

**Data Collection Survey
on Infrastructure Development
in Central Asia and the Caucasus**

**Final Report
Armenia**

MAY 2019

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

NOMURA RESEARCH INSTITUTE, LTD.

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Abbreviations

ADF	Asian Development Fund
AMD	Armenian Dram
ANPP	Armenian Nuclear Power Plant
ARREEF	Armenia Renewable Resources and Energy Efficiency Fund
BMZ	German Federal Ministry for Economic Cooperation and Development
BTL	Build Transfer Lease
BOO	Build Own Operate
BOT	Build Operate Transfer
BOOT	Build Own Operate Transfer
CAC	Civil Aviation Committee
CIS	Copper, Indium and Selenium
CEPA	Comprehensive and Enhanced Partnership Agreement
DBFO	Design Build Finance Operate
EBRD	European Bank for Reconstruction and Development
EDBI	Export Development Bank of Iran
EIB	European Investment Bank
ENA	Electric Networks of Armenia
EPC	Engineering Procurement and Construction
EPSO	Electro Power System Operator CJSC
FRV	Fotowatio Renewable Ventures
GDP	Gross Domestic Products
GIZ	German Agency for International Cooperation
HPP	Hydro Power plant

HRITF	Health Results Innovation Trust Fund
HVEN	High Voltage Energy Network of Armenia
IBRD	International Bank for Reconstruction and Development
ICT	Information and Communications Technology
IFAD	International Fund for Agricultural Development
IFC	International Finance Corporation
IFI	International Financial Institutions
IMF	International Monetary Fund
JICA	Japan International Cooperation Agency
KfW	Kreditanstalt für Wiederaufbau ("Reconstruction Credit Institute")
LRNP	Lifeline Road Network Project
MTA	Ministry of Territorial Administration
MW	Megawatt
PFI	Private Finance Initiative
PPP	Public Private Partnership
PSRC	Public Services Regulatory Commission
RFQ	Request for Quotation
ROT	Rehabilitate Operate Transfer
SDP	Sustainable Development Programme
SHPS	Small Hydro Power System
SME	Small and Medium Enterprises
SREP	Scaling Up Renewable Energy Programme
SWOT	Strength, Weakness, Opportunities and Threaten
TPP	Thermal Power Plant
TWh	Terawatt hours

VFM	Value for Money
WHO	World Health Organization
YCCPP	Yerevan Combined Cycle Power Plant

1. Introduction

1.1. Background

Various types of infrastructure constructed in Central Asia and the Caucasus region during the era of the former Soviet Union are continuing to deteriorate, and it is widely understood that there is a need for financial-cooperation-based support in order to renew and improve the infrastructure. At the same time, externally disclosed information regarding specific high-priority fields and highly feasible projects for infrastructure improvement is extremely limited, which is an issue for setting up projects.

In addition—due to concerns regarding regime changes and increasing public debt as well as expectations concerning increased foreign investment—rapid reforms are underway, including the formulation of new national development strategies as well as improvements to legal systems affecting government restructuring and public-private partnerships (PPPs), and the stances of the governments of each country regarding infrastructure development are changing as well.

For Japan, developmental cooperation to improve infrastructure is a focus field in terms of each country's official development assistance policy in the region. Based on the above trends, in order for Japan to consider its cooperative course of action as a country as well as specific new projects, it is necessary to collect and organize information on the infrastructure improvement situation of each country, the future approach policy, the activities of other donors, and new trends in recent years.

1.2. Purpose

The purpose of this research is to collect and analyze information on the national development strategy, sector-specific development priority and needs, support trends of other donors, and PPP-related systems, results, etc. of the covered countries (Uzbekistan, Azerbaijan, Armenia, Georgia), think about the possibility of utilizing Japanese technology / know-how and expanding business in countries targeted by Japanese companies, and consider the possibility of cooperation by Japan as well as promising new project candidates.

Based on the above mentioned background, we interviewed government agencies in the countries covered by this research, international financial institutions and other donors currently engaged in cooperation, and Japanese companies interested in overseas expansion, and we also conducted desktop research to consider infrastructure-improvement projects in each country and collect / organize useful information. Note that, although we kept loan assistance (yen loans, foreign loans and investments, etc.) in mind as we considered new project candidates, we did not exclude the possibility of support through technical cooperation and financial aid.

In addition, due to policy shifts occurring in each country during the period of this research, this research was conducted during a time when the situation was changing with every passing moment. We conducted field research from May to October of 2018 and created this report based on information current as of December of 2018, but there were major situational changes after that as well. We did revise this report based primarily on major situational trends starting in January of 2019, but we would like our readers to double-check the latest information.

2. Methodology

2.1. Research framework

2.1.1. Target sectors

This research covers urban development, transportation / traffic, the environment (waste / sewage), health care (medical care / welfare), and energy fields.

