MINISTRY OF ENERGY, MINING AND MINERAL RESOURCES

MACEDONIAN STATEMENT ON SECURITY OF GAS SUPPLY

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Contents

LIST OF ABBREVIATIONS

CARDS	*COMMUNITY ASSISTANCE FOR RECONSTRUCTION, DEVELOPMENT, AND STABILISATION*
CEE	*CENTRAL AND EASTERN EUROPE*
CFCD	*CENTRAL FINANCING AND CONTRACTING DEPARTMENT*
TPES	*TOTAL PRIMARY ENERGY SUPPLY*
CPC	*COMMISSION OF PROTECTION OF COMPETITION*
CRES	*CENTRE FOR RENEWABLE ENERGY SOURCES AND SAVINGS*
DSO	*DISTRIBUTION SYSTEM OPERATOR*
ED	*ENERGY DEPARTMENT*
EA	*ENERGY AGENCY*
EBRD	*EUROPEAN BANK FOR RECONSTRUCTION AND DEVELOPMENT*
EC	*EUROPEAN COMMISSION*
ECS	*ENERGY COMMUNITY SECRETARIAT*
ECT	*ENERGY CHARTER TREATY*
EE	*ENERGY EFFICIENCY*
EEAP	*ENERGY EFFICIENCY ACTION PLAN*
USAID	*UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT*
EPBD	*DIRECTIVE 2002/91/EC ON ENERGY PERFORMANCE OF BUILDINGS*
EPC	*ENERGY PERFORMANCE CONTRACT*
ERC	*ENERGY, WATER SERVICES AND MUNICIPAL WASTE MANAGEMENT SERVICES REGULATORY COMMISSION*
ESCO	*ENERGY SERVICE COMPANY*

ESIA	*ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT*
EU	*EUROPEAN UNION*
EUD	*EUROPEAN UNION DELEGATION*
GDP	*GROSS DOMESTIC PRODUCT*
GEF	*GLOBAL ENVIRONMENTAL FACILITY*
GHG	*GREENHOUSE GASES*
Government	*MACEDONIAN GOVERNMENT*
WtE	*WASTE-TO-ENERGY*
WTO	*WORLD TRADE ORGANISATION*
IEA	*INTERNATIONAL ENERGY AGENCY*
IPA	*INSTRUMENT FOR PRE-ACCESSION ASSISTANCE*
IRR	*INTERNAL RATE OF RETURN OF AN INVESTMENT*
IT	*INFORMATION TECHNOLOGY*
Ktoe	*1000 TONS OF OIL EQUIVALENT*
LSGUs	*LOCAL SELF-GOVERNMENT UNITS*
MACORA	*MACEDONIAN COMPULSORY OIL RESERVES AGENCY*
MANU	*MACEDONIAN ACADEMY OF SCIENCES AND ARTS*
MFA	*MINISTRY OF FOREIGN AFFAIRS*
MERMS	*MINISTRY OF ENERGY, MININING AND RAW MATERIALS*
MoF	*MINISTRY OF FINANCE*
WB	*WORLD BANK*
Mtoe	*MILLION TONNES OF OIL EQUIVALENT*
NGO	*NON GOVERNMENTAL ORGANISATION*
WG	*WORKING GROUP*
NPV	*NET PRESENT VALUE OF THE CASH FLOW OF AN INVESTMENT*
OECD	*ORGANISATION OF ECONOMIC COOPERATION AND*

	DEVELOPMENT
PA	*PUBLIC ADMINISTRATION*
WtB	*WASTE-TO-BIOMETHANE*
PCA	*PARTNERSHIP AND COOPERATION AGREEMENT*
PCM	*PROJECT CYCLE MANAGEMENT*
PD	*PROJECT DIRECTOR*
PPP	*PUBLIC-PRIVATE PARTNERSHIP*
PSC	*PROJECT STEERING COMMITTEE*
QAS	*QUALITY ASSURANCE SYSTEM*
RE	*RENEWABLE ENERGY*
RES	*RENEWABLE ENERGY SOURCES*
RESMD	*REGIONAL ENERGY SECURITY AND MARKET DEVELOPMENT*
RES-H	*RENEWABLE ENERGY SOURCES – HEATING*
RUE	*RATIONAL USE OF ENERGY*
SAA	*STABILISATION AND ASSOCIATION AGREEMENT*
SC	*STEERING COMMITTEE*
SCM	*STEERING COMMITTEE MEETING*
SE	*SUSTAINABLE ENERGY*
SEA	*SECRETARIAT FOR EUROPEAN AFFAIRS*
TPP	*THERMAL POWER PLANT*
UN	*UNITED NATIONS*
UNDP	*UNITED NATIONS DEVELOPMENT PROGRAMME*
UNIDO	*UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANISATION*

1 LEGAL REGULATION ON SECURITY OF SUPPLY

According to the Energy Comunity Treaty (ECT), an update of the security of supply statement for the gas is to be carried out every year and for electricity sector to be carried out every two years. In addition, Article 18 of the Energy Law, requires an annual security of supply for the gas sector

1.1 The Ministry of Energy, Mining and Mineral Resources

The Ministry of Energy, Mining and Mineral Resources is the newly established institution in the country that performs duties referring to:

- energy, energy policy and planning of development in the area of electricity, natural gas, oil and oil derivatives, heating energy and thermal waters, as well as other types of energy and their use;
- energy supply;
- conducting procedures for selection and appointment of governance bodies, management and supervision of legal entities in the area of energy fully or dominantly owned by the country;
- strategy and policy for energy security;
- rational use of energy and energy efficiency, renewable energy resources;
- coordination of the work and realization of energy investments;
- mining, strategy and mining development policy;
- exploitation of minerals and geological resources;
- geological research and research related to exploitation of minerals;
- preparation of a programme for research works in the area of basic geological research related to sustainable use of resources;
- supervision under their authority; and
- other works and duties defined by law.

1.2 Energy Law

Scope of the Energy Law

In May 2025 was established the new Law on Energy and its amendment (Official Gazette No. 101/2025 and 135/2025)and it is the primary piece of legislation that regulates the domestic energy sector. With this law, in accordance with the Decision of the Ministerial Council of the Energy Community No. 2021/13/MC-EnC, alignment is carried out with Directive (EU) 2019/944 of the European Parliament and of the Council of 5 June 2019 on common rules for the internal market for electricity and amending Directive 2012/27/EU (CELEX No. 32019L0944); Regulation (EU) 2019/943 of the European Parliament and of the Council of 5 June 2019 on the internal market for electricity (CELEX No. 32019R0943); Regulation (EU) 2017/1938 of the European Parliament and of the Council of 25 October 2017 concerning measures to safeguard the security of gas supply and repealing Regulation (EU) No. 994/2010 (CELEX No. 32017R1938); Regulation (EU) 2022/1032 of the European Parliament and of the Council of 29 June 2022 amending Regulations (EU) 2017/1938 and (EC) No.

715/2009 as regards gas storage (CELEX No. 32022R1032); Regulation (EU) No. 1227/2011 of the European Parliament and of the Council of 25 October 2011 on wholesale energy market integrity and transparency (CELEX No. 32011R1227); and Regulation (EU) No. 2015/1222 of the European Commission of 24 July 2015 establishing guidelines on capacity allocation and congestion management (CELEX No. 32015R1222).

The Energy Law governs:

- the objectives and manner of implementing the energy policy;
- energy activities, the manner and conditions for their performance;
- the rights and obligations of energy consumers and users of energy systems;
- the procedure for determining and fulfilling the obligations for providing public services in the supply of electricity, gas and heat;
- security of energy supply;
- the status, competence and manner of operation of the Regulatory Commission for Energy, Water Services and Municipal Waste Management Services (hereinafter referred to as: the Energy Regulatory Commission);

Objectives of the Energy Law

The objective of this Law shall be to provide:

- secure, safe and quality energy supply to consumers;
- an efficient, competitive and financially sustainable energy sector, based on the principles of non-discrimination, objectivity and transparency, which ensures a high level of security and quality in energy supply;
- promotion of consumer rights and their active role in energy markets;
- protection of the rights of energy consumers, including vulnerable consumers;
- fulfilment of public service obligations, as well as protection of the rights and interests of users of energy systems;
- safe, secure and efficient operation, maintenance and development of electricity and gas transmission and distribution systems, transport of crude oil or oil derivatives through oil pipelines or product pipelines, as well as heat distribution systems in order to provide a high level of services for the needs of the users of these systems;
- readiness of the energy sector to deal with energy crises;
- application of the established internationally agreed rules for cross-border exchange of electricity and gas, as well as cooperation of the operators of the electricity and gas transmission systems and the nominated operator of the organized electricity market with the relevant operators from other countries within the framework of the organized forms of cooperation of the operators;
- participation and connection with the regional and European electricity and gas markets in accordance with the rights and obligations arising from international agreements ratified in accordance with the Macedonian Constitution (hereinafter: the ratified international agreements);
- cooperation between the country and the other contracting parties of the Energy Community and the Member States of the European Union for the purpose of preventing, preparing for and managing crisis situations in the supply of electricity and gas based on the principles of solidarity, transparency, non-discrimination and competition;
- ownership unbundling of the electricity transmission system and the gas transmission system; and
- environmental protection and mitigation of climate change from the negative impacts of the performance of energy activities.

In accordance with Article 11 of the Energy Law, the energy policy is geared towards securing:

- secure, safe and quality supply of consumers with all types of energy;
- stability, competitiveness and economic functionality of the energy sector;
- efficient provision of services and protection and promotion of consumer rights;
- reduction of energy poverty and protection of vulnerable consumers;
- integration of the Macedonian energy markets into regional and international energy markets;
- use of energy sources in a manner that ensures sustainable energy development;
- promotion of energy efficiency;
- reduction of the use of fossil fuels for energy production;
- encouragement of the use of renewable energy sources;
- compliance with regional development policies;
- appropriate use of degraded land for energy purposes;
- protection of public health, the environment and mitigation of climate change from the harmful impacts arising from the performance of energy activities and fulfillment of the Macedonian obligations arising from ratified international agreements.In order to achieve the goals of energy policy, the competent state authorities and the operators of the Macedonian energy systems shall cooperate with scientific, educational and professional institutions and organizations, the competent authorities and bodies, entities or legal entities of other countries, as well as with the authorities and bodies at the regional and international level established by ratified international agreements.

1.3 Energy, Water services and Municipal waste management services Regulatory Commission

The Energy, water services and municipal waste management services regulatory commission is the single legal entity that regulates issues pertaining to the performance of energy activities and which is an independent body in terms both of its operation and decision-making. The Energy Regulatory Commission (ERC) was established by the Law for amending the Energy Law (Official Gazette 94/2002) and became operational in 2003. The ERC is composed of five members, one of which acts as its president. The members and the president of the ERC are appointed and dismissed by the Macedonian Parliament, upon proposal of the Government, after taking in consideration the adequate and just representation of all communities.

1.4 Competences of the Energy Regulatory Commission

By exercising its competence established by the Energy Law and other laws, and taking into account the objectives of energy policy, the Energy Regulatory Commission shall ensure:

- competitive, secure and sustainable energy markets in the country and their inclusion in regional and international energy markets;
- opening of markets for all consumers and suppliers in the Energy Community and the European Union;
- removing restrictions on trade in electricity and gas, including providing adequate cross-border transmission capacities to meet demand and facilitate electricity and gas flows in the Energy Community and the European Union;

- developing secure, reliable, competitive and efficient energy systems oriented towards users;
- strengthening the functions of markets in ensuring a secure and sustainable energy supply;
- optimizing the use of electricity and gas by energy system operators in order to improve energy efficiency;
- facilitating access for new users to the electricity and gas transmission and distribution systems and the heat distribution system, as well as for energy market participants, in particular producers of electricity from renewable sources and energy storage;
- increasing the efficiency of the systems and accelerating the integration of the markets through short-term and long-term incentive measures for operators and users of the transmission and distribution systems of the appropriate type of energy;
- protecting and promoting consumer rights and achieving high standards in fulfilling the obligation of public and/or universal service in the supply of electricity, gas and heat;
- achieving high standards in the provision of public and universal service in energy supply, in particular with regard to the protection and promotion of the rights of vulnerable consumers and the provision of necessary information to consumers, in particular on the procedure for changing electricity or gas supplier and
- providing compensation for justified costs, including necessary costs for information and communication technology and infrastructure costs, and enabling the operators of regulated energy activities to provide efficient and reliable regulated services.

Monitoring functions of the Energy Regulatory Commission

The Energy Regulatory Commission shall monitor and supervise the functioning of the energy markets in order to:

1. strengthen the efficiency, competitiveness, integrity and transparency of the energy markets;

2. detect irregularities, distortion of competition and forms of unfair competition on the market, as well as other activities on the energy markets contrary to the laws, other regulations and obligations set out in the licenses for carrying out energy activities and

3. detect and prevent trading in energy products on the wholesale market based on inside information and manipulation of the wholesale markets in energy products, including attempted manipulation of the wholesale markets in energy products.

