

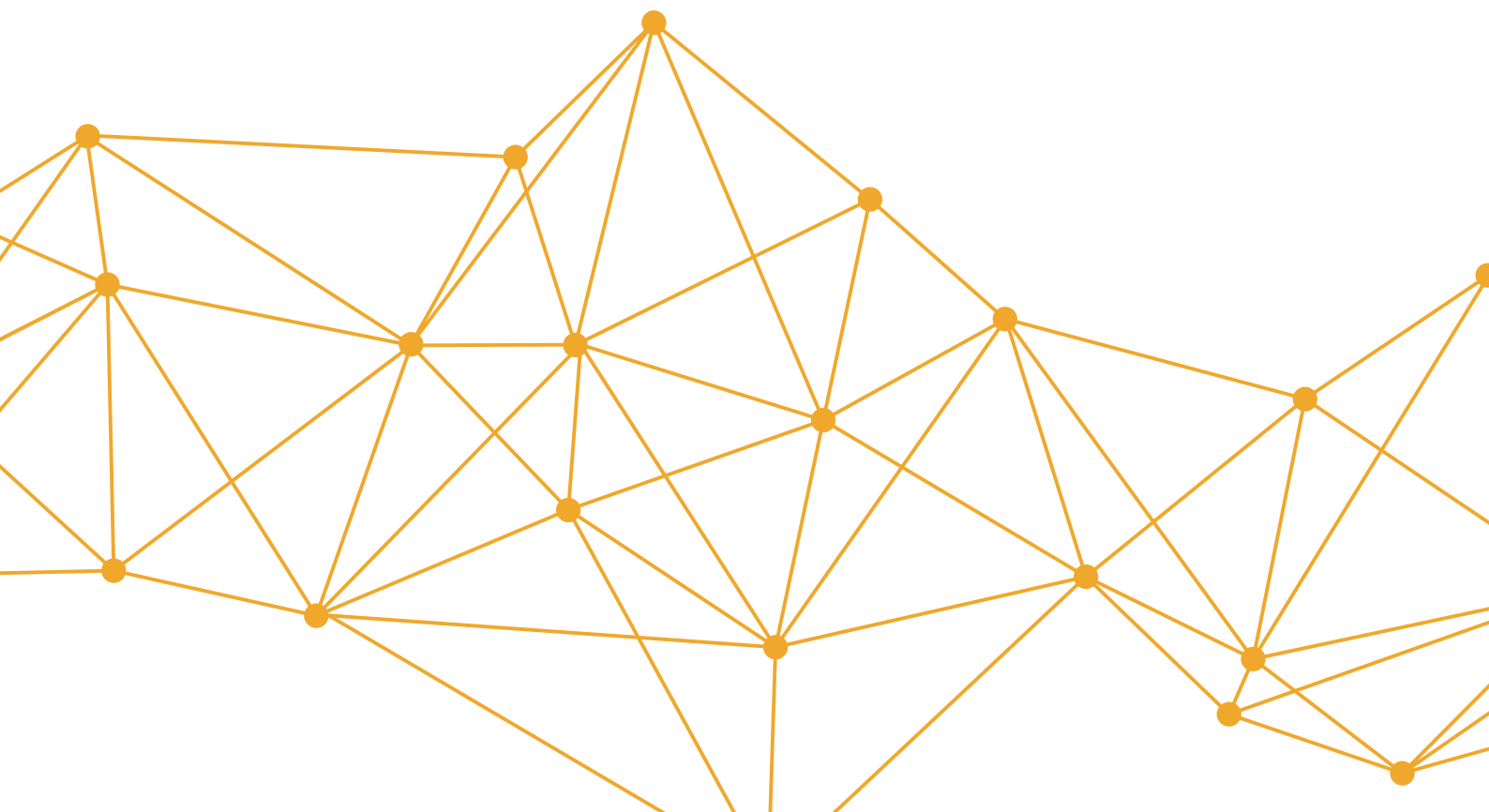
NATIONAL COMMISSION
FOR THE STATE REGULATION
OF ELECTRONIC COMMUNICATIONS,
RADIO FREQUENCY SPECTRUM AND
THE PROVISION OF POSTAL SERVICES

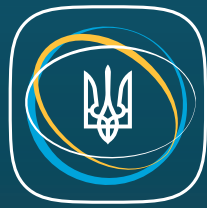


NCEC'S STRATEGIC PRIORITIES

regarding the regulatory environment development
in the field of electronic communications
for 2024-2026





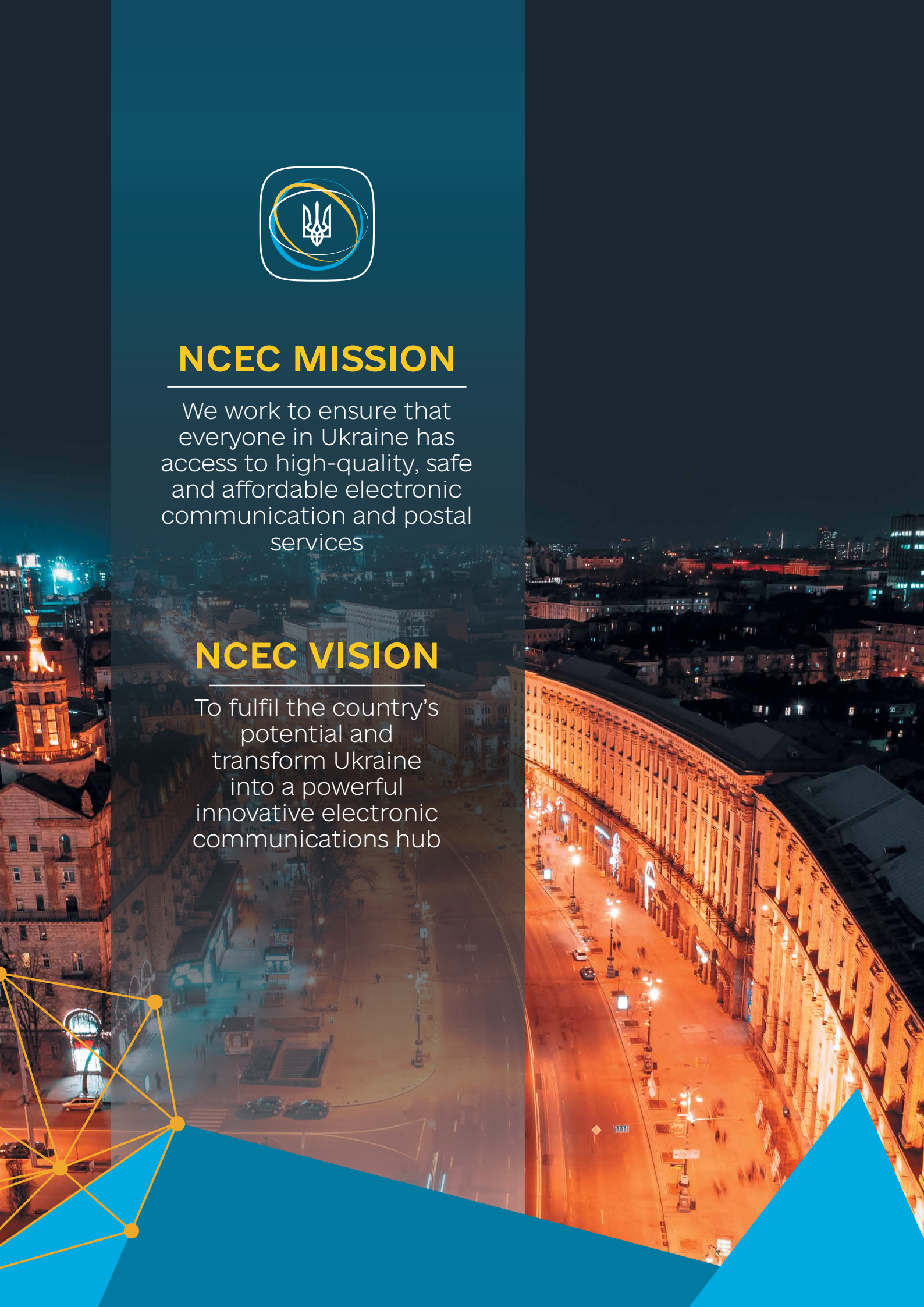


NCEC MISSION

We work to ensure that everyone in Ukraine has access to high-quality, safe and affordable electronic communication and postal services

NCEC VISION

To fulfil the country's potential and transform Ukraine into a powerful innovative electronic communications hub



CONTEXT

INTRODUCTION	4
STRATEGY PRIORITY 1: ALIGNMENT OF THE LEGISLATION IN THE FIELD OF ELECTRONIC COMMUNICATIONS WITH THE EU ACQUIS FOR INTEGRATION INTO THE EU DIGITAL SINGLE MARKET	12
Joining the EU free roaming area: Roam Like At Home	13
Ensuring full compliance of the national legislation of Ukraine in the field of electronic communications and radio frequency spectrum with EU acquis	14
Ensuring the protection of consumer rights and legitimate interests in terms of affordability and receipt of electronic communications services of appropriate quality	15
Universal electronic communications services	19
Radio frequency spectrum	23
Ensuring electronic communication networks resiliency in emergency situations, state of emergency and martial law	23
STRATEGY PRIORITY 2: THE DEVELOPMENT OF ELECTRONIC COMMUNICATION NETWORKS AND THE INTRODUCTION OF THE LATEST RADIO TECHNOLOGIES TO ENSURE A RESILIENT GIGABIT BROADBAND CONNECTIVITY	24
Cost-efficient deployment of Gigabit broadband infrastructure	25
5G introduction and rollout	28
Small cell deployment	30
STRATEGY PRIORITY 3: SHARING EXPERIENCE OF UKRAINE AS A ROLE MODEL IN THE FIELD OF ELECTRONIC COMMUNICATIONS	32
Global lessons in resilience, effective cooperation and timely decision-making	33
Collaboration	34
Transparency	34
Effectiveness and efficiency	34
Enablement	35
Innovation	35
Planning for the future together	36
STRATEGY PRIORITY 4: DEVELOPMENT OF INTERNATIONAL COOPERATION AND INTERNATIONAL TECHNICAL ASSISTANCE PROJECTS	38
Cooperation with the Body of European Regulators for Electronic Communications (BEREC) and the Radio Spectrum Policy Group (RSPG)	39
Cooperation with international organizations and institutions	40
Bilateral cooperation	41
Involvement and implementation of technical assistance projects	41
STRATEGY PRIORITY 5: NCEC'S INSTITUTIONAL CAPACITY BUILDING	42
MONITORING AND REVIEW	43
NON-FULFILMENT RISKS	43
ANNEX 1: POLICY AND REGULATORY IMPLICATIONS OF SETTING BROADBAND TARGETS IN HARMONISATION WITH THE EU DIGITAL DECADE CONNECTIVITY GOALS	44
ANNEX 2: FURTHER SUPPORTING MATERIAL	58

ACRONYM LIST

NCEC, regulatory authority	National Commission for the State Regulation of Electronic Communications, Radio Frequency Spectrum and the Provision of Postal Services
The Law on the Regulator	Law of Ukraine «On the National Commission for the State Regulation of Electronic Communications, Radio Frequency Spectrum and the Provision of Postal Services»
UCFR	State Enterprise “Ukrainian State Centre of Radio Frequencies”
EU	European Union
NRA	National regulatory authority (in electronic communications)
The EU-Ukraine Association Agreement	Association agreement between the European Union and its Member States, of the one part, and Ukraine, of the other part
QoS	Quality of services
SIP	Single Information Point
ERP	Electronic Communication Platform

INTRODUCTION

Background

NCEC is the Ukrainian national regulatory authority that exercises state regulation and supervision in the fields of electronic communications, radio frequency spectrum and postal services.

The status of NCEC as the independent NRA, its principal objectives, tasks, powers and procedural rules are defined by the Law on the Regulator, the Law of Ukraine «On Electronic Communications», the Law of Ukraine «On Postal Communication», the Law of Ukraine «On Access to Construction, Transport, Electricity Facilities for the Development of Electronic Communications Networks» and the Law of Ukraine «On Fundamental Principles of State Supervision (Control) in the Sphere of Economic Activity».

NCEC was established following the enactment of the Law on the Regulator on 13 February 2022 as a legal successor of the National Commission for the State Regulation of Communications and Informatization (NCCIR). NCCIR staff and its Board (Chairman and Members of NCCIR) were transferred to NCEC, ensuring continuity and sustainability of the activities of the Regulator authority.

In the field of electronic communications, NCEC's competencies comprise promotion of effective competition and development of the regulatory environment, management of scarce resources (such as radio frequency and numbering resource), consumer rights protection, measures to ensure universal services, ensure the investment attractiveness of infrastructure development and markets, promote the adaptation (harmonization) of Ukrainian legislation in the fields of electronic communications, radio frequency spectrum to EU legislation, as well as the integration of Ukrainian markets in the field of electronic communications into the EU Digital Single Market.



Context



In accordance with the EU-Ukraine Association Agreement together with the EU-Ukraine Deep and Comprehensive Free Trade Area (DCFTA), applied since 2016¹, Ukraine had achieved a broad alignment of its legislative framework with the EU *acquis* for electronic communications, following enactment of the two key legal acts:

- The «On Electronic Communications»², in force since 1 January 2022, established the legal basis for a comprehensive institutional and regulatory reform of the Ukrainian sector of electronic communications. The law aims at approximation of the Ukrainian legislation with the EU rules for electronic communications and sets out policy objectives aligned with the Directive (EU) 2018/1972 of the European Parliament and of the Council of 11 December 2018 establishing the European Electronic Communications Code (Recast) (hereinafter – the European Code of Electronic Communications, EECC)³.
- The Law on the Regulator⁴, in force since 13 February 2022, defines the status of the national regulatory authority, its powers, main tasks and procedures, and lays down provisions for strengthening the regulator's independence and administrative capacity.

On 28 February 2022, Ukraine submitted the application for EU membership to the European Council received Ukraine's and on 17 June the European Commission published its Opinion⁵, recommending that the EU Council accept Ukraine's candidacy. On 23 June 2022, the European Parliament adopted a resolution calling for the immediate granting of candidate status for EU membership to Ukraine⁶. On the same day, the European Council granted Ukraine the status of a candidate for accession to the EU⁷.

The EU candidate status provides for Ukraine's closer integration in the EU Digital Single Market, reduction of cross-border barriers to digital trade and acceleration of Ukraine's digital economy.

As a concrete example of progressive EU integration, in June 2022 NCEC was authorized to join the Body of European Regulators for Electronic Communications (BEREC) as a member without voting rights⁸. This status enables NCEC to take part in the day-to-day work of BEREC's Board of Regulators, Management Board and appoint its experts to join in BEREC's working groups. By allowing closer cooperation and an exchange of best practices with other European regulators, participation of NCEC in the work of BEREC and the BEREC Office will further facilitate alignment of the Ukrainian regulatory framework with the EU rules.

Another important step in extending the EU internal market treatment to Ukraine was achieved in April 2023 when the EU-Ukraine Trade Committee approved an amendment⁹ of Appendix XVII-3 (Rules applicable to electronic communication services) of the EU-Ukraine Association Agreement to enable Ukraine to join the EU's free roaming area. Since April 2022, Ukrainian and European operators of electronic communications are offering affordable or free calls between the EU and Ukraine, based on a voluntary agreement facilitated by the NCEC and the European Commission, which has been extended until 9 July 2024¹⁰. Based on the revised Priority Action Plan for implementation of the EU-Ukraine DCFTA in 2023-2024¹¹, Ukraine will be integrated in the EU internal market for roaming once it has implemented relevant EU legislation.

¹ <https://eur-lex.europa.eu/eli/dec/2021/2219/oj>

² <https://zakon.rada.gov.ua/laws/show/1089-20#Text>

³ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018L1972>
https://zakon.rada.gov.ua/laws/show/984_013-18#Text

⁴ <https://zakon.rada.gov.ua/laws/show/1971-20?lang=en#Text>

⁵ https://neighbourhood-enlargement.ec.europa.eu/opinion-ukraines-application-membership-european-union_en

⁶ <https://www.europarl.europa.eu/news/en/press-room/20220616IPR33216/grant-eu-candidate-status-to-ukraine-and-moldova-without-delay-meps-demand>

⁷ <https://www.consilium.europa.eu/en/policies/enlargement/ukraine/>

⁸ <https://digital-strategy.ec.europa.eu/en/news/commission-decision-ukraine-joining-work-berec>

⁹ https://zakon.rada.gov.ua/laws/show/845_001-23#Texthttps://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_2023.123.01.0038.01.ENG&toc=OJ%3AL%3A2023%3A123%3ATOC

¹⁰ <https://digital-strategy.ec.europa.eu/en/news/roaming-ukraine-operators-extend-agreement-provide-affordable-calls-and-ukraine-another-year>

¹¹ <https://circabc.europa.eu/rest/download/f3a2634c-f484-4874-a72d-be088c94d1e8>

National policy considerations



The current national broadband connectivity targets in Ukraine were set out as part of the National Economic Strategy 2030, approved by the Cabinet of Ministers of Ukraine by the Resolution No. 179 of 3 March 2021¹². The strategy establishes a goal of «Ensuring development of competitive electronic communication market providing high quality ICT services», achievement of which envisages: improvement of infrastructure for electronic communications, introduction of new technologies in telecommunications, support for construction of infrastructure of electronic communication in commercially unprofitable regions, optimization of the radio frequency fees and improvement of legislation and regulation of the sector.

The National Economic Strategy defined the following high-speed broadband connectivity targets for 2030:



- **95%** of the population has access to mobile broadband with at least 50 Mbps;
- **75%** of households subscribing to fixed broadband access with at least 100 Mbps;
- **99%** of the population provided with the technical ability to connect to fixed broadband access with 1 Gbps;
- **99%** of social infrastructure institutions and local governments connected to fixed broadband access with at least 1 Gbps.

¹² <https://zakon.rada.gov.ua/laws/show/179-2021-n#Text>



To support the long-term strategic goals outlined above, as well as in accordance with Article 6.1 (4) of the Law of Ukraine «On Electronic Communications», the central executive authority in the field of electronic communications and radio frequency – the Ministry of Digital Transformation of Ukraine (hereinafter MDTU, the Ministry), works out, in alignment with the regulatory authority, a development in particular strategy in the field of electronic communications and the national plan for the development of broadband electronic communication networks. Such a strategy (-ies) should include the analysis of the status of fixed and mobile broadband in the country, the challenges and objectives for national broadband deployment and specific regulatory, financial and technical measures and instruments to facilitate the implementation and monitoring of broadband rollout, particularly of the high-speed fiber networks and 5G technology. Currently, MDTU developed the draft of Strategy for the development of the sphere of electronic communications sector of Ukraine for the period up to 2030, which is under of public consultations (draft of the order of the Cabinet of Ministers of Ukraine «On the approval of the Strategy for the development of the electronic communications sector of Ukraine for the period until 2030 and the approval of the operational plan of measures for its implementation in 2024-2026»)¹⁵ (hereinafter – strategy for the development of the electronic communications sector of Ukraine 2030). After the approval of the strategy, NCEC will align its strategic priorities accordingly if necessary/if appropriate.

The ongoing Russia's full-scale war against Ukraine had a negative effect on the policy development process, as under the martial law the government capacity to define, monitor and adjust connectivity targets, definitions and goals is severely impeded. As a direct consequence of the Russia's full-scale war against Ukraine, investment in the new network infrastructure rollout throughout the country was decreased and network deployments were slowed or suspended. Although infrastructure investment soared in some regions, these efforts were mainly focused on restoring and maintaining connectivity in the war-affected areas.