Table 1 Main sectors and types of infrastructure that were considered

Fields		Assumed projects
Urban development, transportation / traffic	Urban development	Urban roads, transportation network improvement
	Transportation	Port improvement Airport improvement Railway improvement
	Traffic	Traffic congestion measures
Energy	Power	Renewable energy Combined cycle power generation Power transmission and distribution network rehabilitation
	Regional heat supply	Boiler replacement Heat supply network rehabilitation
	Other	Other
Environment	Sewage	Treatment plants, sewer line rehabilitation
	Waste treatment	Waste disposal site improvement and restoration Recycling equipment introduction
Healthcare	Healthcare	Medical equipment renewal Advanced medical equipment introduction
Other		Although this is not included in the above, we confirmed needs for the following as well: Public safety measures

2.1.2. Research items

The major research items covered by this research are as follows:

- Infrastructure improvement plans, development issues, etc.
- Infrastructure development organizations, human resources, etc.
- PPP-related policy framework and infrastructure / examples
- The support situation of other donors
- Fundraising situation related to infrastructure development
- Project short list
- Project long list

2.1.3. Assumed support tools

We considered the possibility of support utilizing the following JICA schemes:

- ODA Loan
- Private Sector Investment Finance
- Grant Aid
- Technical Cooperation

2.2. Literature/desktop survey

The literature/desktop survey made use of data collected from the websites of all the Armenian government's ministry and government office's websites, policy related documents, project websites such as the North-South Road Corridor project, and through carrying out searches on papers such as a geothermal resources distribution thesis. The list of websites used for the investigation is recorded in 6.1, the list of literature in 6.2. Also, footnotes show the sources of remarks and facts in the text.

2.3. Preliminary interview investigation

For preliminary information gathering before the field investigation, interviews were carried out by phone and face-to-face; with the Ministry of Nature Protection, the Ministry of Energy, Infrastructures and Natural Resources, the Ministry of Emergency Situations, the Ministry of Transport, Communication and Information Technologies, and the Ministry of Health, etc.

2.4. Field interview investigation

Field interviews conducted information gathering by visiting each Ministry, such as the Ministry of Economic Development, the Ministry of Health, the Ministry of Energy, Infrastructures and Natural Resources, the Ministry of Transport and Communication, the Ministry of Territorial Administration, the Ministry of Emergency Situations, and donors such as the World Bank and the Asian Development Bank. Destinations and interviewees list reference 6.4.

2.5. Statistical Data

The statistical data used in the analysis of Armenia is in 6.5. Mainly, documents from the Armenian government's statistics bureau are used. The figures used in the text other than the following statistics are materials collected through document citation and interviews.

3. Development policy and laws and ordinances

3.1. Development policy

Armenia undertook legal reform to transfer the power of governance from the President to the Prime Minister by constitutional reform in 2015. On April 13, 2018 former President Serzh Sargsyan took up the post of Prime Minister but it was supposed that the Prime Minister would exercise the power of governance after this change in Prime Ministers. Opposition parties and the people were opposed to Mr. Sargsyan, a former President who had stepped back from power, taking up the post of a Prime Minister with the power of governance, and as a result, Mr. Sargsyan was forced to resign on April 23. In response, on May 8, 2018 the National Assembly carried out a re-vote to select a Prime Minister, and the opposition party's Nikol Pashinyan was elected¹.

A National Assembly member election was planned for December 9, 2018, and the current Prime Minister Nikol Pashinyan was re-elected.

As of June, 2018 the current administration announced that it will focus on economic development in the following 3 areas^{2,3}.

- High-tech industry
 - To carry out the strengthening of the high-tech industry, in particular the defense industry, raising Armenia's national security level.
 - Promote collaboration between science and business, to work towards the commercialization of scientific research results, through the promotion of innovation and business development subsidy aid.
- Agriculture
 - Improve agricultural efficiency and the standard of living of farmers, increase agriculture's profit ratio and work towards guaranteed food stability security.
- Tourism
 - Armenia's profile is rising internationally due to the worldwide reporting of the chain of events of the Velvet Revolution that accompanied this change of government, and tourist numbers are increasing. Make the most of this opportunity and aim to foster the tourism industry.

At the moment it is not the case that the government's policies are reaching to the specific policy level, it is expected that new cabinet ministers will be elected because of an election in December, and under those cabinet ministers specific policies will be actualized.

¹ Takahashi Atsushi (2018) A change of administration was implemented, aimed at eradicating corruption, Business briefing 8b5956fcc479334c, <https://www.jetro.go.jp/biznews/2018/05/8b5956fcc479334c.html>

² RA Government Decree # 442, on 27th March, 2014, Armenia Development Strategy for 2014-2025, https://eeas.europa.eu/sites/eeas/files/armenia_development_strategy_for_2014-2025.pdf

³ <https://armenpress.am/eng/news/935920.html>

3.2. PPP related organization

3.2.1. PPP policy

Armenia's PPP policy can be divided into two periods.

The first period is from 2000 to 2016, the second period is from 2017 onwards, when PPP related policy measures from the Armenian government were officially announced.

In the first phase water and sewer services contracts etc., were put into practice, but according to a preliminary interview with the Armenian government, Armenia learned the following lessons from initiatives in the first period.

- A specific, government side, contact organization is needed for non-governmental managers.
- Carry out appropriate risk distribution between public and private sectors.
- Start PPP initiatives rather than waiting for a complete reform of the legal system.
- The public sector is responsible for securing and monitoring the construction budget, private operators are to carry out capital investment.
- For the optimization of financial affairs, guarantee a necessary, sufficient water rate charge increase, in order to improve efficiency and reduce costs.
- In the initial stages of PPP in particular, secure continuous support such as capital expenditure and technical cooperation from donors.

