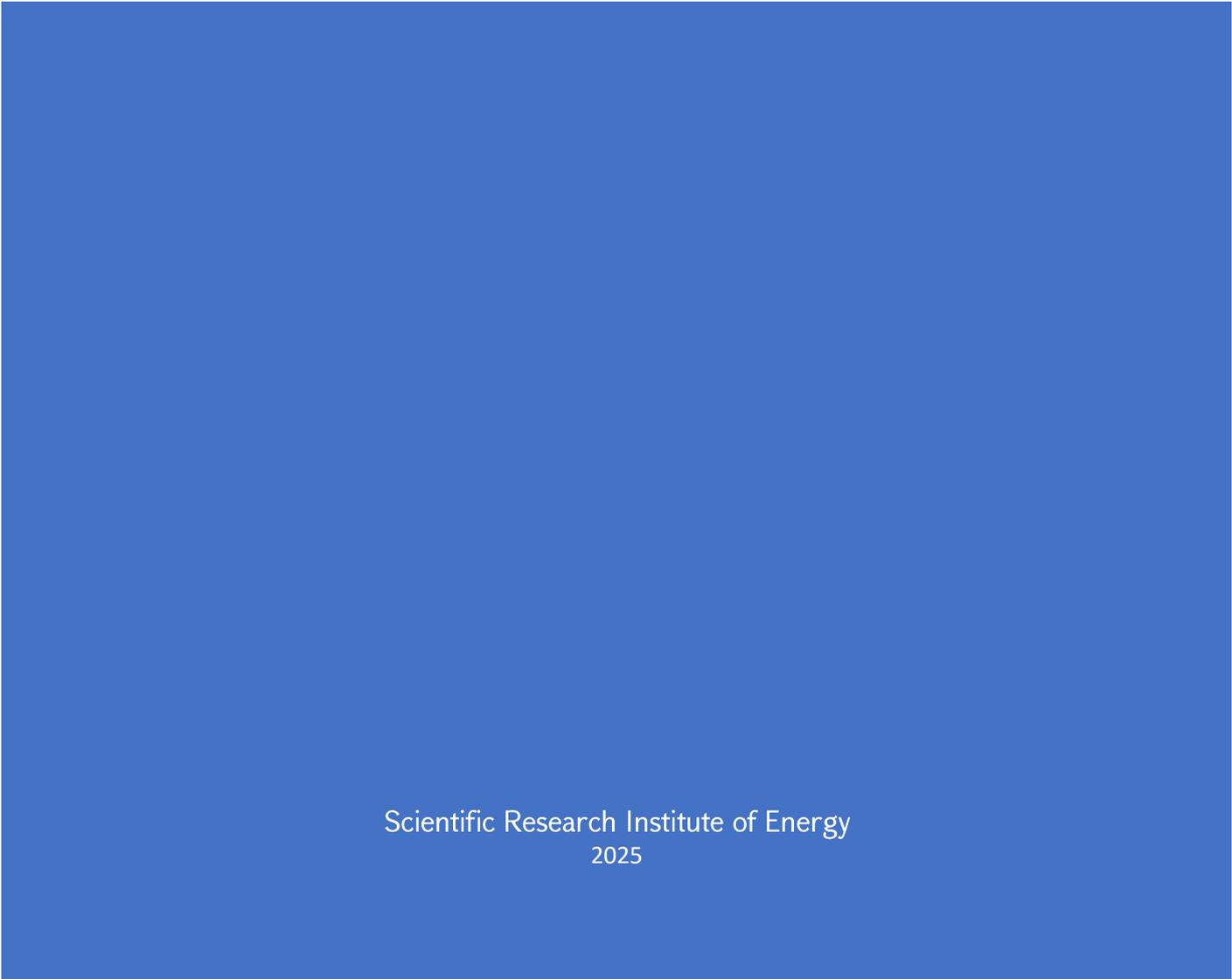




**ENERGY BALANCE
OF THE REPUBLIC OF ARMENIA
FOR 2024**



Scientific Research Institute of Energy
2025

“Energy Balance of the Republic of Armenia, 2024”

Yerevan – 2025

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ABBREVIATIONS

AEB	Armenia Energy Balance
CJSC	Closed Joint Stock Company
CN FEA	Commodity Nomenclature of Foreign Economic Activity
CNG FS	Compressed natural gas fueling station
EB	Energy Balance
EDRC	Economic Development and Research Centre
ENA	Electric Network of Armenia
EU	European Union
GEF	Global Environmental Fund
HPP	Hydro Power Plant
HVEN	High Voltage Electric Networks
IEA	International Energy Agency
ILCS	Integrated Living Conditions Survey
M&A	Monitoring and assessment
MTAD	Ministry of Territorial Administration and Infrastructure
NPP	Nuclear Power Plant
OECD	Organization for Economic Cooperation and Development
PSRC	Public Services Regulatory Commission
PV	Photovoltaic
R2E2	Armenia Renewable Resources And Energy Efficiency Fund
RA	Republic of Armenia
RF	Russian Federation
TPP	Thermal Power Plant
UGSF	Underground gas storage facility
UNDP	United Nations Development Program
WPP	Wind Power Plant

MEASUREMENT UNITS

GWh	gigawatt*hour (10^9 Wh)
J	Joule
km	kilometer
ktoe	kiloton oil equivalent (1000 toe)
kW	kilowatt (10^3 W)
kWh	kilowatt*hour (10^3 Wh)
m ³	cubic meter
MJ	megajoule (10^6 J)
million m ³	million cubic meter
MW	megawatt (10^6 W)
MWh	megawatt*hour (10^6 Wh)
t	ton
TJ	terajoule (10^{12} J)
toe	ton oil equivalent
W	Watt
Wh	Watt*hour

1 INTRODUCTION

Development of the RA Energy Balance is important for the assessment of the energy security level of the country, the diversification of power supply and the trends in greenhouse gas emissions, as well as for evaluation of the progress in achieving the targets of the United Nations Framework Convention on Climate Change (UNFCCC).

Energy balance is a valuable instrument for the assessment, documentation and monitoring of the energy efficiency and renewable energy indicators in the country for the given year.

Energy balance is one of the main sources for the collection of the initial data on GHG emissions in the Energy sector. It serves as a ground for the development and implementation of mitigation measures addressing the environmental challenge of climate change. Implementation of the mitigation measures is of a great importance under the Paris agreement and commitments undertaken by the Republic of Armenia.

For the compilation of the Energy Balance the following actions were undertaken:

- Collection of the official data from the Statistical Committee of RA (Armstat);
- Business meetings and discussions have been organized to improve data collection, in particular: (a) for the assessment of the consumption volumes of liquid fuels by sectors; (b) for evaluation of biofuels consumption (particularly, firewood and manure); (c) to assess the production and consumption of solar PV and water heating energy;
- Methodology for the compilation of 2023 Energy Balance was analyzed;
- Collected data were analyzed, the balance indicators were calculated, and the initial data were archived;
- 2024 Armenia Energy Balance was compiled and presented in Eurostat and International Energy Agency's formats.

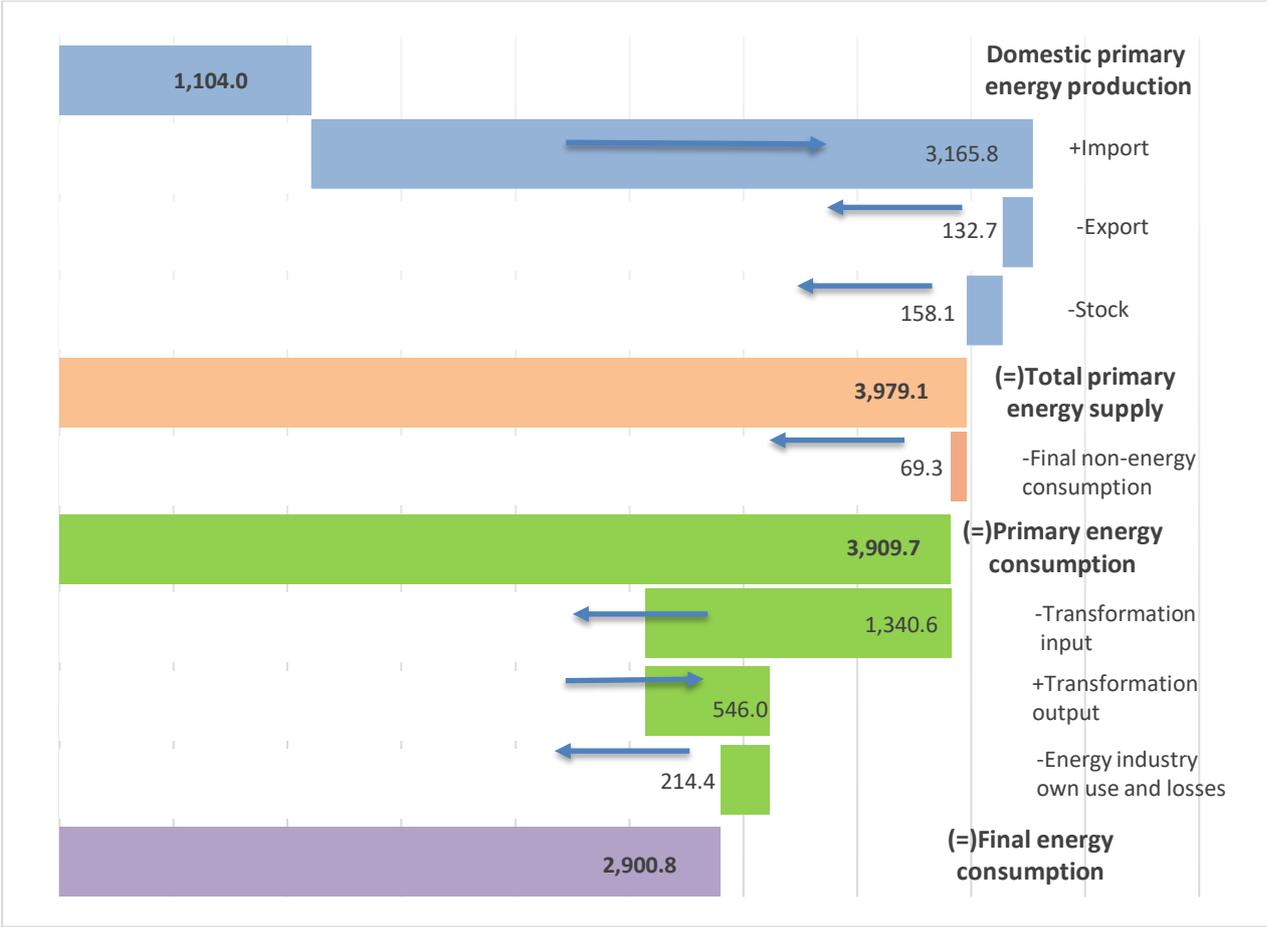
Compilation and publication of Armenia Energy Balance is defined by the RA Law on "Energy Efficiency and Renewable Energy".

The guideline¹ published by the IEA, Eurostat and Organization for Economic Cooperation and Development (OECD) as well as the "Explanatory Note on Energy Balance of Armenia" developed by the Economic Development Research Centre (EDRC) serves as methodological base for the compilation of the 2024 Armenia Energy Balance. The main sources of the initial data and the major applied approaches for the compilation of the energy balance are reflected within the mentioned Explanatory Note.