The measures and targets, which will be set out in the strategy for the development of the electronic communications sector of Ukraine 2030, must take into account the necessity of immediate infrastructure recovery alongside future network deployment and connectivity goals. Short- and medium-term strategic objectives should allow for gradual progress and be ready for the long-term planning process when peace is restored (after the abolition of the legal regime of martial law). Public and private sectors should be prepared to ensure transition from reactive short-term to proactive long-term planning, involving all stakeholders, with the objective to transform electronic communications networks into a modern, secure and resilient infrastructure, progressively integrated into the EU Digital Single Market, aligned with the EU connectivity goals and the vision of making Ukraine the most digital country in the EU.



¹⁵ <https://thedigital.gov.ua/regulations/pro-shvalennya-strategiyi-rozvitku-sferi-elektronnih-komunikacij-ukrayini-na-period-do-2030-roku-ta-zatverdzhennya-operacijnogo-planu-zahodiv-z-yiyi-realizaciyi-u-2024-2026-rokah>

The main goal for connectivity in the EU Digital Decade policy programme is for every European household to have access to high-speed

Internet coverage by **2025** and **5G** and Gigabit connectivity by **2030**¹⁴

There is a clear opportunity for Ukraine to adopt a coherent postwar national strategy, including broadband development that aims to allow all premises to have access to high-speed broadband services. Ukraine's effective alignment with the EU connectivity goals is yet another aspect of integration into the EU digital market, although these interim goals will have to be reviewed to set realistic national targets taking account of the actual situation and post-war timing.

There are three essential and complementary components to the goal of ensuring that everyone in Ukraine has access to high-quality, safe and affordable electronic communication services:

- 1 A clear investment-led strategy aligned with the EU Digital Decade objectives, including the necessary coordination of investments and the setting of targets to achieve universal Gigabit and 5G connectivity.
- 2 The safety net of the universal service framework which seeks to ensure access to voice telephony services

and broadband access at a fixed location at an affordable price. These measures would be particularly important during the immediate post-war reconstruction period as means to ensure access to basic electronic communications and digital services while the deployment of modern high-speed broadband infrastructure is still ongoing.

- 3 Raising digital skills and literacy to ensure that the increased availability of high capacity broadband connectivity can be fully exploited by Ukrainian citizens and businesses.

Understanding the need to harmonise national broadband connectivity objectives with those of the EU and integrate them into the EU Digital single market would be a prerequisite for many of NCEC implementing steps that are addressed in this document.

Important aspects of the implications of adopting a set of policy goals for the electronic communications sector that are harmonised with the EU Digital Decade policy programme are developed further in an Annexes to this document, including the investment and funding aspects. These aspects are particularly important in the current Ukrainian context, given the significant external (international) funding that is expected to be available at the end of the Russia's full-scale war against Ukraine. If Ukraine regulatory and institutional framework will align with the EU requirements the confidence of these external investors will be enhanced. Another prerequisite for effective implementation of the regulatory framework is to ensure that NCEC has adequate technical, financial and human resources to carry out its tasks in effective and impartial manner.

¹⁴ https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age/europes-digital-decade-digital-targets-2030_en

¹⁵ Decision No 1/2023 of the EU-Ukraine Association Committee in Trade configuration of 24 April 2023 modi-fying Appendix XVII-3 – <https://eur-lex.europa.eu/eli/dec/2023/930>



Strategic priorities

This document outlines NCEC's mid-term strategic priorities for the period 2024-2026, which will be in the focus of organisation of NCEC's activities. These strategic priorities have been defined based on recent electronic communication market developments in the context of the ongoing full-scale Russia's war against Ukraine and taking into account the objectives set out in the amended Appendix XVII-3¹⁵ of Annex XVII of the EU-Ukraine Association Agreement.

The strategic priorities aim at defining the key rules and regulations that NCEC intends to focus on in the coming years and ensuring a predictable regulatory environment and sustainable post-war recovery of the Ukrainian electronic communications market.

Monitoring and review

NCEC will closely monitor implementation of the strategic priorities set out in this document and report annually on the achieved progress. To ensure that the NCEC strategic priorities remains relevant and aligned with future developments, NCEC will revisit its strategic priorities over the course of the period when it is necessary and taking into account further developments on the market and national circumstances, as well as other objective reasons.

STRATEGIC
PRIORITY

1

ALIGNMENT OF
THE LEGISLATION
IN THE FIELD OF
ELECTRONIC
COMMUNICATIONS
WITH THE EU
ACQUIS FOR
INTEGRATION INTO
THE EU DIGITAL
SINGLE MARKET



To support effective integration of Ukraine into the EU Digital single market, NCEC will keep implementation (enforcement) of the EU regulatory framework in electronic communications and radio spectrum as a strategic priority in the coming years.

This means prioritising rules and regulations that implement the amended Appendix XVII-3 of Annex XVII of the EU-Ukraine Association Agreement, the two sectoral laws: the Law of Ukraine «On Electronic Communications» and the Law on the Regulator, along with the immediate measures intended to maintain uninterrupted, secure and resilient

connectivity for Ukrainian citizens and businesses while the Russia's full-scale war against Ukraine continues and also during the post-war period.

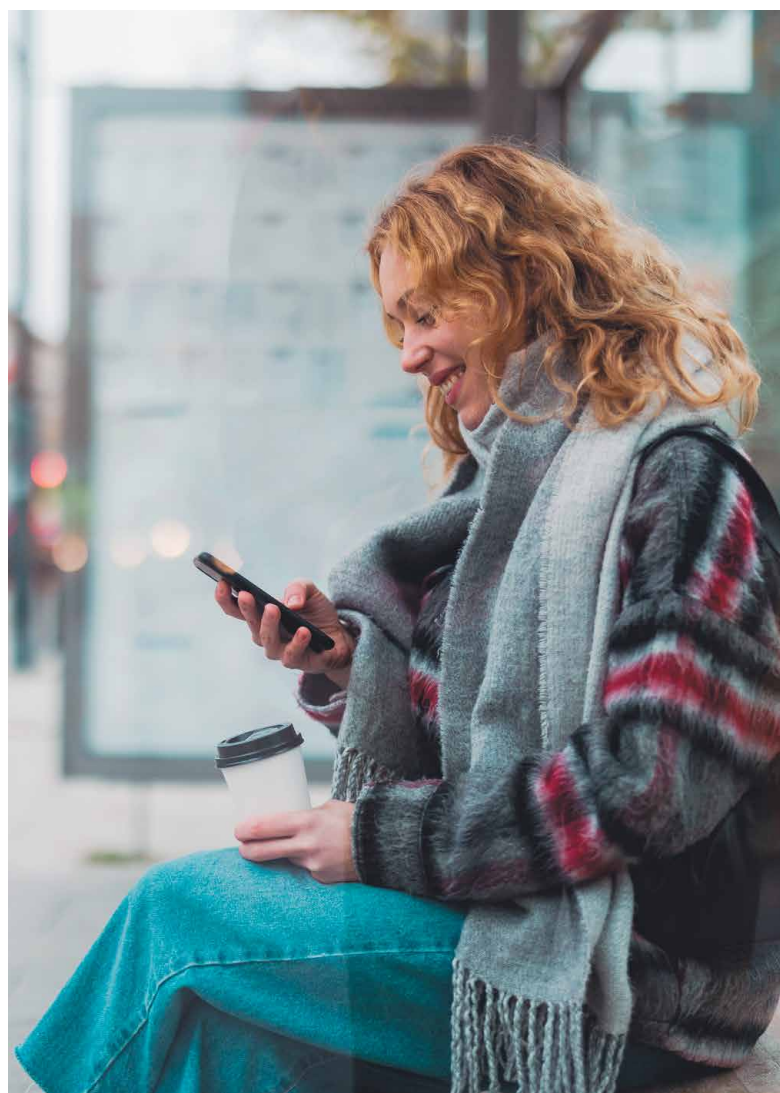
This also includes dynamic approximation of Ukraine's sectoral national legislation taking into account the evolution of the EU law and the best international practices for ensuring predictable, transparent and investment-friendly regulatory environment and further actions essential for the development of a new Gigabit capable communications infrastructure in the longer term.

Joining the EU free roaming area: Roam Like At Home



The main benefit that joining the EU free roaming area will bring to the Ukrainian end users is that calls, SMS and data that a user consumes during periodic travel within the EU are charged at the same rates and with the same quality of service as applied by the domestic operators in Ukraine.

To enable Ukraine's full integration into the EU free roaming area, the most immediate step is to ensure harmonisation of the Ukrainian laws with the relevant EU regulations and to take into consideration the applicable BEREC guidelines. This involves aligning national legislation with the Regulation (EU) 2022/612 of the European Parliament and of the Council of 6 April 2022 on roaming on public mobile communications networks within the Union (recast) (Roaming Regulation (EU) 2022/612)¹⁶ and the Commission Implementing Regulation (EU) 2016/2286 of 15 December 2016 laying down detailed rules on the application of fair use policy and on the methodology for assessing the sustainability of the abolition of retail roaming surcharges and on the application to be submitted by a roaming provider for the purposes of that assessment (Implementing Regulation (EU) 2016/2286)¹⁷, as well as Regulation (EU) 2018/1971 of the European Parliament and of the Council of 11 December 2018 establishing the Body of European Regulators for Electronic Communications (BEREC) and the Agency for Support for BEREC (BEREC Office), amending Open Internet Regulation (EU) 2015/2120 and repealing Regulation (EC) No 1211/2009¹⁸.



¹⁶ <https://eur-lex.europa.eu/eli/reg/2022/612>

¹⁷ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32016R2286>

¹⁸ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018R1971>

The provisions on the fair use policy and the sustainability mechanism could be particularly important in the specific Ukrainian market situation with relatively low retail domestic mobile prices as a safeguard tool in a situation where Ukrainian mobile operators might be unable to recover their costs from providing international mobile roaming services and to prevent abusive uses of roaming services. Another important aspect is to ensure that NCEC has the necessary competencies for effective implementation and enforcement of the new roaming provisions.

Progressive integration of Ukraine in the EU internal market for electronic communications services also requires the implementation of the Commission Delegated Regulation (EU) 2021/654 of 18 December 2020 supplementing Directive (EU) 2018/1972 of the European Parliament and of the Council by setting a single maximum Unionwide mobile voice termination rate and a single maximum Unionwide fixed voice termination rate (Commission Delegated Regulation (EU) 2021/654)¹⁹. In line with the priorities set out in the amended Appendix XVII-3 of the EU-Ukraine Association Agreement, EU-wide termination rates will apply to international calls originating in the EU Member States with immediate effect, while the national termination rates will follow a three-year glide path from the rates set based on the bottom-up long-run incremental cost (BU LRIC) model towards the EU-wide FTRs and MTRs.

In this regard, one of the key steps to achieve this priority was the adoption of the Law of Ukraine «On Amendments to Certain Legislative Acts of Ukraine Regarding the Implementation of European Legislation on

Roaming» (reg. No. 10265 dated 17.11.2023) by the Verkhovna Rada of Ukraine on May 22, 2024, which was developed with the leading role of NCEC by the Working group on the accession of Ukraine to the EU policy «Roam-Like-At-Home» (RLAH), created by the NCEC's decision No. 42 dated 02.01.2023 with the participation of representatives of the Ministry, mobile operators, the Association of Telecommunications Operators «Telas», as well as in cooperation with European experts of the EU technical assistance project «Digital Policy Support to Ukraine».

The next stage is the development and adoption by NCEC normative legal acts (bylaws) necessary to ensure the full implementation of the specified EU acts on roaming.

Ensuring full compliance of the national legislation of Ukraine in the field of electronic communications and radio frequency spectrum with EU acquis

In order to ensure a full integration into the EU Single Digital Market, it is necessary to fully **transpose legislation in the field of electronic communications in accordance with the European Code of Electronic Communications**.

At the same time, NCEC will ensure participation in the official screening of Ukrainian legislation for its compliance with EU acquis, and other events within the negotiation process on Ukraine's accession to the European Union, in particular to join the EU internal market in the field of electronic communications.

¹⁹ https://eur-lex.europa.eu/eli/reg_del/2021/654/oj

Ensuring the protection of consumer rights and legitimate interests in terms of affordability and receipt of electronic communications services of appropriate quality

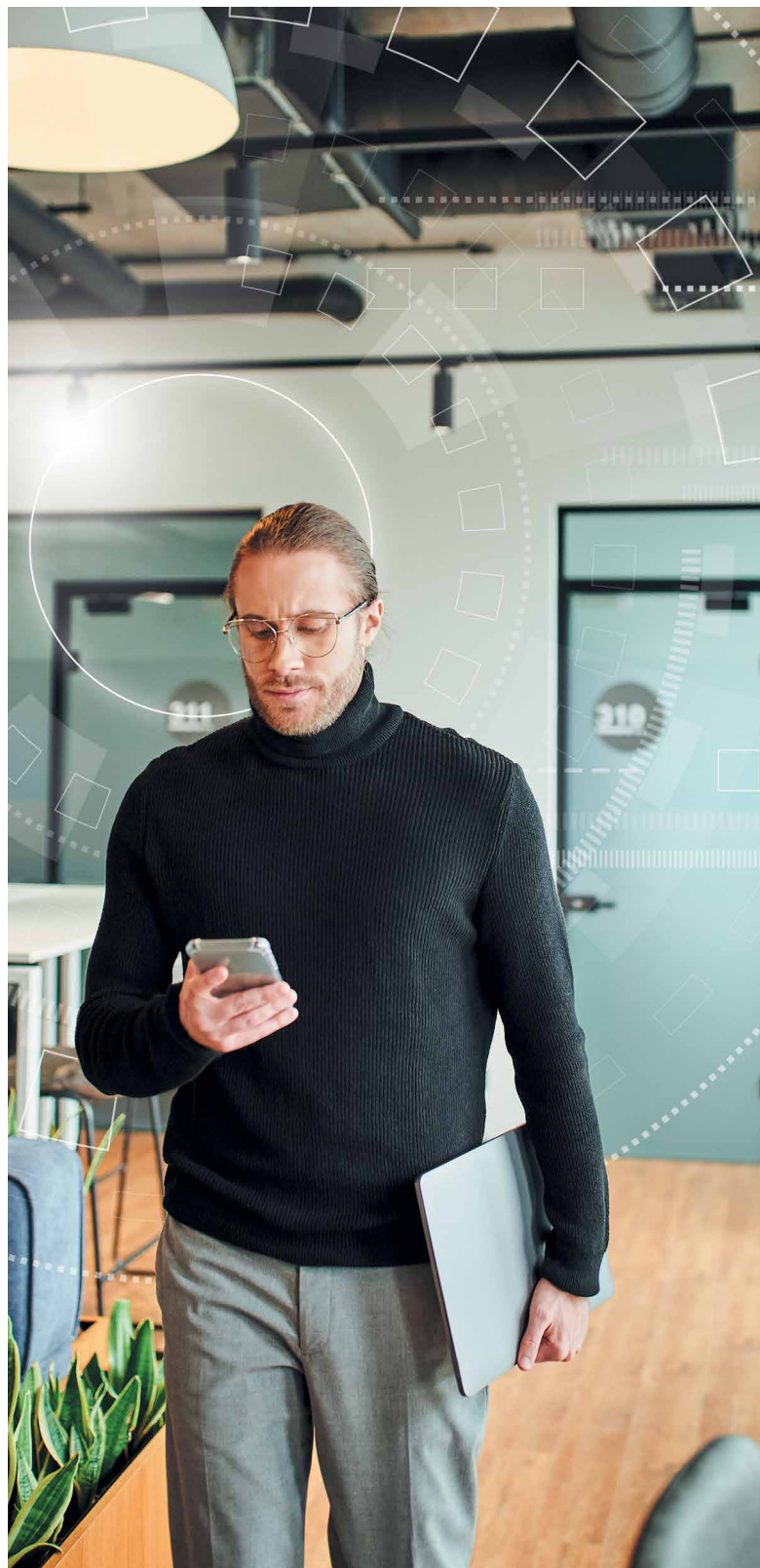


Ukraine's integration into the EU digital single market requires also full alignment of the national legislation with the EU sector-specific end-user protection rules. The primary objective of such an alignment is to achieve an equally high level of protection for Ukrainian end users in a competitive electronic communications market that provides consumer benefits in terms of choice, price and quality.

At the EU level, harmonised sector-specific end-user protection rules are set out in the EEC and the Regulation (EU) of the European Parliament and of the Council of 25 November 2015 laying down measures concerning open Internet access and amending Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services and Regulation (EU) No 531/2012 on roaming on public mobile communications networks within the Union (Open Internet Regulation (EU) 2015/2120)²⁰. Sector-specific end-user protection rules complement general consumer protection and aim at a high level of consumer protection in the electronic communications sector. These sector-specific rules cover in particular areas such as contractual information, transparency, quality of service (QoS), contract duration and termination, number portability and switching providers of Internet access services, privacy and security, and access to emergency numbers.

In the Ukrainian legislation, the EEC provisions on consumer rights have been transposed through Section XIV of the Law of Ukraine «On Electronic Communications». Effective implementation of these provisions requires adoption by the Cabinet of Ministers of Ukraine in consultation with NCEC of the rules on providing and obtaining electronic communications services, in accordance with Article 104 of the Law of Ukraine «On Electronic Communications».

With the enactment of the Law of Ukraine «On Electronic Communications» and the Law on the Regulator, NCEC has commenced the implementation of a new task in the field of electronic communications regarding the quality of electronic communication services,



²⁰ <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32015R2120>

as stipulated by the EECC and the Open Internet Regulation (EU) 2015/2120²⁰ – monitoring the quality of electronic communication services.

Currently, under the martial law, the main goal of QoS monitoring is researching and provision of NCEC and interested parties (stakeholders) with an understanding of the current state, quality, and accessibility of mobile communication electronic communication services in the territory of Ukraine where combat operations are not taking place. This is aimed at ensuring the protection of end consumers' rights to receive electronic communication services of appropriate quality.

NCEC will order work for the QoS monitor at UCRF, an enterprise under the jurisdiction of the regulatory authority management sphere. Additionally, there is a should expansion of the QoS monitoring system and the implementation (putting into operation) of specific subsystems. This includes the introduction of a **crowdsourcing tool** (tool of broadband access to Internet, including speed test tool), a subsystem for calculating coverage areas of electronic communications networks for mobile communication, and a visualization subsystem, considering the best practices of the NRAs of the EU Member States.

To enable end-users to make comparisons between offers of different providers, NCEC will introduce an independent **comparison tool** which provides clear, complete, comprehensive and up-to-date information on the quality of service of Internet access services and number-based interpersonal electronic communications services, as envisaged in article 4.4 (13) of the Law on the Regulator.

The Law on the Regulator has also expanded and strengthened NCEC's dispute resolution powers covering a wide range of issues within the scope of the Law of Ukraine «On Electronic Communications» and related acts. These powers set out under article 4.4 (13) of the Law on the Regulator now include out-of-court resolution of disputes between providers of electronic communications services and end users, in line with the requirements set out in Article 25 of the EECC. To ensure effective enforcement of legitimate consumer interests, NCEC will work on implementing **regulations setting out procedural rules for handling of consumer complaints by providers of electronic communications networks and services and dispute resolution.**

The Russia's full-scale war against Ukraine has heavily destroyed electronic communications infrastructure across the country, causing severe damage and service interruption for millions of households as well as private and public institutions. When a significant number of the Ukrainian end users have no access to voice communications and the Internet at all or experience significantly deteriorated quality of service, a particularly important and challenging task will be to provide reliable and up-to-date information about the availability of connectivity and QoS in different areas.

In this context, NCEC will focus on effective implementation of the regulatory measures and tools addressing information about **geographical coverage** (as part of the ERP) and **quality of service for fixed and mobile voice communications and Internet access services (a QoS tool)**. The purpose of these measures will be to ensure maximum transparency for end users in terms of the key quality of service parameters and factors that may affect the level of quality, both within and outside the control of the service providers. In adopting these measures, NCEC will follow the requirements set out in the Open Internet Regulation (EU) 2015/2120 and the associated BEREC guidelines²¹.