In the Armenian government program the importance of public-private partnership was identified from the Program of the Government of the Republic of Armenia for 2008-2012⁴, developed with support of the UNDP (Kudelitch and Khachatryan, 2018)⁵. In this program, PPP was defined as a fund-raising method to provide services and new infrastructure construction, and for the maintenance of existing infrastructure, to meet the needs of the people and government, so as to curtail government expenditure and implement long-term economic growth. In addition, the importance of risk sharing in the public and private sectors was also identified (Kudelitch and Khachatryan, 2018). However, afterwards it was not legislated as PPP law.

In December 2012 when the new procurement law was enacted, it was stipulated for PPP, particularly concessions. Also,

⁴ Resolution of the Government of the Republic of Armenia No.380-A of April 28, 2008, "On the programme of the Government of the 2008-2012, <http://www.gov.am/files/docs/76.pdf>

⁵ Kudelitch, M.I. and Khachatryan A.V. (2018) Участие финансовых органов Республики Армения в процессах государственно-частного партнерства (Participation of Financial Bodies of Armenia in Public-Private Partnership Process), Financial Journal, 4, pp. 76-89, DOI: 10.31107/2075-1990-2018-4-76-89, https://www.nifi.ru/images/FILES/Journal/Archive/2018/4/statii_4/07_fm_2018_4.pdf

the following legislative systems⁶ are regarded as PPP related laws.

- Attachment of the Government of September 20, 2012 N0. 1241-N
- Decree No. 168 on Arranging Procurement Process dated February 10, 2011
- Decree No.1241-N on the Assessment and Approval of PPP projects
- Republic of Armenia Law on Procurements
- Law on Procurements dated December 16, 2016

This public procurement law, although stipulating PPP project evaluation and the written proposal recognition procedure as part of public procurement, did not stipulate the completion of PPP transactions or the conclusion process of written contracts, with the result that it did not promote PPP in practice (Kudelitch and Khachatryan, 2018).

Based on this history Armenia's Ministry of International Economic Integration and Reforms (at that time), with regards to the EBRD, requested support for the modernization of PPP related policies and the development of a legal framework, in February 2017. In response to this the EBRD, with regards to the Armenian government, implemented the provision of a consultant for PPP related legislation, including concession contracts that played a leading role in the transportation sphere⁷.

As a result, in November 2017, the Policy Statement on Public-Private Partnerships of the Republic of Armenia, from the Armenian government, was officially announced. This document is not the law itself but asserted basic policies for the Armenian government to establish PPP law hereafter. The Armenian government assumes private sector participation (PSP) in relation to infrastructure maintenance, including simple outsourcing etc. The Policy Statement is targeted to only small scope PSP schemes, generally referred to globally as PPP rather than PSP. Based on this policy, the EBRD submitted a PPP bill to the Armenian government in March 2018⁸.

As shown in Table 2, ownership of existing infrastructure did not change, but a scheme where operation is entrusted to private partners, or operation rights are transferred, was assumed.

⁶ <https://ppp.worldbank.org/public-private-partnership/legislation-regulation/laws/ppp-and-concession-laws>

⁷ <https://www.ebrd.com/cs/Satellite?c=Content&cid=1395254814258&d=Mobile&pagename=EBRD%2FCContent%2FContentLayout>

⁸ https://finport.am/full_news.php?id=33690&lang=3

Table 2 Types of PPP assumed in the PPP related Policy Statement

Target Assets	Type	Description
Existing infrastructure	Operation and Maintenance contract	<ul style="list-style-type: none"> ● The private sector enters into a contract to operate and maintain the existing infrastructure for a specific period of time. ● The private sector is paid expenses for commission from the government, together with performance-based incentives.
	Operating Concession	<ul style="list-style-type: none"> ● Private partners can operate and maintain existing infrastructure, and collect fees from users, while receiving management subsidy aid from the government. ● For contract form, there are cases where lease contracts are chosen.
	Rehabilitate-Operate-Transfer:ROT	<ul style="list-style-type: none"> ● Private partners can contract the right to operate and repair the target assets, until the operation rights transfer date ● Private partners can collect transit fares etc. ● Operating rights are returned to the public on the contract expiration date.
New infrastructure	Build Transfer Lease: BTL	<ul style="list-style-type: none"> ● Private partners contract for construction, operation and maintenance. ● Ownership is transferred to the public at the stage when construction is finished. Afterwards, private partners lease back the infrastructure from the public and operate it until the contract term expires
	Build Operate Transfer: BOT	<ul style="list-style-type: none"> ● Private partners contract for construction and operation (including maintenance management). ● Transfer of ownership to the public takes place after contract expiry.
	Design Build Finance Operate: DBFO	<ul style="list-style-type: none"> ● Private partners contract for planning, fundraising, construction, operation and maintenance management. ● Private partners operate and collect tolls and usage fees from users. ● Ownership is transferred to the public after the contract expires.
	Build Own Operate Transfer: BOOT	<ul style="list-style-type: none"> ● In cases where there is no plan for DBFO

	Build Own Operate: BOO	<ul style="list-style-type: none"> ● In BOOT, in cases where the ownership of the asset is not transferred to the public.
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(Source) Policy Statement on Public-Private Partnerships of the Republic of Armenia

As of the end of December 2018, the Division of Public Investment Programs Management under the Ministry of Economy has jurisdiction of the PPP legal system⁹ but a PPP bill itself has not been officially announced. However, comments on the draft have already been made (Kudelitch and Khachatryan, 2018). For example, the PPP bill stipulates that a plan that meets the following requirements should be a PPP (draft Article 4). On the other hand, no comment has been made on such issues such as whether government guarantees, or proposals by private businesses, are possible.