During the compilation of the 2017 Energy Balances the Excel program has been developed by the EDRC which was revised by "Scientific Research Institute of Energy" CJSC. Slight upgrades were also made in 2024 Energy Balance, in particular, the values of imported oil products were clarified with Armstat based on 10-digit classifier, as well as the values and structure of energy consumption in industrial branches, data on imported solar water heaters has been received from the RA Customs Service.

¹ "Energy Statistics Manual", OECD/IEA, 2007
(<https://iea.blob.core.windows.net/assets/67fb0049-ec99-470d-8412-1ed9201e576f/EnergyStatisticsManual.pdf>)

Figure 1.1: Visualization of the Energy balance 2024, ktoe



2 SIGNIFICANCE OF THE ENERGY BALANCE

The Energy balance is represented in the form of a standard spreadsheet format, which reflects amounts of the energy resources extracted, produced, imported, exported, stored, processed, converted, transported, distributed and used in various sectors in Armenia during the reporting period. The Energy balance of the country is presented in the Eurostat or IEA standard formats, which comply with the regulation No 1099/2008² of the European Parliament and of the Council of 22 October 2008 on energy statistics.

During the compilation of the energy balance, it is necessary to take into account the flows of energy carriers and all types of energy by their generation, recycling, transformation, distribution, storage and final consumption cycles, as well as energy costs and possible losses for own needs.

According to the Eurostat requirements energy balances are composed using natural (TJ) units, and as for the IEA standards - the oil equivalent (1 ktoe equals to 41.868 TJ).

Collection and processing of statistical data and compilation of the energy balance are the first steps for the analysis of the energy situation in the country allowing the assessment of the previous trends and formation of the future policy addressed to the development of the energy sector. The data in the energy balance enable the assessment of the energy efficiency level in the different sectors of the economy and households. It should be noted that emissions indicators are closely related to those of energy efficiency.

The role of clear and comprehensive information is constantly increasing, allowing to not only limited qualitative conclusions, but also to be made quantitative assessments for energy policy.

According to the IEA, in order to develop an energy policy, it is necessary to have clear information about the final consumption, in particular:

- Information on the driving forces of energy consumption,
- Information on the current energy consumption situation,
- Information about the responses on the implementation of the policy options.

All this creates an information environment, which is regularly updated and provides the basis for policy review and correction.

The amounts of electricity produced by renewable sources (wind, solar, etc.) in different countries of the world are still growing. The increase of their share in the energy balance ensures a reasonable level of energy independence of the country and the reduction of greenhouse gas emissions.

Development of the energy balance is necessary for:

- Assessment of the country's energy independence, including the power produced at the renewable energy sources in the energy balance;
- Study of the fuel and energy production and consumption structure;
- Study of the fuel and energy resources demand;
- Analysis of the fuel and energy balance structure for its improvement;

² <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02008R1099-20240207>

- Definition of the capital investments volumes for the development of the fuel and energy complex in the country;
- Identification of the export and import volumes of fuel and energy resources;
- Assessment of the energy efficiency potential;
- Identification of the greenhouse gases & other emissions volumes and the development of measures to minimize their negative impacts on the environment, etc.

The recommendations presented by IEA and UNDP experts were taken into account to exclude items absent in Armenia from the rows and columns of the standard balance sheet, as well as to improve the balance report. This applies, for example:

- in terms of conversion technologies – Chemical heat for electricity production, Oil refineries, etc.,
- in terms of energy resources – Crude oil,
- report tables, graphs, and some text formulations.

3 BALANCE COMPILATION AND APPLIED APPROACHES

This chapter presents the initial data of the main energy carriers included in the energy balance and the basic approaches applied for compilation of the balance.

3.1 Electricity Balance

General information and overview

Electric energy is one of the most developed areas in the economy of Armenia. There are both the traditional sources for electricity production that are NPP, TPP and HPPs, and the alternative sources. The governmental decisions contributed to the development of several alternative energy projects which include installation of licensed and autonomous solar PV systems, solar water heaters, as well as wind power monitoring and geothermal energy exploration, etc.

Armenia exports electricity to Iran and Georgia as well as imports electricity from them. Electricity export to Iran is realized on electricity-for-gas swapping agreement and amounted to 1465.1 million kWh that was 95% of the overall exported electricity from Armenia in 2024. The import from Iran amounted to 7.4 million kWh in 2024, which is mainly conditioned by the power system regimes. Electricity export to Georgia is mainly organized in the emergency switched off the 500 kV Caucasian power transmission line feeding the Georgia's power system from Russia and in 2024 it was amounted to 72.7 million kWh (5%). In high flood seasons the power supply to the Northern parts of Armenia is performed from Georgia in the island mode and amounted to 137.4 million kWh in 2024.

Error! Reference source not found. provides an overview of electricity produced in 2024 for the respective installations, the share on the total energy production and the relative change between the years 2023 and 2024. In 2024 the share of electricity from renewable sources is 32% of the total electricity production in Armenia.

Table 3.1: Overview of electricity produced (million kWh), share on the total electricity production (%) and change 2024/2023 (%)

	Installation	Electricity produced in 2024 (million kWh)	Share on total electricity production	Change 2024/2023 (%)
	Nuclear Power Plant	2,830.0	30%	4%
Thermal power plants	Yerevan TPP	1,271.3	14%	-7%
	Hrazdan TPP	96.6	1%	-71%
	Hrazdan-5	373.3	4%	108%
	ArmPower	1,768.8	19%	-3%
	Combined cycle power plant Yerevan State Medical University after Mkhitar Heratsi	6.5	0.07%	13%
Renewables				
Hydro power	International Energy Corporation	365.8	4%	-8%
	Contour Global Hydro Cascade	689.3	7%	27%
	171 small HPPs ⁽¹⁾	1,004.0	11%	43%

	Installation	Electricity produced in 2024 (million kWh)	Share on total electricity production	Change 2024/2023 (%)
PV	Licensed (utility-scale) producers ⁽²⁾	491.8	5%	29%
	Autonomous producers ⁽³⁾	487.6	5%	39%
	Wind farms ⁽⁴⁾	1.2	0.01%	-47%
	Total electricity production	9,386.3		7%
	Total electricity production from renewable sources	3,039.8	32%	28%

Note:

(1) According to the RA MTAI and Statistics Committee, the number of the small HPPs in 2024 was 171, with total installed capacity of 370.6 MW

(2) total installed capacity of licensed solar PV plants reached 285.3 MW in 2024 (ArmStat)

(3) autonomous solar PV producers reached 420.5 MW³

(4) total installed capacity of 2.9 MW

Electricity is transmitted and distributed by HVEN and ENA CJSCs wherein inevitable technical losses occur. Losses in 2024 amounted to 621.8 million kWh.

Data Sources

The data on the production and the own needs of each of the plants, as well as on the losses in the transmission and distribution processes have been collected from the RA MTAI official website ⁴. The data on the output of autonomous and licensed solar PV installations were collected from Armstat and the official website of the RA PSC.

Solar water heater data were obtained from the RA Customs Service in the "make-quantity" format, which is recommended for the collection of these data.

The data on electricity consumption by industry are provided by Armstat.

The data on the consumption of electricity in other sectors were collected from the official website of the RA PSC.

3.2 Natural Gas Balance

General Information and Overview

The supply and sale of natural gas on the RA domestic market is carried out by the “Gazprom Armenia” CJSC. The total length of the gas transportation system is 1668.5 km. The gas is transported through the 1580.9 km long gas pipeline and the remaining part is in operational reserve⁵. Unused pipelines are in operational reserve mode.

The underground gas storage facility (UGSF) owned by Gazprom Armenia, located in Abovyan, is also used to store gas reserves. UGSF has strategic importance since it ensures the reliability of the gas supply in the country while being used to cover the seasonal and peak demand of gas. In 2024,

³ <https://energyagency.am/category/infografiks/inqnavar-arevayin-kayanner-2025t--hounvar>

⁴ <https://www.mtad.am/pages/armenian-energy-system-production-stations>

⁵ <https://armenia-am.gazprom.com/about/today/>

73.0 million m³ of gas was taken from the gas pipelines and UGSF (9.2% more than in 2023), meanwhile, 78.0 millionm was pumped into the UGSF (6.4% more than in 2023).

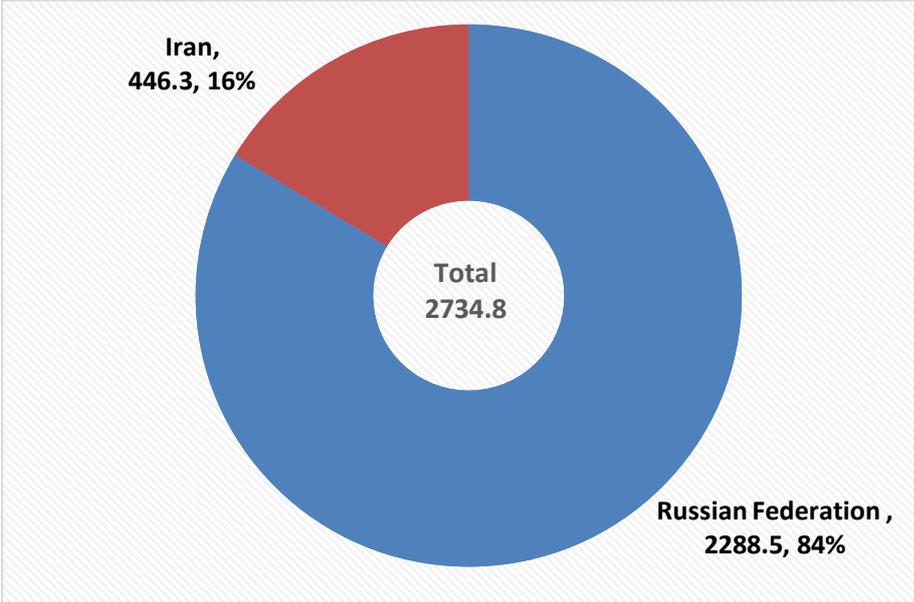
The gas distribution network includes:

- 19869.1 km (high, medium and low-pressure gas pipelines, as well as engineering structures located on them)
- 2674 gas regulating points
- 9613 individual pressure regulators
- 1433 head measuring nodes
- 314 electrochemical protection stations.

Diversification of the gas supply to the Republic of Armenia is ensured by the gas imported from the Russian Federation and the Islamic Republic of Iran. The agreement with Iran provides for the exchange of gas for electricity. Currently, a 400 kV double-circuit power transmission line is under construction to ensure the contractual volumes of gas imported from Iran.

Figure 3.1 shows the total amount of imported natural gas in 2024 (million m³). In 2024, imports of natural gas from the Russian Federation decreased 3.0% and from the Iran increased 20.5%. The overall import of natural gas for 2024 was 2734.8 million m³, which increased by 0.1% compared to the previous year.

Figure 3.1: Amount of natural gas imported in 2024, million m³, %



Currently, Armenia has leading positions among the countries in the world that apply natural gas as an engine fuel. It is economically advisable compared to oil products consumption and leads to the significant reduction of hazardous substances and greenhouse gases emissions in the atmosphere. According to the official website of "Gazprom Armenia" CJSC, today there are about 380 CNG FSs operating in Armenia.

Table 3.2 shows the amount of natural gas used in the respective (except for the energy sector) sectors, their share on the total use of natural gas as engine fuel and the relative change between the years 2023 and 2024.

Table 3.2: Use of natural gas in the respective sector, share and change

Sector	Natural gas [million m ³]	Share on total natural gas consumption	Change 2024/2023 [%]
Industry	273.5	14.8%	-6.9%
Transport	360.0	19.5%	-12.6%
Households	896.3	48.6%	10.9%
Agriculture ⁽¹⁾	128.4	7.0%	46.0%
Service	185.3	10.1%	-8.4%
Total	1843.5		2.2%

Note: (1) volume of natural gas consumption for heating greenhouses

Data Sources

The data provided by the RA PSRC, RA MTAI and Armstat served as the information source for the compilation of the natural gas balance.