During the ongoing electronic communication networks restoring process, the minimum quality of service (QoS) levels that have been either contracted or mandated by the regulation may not be always achievable due to objective factors outside of the service providers' control. In this context, focusing on sanctions for non-compliance with the quality of service requirements may be counterproductive. Therefore, the measures developed by NCEC in consultation with the industry (operators) will focus on clear and transparent information, as well as remedies that should be made available to end users when the minimum quality of service cannot be assured. For example, such remedies have been implemented by several EU Member States and may include: a compensation to the end users if the speed is below defined thresholds, a possibility to terminate the contract without any penalty or to switch to a package with a lower monthly fee (e.g. Croatia, Czech Republic, Germany, Spain).

In close cooperation with the industry, NCEC will develop a **mapping system of broadband service availability** at specified quality levels as envisaged as one of its tasks in Article 4.4(11) of the Law on the Regulator:

²¹ <https://www.berec.europa.eu/en/document-categories/berec/regulatory-best-practices/guidelines/berec-guidelines-on-the-implementation-of-the-open-internet-regulation>

«11) conducting geographical surveys of broadband access network deployment (both fixed and mobile communication) and of availability of universal electronic communications services (hereinafter – universal service).»



These provisions are aligned with Article 22 of the EEC that establishes the requirement for NRAs or other competent national authorities to conduct geographical surveys of electronic communications, which in essence consists of mapping total service availability. The rationale underlying Article 22 of the EEC is the idea that geographical information on the reach of broadband networks will become an important tool enabling effective design and implementation of broadband policies, availability of universal electronic communications services and related regulations.

In implementing this task, NCEC will take into consideration the BEREC Guidelines on geographical surveys of network deployments²². The mapping system of broadband service availability will be also used to develop an information tool enabling end users to determine the availability of broadband connectivity and service quality (QoS) in different areas, with a level of detail

which is sufficient to support their choice of Internet access service provider.

In a longer term, broadband mapping will be a prerequisite for the cost-efficient construction of infrastructure using supporting private and public investment in sustainable, inclusive high-speed broadband connectivity²³. It will be instrumental in deciding on appropriate regulatory and policy tools to stimulate infrastructure recovery and new deployment, including coverage obligations in spectrum licences, universal service framework and public financing measures for broadband rollout, as further discussed below. At the same time, NCEC shall introduce **an effective control and supervision mechanism for the fulfilment of these obligations**.

One of important task on which the NCEC's activity is focused is the providing high-quality mobile communications to the main highways. Starting from 2022, as a result of the joint work of NCEC, the Ministry and

²² <https://www.berec.europa.eu/en/document-categories/berec/regulatory-best-practices/guidelines/berec-guidelines-to-assist-nras-on-the-consistent-application-of-geographical-surveys-of-network-deployments>

²³ <https://www.itu.int/en/ITU-D/Regional-Pres-ence/Europe/Documents/Publications/2022/ITU%20Guidelines%20to%20establish%20broadband%20mapping.pdf>

mobile operators, 14 key international road routes were identified, which have a special national importance in passenger traffic and freight transportation, taking into account the conduct of hostilities, and

required the development of

269

mobile base stations connection.

NCEC focused also on the provision of main highways with high-quality mobile communications. Starting from 2022, as a result of the joint work of NCEC, the Ministry and providers of mobile communication, 14 key international roads were identified, which have a special national importance in passenger traffic and freight transportation, taking into account hostilities, and required the construction of 269 mobile base stations.

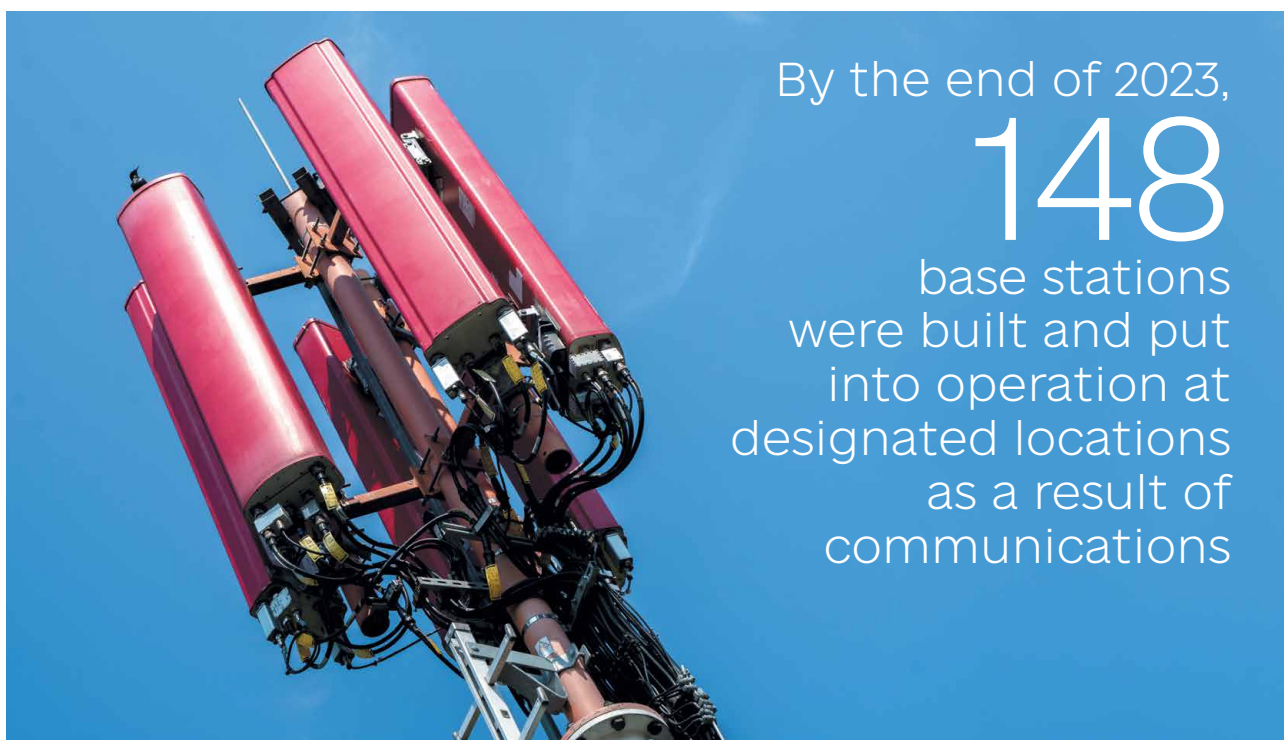
Communications quality improvement along the highways of Ukraine continued

in 2023 as well. Thus, NCEC took measures and consolidated the efforts of participants in the field of electronic communications and contributed to land plot allocation to mobile communication service providers on the forestry territory for the base stations construction and initiated the simplification of mechanisms and procedures for operators obtaining rights to place electronic communications equipment on the land plots, as well as to build electronic communications facilities and ensure their effective use.

One of the main problems for mobile communication services providers was the registration of land plots on the forestry territory and territorial communities along highways for the construction and operation of communication facilities. NCEC worked together with the Ministry to facilitate the allocation of land plots, being used by the state specialized forest enterprise – State Enterprise «Forests of Ukraine», to mobile communication providers.

By the end of 2023, 148 base stations were built and put into operation at designated locations as a result of communications **quality improvement measures along the international highways of Ukraine**. These measures are also planned for 2024 and further.

So, NCEC within its powers will focus on implementing measures to provide 95% of international and national highways with mobile broadband Internet access with an average data speed (DL) of 30 Mbit/s, as well as on implementing measures to provide 70% of railway with mobile Internet access with an average data speed (DL) of at least 5 Mbit/s.



By the end of 2023,
148
base stations
were built and put
into operation at
designated locations
as a result of
communications



The availability of an adequate and reliable broadband Internet access service is today a crucial enabler for participation in the digital economy and society. It is essential that people and businesses are able to access an adequate and reliable broadband Internet access service, regardless of where they live or work. The universal service acts as a 'safety net' to ensure that defined basic services are available to all end users on request and at an affordable price to consumers, where a risk of social exclusion, arising from the lack of such access, prevents citizens from full social and economic participation in society.

Due to the growing importance of broadband Internet access for all citizens, article 99 of the Law of Ukraine «On Electronic

Communications», in line with article 84 of the EEC, now includes within the scope of the universal service the provision at a fixed location of an adequate and affordable broadband access, along with voice communications services. Moreover, there should be no limitations on the technical means by which the universal service connection is provided, allowing for wired or wireless technologies.

Provisions of article 84 of the EEC do not define a precise bandwidth that should be applicable within the scope of universal service for the whole EU, but establish the criteria on the basis of which each EU Member State should define a minimum bandwidth adapted to its territory:

«Each Member State shall, in light of national conditions and the minimum bandwidth enjoyed by the majority of consumers within the territory of that Member State, and taking into account the BEREC report on best practices, define the adequate broadband Internet access service for the purposes of paragraph 1 with a view to ensuring the bandwidth necessary for social and economic participation in society. The adequate broadband Internet access service shall be capable of delivering the bandwidth necessary for supporting at least the minimum set of services set out in Annex V.».

Accordingly, article 99 of the Law of Ukraine «On Electronic Communications» MDTU as central executive authority in the field of electronic communications and radio frequency, in close coordination with NCEC, shall define the minimum bandwidth and other quality of service characteristics for an adequate broadband Internet access service.

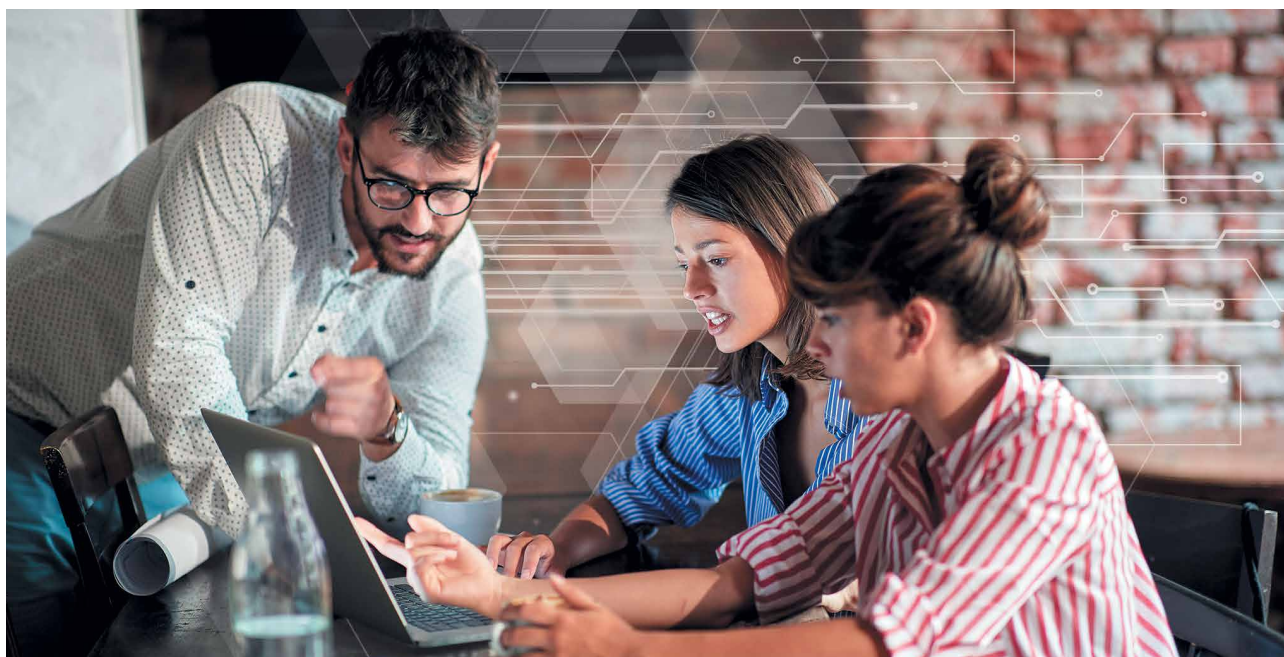
The requirements set for an adequate Internet access service must be defined in such manner that the following services, listed in article 99(2) of the Law of Ukraine «On Electronic Communications», are supported **(the service criterion)**:

- electronic mail;
- search engines enabling search of all types of information;
- basic training and education electronic tools;
- mass media in the Internet;
- electronic commerce;
- Internet banking;
- access to electronic governance services (electronic administrative services);
- social media and Internet messaging services;
- voice and video communication.

The definition of the adequate broadband Internet access service should also take into account the minimum bandwidth used by the majority of consumers in the national territory **(the majority criterion)**. In practice, this criterion has been interpreted by the European Commission in the context of its third regular review of the scope of universal service²⁴ as the data rate is used at national level by:

- at least 50% of all households; and
- at least 80% of all households with a broadband connection.

When approving the draft indicators for defining the universal electronic communication service of broadband Internet access at a fixed location, developed by the central executive body in the field of electronic communications – MDTU, NCEC will follow the BEREC Report on Member States' best practices to support the defining of adequate broadband Internet access service, other commonly used criteria include preventing significant market distortions and/or significant implementation costs, as well international benchmark comparisons²⁵. In recent years, the most common adequate broadband data rate was defined by EU Member States as a minimum download rate of 10 Mbps (e.g. Czech Republic, Germany, Greece, Lithuania, Slovenia, Spain, Sweden). Some EU Member States have also defined additional characteristics, such as a minimum upload rate and latency.



²⁴ <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2011:0795:FIN:EN:PDF>

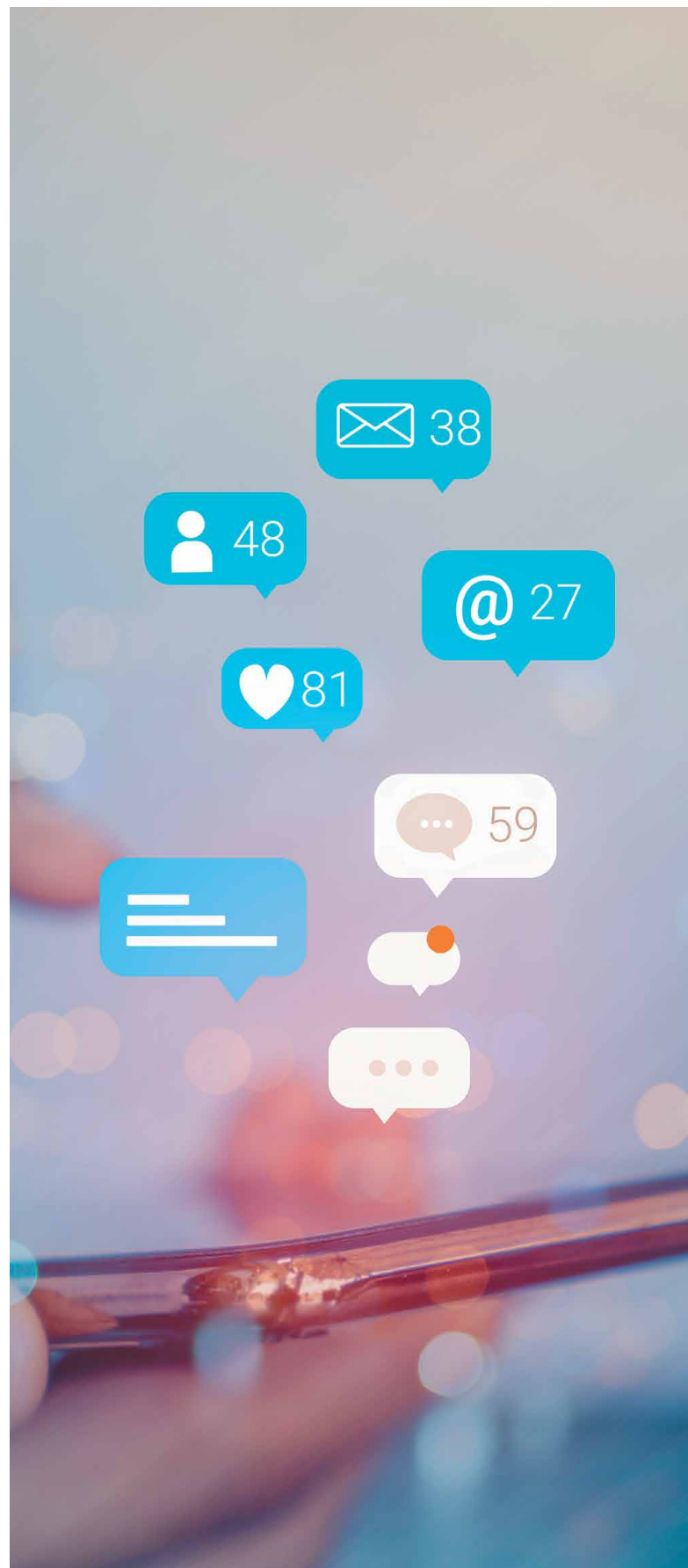
²⁵ <https://www.berec.europa.eu/en/document-categories/berec/reports/berec-report-on-member-states-best-practices-to-support-the-defining-of-adequate-broadband-internet-access-service-ias>

Article 100 of the Law of Ukraine «On Electronic Communications» also requires NCEC to **monitor the evolution and level of retail prices of the two components of the universal service:** voice telephony and broadband services. The results of this monitoring should be used to assess affordability of the universal service and if necessary, adopt specific measures to facilitate provision of affordable universal service for consumers with low income and special social needs that cannot afford to pay the competitive market prices. An example of such a safety net approach is the UK's 'social tariffs'²⁶.

During the ongoing Russia's full-scale war against Ukraine, the importance of instant universal access to digital infrastructure has been widely recognised by the government and other public and private entities, as demonstrated by well-coordinated collective efforts to restore and maintain reliable and affordable connectivity, further discussed below. Although most of the war-affected areas suffered devastating destruction of both mobile communications and fixed network infrastructures, the connectivity has been maintained thanks to common efforts and emergency measures undertaken by the competent Ukrainian authorities (including NCEC) and by fixed and mobile network operators, including provision of free national roaming, free connectivity at community centres and outdoor public Wi-Fi hotspots, discounted services and terminal equipment for low-income consumers and uninterrupted access to electronic communication services for end users who were unable to pay their bills²⁷.

Investing in electronic communications networks during the ongoing Russia's full-scale war against Ukraine is a very difficult task, which can realistically be achieved mostly by the largest operators. Restoring universal connectivity along with the deployment of new electronic communications infrastructure will remain of primary importance upon the conclusion of the ongoing Russia's full-scale war against Ukraine.

As a short and medium term goal, the universal service framework may serve as an important 'safety net to ensure affordable access to the minimum of set of basic digital services for Ukrainian citizens when they return to their homes after the end of hostilities and before the launch of the scale electronic communication infrastructure reconstruction process, firstly at the liberalised territories.



²⁶ <https://www.ofcom.org.uk/phones-telecoms-and-internet/advice-for-consumers/costs-and-billing/social-tariffs>

²⁷ <https://mind.ua/publications/20254162-rik-nezlamnosti-yak-internet-provajderi-zagartuvali-merezhi-pid-chas-masovanih-kiber-ta-artilerijski>

To support the electronic communication infrastructure restoration work, NCEC will take into account a complete assessment of the scale of the damage to the electronic communications infrastructure, as part of its geographical survey and network deployment mapping, in coordination with other stakeholders. This assessment will be an important prerequisite for evaluation of the state of availability of broadband networks (mobile, fixed wireless, cable, fibre) and the recovery needs. It should provide an up-to-date information on areas where there is no broadband infrastructure or where it has been completely destroyed and help to identify future steps needed to fully restore the networks and the timelines for such activities.