In order to effectively exercise the competence referred above, the Energy Regulatory Commission shall monitor in particular:

- the fulfillment of the legally established obligations of the providers of regulated energy activities relating to ensuring security of supply of electricity, gas and heat;
- the functioning of the energy markets in order to ensure their promotion and security of supply of energy, including the development of competitiveness and the degree of opening of the wholesale and retail energy markets;
- the application of the rules and conditions or methodologies that, in accordance with this Law, the providers of energy activities apply directly or after prior approval by the Energy Regulatory Commission;

- the implementation of plans for the development of energy transmission and distribution systems and, where necessary, request or recommend changes to these plans;
- access to networks for new generation plants for the production and storage of electricity, in particular the removal of obstacles that could prevent the access of new participants to the market for electricity produced from renewable energy sources and to energy storage facilities and publish a national report every two years, including recommendations;
- priority dispatchable quantities of electricity and restrictions on priority network access and/or priority dispatching;
- conditions for access to storage capacities in the gas transmission system and other gas system services;
- the use of revenues generated from congestion management in electricity and gas transmission systems;
- the use of revenues from fees for access and connection to energy transmission and distribution networks and their investment in the sustainability of the networks;
- the time required by transmission and distribution system operators to connect new users and to eliminate faults;
- the application of cybersecurity rules to generation facilities and energy transmission and distribution systems;
- the compliance of the operations of electricity and gas transmission and distribution system operators with regard to the safety and reliability of the systems;
- timely publication of all relevant information by transmission and distribution system operators in accordance with accepted international obligations and standards, related to energy consumption, production, storage and losses, system and interconnection management, network use and allocation of capacities to interested parties, demand balancing, estimated and planned energy quantities and changes in the structure of energy production, storage and transmission capacities, the technical condition of energy transmission and distribution systems before and after reconstruction or rehabilitation after a major incident;
- the level of transparency of electricity and gas prices in the relevant markets, the financial and real volume of planned and realised transactions by energy transmission and distribution system operators, as well as energy traders and suppliers;
- changes in the ownership structure of energy operators, in particular energy transmission and distribution system operators;
- the application of tariff systems and prescribed tariffs;
- the application of the conditions and fees for the connection of new electricity generation and storage facilities to the grid;
- the performance of licensees in relation to their obligations set out in the issued licenses, including matters related to cross-border electricity and gas transmission;
- the emergence of restrictive contractual obligations, including exclusivity provisions that prevent consumers from concluding contracts with multiple energy suppliers at the same time or that may restrict their right to choose a supplier, and to notify the Commission for the Protection of Competition thereof;
- the implementation of measures to protect consumer rights by transmission and distribution system operators, as well as suppliers, in particular with

regard to:

- the rights of consumers to obtain data on their own consumption, the method of calculating the delivered energy and the elements of the bill for the delivered energy;
- obtaining complete and understandable information regarding the prices and tariffs applicable to household energy prices;
- the methods of paying bills for consumed energy;
- notification of consumers about the consequences of the non-functioning of energy transmission and distribution systems due to reconstruction or rehabilitation after a major accident;
- disconnections of users from the systems;
- fees for repairs and maintenance of networks;
- handling of complaints and grievances and complaints submitted by consumers and provision of information to consumers relating to their rights to electricity supply contracts with dynamic pricing, aggregation contracts and installation of smart metering devices;
- the realization of benefits for consumers arising from the efficient functioning of energy markets, the promotion of effective competition and from measures taken to protect consumers;
- the compliance of electricity supply prices with the requirements of Article 6 of this Law;
- the quality of services provided by energy operators, including the manner in which complaints from consumers are handled;
- the implementation of the obligations to maintain separate accounting for persons performing one or more regulated energy activities or one or more regulated energy activities and another energy activity or another activity, as well as the effective separation of accounting records in accordance with this Law;
- the implementation of the programs for the harmonization of operators of the relevant energy systems, in order to ensure non-discrimination, transparency and objectivity in the functioning of the energy markets;
- the regularity of the publication of data on the conditions in the electricity transmission system and the gas transmission system and their submission to the relevant international bodies;
- investments in electricity generation capacities in relation to the security of energy supply;
- determining and monitoring the implementation of measures and procedures for the protection and promotion of the rights of vulnerable consumers established by this Law;
- the compliance of the operations of the entities responsible for the implementation of market coupling functions;
- technical cooperation between transmission system operators, electricity and gas market operators with the relevant operators from the contracting parties of the Energy Community and the Member States of the European Union;
- activities for trading in energy products on the wholesale market in order to detect and prevent trading based on inside information and manipulation of the wholesale energy products market, including attempted manipulation of the wholesale energy products market;
- monitors the operation of the electricity system and coordination within the joint system management region and reports to the ECRB/ACER as necessary.

1.5 Public service obligations

An obligation on public service provision is defined in the Energy Law as one or more obligations imposed to the entities performing regulated energy activities for the purpose of public interest realization pursuant to the present law, and related to safety, including the reliability of supply, service affordability for users at all times, energy or energy fuel quality and price, services, as well as environmental protection, including energy efficiency and climate change protection.

As regards the description of a "*regulated energy activity*", such an activity is defined as an energy activity by means of which the public service is provided and performed under terms and conditions, manner, prices and tariffs stipulated, i.e., approved by the Energy and Water ServicesRegulatory Commission.

In the Energy Law, the following activities are regulated activities and the entities performing these activities are subject to public service obligations**:**

- electricity transmission;
- organization and management of the electricity market with bilateral agreements;
- electricity distribution;
- gas transmission;
- organization and management of the gas market;
- gas distribution;
- regulated production of heat;
- distribution of heat;
- supply of heat;

management of an organized electricity market;The Energy Law also states that entities performing regulated energy activities shall be obliged to comply with the obligations on public service provision.

The Government, upon a proposal from the Ministry or the local self-government units and after having previously obtained an opinion from the Energy Regulatory Commission and an opinion or decision from the Commission for Protection of Competition, may also adopt a decision imposing on a performer of an unregulated energy activity an obligation to provide a public service for a certain period of time.

The purpose of the public service is to ensure:

1. security, including security of supply;
2. regularity, quality and price of supply;
3. efficient and economical use of natural resources intended for energy production;
4. improvement of energy efficiency;
5. greater use of energy from renewable sources; or
6. environmental protection and climate change mitigation.

In the decision, the public service obligation must be clearly defined, non-discriminatory, easily verifiable and guarantee equal access of consumers to the public service, not distort competition on the Macedonian market, in the region and in the European Union, except to the extent necessary for the achievement of the general economic interest, as well as establish the financial, technical and personnel conditions that must be met by the provider of the unregulated energy activity on which the public service obligation is imposed.

If the purpose of imposing a public service obligation relates to the price of supply, when adopting the decision, these requirements must be taken into account.

1. not to exceed the requirements for ensuring the general economic interest;
2. prices shall be clearly defined, transparent, non-discriminatory and easily verifiable, with the verification of prices being carried out by the Energy Regulatory Commission;
3. guaranteeing equal access of energy operators from the contracting parties of the Energy Community and the Member States of the European Union to Macedonian consumers;
4. the application of prices shall be time-limited and appropriate to the needs of users;
5. not to create additional costs for market participants in a discriminatory manner and
6. the results obtained from the applied Methodology for measuring the level of energy poverty in the country.

The Ministry shall immediately notify the Energy Community Secretariat of the decision mentioned above, as well as of the possible impacts on the functioning of the electricity or gas market, and shall inform it every two years of the need to extend the obligation to provide a public service.

The energy operator on which the obligation to provide a public service has been imposed by the decision shall be granted a compensation for providing a service of general economic interest in a transparent and non-discriminatory manner in accordance with the state aid regulations, which shall compensate the energy operator for its losses, taking into account the opinion or decision of the Commission for the Protection of Competition. The Energy Regulatory Commission shall, in the license for performing the energy activity of the operator of the unregulated energy activity, specify the conditions and manner for fulfilling the obligation to provide a public service determined in the decision, and in particular the scope and content of the public service, the area in which the public service is provided, as well as the duration and necessary quality of the service in fulfilling the public service obligation. The Energy Regulatory Commission shall, at least once a year, publish a report comparing the prices at which the public service is provided and the prices on the relevant energy market and submit it to the Commission for Protection of Competition and the Council for Consumer Protection. The report shall contain an assessment of the impact of fulfilling the obligation to provide a public service on competition on the relevant energy market.

1.6 Gas suppliers of last resort

The Energy Law defines the Electricity Supplier of Last Resort and Gas Supplier of Last Resort.

Gas supplier of last resort is a gas supplier that provides the public service on gas supply to consumers connected to the gas system in the cases stipulated under the law.

Under the Energy Law the natural gas supplier of last resort is obligated to secure supply to consumers connected to the natural gas transmission or distribution system, for exercising their right to natural gas supply at all times, under reasonable and clearly comparable and transparent prices set by the Energy Regulatory Commission. Added to this, the suppliers of last resort are required to provide this public service and are obliged to secure electricity or natural gas supply to households or small consumers that have not signed contracts with any of the suppliers, or if their previous suppliers have discontinued the implementation of obligations assumed under the supply contracts. Lastly, it is stipulated that, in the case of natural gas supply

of last resort to consumers, such supply shall be performed under approved and controlled prices that shall not prevent competition and normal operation of natural gas markets.

The supplier of last resort for electricity or the supplier of last resort for gas shall be obliged to supply consumers who are left without a supplier in the event that:

1. the previous supplier has ceased to fulfil its supply obligations under the existing electricity or gas supply contracts;
2. the previous supplier is unable to supply due to the fact that bankruptcy proceedings have been initiated against it with personal management or at the request of a creditor or liquidation proceedings have been initiated;
3. the consumer has not concluded a new contract for the supply of electricity or gas after the termination or expiry of the existing supply contract;
4. the license of the previous supplier has been suspended, permanently revoked or has ceased to be valid; or
5. the previous supplier has had its contract for participation in the electricity market or the gas market suspended or terminated.

1.7 Energy security

The safeguarding of the security of energy supplies is one of the key aims of the Energy Law: Article 17 expressly states that reliability of the relevant energy type or energy fuel supply shall be secured, in particular, by means of:

- achieving a balance between supply and demand on the market of the appropriate type of energy, including possible substitution with another type of energy, another direction of supply and energy storage;
- forecasting the level of expected future demand for an appropriate type of energy and the possibilities for meeting the forecasted demand with the available energy sources and capacities;
- ensuring an appropriate level of energy production and storage capacities by implementing measures for the construction of new and upgrading of existing capacities;
- construction of new, upgrading and expansion of existing ones and ensuring a high quality and high level of maintenance of the transmission and distribution networks of the appropriate type of energy;
- applying measures for efficient use of energy and for reducing or limiting consumption, determined by this and other laws;
- improving the level of electricity and gas interconnections;
- encouraging the implementation of measures to increase the efficiency of energy networks, aggregation and demand-side management;
- adopting and monitoring the implementation of measures and activities to ensure cybersecurity of the network and information systems, which are an integral part of the energy transmission and distribution systems, as well as of the management systems for electricity generation facilities, in accordance with the provisions of this Law, the National Cybersecurity Strategy and the Action Plan of the National Cybersecurity Strategy, as well as other regulations that provide for measures and activities to ensure cybersecurity;
- use of emergency energy supply services with neighboring countries and services for coordination of security of supply from the Regional Coordination Center and
- application of emergency measures of a temporary nature in the event of inability to deliver an appropriate type of energy, determined by this Law.

The Energy Law further compels State authorities and entities performing regulated energy activities, as part of their stipulated rights, obligations and competences, to propose and undertake measures aimed to secure reliability of energy supply.

Also, the Energy Regulatory Commission is charged with the supervision of the compliance of entities performing regulated energy activities with the obligations on securing reliability of supply, and in its annual report is required to include data related to:

- the operational security of the systems, including the application of cybersecurity measures to the network and information systems, which are an integral part of the energy transmission and distribution systems, as well as of the systems for managing electricity generation facilities;
- the balance between supply and demand in the energy markets during the reporting period;
- the levels of expected energy demand, the electricity storage and generation capacities that ensure security of supply, which are under construction or whose construction is planned in the next five years;
- measures to deal with the inability to cover peak demand by one or more suppliers and the possibilities for ensuring security of energy supply in the period from five to 10 years, after the year for which the report is prepared;
- planned investments for the integration of production capacities and large consumers with special reference to investments in networks required for the integration of renewable energy sources and
- planned investments in interconnection capacities for the next 10 years.

1.8 Energy balance

The Government, with an energy balance as an indicative planning document, shall determine the total energy needs and the needs of certain types of energy, the possibilities for their satisfaction from domestic production and from imports, for a period of one year, as well as the greenhouse gas emission factor for the produced MWh.

The Government, upon a proposal from the Ministry, after a previously obtained opinion from the Energy Regulatory Commission, shall adopt the energy balance for the following year by 31 December of the current year.

The Ministry shall monitor the implementation of the energy balance for the current year, and, when necessary, shall propose appropriate measures to the Government. The Minister of Energy, Mining and Mineral Resources (hereinafter referred to as: the Minister) shall adopt a Rulebook on Energy Balances and Energy Statistics, which shall prescribe:

1. the form, content and manner of preparation of the energy balance;
2. the content, manner and deadline for submitting the data required for preparation and monitoring of the implementation of the energy balances;
3. the methodology for determining the greenhouse gas emission factor for MWh produced for fossil fuel power plants and on average for the total electricity produced; and
4. the type of data required for preparation and monitoring of the implementation of the energy balance.

For the preparation and monitoring of the energy balance, upon request of the Ministry, the state administration bodies and local self-government units, energy activity providers, as well as energy consumers, are obliged to submit the necessary data within the deadlines specified in the Rulebook referred above. The data shall also be submitted for the purposes of preparing the strategies, programs, action plans and reports, the adoption of which is provided for by the Law.

1.9 Acts for declaration of crisis

One of the principal priorities of the Macedonian Government in the energy sector is connected with need to ensure the national goal of security of energy supplies and to tackle any unexpected event, which might jeopardise the reliability and security of energy supplies. For this purpose, Article 43 of the Energy Law states that, on the proposal from the Ministry, by means of an act, the Macedonian Government shall stipulate in detail:

- The Ministry shall initiate a procedure for declaring a gas supply crisis in accordance with the Law on Crisis Management and the regulation referred to the Energy Law, whereby one of the following crisis levels may be declared:
  1. “early warning” level, in the event that there is precisely defined, clear, serious and reliable information that a certain event may result in a significant deterioration of the gas supply situation and that this may lead to the activation of the “alarm” or “emergency” crisis levels;
  2. "alarm" level, in case when due to the interruption in gas supply or unusually high gas consumption the gas supply may deteriorate, however the market mechanisms can still cope with the interruption or high demand, without the need to activate non-market-based measures or
  3. "emergency" level in case when due to unusually high gas demand, a significant interruption in gas supply or other significant deterioration in gas supply and when all applied market-based measures are insufficient to meet the gas demand and therefore non-market-based measures need to be applied, primarily to ensure the gas supply to protected consumers.

2. STRATEGY FOR ENERGY DEVELOPMENT

According to the Energy Law the Strategy for Energy Development shall determine:

- the long-term goals for the development of individual energy activities in order to ensure security of supply of various types of energy;
- the priorities for the development of the energy sector;
- priorities in connecting the Macedonian energy systems with the energy systems of other countries;
- connecting the Macedonian energy markets with regional and international energy markets;
- determining and using energy resources and capacities of strategic interest to the state;
- sources and methods for providing the necessary quantities of energy;
- long-term forecasting of investment needs in production, transmission and distribution capacities and storage facilities in order to meet energy needs;
- the method of implementing the planned investments and providing the necessary financial resources;
- the potential of renewable energy sources,

- including energy storage possibilities,
- as well as measures to support the use of renewable energy sources, in order to increase the
- share of energy produced from renewable sources in the gross final energy consumption;
- energy efficiency measures and measures to stimulate their implementation;
- measures to reduce the use of fossil fuels for energy production;
- the conditions and methods for ensuring environmental protection and climate change mitigation, as well as measures to implement protection;
- encouraging competition in energy markets;
- consumer protection and
- other elements of importance for the development of the Macedonian energy sector.

2.1 Energy Development Strategy until 2040

By adopting to the new Energy Development Strategy until 2040 in December 2019 the Macedonian energy sector has become the first one in the Western Balkans region to consider coal phase-out by 2030.

The Strategy defines five energy pillars with six strategic goals, closely interlinked with the five dimensions of the EU Energy Union Strategy:

-security, solidarity and trust;

-a fully integrated internal energy market;

- energy efficiency;

-decarbonizing the economy;

- research, innovation and competitiveness.

The Strategy have three scenarios: reference, moderate transition and green.

The realization of each scenario envisages a different budget, 9.4 million euros for reference scenario, 13 billion euros for moderate scenario and 17.5 billion euros for green scenario.