Information about the gas amounts imported and taken from the gas pipelines and UGSF as well as the data on the gas volumes pumped into the UGSF, losses in transportation and distribution systems, transported gas amounts, own needs consumption, recovered gas volumes and consumption in the transportation sector were taken from the RA PSRC's official website.

Information on the average monthly calorific value of the supplied gas is supplied by "Gazprom Armenia" CJSC by the request of RA Ministry of Territorial Administration and Infrastructure.

The data on the natural gas used in the industry and agriculture sectors for energy purposes and in separate power plants were provided by Armstat.

3.3 Thermal energy balance

General information and overview

The share of the thermal energy in Armenia's total final energy consumption is quite small (1%). Thermal energy is equally consumed for households and the service sector.

In the beginning of 1990's, upon energy crisis in Armenia gas was supplied irregularly due to Armenia's low solvency and regular explosions of the gas pipeline. That was the reason for the collapse of the centralized heat supply systems. After the gas supply restoration, individual thermal equipment was widely used for hot water and heating preparation. Currently, centralized heat supply in Armenia is implemented by small combined cycle power plants. "Yerevan State Medical University after Mkhitar Heratsi" foundation and "Lus Astkh" LLC produce heat energy for its own needs, and "ArmRuscogeneration" CJSC realizes heat supply to Hovhannisyan, Varuzhan, Isahakyan, Tumanyan, Kuchak and Narekatsi blocks of Avan administrative area in Yerevan. There is no data on the thermal energy produced in 2024 at the cogeneration station of the "Yerevan State Medical University after Mkhitar Heratsi" foundation while useful delivery of electricity was 5.7 million kWh. In 2024, thermal energy and electricity were not produced in "ArmRuscogeneration" CJSC.

In 2024 “Hrazdan-5” unit produced 14 000 GJ thermal power which is consumed by “Hrazdan TPP” OJSC. Electricity at the "Hrazdan TPP" was produced by condensing-type units. The Combined cycle unit at “Yerevan CHPP” in 2024 operated in condensing mode.

There are small capacity boiler houses in Armenia designed for the heating of one or several buildings. Thermal energy sources also include solar water heaters. There is no reliable information about the individual solar water heaters' areas and the volumes of their utilization in different sectors, particularly, in the food industry and service sector. According to expert estimates based on type-quantity data of water heating systems from the tax service, solar thermal power was calculated for 2024 towards 2023 increased heat energy and added to the value of 2023 balance. In 2023, thermal power generated by solar units comprised 723.8 TJ, about 1.1 times more than 2023. The share of this energy is insignificant and is accounted for in the chapter “Renewable energy balance”.

Data sources:

Information about the thermal energy of thermal power plants was provided by Armstat.

The information on the solar water heaters is based on the data available at the Tax Service.

3.4 Oil product balance

General information and overview

The data on the following oil products are presented in the oil product balance:

- Motor fuel types (engine gasoline, diesel fuel, petrol for jet engines, aviation kerosene)
- Liquid oil gases,
- Mazut and oil bitumen,
- Other oil products (other kerosene types, special types of gasoline, lubricants, paraffin and other oil products).

There is no oil extraction in the territory of Armenia and all the oil products are imported.

Some types of the imported oil products are used in the limited amounts for the production of varnish, paints and the other products in Armenia. Imported bitumen and mazut are utilized for non-energy purposes either.

Table 3.3 shows the relative share of the different oil products in the respective sectors.

Table 3.3: share of oil products to the respective sectors (in %)

Sector	Motor gasoline	Diesel oil	LPG	Other oil products
Transport	99.99%	82.9%	91.6%	-
Industry ⁽¹⁾	0.001%	8.1% ⁽¹⁾	0.04%	-
Agriculture ⁽²⁾	-	9.0% ⁽²⁾	-	-
Services	-	-	6.0%	-

Sector	Motor gasoline	Diesel oil	LPG	Other oil products
Households	-	-	2.3%	-
Non-energy use	0.03%	0.9%	-	100%

Note:

Insignificant amounts of diesel fuel are also consumed by diesel generators which are reserve sources for power production. The data on this sector's consumption isn't available.

(1) Diesel fuel consumed by the industrial sector is utilized to operate different types of mechanisms (drilling rigs, cranes, telescopic towers and other mechanisms). The major consumers of the industrial sector were the mining industry and non-ferrous metallurgy.

(2) tractors, combines and other mechanisms

Data sources

Information on the imports and exports of oil products, as well as the data on the volume of the oil products consumption in the industrial sector, the data on the sowing and total harvesting areas of the agricultural crops, and the expert assessment of the agricultural sector on the consumption of fuel in the agriculture sector were provided by Armstat.

3.5 Coal Balance

General information and overview

Armstat data on the imported coke, semi-coke, anthracite, lignite and other coal types were used to compile the coal balance.

In 2024, the share of coal consumed for energy purposes was only 0.5% of total energy consumption. About 86.4 % of coal was used in the household sector.

There are lignite deposits in Jajur and Dilijan. They haven't got any industrial significance, and according to the expert estimations around 500 families collect the lignite manually. Therefore, the mining of the lignite in 2024 remained at the level fixed in 2023.

Data Sources

Armstat provided the data on the volumes of coal import and export, as well as consumption in the industrial sector.

Information about the mining of the lignite was revealed using the expert assessments.

3.6 Balance of wood and other biofuels

General information and overview

Wood and other types of biofuels are considered renewable energy sources.

Types of the biofuels are:

- Industrial wastes,

- Solid household wastes,
- Solid biomass (including charcoal),
- Biogases.

Firewood and timber in Armenia are revealed in the following ways:

- Sanitary deforestation (solid biomass),
- Illegal deforestation (solid biomass),
- Fallen dry wood (solid biomass),
- Wastes from woodworking and furniture manufacturing (industrial wastes),
- Import.

As shown in Table 3.3, wood, wood products and other biofuels are used in the Industry sector, households and services, whereas households are the main consumers of these products.

Table 3.3: relative share of wood, wood products and other biofuels to the respective sectors.

Sector	Timber, firewood, sawdust	Other vegetal material and residues	Charcoal	Animal waste
Industry	0.01%	0.03%	0.7%	-
Households	94.99%	99.97%	94.3%	100%
Services	5.0%	0.0%	5.0%	-

Official data on the individual biogas facilities aren't available. In Armenia, these technologies mainly use manure. Manure is also utilized for energy purposes as a furnace fuel, in particular for heating purposes.

Limited amounts of crude and other solid residues are also imported to Armenia.

Data sources

The data on the imports and exports of wood and other biofuels have been provided by Armstat.

The data on the consumption of firewood and manure in households were also provided by Armstat based on the results of the survey.

The data on manure consumption are based on expert calculations considering annual outputs per farm animal provided by Armstat.

Armstat also provided information on firewood and wood consumption in the industrial sector.

3.7 Renewable energy balance

General information and overview

This chapter includes hydro, wind, solar and geothermal energy.

Table 3.4 shows the amount of electricity produced (million kWh), capacity (MW), the share on the total electricity production and the relative change between the years 2023 and 2024 from renewable sources.

Table 3.4: Overview of electricity produced (million kWh), capacity (MW) share on the total electricity production (%) and change 2024/2023 (%)

	Installation	Electricity produced in 2024(million kWh)	Capacity (MW)	Share on total electricity production	Change 2024/2023 (%)
Hydro power	International Energy Corporation	365.8	561.4	4%	-8%
	Contour Global Hydro Cascade	689.3	404.2	7%	27%
	171 small HPPs	1,004.0	370.6	11%	43%
PV	Licensed (Utility-scale) producers	491.8	285.3	5%	29%
	Autonomous producers	487.6	420.5	5%	39%
	Wind farms	1.2	2.9	0.01%	-47%
	Total electricity production from renewable sources	3,039.8		32%	28%

Hydro energy is the most developed among the other renewable energy resources in Armenia.

Armenia has significant potential for solar energy production. Solar energy is represented by solar water heating and PV power plants. In 2024, the increase in the amounts of hot water and electricity produced by solar technologies was continued due to the policy realized by the RA Government^{6,7,8,9} such as the introduction of tariffs, net metering system etc. As a result of the implemented initiatives, energy production from solar technologies increased by 1.3 times compared to 2023.

Share of the energy produced using solar technologies in the primary production of renewable energy carriers was 28% in 2024. This indicator has increased significantly compared to 2023, which is due to the expansion of the use of solar technologies.

Geothermal energy in Armenia is represented by several pilot installations which haven't been included in the energy balance due to their insignificant production volumes.

Data sources

The data on the WPP production amounts were taken from Armstat.

Sources for the information on the solar technologies were the "ENA" CJSC, customs service and R2E2.

The Solar Map of Armenia, as well as information on the installed capacity and the amount of electricity generated by licensed PV installations, published on the PSRC official website, served as a source of the data on the sun hours duration.

⁶ https://energyagency.am/en/page_pdf/arevayin-energetika

⁷ <https://www.ena.am/Info.aspx?id=11&lang=1>

⁸ <https://www.himnadram.org/en/1660039870>,

⁹ https://energyagency.am/en/page_pdf/arevayin-energetikayi-ardyounavet-ogtagor

4 INDICATORS

This chapter includes information and analysis of the different indicators such as production of primary energy sources, imports, total primary energy supply, energy intensity per GDP and per capita, the share of renewable energy, energy consumption by fuel and the final energy consumption per sector.

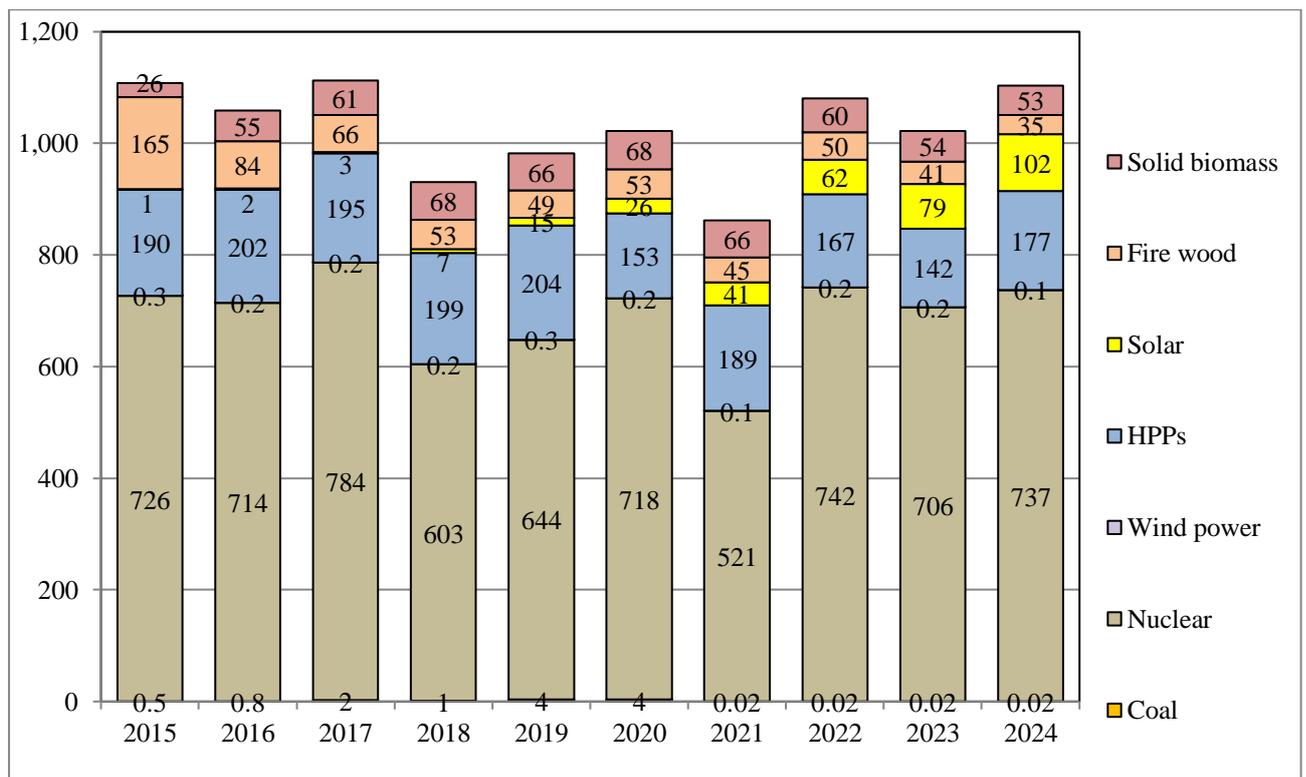
4.1 Production of primary energy resources

The main domestic sources of primary energy production are nuclear energy and hydro energy, which share amounted to 66.8% and 16.0% correspondingly in 2024. The volumes of energy produced in HPPs have increased compared to previous years, driven mainly by small HPPs showing a particularly strong rise of 43%.

