World energy price projection

Energy Source	2017	2020	2025	2030	2035	2040	2045	2050
Coal, EU, USD 2017/t	85	90	80	83	84	85	87	89
Brent oil, USD 2017/barrel	52	65	88	96	105	112	121	132
Natural gas, EU, USD 2017/mln BTU	5.8	6.0	7.8	8.2	8.6	9.0	9.4	9.9

It is important to mention that the project was building long-term emission pathways extending beyond the NDC 2030 time frame to assist the GoU in building long-term pathways and to ensure continuity of its climate ambition actions in the long term while achieving the NDC target in 2030. At the same time, the project aimed to conduct technical analysis of a possible Paris-aligned pathway for Ukraine in the long term, to set appropriate interim targets to achieve such a transition and to identify the policies and measures that would be needed and their costs.

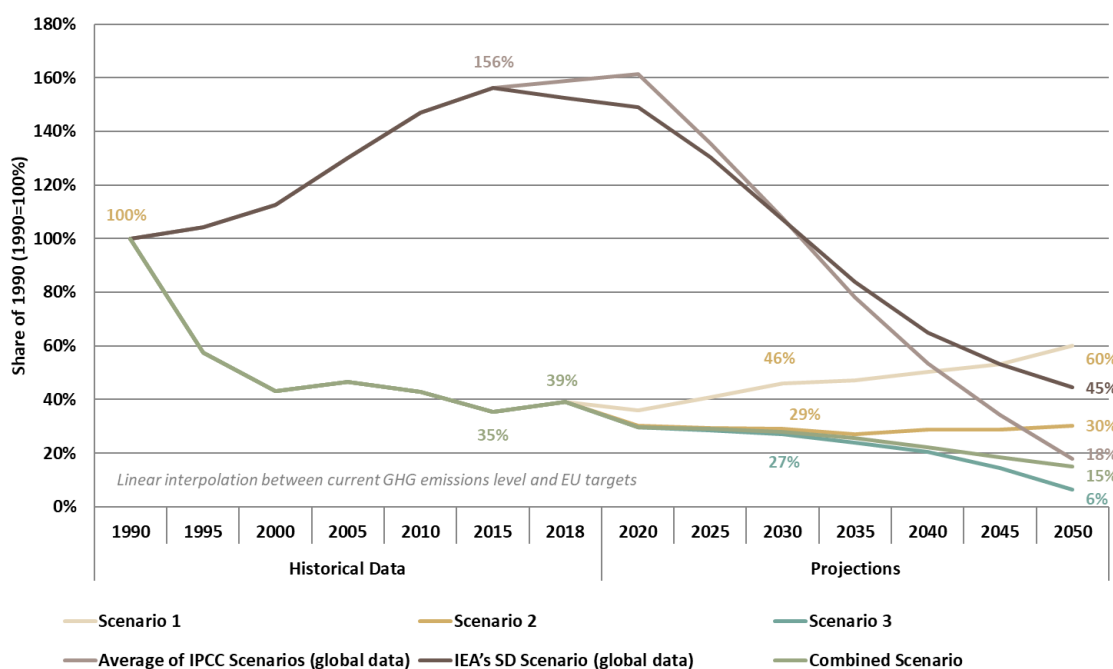
Modelling

As a result of consultations and coordination with the GoU, a set of internationally recognized modelling tools was selected for Ukraine's NDC scenario modelling framework approach (see Figure 2.1 of this report). The **TIMES-Ukraine model** was used for GHG emission pathway modelling in the energy sector, together with the dynamic Ukrainian **general equilibrium model** and modelling tools based on the IPCC approach – **mass balance model** for the Waste sector and EXCEL-based application for the LULUCF sector. A combination of the optimization least-cost energy system, macroeconomic (CGE) and sectoral models is the most common method of determining long-term, cost-optimal energy/emission pathways based on a range of different assumptions. The modelling process is described in detail in Section 1.4 of this report and in the separate Report 3 and Report 4.

The following four NDC/GHG emission pathway scenarios were designed and further modelled:

- Scenario 1, or the “**Business as usual (BAU) scenario**”, was set as an “exploratory scenario”, assuming that no fundamental changes take place and particularly that no additional emission reduction measures are implemented during the projected period;
- Scenario 2, or the “**Reference scenario**”, contains numerous targets and indicators to be achieved according to the current legislation modelled as policy constraints with a policy-specific timeline (e.g. the Energy Strategy until 2035 indicators and targets and the NEEAP, NREAP and LEDS indicators);
- Scenario 3, or the “**Climate-neutral economy scenario**”, contains the same set of policy targets as applied to the reference scenario with an additional target constraint imposed on the level of GHG emissions per capita by 2070;
- Scenario 4, or the “**Combined sensitivity scenario**”, was modelled on the baseline economic development scenario and included the conditions of Scenario 2 for the sectors of agriculture and land use, land use change and forestry (LULUCF) as well as various sensitivity options, including carbon tax and nuclear power station variables and others (see Section 2.3 for further details).

