**Annex**
**to the Decision of the Board of Directors**
**dated 09.12.2022 № 13**

# Low-carbon development program of Kazakhtelecom JSC for 2022-2032

## Introduction

The Low-Carbon Development Program of Kazakhtelecom JSC (hereinafter - the Program) is developed within the framework of implementing the strategic objective on reducing carbon footprint in accordance with the legislation of the Republic of Kazakhstan, the Charter of Kazakhtelecom JSC, the Development Strategy of Kazakhtelecom JSC JRun for 2023-2032. Despite the fact that the Company's share of greenhouse gas (hereinafter - GHG) emissions is less than 1% of the nationwide emissions, Kazakhtelecom JSC supports the global aspirations of Kazakhstan to reduce GHG emissions. Low-carbon development program is the most important element of the ESG transformation conducted by the Company. Low-carbon development, as part of the general corporate strategy in the mid- and long-term perspective, will enable to strengthen the business sustainability, attract additional investments, improve the Company's positioning in terms of responsible business management. Implementation of the low-carbon development program demonstrates Kazakhtelecom JSC's commitment to the national policy of Kazakhstan as the main telecommunications industry enterprise in the country. The program determines the objectives for reducing GHG emissions, key areas and activities for decarbonization for the period from 2022 to 2032.

## Glossary

| | |
|---|---|
| RES | Renewable energy sources |
| IPCC | Intergovernmental Panel on Climate Change |
| BAT | Best Available Technology |
| GHG | Greenhouse gases |
| UNFCCC | UN Framework Convention on Climate Change |
| GGR | Greenhouse Gas Registry |
| ETS | Emissions Trading System |
| SPP | Solar power plant |
| DC | Data center |
| BBA | Broadband access |
| ER | Energy Registry |
| CDD | The Carbon Disclosure Draft |

| | |
|---|---|
| FTTH | Fiber to the Home |
| GHG Protocol | Greenhouse Gas Protocol |
| I-REC | International Renewable Energy Certificate |
| TCFD | Task Force on Climate-Related Financial Disclosures |
| MSA | Multi-service subscriber access |
| ATS | Automatic telephone station |
| DSLAM | Digital Subscriber Line Access Multiplexer |

# 1. Climate agenda

## 1.2 International context

Global climate change is one of humanity's main challenges since the 20th century and will remain an international agenda for the near future. The urgency of solving the climate crisis is widely recognized by world governments, international organizations, various corporations and civil company as a whole.

A key driver of low-carbon development at the international level is the tightening of regulatory requirements. The formation of the international climate agenda took place at the turn of the 1980s. The transformation of the scientific problem into a political one is associated with the establishment of the IPCC in 1988, which is a scientific view of the assessment of climate change risks. The institutional development of international climate policy began with the adoption of the UNFCCC in 1992, which established a common concept for the implementation of activities of the international community. Adopted in 1997, the Kyoto Protocol for the first time laid down obligations of countries to reduce GHG emissions in 2008-2012, and allowed the use of market mechanisms to achieve the targets. The concept of low-carbon development has been on the international climate agenda for the first time since 2009, as part of the Copenhagen Accord. In 2015, the Paris Agreement was adopted with the purpose of substantially reducing global GHG emissions to limit global temperature increases this century to 2°C, with further limits on increases to 1.5°C.

The world's leading economies continue to tighten climate regulation focused on meeting commitments under the Paris Agreement. The implementation of TUR in the European Union from 2023 will lead to additional costs for exporting companies. According to the mechanism, suppliers of goods to European markets will have to submit reports that will contain information on GHG emissions related to the production of final

products, as well as purchase certificates for the declared volume of emissions. The list of goods that fall under the regulation will be periodically reviewed in order to expand. Such a mechanism will have a significant impact on all of the European Union's trading partners.

The tightening of regulatory requirements and the additional fiscal burden on business entails an increased demand on the part of investors to take climate aspects into account. The growing investor interest in sustainable development, including climate change, is evidenced by the spread and recognition of initiatives aimed at promoting responsible investment practices. While in 2013 the number of investment institutions that joined the PRI (Principles for Responsible Investment) initiative was 34, by 2021 the number had reached 121 institutions. The global volume of issues of financing instruments with ESG characteristics is also growing. In 2013, issuance was $28.7 billion, while in 2021, investment is estimated at $1,643.7 billion. When making investment decisions, one of the key non-financial indicators mandatory to be considered in the business model is climate risks.

Information disclosure and accountability to internal and external stakeholders, the subject of which are the results of the organization in relation to mitigation and climate risk assessment, are becoming an integral element of governance. There are a number of international drafts, standards and recommendations for disclosure of GHG emissions at the corporate level. One of the first global climate drafts is the CDD[1], which voluntarily discloses GHG emissions. In 2021, more than 13,000 companies around the world disclosed information, showing a 37% increase from 2020 and more than 141% from 2015. Based on the results of the disclosures, CDD assigns companies a grade ranging from A (the highest grade) to F (the lowest grade). No less significant in terms of disclosure of financial assessment of climate risks are the recommendations of TCFD[2]. In some countries, the recommendations are mandatory. As of early 2022, more than 3,000 organizations supported the TCFD recommendations. The UK is the first country in the world to require major issuers to disclose financial information in accordance with the TCFD recommendations. In addition, disclosure is mandatory in some stock exchanges, which includes one of the largest exchanges in Europe - the London Stock Exchange.