- Continues for at least 5 years after the PPP contract becomes effective
- Public infrastructure offers a public service and is maintained, repaired, constructed and operated in a technically good condition
- Risk is shared between the public and private sector
- Economic benefits to Armenia are brought about, surpasses the EIRR rate set by the government
- Be consistent with the priorities in the public investment management policy
- Financially bearable
- VFM is positive

⁹ <https://pppknowledgehub.org/countries/armenia>

3.2.2. PPP cases¹⁰

As of the end of December 2018, Table 3 shows examples of private sector participation in infrastructure operations in Armenia. As mentioned above, in Armenia, a legal system that stipulates well known schemes such as PFI and concessions is not yet established, but largely there are the following tendencies.

First, there are 4 divisions of public-private partnership: water and sewer services, electricity, ICT and transportation such as airports and railways. As for the contract form, water and sewer services are changing from an operation contract (comprehensive entrusting) to a facility contract, electricity is an operations contact (comprehensive entrusting), without causing the transfer of all ownership rights. On the other hand, ICT is a private investment, operation and ownership, a private investment without government participation. Airports and railways are construction, large-scale rehabilitation, operation, transfer (BR/ROT), and have a scheme similar to PPPs in other countries.

Private operators (sponsors): Water and sewage services are under contract with Veolia of France and Saur¹¹, airports are under contract with Corporation America of Argentina, electricity and railways are being entrusted to Gazprom of Russia and Russia Railways respectively.

With regard to bidding methods, water and sewage services and railways are decided by competitive bidding, but electricity and airports are decided by the trustees by direct negotiations. The procurement procedures shown in the aforementioned Public Procurement law, established in 2010, have not been uniformly applied to all projects in the past. Also, from the fact that in practice unsolicited proposals are carried out, when it comes to the proposal of PPP projects and direct negotiations, they are seen as unsolicited proposals.

On the other hand, the only case to receive support from an international aid agency is the water and sewage services 2016 contract with Veolia. Also, the Armenian government only provides financial support for railway cases. From these facts, it can be seen that, in what is called PPP, few so-called government participation cases and only highly profitable private investment cases are being established at the present time.

¹⁰ https://www.esmap.org/sites/default/files/esmap-files/Armenia_Yerevan_Water_Case_Study.pdf
https://www.unece.org/fileadmin/DAM/ceci/documents/2016/PPP/Forum_PPP-SDGs/PPP_Forum_2016-Compendium_All_Presentations.pdf

¹¹ <https://www.saur.com/en/core-business/water/>

Table 3 PPP cases in Armenia

PPP Name	Bidding method	Form	Sector	Start year	Monetary amount (\$1 million)	Sponsor	Creditor	Government Support
Armenia Railway Concession	Competitive bidding	BROT ¹²	Railway	2008	\$575.00	Russian Railways (RZD)	NA	Income assistance
Orange Armenia	NA	BOO ¹³	ICT	2008	\$333.00	NA	NA	NA
Zvartnots International Airport	NA	BROT	Airports	2001	\$294.00	Corporacion America	NA	NA
Veolia water and wastewater services affermage contract	Competitive bidding	Lease contract	Water and sewer services	2016	\$200.00	Veolia Environment	EBRD, EIB, KfW	NA
Hrazdan TPP Fifth Block	Direct negotiations	BROT	Electric	2006	\$200.00	Gazprom	NA	NA
Shirak Airport Concession	Direct negotiations	ROT ¹⁴	Airports	2007	\$10.00	Corporacion America	NA	NA
Yerevan Water and Sewerage Lease Contract	Competitive bidding	Lease contract	Water and sewer services	2005	\$0.00	Veolia Environment	NA	NA
Armvodokanal	Competitive bidding	Operations contract	Water and sewer services	2004	\$0.00	Saur	NA	NA
Metsamor Nuclear Power Plant	Direct negotiations	Operations contract	Electric	2003	\$0.00	Unified Energy System of Russia (RAO UESR)	NA	NA
Yerevan Water and Sewerage Management Contract	Competitive bidding	Operations contract	Water and sewer services	2000	\$0.00	WRc Companies, C- Lotfi & Asociati, Acea SpA	NA	NA

(Source) <https://pppknowledgelab.org/countries/armenia>

¹² Build, rehabilitate, operate, and transfer

¹³ Build, own and operate

¹⁴ Rehabilitate, operate, and transfer

Water and sewage services case management contract ¹⁵

In particular, when Armenia became independent from the Soviet Union in 1991, over 30 years had passed since many of the water and sewage facilities had been constructed and were in a condition where maintenance management and renewal were necessary. Even in the early 2000s, the level of service was extremely low, and in many areas of Armenia waterworks were supplied for not even 6 hours a day. In the face of such a critical situation, the government, with the financial support of the World Bank, inspected water supply centers in Hungary, France and Poland. Afterwards the government executed management contracts and lease contracts (2006-2016) related to Yerevan City and 32 suburban districts other than Yerevan City.¹⁶

These contacts with the private sector have considerably improved the water and sewer service time. For example, in Yerevan, a 24-hours per day water supply has been realized, the water supply infrastructure has had additional construction and repairs have been carried out. In addition, the quality of customer service has also been improved. Within the waterworks supply area, 42% is in the area of the poorest segment of the population, but due to the improved service, water rates have risen sharply, with a 42% rise in charges orientated to households in rural poverty. On the other hand, in most places, people support PPP and show their intention to pay for water supply services. In a 2011 survey, 30% of the respondents preferred to re-nationalize the water supply service, but a majority of the remaining 70% of respondents supported PPP. In addition, in areas where the Armenia Waster Sewerage Company (AWSC) supplies water and sewerage services, other than Yerevan City, 33% preferred re-nationalization but the rest support PPP.