The results of the extensive modelling exercise, conducted in continuous coordination with the GoU, are presented below and in Sections 2.4–2.6 in this report.



Ukraine's GHG Emission Pathways

Climate Finance and Investments

Once the designed scenario modelling process had been finalized and taken through an extensive, over 12-month-long, broad stakeholder consultation process in various formats with over 1200 participants (see Section 1 of this report) for discussion, inputs and numerous iterations, the estimation of the investment needed for the implementation of each of the four NDC scenarios was conducted.

GHG emissions and investment needs by updated NDC scenario

Scenario Name	GHG emission reduction compared with the 1990 level		Investment needs (without consumer spending), billion euros		Renewable energy share			
	2030	2050	2020–2030	2020–2050	Electricity production		TPES	
					2030	2050	2030	2050
Business as usual	-54%	-40%	202	671	17%	24%	5%	8%
Reference	-71%	-70%	241	731	30%	45%	13%	20%
Climate-neutral economy	-73%	-94%	256	971	34%	56%	15%	38%
Combined sensitivity	-72%	-85%	263	798	31%	86%	15%	53%

The results of the broad stakeholder consultation process had identified the **combined sensitivity scenario (Scenario 4)** as the most ambitious and as still being realistic for Ukraine. To assess the financial feasibility of this scenario, the project conducted an analysis of additional potential sources of climate finance, proposed potential climate finance governance, identified institutional gaps and challenges and proposed scenario-specific steps that will need to be taken by both government authorities and private finance institutions and entities to attract and leverage the required climate finance investment for the combined sensitivity scenario. The

modelling results for Scenario 4 indicate that its implementation requires the attraction of on average around 26 bln euros annually up to 2030. As this is estimated to represent 70–80% of all capital investments, the average capital investment over the 2021–2030 period is expected to be **at least 33 bln euros annually**. Given that the capital investments in Ukraine totalled around 20 bln euros in 2019, this represents a 65% increase against the 2019 data for the average investment year. As such, the total capital investments required to enable the Ukrainian economy to transition to a low-carbon development pathway are reasonable in absolute terms, considering the historical trends. Across all sectors, **own enterprise funds and bank loans** are expected to **deliver nearly 90% of the total financial resources**. The role of state and local budgets, albeit fluctuating per sector, is estimated to be responsible for just under 7% of the total CAPEX, which is in line with the historical share that domestic public finance has provided in capital investments in Ukraine.

Ukraine should anticipate that a growing share of future EU funding is likely to be earmarked for the development and implementation of Ukraine's low-carbon development roadmap, which may support the incremental costs associated with a more ambitious NDC target. We project that one-third of future EU finance for Ukraine will be earmarked for such climate-related investments in the 2021–2030 period, amounting to least 10 billion euros – or nearly one-fifth of the total incremental funding required – that could be leveraged in support of the identified incremental investments (equivalent to 1 bln euros per year).¹ Currently, the **EU-based DFI flows** have averaged **at least 1.7 bln euros per year**, with EU budget funding averaging an additional 1.3 bln euros per year.

Carbon-Pricing Approaches/Instruments

In the combined sensitivity scenario, the foreseen implication of a higher carbon tax would be to raise public funding for low-carbon investments. When the price of the tax is increased to 5 euros per tonne, the total carbon revenues raised through the carbon tax would amount to 9.3 bln euros, or just under 1 bln euros per year. Doubling this price to **10 euros per tonne** would generate cumulative revenues of 18.5 billion euros, equivalent to **nearly 2 bln euros per year**. Over a 10-year period, this would translate into total potential revenue of 20 bln euros (difference between BAU and combined scenario), representing one-third of the total incremental funding required for NDC implementation.

While such carbon price may appear high compared with the current price level, it should be noted that prices under the EU-ETS reached a record high of 80 euros at the end of 2021, and the EU is likely to use the EAU price as a benchmark for pricing the border adjustment tax proposed under the EU Carbon Border Adjustment Mechanism. Increasing taxation domestically (rather than paying the tax at the EU border for exported products) and redirecting these increased revenue streams into a national climate fund could cover as much as one-third of the incremental CAPEX costs estimated over the 2021–2030 period. A more detailed approach to climate finance and concrete steps for Ukraine are outlined in Section 4 of this report.