Thus, the tightening of carbon regulation, the voluntary commitment of large companies and the growing interest of investors in climate disclosure is a steady and unquestionable trend.

### 1.1.National context

Kazakhstan, as a country integrated into the global community, shares the global purpose of combating climate change. As the largest GHG emitter in Central Asia[3], the country has established a regulatory framework consisting of a number of regulations. In particular, the Environmental Code was adopted, which prescribes the tools of state regulation of GHG emissions and removals, including the establishment of a carbon budget, carbon quota and administration of plant operators. Mandatory annual reporting on

[1] The Carbon Disclosure Draft - Draft for disclosure of information on the Company's environmental impact (climate, water, forest)
[2] Task Force on Climate-Related Financial Disclosures - Working Group on Financial Disclosures Related to Climate Change
[3] According to REdiCAP (The Regional Dialogue on Carbon Pricing)

GHG emissions to the authorized bodies was introduced. Also, according to the Environmental Code, the state encourages and stimulates the application of BAT, aimed at reducing the negative impact on the environment.

The current state mechanism for limiting GHG emissions is quota allocation, which takes place on the basis of national quota allocation plans with the issuance of certificates of emissions by regulated sectors of the economy. Exceeding the established and additionally purchased amount of GHG emission quotas results in a fine for the operator of the installation. Additional volume of quotas can be purchased with the help of ETS from other enterprises, as the quota units are the goods allowed for turnover in Kazakhstan under the conditions stipulated by the Environmental Code. To date, ETS covers only part of the areas of activity, given almost 50% of the total GHG emissions in Kazakhstan.

In addition to the regulatory component, Kazakhstan has strategic documents related to the climate aspect. One of the first documents of national importance is the Concept for the Transition of the Republic of Kazakhstan to a Green Economy[4], approved by Presidential Decree № 577 of 30.05.2013, which introduces target indicators of a green economy, including indicators to improve energy efficiency and reduce carbon dioxide emissions in the power sector. A national draft "Green Kazakhstan" was adopted for the period from 2021 to 2025. One of the purposes of the draft is to improve the environmental situation, including through a 10% reduction in specific energy consumption in certain sectors of industry (including the chemical industry). In 2016, by ratifying the Paris Agreement, Kazakhstan supported the global purpose to keep global average temperature rise below 1.5°C and made voluntary commitments to reduce GHG emissions. Adhering to the commitments, the Ministry of Ecology, Geology and Natural Resources of the Republic of Kazakhstan is developing a Doctrine (strategy) to achieve carbon neutrality by 2060. As key measures of the transition to carbon neutrality the document proposes the abandonment of new coal-fired generation drafts and the gradual reduction of coal in the energy balance, doubling the share of renewable energy sources in power generation, one hundred percent electrification of personal passenger transport, use of green hydrogen, complete abandonment of coal-based production, etc.[5]

### 1.1.Key trends in the industry

The telecommunications industry is not the main emitter of global GHG emissions, accounting for about 1.8%-2.8%. At the same time, there is a positive dynamics of emissions along with global emissions as a result of the rapid development of the sector. Whereas in 2002 the industry's GHG emissions were 530 megatonnes CO2-eq, for 2020 the figures range from 800 to 2,300 megatonnes CO2-eq.[6]

Major international industry organizations in the telecommunications sector are actively involved in the promotion of the climate agenda and its integration into the corporate sector, developing methodologies and standards for reducing GHG emissions. In particular, ITU (The International Telecommunication Union) in cooperation with GeSI

[4] https://adilet.zan.kz/rus/docs/U1300000577
[5] Towards low-carbon development in Kazakhstan | United Nations Development Programme (undp.org)
[6] According to Lancaster University

(Global e-Sustainability Initiative), GSMA (Global System for Mobile Communications) and SBTi (The Science Based Targets initiative) developed a standard that describes the necessary amount of GHG emissions reduction for the telecommunications industry until 2032. According to the largest international association of mobile operators GSMA, 29 companies-operators[7], providing 30% of mobile communications connections worldwide, adopted the ITU standard GHG emission reduction targets.

An analysis of the world's 19 largest telecom operators[8] showed that 95% of the companies already have ambitious GHG reduction purposes. Major industry players actively participate in information disclosure programs. The analysis showed that 95% of companies participate in the CDD drafts and voluntarily disclose data on GHG emissions. As part of the disclosure, 74% of the companies were assigned A or A- grades, indicating a high level of development of climate issues in the companies. 74% of the analyzed telecommunications companies disclose information on financial assessment of climate risks in accordance with the requirements of TCFD. Based on the analysis, we can conclude that the telecommunications industry as a whole, and large companies in particular, are already addressing climate change issues, improving environmental performance, showing a good current position, despite its insignificant share in global GHG emissions.