The data of renewable energy production in 2015-2016 are not reliable, as the volumes of energy production from firewood, other biomass (manure) and solar installations in those years were overestimated. Since 2017, Armstat has been adjusting the amount of firewood and other biomass consumed in households. The analysis revealed that the volume of firewood and animal waste consumption in households gradually decreased over 2018–2024, in 2024 firewood consumption fell to 33.9 ktoe and animal-waste consumption to 53.0 ktoe.

Growth of solar energy production is significant in the result of encouraging development of photovoltaic and solar water heating installations. For comparison, note that in 2023 the share of energy production using solar technologies was 7.7% and increased in 2024 up to 9.2%.

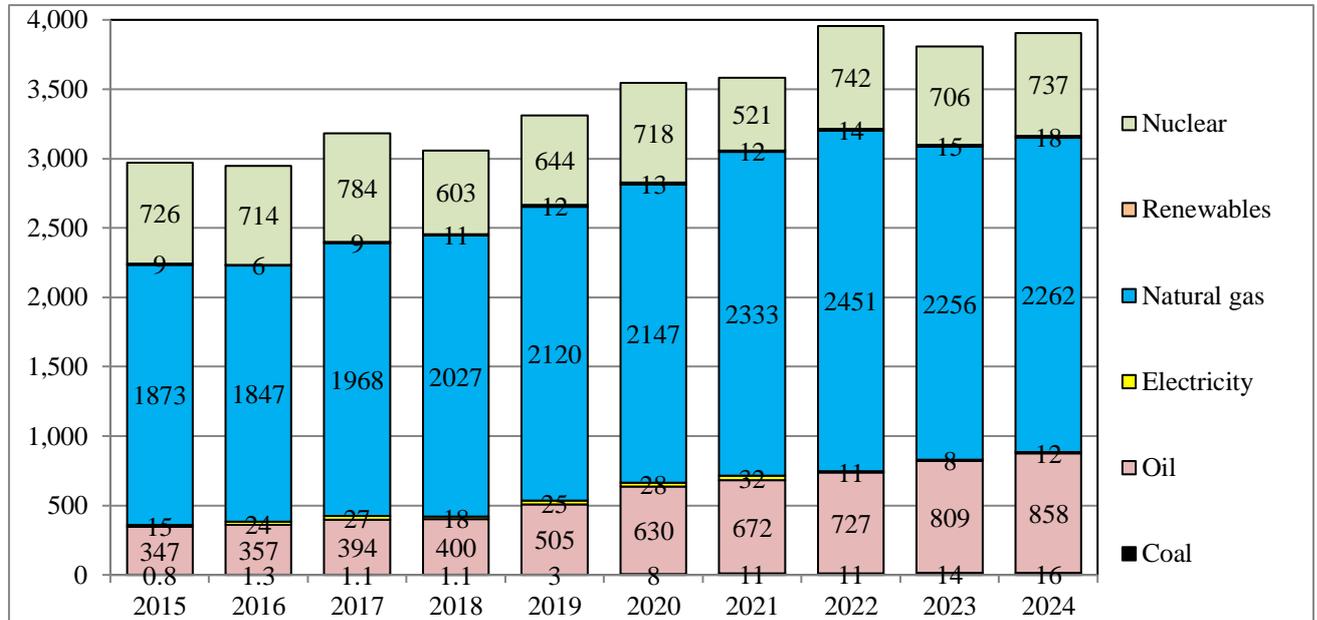
Figure 4.1: Production of primary energy resources (ktoe)



4.2 Imports

Armenia remains a country with great dependence on the imports of the energy resources. In 2024, imported energy resources in the total primary supply of energy were 72.3%. In 2024, energy imports increased by 2.1% compared to 2023. This is mainly due to the increase in imports of oil products.

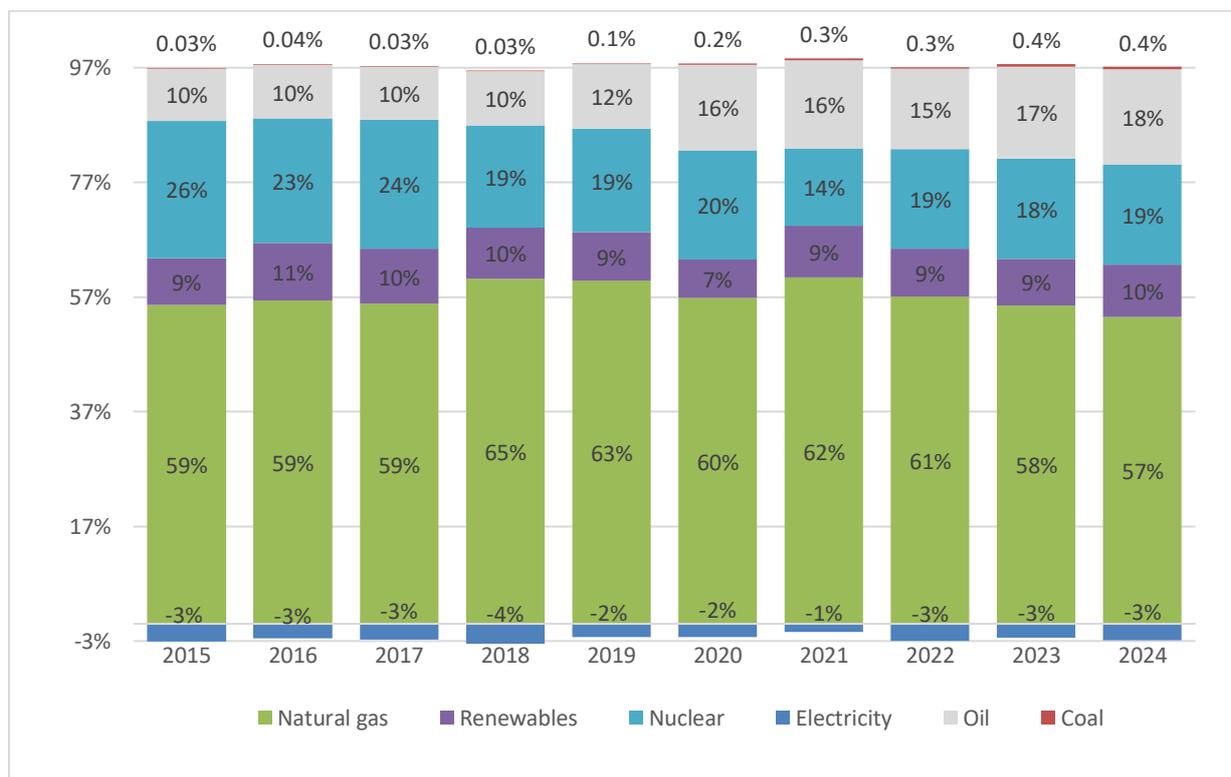
Figure 4.2: Imports of energy (ktoe)



4.3 Total primary energy supply

In 2024 the volume of the total primary energy supply increased by 3.2% compared to 2023.

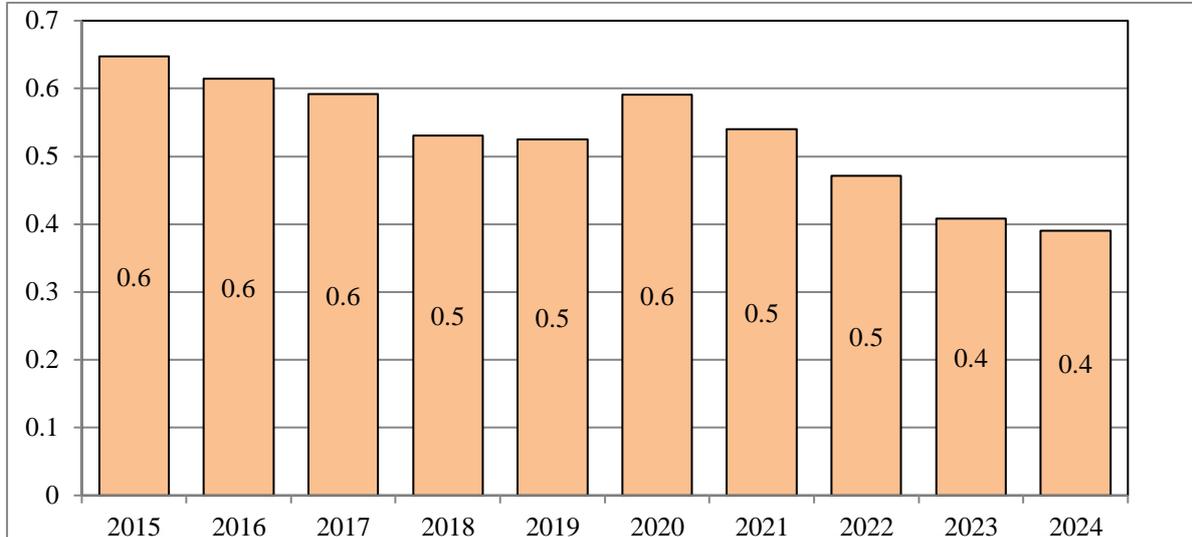
Figure 4.3: Total primary energy supply (%)



4.4 Energy intensity per GDP

As can be seen from the graphs depicted, the energy intensity of the gross domestic product continuously dropped during 2015-2019, except for 2020. In 2024 a decrease in energy intensity of 4.3% was registered compared to 2023. The reason for these decreases is the growth in gross domestic product (GDP) by 7.8% (according to the section "11.10. Production of gross domestic products" of the «Statistical Yearbook of Armenia, 2025», GDP in 2023 amounted to 9453.2 billion drams, and in 2024 – 10,193.4 billion drams).