The geographical survey results will provide an important input for defining the minimum quality of service criteria for the universal service elements, including the adequate broadband data rate and other functional characteristics. This should also support the design of appropriate measures to ensure connectivity for public places and anchor locations (e.g. schools, hospitals, libraries, transport hubs and public administrations, community Internet access points in areas most severely affected by the Russia's full-scale war against Ukraine), as well as afford-ability measures for the most vulnerable users. In case if these measures have been adopted as part of the strategy for the development of the electronic communications sector of Ukraine 2030 in part of broadband connectivity or in other strategical document, NCEC will undertake the necessary implementing steps in consultation with the industry stakeholders.

Under the EU regulatory framework, market-driven rollout has priority as the means of ensuring the provision of broadband connections. If the market does not deliver the desired results, State aid measures (in accordance with State aid rules of Ukraine and the EU State aid rules for broadband networks – hereinafter – state-aid rules²⁸) can be taken into consideration and the provision of services under the universal service framework is intended as a tool to fill the remaining supply gaps and creation of attractive conditions for investment attraction.

This setting of priorities is provided for in the recital 229 of the EECC:

²⁸ <https://digital-strategy.ec.europa.eu/en/news/commission-adopts-revised-state-aid-rules-broadband-networks>

«The market has a leading role to play in ensuring availability of broadband Internet access with constantly growing capacity. In areas where the market would not deliver, other public policy tools to support availability of adequate broadband Internet access connections appear, in principle, more cost-effective and less market-distortive than universal service obligations, for example recourse to financial instruments such as those available under the European Fund for Strategic Investments and Connecting Europe Facility, the use of public funding from the European structural and investment funds, attaching coverage obligations to rights of use for radio spectrum to support the deployment of broadband networks in less densely populated areas and public investment in accordance with Union State aid rules.»

In the absence of state funds available for broadband deployment, an important role in restoring and expanding broadband infrastructure in Ukraine could be played by financial cooperation and support from international partners (e.g. OECD, World Bank, EBRD). Irrespective of the financing source – whether state aid or international donor funding – it is important to ensure

that it is supported by transparent and non-discriminatory assessment framework, in line with the key principles of the EU Guidelines on State aid for broadband networks (2023/C 36/01)²⁹. Another possible way to finance broadband deployment projects is to attract investment, and this can be facilitated by creating attractive conditions for such investment.

Radio frequency spectrum



Currently, the compensation mechanism in case of release or restriction of the use of previously allocated radio frequency spectrum, including its cost calculation and attraction of budgetary and/or extra-budgetary funds for this purpose and the compensation of costs

associated with the radio frequency spectrum conversion to special users with attraction of extra-budgetary funds, remains unclear. Therefore, in case of development of these compensatory mechanisms by the Ministry, NCEC will be involved in such activities.

Ensuring electronic communication networks resiliency in emergency situations, state of emergency and martial law



From the beginning of the Russia's full-scale invasion of Ukraine, one of the main NCEC's tasks was to keep Ukrainians connected. Coming from that, in 2023 within the framework of the EU project «Supporting the Digital Policy of Ukraine» together with NCEC experts and involved stakeholders and providers of electronic communication networks and services, the Report on Resilience plan for telecommunications networks of Ukraine» as well as the list of recommendations for both providers, public authorities and local authorities were developed³⁰. According to the decision of NCEC dated 31.05.2023 No. 221 «Report on technical assessment. The plan of resilience of telecommunications networks of Ukraine» (not publicly available) was taken into account and it was determined for the appropriate use of its results by the officials of NCEC during the development of relevant proposals aimed at increasing the stability of the functioning of electronic communication networks in Ukraine. An extract of the recommendations from the Report was made public for providers of electronic communications networks and services. Additionally, NCEC addressed Cabinet of Ministers of Ukraine with initiative to involve public and local authorities in the

implementation of the recommendations given in the Report. With this aim, NCEC prepared the relevant Action Plan on ensuring the resilience of electronic communications networks, which foreseen for the common work of various public and local authorities, providers of electronic communications services as well as addressed the Prime-Minister of Ukraine with initiative to prepare a draft legal act, by which the mentioned Action Plan will be adopted. Therefore, action 232 «**Development and submission to the Cabinet of Ministers of Ukraine of a draft order of the Cabinet of Ministers of Ukraine on the approval of a Action plan on ensuring the resilience of electronic communication networks**» was included in the Plan of Priority Actions of the Government for 2024³¹ for the implementation of which NCEC and other public authorities are determined.

When the document will be adopted, during next years, NCEC within its competence will focus on ensuring the implementation of the respective action plan, and therefore on practical steps to ensure electronic communication networks resiliency in emergency situations, state of emergency and martial law.

²⁹ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52023XC0131%2801%29>

³⁰ <https://portal.nkrzi.gov.ua/index.php?r=site/index&pg=533&id=10615&language=uk>

³¹ <https://www.kmu.gov.ua/npas/pro-zatverdzhennia-planu-priorytetnykh-dii-uriadu-na-2024-rik-137r-160224>

STRATEGY
PRIORITY

2

THE DEVELOPMENT
OF ELECTRONIC
COMMUNICATION
NETWORKS
AND THE
INTRODUCTION OF
THE LATEST RADIO
TECHNOLOGIES
TO ENSURE A
RESILIENT GIGABIT
BROADBAND
CONNECTIVITY



Cost-efficient deployment of Gigabit broadband infrastructure



NCEC in close cooperation with other responsible state authorities, Parliament and industry stakeholders has adopted a set of immediate measures during the ongoing Russia's full-scale war against Ukraine to support the highest possible levels of connectivity. These measures have been aimed at maintaining of electronic communication infrastructure and reducing the administrative barriers and the costs for its recovery and deployment, including in particular:

- The Law No. 2078-IX «On Amendments to chapter V «Final provisions» of the Law on Regulation of Urban Planning Activities»³² adopted in February 2022 simplifies access to the public land for deployment of mobile base stations, both under martial law conditions and during the post-war reconstruction.
- The Final provisions of Law No. 2240-IX «On Amendments to the Law of Ukraine «On Electronic Communications» regarding increasing the work organization efficiency of providers of electronic communication networks and/or services in martial law»³³, allows providers of electronic communication services to use radio equipment and radiating devices, including those imported from abroad, under simplified procedures, without compliance with the separate requirements of the Law of Ukraine «On Electronic Communications».
- The Law No. 2530-IX «On Amendments to some legislative acts of Ukraine regarding provision of conditions for the restoration and development of electronic communication networks» adopted in August 2022 canceled redundant administrative approvals for reestablishing communications after deoccupation of the Ukrainian territories³⁴.
- For the duration of the martial law in Ukraine and 60 days after its termination or cancellation, the amount of the periodic fee for access to infrastructure elements of electric power facilities is set at 1 kopeck per month³⁵ (from 01.01.2023 – 10 UAH per month)³⁶.

³² <https://zakon.rada.gov.ua/laws/show/2078-ix#Text>

³³ <https://zakon.rada.gov.ua/laws/show/2240-20#Text>

³⁴ <https://ips.ligazakon.net/document/t222530?an=1>

³⁵ <https://zakon.rada.gov.ua/laws/show/z0361-22#Text>

³⁶ <https://zakon.rada.gov.ua/laws/show/z1463-22#Text>



To the extent that administrative barriers to network deployment are still in place under the current martial law, NCEC will strive to reduce such burdens to help operators construct and extend networks more rapidly. Upon the conclusion of the Russia's full-scale war against Ukraine, NCEC within its competence will reassess the continued application of these measures during the ongoing process of restoring and constructing the new gigabit-enabled electronic communications infrastructure against the requirements of the Directive 2014/61/EU of the European Parliament and of the Council of 15 May 2014 on measures to reduce the cost of deploying high-speed electronic communications networks³⁷ (hereinafter – Broadband Cost Reduction Directive) and the

Regulation (EU) 2024/1309 of the European Parliament and of the Council of 29 April 2024 on measures to reduce the cost of deploying gigabit electronic communications networks, amending Regulation (EU) 2015/2120 and repealing Directive 2014/61/EU (GIA)³⁸, entered into force on 11 May of 2024 and will be fully applicable in November 2025³⁹.

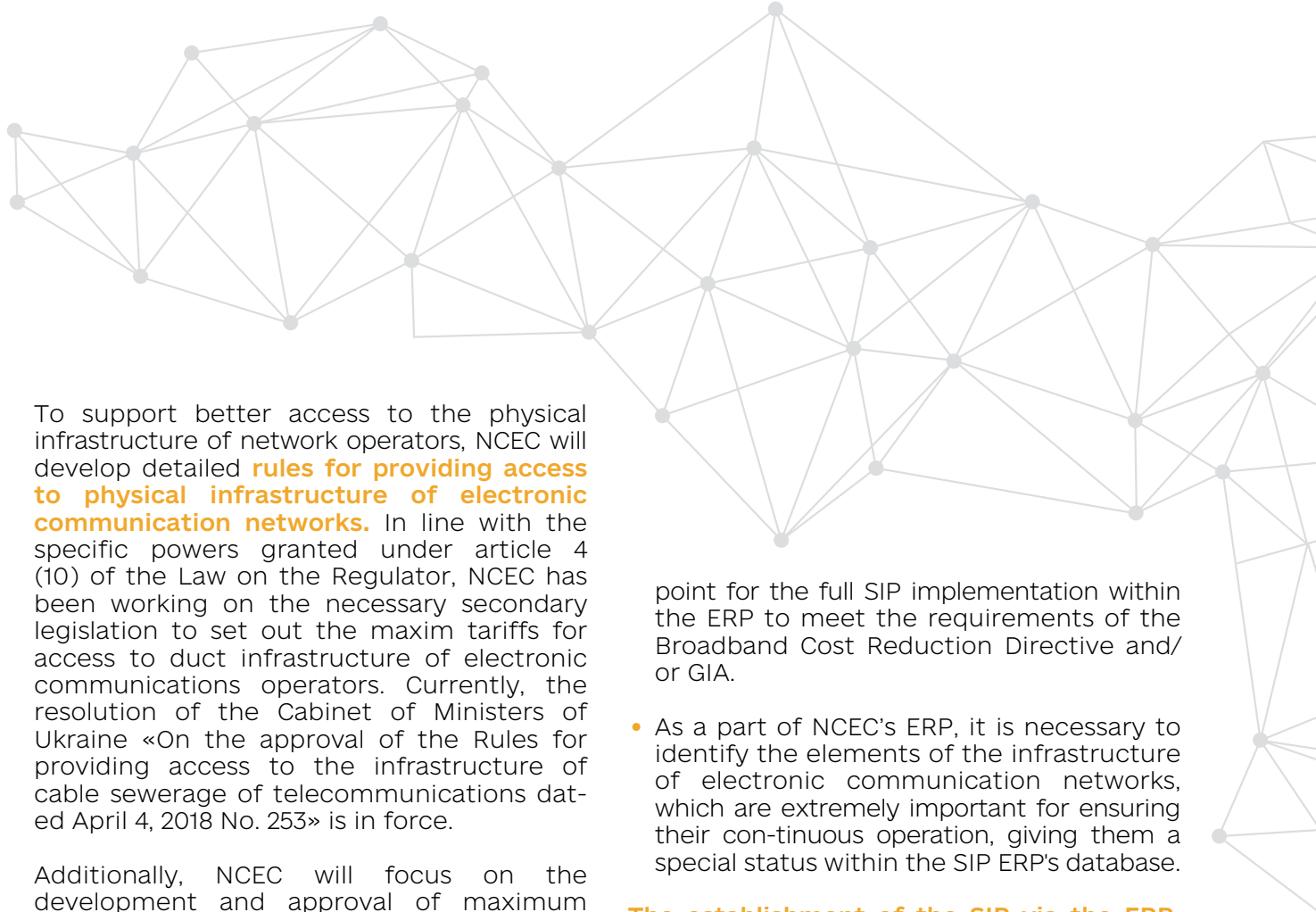
Where civil engineering infrastructure exists and is reusable, effective access to such infrastructure may significantly facilitate the network restoration and rollout. In this context, it is important to ensure that cost-efficient restoration of the damaged electronic communications networks is not obstructed by high level of infrastructure access fees.



³⁷ <https://eur-lex.europa.eu/legal-content/en/TXT/?uri=celex%3A32014L0061>

³⁸ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32024R1309>

³⁹ The EU-Ukraine Association Agreement contains obligations regarding the implementation of the Broadband Cost Reduction Directive). At the same time, it is worth analyzing and considering the possibility of implement-ing the provisions of the GIA as a new EU acquis, which repeals the specified Directive. In the case of making relevant changes to the Association Agreement or reaching an agreement with the EU to focus specifically on the GIA, this document should be read in the relevant parts through the lens of the GIA.



To support better access to the physical infrastructure of network operators, NCEC will develop detailed **rules for providing access to physical infrastructure of electronic communication networks**. In line with the specific powers granted under article 4 (10) of the Law on the Regulator, NCEC has been working on the necessary secondary legislation to set out the maximum tariffs for access to duct infrastructure of electronic communications operators. Currently, the resolution of the Cabinet of Ministers of Ukraine «On the approval of the Rules for providing access to the infrastructure of cable sewerage of telecommunications dated April 4, 2018 No. 253» is in force.

Additionally, NCEC will focus on the development and approval of maximum tariffs for the provision of electronic communication networks cable ducts.

As for physical infrastructure access, according to article 8 of the Law «On Electronic Communications», NCEC should also act as a single information point (SIP) regarding available physical infrastructure owned by electronic communications network operators through the ERP. In implementing this task, NCEC will take into account of best practices of the EU Member States recommended as part of the Connectivity Toolbox⁴⁰, and GIA.

In the medium term, NCEC will need to assess (if necessary, together with other relevant bodies) the full scope of the SIP within the ERP to ensure the full benefits of the broadband cost reduction measures (from longer-term measures perspective), but in the short term, in preparation for the emergency reconstruction phase of infrastructure investments, the following actions should be undertaken:

- To ensure that all new emergency reconstruction infrastructure elements are registered in a database containing details (for each asset) of the funding source, technical function and purpose, geographical location, ownership and operation. This is the expected starting

point for the full SIP implementation within the ERP to meet the requirements of the Broadband Cost Reduction Directive and/or GIA.

- As a part of NCEC's ERP, it is necessary to identify the elements of the infrastructure of electronic communication networks, which are extremely important for ensuring their continuous operation, giving them a special status within the SIP ERP's database.

The establishment of the SIP via the ERP, as well as the analysis of information that will be accumulated in this way, can be as a fundamental part for coordination and monitoring of infrastructure investment projects. For all new investments, this involves:

- Expanding the scope of transparency requirements to owners of physical infrastructure in other sectors beyond electronic communications, as well as public institutions and local authorities;
- Facilitating the coordination of planned civil works among electronic communications network operators, as well as with other industry sectors;
- Ensuring that existing physical infrastructure and planned civil works information from different sources (e.g. competent national authorities at any level, public sector bodies and network operators) is made available via the SIP and to the extent possible, in electronic format and via one single data portal;
- Implementing a broadband mapping system that will cover availability of both passive infrastructure as well as service availability.

⁴⁰ <https://digital-strategy.ec.europa.eu/en/policies/connectivity-toolbox>

5G introduction and rollout



The spectrum assignment procedures and commercial launch of 5G services in Ukraine were delayed due to several factors. First, since the 4G spectrum auction procedures were conducted only in 2018, the Ukrainian mobile network operators still have been focused on 4G deployment and expansion of network coverage into rural areas. Furthermore, since the calculation of electromagnetic compatibility with radioelectronic means of special users in the 3.6 GHz range has not been completed and the sources of financial compensation for the spectrum release by broadcasting companies in the 700 MHz range has not been defined, in August 2021 the Cabinet of Ministers of Ukraine amended the implementation plan for the introduction of 5G⁴¹ postponing the commercial launch of 5G networks to 2022. These plans have been further delayed with the outbreak of the Russia's full-scale invasion of Ukraine on 24th February 2022.

Several emergency spectrum management measures adopted during Russia's full-scale war against Ukraine have been focused on maintaining uninterrupted connectivity for the existing 2G, 3G and 4G mobile services, including:

- National roaming among the three mobile network operators enabling access to voice, SMS and data transmission services at 2G and 3G basic data rates, without changing SIM cards or applicable tariff plans⁴²;
- Automatic extension of validity of the spectrum licences and numbering resource authorisations for the period of the martial law in Ukraine and within six months after its termination⁴³; and
- Temporary assignment free of charge of the available spectrum in the 2 GHz band for 3G and 4G services to prevent congestion of mobile networks during the forced migration of mobile subscribers to the Western regions of Ukraine⁴⁴.

Provision of sufficient spectrum in the 700 MHz and 3,6 GHz, bands remains a key prerequisite for the implementation and deployment of 5G networks

⁴¹ <https://www.kmu.gov.ua/npas/pro-vnesennya-zmin-do-planu-zahodiv-shchodo-vprovadzhennya-v-ukrayini-sistemi-ruhomogo-mobilnogo-zvyazku-pyatogo-pokolinnya-930-040821>

⁴² <https://nkrzi.gov.ua/index.php?r=site/index&pg=99&id=2262&language=uk>

⁴³ <https://itd.rada.gov.ua/billInfo/Bills/Card/39857>

⁴⁴ <https://nkrzi.gov.ua/index.php?r=site/index&pg=99&id=2250&language=uk>

Making available a sufficient amount of harmonised spectrum, in particular in the 700 MHz and the 3.6 GHz bands, remains a key prerequisite for the introduction and deployment of 5G networks in Ukraine.

NCEC will also consider the possibility of introducing technological neutrality for the use of both 4G and 5G in the frequencies 2100 MHz, 2300 MHz, and 2600 MHz.

As spectrum in the 694–790 MHz and 790–862 MHz frequency range is still used by TV broadcasting services and also by the Ministry of Defence of Ukraine, one of the key priorities is **to ensure release of these frequencies** in coordination with the National Council of Ukraine for Television and Radio Broadcasting, MDTU and the Ministry of Defence of Ukraine.

In deciding on the appropriate award mechanism for 5G spectrum, NCEC will assess the effectiveness of the emergency spectrum policy measures, such as temporary spectrum assignments that have been carried out during the war, and how these measures may be retained or evolved to stimulate network restoration and investment towards affordable and universal broadband connectivity.

In this context, NCEC will analyse relevant experience of the EU Member States that applied different forms of incentives in their recent spectrum awards to stimulate network rollout and coverage, including:

- Assignment of spectrum on temporary basis without an auction, but possibly subject to network rollout and commercial launch commitments (e.g. the approach used during the COVID-19 pandemic in Belgium, Ireland and Iceland);
- A possibility for mobile operators to offer commitments to invest in coverage and network rollout instead of purely financial bidding (e.g. the approach used for the 800 MHz spectrum award in Sweden);
- A reduction of the reserve price for spectrum blocks with increased coverage requirements (e.g. the award of the 800 MHz spectrum in Slovenia and the 700 MHz spectrum in Sweden);
- A possibility to receive discount on the spectrum fees in exchange for accepting additional obligations to cover underserved areas (e.g. the approach used in Austria, Denmark and Norway);

- An option to pay the spectrum award fees in installments instead of high upfront payments (e.g. the 5G multiband spectrum auction in Greece offered winning bidders a possibility to pay upfront 30% of the licence fees with the remaining 70% paid in nine annual installments).

Following this assessment and in consultation with the industry and other stakeholders, NCEC will decide on the appropriate spectrum award format for 5G, including the possibility to combine various financial incentives with network coverage obligations to facilitate quick 5G network rollout and coverage of underserved areas, specific social anchors (e.g. schools, universities, hospitals, libraries) and transport infrastructure.

Taking into account the market situation and based on a forward-looking assessment of the competitive conditions, as envisaged in article 52(2) EECC, NCEC will also assess whether additional procompetitive measures could be justified, such as attaching to new spectrum licences specific obligations with regard to wholesale access in the form of national roaming, colocation or MVNO access. The implementation of regulatory measures following such an assessment should be carried out in consultation with the market stakeholders.