## 2. Purposes and challenges of low-carbon development for Kazakhtelecom JSC

### 1.2 Low-carbon development purposes

Being the largest fixed telephony operator in Kazakhstan, the leader in providing telecommunications services, as well as one of the largest operators of the national data transmission network, Kazakhtelecom JSC supports Kazakhstan's participation in the global GHG emission reduction targets and realizes the importance of developing decarbonization measures. The Company is actively applying and introducing sustainability principles in its business model. One of the areas of Kazakhtelecom JSC's Strategy is improvement in the field of sustainable development.

The strategic objective of Kazakhtelecom JSC is to reduce GHG emissions by 13% by 2032 compared to the base year 2021, with a further aim to achieve carbon neutrality by 2060. This Program considers the forecast of targets for two key development scenarios, for which the base year is 2021:

1. "Business as usual"

The scenario implies continuation of implementation of the current business model and current trends in Kazakhtelecom JSC's activity without focusing on low-carbon development. Measures on energy saving and energy efficiency will be implemented

[7] América Móvil, AT&T, BT, Bharti Airtel, Deutsche Telekom, Elisa, Far Eastone, KPN, Magyar Telekom, NTT DOCOMO, Orange, Proximus, Reliance Jio Infocomm, Safaricom, Singtel, SK Telecom, STC, Swisscom, T Mobile USA, Taiwan Mobile, TDC, Tele2, Telefónica, Telekom Austria, Telenor, Telia Company, Telstra, Verizon и Vodafone.

[8] America Movil, AT&T Inc., BCE Inc., BT Group Plc, Chunghwa Telecom Co., Ltd., Deutsche Telekom AG, MTS, Nippon Telgraph and Telepohone Corp, Orange SA, Proximus SA, Rostelecom, Royal KPN NV, Singapore, Telecommunications Ltd, Swisscom AG, T-mobile U.S Inc., Telefonica SA, Telus Corp, Verizon Communications Inc., Vodafone Group PLC

based on economic feasibility. With the development of the Company, construction of new data centers and other infrastructure, GHG emissions will increase proportionally.

2. "Decarbonization"

The scenario assumes reduction of GHG emissions by 13% by 2032. Implementation of the scenario will require the development of a set of decarbonization measures, setting targets and investing funds to implement a program to reduce GHG emissions. According to the "Decarbonization" scenario, it is planned to reduce GHG emissions by 9.1% through an annual reduction of electricity consumption by 2%[9] and district heating energy consumption by 1%. In addition, it is planned to reduce GHG emissions by 3.9% by purchasing green certificates from RES generation facilities in the amount of 10,700 MWh (Table 1)[10].

Table 1. Forecast of target indicators in two development scenarios

| **Development Scenario** | **1. "Business as usual."** | | **2. "Decarbonization"** | |
|---|---|---|---|---|
| **Indicator name** | Electricity consumption, MWh | Heat consumption from district heating, Gcal | Electricity consumption, MWh | Heat consumption from district heating, Gcal |
| **2021** | 199 190 | 83 613 | - | - |
| **2022** | 202 178 | 83 613 | 198135 | 82 777 |
| **2023** | 205 211 | 83 613 | 197002 | 81 941 |
| **2024** | 208 289 | 83 613 | 195792 | 81 105 |
| **2025** | 211 413 | 83 613 | 194500 | 80 268 |
| **2026** | 214 585 | 83 613 | 193126 | 79 432 |
| **2027** | 217 803 | 83 613 | 191667 | 78 596 |
| **2028** | 221 803 | 83 613 | 190751 | 77 760 |
| **2029** | 225 130 | 83 613 | 189110 | 76 924 |
| **2030** | 228 507 | 83 613 | 187376 | 76 088 |
| **2031** | 231 935 | 83 613 | 185548 | 75252 |
| **2032** | 235 414 | 83 613 | 172923[11] | 74416 |

As of 2022, subsidiaries and other affiliated organizations are not included in the inventory boundary. In the future, it is planned to diagnose the accounting system, quantify greenhouse gas emissions of subsidiaries and include them in the inventory boundary.

The forecast of target indicators allows comparing two scenarios of Kazakhtelecom JSC's development under consideration. According to the "Business as usual" scenario, there will be an increase in electricity consumption in 2032 by 33 thousand MW*h compared to 2022, while the consumption of thermal energy, both own and from district heating is assumed unchanged due to the lack of forecast data. In the "Decarbonization" scenario, the applied measures may result in electricity consumption reduction of about 14.5 thou. MWh in 2022-2032. Heat consumption from district heating will be reduced by about 8 thousand Gcal.

[9] The calculation of the 2% reduction in electricity takes into account the annual increase in consumption under the "Business as usual" scenario

[10] It is possible to redistribute ratios of energy reductions by type

[11] This value takes into account the purchase of green certificates of RES generation facilities in the amount of 10700 MW*h, which is taken as zero in the calculation of indirect emissions Scope 2. Without taking into account the purchase of certificates, the volume of electricity consumption in 2032 is 183623 MW*h.

Taking into account the results of the above scenarios and the Company's objectives, it is proposed to focus on the "Decarbonization" scenario.