The new Energy Development Strategy until 2040 suggests high penetration of RES and projects like hydro-pumped storage plant energystorage for balancing.This approach gives full uncertainty for the future energy supply in the country because the Strategy put focus only on electricity sector and practically there is no interdependency with the natural gas as a backup, no flexibility, no vision for X-P or X-P-X which is in contradictory with the previous gatherd experience and engineering practice of many experts dealing with the energy issue in the world (Rinaldi). This can be evidenced with the latest blackouts that the electricity systems experienced in Spain, Portugal and Czech Republic.

3. MACEDONIAN NATURAL GAS SYSTEM

3.1 Regulatory framework in gas sector

The Law on Energy (Official Gazette No. 101/2025 and 135/2025), is the primary piece of legislation that regulates the domestic energy sector. The Energy Law is aligned with the:

-Directive (EU) 2019/944 of the European Parliament and of the Council of 5th June 2019 concerning common rules for the internal market in electricity and amending Directive 2012/27/EU;

-Regulation (EU) 2019/943 of the European Parliament and of the Council of 5th June 2019 on the internal market in electricity;

-Regulation (EU) 2017/1938 of the European Parliament and of the Council of 25th October 2017 concerning measures to safeguard security of gas supply and repealing Regulation (EU) No. 994/2010;

-Regulation (EU) 2022/1032 of the European Parliament and of the Council of 29 June 2022 amending Regulations (EU) 2017/1938 and (EC) No. 715/2009 with regard to gas storage;

-Regulation (EU) No. 1227/2011 of the European Parliament and of the Council of 25 October 2011 on the integrity and transparency of wholesale energy markets and

-Regulation (EU) No. 2015/1222 of the European Commission of 24 July 2015 establishing guidelines on capacity allocation and congestion management.

Pursuant to the above quoted directives and regulations, the Law establishes effective legal framework for cooperation, mutual reporting and coordination of the activities of the competent authorities of the country with the relevant institutions of the Energy Community in relation to the obligations for reporting on security of supply, coordinated management in crisis situations, reporting on the imposition and monitoring of the fulfilment of the obligations for providing public and universal service and the possibility for coordinated activities regarding the functioning and the development of regional energy markets, especially in the allocation of interconnection capacity, balancing and managing third party access to energy systems.

3.1.1 Secondary legislation

As stipulated in the Energy Law, a number of secondary legislative acts have been enacted to further formulate and refine the legal regime governing the performance of natural gas activities. In what follows, we shall give a concise account of these acts and the issues they respectively address.

The Natural Gas Transmission Grid Code

Pursuant to the e Energy Law, the natural gas TSO is obliged to adoptand, upon previous approval from the Energy Regulatory Commission, to publish in the “Official Gazette” and on its website the Natural Gas Transmission Grid Code.The existing Grid Code for transmission of natural gas was prepared by AD GA-MA, the natural gas transmission system operator, which was approved by the Energy Regulatory Commission on 30th of March 2009 (“Official Gazette” No. 45/2009).However, JSC Nomagas amended the Grid Code in 2022 in order to be in compliance with the Energy Law(“Official Gazette” No. 285/2022.

The natural gas transmission Grid Code specifically governs:

- the technical and other conditions for safe and safe operation of the natural gas transmission system,
- the technical and technological conditions and the manner of connection of the facilities, devices and installations of the natural gas transmission system,
- the procedure for granting consent of the users for connection to the transmission network, as well as the cooperation and obligations of the transmission system operator,
- the methodology for determining the fee for connection to the transmission network,
- the conditions and method of access of a third party to the transmission system, as well as the manner of determining the guarantees for payment of the services for transmission of natural gas,
- the manner of compliance with the users of the natural gas transmission system in cases of planned interruptions,
- the contents of the plans for development and maintenance of the transmission system, as well as the manner and procedure according to which the system users submit the necessary data for the preparation of those plans,
- the manner and procedure for forecasting the needs of natural gas, as well as the obligations of the users of the natural gas transmission system with regard to the supply of the necessary data necessary for the preparation of the forecasts for the needs of natural gas,
- measures, activities and procedures in case of disturbances and accidents,
- the functional requirements and the accuracy class of the measuring devices, as well as the manner of measuring the quantities of natural gas,
- technical criteria for the provision of system services,
- the manner and procedure for publication and allocation of the available transmission capacity and management of overloads in the natural gas transmission system,
- the manner and procedure for access to installations and measurement-regulation stations that are integral part of the transmission system and are owned by consumers or users,
- the quality of the services provided by the operator of the natural gas transmission system to the users,
- the operation of the operational management systems,
- the manner of publishing information that, in accordance with the provisions of this Law, is obliged to be published,
- the manner and procedure for providing the information for users of the system, and
- the manner of cooperation with the operators of the natural gas transmission systems to which it is connected, as well as with the operators of the distribution systems connected to the natural gas transmission system.

Gas Supply Rules

Pursuant to the Energy Law, the ERC issues the Natural Gas Supply Rules.These rules,determine the general terms and conditions governing the supply of natural gas, as well as the mutual rights, obligations and responsibilities of natural gas suppliers, customers, the operator of the natural gas transmission system, and the natural gas distribution system operators, and especially:

- the conditions, the manner and the term of concluding the contract for supply with the appropriate type of energy,

- the method of measurement, calculation, invoicing and recovery of the delivered energy,
- consumers to whom the delivery cannot be interrupted and the manner of providing guarantees for settling the expenses for the consumed energy,
- the manner and procedure for changing the supplier by consumers and exercising the right to a consumer without compensation, to change the supplier,
- the quality of services provided by energy suppliers,
- the minimum conditions and the manner of organizational setup and technical equipment of the energy suppliers for providing communication with the consumers in order to provide the prescribed quality of the services provided by the supplier,
- the supplier's obligations to the different categories of consumers and the specificity of each category of consumers in terms of their financial and negotiating ability,
- the manner and procedures for communication and exchange of information between the energy supplier and the operator of the appropriate system in order to ensure the prescribed quality of the energy and services provided by the operators,
- the conditions and the procedure for exclusion of consumers from the transmission or distribution systems in cases where consumers do not fulfil the obligations determined by law, other regulation and / or contract,
- the manner, the form and deadline for submission of reports, which energy suppliers and the respective operators are obliged to submit to the Energy and Water Services Regulatory Commission,
- the necessary information that suppliers are obliged to provide to consumers in their accounts in a timely manner, as well as information that should be made publicly available and of interest to all consumers,
- conditions and ways to supply vulnerable consumers and
- special measures for consumer protection.

The ERC issued the Natural Gas Supply Rules on 1stof March 2019 and amended the same on 08th of February 2024.

Natural Gas Market Rules

The Energy Regulatory Commission also adoptsRules for the natural gas market, based on the principles of transparency, non-discrimination and competitiveness, which are particularly regulated:

- the establishment, organization and control of natural gas trading and ancillary services, including cross-border trading,
- the conditions to be met by the participants in the natural gas market,
- rights and obligations of the participants in the natural gas market
- the procedure and the manner of collecting and submitting data to the Energy Regulatory Commission in relation to the condition state and occurrences with the natural gas market.
- other issues concerning the organization and functioning of the natural gas market

Natural Gas Market Rules were adopted on 18th of June 2019 by ERC and amended on 28th of December 2022 .

Gas Distribution Grid Codes

As required by the Energy Law, the adoptionof the Natural gas distribution Grid Codes will specify:

- the technical conditions for connection of natural gas consumers to the natural gas distribution system,
- the methodology for determining the fee for joining the natural gas distribution system,
- the conditions and the method of access of a third party to the system,
- the technical and other conditions for the reliable and safe operation of the distribution system and for the provision of quality services to the users of the system,
- measures, activities and procedures in case of outages and crisis situations,
- the manner and procedure for supervision and testing of the natural gas distribution network,
- the manner and procedure for regulating the flow and pressure of natural gas through the distribution network,
- the manner and procedure for harmonization of the activities in the natural gas distribution system with the activities in the natural gas transmission system,
- the functional requirements and the accuracy class of the measuring devices, as well as the manner of measuring the quantities of natural gas,
- planning for the maintenance and development of the natural gas distribution system,
- the manner of compliance with the users of the natural gas distribution system in cases of planned interruptions,
- the content of the plans for the development of the natural gas distribution system, as well as the manner and procedure according to which the system users submit the necessary data for the development of the development plans,
- the quality of the service for the delivery of natural gas,
- the forecast of the needs of natural gas, on the basis of the data obtained from the suppliers and the plans for the development of consumers,
- the manner and procedure for providing information to the users of the system, and
- the manner of cooperation with the transmission system operator and other operators of natural gas distribution systems.

ERC approved the Natural Gas Distribution Grid Codes for TIDZ on 11th of January 2024 and for Kumanovo-Gas on 31st of October 2024.

Decree on dealing with the energy crisis

The Government, upon a proposal from the Ministry and following a prior opinion from the Energy Regulatory Commission pursuant to Article 45 of the Energy Law , shall adopt Decree on measures and activities for managing the gas supply security crisis.

The Decree shall, in particular, regulate:

- the manner of exercising the competences of the Ministry and the performers of regulated energy activities for transmission and distribution of electricity and gas in relation to the determination, proposal and implementation of measures and activities for preparedness for dealing with risks;

- the manner and conditions under which certain operational tasks and activities of the Ministry related to preparedness for dealing with risks may be transferred to certain performers of regulated energy activities for transmission or distribution of electricity and

gas;

- the form, content and procedure for preparing scenarios for preparedness for dealing with risks in the electricity sector and the gas sector, as well as the procedure for determining and evaluating the scenarios;

- the form, content and procedure for preparing the risk preparedness plan and the prevention plan and intervention plan, as well as defining and implementing measures to mitigate the risk and strengthen the resilience of the electricity and gas transmission and distribution systems;

-the procedure for managing the supply of electricity and gas in a state of electricity crisis and gas supply security crisis;

-the exchange of information with the competent authorities of the other contracting parties of the Energy Community from the relevant region or the Member States of the European Union, as well as other regional and international institutions and bodies for energy security;

-the criteria for determining the threshold for sending an early warning and for declaring a crisis and taking measures and activities to deal with an electricity crisis and a crisis in the security of gas supply;

-the procedures and mechanisms for issuing an early warning or announcement of an electricity crisis and a crisis in the security of gas supply, as well as the actions taken upon receipt of the relevant notifications and warnings from another contracting party to the Energy Community or a Member State of the European Union;

-the mechanisms for activating and implementing energy security measures in accordance with the risk preparedness plan and the prevention plan and intervention plan;

-the gas supply criteria;

-the procedures and mechanisms for cooperation and appropriate assistance with another Contracting Party to the Energy Community or a Member State of the European Union and with international bodies for energy crisis management;

- the measures for assistance to another Contracting Party to the Energy Community or a Member State of the European Union in the relevant region for coordinated system management or to another directly connected Contracting Party or a Member State of the European Union, which may be provided or exchanged in the event of an energy crisis;

-the manner and procedure for communicating with the public and providing information to the media on the results of the measures taken and the measures to be taken; and

- the manner and procedure for monitoring and reporting on the management of the energy crisis and the impact of the energy crisis on energy systems, as well as the evaluation of the consequences of the energy crisis.

The Balancing Rules

Pursuant to the e Energy Law, the natural gas TSO is obliged to adopt and, upon previous approval from the Energy Regulatory Commission, to publish in the “Official Gazette” and on its website the Balancing Rules. They specifically governs:

-the rights and obligations of balancing service providers;

-the procedure for the procurement of balancing services;

-the methodology for setting prices for balancing services, as well as the procedure for their calculation, invoicing and collection, which should be non-discriminatory, reflect the actual costs incurred and enable the minimization of balancing costs;

-the manner of determining the activated quantities of balancing services that are settled between balancing service providers and

-the financial settlement with balancing service providers and balance responsible parties.

-the responsibilities of balance responsible parties, including the conclusion of balance responsibility agreements

-the form, content and manner of maintaining a register of balancing service providers and a register of balance responsible parties

-the manner of calculating imbalances between nominated and realized transactions based on measurements made by TSOs and DSOs

JSC Nomags published its Balancing Rules in Official Gazete of RM No.285/22 on 28th December 2022.

The Tariff Systems

The Energy Regulatory Commission for the purpose of exercising its competence will adopt the tariff systems for transmission and distribution of natural gas, as well as for the services provided by the gas market operator and the operator for the natural gas market, shall determine the manner of establishing the tariffs for regulated services determined by applying the appropriate methodologies referred to in Article 28 of the Energy Law.

ERC adopted the tariff systems for transmission of natural gas on 28th of December 2022 and its amendments on 18th of December 2023 and on 21st of December 2024,

ERC adopted the tariff systems for distribution of natural gas on 24th of December 2018 and its amendments on 18th of December 2023.

Certification Rulebook

The Energy Regulatory Commission for the purpose of exercising its competence also adopts Rulebook on Certification of Transmission System Operator and Transmission System Operator of Natural Gas.

The Rulebook on Certification of Transmission System Operator on Electricity and Transmission System Operator of Natural Gas was adopted on 1stof August 2018.

Based on the Rulebook on Certification of Transmission System Operator on Electricity and Transmission System Operator of Natural Gas, JSC Nomagas was certified as nominated Transmission System Operator for Natural Gas on 04th of July 2024.

3.1.2 Cooperation measures

Pursuant to Article 35 the Ministry is responsible(Competent Authority) for undertaking measures for the protection of security in the gas supply.

Acording to Article 33 of the Energy Law the Ministry, within the framework of the agreed regional and bilateral measures and in accordance with the principle of solidarity, and taking into account the technical capacity of the Macedonian electricity system, shall cooperate and act jointly with the other Contracting Parties to the Energy Community and the Member States of the European Union in preventing and managing electricity crises.

In order to achieve the above mentioned cooperation, the Ministry shall agree with the competent authorities of the Contracting Parties to the Energy Community and the Member States of the European Union the necessary technical, legal and financial arrangements for the implementation of the regional or bilateral measures before the assistance is offered, in particular with regard to:

-the activation of any type of assistance and the termination of the provision of assistance;

-the maximum quantity of electricity to be delivered at regional or bilateral level and the method of delivery; and

- the fair compensation to be paid for the assistance provided, consisting of: the costs of providing the electricity; the costs of transmitting the electricity supplied to the territory of the Energy Community Contracting Party or the European Union Member State requesting the assistance; the costs actually incurred by the Energy Community Contracting Party or the European Union Member State providing the assistance, including the costs of the assistance provided but not activated; and all costs arising from legal proceedings, arbitration proceedings or similar proceedings and settlements.

3.1.3 Measures to cover peak demand

In the Energy Law in Article 211 paragraph (2) point (21) is stated:

The natural gas transmission system operator shall be obliged, in accordance with this Law and the regulations and rules adopted on the basis of this Law,among other things

to address peak loads in the natural gas transmission network, pursuant to the Natural Gas Transmission Grid Code.

3.1.4 The regulatory incentives for new investment

The Energy Law in Article 215 prescribes that:

For each regulated period the gas transmission system operator shall prepare and submit for approval to the Energy Regulatory Commission plans for investment in the transmission system, which shall in particular present the expected increase in the efficiency of the system operation as a result of the envisaged investments.