As part of the assessment of the 5G spectrum licensing mechanism, NCEC will also analyse the possibility and expediency of **issuing regional licenses (similar to licensing schemes for the 3.5 GHz applied in Austria, Ireland and Croatia).**

as well as local licenses for private and industrial 5G networks. Examples of industrial 5G networks include factory automation, business parks, local networks in ports or airports, connected cars or agricultural projects. Several European countries have already issued or considered issuing local licenses for industrial users in the 3.4-3.8 GHz (Germany, Sweden), the 3.8-4.2 GHz (Belgium, Denmark, France and the United Kingdom) and the 26 GHz (Austria, Denmark, Finland, Spain). Such licensing mechanisms may offer the possibility to launch local 5G networks even while the full spectrum is not yet available on the national scale.



The deployment of small cells has been a critical part of the 4G network upgrades and expansion but will become even more critical in 5G networks because of the introduction of higher spectrum bands that necessitate denser network deployments to support larger traffic volumes per unit area.

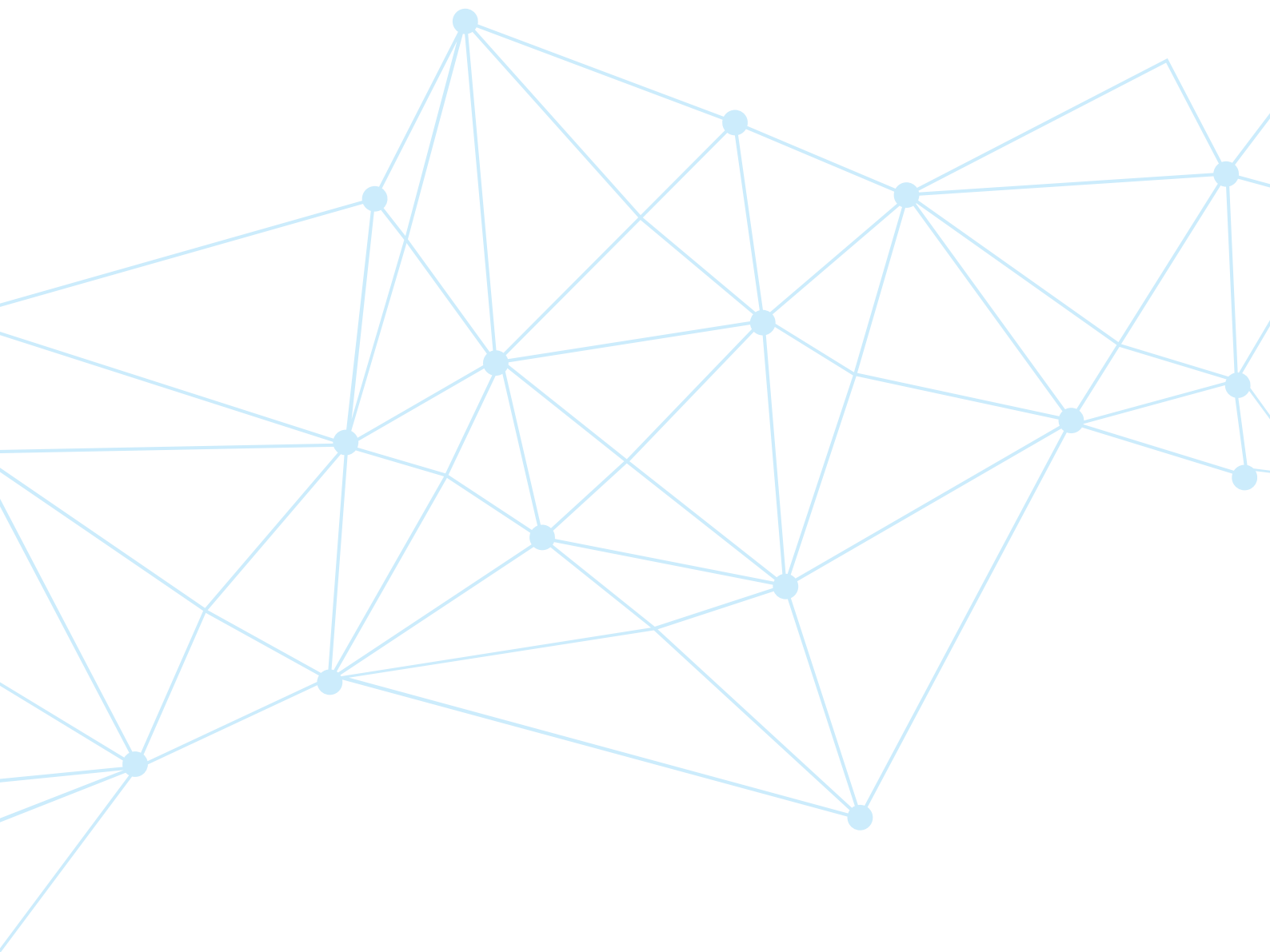
To support the deployment of 5G networks, article 57 of the EEC introduced a light deployment regime for small area wireless access points. In particular, such deployment cannot be subject to any specific administrative fees. Also, the deployment of the small area wireless access points which comply with the EU harmonized characteristics set out in the Commission Implementing Regulation (EU) 2020/1070 of 20 July 2020 on specifying the characteristics of small area wireless access points pursuant to Article 57 paragraph 2 of Directive (EU) 2018/1972 of the European Parliament and the Council establishing the European Electronic Communications Code⁴⁵ cannot be subject to individual town planning permits or other individual prior permits.

As the Law of Ukraine «On Electronic Communications» does not provide legal basis for such a light deployment regime for small cells, NCEC will consider possibility to prepare regulations **setting out the physical and technical characteristics** (maximum size, weight, emission power, visual impact) **of small cells falling under the light-touch regime** based on the EU rules. Account will be taken of the European Commission's 2022 review of small cells implementation experience in the EU Member States⁴⁶ such that when 5G licenses have been awarded, efficient and timely deployment can take place in the light of the best European practices.

⁴⁵ https://eur-lex.europa.eu/eli/reg_impl/2020/1070/oj

⁴⁶ <https://digital-strategy.ec.europa.eu/en/library/commission-report-status-implementing-rules-small-cells-5g-deployment>





STRATEGY
PRIORITY

3

SHARING
EXPERIENCE OF
UKRAINE AS A
ROLE MODEL
IN THE FIELD
OF ELECTRONIC
COMMUNICATIONS



Global lessons in resilience, effective cooperation and timely decision-making



The unprovoked and unlawful full-scale Russia's of Ukraine has caused considerable destruction and damage to electronic communications infrastructure. This massive destruction has been a result of deliberate assaults designed to keep Ukrainian citizens without communication means, isolated from true information about the course of the Russia's full-scale war against Ukraine, as well as for spreading enemy's fakes and propaganda. However, Ukraine's electronic communications sector has shown great resilience in the waretime, with broadband networks being defended, maintained and used even under attacks.

This resilience can be attributed to several key factors, with one notable distinction being the **effective cooperation between public and private sector** that ensured that decisions concerning communications resilience were swiftly made in the initial days and weeks of the Russia's full-scale invasion of Ukraine as well as decisions aimed at solving problems faced by providers of electronic

communication networks and services. It is impossible to overestimate the role and overexertion of electronic communications network and service providers and their personnel in keeping Ukrainians connected.

The role of NCEC as the regulatory authority in the wartime (martial law) or emergency situations is to facilitate connectivity for all citizens and assistance in restoring networks. From the first days of the Russia's full-scale invasion of Ukraine, NCEC contributed to establishing collaboration between the providers of electronic communications networks/services and government authorities, demonstrating six core elements of good governance in a crisis: collaboration, transparency, effectiveness and efficiency, enablement and innovation in its decision-making.

These good practices, which are further discussed below, place Ukraine in a position of a role model for other countries and a source of inspiration for the operators worldwide in terms of improving network resilience.



Collaboration

- NCEC established regular dialogue with all relevant stakeholders: the providers of electronic communications networks, MDTU, the State Service of Special Communications and Information Protection of Ukraine (SSSCIP), National Center for operational and technical management of telecommunications networks (NCU), Association of operators «Telas» and other associations to make quick decisions and solutions to ensure the proper functioning of the electronic communications sector.
- Regular meetings with operators with participation of responsible state authorities that were set up by NCEC since the first days of the Russia's full-scale invasion of Ukraine war became a reliable platform for prompt discussion and decision making in the context of ensuring resilience of the networks in wartime.

Transparency

- As the administration of electronic communications networks under martial law in a war-time has been assumed by NCU, NCEC has ensured that industry stakeholders are promptly informed of the NCU decisions through the NRA's website and via direct correspondence.

Effectiveness and efficiency

- NCEC jointly with NCU, MDTU and the three mobile operators: Kyivstar, Vodafone Ukraine and lifecell, facilitated the implementation of the national roaming for voice, SMS and data services at 2G and 3G. National roaming became functional in less than two weeks after the outbreak of the Russia's full-scale invasion of Ukraine, enabling connectivity in the most affected areas. At a later stage, the national roaming was extended nationwide and has been used ever since then by more than 900,000 subscribers on a daily basis.
- NCEC facilitated implementation of free international roaming for Ukrainian people flee-ing from the Russia's full-scale war against Ukraine to the EU. In just 1.5 weeks after the first official meeting between the European Commission and Ukrainian stakeholders, three Ukrainian and 24 European operators agreed on roaming connectivity in support of refugees from Ukraine – Joint Statement. After several prolongation (with active participation and facilitation of NCEC), Joint Statement is still in force till 9 July 2024 and probably will prolong further. With this aim, NCEC works closely with the responsible Directorate of the European Commission as well as NCEC jointly with BEREC recently conducted monitoring of implementation of the Joint Statement on roaming (the relevant BEREC report was published on the beginning of June 2024).
- NCEC voluntarily coordinated the need for electronic communication equipment that was damaged or destroyed. It has been collecting the operators' needs for fast repair of damages from the first weeks of the Russia's full-scale invasion of Ukraine. As a result of these NCEC's efforts, the Ukrainian mobile operators received 3,400 items of equipment as a donation from one EU operator in 2022, as well as 1,100 items of equipment from other EU operators in 2023 (with support of Swedish Post and Telecom Authority – PTS). Furthermore, NCEC also actively worked with the European Commission, BEREC, NRAs and other donors – either foreign operators or suppliers – to find solutions for providing necessary electronic communications equipment.

Enablement

- On the NCEC's proposal, in order to prevent congestion of RAN networks during the forced migration of subscribers to the Western regions of Ukraine, mobile operators were granted temporary additional spectrum assignments of available free frequency bands for 3G and 4G services.
- In a similar move, NCEC ensured automatic extension of validity of the spectrum licenses of the mobile network operators for the period of the martial law in Ukraine and within six months after its termination.
- Further initiatives to enable uninterrupted network operations and speedy re-establishment of the damaged or destroyed infrastructure included affordable access to essential electric power facilities, simplified procedures for access to the public land for deployment of mobile base stations and re-establishing communications after de-occupation of the Ukrainian territories.
- On NCEC's recommendation, NCU allowed all categories of users to utilize subscriber satellite terminals of the SpaceX Starlink system. The priority users authorized for the Starlink system included the de-occupied cities/villages where mobile connections have been almost destroyed, as well as other key public facilities such as schools, hospitals, municipalities, fire departments, financial institutions and energy plants. As a result, Ukraine has now unique experience of using Starlink with around 47,000 terminals as of May of 2024 (based on data from MDTU).

Innovation

- NCEC facilitated the use of new types of communications equipment and devices through a regulation on the register of radio equipment and radiating devices. This regulation opened the way for introduction of new radio equipment into Ukraine, which is necessary to restore and maintain stable operation of networks.
- NCEC ensures continuous innovation and evolves existing measures to keep citizens connected during the Russia's full-scale war against Ukraine.



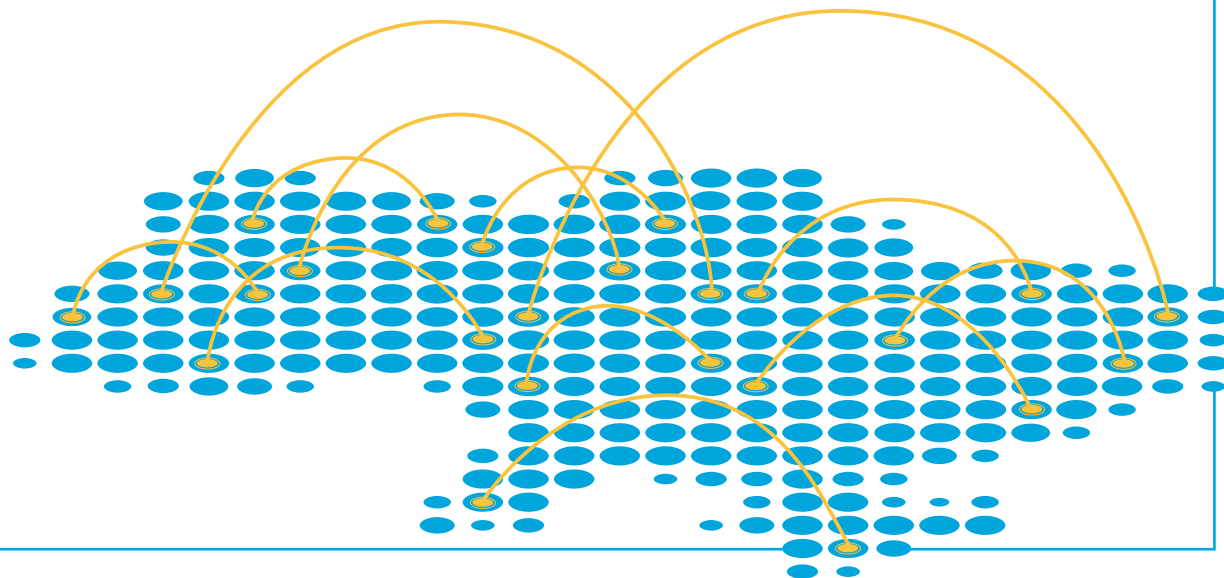
Planning for the future, together

In March 2022, to accelerate the plans for recovery, NCEC applied for support to the EU Delegation to Ukraine to assess the damages and to provide practical recommendations aimed at further increasing stability and resilience of the electronic communication network (whilst supporting Ukraine's alignment to relevant EU policies, regulations, standards and ethics). As it was already mentioned above as a result within the framework of the EU project «Supporting the Digital Policy of Ukraine» together with NCEC experts and involved stakeholders and providers of electronic communication networks and services, the Report on Resilience plan for telecommunications networks of Ukraine» together with the list of recommendations for both providers, public authorities and local authorities were developed as well as NCEC prepared the relevant action plan to ensure the stability of electronic communication networks, which was included in the Plan of Priority Actions of the Government for 2024 (action 232)⁴⁷. Currently, NCEC is consulting a draft order of the Cabinet of Ministers of Ukraine on the approval of a corresponding plan of measures to ensure the stability of electronic communication networks with relevant public authorities.

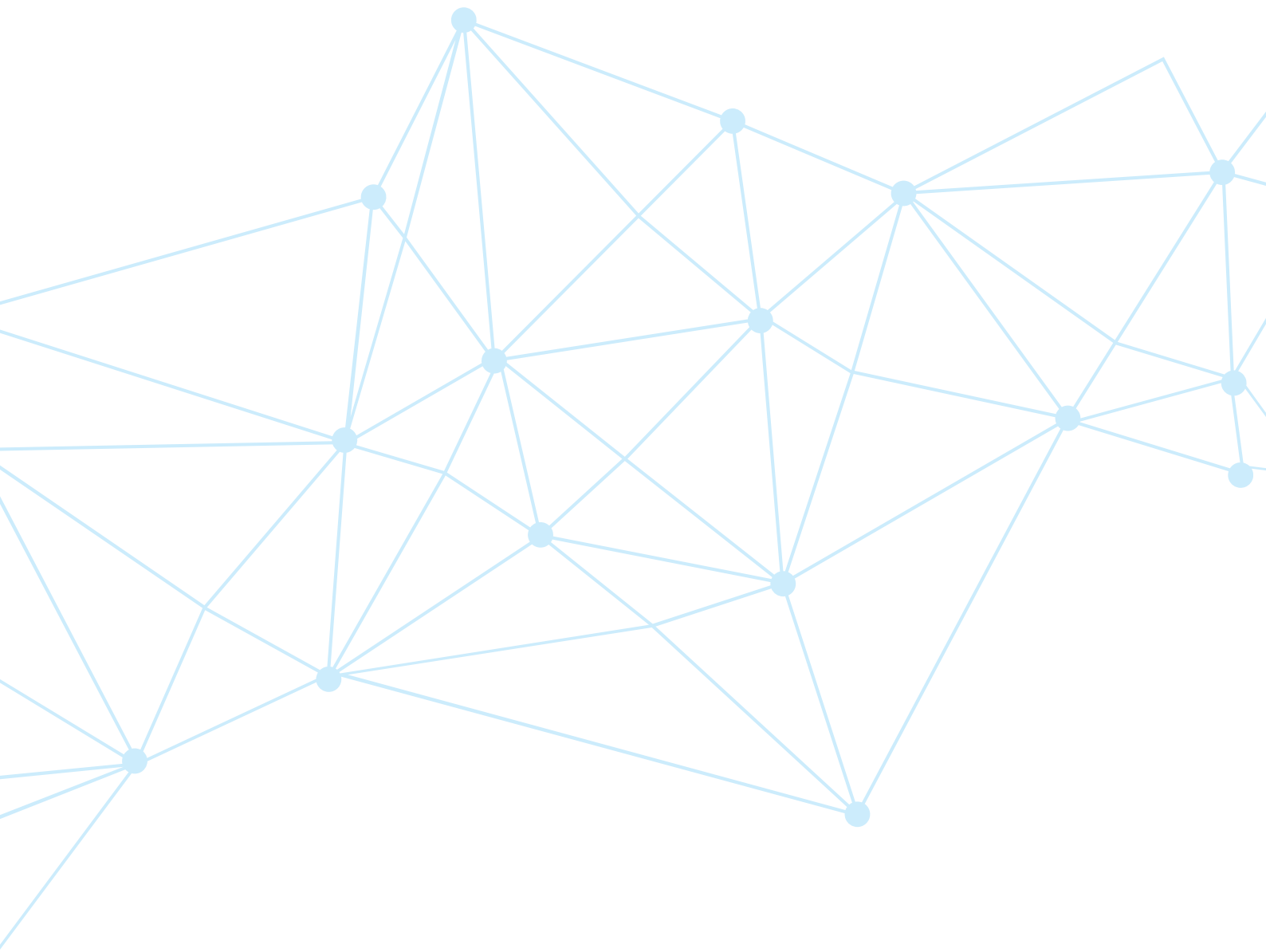
In order to assess the losses and damages to the electronic communication sector, as well as the funding required for the full restoration of electronic communications networks, NCEC in cooperation with MDTU developed a methodology for calculating CAPEX losses of the operators as a result of the continued armed aggression against Ukraine.

Ukraine's unique experience in handling the challenge of continued connectivity during Russia's full-scale war against Ukraine highlights several examples of good regulatory practice and well-coordinated efforts by the electronic communications sector and state authorities, as identified above.

It also demonstrates that the wellbeing of the population and the protection of the economy and society is best served by designing electronic communication networks with built-in resilience and protection against damage, from natural causes as well as war.