### 2.2 Challenges to low-carbon development

The Company faces a number of challenges on the way to achieving its low-carbon development targets:

– The need for modernization.

The planned transition to low-carbon development will be accompanied by widespread modernization, improvement of technological processes in terms of energy efficiency and continuous search for new innovative and technological solutions.

– The need for significant financial investment.

Implementation of decarbonization measures in any manifestation will require significant financial investments. At the same time, the development of "green" technologies is currently a rather expensive initiative.

– Rebuilding the business model.

Low-carbon development requires adaptation of business processes to the impact of climate change, including setting a strategic purpose for decarbonization, taking into account global climate change trends, identified climate risks and opportunities, followed by mitigation and adaptation measures.

## 3. Analysis of the current situation

### 3.1 Description of activities and key performance indicators

The core business of Kazakhtelecom JSC is regulation of infocommunication services of telephony, data transmission networks, BBA access, video conferencing, SIP-telephony (Session Initiation Protocol), IPTV (Internet Protocol Television) and hosting.

In 2021 the Company achieved positive results in implementation of its long-term strategy. The number of fixed lines in Kazakhtelecom JSC's network decreased by 3% compared to 2019. Decrease in the number of fixed lines is explained by the refusal of users from fixed telephony services in favor of mobile communications, which corresponds to the global trends. The number of BBA subscribers increased by 9% compared to 2019, while the number of pay-TV subscribers was 119% compared to 2019. In the case of mobile telephony, the number of subscribers in 2021 decreased by 6% compared to 2019. This reduction is related to the strategy of Kazakhstani operators aimed at development of the corporate sector through complex offers, entering related markets (fixed communications, IT integration, e-commerce, industrial Internet), offering ready industry solutions (Fig. 1).

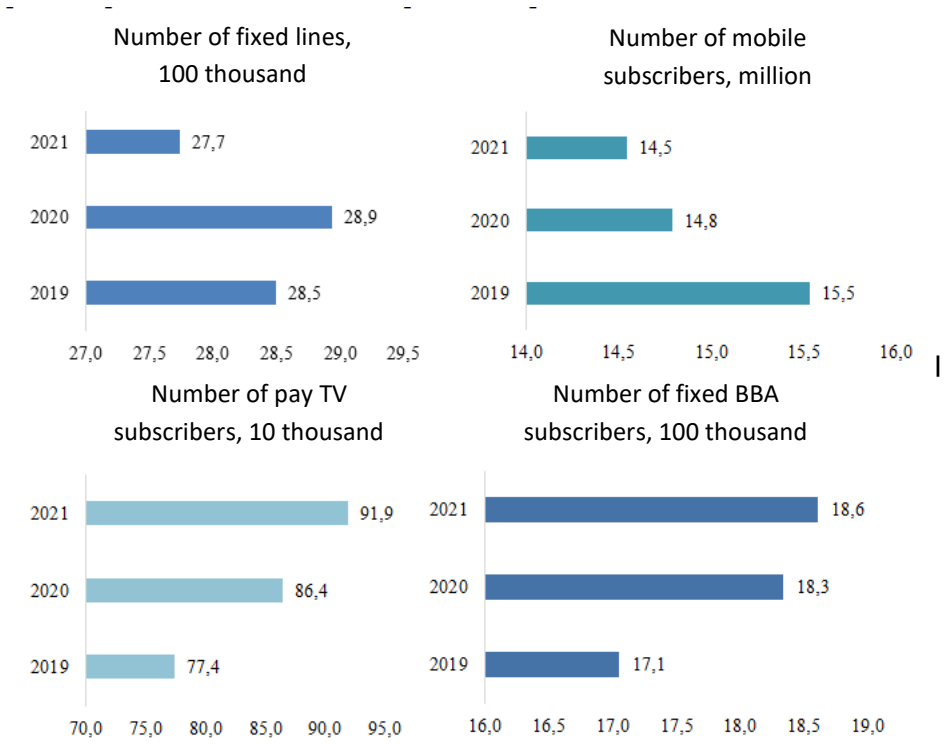


Figure 1. Main production indicators

The growth of pay TV and BBA subscribers is associated with the active implementation of drafts in these areas during the period from 2019 to 2021. In particular, in 2020, Kazakhtelecom JSC provided rural settlements with population of 250 and more with broadband mobile Internet.

Positive dynamics of production indicators over the last three years and a number of implemented drafts aimed at subscriber growth are indicative of the Company's focus on expansion of services and active business development.

### 3.2 Inventory of GHG emission sources

In 2021, the primary inventory of GHG emissions was conducted for the following Kazakhtelecom JSC branches operating in all regions of Kazakhstan:

Corporate Business Division;
Retail Business Division;
Network Division;
Information Technology Division;
Telecom-Complex Directorate;
"Service Factory;
Infocommunication Technology Academy Directorate;
Directorate for construction of telecommunications facilities and infrastructure.

Subsidiaries and other affiliated organizations were not included in the inventory boundary. In the future, the Company plans to expand the scope of the inventory when improving the system for accounting for greenhouse gas emissions.