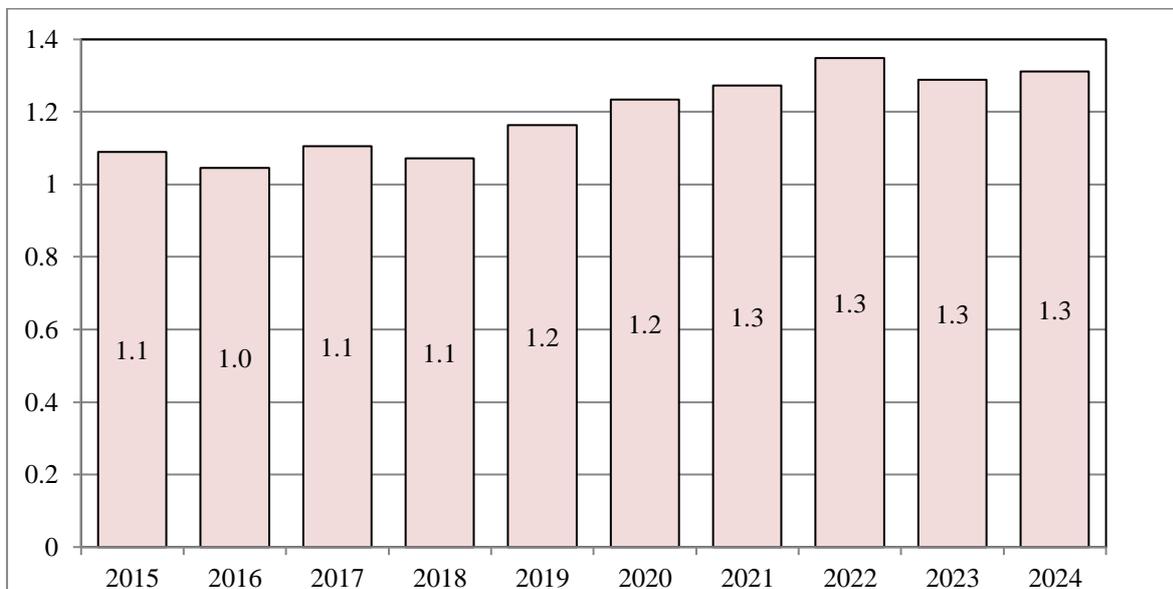
Figure 4.4: Energy intensity per GDP (ktoe/billion AMD)



4.5 Total primary energy supply per capita

In 2024 the primary energy supply per capita increased by 1.8% compared to 2023.

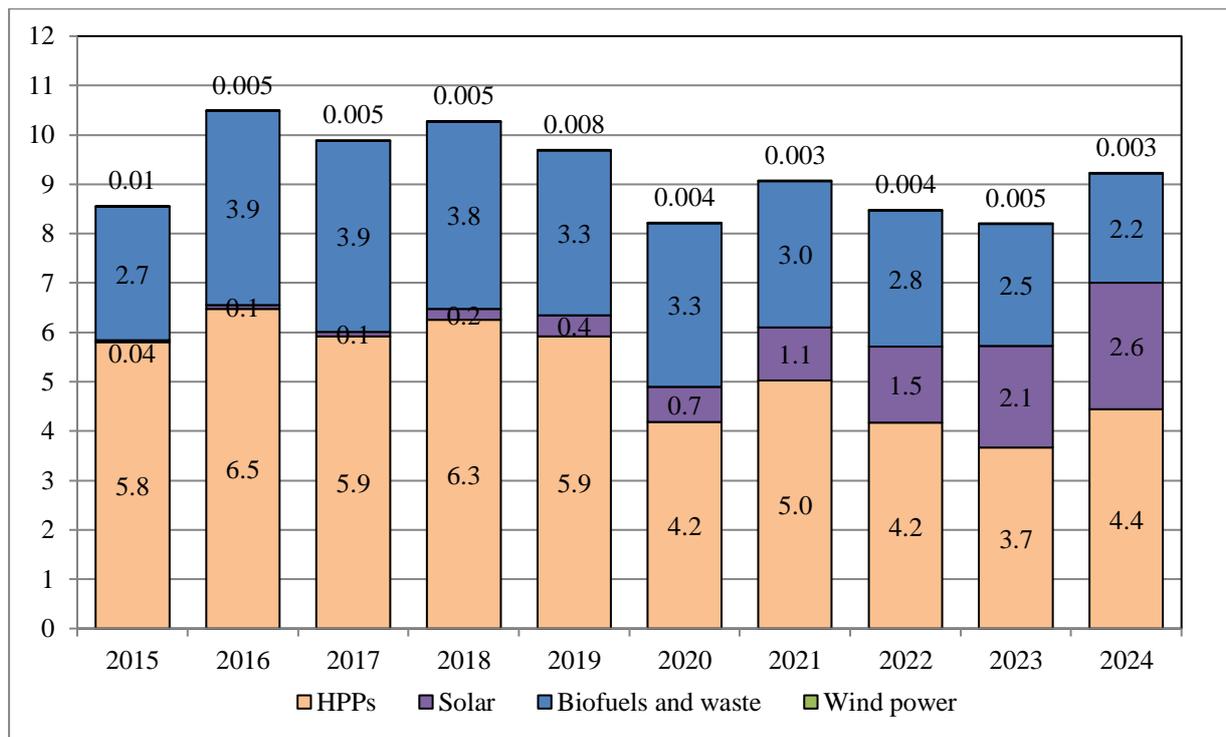
Figure 4.5: Total energy supply per capita (toe/capita)



4.6 Share of renewable energy against the total primary energy supply

As it has already been mentioned that 2015-2016 data are not reliable, as the volumes of energy production from firewood, other biomass (manure) and solar installations in those years were overestimated. In 2017-2019, as a result of adjusting the volume of these energy resources, there is a decrease in the share of renewable energy production in relation to the supply of primary energy. In 2020 this decrease has a very visible appearance as a result of the reduction of the output of hydropower plants. In 2021, there is an increase in the share of renewable energy production, which is due to the increase in the generation of HPPs and solar power plants. In 2024, an increase in the share of renewable energy production is observed, which is due to the growth in the production volumes of solar energy and hydropower plants.

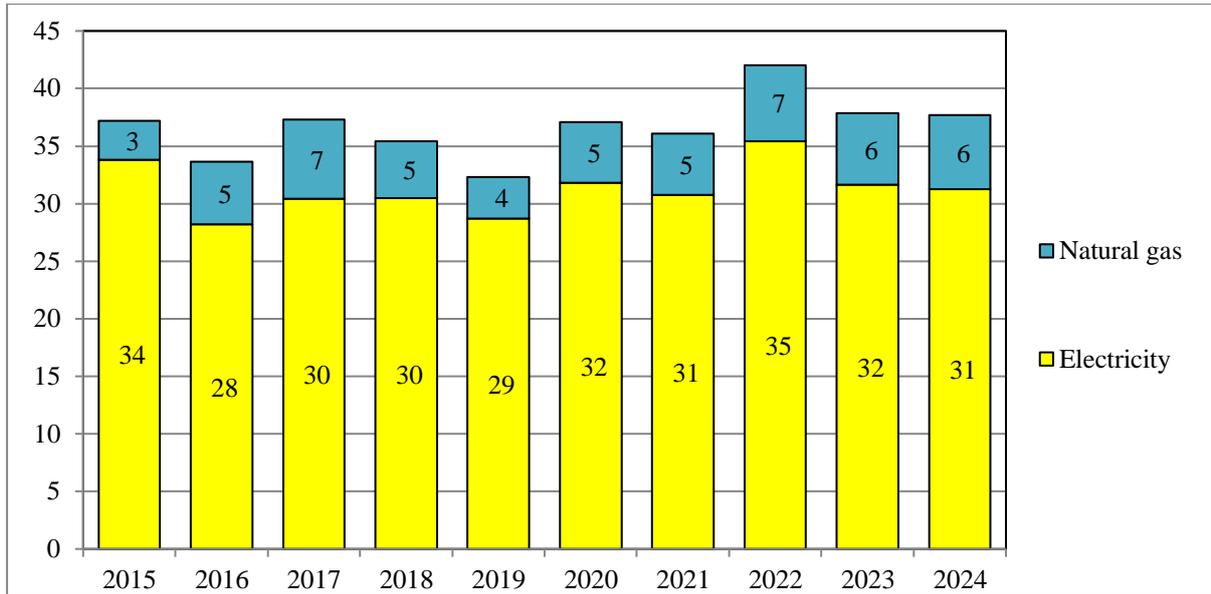
Figure 4.6: Relative share of primary renewable energy against the total primary energy supply (%)



4.7 Energy consumption for own needs

In 2024, there is a certain decrease in the total expenditure of energy carriers on own needs compared to 2023. In the case of natural gas, although the total gas consumption at the plants decreased, the volume of own needs increased by 3.9%. This increase is due to the increase in gas consumption at the "Hrazdan 5" plant. In the case of electric energy, the expenditure decreased by 1.3%, which is due to the decrease in the output of thermal power plants.

Figure 4.7: Energy consumption for own needs by fuel (ktoe)

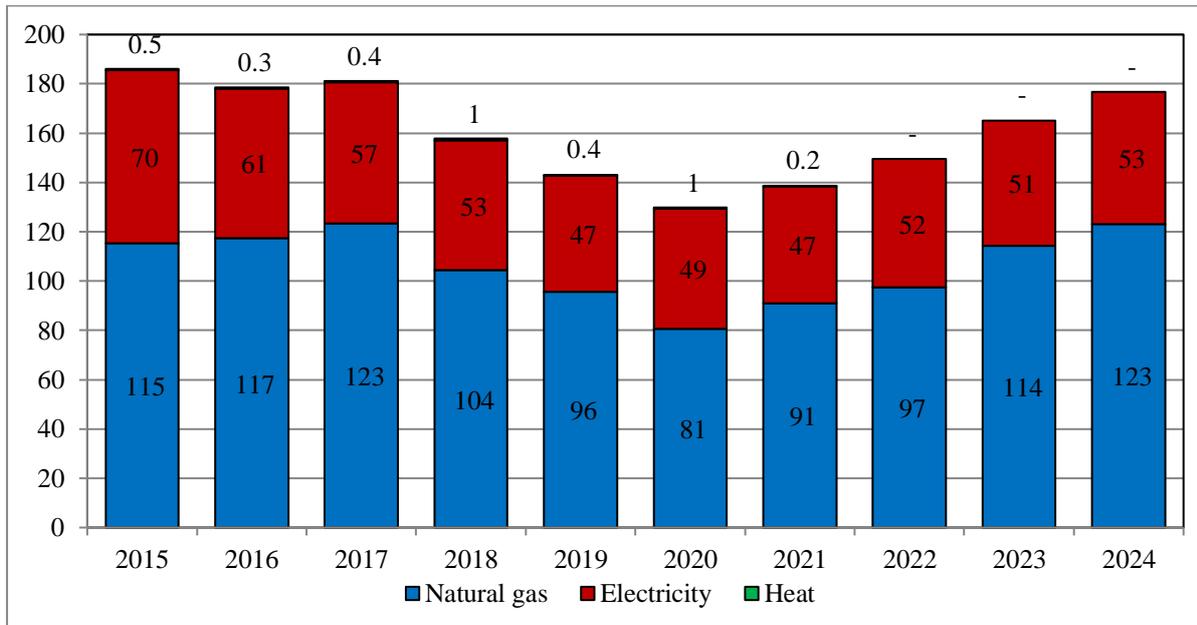


4.8 Losses of energy sources due to transmission and distribution

Loss of energy resources increased in 2024 by 7.0% compared to 2023. This is conditioned by increased losses in the natural gas and electricity distribution and transmission systems.

Total natural gas losses, a key indicator of inefficiencies, linked to the volume of the consumed natural gas and reflect the aging infrastructure, inadequate modernization efforts, and limited investment.