Although many aspects of water supply services have been improved by PPP, the amount of water leakage continues to increase as the water supply increases. Another reason is that the government lacks the surplus funds to carry out repairs of the water supply network and prevent leakage from available reservoirs. PPP has also failed to improve financial efficiency in locations outside Yerevan City. Since the city of Yerevan switched to a lease contract from 2006 to 2016, by 2011 it had achieved independent profitability. On the other hand, the rest of the country has their services tendered by operation contracts, and the level of charges is becoming lower than the level that recovers all costs. It is necessary to note that this is a political consideration and is not due to the PPP approach.

The Armenian government has decided to continue its partnership with the private sector, based on the PPP experiences of 2000 to 2016. First generation PPP was not all-purpose, to the extent that it did not accomplish a decrease in the amount of water leakage, the expansion of sewage treatment plants, the securing of financial autonomy for water supply industry operations, or the supplying of waterworks of 579 communities where rural waterworks were not provided for etc.

¹⁵ This section was produced from Energy Sector Management Assistance Program (ESMAP)(2011) GOOD PRACTICES IN CITY ENERGY EFFICIENCY: Yerevan, Armenia – Water and Sewerage Management Contract, https://www.esmap.org/sites/default/files/esmap-files/Armenia_Yerevan_Water_Case_Study.pdf and https://www.unece.org/fileadmin/DAM/ceci/documents/2016/PPP/Forum_PPP-SDGs/PPP_Forum_2016-Compendium_All_Presentations.pdf

¹⁶ International PPP Forum: “Implementing the United Nations 2030 Agenda for Sustainable Development through effective, people-first Public-Private Partnerships”

For this reason, the government switched to a 15-year lease contract from 2017 onwards. This contract mandates the reduction of the uncollected water volume, expansion of the water treatment facilities, and the full recovery of the operating and maintenance management costs from charges.

3.3. Financing procurement potential of the financial sector

3.3.1. Armenia's investment environment¹⁷

Armenia's macroeconomic situation is good for potential investors, and Armenia's legal system is open to foreign investors. The GDP ratio of foreign direct investment (FDI) in 2015 was 1.6% and is expected to increase to 3.1% in 2018. At present, the main investments to Armenia are from Russia, France and Argentina. In particular, investment in the energy and IT sectors is high, reaching \$1.9 billion between 2010 and 2015.

The IT sector is important for the economic development of Armenia and has become an important sector in international cooperation. The Armenian government has launched several platforms to improve development of the IT sector and the investment environment. The Armenian government has already invested over \$100 million in the IT sector, including the establishment of the Information Technology Development Support Council (ITDSC) and the Enterprise Incubator Foundation (EIF)¹⁸

In Armenia, government support and infrastructure for the implementation of new IT projects is in place, and the market is accepting new entrants. Meanwhile, the energy sector has also been liberalized, and there is a legal system in place to accept investment in the renewable energy sector. There are investment opportunities worth \$596 million in Armenia, and there are power supply investment opportunities for electricity exports and new electricity demand consumers.

3.3.2. The state of Armenia's banking sector

Indirect finance is still mainstream in Armenia, and as of December 31, 2017, 17 commercial banks are active. The 17 banks have 528 branches in Armenia and Nagorno-Karabakh, of which 237 are located in Yerevan. The number of employees in Armenia's banking sector is 11,175.

Table 4 Key Financial Indicators in Armenia's banking sector (Million AMD)

Main indicators	2017	2016	Change from 2016 to 2017
Assets	4,362,083	4,089,501	6.7%
Interest earning assets	3,419,736	3,150,729	8.5%
Gross advances to customers	2,818,197	2,669,150	5.6%
Loan portfolio	2,649,574	2,556,297	3.6%
Liabilities	3,661,061	3,427,103	6.8%
Deposits	2,555,793	2,325,991	9.9%

¹⁷ Drawn up from a preliminary interview with the Ministry of Economic Development and Investments

¹⁸ Enterprise Incubator Foundation (<http://www.eif.am/>), while subsidizing business development and innovation, is carrying out various projects such as implementing joint projects with Microsoft and the World Bank. (<http://www.eif.am/eng/projects/>).