1. According to the GHG Protocol definition of operational boundaries, the inventory included the identification of GHG emissions associated with the activities of the organization and dividing them into the following categories (Annex 2):

— Direct GHG emissions (Scope 1) - GHG emissions from GHG sources owned or controlled by the organization;
— Indirect energy GHG emissions (Scope 2) - GHG emissions from the production of imported electricity, heat or steam consumed by the organization;
— Other indirect GHG emissions (Scope 3) - GHG emissions other than energy indirect GHG emissions that result from the organization's activities, but arise from GHG sources owned or controlled by other organizations.

The total GHG emissions[12] of Kazakhtelecom JSC by the end of 2021 were estimated by two scopes (Scope 1, Scope 2) and amounted to 254,249 tons CO2-eq. Most of them account for carbon dioxide with a share of 99.9%, the share of methane and nitrous oxide emissions is less than 1% (see Table 2).

| **Total greenhouse gas emissions** | **CO2 emissions** | **CH4 methane emissions** | **N2O nitrous oxide emissions** |
|---|---|---|---|
| | **tons of CO2-eq.** | | |
| **254 249** | 254 167 | 20 | 61 |
| **100%** | 99,9% | 0,008% | 0,03% |

Table 2. Total GHG emissions, tons CO2-eq.

Direct GHG emissions of Kazakhtelecom JSC include the following categories of emissions: stationary and mobile combustion.

Indirect energy GHG emissions of the Company include the following categories of emissions:

1.2.1. Generation of imported electrical energy;

2.2.1. Generation of imported thermal energy.

In 2021, direct GHG emissions were 28,832 tons CO2-eq., indirect energy GHG emissions were 225,417 tons CO2-eq., the share in the total annual volume is 11% or 89%, respectively (Figure 2). The results show the dominance of Scope 2 emissions due to the lack of production processes in the Company. Generation of imported electric energy;

[12] In the future, the Company is considering the possibility of expanding the scope of GHG emissions to include Scope 3

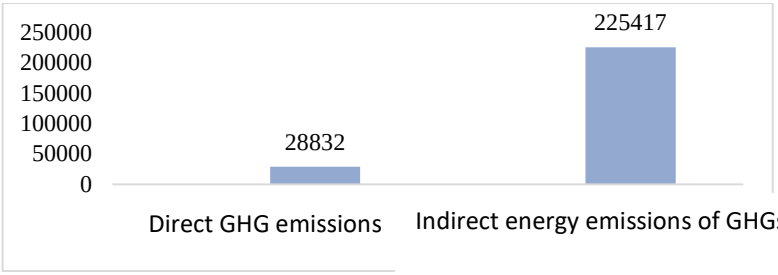


Figure 2: Gross GHG emissions from Scope 1, Scope 2 for 2021

The largest share of indirect energy GHG emissions 73% is associated with the production of imported electricity, 16% of greenhouse gas emissions associated with the production of imported thermal energy from external networks.

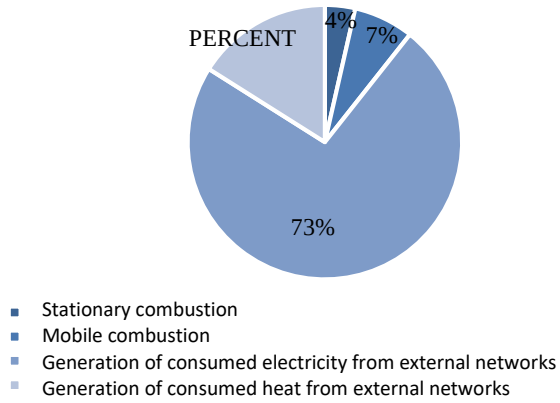


Figure 3: GHG Emissions Structure for 2021, %

Stationary combustion (4%) and mobile combustion (7%) have the lowest share of GHG emissions (Figure 3).

### 3.2.1. Direct greenhouse gas emissions

Direct greenhouse gas emissions in Kazakhtelecom JSC are related to combustion of fossil fuels at the Company's stationary and mobile units. Mobile fuel combustion is conducted as a result of operation of cars, trucks, as well as special-purpose vehicles that are on the Company's balance sheet. The share of emissions from this source category was 7%. Stationary combustion of fuel resources is associated with the operation of boilers and generators designed to produce energy to meet technological needs, the share of emissions amounted to 4%.

Table 3: Direct GHG emissions by type of fuel combustion for 2021.

| Emission source categories | Type of energy resource consumed | Energy consumption, TJ | GHG emissions, tCO2-eq | Percentage, % |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| **Stationary combustion** | Coal | 17,4 | 1 493,4 | 5 |
| | Diesel fuel | 75,8 | 5 704,9 | 20 |
| | Natural gas | 56,7 | 3 131,2 | 11 |
| **Mobile combustion** | Gasoline | 7,7 | 541,5 | 2 |
| | Diesel fuel | 34 | 2 561,5 | 9 |
| | Natural gas | 88,4 | 4 878,2 | 17 |
| | Motor gasoline | 149,8 | 10 521,8 | 36 |
| **Total** | | **429,8** | **28 832,6** | **100** |

The structure of fuel consumption in the above categories is characterized by a high share of gasoline (36%) in mobile combustion and diesel fuel (20%) in stationary combustion. The second largest share of natural gas in the energy consumption structure is due to the Company's implementation of a number of initiatives to switch to a lower-carbon fuel.