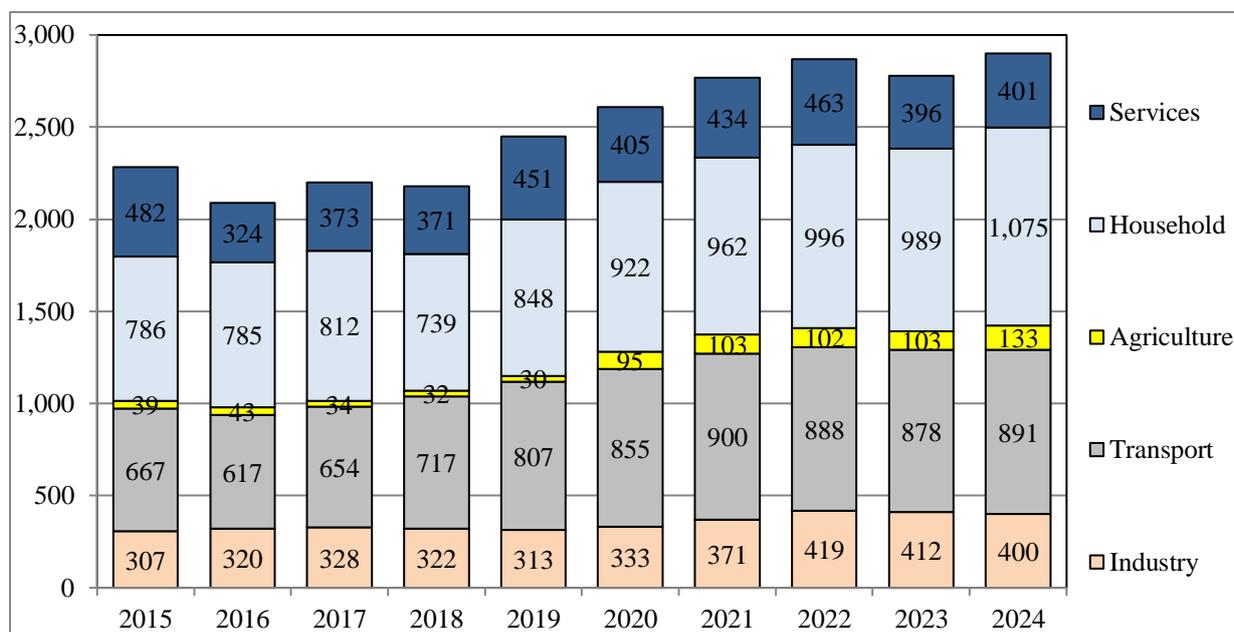
Figure 4.8: losses of energy in transmission and distribution (ktoe)



4.9 Final energy consumption per sector

In 2024 the main sector of energy consumption was the household which had a share of 37.1% against the total amount of the final energy consumption. The transport share was 30.7%. The share of service sector was 13.8%, industry – 13.8%, and agriculture – 4.6%:

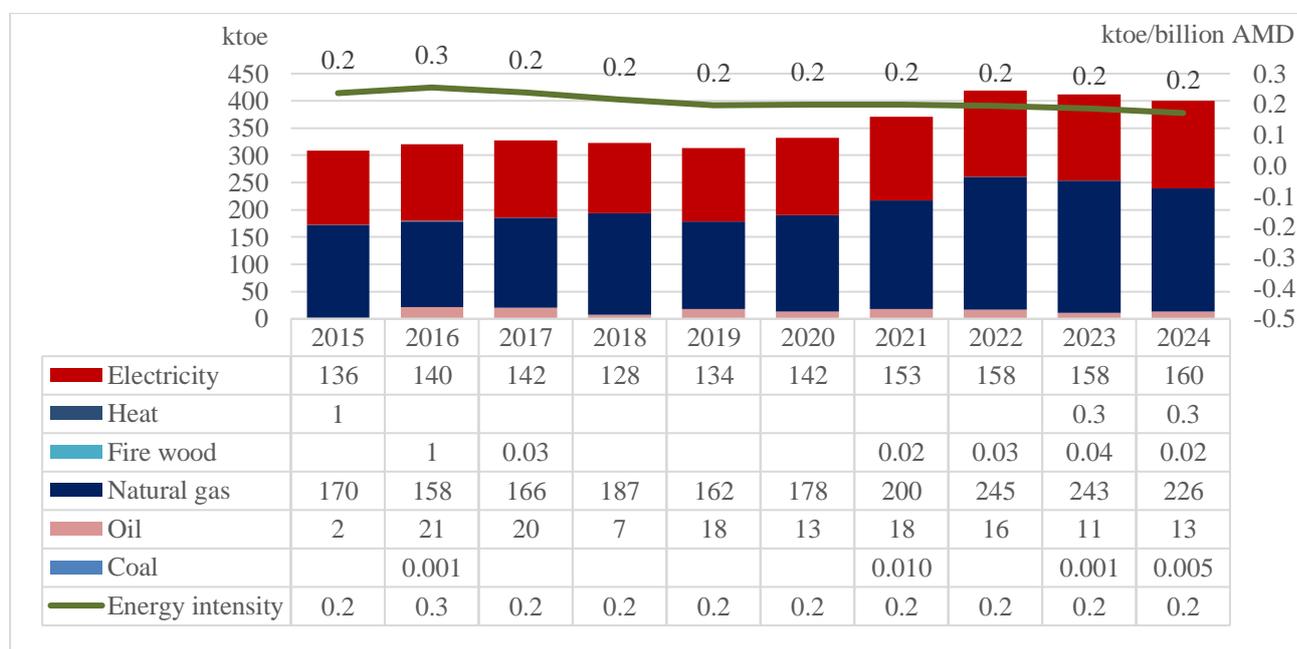
Figure 4.9: Final energy consumption by sector (ktoe)



4.9.1 Final energy consumption – Industry and Construction

In 2024, a slight decrease in energy consumption in this sector is observed 3.0% compared to 2023. This decrease is due to the decrease in the consumption of natural gas. This trend is also reflected in the energy intensity of these sectors (-8.0% compared to 2023).

Figure 4.10: Final energy consumption (ktoe) and energy intensity (ktoe/billion AMD) in the industry and construction sector



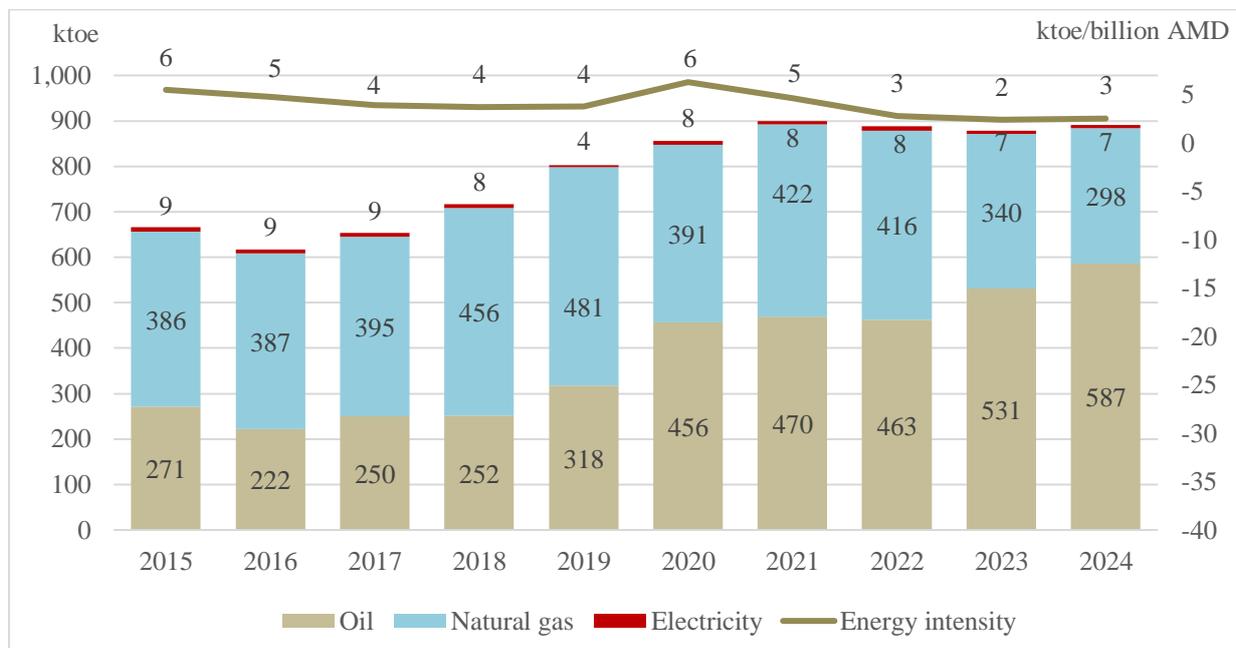
4.9.2 Final energy consumption – Transport

In 2024 there is a increase in energy consumption in the transport sector 1.5% compared to 2023. This is mainly due to the increase in the use of oil products.

The energy intensity of the transport sector has increased by about 6.0% compared to 2023. This is mainly due to the decrease in value added in the transport sector by 4.3% (according to the section "11.10. Production of gross domestic products" of the «Statistical Yearbook of Armenia, 2025», value added in the transport sector in 2023 amounted to 363.2 billion drams, and in 2024 – 347.8 billion drams).

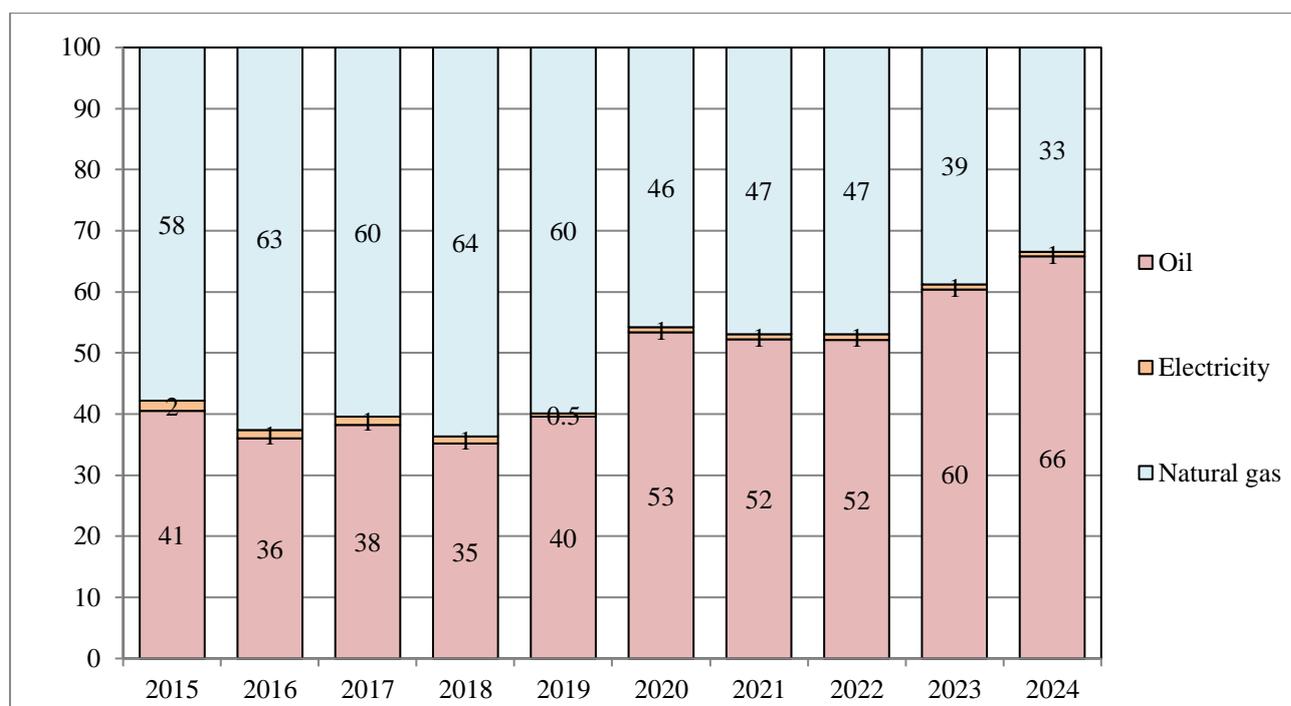
In 2020 the energy intensity of the transport sector has sharply increased (approximately doubled compared to 2019). This is mainly due to a 34.8% decrease in value added in the transport sector, which in turn is due to the COVID crisis and the war.