Main indicators	2017	2016	Change from 2016 to 2017
Equity	701,023	662,398	5.8%
Charter Capital	423,724	370,949	14.2%
Total Income	439,389	404,794	8.5%
Interest Income	362,721	326,156	11.2%
Non-interest income	32,281	27,412	17.8%
Net interest income	161,469	141,028	14.5%
Net non-interest income	22,165	19,559	13.3%
Net operating income	228,021	211,813	7.7%
Operating expenses	-121,433	-108,204	12.2%
Net provision expenses	-58,201	-64,912	-10.3%
Net profit before taxes	48,387	38,697	25.0%
Net profit after tax	38,228	33,079	15.6%
Other comprehensive income	11,480	25,930	-55.7%
Total comprehensive income	49,708	59,010	-15.8%

(Source) KPMG (2017) Armenian Banking Sector Overview,

https://home.kpmg/content/dam/kpmg/am/pdf/2017/Armenian%20Banking%20Sector%20Overview_2017%20Q4_Eng.pdf

3.3.3. The state of private finance

Private banks limit lending to local currency, short-term, high interest rates (18-24%), and also earn commission, such as account management fees. Additional fees are raising real interest rates further. What is more, in the case of lending, sufficient collateral is required, and that collateral also requires articles of high market price or value (houses, cars, money, etc.) Even for partially guaranteed loans, the annual interest rate is up to 15%. For this reason project financing for infrastructure maintenance cannot be established without highly concessional foreign aid, and private businesses are developed only for sectors such as manufacturing, trade and consumers (Fig. 1).

Because of this, several government agencies provide project finance, export financing, and investment insurance services for investors in Armenia. Project finance by government agencies are international aid agency projects, such as the World Bank, EBRD and ADB.

Consumer loans and industrial and foreign trade loans have traditionally been the main areas of bank lending, but recently the highest growing lending destination has been the construction sector, which grew 39.8% in 1 year from December 31 2016.

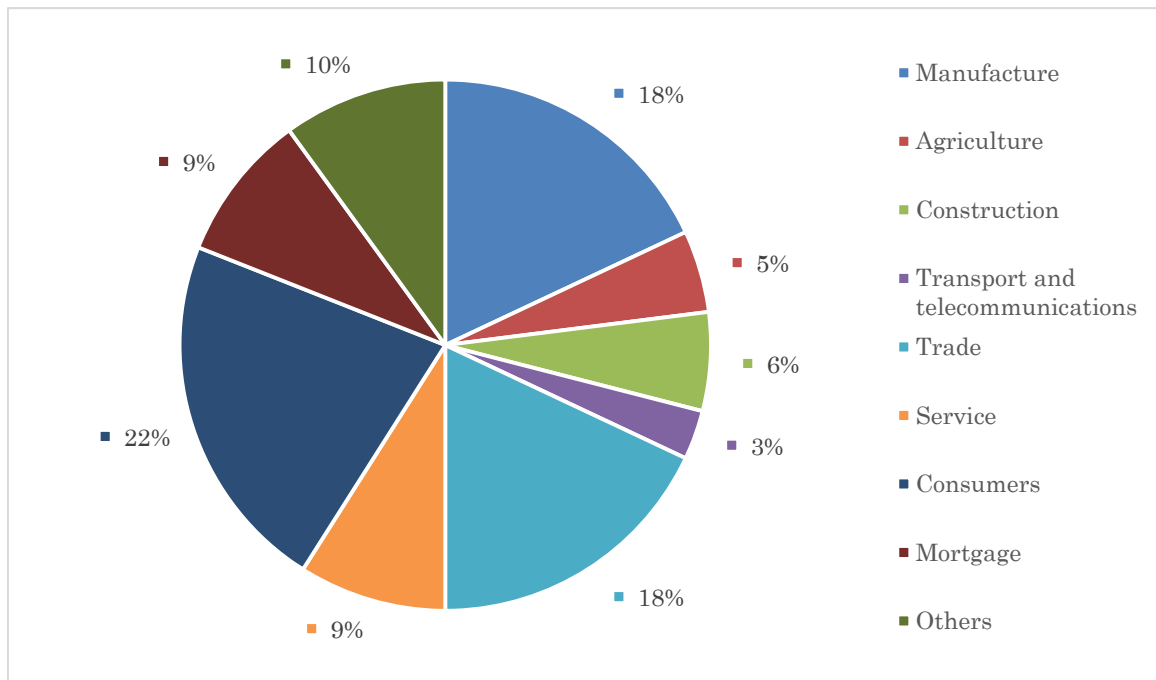


Figure 1 Bank lending percentages by sector

In Armenia, there is a national fund for small and medium enterprises (SME Development National Center of Armenia: hereafter, the SME Fund,) which was established in 2002. The fund is capitalized by the national budget and sustains a support program for SME. Since 2002 many SME have received timely support for business and management.

It has been decided that the SME Fund perform the following duties.

- Support the SEM and national government dialog
- SME management efficiency improvement and competitiveness reinforcement
- Guarantee availability of business services for SME
- Expansion of securing of funds opportunities for SME
- Promoting SME R&D and innovation
- SME entrepreneurship support
- SME activities' internationalization support
- Technology and financial support program

The technical and financial support menu provided by the SME Fund is as follows.

Table 5 Technical and financial support menu of Armenian SME Fund

Technical support	Financial support
Information provision and consultation services for project implementation in Armenia	Provision of guarantees for loans
Promotion of local products and branding	Capital investment
Sales promotion	Financing support for the promotion of enterprise
Export promotion	Partial subsidy of borrowing rate
Support for the promotion of enterprise	
Support for implementing new technologies and innovations	

Since 2008 the SME Fund has also played a role in the Enterprise Europe Network Correspondence Center. This network supports and advises the stimulation of business activities in Europe. The network, with over 600 partner organizations in more than 40 countries promotes competitiveness and innovation at the local level in Europe.