### 3.2.2. Indirect energy emissions of greenhouse gases

Indirect energy emissions of greenhouse gases amounted to 89% of gross GHG emissions for 2021. Consumable electrical energy accounts for 73% of GHG emissions, where energy consumers are service and network equipment, climate control equipment, office equipment, room lighting devices, etc. Most of the electricity 76% is consumed for technological purposes due to the continuous functioning of server and network equipment connected to the Internet, as well as uninterrupted power supply and cooling system. Heat energy consumed for space heating and hot water supply needs accounts for 16% of GHG emissions (Table 4)

Table 4: Indirect energy GHG emissions for 2021.

| **Energy consumption** | **Destination** | **Emissions, tCO2-eq.** | **Percentage, %** |
|---|---|---|---|
| **Electric power** | Technological | 140 559,9 | 76 |
| | Administrative and housekeeping | 44 388,1 | 24 |
| **Total** | | **184 948** | **100** |

| | | | |
|---|---|---|---|
| **Consumption of district heat from external suppliers** | Heating and hot water supply | 40 468,7 | 100 |
| **Total** | | **40 468,7** | **100** |

Taking into account the results of the inventory of GHG emissions, significance of categories and sources, decarbonization measures were developed.

## 4. Key areas of low-carbon development

Achievement of low-carbon development objectives is inextricably linked to the development and implementation of decarbonization measures, as well as deep integration of the climate aspect into the Company's business model. Kazakhtelecom JSC identifies for itself four key areas of low-carbon development:

1. Alternative energy;
2. Resource conservation and energy efficiency;
3. Remuneration measures;
4. Monitoring and management of greenhouse gas issues.

### 4.1Alternative energy

**Alternative energy** – is energy based on the use of RES, such as wind, solar, tidal and earth heat energy. Within the framework of this direction Kazakhtelecom JSC considers carrying out measures **to increase the share of RES in the Company's energy balance**. There are a number of scenarios for the use of renewable energy:

- **Construction of RES generating facilities.** The most preferred type of renewable energy installations for the Company are SPP due to the greater flexibility and modularity of the installations, as well as the absence of design restrictions. Currently, the installed capacity of the Company is 3.5 kW. The increase in installed capacity is associated with the use of SPP for power supply of outdoor lighting in data processing centers. The main technological constraint for the widespread use of RES installations is the lack of stability of energy generation due to the variability of solar radiation, wind speed, etc;
- **The purchase of green certificates** implies the purchase of green energy from RES facilities**.** The purchase of green certificates fixes the willingness and interest of the Company to purchase a certain amount of clean electricity. A green certificate is documented information about the fact of electricity production from an alternative source, registered in the register by the generating facility. There are 3 systems for regulating and tracking the origin of green certificates: I-REC, REC (Renewable Energy Certificate) and GO

(Guarantee of Origin). Green certification is the most used mechanism to achieve carbon neutrality by leading companies in the telecommunications industry. In Kazakhstan, the issuer of the I-REC standard is the Association "ECOJER". The cost of I-REC certificates currently varies in the range of 1.8-2.8 USD per 1 MWh, depending on the type of RES generation;

- **Concluding direct agreements for the supply of electricity directly from RES-based power generation plants.** Direct purchase of electricity directly from the energy producer with the help of a settlement and financial center.

### 4.2 Resource Conservation and Energy Efficiency

Reduction of consumption of energy resources by improving energy efficiency and switching to resource-saving technologies is the main area of activity in achieving the purposes of carbon neutrality. Within this direction, Kazakhtelecom JSC considers implementation of measures to reduce consumption of imported electricity, heat and fuel resources during operation of own energy generating facilities (boilers, generator, etc.). Further description of decarbonization measures will be presented in terms of energy resources consumed.

*Imported electrical energy*

Absolute dominance of imported electricity consumption in Kazakhtelecom JSC is due to widespread use of the resource in all structural divisions of the Company for technological and administrative purposes. The list of measures considered for implementation includes:

1. **Modernization of technological equipment** (switching, climatic, server, satellite, etc.) with lower specific power consumption rates compared to existing ones and with a higher coefficient of efficiency of at least 0.94-0.96.

2. **Replacing fluorescent lamps with LED lamps in administrative premises.** The use of modern luminaires with energy-efficient lamps involves the use of LED lamps, whose electricity consumption is 40-60% lower than that of fluorescent lamps. An additional advantage of using energy-efficient lamps is their long service life.

3. **The installation of motion/presence sensors for the lighting system**, will automatically turn on/off the lighting in the room depending on the intensity of natural light flow and/or the presence of people. The advantage of using this equipment is a reduction in energy consumption of up to 80%.

4. **Setting personal computers to hibernate when they are not used for more than 2 hours and installing software to automatically turn off personal computers** will reduce power consumption by up to 20%.