The Energy Regulatory Commission shall ensure that the costs of implementing the above stated investments are reimbursed through the gas transmission tariff

3.1.5 Gas Infrastructure Standard

Pursuant to Article 36 of the Energy Law the gas transmission network rules shall establish an obligation for the gas transmission system operator in the event of an interruption of gas delivery through the largest gas transmission pipeline to ensure, by applying the N-1 criterion determined by the gas transmission network rules, the technical capacity of the remaining transmission infrastructure to satisfy the total gas demand in the country during one day with exceptionally high demand, which is determined according to statistical calculations and occurs once in 20 years, taking into account gas consumption trends, the results of the application of energy efficiency measures and the utilization rate of the existing gas pipeline infrastructure.
It must be noted that, considering that currently the country has only one gas interconnection (with Bulgaria), the N-1 formula is equal to 0. However, the

implementation of gas project interconnection with Greece in 2027 and additional one with Serbia is expected to increase the level of the security of supply above 100%, depending on the gas demand scenario. Additional gas transmission capacity should be introduced to the gas system in order to maintain the security of supply at riskless level.

3.1.6 Gas supply criterion

Pursuant to Article 37 of the Energy Law the Ministry, in accordance with the supply criterion determined by the Ordinance for crisis situation, shall, by decision, order the gas supplier with a public service obligation to take measures for uninterrupted gas supply to protected gas consumers in the event of:

1. extreme temperatures for a period of seven days or in cases that, according to statistical probability, occur once in 20 years;

2. unusually high gas demand for a period of 30 days that, according to statistical probability, occurs once in 20 years and

3. an outage in the largest gas transmission pipeline for a period of 30 days under average winter temperature conditions.

3.1.7 Protected gas consumer

A protected gas consumer is a household connected to the gas distribution system, public institutions offering primary social services connected to a gas transmission or distribution system, as well as a heat producer that produces heat for the needs of households, small consumers, and which cannot use any other fuel than gas, where the total gas consumption of small and medium consumers and public institutions offering primary social services does not exceed 20% of the total gas consumption in the country.

3.1.8 Obligation to provide storage capacity

In order to ensure security of gas supply, pursuant to Article 38 of teh Energy Law the Government shall adopt a decision imposing a public service obligation on one or more licensees for the performance of energy activities in the supply, transmission and storage of gas, to lease storage capacity from a gas storage operator or another gas trader or supplier from another contracting party to the Energy Community or a Member State of the European Union in which a gas storage facility is located, no later than 1 November each year.

The total storage capacity to be provided shall allow for the storage of quantities of gas equal to at least 15% of the average annual consumption in the country in the previous five years or a quantity that is possible given the technical limitations of the cross-border gas transmission capacities, whereby if those technical limitations do not allow for the fulfillment of the obligation to provide a lease of storage capacity, the obligation shall be deemed to be fulfilled if, instead of gas, the participant.

3.1.9 Risk Assessment

Pursuant to Article 39 of the Energy Law the Ministry shall carry out an assessment of the risks that may affect the security of gas supply in the country. The assessment shall be prepared by the gas transmission system operator at the request of the Ministry after

prior consultation with the gas distribution system operator, gas suppliers and traders, gas consumers, electricity producers and the electricity transmission system operator, as well as with the Energy Regulatory Commission.
For the Risk Assessment (Q1 2026) the Ministry will use the available JRC technical support ''Collaboration EC-JRC / Ministry of Energy, Mining and Mineral Resources''.

3.1.10 Prevention and Intervention Plan

Pursuant to Article 40 of the Energy Law the Ministry shall adopt:

- a Prevention Plan containing measures necessary to eliminate and mitigate the risks identified in the risk assessment referred to in Article 39 of this Law, including the effects of energy efficiency and demand-side management measures, and

-an Intervention Plan containing measures to be taken to eliminate or mitigate the effects of gas supply interruptions.

The Ministry shall, by decision, oblige the gas transmission system operator, after prior consultation with the gas distribution system operator, gas suppliers and traders, gas consumers, electricity producers and the electricity transmission system operator, and in cooperation with the Energy Regulatory Commission, to prepare the plans within four months of the preparation of the risk assessment.

For the Prevention and Intervention Plan(Q2 2026) the Ministry will use the available JRC technical support ''Collaboration EC-JRC / Ministry of Energy, Mining and Mineral Resources''

3.1.11 Declaration of a gas supply crisis

Pursuant to Article 43 the Ministry shall initiate a procedure for declaring a gas supply crisis in accordance with the Law on Crisis Management and the Ordinace for crisis situation, whereby one of the following crisis levels may be declared:

-“early warning” level, in the event that there is precisely defined, clear, serious and reliable information that a certain event may result in a significant deterioration of the gas supply situation and that this may lead to the activation of the “alarm” or “emergency” crisis levels;

-"alarm" level, in the event that due to the interruption in gas supply or unusually high gas consumption, gas supply may deteriorate, but market mechanisms can still cope with the interruption or high demand, without the need to activate non-market-based measures; or

- "emergency" level in the event that due to unusually high gas demand, a significant interruption in gas supply or other significant deterioration in gas supply occurs and all market-based measures applied are insufficient to meet the need for gas and therefore non-market-based measures need to be applied, primarily to ensure the supply of gas to protected consumers.

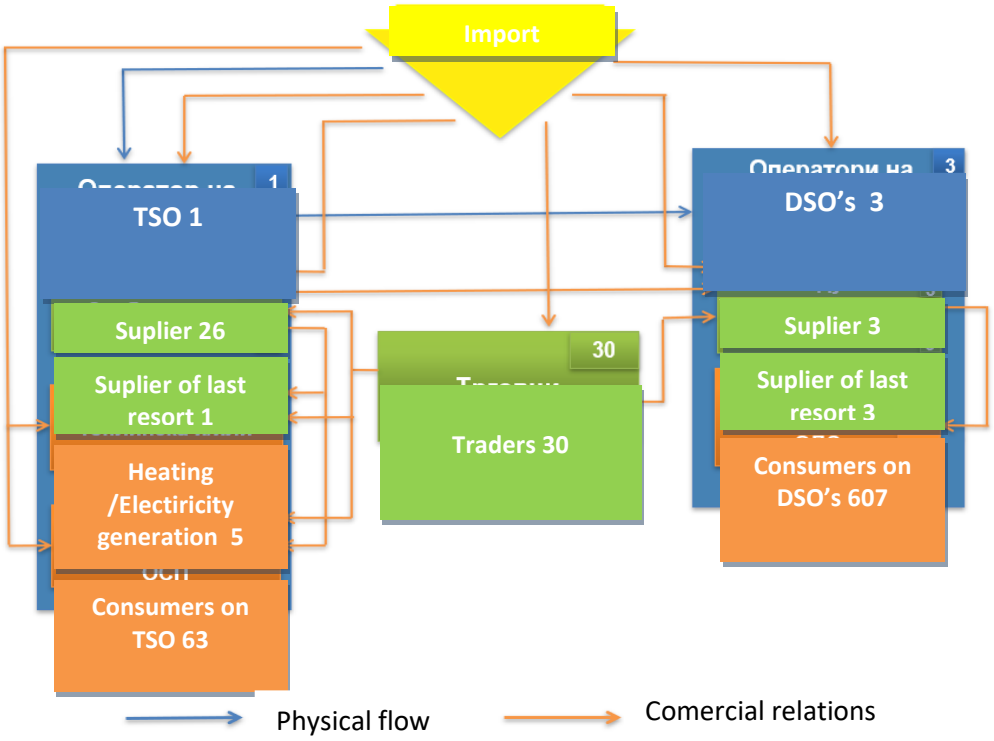
3.1.12 Exchange of information

Article 44 stated that in the event of a declared gas supply crisis the affected licensees for carrying out energy activities in the field of gas shall be obliged to submit to the Ministry on a daily basis information in particular on:
-forecasts of the daily quantities of gas demanded and offered, expressed in kWh;

-daily gas flow at the points of entry and exit of the gas transmission system, as well as at all points of connection of the system to a gas storage facility or a liquid gas terminal; and
-the period, expressed in days, for which it is expected that the gas supply to protected consumers will be ensured.

3.2 KEY MARKET PARTICIPANTS AND THEIR RESPONSIBILITIES

As it has already been stressed, the Energy Law, has set up the prerequisites for the full opening-up of the Macedonian natural gas market by regulating all issues related to the legal and financial aspects pertaining to the performance of natural gas transmission, transmission system operation, distribution and supply activities. In the next sections, we shall present a concise account of the key participants in the domestic natural gas sector and describe in brief their respective functions and tasks.



Picture1. Macedonian natural gas market scheme

The Gas Transmission System Operator

The gas transmission system operator shall maintain, upgrade and expand the gas transmission network, manage the gas transmission system and ensure connection with other systems, including gas transmission systems of other countries.

The gas transmission system operator shall be obliged, in accordance with the Energy Law and the regulations and rules adopted on the basis of the Energy Law:

-to contribute to the security of gas supply,

by ensuring reliable, safe, economically viable and high-quality transmission and delivery of gas through the transmission system;

-to ensure reliable and secure operation of the gas transmission system and improve its operability;

- to have at all times the material, technical and human resources, as well as financial funds necessary for the fulfillment of its obligations in relation to the development, upgrade and maintenance of the gas transmission system;

-to provide all information necessary for access to and use of the gas transmission system and to provide access to the users of the gas transmission system;

-in accordance with the gas transmission network rules, to connect gas distribution systems, biomethane and hydrogen producers and gas storage facilities to the gas transmission system, and to connect other users to the gas transmission system if this is economically justified;

-to publish on its website the transmission tariffs, previously approved by the Energy Regulatory Commission;

-to build new and upgrade existing transmission networks in the country;

-to build new and upgrade existing interconnection capacities with neighboring countries, taking into account the efficient use of existing interconnection capacities and the balance between investment costs and benefits for consumers;

- to ensure cross-border gas flows through its transmission network within the available transmission capacity;

-to develop an annual maintenance plan for the transmission system and, after its approval by the Energy Regulatory Commission, to publish it on its website;

-to develop a final daily transmission and load schedule for the gas transmission system and to record and store the data obtained in the process of developing the final daily schedule;

-to ensure daily dispatching and real-time management of gas flows, taking into account internal and cross-border transactions through the gas transmission system, based on the final daily schedule;

-to ensure synchronized operation of the gas transmission system with the transmission systems to which it is directly connected, as well as to cooperate and exchange data with operators of other gas transmission systems;

-to publish data and timely provide information from operators of neighboring gas transmission systems on the available transmission capacities of interconnectors or transnational gas pipelines, in order to ensure efficient, non-discriminatory, objective and transparent access to and use of the gas transmission system;

-to ensure the installation and maintenance of metering devices and to measure the gas flow at all metering points at the reception and delivery points in the transmission system and to deliver the measurement data to system users and the gas market operator;

- to provide access to users of the gas transmission system for reading the metering devices in their possession;

-to procure system services for balancing the gas transmission system, in accordance with the rules for balancing the gas transmission system;

-to establish and maintain a register of balancing service providers and a register of balance responsible parties;

-to prepare rules for the procurement of gas to cover losses and for own needs in the gas transmission system and submit them to the Energy Regulatory Commission for approval;

-to procure gas to cover losses and for own needs in the gas transmission system in order to ensure secure and reliable operation of the gas transmission system under market conditions in a transparent, non-discriminatory and competitive manner;

-to resolve congestion in the gas transmission network, in accordance with the gas transmission network rules;

- to ensure balancing of the gas transmission system and settlement of deviations and balancing services, in relation to providers and users of balancing services, as well as to ensure the calculation, invoicing and collection of balancing services;

- to keep records and schedule of physical transactions and to determine the necessary changes in the gas dispatch schedule in the event of a threat to gas supply, accidents or major deviations in gas consumption from the determined quantities within the technical capabilities of the gas transmission system, whereby the costs of gas procurement, with the application of the balancing mechanism.

The Gas Market Operator

The Natural Gas Market Operator is a company that carries out activities related to the organization, efficient operation and development of the organized natural gas market and is obliged to provide confidentiality of the commercial data that the participants in the natural gas market submit. ERC in cooperation with the natural gas market operator and the natural gas transmission system operator shall adopt rules for the natural gas market that regulate the organization and functioning of the market, the conditions that market participants should fulfil, the elements of the contracts for the participation in the market, the establishment, organization and control of natural gas trading and ancillary services, including cross-border trading, as well as the procedure and the manner of collecting and submitting data to the ERC in relation the situation and the phenomena on the market. Until the establishment of a market operator, this function will be performed by the operator of the natural gas transmission system.

Gas Distribution System Operator

The gas distribution system operator for a certain area of the Macedonian territory in which it distributes gas shall maintain, and when economically viable, upgrade and expand the distribution system it manages and connect it to the gas transmission system.

The gas distribution system operator, in accordance with the Energy Law and the regulations and rules adopted on the basis of the Energy Law, shall be obliged to:

-ensure reliable, reliable, economically viable and safe operation of the gas distribution system it manages;

-ensure reliable, safe and quality gas delivery through the gas distribution system it manages in a non-discriminatory and transparent manner, and in accordance with the prescribed quality;

- in accordance with the gas distribution network rules, connect biomethane and hydrogen producers and gas storage facilities to the gas distribution system, and connect other users to the gas distribution system if economically justified;

- enable third-party access to use the gas distribution system;

- provide information to other gas distribution system operators, as well as the gas

transmission system operator, in a timely manner;

- provide users of the gas distribution system with the information necessary for efficient access to the system in a timely manner;

- provide suppliers with electronic access to the list of consumers that does not include households, as well as their consumption for the last 12 months;

- to publish on its website a list of fees for each category of consumers, which has been previously approved by the Energy Regulatory Commission;

- to develop, upgrade and maintain the gas distribution system it operates and to ensure the long-term ability of the system to meet justified gas distribution demands;

- to harmonize the operation of the gas distribution system with the operation of the gas transmission system;

- to prepare a plan for the maintenance of the distribution network, and after its approval by the Energy Regulatory Commission, to adopt it and publish it on its website;

- to procure system services and gas to cover losses in the distribution network under market conditions in a transparent, non-discriminatory and competitive manner, in accordance with the gas procurement rules;

- to measure the quantities of gas taken from the gas transmission system and delivered to consumers and to submit the measurement data to gas suppliers or traders, the gas transmission system operator, the gas market operator and, in accordance with this Law and the regulations adopted on the basis of this Law, to any other party that may request them;

- to enable users to access the metering devices owned by the gas distribution system operator in accordance with this Law and the gas distribution network rules;

- to keep a dispatch book, records of the confidentiality of communication systems, data from the monitoring and management system, measurement data and to keep such data for a period of at least 10 years;

- to ensure the confidentiality of business data of users of the distribution system and to prevent a discriminatory manner of disclosing information about its activities that could achieve a commercial advantage for related companies and

- not to misuse confidential information obtained from a third party in relation to providing access to the gas distribution system **Natural Gas Suppliers** The gas supplier shall purchase gas in the country and/or from abroad for the purpose of sale to its customers, including electricity and/or heat producers, other suppliers, traders, the gas transmission or distribution system operator and other participants in the gas market.