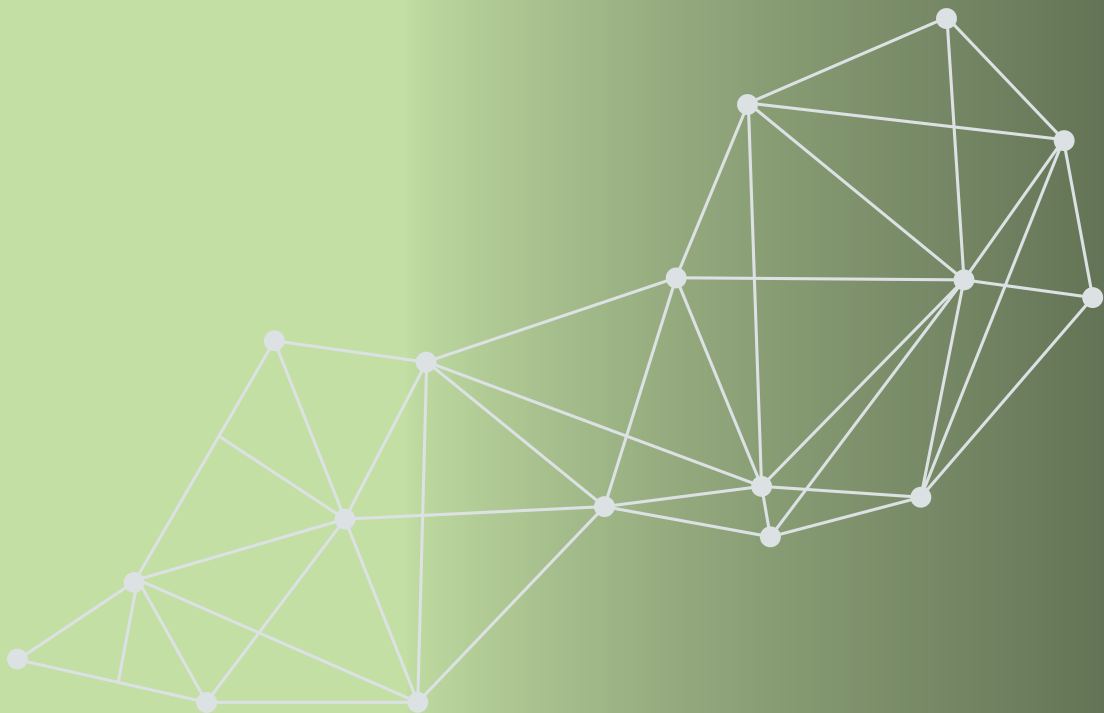
⁴⁷ <https://www.kmu.gov.ua/npas/pro-zatverdzhennia-planu-priorytetnykh-dii-uriadu-na-2024-rik-137r-160224>



STRATEGY
PRIORITY

4

DEVELOPMENT OF
INTERNATIONAL
COOPERATION
AND
INTERNATIONAL
TECHNICAL
ASSISTANCE
PROJECTS



Ensuring the fulfilment of NCEC's powers, especially during the Russia's full-scale invasion of Ukraine, in terms of supporting regulatory cooperation in the fields of electronic communications and radio frequency spectrum with the Body of European Regulators for Electronic Communications (BEREC), other relevant institutions of the European Union, national regulatory authorities of other states, other foreign and international organizations became one of the priority tasks.

In the conditions of constant violation of international law and treaties on the part of the aggressor state, NCEC, within the limits of its powers, takes measures for international coordination and protection of radio frequency assignments of Ukraine in terms of general users, ensures international protection of numbering resources assignments, as well as condemned actions of the aggressor state within international and regional sectoral organizations.

At the same time, NCEC cooperates with partners to attract international assistance to recover electronic communication networks and provide the population of Ukraine and foreigners who visit Ukraine with high-quality electronic communication services under any conditions.

As it already noted in the description of strategic priority 1: Alignment of the legislation in the field of electronic communications with the EU acquis for integration into the EU Digital Single Market, NCEC ensures the successful implementation of measures to fulfill Ukraine's European integration obligations.

These and many other tasks of NCEC foresee and require the deepening and strengthening of international cooperation, as well as the involvement of international technical assistance.

NCEC sees such cooperation at least according to the following vectors:

Cooperation with the Body of European Regulators for Electronic Communications (BEREC) and the Radio Spectrum Policy Group (RSPG)



The main areas of cooperation, on which NCEC will focus, will be the involvement of the best European practices in the regulation of electronic communications and radio frequency spectrum during European integration and ensuring close integration into the EU Single Digital Market, representing the interests of Ukraine in the development of new EU policies in the fields of electronic communications and radio frequency spectrum.



Cooperation with international organizations and institutions



International organizations and institutions with which NCEC develops cooperation include, in particular, the International Telecommunication Union, the European Conference of Communications Administrations, GSMA, the Organization for Economic Cooperation and Development (OECD), the OSCE, the EBRD and the World Bank. The main goals of this cooperation are to ensure the protection of the interests of the fields of electronic communications and radio frequency spectrum of Ukraine, in particular in terms of international coordination and protection of radio frequency assignments of

Ukraine in terms of general users, ensuring international protection of numbering resources assignments, attraction of investments and international assistance for the recovery and construction of new electronic communication networks, planning activities for capacity building and development of the Ukrainian fields of electronic communications and radio frequency spectrum, protection of national interests of Ukraine as well as condemned actions of the aggressor state at the global international level.



Bilateral cooperation



Bilateral cooperation of NCEC with national regulatory authorities of foreign states, including EU Member States, and its development will ensure the implementation of international coordination and protection of radio frequencies assignments of Ukraine in terms of general users and international protection of numbering

resources assignments, as well as promote sharing regulatory experience in the field of electronic communications, ensuring resiliency and sustainability of electronic communication networks, radio frequency spectrum management, providing consumers with high-quality and affordable electronic communication services etc.



Involvement and implementation of technical assistance projects



The main goal of involving and implementing international technical assistance is the most effective implementation of the priority areas defined above, learning the best practices of EU acquis implementation into national legislation and law enforcement at the national level, protecting the rights

of electronic communication services consumers, developing competition in the electronic communications market, etc. introduction of regulatory obligations in the markets of electronic communications, where the competition is distorted, etc.

STRATEGY
PRIORITY

5

NCEC'S
INSTITUTIONAL
CAPACITY
BUILDING



In order to ensure that the NCEC exercises its powers defined by the legislation of Ukraine in the field of electronic communications and radio frequency spectrum, as well as to ensure effective integration into the EU Single Digital Market, NCEC shall take measures to increase its institutional capacity, in particular the following:

- providing the Regulator with funding at a sufficient level;
- providing the Regulator with human resources and creating a relevant organizational structure;
- taking measures aimed at increasing NCEC's visibility and transparency.

This also includes the dynamic approximation of sectoral national legislation in Ukraine, taking into account the evolution of EU legislation and international best practices to ensure a predictable, transparent, and favorable regulatory environment, including for investments, and further actions necessary for the development of new Gigabit infrastructure in the long term.

MONITORING AND REVIEW

NCEC shall monitor the implementation of the strategic priorities outlined in this document and the respective action plan, which will be developed in order to implement strategic priorities in practice, and report annually on the progress achieved. To ensure that the NCEC strategic priorities remains relevant

and aligned with future developments, NCEC will revisit its strategic priorities over the course of the period when it is necessary and taking into account further developments on the market and national circumstances, other objective reasons as well as consultations with stakeholders.

NON-FULFILMENT RISKS

Among the main risks that can affect the non-fulfilment or incomplete fulfilment of strategic priorities are the Russia's full-scale invasion of Ukraine, absence or insufficient funding of

NCEC's activities, the existing gaps in legislation, in particular, those aimed at the fulfilment of the indicated strategic priorities, and efficiency of their elimination in current circumstances.

POLICY AND REGULATORY IMPLICATIONS OF SETTING BROADBAND TARGETS IN HARMONISATION WITH THE EU DIGITAL DECADE CONNECTIVITY GOALS

Ukraine's current national policy targets for electronic communications (as contained in the 'National Economic Strategy 2030, approved by the Cabinet of Ministers of Ukraine by Resolution No. 179 of 3 March 2021⁴⁸) contains a set of goals which do not provide full Gbit connectivity.

It is expected that the relevant goals will be part of the strategy for the development of the electronic communications sector of Ukraine 2030.

In order for Ukraine to fully integrated at policy and implementation levels with the EU, the adoption of the EU's Digital Decade targets is a necessary prerequisite for the effective implementation (including the necessary financing and investments) of a fully enabled digital future, fully exploiting modern fixed and mobile electronic communication networks and services.

This Annex outlines the main policy, investment, funding and regulatory implications of adopting the EU's Digital

- 1 Where will the investment funds come from to meet the necessary infrastructure needs of a fully Gbit connected society?
- 2 How does Ukraine ensure that the investment funds are used efficiently?

- 3 When every household and person can be connected, will everyone be able to afford service?

Decade goals in Ukraine. The key questions that this Annex seeks to answer are:

The answers to Question 1 will include an examination of how private and state investment can be used (both types of investment are expected to employ very significant levels of external (international) funding following the end of the Russia's full-scale war against Ukraine).

The answers to Question 2 include the regulatory implementation of the Broadband Cost Reduction Directive and also the creation and implementation of a set of 'state-aid' rules. This question regarding the efficient use of investment funds will be particularly relevant, given that the inflow of external (international) funding is expected to be very significant at the end of the Russia's full-scale war against Ukraine. The external funders' confidence in Ukraine's ability to implement effective infrastructure schemes will be considerably enhanced if the relevant EU measures (BCRD and the EU State aid rules for broadband networks) will be implemented in Ukraine.

The answer to Question 3 includes the consideration of a change to the role of 'universal service' policies in electronic communications away from direct state-subsidies (as at present) towards a 'safety-

⁴⁸ <https://zakon.rada.gov.ua/laws/show/179-2021-n#Text>

net' provision of basic services targeted at those citizens that cannot afford the tariffs prevailing in a fully competitive market with universal fixed and mobile Gbit connectivity.

Gbit broadband connectivity everywhere is a key «Digital Decade» policy in the EU and as such this policy is expected to become a key prerequisite for implementing the future strategy for the development of the electronic communications sector of Ukraine 2030.

The primary role in establishing policy and ensuring that the sector operates effectively is with the Ministry, with the implementation and market enablers being the primary responsibility of NCEC. Much of the investment decision-making will involve the private sector market players, within the overall context of an effective (and soon EU compatible) policy, legal and regulatory framework for the electronic communications sector. NCEC therefore plays a vital role, not only as guardians of the regulatory framework,

but also as the link between private sector investment interests and government policy.

NCEC should therefore be involved in a wide range of aspects together with the Ministry and the sector operators involving the design and operation of the necessary systems and procedures for:

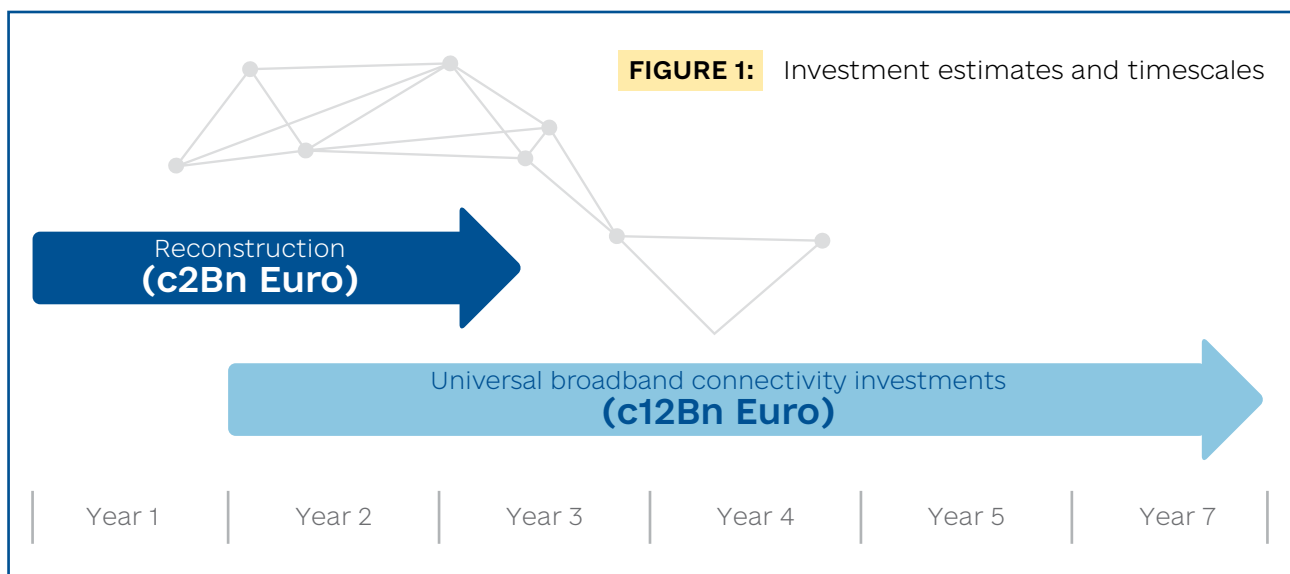
- the coordination of investment projects
- ensuring funding is linked explicitly with investment to achieve Ukraine's Gbit connectivity goals
- the justification rules for state participation ('state-aid rules')
- broadband investment effectiveness (Broadband Cost Reduction Measures)
- the implementation of the required transition to a 'safety net' of basic broadband service provision ('universal service').

How much full Gbit broadband connectivity cost?

Much of the investments projects required (in FTTx networks and 5G mobile coverage) to enable all premises and persons to be high-speed broadband-connected throughout Ukraine will be carried out by the private sector operators. In theory, there are two factors which restrict the private sector from fully achieving the Digital Decade goals within the required timeframe (this is 2030 for EU countries).

- 1 The lack of commercial (profit-related) incentive to invest in infrastructure in geographical locations where operators can make their required rate of return on investment
- 2 The lack of sufficient funds being available

The cost of establishing universal broadband coverage in Ukraine falls into two main categories, as illustrated below:

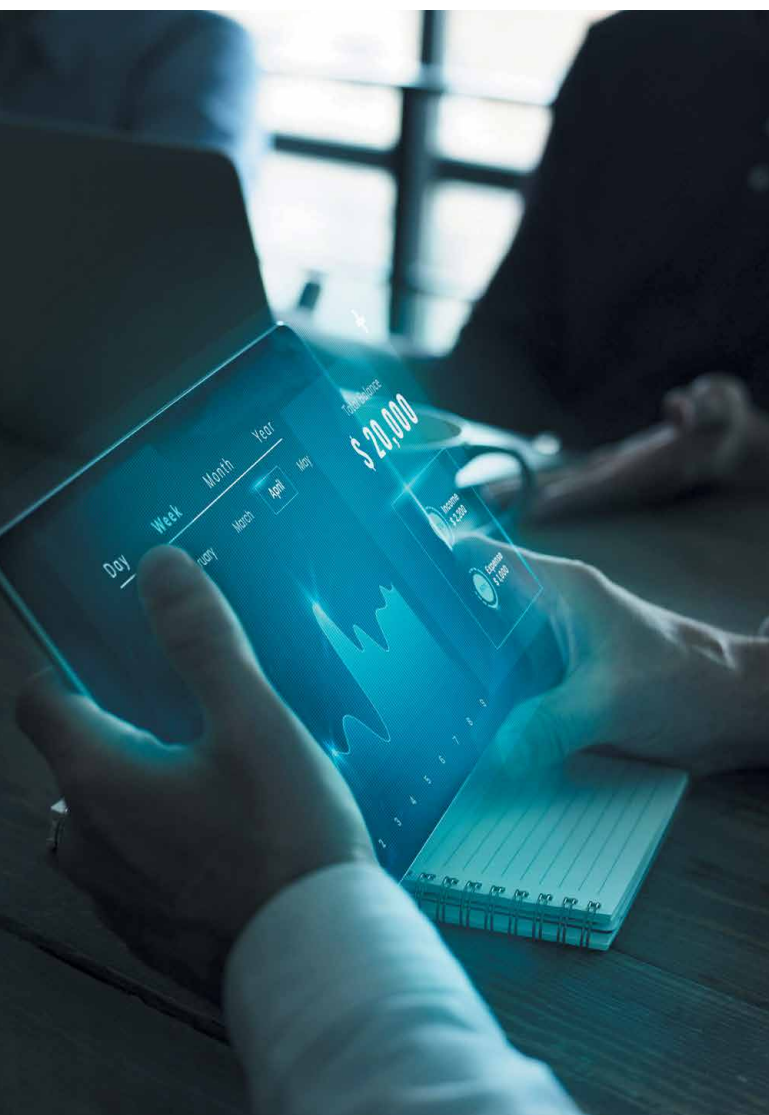


The cost of the emergency reconstruction programme has been estimated by ITU in 2022 as \$1.79bn (Euro 1.64Bn⁴⁹).

In order for Ukraine to harmonise with the EU broadband connectivity policies and targets, it is estimated that Ukraine would require a further Euro 12.1Bn⁵⁰ of infrastructure investments over the period up to 2030. This figure for Ukraine is based on the EU estimate of 137Bn Euro⁵¹ and adjusting (pro-rata) for the differences between the EU and Ukrainian population forecasts for 2030 (EU 2030 forecast population 468m vs. Ukraine 2030 population 41.5m).

The EU estimate of **137Bn** assumes additional FTTX investments, taking account of the re-use of existing infrastructures and the savings arising from implementation of the Broadband Cost Reduction Directive or GIA.

Where will the investment finance come from?



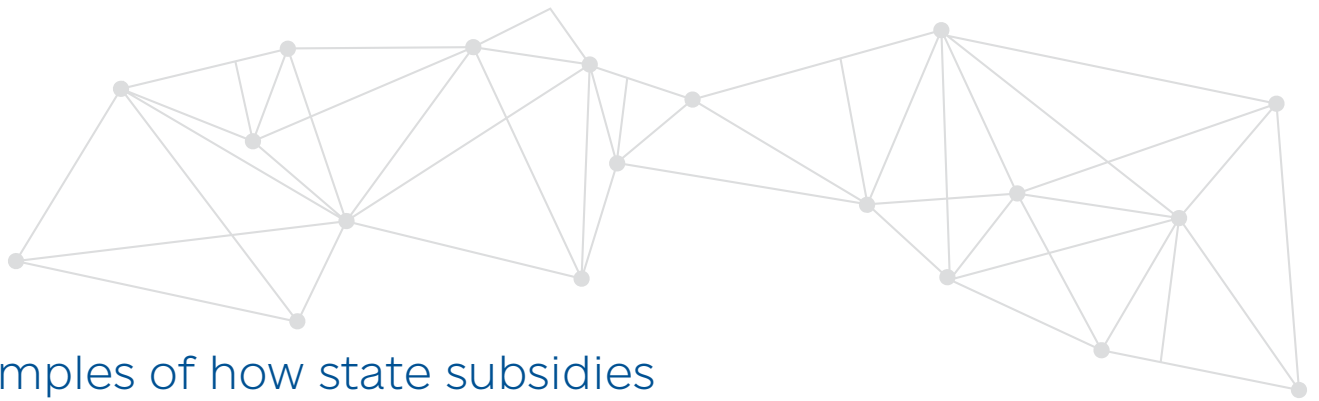
In order for Ukraine to achieve broadband connectivity targets aligned with the EU and within a target period set by the Ukraine government, it is fully expected that a large proportion of the necessary investment funding will originate from outside Ukraine in the form of grant or loan financing. To set the scene for the overall approach to the funding of investments for the achievement of full Gbit connectivity throughout Ukraine, the approach used in the EU is summarised below:

- The EU fully expects the majority of investments in infrastructure of electronic communication will continue to be made using private investments by operators within an open and competitive market.
- The achievement of the EU's ambitious broadband connectivity targets is unlikely to take place within the required timescales without some degree of state subsidy. The required state aid could take several forms:
 - Supply-side measures including direct state investments in infrastructure, joint investments between the state and the private sector, the direct award of subsidies to the private sector or a combination of several types of measure;
 - Demand-side measures including the issuing of vouchers to consumers that can be used to purchase broadband services more cheaply or the regulation of 'social tariffs' to ensure that disadvantaged households can afford broadband services.