5. **The application of reflective film on the windows.** The measure consists in the use of high-tech self-adhesive film, which reduces the heating of the room in the summer, which also reduces the load on the air conditioner. The advantage of

using reflective films is the reduction of energy consumption by up to 35% for cooling relative to the annual total energy consumption during peak periods with a slight increase in the annual total energy consumption for heating by 2%.

6. **De-duplication and upgrade of copper networks to modern fiber-optic technology.** FTTH technology is any broadband telecommunications data network, which uses in its architecture fiber-optic cable as the last mile to provide all or part of the subscriber line (from the provider's equipment to the home). Currently, a large amount of morally and physically obsolete ATS/MSA/DSLAM equipment for providing services over copper lines is in operation on the networks of cities with FTTH networks built. The draft is implemented in order to optimize costs for maintenance of the access network infrastructure and station equipment, provides for dismantling of ATS, MSA, DSLAMs, including the release of buildings and premises, switching BBA subscribers from copper lines to optical lines.

The following are considered additional measures in the structure of Kazakhtelecom JSC's power consumption for DC:

7. **The use of climate systems that use "free-cooling" technology in the construction of new DC.** The technology uses natural cooling of the object at the expense of the environment without the inclusion of compressors and other energy-intensive equipment. When the air temperature drops outside, there is no need to turn on the heat exchange systems of air conditioners. The advantage of climate systems with free-cooling technology is a 90% reduction in energy consumption compared to those systems that do not have this technology.

8. **Modernization of existing DC** to improve energy efficiency, which includes measures such as the introduction of temperature monitoring, ventilation system optimization, increasing the temperature and relative humidity settings on the computer room air conditioners, etc.

A number of existing buildings and structures on Kazakhtelecom JSC's balance sheet that were built before 2015 do not have energy efficiency class. In this regard, heat losses in old buildings in the structure of energy consumption are increasing and the Company is considering the following measures to improve their resource efficiency:

9. **Thermo-modernization of buildings and structures** (increasing the reflectivity of walls and ceilings) is applicable to old buildings and is aimed at reducing energy consumption through thermal insulation of building envelopes and roofs. The average value of loss of thermal energy in the building accounts for windows and exterior walls and reaches 40%, roofs - up to 8%.

10. **Optimization of used heated rooms** is to reduce non-operated rooms.

*Fuel resources*

Apart from imported heat energy, Kazakhtelecom JSC's balance sheet includes facilities and facilities that do not have access to district heating, but have heat energy based on generation at own boilers and generators. As a measure to reduce GHG emissions at these facilities, the Company is considering **replacing coal with a lower-carbon fuel** (gas), which also includes upgrading the existing equipment. It is worth noting that the value of specific GHG emissions for coal is 40% higher compared to gas.
A similar replacement is applicable to mobile sources of GHG emissions, which implies the **conversion of vehicles from diesel and gasoline fuel to gas**. The value of specific GHG emissions for diesel and gasoline is higher by 26% and 19% compared to gas, respectively.

### 4.3Remuneration measures

In addition to activities aimed directly at reducing GHG emissions, there are also those that allow to compensate for them through the implementation of climate drafts, which are aimed at absorbing, capturing, storing, preventing GHG emissions, etc. An example of a climate draft is a forest-climate draft involving absorption of CO2 emissions by planted forests. The result of implementation of climate drafts are carbon units, expressed by the amount of prevented or absorbed emissions in tons of CO2-eq. The first direction involves the development of a portfolio of offset drafts to be implemented by the Company itself, and the second will be the remuneration of GHG emissions through the purchase of ready-made carbon units from third-party companies.

It is worth noting that to date the practice of offset drafts in Kazakhstan is lacking and investors do not take into account the profits from the sale of CO2 offset units in the financial models of green drafts. In the future, assessment of financial benefits will be taken into account in the planning of green drafts.

### 4.4Monitoring and management of greenhouse gas issues

Within the framework of the Program, the Company provides for building a corporate system for monitoring, reporting and management of GHG emissions. With a view to a unified approach, Kazakhtelecom JSC is considering developing a full list of internal corporate documents regulating the issues related to carbon management. The Company plans to carry out an annual inventory of sources of GHG emissions, to disclose, calculate and verify GHG emissions in accordance with the requirements of local and international reporting practices, as well as on the relevant standards and guidelines on monitoring and reporting on greenhouse gases (the IPCC guidelines, ISO 14064 standards, GHG Protocol).

Kazakhtelecom JSC also plans to work on the disclosure of information on the financial assessment of climate risks in accordance with the recommendations of TCFD and CDP. The preparation will touch upon the practices of corporate governance (including the consolidation of the authorized body for climate issues), strategic planning,

risk assessment and control. Implementation of TCFD recommendations will strengthen and develop corporate risk management practices in the area of carbon neutrality.

In 2022, as part of the primary inventory of sources and quantification of GHG emissions, the Company developed ERs and GGRs describing the structure of primary data and production facilities that consume energy resources, as well as basic methodological approaches for determining gross GHG emissions.

In 2022, an ER and GGR was developed that includes structural data for primary production facilities that consume energy resources. In the interests of achieving the purposes of low-carbon development, the Company will develop a corporate document to unify the requirements for reporting on energy flows, GHG emission flows in terms of their reduction.