3.3.4. The possibility of long-term funding for infrastructure projects

As mentioned above, interest rates in Armenia are high, and the central bank's base rate hasn't dropped below 12% since 2009. Because of this, short-term lending is mainstream and long-term borrowing for infrastructure projects is difficult.

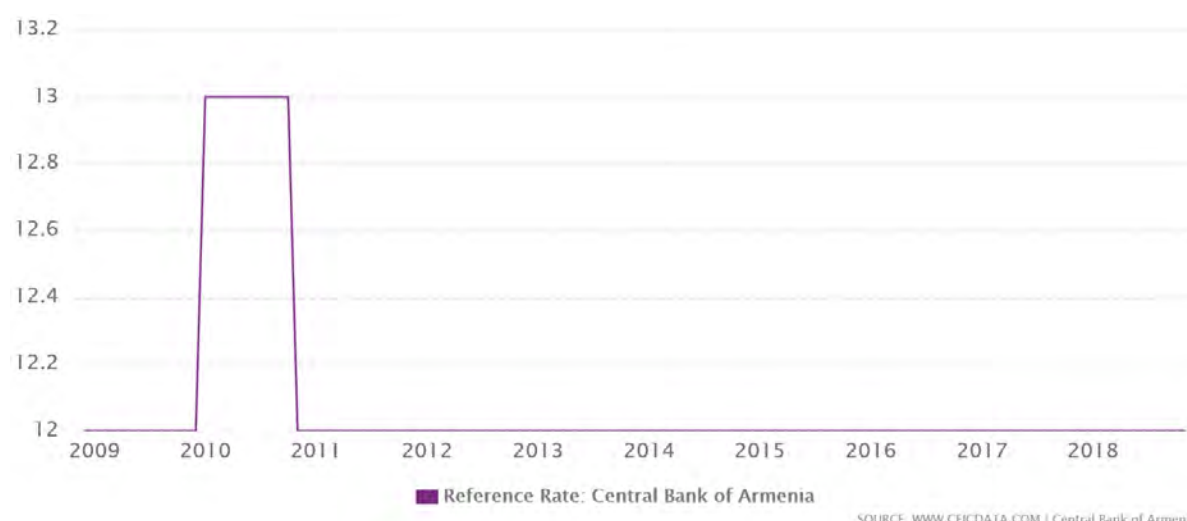


Figure 2 Changes in Armenia's basic rate of interest

Because of such high interest rates, many infrastructure development projects in Armenia rely on donor financing. Interest rates from donors are 0.5% to 1.75% despite the 15-40 year loan period. Even in cases where PPP is assumed, it is considered difficult to procure long-term funds without using some kind of public fund.

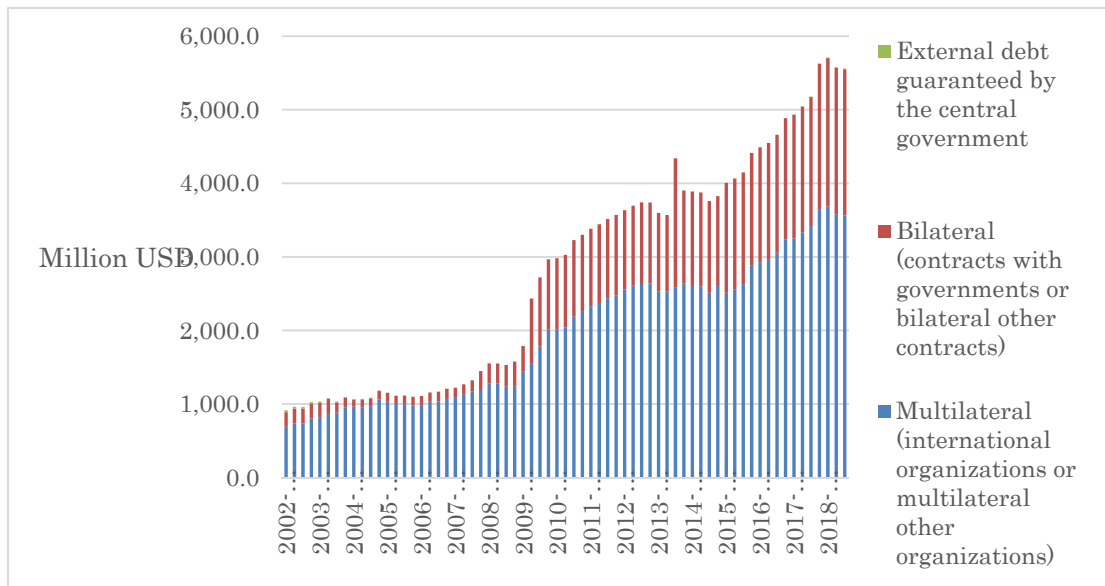
Table6 Examples of interest rates and loan periods for Armenian infrastructure development projects

Project name	Sector	Terms	Loan source
Rural Areas Economic Development	Agriculture	<ul style="list-style-type: none"> ● 5 years deferred 20 years ● Interest rate 1.75% ● Unused service charge 1% 	International Fund for Agricultural Development (IFAD)
ARM: Water Supply and Sanitation Sector Project	Water and sewage services	<ul style="list-style-type: none"> ● Interest rate during the deferment period is 1%, and after that 1.5% ● 2.93% if money is not withdrawn from account 	-
Caucasus Power Lines program implementation on Armenia	Energy	<ul style="list-style-type: none"> ● 25-28 years ● Average lending interest rate 0.5% 	European Investment Bank
		<ul style="list-style-type: none"> ● Primary loan 5 years with a fixed term 15 years, secondary loan 40 years ● Interest rate 0.75% 	KfW

(Source) Produced from public information etc.