Figure 4.11: Final energy consumption (ktoe) and energy intensity (ktoe/billion AMD) in the transport sector



It can be seen from the graph that there is a decrease in natural gas, an increase in oil products and an insignificant decrease in electricity consumption. In 2024, the share of consumed natural gas in the transport sector was 33.4% of the energy consumed, oil products - 65.8%, and electricity – 0.8%. It should be noted that the electricity consumed by electric cars is partly included in the total consumption of the transport sector. It is counted for only public transport. The private electric car consumption which is the main part is included in the Household sector.

Figure 4.12: Relative share of oil, natural gas and electricity in the transport sector (%)

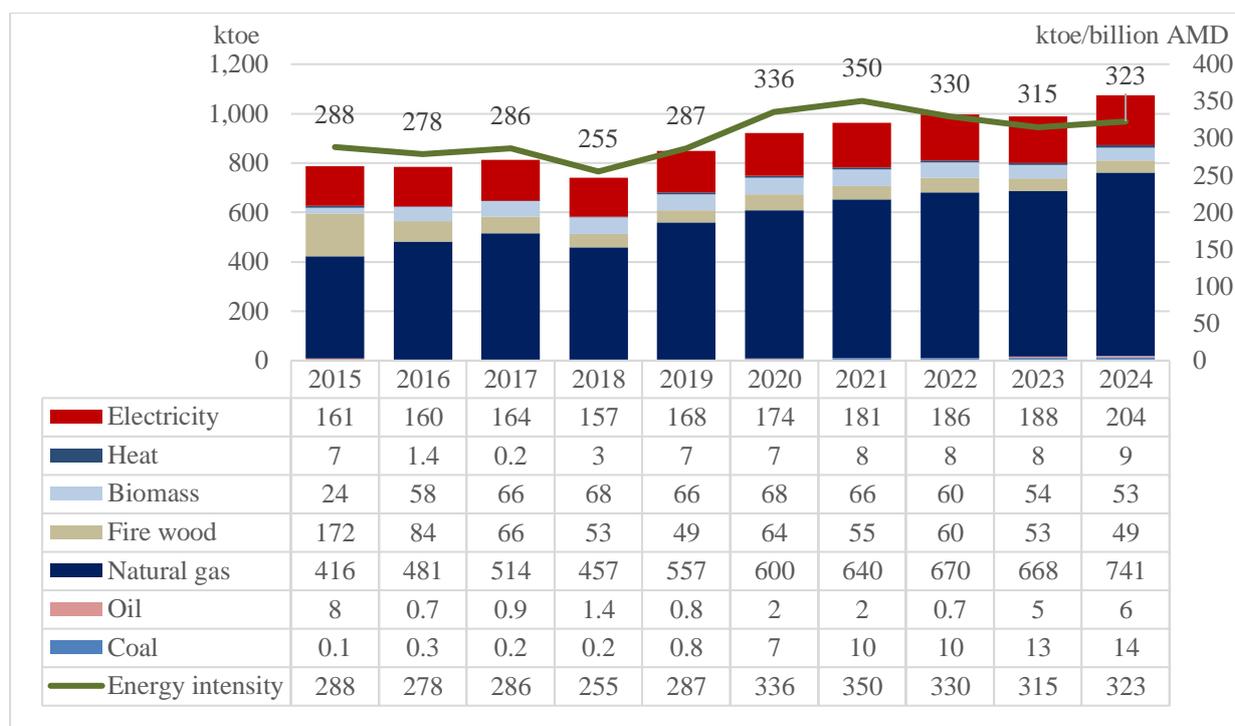


4.9.3 Final energy consumption – Households

The consumption of energy resources in the households increased by 8.7% in 2024 compared to 2023. This is mainly caused by the increase of consumption of oil products 17.0% and natural gas 11.0%.

The energy intensity in the households was almost at the same level in the years 2015-2017 (around 285 ktoe/billion drams). Since 2019 there has been an increase in energy intensity up to 2021. In 2024 it increased by 2.4% compared to 2023. This is mainly due to the increase in energy resources consumption and increase in value added in the household by 6.2% (according to the section "11.10. Production of gross domestic products" of the «Statistical Yearbook of Armenia, 2025», value added in the household sector in 2023 amounted to 3.1 billion drams, and in 2024 – 3.3 billion drams).

Figure 4.13: Final energy consumption (ktoe) and energy intensity (ktoe/billion AMD) in the household sector



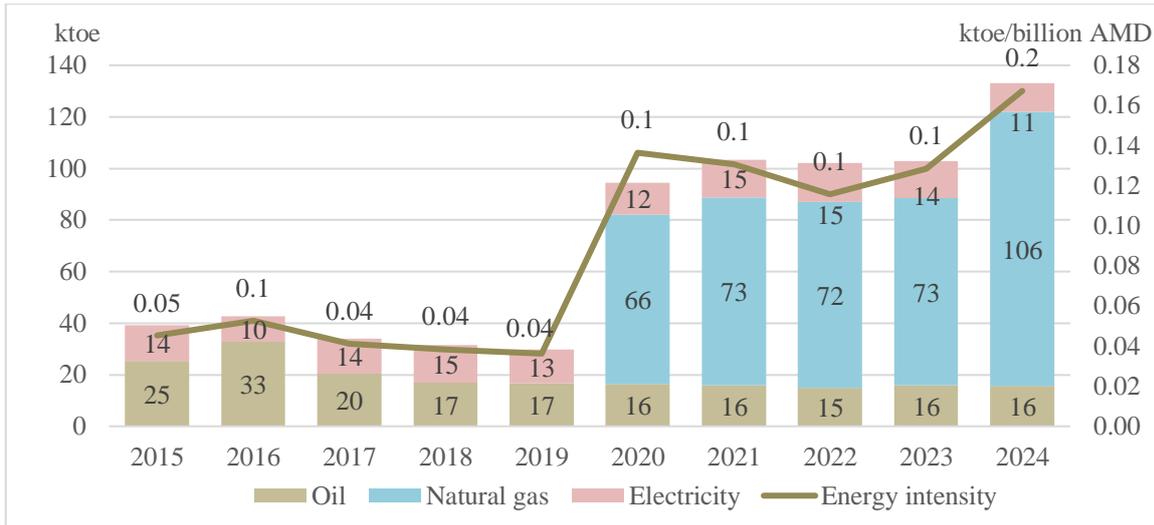
4.9.4 Final energy consumption – Agriculture

The energy consumption in the agriculture sector increased in 2024 by around 29.3% compared to 2023. This is mainly due to the increase in the natural gas consumption by 46.2%.

The energy intensity in the agriculture sector increased by 30.3% compared to 2023. This is mainly due to the increase of consumption of energy resources compared to the decrease in the value added of the sector by 0.8% (according to the section "11.10. Production of gross domestic products" of the «Statistical Yearbook of Armenia, 2025», value added in the agriculture sector in 2023 amounted to 801.8 billion drams, and in 2024 – 795.7 billion drams).

Before 2020, natural gas consumption in greenhouse farms was included in the industry sector. In 2020, a special gas tariff for agriculture was applied, after which its consumption was considered separately.

Figure 4.14: Final energy consumption (ktoe) and energy intensity (ktoe/billion AMD) in the agriculture sector

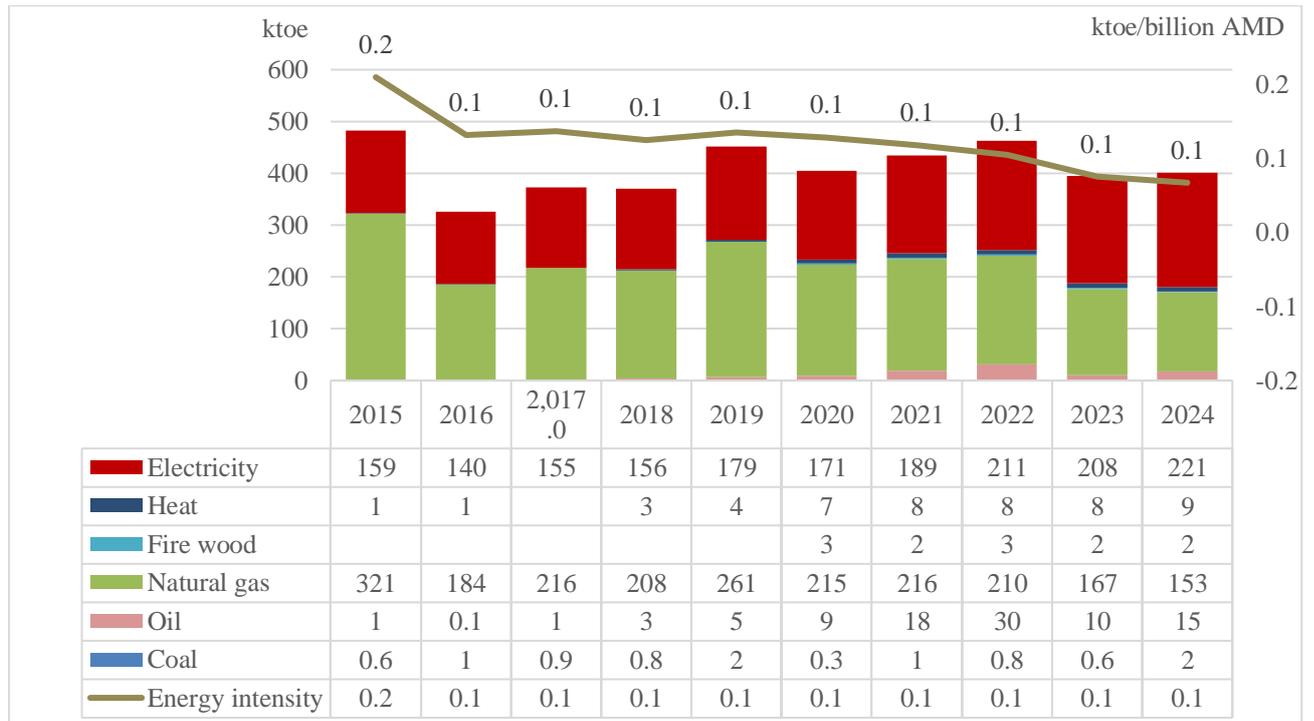


4.9.5 Final energy consumption – Services and other sectors

The consumption of energy resources in the service and other sectors in 2024 increased by about 1.5% compared to 2023. This is due to the increase in the consumption of oil products and coal.