¹ Across all DFIs, climate finance contributions predominantly support energy generation, efficiency and supply projects, followed by transport and infrastructure projects. The total flows to Ukraine, despite decreasing in the 2015 to 2018 period (from 940 mln US dollars to 519 mln US dollars), almost doubled in the subsequent year, reaching 1,115 mln US dollars in 2019. Since the leading DFIs collectively committed to channelling at least 65 bln US dollars into climate finance annually by 2025 (a figure that is 50% above the 2019 levels), it is reasonable to expect that Ukraine will continue to be able to benefit from these international climate finance channels throughout the 2021–2030 period.

Policies and Measures

To implement the NDC target, the project developed a comprehensive cross-sectoral list of policies and measures that need to be either implemented or developed and then implemented. Proposed in Report 4 and outlined in Section 3 of this report, the policies and measures are economy wide, including the electricity, heating, transport, industry, housing and waste sectors as well as agriculture and forestry, bioenergy, the fiscal market, society covenants and adaptation with over 150 sector-specific, cross-sectoral, financial and behaviour pattern policies and measures that are aligned with the existing national legislation or international obligations of Ukraine and will put Ukraine on a track towards a sustainable and climate-resilient economy and society while ensuring green recovery and pursuing the pathway to the sustainable transition to a net-zero and equally fair society (alignment of the Paris Agreement and EU Green Deal).

The proposed policies and measures will serve as a basis for developing the so-called NDC National Action Plan, which is required by the legislation framework for any policy document to be implemented. The work on the NDC Implementation Action Plan was launched in early September 2021 by the GoU.

NDC Implementation and Next-Step Recommendations

High-level key messages on the updated NDC process and the Paris Agreement provision alignment for policy makers based on the project's technical analysis findings

The project has been conducting sectoral and cross-sectoral technical analysis and developing policy approaches for almost 3 years within the scope of developing the Ukrainian NDC, and, even though the national political process resulted in the adoption of a different, but still technically aligned, updated Ukrainian NDC target, the project considered that the GoU could use the project findings for further long-term strategic national and sectoral sustainable development planning processes, such as informing the national process on the Ukraine Green Deal and Green Recovery Plan discussions, updating the Energy Strategy, finalizing the Integrated Energy and Climate Action Plan and others. These key messages could inform the further development of the sustainable national legislative framework and green transformation pathways.

- The modelling results show that it is possible for Ukraine to move towards a long-term path that will deliver a sustainable low-carbon and climate-resilient Ukrainian economy with deep emission cuts consistent with the goals of the Paris Agreement.
- Focusing in the near term on the full implementation of the existing and planned short-term policies and measures is critical. Our analysis has shown that this will not significantly alter the current economic composition and will allow the possibility for Ukraine to enhance its ambition and achieve net-zero emissions by 2070, while the recently adopted National 2030 Economic Strategy set the target to achieve net-zero emissions even earlier, by 2060.
- Such an enhanced ambition for the long term will open up the potential for the country not only to transform the economy into a carbon-neutral economy but also to foster innovation and competitiveness and provide a clean service- and technology-driven economy, avoiding capital lock-in into inefficient and stranded assets.

- Ukraine already has the foundation to deliver progress between now and 2030. However, the policies and measures necessary to allow the economy to shift onto carbon neutral development pathway. Long-term climate policies need to be set with respective targets, the changes are required in the following areas:
 - A further increase in renewable energy installed capacity;
 - Early adoption of the new technologies, e.g. hydrogen and CCSU;
 - Significantly more energy-efficient buildings;
 - Increased electrification of transport;
 - Better waste management and water use;
 - Increased organic crop production and a reduction of methane in agriculture;
 - Increased carbon sink through afforestation.

Recommendations on the NDC implementation for the GoU, including institutional recommendations, the elaboration of policies and the development and implementation of measures within the National NDC Action Plan process and the financial concept of NDC implementation and its approaches.

Adopted in July 2021, the national updated NDC target was an important milestone in the implementation of Ukraine's Paris Agreement provisions on the pathway to sustainable development and green transformation of the Ukrainian economy and society. While the development and adoption of the updated NDC took almost 3 years of extensive technical work, coordination and a stakeholder consultation process, it is expected that the GoU will be able to build on the results of this work to develop its NDC implementation plan in line with the relevant legislation provision and in an expedited manner. This process of National NDC Implementation Action Plan development was launched by the GoU in September 2021 and is ongoing.

The Action Plan aims to elaborate on specific policies, measures and steps, identify responsible state authorities and specify timelines, a budget and its source for each policy and measure. This work is a crucial milestone in implementing the updated NDC as only an action plan that is adopted domestically will operationalize the NDC and the GoU to implement the adopted and communicated NDC. Building on the development and implementation of previous strategic documents, the development and adoption of a proper NDC Implementation Action Plan is expected to take from 6 to 12 months, preliminary by February 2022.