The gas supplier who has undertaken to supply gas shall ensure the necessary transmission and/or distribution capacity from the relevant operators.

The gas supplier, based on the measurements carried out by the relevant distribution system operator, shall invoice its customers for the delivered gas at the agreed price, including in the invoice the fees for the use of the transmission system, the fee for the use of the gas market and/or the fee for the use of the gas distribution system.

The gas supplier shall be obliged, in accordance with the Energy Law and the regulations and rules adopted on the basis of the Energy Law, to:

-fulfil its obligations towards consumers in relation to the security and volume of gas supply;

-provide its consumers with a service of quality set out in the gas supply rules;

-ensure non-discriminatory treatment of all consumers;

-provide the gas transmission system operator with data on transactions and gas consumption plans for its consumers, necessary for the calculation of imbalances;

-enable consumers to receive regular and accurate notifications on actual consumption and gas costs, so that they can manage their consumption;

-pay for the purchased quantities of gas, as well as system services from the gas transmission system operator and/or gas distribution system operator;

-enable a change of supplier in a transparent and non-discriminatory manner, at no cost to the consumer, within a period not exceeding three weeks from the date on which the consumer submitted a request for supply to the new gas supplier;

-ensure that, in the event of any change of gas supplier, the consumer receives final closure of the account within six weeks of the change of supplier;

-establish procedures for the effective resolution of its customers' complaints within 60 days, including the possibility of out-of-court dispute resolution and an obligation to return and/or compensate funds where justified;

-publish on its website the terms and conditions of gas supply contracts for each category of consumers; and 11. operate on the principles of objectivity, transparency and non-discrimination and publish general statistical data related to its consumers, as well as its activities, taking into account the protection of data confidentiality.

Natural Gas Supplier with a Public Service Obligation

The gas supplier with a public service obligation when providing the public service of gas supply, shall be obliged to:

-inform consumers of their rights and the conditions for gas delivery within the framework of the public service;

- apply the gas price established in accordance with the tariff system;

- inform consumers of the conditions for supply and the price of gas, as well as to inform them that they have the right to choose another gas supplier;

- supply gas, as a public service, to households and small gas consumers within the territory for which it has a license to provide the public service of gas supply;

- procure gas on market terms and select the best offer that enables it to ensure the efficient provision of the public service; and

- publish on its website the prices for supply within the framework of the public gas supply service.

The prices for gas charged by a gas supplier with a public service obligation shall:

- be objective and transparent;

- reflect the costs of purchasing and supplying gas;

- be easily comparable with the prices of other gas suppliers; and

- do not discriminate between consumers of the same category.

Gas Supplier of Last Resort

Gas Supplier of Last Resort is obliged to supply consumers who have not been provided with a natural gas supplier in the event that:

- the previous supplier has ceased to fulfil its supply obligations under the existing electricity or gas supply contracts;

- the previous supplier is unable to supply because bankruptcy proceedings have been initiated against it with personal management or at the request of a creditor or liquidation proceedings have been initiated;

- the consumer has not concluded a new electricity or gas supply contract after the termination or expiry of the existing supply contract;

- the license of the previous supplier has been suspended, permanently revoked or has ceased to be valid; or

- the previous supplier has had its contract for participation in the electricity or gas market suspended or terminated. The natural gas supplier, of Last Resort, sells natural gas at market prices, which it publishes on its website and updates at least once a month and has the right to request an instrument for securing payments from consumers, other than households and small consumers. After the conducted tender procedure, the Government shall make a decision on the election of the supplier with the obligation to provide a natural gas supply of Last Resort.

Natural Gas Consumers

Every gas consumer may, at his/her own choice, be supplied with gas from a supplier, in accordance with the conditions established by the Energy Law and the rules for gas supply.

By way of exception, consumers participating in the wholesale gas market may also purchase gas from gas traders.

Consumers participating in the wholesale gas market shall, in order to meet their needs, provide adequate transmission and/or distribution capacity or may transfer that obligation to their suppliers or traders.

Consumers purchasing gas from suppliers or traders of gas shall have the right to obtain all relevant consumption data from their suppliers or traders. The content of the data to be provided by the gas supplier shall be regulated in more detail by the rules for gas supply. The natural gas market is fully liberalized starting from 1st of January 2015.

3.3 THE EXISTING NATURAL GAS SYSTEM

3.3.1 Transmission and distribution

On Macedonian territory there are neither indigenous natural gas resources nor a gas storage facility and all gas is imported from Russia (via Bulgaria andTurkey) through a single transmission line that crosses the Bulgarian border at Deve Bair and is 100% reliant on import. The pipeline was constructed in 1997 and runs almost 98 km to Skopje, connecting KrivaPalanka, Kratovo and Kumanovo on the way. The installed capacity is 0.8 bcm/y at 54 bar with a possibility of an upgrade to 1.2 bcm/y at a higher pressure. The present throughput capacity is 145,000 m3/h.

Currently, this pipeline is with utilisation of approximately 40-50%. Natural gas made up only 8-10% of primary energy supply. However, this share has a great potential to increase in the near future with ambitious natural gas network development plans.

Macedonian state relies heavily on imported oil and natural gas for transportation, heating, and industrial use. There are no domestic oil or gas reserves, making the country vulnerable to price fluctuations and supply disruptions.

in 2022 thermal power plants dominate with 54% of the total capacity, followed by hydropower plants at 42%, and other renewables at 4%. Within the thermal capacity, lignite power plants constitute approximately 57%, gas power plants account for 32%, and the oil-powered TPP Negotino makes up the remaining 10%. In the hydro sector, reservoir power plants represent the majority with 72%, while run-of-river plants account for 28%.

As the price of natural gas depends on the quantity of gas transported through the pipeline, increased domestic gas usage may result in a lower domestic price of natural gas per cubic metre. The extension of its local networks combined with renewed efforts

to extend connectivity to international gas pipeline corridors form the basis of the National Gasification Strategy.

The existing natural gas network is concentrated in the north and eastern part of Macedonian territory and mainly serves the Skopje area.

Pipeline	Length (km)	Diameter (mm)
Bulgarian border to Skopje	98[1]	500
Klecovce- Shtip branch	61	500
Shtip-Negotino branch	36	500
KrivaPalanka branch	1.5	100
Ginovci branch	1.7	100
Kratovo branch	4.6	100
Kumanovo branch	7.0	200
Skopje South branch	8.3	400
Skopje North branch	1.3	300
TIDZ – Bunardzik branches	5.6	200

Table1. The length of Macedonian Natural Gas Systembuilt in 1997

The system has eight main branch points from the main line and 52 pressure reduction stations, 3 metering stations, 7 valve stations and a pig launching station.

[1]*This length don't include the recent developments in the Macedonian gas sector starting as of 2016 where 270km of main gas pipeline was under construction till 2024*

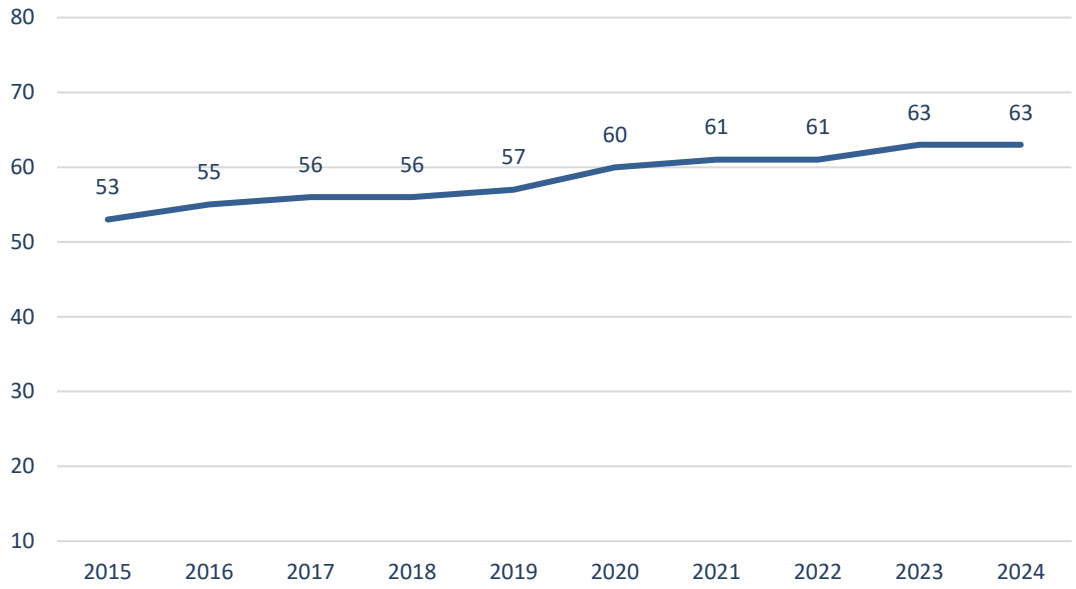


Chart1 Number of consumers connected to TSOs in the past 10 years

There are three distribution companies. City of Kumanovo is with gas network length of 22.5km that supplies 24 public and legal entities and cca 62 households and TIDZ (Technological Industrial Development Zones, Skopje) with 7.7 km gas network length serving 17 big industrial consumers. There is also a small usage of natural gas in the Strumica region with gas network length of 44km in the south of the country where compressed gas(CNG) is supplied by road from Bulgaria. The customers are 14 public buildings, 20 commercial and 260 households. Pursuant to the Energy Law these DSOs have also the licence for natural gas supply and supply of last resort.

Year	DTIDZ	Strumica gas	Kumanovo-Gas	Total
2015	7	202	37	**246**
2016	8	202	40	**250**
2017	7	240	57	**304**
2018	10	263	69	**342**
2019	9	294	86	**389**
2020	12	315	100	**427**
2021	14	355	117	**486**
2022	15	359	129	**503**
2023	16	360	158	**534**
2024	17	411	235	**663**

Table2 Number of consumers connected to DSOs in the past 10 years

3.3.2 Consumption

Chart2:Gas Consumption in the past three years2017,2018,2019

The heavy seasonal consumption (15% in summer) is apparent with most of the gas used for heating and CHP plants in the winter (80%). The small industrial load is maintained throughout the year (16%). A winter disruption would obviously have the most economic and social impact.
The contribution of natural gas to the overall energy consumption has not increased significantly over the past decade. Gas accounts for less than 7% of the country's energy supply. According to the annual JSC Nomagas reports, in 2024 gross inland consumption was 0.323bcm of which over 82% was consumed in heat and CHP plants. Only a minimal amount 2 % is supplied to residential customers.

During 2024, as many as seven natural gas traders independently participated in the procurement of imported natural gas, which is a record in the number of importers. This is an additional indicator that there is dynamics and movement in the natural gas market and increased competitiveness in it.

Still in the period of last 10 years, the usage of natural gas in the country has increased by 300%, the transmission tariff has decreased by 50% and the price of gas has decreased by 20%. Gas participates in the final electricity generationin the country with a share of 17-21%.

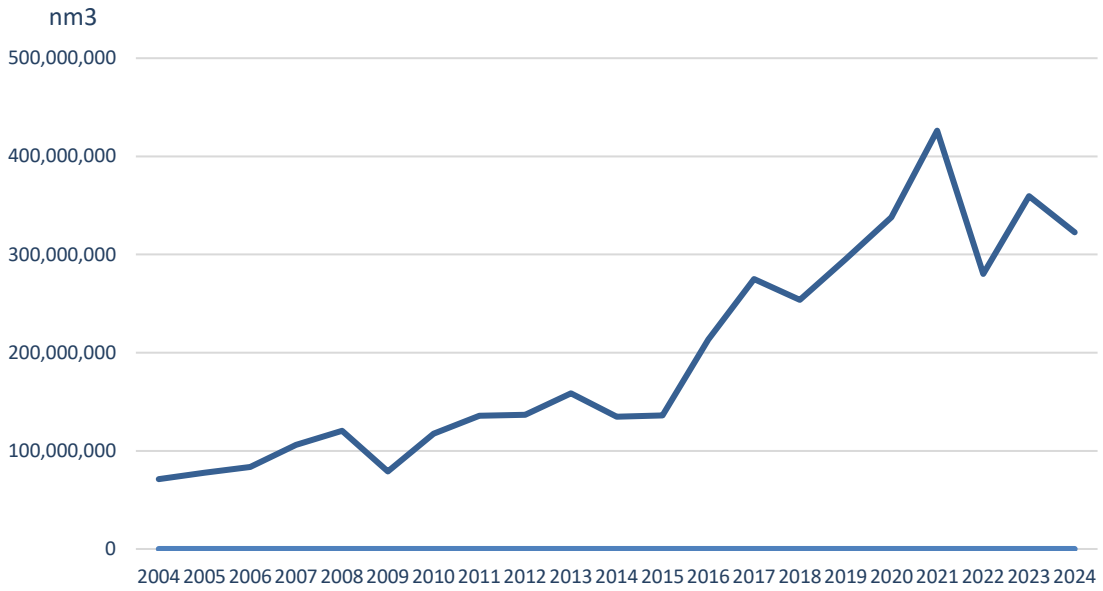


Chart3:Gas Consumption in the past 20 years

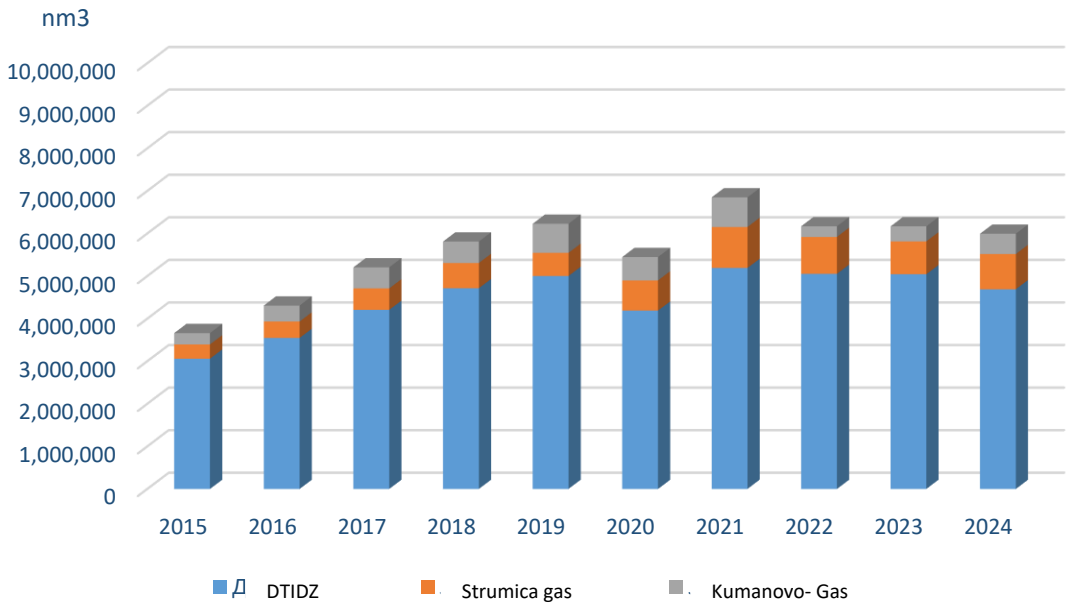


Chart 4 DSO gas consumption in the country in the past 10 years

3.3.3 Market operations

ERC have issued 30 licenses for natural gas trading and 26 for natural gas supply. As already mentioned, there are also 3 licenses for distribution system operations: DTIDZ, Kumanovo-Gas and Strumica Gas (using CNG traded from Bulgaria via road) with incorporated licences for natural gas supply. During 2024, as many as seven natural gas traders independently participated in the procurement of imported natural gas, which is a record in the number of importers. This is an additional indicator that there is dynamics and movement in the natural gas market and increased competitiveness in it.