⁴⁹ Using an exchange rate of 1.09 Euro/USD on 15th May 2023

⁵⁰ This is based on a prorata fraction (EU 2030 forecast population 468m vs. Ukraine 2030 population 41.5m) using the EU estimate of Euro 137Bn (additional FTTX investments taking account of the re-use of existing infrastructures and the full implementation of the Broadband Cost Reduction Directive) Ukraine Gbit/sec infrastructure cost = $137 \times 40/500 =$ Euro 12.1Bn

⁵¹ <https://www.prysmiangroup.com/staticres/nexst-2017-2/article-1.html>



Examples of how state subsidies are used to achieve 'Digital Decade' Gbit full connectivity



As it has already been estimated (see above) that achieving full Gbit connectivity in Ukraine will cost around 12Bn Euro. This amount for Ukraine is based on estimates already made for the entire EU and adjusted to a figure for Ukraine's population size relative to the EU in 2030. As in the EU, it can be expected that the main investments in Ukraine will be by the private sector operators using their own financial funding enhanced substantially by their access to external and international funding sources.

In the EU, where there is expected to be a shortfall in the investments by the private sector, then state subsidies (funding by individual EU Member States' governments) have an important role to play⁵². The sources of this state funding can be from the state budget and if necessary, topped up by external and international funding sources. The primary role of state funding is to facilitate the provision of network infrastructures in geographical areas where the private sector operators are not planning to invest within the target timescale. The mechanisms to achieve infrastructure connectivity in these so-called 'white areas' can vary. Examples are:

- Direct investment and ownership of infrastructure by the state:
 - In local access (last mile) infrastructures (where suitable Gbit capable backhaul infrastructure already exists)
 - In backhaul connecting to white areas, leaving the local access (last mile) connectivity to be created by the private sector
 - In these cases where the state is the sole investor, the resulting infrastructure is generally owned and operated by the state with open access to all interested broadband service providers
 - In many cases, the state ownership is defined for a limited period (such as 10 years) after which the private sector can bid for the takeover of the state infrastructure, generally under the condition that it remains an open-access network
- 'Accelerating' investment subsidies in the form of payments to the private sector:
 - Where a private sector investment scheme has insufficient expected return on investment, the state payment is awarded (normally to the operator that wins a subsidy auction) in order to incentivise the operator to make the investment now rather than later
 - In this case the resulting infrastructure is normally owned and operated by the private operator. Where this operator has significant market power (SMP), it is normally expected that the regulator will impose an ex-ante obligation for open access to the infrastructure for any broadband service provider to use. In other cases, open access will be required as a condition attached to the state funding contribution, rather than in the case of an SMP operator.

⁵² There are many examples in the EU – see <https://pdf.sciencedirectassets.com/271735/1-s2.0-S0308596120X00085/1-s2.0-S0308596120300665/am.pdf?>

⁵³ Recent examples outside the EU include Serbia and Georgia – see <https://opennet.ge/eng/list/15/akhali-ambebi> та <https://www.ebrd.com/news/2022/ebd-eu-finance-expansion-of-broadband-in-rural-serbia.html>

- Joint investment and ownership models (Public-Private Partnerships):
 - Where a private operator forms a joint venture with a state entity (with joint funding and joint ownership) to install and operate a pre-defined part of the required Gbit network infrastructure.
 - This case can either create a commercial (profit seeking) venture or a venture where the state funding is covered by the 'state-aid rules' meaning that the state is subsidising an investment scheme that would otherwise not take place as a commercial private sector investment scheme.

In order for Ukraine to achieve broadband connectivity targets aligned with the EU, then a combination of private sector and state investments will be required, using one or more of the above mechanisms. Ukraine will therefore need a set of 'state-aid rules' to ensure the least possible cost to taxpayers and without undue distortions to a properly functioning competitive market. The specific requirements of the required state aid rules are contained in the section '**Ensuring the coordination and financing of full universal Gbit connectivity**' below.

The required of investments (made up of both private and state investments as described above) to achieve full Gbit connectivity (in harmony with the EU Digital Decade goals) are expected to be substantially assisted by external and international funding, rather than coming from the existing cash resources of the Ukraine private sector or the Ukrainian government budget. The various ways in which external funding could be channeled via Ukrainian private operators and the Ukrainian state are shown in Figure 2.

Lessons from the pre-war climate for investments in broadband infrastructure in Ukraine



In 2020, EBRD carried out a comparative analysis (of around 20 countries including Ukraine) of the factors influencing (either positively or negatively) investment conditions, based on the views expressed by market stakeholders in each country⁵⁴. The results for Ukraine are summarised below.



⁵⁴ <https://www.ebrd.com/sites/Satellite?c=Content&cid=1395292756036&pagename=EBRD%2FContent%2FContentLayout>



MARKET ATTRACTIVENESS

A range of broadband market stakeholders in Ukraine were asked about the attractiveness of the market in 2020 with specific regard to the conditions favouring investments in broadband infrastructures (fixed and mobile). The results, given in detail in the EBRD report, are summarised in the table below, together with extracts from the report's main recommendations to improve the overall attractiveness of the market for investors.

Market attractiveness factors	Ukraine	Recommendations for improving the overall attractiveness of the market (selected EBRD report extracts)
Overall size of the market, in population terms and relative spending power		Demonstrating a clear commitment to the effective implementation of an investor-friendly legal and regulatory framework for the broadband market
Growth potential of the market, in terms of demand for broadband-services		
Efficiency of the markets in terms of fair competitive conditions		Ensuring that the legal and regulatory framework fully supports broadband infrastructure investments
A clear national ICT market strategy for the country with stated ambitions and goals, for example targets for broadband coverage and take-up		Agreeing a clear national broadband strategy with stated ambitions and goals, including targets for broadband coverage and take-up



Good

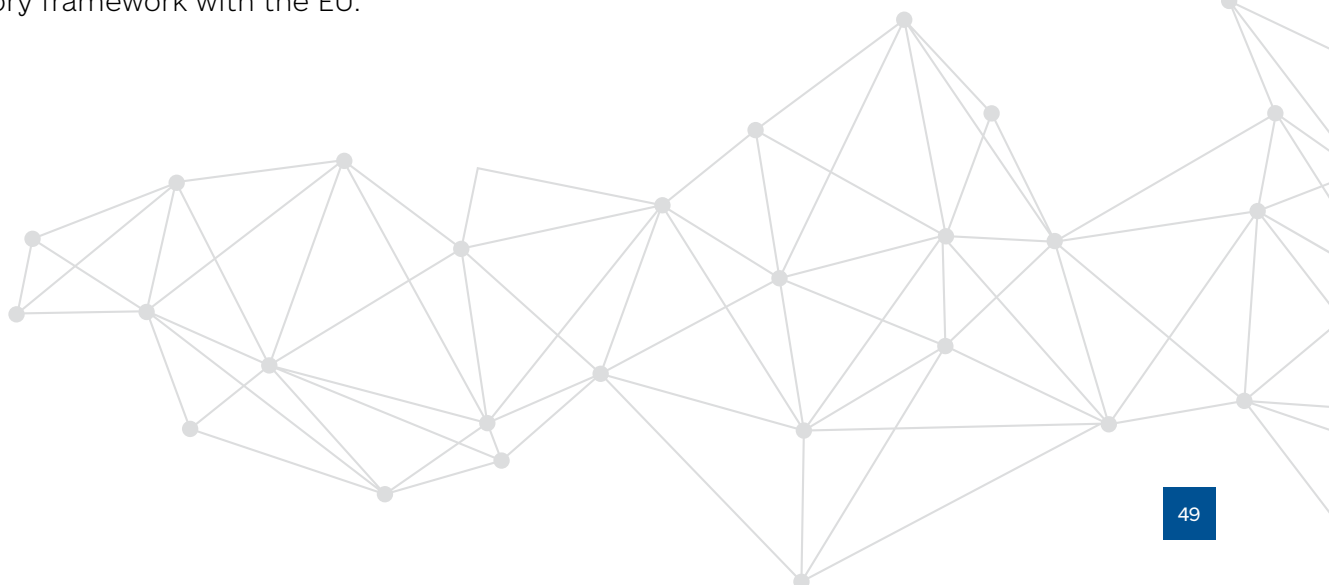


Medium



Poor

The recommendations shown in the table above have been taken into account in the NCEC strategic priorities (1-3), in particular to support the implementation of the strategy for the development of the electronic communications sector of Ukraine 2030 (in line with the EU's 2030 goals for full Gbit connectivity in Ukraine and the harmonization of Ukraine's legal and regulatory framework with the EU).








INVESTMENT RISK FACTORS



A range of broadband market stakeholders in Ukraine were asked about the main risks associated with investments in broadband infrastructures (fixed and mobile). The detailed descriptions, as expressed by the stakeholders, of these individual risks in Ukraine are contained in the EBRD report. The stakeholders were asked about a total of 14 investment risk factors, all relevant to broadband infrastructure. For each factor, the stakeholders expressed their views and assessed the impact (high, medium or low) against each factor. Full details of the specific factors within each risk category are given in the EBRD report.

The results for the high and medium risk factors together with extracts from the EBRD report recommendations are summarised in the chart below:

Investment risk factors	Ukraine	Recommendations for reducing broadband investment risks (selected EBRD report extracts)
Political stability and security		See note 1 below
Legal and regulatory framework specific to electronic communications and broadband		Ensuring that the legal and regulatory framework fully supports broadband infrastructure investments
The country's overall legal system, predictability and process		Demonstrating a clear commitment to the effective implementation of an investor-friendly legal and regulatory framework for the broadband market
Access to spectrum resources		<p>In planning the release of new spectrum, the government and regulator should recognise that investors need more certainty, for example by ensuring technological neutrality, extending licence periods and by aligning new spectrum release dates.</p> <p>The financial charges raised for spectrum should be based on market needs as well as on the need to reflect any remaining spectrum scarcity. Open market consultations, well in advance of spectrum releases, should be used to find the right balance in spectrum charges, recognising the cost pressures faced by operators in meeting national ICT objectives. Similarly, any quality or coverage obligations faced by spectrum holders should be subject to consultation.</p>
Taxation generally or targeted at the sector		<p>More weight should be placed on the exceptional macro-economic benefits of investment in broadband infrastructures as sufficient grounds for not taxing them.</p> <p>Consider whether there is a special economic development case for the application of an especially low and advantageous tax rate to facilitate greater investments in specific broadband-enabled projects.</p>

Corruption generally or in any aspect of operations		See note 2 below
State participation in the sector		To establish a clear policy for the ICT sector, within which the investment strategies of market players can have greater confidence. This recommended consultation is particularly important for the broadband sector because any adverse impact on infrastructure investments also spills over onto all other sectors of the economy that rely on ICT services for their development.
State participation in the sector		To establish a clear policy for the ICT sector, within which the investment strategies of market players can have greater confidence. This recommended consultation is particularly important for the broadband sector because any adverse impact on infrastructure investments also spills over onto all other sectors of the economy that rely on ICT services for their development. Adopt a best-practice set of state-aid guidelines to ensure that any state investments do not adversely impact on the overall private-sector led investment climate.
State assistance and funding schemes		A full range of state-funding options is considered by governments in consultation with the market before decisions are reached. The different options should be tested against full cost/benefit criteria as well as taking into account the implications of each option on the potential impact on market efficiencies, competition and consumer choice. The chosen model should be piloted in limited geographical areas to gain experience before scaling up into a full national scheme.
Certainty in construction permits and wayleaves		Implement best practice legislation, procedures and on-line capabilities (such as those described in the Broadband Cost Reduction Directive) that will significantly ease the problems associated with providers seeking permissions to install broadband infrastructures.
Overall infrastructure		See note 3 below



Medium priority



High priority

Note 1: Political stability and security. At the time of the EBRD survey (late 2020) this factor was expressed by the stakeholders as the greatest risk facing broadband infrastructure investments in Ukraine. There were no specific recommendations given in the EBRD survey report as this issue was considered to be outside the scope of the sector-specific recommendations. Seen from a 2024 perspective, it is now clear

that this risk is very significant and will not be removed until the satisfactory cessation of the Russia's full-scale war against Ukraine. When that point is reached, the risks arising from political insecurity should be very significantly reduced so that investments can flow freely into rebuilding the essential broadband infrastructures and creating full Gbit connectivity in line with the wider European 2030 goals.

Note 2: Corruption generally or in any aspect of operations. At the time of the EBRD survey (late 2020) this factor was considered to be a medium risk to broadband infrastructure investments. There were no specific recommendations given in the EBRD survey report as this issue was considered to be outside the scope of the sector-specific recommendations. From a forward-looking perspective, in considering the expected need for very significant post-war investments (into rebuilding the essential broadband infrastructures and creating full Gbit connectivity in line with the wider European 2030 goals), the perception of this corruption-related risk must be significantly reduced. Some recommendations and NCEC's potential role are given in the following sections of this Annex under the headings *'Short-term actions to support 'Careful Coordination' of investments'* and *'Ensuring the coordination and financing of full universal Gbit connectivity'*.

Note 3. Overall infrastructure. This factor includes the risk posed by non-telecommunications infrastructures on investments in broadband infrastructures, including power outages, poor transport and access to remote sites. At the time of the EBRD survey (late 2020) this factor was considered to be a medium risk to broadband infrastructure investments. There were no specific recommendations given in the EBRD survey report as this issue was considered to be outside the scope of the sector-specific recommendations. Viewed from a 2024 perspective, these overall infrastructure wartime risks have placed an overwhelming risk to telecommunications in general. As detailed in the section 'Projecting Ukraine as a role model', given the Russia's full-scale war against Ukraine conditions, Ukraine has dealt well with keeping essential infrastructures running to maintain critical communications and keep ordinary consumers connected. From a forward-looking perspective, Ukraine is expected to ensure that critical infrastructures, including non-telecommunications assets, are fully resilient and compatible with the objectives of full Gbit broadband connectivity in Ukraine.

Short-term actions to support 'Careful Coordination' of investments



An analysis of the coordination measures required for the funding of infrastructure investments is given in a later section. As a short-term measure, in order to ensure any conditions of funding are transparent and observed in Ukraine, it is necessary to establish a capacity to:

- a** Liaise with funding agencies to ensure that all the relevant terms and conditions are understood and recorded
- b** Establish a database of funders and proposed investment amounts, purposes and time-scales
- c** Establish a monitoring mechanism that requests and receives information from the recipients of investment funds in order to check if the implementation is fully in line with the proposals

The establishment of a database of funders and investments, point (b) above, can be the first step towards the establishment of the single information point (SIP) within the NCEC's ERP and envisaged as part of the requirements of implementing the Broadband Cost Reduction Directive, see below.

As a practical step towards the establishment of the investment coordination mechanism, NCEC should hold early discussions with a prominent investment agency such as the EBRD, which is the largest institutional investor in Ukraine, and given its operation experience in Ukraine, it will act as the lead Institution for co-investments under a newly established Investment Platform⁵⁵.

Note: For the mining sector, an investment transparency system has already been established by Ukraine in conjunction with the Extractive Industries Transparency Initiative (EITI)⁵⁶. The Ukraine Extractive Industries Transparency Initiative⁵⁷ reviews the data provided by independent companies in the sector. This already established methodology could be considered by competent authority as a part of the model that could be adopted for the future by the sector of electronic communication as part of the overall mechanism of that will be required in Ukraine to help coordinate the very significant post-war external and international funding expected to be invested in Gbit infrastructures.

⁵⁵ <https://www.ebrd.com/news/2023/ebrd-and-dfis-establish-ukraine-coinvestment-platform.html#:~:text=The%20EBRD%2DG7%20DFI%20DFI,a%20mainly%20private%20sector%20focus>



Ensuring the coordination and financing of full universal Gbit connectivity



According to estimates by the ITU, Ukraine will need to invest a minimum of \$1.79bn (Euro 1.64Bn⁵⁸) to restore its sector of electronic communications to pre-war levels. This estimate was made during 2022 and the amount is likely to increase as the Russia's full-scale war against Ukraine continues. In addition, in order to fulfil Ukraine's vision of creating an infrastructure to provide universal Gbit connectivity using FTTH technology (and based on the EU area estimate of Euro 137Bn for 100% coverage and 50% take-up by 2030), it is estimated that Ukraine would require a further Euro 12.1Bn⁵⁹ of infrastructure investments over the period up to 2030. The total infrastructure costs for full implementation of the EU's Gbit society targets in Ukraine by 2030 is therefore estimated to be around Euro 14Bn.

1,79 billion dollars Ukraine needs to restore the sphere of electronic communications to the pre-war level

With the required levels of investment for reconstruction alone, international financing institutions are preparing to provide funding support. In an announcement, the Development Finance Institutions of the G7 countries have stated:

«The needs of Ukraine in a period of reconstruction are vast and beyond the scope of any single institution. As a result, careful coordination is needed between Ukraine's partners to maximise effectiveness, create synergies and increase impact.»^{60 61}



⁵⁶ <https://eiti.org/countries/ukraine>

⁵⁷ <https://eiti.org.ua/en/eiti-in-ukraine/#legislation-regulating-extraction-industry-in-ukraine>

⁵⁸ Using an exchange rate of 1.09 Euro/USD on 15th May 2023

⁵⁹ This is based on a pro-rata fraction (EU 2030 forecast population 468m vs. Ukraine 2030 population 41.5m) using the EU estimate of Euro 137Bn (additional FTTH investments taking account of the re-use of existing infrastructures and the full implementation of the Broadband Cost Reduction Directive) Ukraine Gbit/sec infra-structure cost = 137 x 40/500 = Euro 12.1Bn

⁶⁰ <https://www.ebrd.com/news/2023/ebrd-led-ukraine-investment-platform-launched-in-tokyo.html>

⁶¹ <https://www.dfc.gov/media/press-releases/joint-statement-establishment-ukraine-investment-platform>

In order to reflect the «careful coordination» necessary from the investor side, Ukraine will have to have a capacity in place to ensure that the necessary investments in the electronic communications sector have the most benefit to Ukraine, in particular