The following recommendations could inform the development of comprehensive cross-cutting national legislation, including a National NDC Action Plan with either a 5-year or a 10-year cycle, a toolkit of sectoral concepts and action plans setting Ukraine on the pathway to implementing the NDC and achieving its target with a view to revisiting the current updated NDC by 2025. The updated NDC implementation process would require new and innovative approaches at the **institutional level** due to its cross-sectoral and transformational nature, including financial transformation. At the same time, it would need to be aligned with the existing legislation implementation processes, including but not limited to the Energy Strategy, Waste Management Strategy, National 2030 Economic Strategy and potentially emerging new legislation. Therefore, setting up a special ad hoc task force under the *governmental committees on economic and financial policies, fuel–energy complex, community development and environment protection* is recommended.

This institution-level step would allow the development of **comprehensive cross-sectoral NDC implementation legislation** and expedite the coordination and consultation processes. The overarching mandate of this governmental committee would also enable the establishment of a relevant platform for Ukrainian climate finance and the green taxonomy legislation framework.

The proposed institution-level step would also create a proper space for the elaboration and prioritization of **NDC policies and measures** on the sectoral and cross-sectoral levels while ensuring the cross-cutting nature of most of the policies, aligning them with the existing legislation framework and avoiding overlaps. These policies and measures could serve as a basis for the **Integrated Energy and Climate Action Plan** required by the Energy Community. The cross-sectoral nature of the governmental committee would also enable close coordination with the **Just Transition** of Coal Regions initiative and any other energy and climate initiatives and programmes while ensuring that the implementation of NDC policies and measures puts Ukraine on the pathway to a green post-COVID recovery and the pursuit of national sustainable development goals.

The proposed policies and measures under the updated NDC development process cover all the sectors of the economy and society transformation, including adaptation policies and measures and relevant financial sector policies to introduce the green taxonomy concept and to establish a climate finance framework with the aim of implementing all the proposed policies and measures in sustainable and timely manner. Therefore, the proposed policies and measures could frame the relevant sectoral concepts and approaches, while the existing sectoral policies should be cross-checked against the updated NDC target contributions and revised if required.

The implementation of the **adaptation policies and measures** proposed to achieve the adaptation goal of establishing a national adaptation legislation framework will require a separate track of consultations and adoption, most likely within the existing National Adaptation Strategy development process.

The **financial concept** for NDC implementation could be built on the climate finance analysis conducted within the project's scope with a view to operationalizing its key recommendations on the national and regional levels and enabling public finance to leverage the required private finance that will contribute to achieving the updated NDC target and long-term goal of net-zero emissions by 2060 as defined in the National 2030 Economic Strategy.

Recommendations for enhancing the NDC transparency cycle, including regular processes of national NDC updating by establishing a holistic and comprehensive national NDC transparency system as per the relevant Paris Agreement provisions

The updated NDC is the second NDC developed by the GoU under the Paris Agreement provisions since 2015. A 5-year cycle of NDC submissions will be defined further for the post-2030 time frame later, but it is clear now that regular updating or revision of the NDC will be required by Ukraine. The lessons learned during this project show the necessity of establishing a continuous and enhanced NDC transparency framework on the government level, which will be based on the existing National GHG Inventory System, while using the best international practices for modelling, monitoring and verification and lessons learned on the national and regional levels. Such an NDC transparency framework will enable the provision of continuous, reliable and comparable data to inform the NDC development and reporting processes, which will become increasingly complex after each NDC submission cycle, will include more and more elements and will reach a deeper level of granularity in each reporting and submission cycle in

accordance with the relevant Paris Agreement provisions for an enhanced transparency framework and regularly revised IPCC Guidelines.

As the NDC implementation period started in January 2021, there will be new elements for reporting within the transparency framework and its reporting cycles (see Section 6 on transparency for more details); therefore, the establishment of enhanced continuous monitoring systems for climate finance, technology transfer and capacity building and response measures for climate adaptation and resilience is recommended.

While implementing the Paris Agreement provisions, Ukraine will also pursue the implementation of other national, bilateral and multilateral agreements, for example the EU–Ukraine Association Agreement, Energy Community and others, so the alignment of the NDC transparency framework with the recently established MRV system and the emerging domestic ETS is also a very important step in the transparency framework.

Other potentially emerging initiatives, such as the Ukraine Green Deal, Green Recovery Program, Green Taxonomy and others, should also be aligned with the NDC and cross-checked against the contribution to sustainable green growth and the achievement of net-zero emissions, including its proper reflection in the NDC transparency framework.