In 2024. TE-TO JSC Skopje has a dominant share in the import and wholesale trade of natural gas in 2024 with 71.9%, followed by Makpetrol JSC Skopje, whose share is 15.8%.

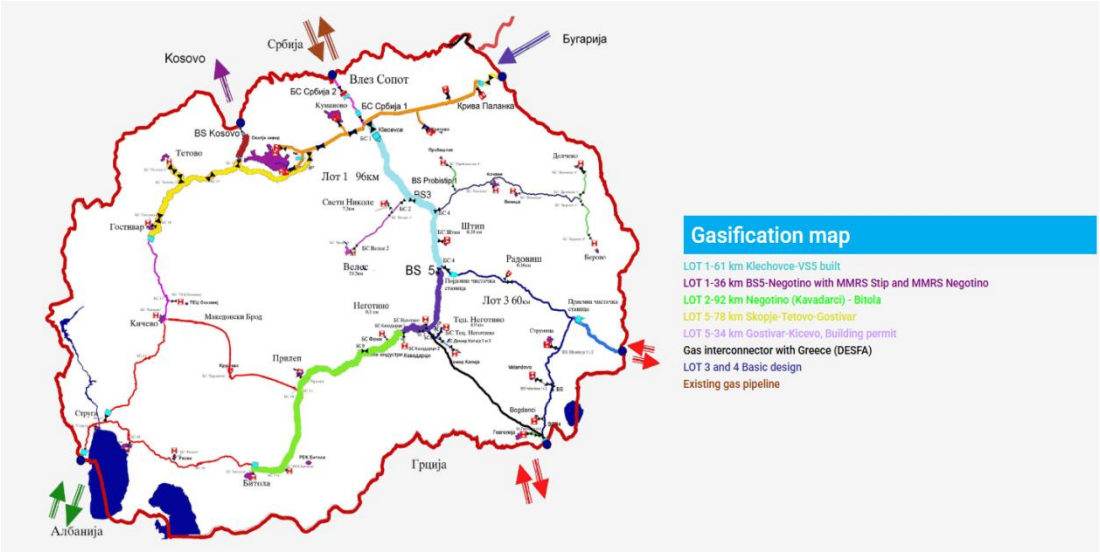
Characteristic of TE-TO JSC Skopje as a dominant participant in the wholesale natural gas market is the absence of classic trading activities, i.e. this company uses imported gas primarily for its own needs in the area of combined production of electricity and heat.

Makpetrol Prom Gas supplier issues annual contracts to the customers, while JSC Makpetrol is operating a medium term contract with Gazprom revised on annual basis. Others have short time contracts. The Macedonian companies pay Gazprom directly at the Bulgarian border without the intervening transit fees.

3.3.4 Planned expansion of the National gas system

There are plans to expand the gas distribution system throughout Macedonian territory. According to a feasibility study conducted in 2010, the total annual natural gas demand in 2030 could be 1.84 bcm compared to the present annual consumption of 0.4 bcm.

The 2010 Feasibility Study envisiges construction of several pipeline projects to complete the national distribution system.



Picture3: Planned expansion of the Macedonian Natural Gas System in Feasibilty Study of 2010

On another plane, given that one of the major challenges facing the country revolves around the need to strengthen the use of alternative fuels, important legislative developments have taken place in order to expand the existing natural transmission and distribution networks.

In 2016 JSC MER has finished the construction of the main gas pipeline, Lot1': ,,Klecovce-Block Station 5(near city of Shtip)'' that was financed through funds provided by the "Agreement between the Macedonian Government and the Government of the Russian Federation for regulation of obligation of foreign SSSR upon the calculations related to the stock exchange between foreign SSSR and foreign SFRJ".

The total length of the Lot1' ,,Klecovce-Block Station 5(near City of Shtip)'' is 61km.

Technical parameters:

- Line section DN500 with a length of 61 km;
- Block stations: BS1 (DN500), BS2 (DN200), BS3 (DN500), BS4 (DN400), BS5 (DN500), BS6 (DN700) and BS Shtip (DN100);
- Dispatch cleaning station DN500;
- Protective pipe for optical cable.

Picture 4.Construction of Lot1'

With a loan from Commercial Banks, Erste Bank and Deutche Bank, Macedonian Government in 2015 started financing the project "Macedonian National Gasification System - Phase 1 - section Shtip - Negotino - Bitola (length 127km) and section Skopje - Tetovo - Gostivar "(length 76 km), as the first phase of construction of the ''National Gas Transmission System in the country''. The construction iwas planned to take place in the period 2016 –2020.

Lot1'': In August 2016 started the construction of the Section ''Block Station 6(Shtip) to Negotino'' with total length 36km (finished in 2019).

Technical parameters:

Line section 36 km long with pipe diameter DN 500 (20");

Block stations: BS 7(DN500); BS Negotino (DN80); BS 8 (DN400) and BS Kavadarci 1 (DN150);

MMRS "Stip", with capacity Q=19 000 m3/h;

MMRS "Negotino", with capacity Q=7 000 m3/h.

Picture 5. Construction of Lot1"

Lot5: In April 2017 started the construction of the section "Skopje - Tetovo – Gostivar'' with total length 76 km. Finished in 2024

Technical parameters:

· Line section with a length of 77 km with a pipe diameter of DN 500 (20") and a branch for Tetovo with a length of 10 km with a pipe diameter of DN 150 (6");

· Block stations: BS (DN500) pcs 4, BS (DN200) and BS (DN150);

· Receiving cleaning station DN 500;

· MMRS "Tetovo", with a capacity Q=22 000 m3/h;

Picture 6. Construction of Lot5

Lot2: In April 2017 started the construction of the section "Negotino-Prilep - Bitola'' with length 92 km. Finished in 2023.

Technical parameters:

Line section with a length of 92 km with a pipe diameter of DN 500 (20”);

Block stations: BS (DN500) pcs 5, BS (DN200) com 2, BS (DN150) and BS (DN80);

Reception cleaning station DN 500;

MMRS "Feni Industri", with a capacity Q=15 000 m3/h;

MMRS "Prilep", with a capacity Q=24 000 m3/h;

Picture 7.Construction of Lot2

The second phase of construction of the Macedonian gas transmission system is expected to be constructed till of 2028. This phase includes construction of the ‘’Gostivar-TPP Oslomej-Kicevo’’ Section (34 kilometres in length), and the ‘’Sveti Nikole-Veles’’ Section (28 kilometres in length), which is in the project documentation preparation stage, the ‘’Kicevo – Ohrid’’ Section (50 kilometres in length) and the ‘’Ohrid-Bitola’’ Section (65 kilometres in length) which are both in the tender documentation preparation stage.. For the first and second project funding is provided by the European Bank for Reconstruction and Development. The Government hopes to engage in a similar partnership for the entire country in the future.

The 2010 Feasibility Study proposes six possible interconnection points: two to Greece, one to Bulgaria, and single connections to Serbia, to Kosovo and Albania.

In accordance with the development of international gas pipelines there are several possibilities for interconnection of the gas pipeline system of the country, with, TAP (Trans Adriatic Pipeline), , Southern Coridor, East Med Pipeine, LNG terminals in Greece and with the neighbours through Regional Initiatives like CESEC, EUSAIR and ECS PECI/PMI Projects.

3.3.5 Distribution system

In 2020 - 2024, the Government had unsuccesful tender for awarding contract for a PPP to finance, design and construct the Natural Gas Distribution System in the country. Grant Thornton Greece has been selected by the EBRD to perform an updated feasibility study regarding the development of distribution networks in the country for the purposes of this tender.The delivered report by Grant Thornton Greece updates a 2014 feasibility study (herein after 2014-FS) mainly in terms of costs and assumptions. This update aims to support authorities towards the preparation of a competitive selection process for the award of a nationwide concession / public private partnership (PPP) for the construction and operation of distribution networks. The duration of the concession/PPP scheme is estimated of the order of 30 and 35 years. Potential values of the Concession/PPP Contract were obtained in the report through a baseline and five alternative scenarios. Capital costs are estimated to be in the range from 241 to 745 mil € depending on the scenario considered. Two additional scenarios investigating the impact of increased WACC and bank loan repayments have been also examined.Forecasted natural gas demand at the end of the concession period is in amount of 9,113,161,092 KWh.

In addition to using natural gas in industrial and municipal buildings, there are initial activities in the municipalities of Kumanovo and Strumica to connect interested

households to the local gas distribution grids.

Natural gas demand

When these plans will be completed, the forecasted natural gas demand has been estimated by the Feasibility Study of 2010 and is outlined in the table below.

Year	**2020**	**2025**	**2030**
Residential	0.095	0.170	0.310
Commercial/public services	0.043	0.070	0.095
Industry	0.140	0.210	0.335
Total end users	**0.280**	**0.450**	**0.740**
Power generation	0.930	1.100	1.100
Grand Total	**1.210**	**1.550**	**1.840**

Table3. Forecast of the total consumption of natural gas till 2030 in bcm[2]

This substantial increase in gas demand, all of which would be supplied from one connection and one supplier, would obviously have serious implications for the security of supply. The effects of a disruption would be much more damaging and costly.

Still Nomagas JSC has conducted market survey and has reviewed the forecast of the total consumption of natural gas from the Feasibility study of 2010 into the new Feasibility study of 2019 for the gas interconnector with Greece with the following projections of the demand:

	2022	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**
Energy sector	610	606	604	603	601	603	604	605	605	606
Industrial sector	192	218	221	223	226	250	287	291	291	291
Distribution sector	14	67	155	233	322	384	452	514	564	625
Total	**816**	**891**	**980**	**1059**	**1148**	**1238**	**1343**	**1410**	**1460**	**1522**
Total for IGF (minus 170 mcma)	**646**	**721**	**810**	**889**	**978**	**1068**	**1173**	**1240**	**1290**	**1352**
Total for IGF (minus 350 mcma)	**466**	**541**	**630**	**709**	**798**	**888**	**993**	**1060**	**1110**	**1172**

Table4: Forecast evolution of the total natural gas demand per sector[3]

[2] *Source: Feasibility study for the National gas pipeline system in the country (2010)*

[3] *Feasibility study for gas interconnector with Greece (2019)*

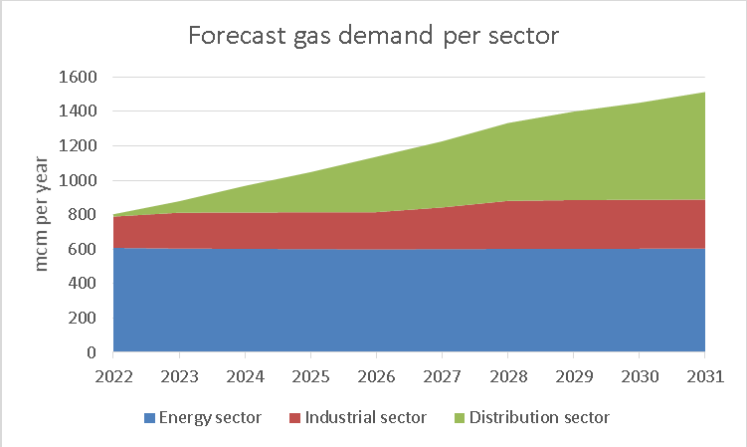


Chart4: Forecast evolution of the total natural gas demand per sector

3.4 SECURITY OF SUPPLY

3.4.1 Supply crisis management

Since 2009, the Government has taken steps to manage a gas supply interruption. The Ordinance on Natural Gas Supply Crisis published in 2013 allows a committee to be formed in the event of a supply interruption. This committee is established under the leadership of the Minister of Economy and is comprised of two officials from the Ministry of Economy and representatives from the system operator for natural gas, the distribution companies, gas traders, suppliers, and the Energy and Water ServicesRegulatory Commission. In the event of an interruption, the committee assembles, evaluates the crisis together with the Centre for Crisis Management, and informs the government. The new Ordinance updated in accordance to the new Energy Law is in the process of adoption.

This Ordinance, which implements the provisions of the Directive 2003/55/EC concerning the specific customers (households) and protecting measures during the natural gas crisis, enumerates the protected natural gas consumers as follows:

-households;

-hospitals, clinics and special health institutions (first aid emergency stations, blood transfusion centres, dialysis centres and other health institutions)

-facilities of special interest to the economy, lives of people and defence of the country,

-care centres for elderly persons,

-kindergartens and

-zoos.

It further sets the criteria for proclaiming crisis situation in supply of NG, namely:

-reduced import,

-extremely low temperatures in uninterrupted duration of five days and

-periods of extremely high consumption of gas during winter months.

Protected customers exist across several gas suppliers and DSOs, with the majority concentrated in residential users(2,583 households total) and critical public services(14).

Hospitals (6) appear prominently, reflecting their high-priority status for continuous supply.

One supplier, ESM Toplina, accounts for the largest share of protected consumption, primarily serving households, but also some hospitals and kindergartens.

Several DSOs (e.g., Kumanovo Gas, Strumica Gas) supply a mix of hospitals, kindergartens, retirement homes, and residential buildings.

The total annual gas consumption for all listed protected customers across suppliers is 175,923,404 kWh per year or 17,167,034.55 Nm^3 per year.

Moreover, it obliges natural gas suppliers to lay down in the supply contracts they sign the minimal needed quantities of natural gas. For present purposes, minimal quantities are considered the contracted quantities between the suppliers and consumers. Moreover, the natural gas suppliers of protected consumers are obliged to inform the natural gas traders about the minimal quantities for protected consumers for the subsequent year not later than 1st of October (in the current year)

The measures to be taken are ranked into 11 levels according to the severity of the supply situation. The measures start with a reduction of all deliveries from the transmission system excepting the CHP plants and district heating systems, which are regarded as the priority. The next step is to disconnect all consumers that have a dual fuel capability and are able to switch to an alternative fuel.

Finally, a gradual reduction of supplies can be made whilst maintaining deliveries to the CHP plants, district heating and protected consumers as long as possible.

Macedonian Ministry now participates in the Security of Supply Coordination Group the Gas Subgroup under the Energy Community.

The Secretariat of the Energy Community participates in the EU Gas Coord.Group.