The energy intensity of these sectors was continuously dropping during 2015-2017 and increased only in 2018 - 2019 and continued to decrease afterwards. The energy intensity of services and other sectors decreased by 10.7% in 2024 compared to 2023.

Figure 4.15: Final energy consumption (ktoe) and energy intensity (ktoe/billion AMD) in services and other sectors



5 COMPLETENESS AND IMPROVEMENTS

During the task implementation:

- Energy balances of Armenia for 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022 and 2023 have been analyzed and addressed to the trends of the main indicators, the reasons for their changes, as well as the methodologies used to fill the data gaps, etc.
- Collection of the official data from Armstat, PSRC, MTAI and R2E2 have been accomplished.
- Energy Balance of Armenia for 2024 has been compiled in the formats of Eurostat and International Energy Agency.
- Draft Energy Balance of Armenia for 2024 has been discussed with the specialists from Armstat and MTAI. Some corrections have been made to electricity production/consumption by Autoproducers, the data on uranium imports, thermal energy production and consumption in industry, the number and total capacity of small HPPs and wind farms, etc.
- The analysis of changes in indicators included in the balance for 2015-2024 has been carried out.
- Based on compiled balance the Fact sheet was developed.

Suggestions for improving data collection.

1. In the section “Final energy consumption” of the Energy Balance, for a more precise presentation of information on the volumes of electricity and natural gas consumption by sector, it is proposed to use in the subscriber databases of "Electric Networks of Armenia" CJSC and "Gazprom Armenia" CJSC the classifier of types of economic activities approved by 2013 September 19, N 874-N the order of the RA Minister of Economy (see <https://armstat.am/am/?nid=370>).
2. To increase the accuracy of the calculation/estimation of solar thermal energy generation, it is recommended to get the data of solar water heaters from the RA Customs Service in "type-quantity" format.

6 CONCLUSIONS

1. During 2015-2017 there was growth in the total primary energy supply, and in 2018 there was some certain decrease (around 4.5% decrease in 2018 compared to 2017). Subsequently, there was a steady increase in the years 2019 (+8.1%), 2020 (+5.6%), 2021 (+4.8%), 2022 (+6.2%), except for 2023 decrease (-3.7%). In 2024, a increase of 3.2% - compared to the year 2023 – was observed.
2. The energy intensity of the gross domestic product continuously dropped during 2015-2024, except for 2020, which was due to COVID and war. The main reason for this decrease is the growth in the gross domestic product (GDP).
3. The total primary energy supply per capita increased by 1.8% in 2024 compared to 2023, due to the increase in GDP.
4. In 2024, the main source for the domestic production of the primary energy resources remain nuclear energy and hydro energy (66.8% and 16.0% of total domestic production, respectively).
5. The volume of firewood and animal waste consumption in households gradually decreased over 2018–2023, in 2024 firewood consumption fell to 33.9 ktoe and animal-waste consumption to 53.0 ktoe.
6. The volume of energy production using solar technologies has significantly increased. The share of this source to domestic production of primary energy resources in 2024 amounted to 9.2%.
7. Armenia remains a country with great dependence on the imports of the energy resources. In 2024 the share of imported energy resources in the total primary supply was 72.3%, while the share of domestic production – 27.7%.
8. A certain decrease in the total energy consumption for own needs by 0.4% is observed in 2024 compared to 2023 due to the decrease in production of old thermal power plants, as well as due to the significant increase of renewables with very low self-consumption needs. At the same time, the losses of energy resources in 2024 increased by 7.0% compared to 2023.
9. The main sectors for energy consumption were households and transport (37.1% and 30.7% of the final consumption for energy purposes, respectively). In 2024, 13.8% of energy was consumed by the service sector, 13.8% by the industry sector and 4.6% by the agriculture sector.
10. Energy consumption in 2024 compared to 2023:
 - decrease in industry by 3.0%,
 - increase in transport by 1.5%,
 - increase in households by 8.7%,
 - increase in agriculture by 29.3%,
 - increase in service and other sectors by 1.5%.
11. Energy intensity in 2024 compared to 2023:
 - decrease in industry by 8.0%,
 - increase in transport by 6.0%,
 - increase in households by 2.4%,
 - increase in agriculture by 30.3%,
 - decrease in service and other sectors by 10.7%.

The increase and decrease in the values of energy intensity is due to an increase and decrease in the gross domestic product and its components.

12. The structure of energy consumption in the transport sector in 2024 consisted of:

- share of oil products – 65.8%,
- share of natural gas – 33.4%,
- share of electricity – 0.8%.

N	Energy Balance of Armenia, 2024	Total	Coal	Oil	Natural Gas	Renewables	Nuclear	Heat	Electricity
5.3	Hydro power stations (MA El. Gen.)	-2.9							-2.9
5.4	Wind power stations (MA El. Gen.)	0.0							0.0
5.5	Gas transportation	-6.4			-6.4				
5.6	Other stations	-0.4							-0.4
6	Distribution and transmission losses	-176.7			-123.2				-53.5
7	Available for final consumption	2,970.1	16.2	703.5	1,524.6	105.6		17.6	602.6
7.1	Final non-energy consumption	69.3	0.4	67.1		1.8			
7.1.1	<i>Chemical Industry</i>	0.2		0.2					
7.1.2	<i>Other sectors</i>	69.1	0.4	66.9		1.8			
7.2	Final energy consumption	2,900.8	15.7	636.4	1,524.6	103.8		17.6	602.6
7.2.1	Industry	399.9	0.0	13.2	226.2	0.0		0.3	160.1
7.2.1.1	<i>Iron and steel</i>	22.4		0.0	12.4				9.9
7.2.1.2	<i>Chemical and petrochemical</i>	3.0		0.2	1.4				1.4
7.2.1.3	<i>Non-ferrous metals</i>	12.2		1.1	1.1	0.0			10.0
7.2.1.4	<i>Non-metallic minerals</i>	126.2	0.0	0.2	108.5				17.5
7.2.1.5	<i>Transport equipment</i>	0.0							0.0
7.2.1.6	<i>Machinery</i>	3.0			0.8	0.0			2.2
7.2.1.7	<i>Mining and quarrying</i>	96.6		8.7	8.1				79.9
7.2.1.8	<i>Food, beverages and tobacco</i>	97.0		0.0	70.5	0.0			26.4
7.2.1.9	<i>Paper, pulp and printing</i>	8.2			5.9	0.0			2.3
7.2.1.10	<i>Wood and wood products</i>	0.1							0.1
7.2.1.11	<i>Textiles and leather</i>	3.4			1.5				1.9
7.2.1.12	<i>Construction</i>	21.5		3.1	14.5				3.9
7.2.1.13	<i>Non-specified (Industry)</i>	6.5		0.0	1.3	0.0		0.3	4.8
7.2.2	Transport	891.3		586.5	297.7				7.0
7.2.2.1	<i>Rail, metro, other electric transport</i>	4.9							4.9
7.2.2.2	<i>Road</i>	884.3		586.5	297.7				
7.2.2.3	<i>Aviation</i>	1.4							1.4
7.2.2.4	<i>Non-specified (Transport)</i>	0.7							0.7
7.2.3	Households	1,075.1	13.6	6.1	741.2	101.9		8.6	203.6

N	Energy Balance of Armenia, 2024	Total	Coal	Oil	Natural Gas	Renewables	Nuclear	Heat	Electricity
7.2.4	Agriculture	133.1		15.6	106.2				11.2
7.2.5	Services	401.5	2.1	15.0	153.2	1.9		8.6	220.7
7.3	Statistical differences	0.0			0.0				0.0

Energy Balance of Armenia for 2024, IEA Format, aggregated, (ktoe)

N	Energy Balance of Armenia, IEA, 2024	Coal	Oil products	Natural Gas	Nuclear	Hydro	Geothermal	Solar, Wind, Others	Biofuels and waste	Electricity	Heat	Total
1	2	3	4	5	6	7		8	9	10	11	12
1.1	Production	0.0			737.4	177.1		101.6	88.0			1,104.0
1.2	Imports	16.2	857.8	2,261.7					17.7	12.5		3,165.8
1.3	Exports	0.1	-0.3						-0.1	-132.2		-132.7
1.4	International aviation bunker		-106.1									-106.1
1.5	Stock changes	0.0	-47.9	-4.1								-52.0
1	Total primary energy supply (TPES)	16.2	703.5	2,257.5	737.4	177.1		101.6	105.6	-119.8		3,979.1
2	Transfers											
3	Statistical differences			0.0						0.0		0.0
4	Transformation processes			-603.2	-737.4	-177.1		-101.6		807.1	17.6	-794.6
4.1	Main activity electricity plants			-601.8	-737.4	-177.1		-42.4		764.6		-793.7
4.2	Autoproducer electricity plants							-41.9		41.9		
4.3	Main activity producer CHP plants			-1.5						0.6		-0.9
4.4	Autoproducer CHP plants											
4.5	Main activity producer heat plants										0.3	
4.6	Autoproducer heat plants							-17.3			17.3	
4.7	Non specified (transformation)											
5	Energy industry own use			-6.4						-31.2		-37.7
6	Distribution losses			-123.2						-53.5		-176.7
7	Total final consumption	16.2	703.5	1,524.6					105.6	602.6	17.6	2,970.1
7.1	Final energy consumption	15.7	636.4	1,524.6					103.8	602.6	17.6	2,900.8
7.1.1	Industry	0.0	13.2	226.2					0.0	160.1	0.3	399.9
7.1.1.1	<i>Iron and steel</i>		<i>0.0</i>	<i>12.4</i>						<i>9.9</i>		22.4

N	Energy Balance of Armenia, IEA, 2024	Coal	Oil products	Natural Gas	Nuclear	Hydro	Geothermal	Solar, Wind, Others	Biofuels and waste	Electricity	Heat	Total
7.1.1.2	Chemical and petrochemical		0.2	1.4						1.4		3.0
7.1.1.3	Non-ferrous metals		1.1	1.1					0.0	10.0		12.2
7.1.1.4	Non-metallic minerals	0.0	0.2	108.5						17.5		126.2
7.1.1.5	Transport equipment									0.0		0.0
7.1.1.6	Machinery			0.8					0.0	2.2		3.0
7.1.1.7	Mining and quarrying		8.7	8.1						79.9		96.6
7.1.1.8	Food, beverages and tobacco		0.0	70.5					0.0	26.4		97.0
7.1.1.9	Paper, pulp and printing			5.9					0.0	2.3		8.2
7.1.1.10	Wood and wood products									0.1		0.1
7.1.1.11	Textiles and leather			1.5						1.9		3.4
7.1.1.12	Construction		3.1	14.5						3.9		21.5
7.1.1.13	Non-specified (Industry)		0.0	1.3					0.0	4.8	0.3	6.5
7.1.2	Transport		586.5	297.7						7.0		891.3
7.1.2.1	Rail, metro, other electric transport									4.9		4.9
7.1.2.2	Road		586.5	297.7								884.3
7.1.2.3	Aviation									1.4		1.4
7.1.2.4	Non-specified (Transport)									0.7		0.7
7.1.3	Other sectors	15.7	36.7	1,000.7					103.8	435.5	17.3	1,609.6
7.1.3.1	Households	13.6	6.1	741.2					101.9	203.6	8.6	1,075.1
7.1.3.2	Agriculture		15.6	106.2						11.2		133.1
7.1.3.3	Services	2.1	15.0	153.2					1.9	220.7	8.6	401.5
7.2	Non-energy use	0.4	67.1						1.8			69.3
7.2.1	Chemical Industry		0.2									0.2
7.2.2	Other sectors	0.4	66.9						1.8			69.1