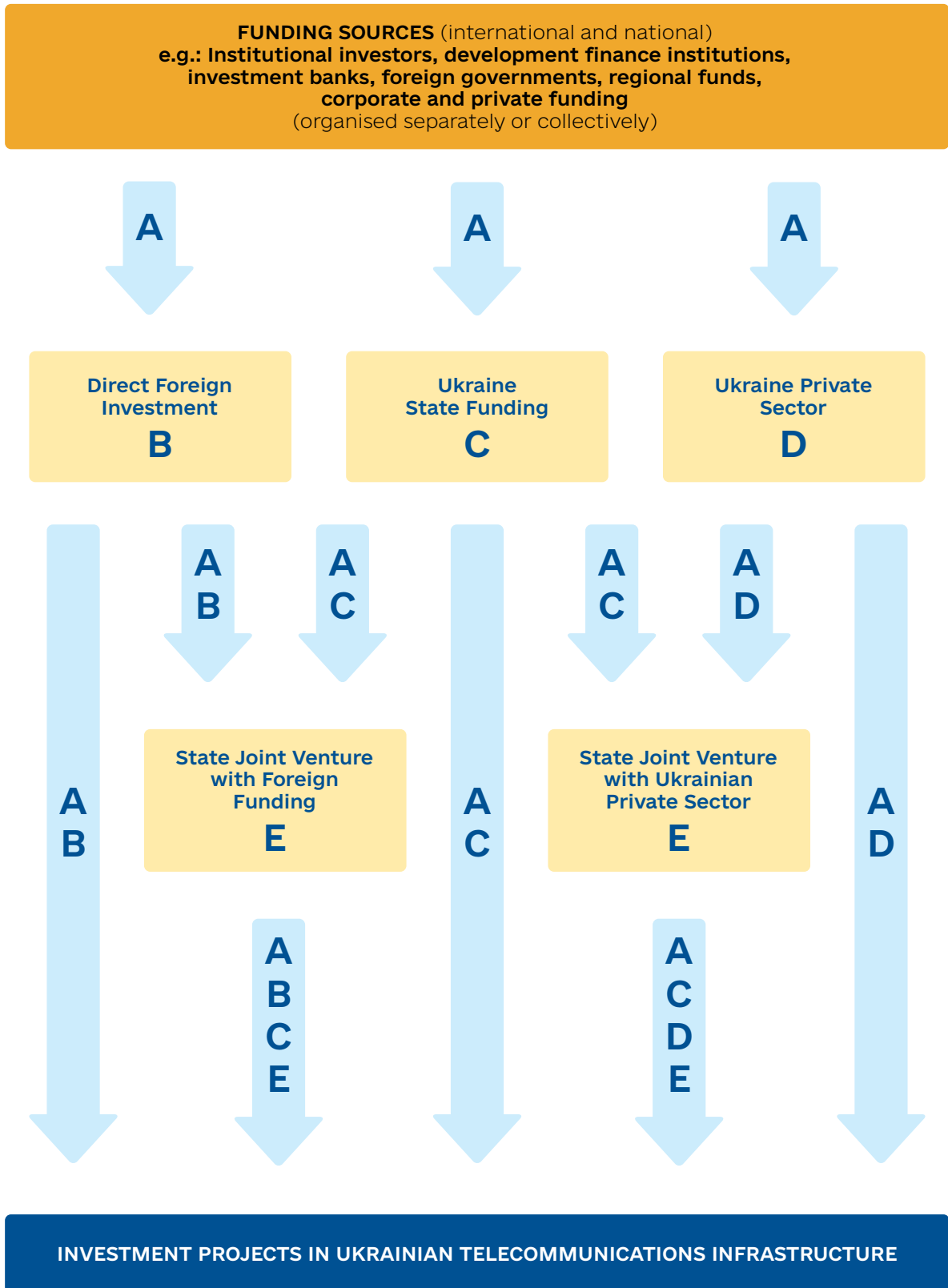
- The necessary investments must be directed specifically for the purposes of achieving the desired objectives, including reconstruction and the achievement of universal Gbit connectivity. In most cases, where reconstruction is necessary, the investments in broadband infrastructure must be implemented in such a way as to promote universal Gbit connectivity and to achieve a resilient national electronic communication infrastructure.
- Some funders prefer supporting the private sector and others favour supporting state entities. In electronic communications, most investments are now expected to take place within the private sector, but in many geographical cases where private sector (profit-seeking) investments are not expected to be made (so called 'white areas'), then some state intervention will be necessary. Some funders have experience of supporting such schemes via support to both the private and public entities. The decision of funders on whether to support the state entity or the private sector will generally be influenced by the level of relative risk (to the funder) involved.
- That the necessary investments are made taking account of the funder's terms and conditions. These terms may cover a range of the funder's requirements and may differ between different funders. The requirements may cover a range of conditions, from the obvious specifics of repayment and ownership (where relevant) to additional requirements placed on the policy, legal and regulatory conditions that must apply to the investments made using the funds. Examples of policy and regulatory requirements are:

- That any spectrum required to facilitate the service using the investment should be made in a timely manner and at a fee not including excess payments to the state
- That any construction permits or rights of way are awarded in a timely manner without undue excess payments to those entities granting permission
- That the assets installed are transparently recorded on a central and accessible database of infrastructure of electronic communication held and administered by a responsible body, including the size of the asset, its value and location. This can be achieved in Ukraine by use of a suitable database within the NCEC's ERP.
- That investments are part of an overall, transparent and coordinated Ukrainian infrastructure master plan within an open and competitive market for electronic communications, as (in Ukraine's case, harmonisation with the EU's European Electronic Communications Code and adopting the EU's Gigabit infrastructure objectives would provide a good means of complying with any such a requirement by funding agencies). The requirement is aimed at avoiding any unnecessary duplication of capacity unless duplication is part of a defined best practice network security and resilience requirement, or as part of an operator's business case to install network-based competitive choice to end-users in the market.
- Full investment savings are expected to be derived from the implementation of the Broadband Cost Reduction Directive.
- That any electronic communication network capacity installed meets the regulatory requirements relating to interconnection, wholesale access and security (and any other relevant provisions) determined by the relevant regulatory body for electronic communications – in Ukraine's case NCEC. For example the use by NCEC of the regulatory requirements of the European Electronic Communications Code is likely to be acceptable to funding agencies.
- That if any part of the investments are made by a government owned (in whole or in part) entity, that the relevant 'state-aid' rules apply in order to ensure that a competitive market is not undermined or that the investment does not 'crowd out' private investments.

The possible relationships between different types of funding and usage for investments is illustrated in Figure 2 below.

⁶² For example see https://ec.europa.eu/enrd/projects-practice/broadband-network-development-rural-white-areas-greece_en.html

FIGURE 2: Funding arrangements and rules



Funding arrangements and rules (key to the above diagram)



Each provider of funding (from the primary sources at the top of the chart to the various project funding vehicles that manage the investment projects in Ukraine's electronic communication infrastructure) will dictate their own conditions and rules regarding the use and disbursement of the funds.

These
'funding rules'
are shown as

A, B, C, D, E

on the chart and are
described as follows:

- ➔ **A:** Rules and conditions set by the primary funders (institutional investors⁶³ development banks⁶⁴, private individuals, governments including EU funding) whether organised individually or collectively.
- ➔ **B:** Rules and conditions set by direct foreign investors (of Type A or from foreign companies) where these will apply specifically to Ukraine.
- ➔ **C:** Rules and conditions set by the Government of Ukraine, for example that the funding is used for the achievement of governmental policies, targets or to serve particular communities).
- ➔ **D:** Rules and conditions set by private commercial entities in Ukraine, normally set by the need for a return in investments.
- ➔ **E:** Rules relating to the use of state aid. In Ukraine, the relevant framework will be based on the EU State Aid Rules for the electronic communications sector⁶⁵. The requirements are set out in more detail in the section below.

For any funding rules that are established within Ukraine (for example C, D and E above), a responsible authority (for example NCEC, MDTU or other assigned authority) is expected to be fully consulted before such rules are promulgated in order to avoid disproportionate levels of regulation within the electronic communications sector or to avoid duplication of existing rules already adopted from the European Electronic Communications Code or new rules that go against the overall objectives already set out for the sector.

The various forms of funding could be used in various ways for a range of specific projects to upgrade/ replace, renew and extend the infrastructure of electronic communication in Ukraine. The four main categories of the investment vehicles are:

- 1 Direct foreign investments (using funding arrangements and rules A and B)
- 2 Joint ventures between direct foreign investors and the Ukrainian government (using rules A,B,C and D above)
- 3 Direct investments by the Ukrainian government (using funding and rules A and C above)
- 4 Joint ventures between Ukrainian private investors and the Ukrainian government (using funding arrangements and rules A,C,D and E above)
- 5 Ukrainian private sector investments (using funding arrangements and rules A and D above)

Where a number of these different categories of investment vehicles are used in parallel (for example when different infrastructure investment projects are being undertaken by different investment vehicles at the same time) there is a need for some form of oversight to ensure that each project is contributing to an overall Ukrainian development policy (for example a «Gigabit society») and within the Ukrainian legal and regulatory framework established for the electronic communications sector.

⁶³ <https://corporatefinanceinstitute.com/resources/capital-markets/institutional-investor/>

⁶⁴ <https://financeincommon.org/sites/default/files/2021-10/mapping-development-banks.pdf>

⁶⁵ <https://digital-strategy.ec.europa.eu/en/news/commission-adopts-revised-state-aid-rules-broadband-networks>



State aid rules for Gbit connectivity



The necessary funding (estimated at 12Bn Euros, see Figure 1) is expected to be predominantly financed by the private sector operators in Ukraine, driven by their requirement to make sufficient return on capital investments within a competitive market governed by a Ukrainian legal and regulatory framework that is aligned with the European Electronic Communications Code.

In places where the targets for universal Gbit connectivity coverage are not expected to be met by private commercial investments alone, state subsidies (based on supplyside or demandside actions) may be applied, that will ensure the provision of broadband gigabit communication services within the established

time limits on the territory of Ukraine, where without such intervention is expected in their absence.

In the EU a special set of 'Guidelines on State Aid for Broadband Networks'⁶⁶ have been introduced (January 2023) «...to support the deployment and take-up of broadband networks in the EU. The new rules contribute to the EU's strategic objectives of ensuring gigabit connectivity for everyone and 5G coverage everywhere by the end of the decade».

In particular, the Ukrainian state-aid rules for broadband will have to align with the following features of the EU state-aid measures:

- **«Align the threshold for public support to fixed networks with the latest technological and market developments.** These changes will allow Member States to invest in areas where the market does not and is not likely to provide end-users with a download speed of at least 1 Gbps and an upload speed of at least 150 Mbps. Any State investment will have to at least triple the available download speed and, in competitive areas, provide at least 1 Gbps download and 150 Mbps upload speeds.
- **Introduce a new assessment framework for the deployment of mobile (including 5G) networks.** The new Guidelines will enable Member States to support mobile networks where the investment would not otherwise have been undertaken by private operators and is not guaranteed by other measures, such as the coverage obligations attached to the use of some radio spectrum.
- **Explain how public support can be used to incentivise the take-up of broadband services.** By addressing barriers to digital connectivity and increasing access to broad-band services, take-up measures aim at promoting digital inclusion and societal resilience. The revised Guidelines spell out the compatibility criteria for social and connectivity vouchers to incentivise consumers and business to use broadband services.
- **Simplify certain rules** in order to facilitate the practical application of the Guidelines and to cut red tape for companies and public authorities. For example, the revised Guidelines allow Member States to require operators to provide the most appropriate set of wholesale access products depending on the competitive situation in a given area and the demand for specific products. This will reduce costs of such products, while preserving competition and preventing lock-in effects.
- **Clarify and provide further guidance on certain key concepts,** which are important for the State aid assessment carried out by the Commission, such as mapping, public consultations, selection procedure, wholesale access pricing, and claw back mechanisms.
- **Update the criteria used for balancing the positive impact of the aid against its negative effects on competition and trade.** The assessment will take account of different possible effects, such as the contribution to the EU's digital and green transition objectives.»

It is important that NCEC has an active role in preparing and implementing these 'state-aid' rules for the electronic communications sector in Ukraine because they shall be designed specifically to support investments in the achievement of the EU's Gbit society objectives in Ukraine. In the case where the relevant

state-aid rules for broadband are promulgated by another state body (for example the MDTU or other competent / assigned authority) then NCEC shall have a role in advising the Ministry/ other competent authority if any proposed broadband investments in Ukraine comply with the state-aid rules.

⁶⁶ https://ec.europa.eu/commission/presscorner/detail/en/ip_22_7595

FURTHER SUPPORTING MATERIAL

Implications for NCEC in terms of concrete priority actions, relevant guidelines and regulations



NCEC should be involved in the formulation of the policy decisions defined in the previous section. A great deal of coordination will be required across the sector, involving national and local governmental interests, private sector stakeholders including the fixed and mobile network operators. The role of the funding institutions will be critical to the scope and timescales for to complete the transition towards Gigabit connectivity.

In order to address the policy considerations, the priority actions should be focussing on need to reconstruct electronic communications infrastructure and investment towards universal Gigabit connectivity. The key elements of the such priority actions shall be as follows:

- I** Network deployment – Defined goals for all fibre fixed networks and 5G, with first priority on maximising coverage and then on competitive access choices for customers.
- II** Spectrum measures including accelerated spectrum availability for 5G, measures for 2G/3G phase out, flexible policies on spectrum sharing).
- III** Universal service, including adequate broadband access definition, availability and affordability, appropriate financing mechanisms.
- IV** National database / SIP of all the infrastructures of electronic communication showing geographical locations and capacities within the scope of the NCEC's ERP.
- V** Financing arrangements including use of donor and state funds (in case of availability of funds) to accelerate fibre backbone investments.
- VI** Design of the implementation coordination project with roles, activities, timescales and supervisory mechanisms, including the reporting on use of donor and state funds.
- 1** Alignment with the Broadband Cost Reduction Directive or GIA⁶⁷ (including expanding the scope to cover all utility sectors and public infrastructure – not just electronic communications) with regard to joint construction, coordination of civil works, infrastructure mapping and one-stop-shop procedures and fair rules for rapid and lowcost permit granting.

⁶⁷ <https://digital-strategy.ec.europa.eu/en/library/gigabit-infrastructure-act-proposal-and-impact-assessment>

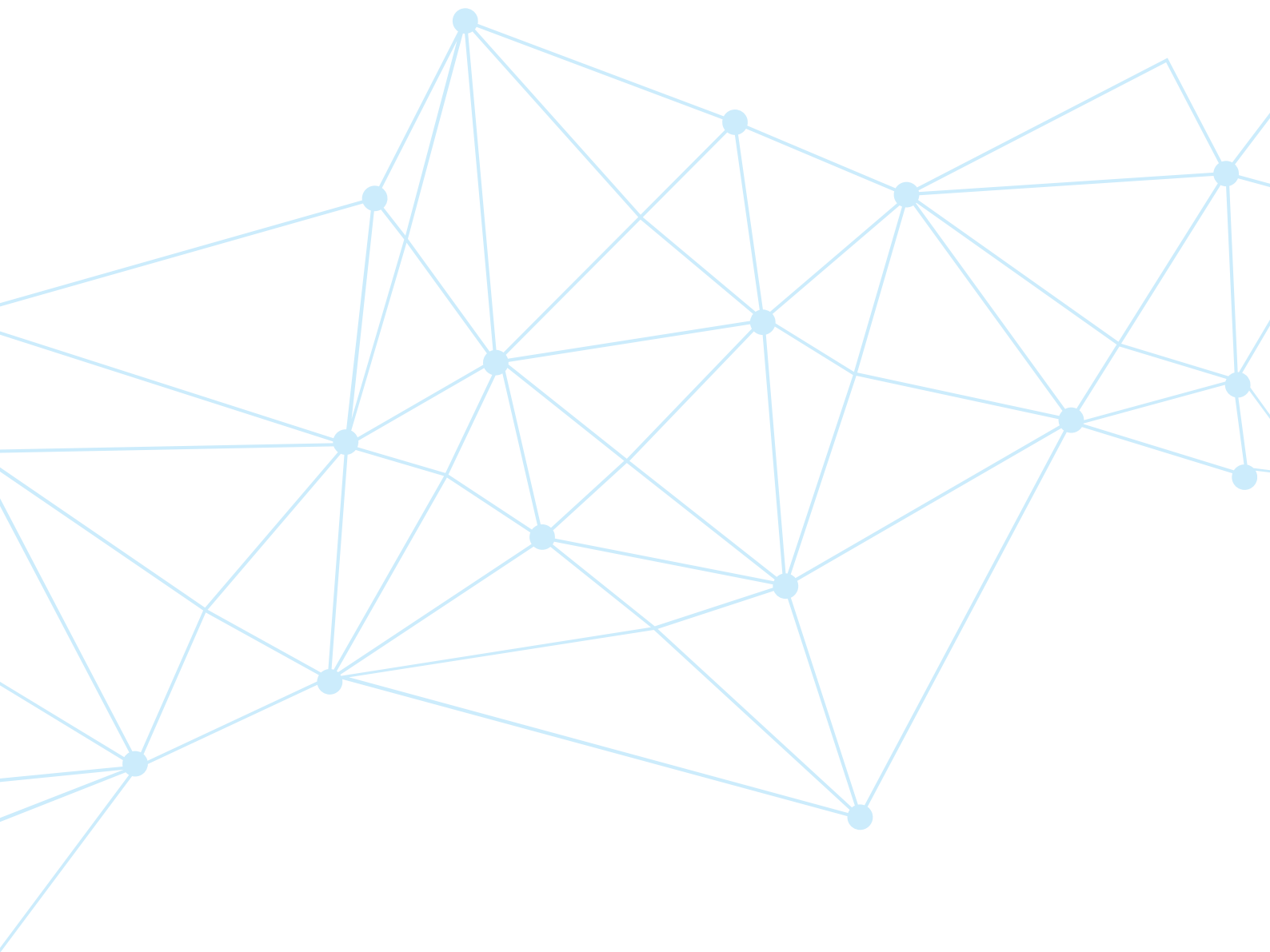
GENERAL GUIDANCE FOR INFRASTRUCTURE INVESTMENTS FOR RECONSTRUCTION AND BUILDING TOWARDS UNIVERSAL GBIT AND 5G CONNECTIVITY

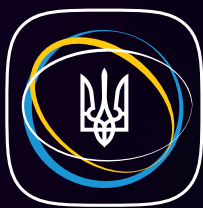


Investment need	Main features	Proposed strategy and policy interventions
Normal growth of fixed and mobile networks and services	Demanded commercial investments in a competitive market	Use of the EU legal and regulatory framework (European Electronic Communications Code)
Replacement of outdated technologies	To reduce operating costs and to allow all customers to be able to migrate to higher speed and more reliable broadband services	National targets for a 'digital society' to include specific fixed and mobile broadband coverage targets plus phase-out plans for copper, 2G and 3G
Achieving universal high-speed broadband access	Extending fibre and 5G mobile coverage to all settlements. Initial focus on large coverage, then focus on competitive access.	Strategy of development of electronic communication sector / National Broadband Strategy backed up by interventions to accelerate commercial investments including broadband cost-reduction measures and justified state-aid (using EU practices)
Repair and rebuilding: Early coverage, followed by competitive networks	<p>Early presence of a single operator to restore all service followed by measures to promote competitive services.</p> <p>Rebuild with fibre and 5G.</p> <p>Only restore copper, fixed wireless access, 2G and 3G on a temporary basis until fibre and 5G installed.</p>	<p>First operator in any location to be obliged to offer wholesale access so that competition is maintained from the start. Competing networks to be added, using the EU regulatory approach.</p> <p>Review of infrastructure sharing arrangements to ensure that overall network resilience is achievable.</p>
Achieving network resilience	<p>Competing networks can independently contribute to overall national resilience.</p> <p>Use of fibre and 5G technologies, underground core and backhaul transmission and access networks. Back-up measures to be designed into networks. Secure network management capabilities including back-up.</p>	<p>Ensuring fully effective sector competition. National targets for end-to-end network resilience across and between different operators and service providers.</p> <p>Incentivise operators to build resilience into network design.</p> <p>National roaming for mobile services and international roaming for displaced persons.</p>

Equipment supply	The supply of relevant hardware and software for the construction, maintenance and continuing growth of telecommunications networks	<p>A joint national procurement policy agreed with all Ukrainian operators.</p> <p>Specific measures to encourage Ukrainian manufacturing and software capabilities.</p> <p>Establish an interoperability test laboratory.</p>
Due diligence in investment justification, expenditure and audit	<p>The supply of relevant hardware and software for the construction, maintenance and continuing growth of telecommunications networks.</p> <p>Where state or external donor financing is used, full transparency of business cases, contract letting and implementation audits.</p>	Standards of due diligence and transparency to be set by reference to international donor organisation requirements (see also following section)

General guidance for infrastructure investments for reconstruction and building towards universal Gbit and 5G connectivity.





**NATIONAL COMMISSION
FOR THE STATE REGULATION
OF ELECTRONIC COMMUNICATIONS,
RADIO FREQUENCY SPECTRUM AND
THE PROVISION OF POSTAL SERVICES**

**NATIONAL COMMISSION
FOR THE STATE REGULATION OF ELECTRONIC
COMMUNICATIONS, RADIO FREQUENCY
SPECTRUM AND THE PROVISION
OF POSTAL SERVICES (NCEC)**

 St. Solomyanska, 3, Kyiv, 03110

 (+380 44) 202-00-43, 202-00-10, 202-00-22

 office@nkrzi.gov.ua;
kabmin_doc@nkrzi.gov.ua

 www.nkek.gov.ua