3.4.2 Options to strengthen the security of supply

On Macedonian territory there are neither indigenous natural gas resources nor a gas storage facility and all gas is imported from Russia (via Bulgaria, Moldova, Romania, and Ukraine) through a single transmission line that crosses the Bulgarian border at Deve Bair.

The pipeline was constructed in 1997 and runs almost 98 km to Skopje, connecting Kriva Palanka, Kratovo, and Kumanovo on the way. The installed capacity is 0,8bcm/year at 54 *bar* with a possibility of an upgrade to 1,2 bcm/year at a higher pressure. The present through put capacity is 145,000 m3/h. Additional 97km were constructed till 2019.

Makpetrol Prom Gas supplier issues annual contracts to the customers, while JSC Makpetrol is operating a medium term contract with Gazprom revised on annual basis. It is understood that the Macedonian companies pay Gazprom directly at the Bulgarian border without the intervening transit fees.

The contribution of natural gas to the overall energy consumption has not increased significantly over the past decade. Therefore the need for new gas supply routes is inevitable for the country.

CESEC (Central and South East Gas Connectivity)

Initiative CESEC aims to promote the diversification of natural gas supply and security of supply in the region by enhancing the regional infrastructure and improving the integration of markets through joint engagement of all EU Member States and of the Parties to the Energy Community.

Memorandum of understanding (MoU) and its action plan under the European Commission initiative of Central Eastern and South-Eastern European Gas Connectivity (CESEC) was signed in 2015 in Dubrovnik, Croatia. The document will pave the way for the closer integration of the EU and Energy Community energy markets. The "Interconnector Greece/Bulgaria – Macedonian gas system" was also listed among ''other projects'' in the CESEC Action Plan. Accordingly we have fulfilledobligationsregarding the CESEC Action Plan 2.0 monitoring reports.

Picture 8.CESEC Projects

EUSAIR

The EU Strategy for the Adriatic and Ionian Region (EUSAIR) is a tool to foster social, economic and territorial cohesion to reduce disparities in the Adriatic-Ionian macro-region through cooperation. In the latest 20205 Action Plan of the Strategy two Macedonian gas interconnectors with Greece and Serbia were included as EUSAIR Flagship Projects.

Transbalkan Gas Ring

The Transbalkan Gas Ring is a cluster of projects consisting of new gas pipelines, upgrading and counterflows through the Balkan region. It refers to Priority action of construction and establishment of an integrated natural gas infrastructure and well-functioning gas market and in particular to the following sub-actions:

a) Diversification of natural gas sources, infrastructures and routes to promote security of natural gas supply and competitiveness
b) Development of interconnections, counterflows and natural gas storage along a regional perspective.

Trans-Balkan Pipeline

Trans-Balkan Pipeline(also referred as Vertical Corridor) had been one of the key gas supply routes in Europe, being historically used for Russian gas exports shipped via Ukraine to Moldova, Romania, Bulgaria, Turkey, Greece and Macedonian soil. Since January 2021 Romania, Bulgaria, Turkey, Greece and Macedonian residents are connected via Turkish Stream.
Taking into account the war in Ukraine and its consumed gas transport system, the largest gas consuming countries in Europe are trying to reduce dependence of Russian gas and to ensure the stability of gas supply.

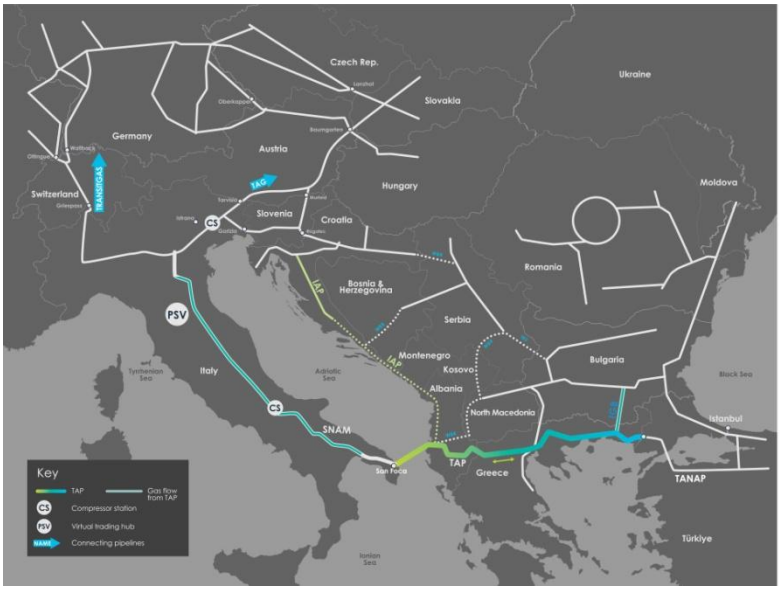
While the Trans Balkan pipeline system (TBP) has historically been a large-volume gas transport route for Russian gas to SEE and Turkey, this role gradually reduced in the past decade due to commissioning of new import infrastructure in SEE (TurkStream) and under the impact of Russia - Ukraine war, flows from North to South finally came to an end with the stop of Russian transit flows through Ukraine on 1 January 2025. At the same time the latest ECS Study '' Unlocking commercial Attractiveness of the Trans-Balkan Pipeline System'' envisages new realities develop for European gas sourcing, where the TBP as an existing and reliable route has the potential to accommodate new gas flow patterns, thus enhancing diversification options by offering the countries traditionally dependent on Russian gas to exploit new gas sources, such as LNG and Azeri gas.

Turkish Stream Pipeline

On the other hand, Russia after the cancellation of the South Stream gas pipeline project in 2014 which was proposed to transport Russian natural gas across Europe via Bulgaria to Balkan countries and Italy, completed the construction of the Turkish Stream Pipeline which follows the same corridor as the South Stream pipeline, comprising a new route towards Turkey. Construction started in May 2017 and gas deliveries to Bulgaria via the pipeline began on 1 January 2020. From Bulgaria, through Serbia, the Turkish Stream is serving Europe. Romania, Greece, Macedonian soil and Turkey are also connected via Turkish Stream.

Trans Adriatic Pipeline (TAP)

Another option that could be considered is a connection to the Trans Adriatic Pipeline (TAP) through Greece or Albania. First, the Trans Adriatic (TAP) gas pipeline that brings gas from Azerbaijan to Europe through Turkey's TANAP pipeline crossing Greece and Albania to Italy. TAP has started its operations in 2021 and is expected to operate at its full capacity of 10 bcm/y in 2022 and 2023. The project of doubling the TAP capacity is under discussion. The pipeline could also transport gas from Iraq, Turkmenistan and Mediterranean in future so would form a secure supply route.



Picture12. Proposed routes for the Trans Adriatic Pipeline

There is also a proposal to connect the TAP between Albania northwards along the Croatian coast, the Ionian Adriatic Pipeline (IAP). This connection, along with the LNG terminal on the island of Krk of the Croatian coast, would substantially increase the security of supply in the region. This coastal pipeline would form part of the Energy Community gas ring concept whereby the gas markets of Albania, Bosnia-Herzegovina, Croatia, Kosovo, Macedonian soil, Montenegro and Serbia could be linked. The ring would have the advantage of having the capability of being supplied from multiple directions and would facilitate the development, regional gas market. Another advantage would be that this system could be developed incrementally by adding new entry points and pipeline sections. A system of gas-fired power stations could help underpin the world in countries with relatively small gas demands such as Macedonian one, to Albania, to Montenegro and to Croatia.

The EastMed Pipeline Project

The EastMed Pipeline Project interconnects the available and already in production gas fields in the Levantine basin to the European markets via Cyprus and Greece. This project is currently assigned to transport up to 20 bcm/y up to the inlet point with Poseidon Pipeline Project.

Project gas interconnection with Greece

This project aims at Diversification of natural gas supply in the Macedonian gas market, given that the 85% of natural gas in the country comes from Gazprom, Russian Federation.

The part of the gas interconnector on the Macedonian territory is with length of 68 km and in the territory of Greece consists of a 54 km pipeline, starting from Nea Messimvria and ending between Greek and Macedonian border, in Evzoni area, a border metering station (BMS) in the interconnection area and est.

Main purpose is to support the gasification of the country by providing an Interconnection Point that can supply large quantities of gas to meet the expected growth in demand, provide security of supply by offering diversification of routes and

sources, ensure market integration aiming at allowing the consumers to have gas prices similar to those of the neighboring countries and to offer a sustainable energy source to the country that has a poor emission intensity index.

- The FS&CBA, ESIA and Basic(Detailed) design has been prepared and revised;
- Completed financial construction(EIB, IG and EBRD);
- Prepared tender documentation for Construction, Construction supervision, Inspection body and Management in accordance with EIB rules;
- The common FID is expected before the end of July 2023;
- Construction phase commenced in May 2025(to last 22months) and Commissioning is planned for 2027.

The results showed that the project can ensure a transportation tariff lower, during the evaluation period, than the one applied until now while it will provide to the country very important benefits regarding security of supply, creation of conditions for gas-to-gas competition and integration in the regional gas market.

Moreover, Greece will benefit from a decrease in the Use of System Charge of 4.5 % in average, over the evaluation period, under condition of achievement of the expected throughput.

There are also plans for transit of gas supplied through the new pipeline to other gas markets of the region (Kosovo, Serbia and up to Hungary). Discussions are in progress between NER and Partners in neighbouring countries (namely Kosovo and Serbia). The transit volume to Kosovo might range from 350 to 500 milNm3 and the one to Serbia 21400 milNm3. However due to the uncertain outcome of these discussions the corresponding capacity has not been included in the Demand forecast of the DESFA study.

Technical data:

Within the main gas pipeline Section “Stojakovo - border with Greece” the following objects and systems are included:

- Line part in length of 68 km with pipe diameter Ø711 mm (*DN* 700) (28’’)
- Valve station 3 pieces
- Pig Launcher/receiver 2 pieces
- Regulation station 1 piece
- Capacity *Q*= 326 000 m3/h
- Automatic operation system with technological process for natural gas transport (DCS/SCADA);
- Line for connection with optic fibres;
- Power supply system,
- Cathodic protection system,
- Security signalling system and fire signalization.
- Maximum pressure and operating (projected) pressure*pmax* = 70 *bar*
- Minimum pressure *pmax* = 25 *bar*

The technical parameters of the gas interconnection pipeline allow further development

of the gasification in the country and the construction of new national gas pipelines.

The benefits for the country of realization of this project are enormous because it will provide additional quantities of natural gas of other sources in Macedonian energy mix and further through Serbia to Central Europe as well as possibility of using natural gas from the Southern Gas Corridor and at the same time it allows connection to the existing Revithoussa and Alexandroupolis LNG terminals in Greece. This leads to diversification and security of supply.

For the economy it is important that it will enable development of competitive component and possibility of decreasing the import price of natural gas because it will ensure availability of natural gas from various producers and suppliers.

The summary cost estimation of the two pipeline parts, in Greece and on Macedonian soil with all ancillary installations i.e. valve stations, scraper stations, cathode protection, telemetry is 49 and 59 million euros each. The Greek part contains also the Border Metering Station.

Picture 10. Start for construction of the Gas Interconnector with Greece

Project gas interconnector to Republic of Serbia

The project consists of an interconnection between the Serbian gas transmission system and Macedonian gas transmission system as a part of the Trans Balkan corridor. The project would allow:

- Competitiveness of natural gas market
- Connecting the gas transmission of both countries with the region (market integration) which would lead to economic, financial and social benefit.
- Development of the region by using the natural gas as energy source as well as security of energy supply in the economic development of the region- Introducing a higher level for achieving economic and social benefits
- Advancement and protection of the environment with higher utilization of natural gas as ecologically clean fuel, in the coal transition etc.

In October 2024 the Ministry of Energy, Mining and Minerals and the Serbian Ministry of Mining and Energy agreed a Memorandum of Cooperation in the gas sector which foresees an assessment of the opportunity to develop a new direct connection between the two gas systems; the drafting of a feasibility study and a study of the impact on the

environment and society of the project for the new gas interconnection between the two countries.

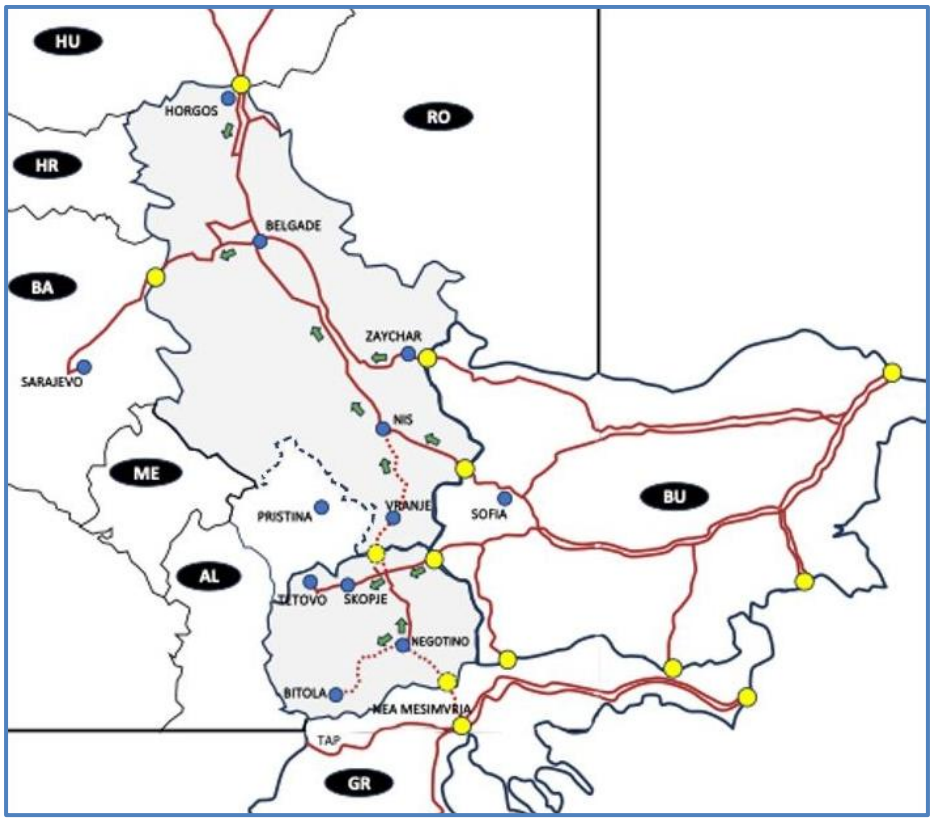
Based on the above mentioned Memorandum in June 2025 State-owned natural gas transmission operator NOMAGAS and Srbijagas also signed a Memorandum of cooperation with the goal of accelerating the realization of a project for the construction of a natural gas interconnector between Macedonian gas system and Serbian one.

With Technical grant secured within IPA Instrument Investment framework of the Western Balkans (Flagship 5 - Transition from coal) for the project Gas interconnection with Serbia feasibility study and ESIA were completed in 2025.