Within the framework of improving the system of management of Kazakhtelecom JSC's emissions and disclosure, Kazakhtelecom JSC is considering measures for transition to an automated system of accounting and management of primary input data that are used in quantitative assessment of GHG emissions. The automation of the collection processes will reduce the probability of error. Data accuracy will also improve granularity in terms of energy flow metering, by increasing the number of meters capturing energy consumption for various purposes.

In order to achieve the purposes of low-carbon development, the Company will develop a unified program to reduce energy consumption at the level of the Joint Stock Company, which will include, among other things, measures for energy audits and the implementation of energy management.

The Company is considering introducing the criterion of carbon intensity of products when carrying out procurement activities, including the development of a policy on the implementation of procurement activities, which will determine the requirements for management processes, procurement planning and supplier selection.

Within the framework of ESG business transformation being conducted in order to improve competitiveness and reduce exposure to long-term non-financial risks, Kazakhtelecom JSC plans to obtain ESG-rating by 2023.

## 5. 3 Closing regulations

The Low-Carbon Development Program of Kazakhtelecom JSC is the main document within the framework of implementation of the strategic objective on reduction of greenhouse gas emissions in accordance with the Environmental Code of the Republic of Kazakhstan and the Charter of Kazakhtelecom JSC. The strategic objective of Kazakhtelecom JSC is to reduce carbon footprint by 2032, with a further purpose to achieve carbon neutrality by 2060.

This Program provides for two main scenarios of the Company's development until 2032: "Business as usual" and "Decarbonization". The chosen "Decarbonization" scenario implies the implementation of a set of measures for the transition to low-carbon development (Annex 1). The main directions of achieving the reduction of carbon footprint are measures in the field of alternative energy, resource efficiency and grid infrastructure, remuneration measures, monitoring and management of GHG issues. Implementation of measures in these areas will provide long-term sustainability and investment attractiveness of Kazakhtelecom JSC.

**Annex 1**
to the Low-Carbon Development Program of Kazakhtelecom JSC for 2022-2032**.**
**Plan for transition to low-carbon business model**

| № | General activities | Unit of measure | The effect of shrinkage | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | **2022** | **2023** | **2024** | **2025** | **2026** | **2027** | **2028** | **2029** | **2030** | **2031** | **2032** |
| 1 | Reduction of imported electricity consumption [13] | % | -2% | -4% | -6% | -8% | -10% | -12% | -14% | -16% | -18% | -20% | -22% |
| 2 | Reduction of imported heat energy | % | -1% | -2% | -3% | -4% | -5% | -6% | -7% | -8% | -9% | -10% | -11% |
| 3 | Task Force on Climate-related Financial Disclosures (TCFD) reports | Draft | | Stage 1 (Preparation) | Stage 1 (Preparation) | Stage 3 (Implementation) | Implementation | Implementation | Implementation | Implementation | Implementation | Implementation | Implementation |
| 4 | Obtaining a rating in CDDreporting | Draft | | | | Implementation | Implementation | Implementation | Implementation | Implementation | Implementation | Implementation | Implementation |
| 5 | Increasing the RES share in energy consumption/Purchase of certificates | MWh | | | | | | | | | | | 10700 |
| 6 | Forming a portfolio offset drafts | thousand tons of CO2-eq. | | | | | | | | Implementation | | | |
| 7 | Obtaining an ESG rating | | | Impleme | Impleme | Impleme | Impleme | Impleme | Impleme | Impleme | Impleme | Impleme | Impleme |

[13] The plan to reduce imported electricity and heat will be reviewed based on the results of diagnostics of the system of accounting and quantification of GHG emissions of subsidiaries and other affiliated organizations and in connection with their inclusion in the inventory boundary.

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | ntation | ntation | ntation | ntation | ntation | ntation | ntation | ntation | ntation | ntation |
| **8** | Total GHG emission reductions (Scope1+Scope2) | % | -0.7 | -1.4 | -2.2 | -2.9 | -3.8 | -4.6 | -5.2 | -6.1 | -7.1 | -8.1 | -13.0 [14] |

**Annex 2**
to the Low-Carbon Development Program of Kazakhtelecom JSC
for 2022-2032

## Structure of energy consumption

| Type of energy resource consumed | Unit of measure | Consumption volume |
|---|---|---|
| Imported electricity | MWh per year | 199190 |
| Imported heat energy | Gcal | 83613 |
| Coal (stationary combustion) | TJ | 17 |
| Diesel fuel (stationary combustion) | TJ | 76 |
| Gasoline (stationary combustion) | TJ | 8 |
| Natural gas (stationary combustion) | TJ | 57 |
| Gasoline (mobile combustion) | TJ | 150 |
| Diesel oil (mobile combustion) | TJ | 34 |
| Natural gas (mobile combustion) | TJ | 88 |

[14] This value takes into account the reduction of GHG emissions from the purchase of green certificates by 3.9%. Without taking into account the purchase of certificates, the reduction of GHG emissions in 2032 will be 9.1% due to measures to reduce electricity and heat consumption.