The main purpose of the construction of this main gas pipeline section arises from the strategic commitment of the Government to achieve higher level of overall functionality of the energy system in the country and to provide conditions for greater infrastructure and economic integration with the neighboring and the remaining European countries. This project will ensure the diversification of natural gas sources and supply routes and possibility for transit of natural gas from Greece to Serbia.

The project code in the Ten-Year Network Development Plan is TRA-N-965.

Comercial financial institution has expressed interest for funding this project.



Picture 11.Gas interconnector to Republic of Serbia

The transit pipeline link from Serbia to Macedonian soil should be with a maximum operation pressure of 50 *bar*. The connection should be realized along the route ''Niš-Leskovac-Vranje'' to Serbian-Macedonian border with a length of 115 km. The main pipeline Serbia-Bulgaria (along the route ''Dupnica-Kalotina-Dimitrovgrad-Niš'') is connected to the construction of the compressor station in Dupnica in Western Bulgaria.

It should provide satisfactory pressure in Southern Serbia. The maximum operation pressure in Bulgaria is 54 *bar*. Due to that the pressure in the main pipeline network at the region of the Serbian-Macedonian border should be 50 *bar*.

The diameter of the main pipeline branch ''Niš-Leskovac-Vranje'' to Serbia-Macedonian

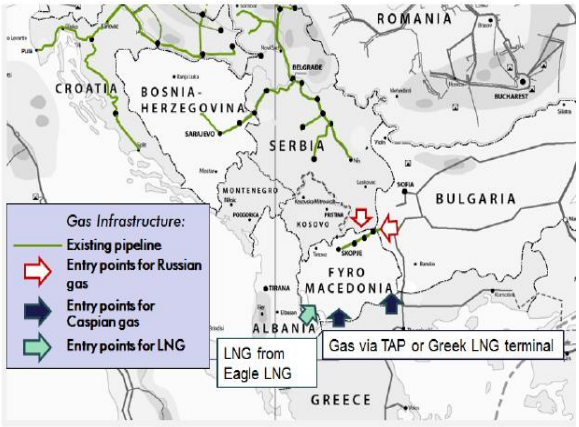
border (Northeast of the town of Kumanovo) is *DN*500 (20″). The necessary natural gas quantities for Macedonian users from the branch through Republic of Serbia are about 1.4 bcm/year. Taking into account the possibilities for delivering LNG gas quantities from Macedonian-Greek Interconnector, this must be reversible link.

In the case of link of Serbia toward Macedonian soil from the main pipeline network of Republic of Serbia it is necessary to construct a compressor or reduction station at the Serbian-Macedonian border. So according to the law and regulations in both states the maximum operation pressure in the main pipeline networks is 50 *bar* and 54 *bar*.

Working groups have been formed from both sides in order to intensify the activities for the realization of the gas interconnector till 2028.

Gas interconnection to Albania

JSC Nomagas and JSC ALBGAZ in September 2018 have signed a Memorandum of understanding (''MoU'') between Albanian gas TSO ALBGAZ JSC and JSC Nomagas. The Memorandum with JSC ALBGAZ is in line with the realization of the project for the construction of gas interconnection for natural gas transmission that should connect Macedonian gas system and the Albanian one.



Source: *ENTSO-G map*

Picture 12. Gas interconnector to Republic of Albania

Picture13: Gas Master Plan of Albania

The interconnection of the Macedonian gas system to the TAP could be through Greece near Gevgelija or near Bitola to the Macedonian-Greek border. Another opportunity to connect the TAP is through the Republic of Albania if the project IAP (Ionian Adriatic Pipeline) is realized. The route of the pipeline connection starts at the area of the town of Fieri, runs in Northeast direction toward the town of Elbasan along the Shkumbini River and then runs in East direction up to the town of Lin on Ohrid Lake and in North direction is crossing the Albanian-Macedonian border southwest of the city of Struga.This pipeline is designed with a diameter of *DN*500 or *DN*700, and maximum operation pressure of 80 *bar*, length of about 90-130 and a cost of 140 million euros. It could transit about 0,5-1 bcm/year. A reduction station of 80/54 *bar* should be constructed on the Albanian-Macedonian border.

In the next period JSC Nomagas will prepepare Basic Project Design for the construction of the project.

Gas Interconnector to Kosovo

On 18th of November 2024, the Macedonian Minister of Energy, Mining and Raw Minerals and the Minister of Economy of Kosovo signed a Memorandum of Understanding in the energy sector between the two Ministries, which is expected to intensify bilateral relations in the energy sector in line with national policies and strategies, by defining priority areas for cooperation such as:Promotion of renewable energy sources and energy efficiency,Exchange of expertise and information between public companies, Development of infrastructure projects of mutual interest and Exploration of opportunities for the exchange of electricity and resources..

In December 2022, with a technical assistance grant from WBIF (West Balkan Investment Framework) mechanism a Feasibility Study and Environmental Impact Assessment Study scope was prepared. The project is included in the List of Priority

Projects and in the Ten Year Network Development Plan (TYNDP) with code TRA-N-966.

The route for gas interconnection would take place from the city of Pristina, near Urosevac in Kosovo*, to the Kosovo* - Macedonian border (northwest of Skopje). It then continues to the south and connects to the future main gas pipeline network in Macedonian City of Skopje. The total length of the gas pipeline on Macedonian soil 21,6 km. At a diameter of *DN*500 (20 ") or *DN*700 (28") depending on the hydraulic calculations, it is possible to order the construction of a compressor station in the middle of the route.

JSC Nomagas in the next period will prepepare Basic Project Design for the construction of the project.

*Picture 14.Gas interconnector to Kosovo**

Storage facilities

Gas storage has an important role in ensuring security of supply and promoting decarbonisation, while also driving forward the energy transition. It is an integral technological and business activity of each gas system, and underground gas storage facilities are fundamental for security and flexibility of supply. While short-term gas supply disruptions have occurred in the past, several factors such as the Russia-Ukraine War since February 2022, price increases and the uncertainties related to future changes in the geopolitical situation can lead to further disruptions of gas supplies and damage the countries still dependent on external gas supplies. Underground gas storage facilities contribute to the security of gas supply by absorbing supply shocks in case of strong demand or supply disruptions.

The storage system makes it possible to compensate for the different requirements for gas supply and consumption: whilst supply - consisting of imports from overseas and domestic production - has a substantially constant flow throughout the year, the demand for gas is concentrated mainly in the winter period. Storage also ensures that quantities of strategic gas are available to compensate for any lack of or reduction in non-EU supply or crises in the gas system.

In June 2022, the European Parliament and the Council adopted the proposal of Regulation on Gas Storage by the European Commission providing that underground gas storage of EU countries' territory must by filled to at least 80% of their capacity before the winter of 2022/2023 and to 90% before the following winter periods. The Energy Community has also adopted the Gas Storage Regulation in October 2022. Its Contracting Parties that have storages, notably the EUSAIR country Serbia, have the obligation to fill them to at least 80% of capacity. Contracting Parties and EU Member States without underground gas storage facilities should make arrangements and use underground gas storage facilities in other Member States with those facilities.

On Macedonian territory there are no underground gas storages but still country has obligation to store 15% in neigboring countries. Through the only existing gas interconnection that we have with the neighboring Bulgaria, there is a possibility for using the underground gas storage capacities of UGS Chiren, when the construction activities for increasing its capacity will be finalized.

The efficient use of the existing infrastructure, including cross-border transmission capacities, underground gas storage facilities and LNG facilities, is important to safeguard the security of gas supply.

LNG options

Liquefied Natural Gas(LNG) facilities provide delivery capacity during peak periods when market demand exceeds pipeline deliverability. There is no requirement for cushion gas and it allows access to a global supply. LNG facilities are, however, more expensive to build and maintain than developing new underground storage facilities.

The Revithoussa LNG Terminal is located on the island of Revithoussa, in the gulf of Pachi at Megara, 45 km west of Athens and is the only one operational regasification and storage terminal in Greece that receives LNG cargoes, temporarily stores and regasifies LNG and supplies the National Natural Gas Transmission System. It has played an important role in the country's strategy to diversify from Russian gas and secure the security of supplies.

It can store 225,000 cubic metres of gas and regasify 1,400 m3/h.It was completed in 1999 and is operated by DESFA SA. In 2022, DESFA started the upgrading of the terminal by adding a floating storage unit to the existing facilities in order to increase storage capacity to 380,000 cubic meters.

In Greece, the long-planned 153,500 cubic meters Alexandroupolis FSRU started with its operation by the end of 2024. Situated in the northeast of Greece, approximately 17.6 km south-west of Alexandroupolis in the Aegean Sea. The project was developed by Gastrade. Alexandroupolis that includes a floating storage and regasification unit (FSRU) with the ability to transport, store and convert LNG into natural gas. It will also be equipped with a subsea and onshore gas transmission system. The floating terminal

have an incoming LNG transfer rate of 10,000 m3/h, a storage capacity of 170,000 cubic meters and a maximum regasification capacity of 700,000 nm3/h. Regasified LNG is transported onshore via a gas transmission system consisting of a subsea pipeline and an onshore pipeline. The onshore pipeline is laid on the coastline of the Apalos area, connecting to the Kipi-Komotini branch of the Greek National Natural Gas System (NNGS) near the Amphitriti village. A new entry station was built by natural gas operator DESFA near the existing NNGS Alexandroupolis exit station, which is currently being operated by the company.

The new infrastructure is tied to other interconnection projects, such as the Gas Interconnector Greece-Bulgaria (IGB), but also the important gas links between Bulgaria, Macedonian soil and Serbia. Through these recent and new projects, these countries will be able to reduce their dependence on Russian natural gas by diversifying their routes and sources of supply.

Macedonian company JSC ESM in 2023 concluded long term TUAgreement(15 years) with Gastrade for booking 1.8TWh yearly capacity in Alexandroupolis FSRU. This capacity can't be used because JSC ESM did not sucede to book auctioned transport capacities on Bulgarian territory to transport LNG form Alexandroupolis FSRU to Macedonian soil.

Infrastructures for small scale LNGs are continuing to develop for road transport, for ships bunkering and for supplying industrial sites not connected to the gas grid.

Hydrogen Strategy

Macedonian state is a candidate country for European Union (EU) membership, and as a Western Balkan Contracting Parity of Energy Community, committed to becoming climate neutral by the year 2050. Carbon neutrality is expected to be a focus of the period beyond 2030, expected to be achieved by a combination ofswitching from natural gas to hydrogen and by carbon caption, use and storage. Natural gas is expected to be dominantly used in combined heat and power generation facilities and in large industrial facilities where transitioning to hydrogen and/or adopting carbon capture technologies is technically possible.

It is expected that hydrogen will have a growing role in energy systems and that the number and importance of electrolysers will grow after 2030 and beyond.Further, it is expected that carbon capture, use and storage technologies will be necessary to reach carbon neutrality, primarily in electricity generation and industry sectors, and that they will play a decisive role after 2040. It is therefore recommended to consider these technologies in the smart specialization strategies for the periods from 2027 and beyond.

Hydrogen Study, is to be developed(in Q3 of 2025) within the Technical Assistance project "Hydrogen study - hydrogen introduction in the Macedonian and Serbia'n gas pipeline network'', funded by the Western Balkans Investment Framework(WB25-MKD-ENE-01), are expected to serve as an important roadmap for further development of gas infrastructure, to be included in relevant development plans.

The Hydrogen study aims to provide guidelines regarding the hydrogen potential in the Macedonian energy sector and in Serbia in terms of;

a) hydrogen demand,

b) integration of renewable energy technologies and electrolytic power,

c) need for importing hydrogen to meet higher demands and

d) hydrogen penetration in industry, transportation, blend with natural gas, etc.

Serbian and Macedonian gas network play a crucial role in the Hydrogen Backbone infrastructure within the Pan-European network.

4. OVERALL CONCLUSIONS

Macedonian state relies heavily on imported oil and natural gas for transportation, heating, and industrial use. There are no domestic oil or gas reserves, making the country vulnerable to price fluctuations and supply disruptions.

in 2022 thermal power plants dominate with 54% of the total capacity, followed by hydropower plants at 42%, and other renewables at 4%. Within the thermal capacity, lignite power plants constitute approximately 57%, gas power plants account for 32%, and the oil-powered TPP Negotino makes up the remaining 10%. In the hydro sector, reservoir power plants represent the majority with 72%, while run-of-river plants account for 28%.

Energy security will further be increased by introduction of additional gas fired cogeneration power plants, as envisaged with the Just Transition Roadmap for gradual coal phase out and enabling regulatory framework for development of new DHS, connection to existing DHS and individual metering and billing of heat consumption.

Several key challenges hinder the Macedonian energy security and the long-term sustainability of its energy system including the aging electricity infrastructure, renewable energy development, insufficient flexibility of the energy system, dependence on coal, and geopolitical risks.

On the other hand, the country has several opportunities to improve its energy security and transition to a more sustainable and resilient energy system.

The country also imports natural gas, making it vulnerable to geopolitical risks, particularly tensions between Russia and the EU. The country is dependent on natural gas for heating and industrial processes, and price volatility in global natural gas markets can lead to financial strain on both consumers and businesses.

At present, the level of security of gas supply is not ideal with further diversification in supply needed; however, the country made significant steps toward addressing these challenges.

At the moment Macedonian gas sector is 100% reliant on gas imports through a single interconnection point from Bulgaria. The new interconnector to Greece, currently under construction, which will be operational in 2027 may diversify routes and enhance gas to gas competition. Other interconnections with Republic of Serbia and Kosovo* have also been proposed. This will enhance the Macedonian security supply and will enable establishing further connections to the international gas networks and gas hubs (Southern Corridor, LNG terminals, East Med Pipeline etc). If these projects are not realised, the country will remain in a highly vulnerable position at the moment as far as security of natural gas supply is concerned.

All gas infrastructure will be hydrogen ready, which will contribute to a gradual and full decarbonization of the national energy system. Institutional and legal framework for the hydrogen use will be developed.

Air pollution, in the form of particulate matter (PM), mainly due to solid and oil fired space heating in households and commercial sector is increasing. Recent data for the period 2004 to 2017 show that during the entire period, population in larger

cities has been exposed to PM concentrations in excess of limit values. To this end, the Macedonian Government, assisted by international donors, has put forward an ambitious gasification plan since the early 2010s.

The proposed expansions of the gas distribution network, whilst remaining dependent on a single supplier via a single pipeline will only serve to compromise the security of supply further.

As Macedonian state continues its path toward EU integration, it can benefit from EU policies, funding, and technical expertise aimed at supporting the green transition. The EU's Green Deal and various energy-related funding mechanisms (e.g., Horizon Europe, Cohesion Fund, Growth Plan and European Investment Bank loans) offer an opportunity to accelerate the transition to a more sustainable and secure energy system.

Macedonian institutions have made significant efforts to transpose existing EU laws regarding security of supply into its own legislation so as to adhere to the EU acquis.

As a country, has made considerable efforts to make strategic partnerships but have been slowed down by geopolitical and economic issues outside its control.

Overall Macedonian gas sector looks well placed to meet the expected requirements that have been presented by the adoption of the EU energy acquis.