3.4. Restrictions on International Commercial Borrowing

Armenia's public external debt has increased by \$160 million from the fourth quarter of 2017 to the first quarter of 2018, reaching \$10 billion and 687.78 million. The average foreign debt from 1999 to 2018 has been \$4 billion and 834.61 million but has increased continuously since 1999. For this reason, the Armenian government restricts projects that assume external debt.

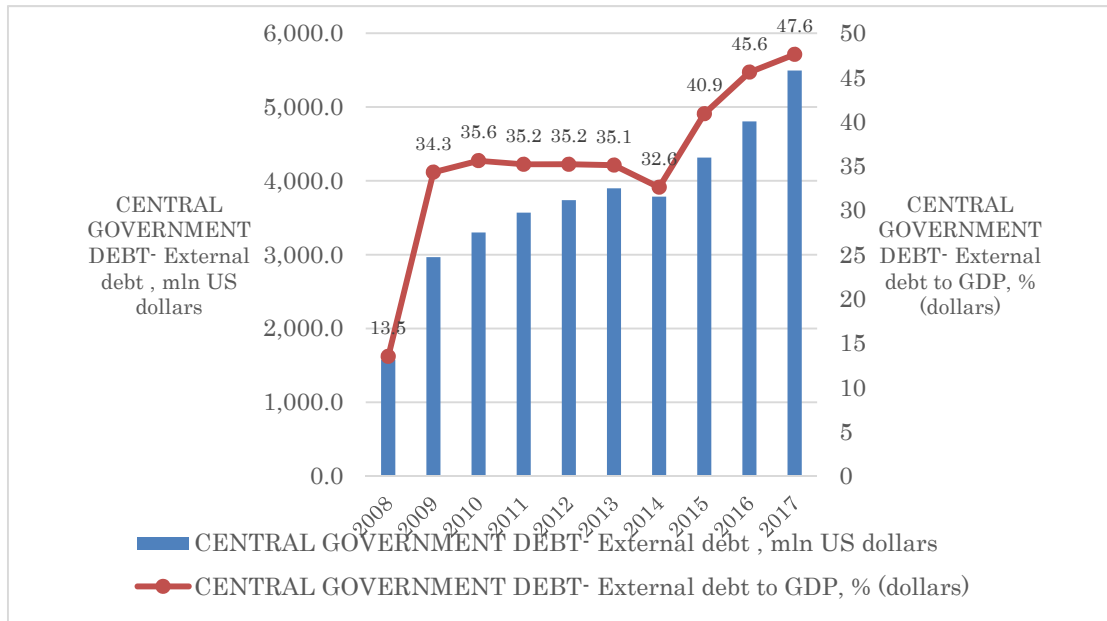


(Source) <https://www.armstat.am/en/?nid=546>

Figure3 Changes in the external debt balance of the Armenian government

As a result, the GDP ratio of the Armenian government's external debt balance continues to rise, reaching 47.6% in 2017. Under the advice of the IMF, the Armenian government sets the threshold for the government sector's debt ratio to 40%, 50% and 60%. Under current financial law, if it exceeds 40%, capital investment exceeding the budget deficit will be made. If it exceeds 50%, spending expenditure restrictions will be imposed, and if it exceeds 60%, government spending will be regulated to be linked to annual government revenue. As the calculation method of the GDP ratio is based on the GDP of the previous year, since around December 2017, rule revision discussions, such as changing the current year's GDP ratio with an indices ratio calculation basis, have taken place.¹⁹ Even at present, restrictions remain on the ratio of foreign debt to GDP, making it difficult for new borrowing to proceed until debt repayment progresses.

¹⁹ http://finport.am/full_news.php?id=32689&lang=3



(Source)

http://armstatbank.am/pxweb/en/ArmStatBank/ArmStatBank_1%20Economy%20and%20finance_14%20Government%20Finances/EF-GF-3-2016n.px/table/tableViewLayout2/?rxid=c169b79c-9f82-4878-a96a-9e404a9f976b

Figure4 Changes in the external debt balance and GDP ratio of the Armenian government

3.5. The state of donor activity

Many aid organizations are active in Armenia. In particular, the EU is vigorously active and is chairing the International Financial Institutions (IFIs) Advisory Group, which was launched in Armenia in March 2007. The group was launched by IFI and the European Commission to support participating candidate countries. The members of this group are as follows.

- European Commission
- World Bank Group (IBRD/IFC)
- European Bank for Reconstruction and Development (EBRD)
- European Investment Bank (EIB)
- Council of Europe Development Bank
- Regional Cooperation Council (successor to the Stability Pact)
- Nordic Investment Bank
- Nordic Environment Finance Corporation
- Black Sea Trade and Development Bank

Within the group, there are subcommittees on transportation, energy, environment and human resource development.

3.5.1. European Bank for Reconstruction and Development: EBRD

Priority areas

An outline of EBRD's activities is as follows. Of the €312 million loan balance, about half is supported by the financial sector. Next comes the field of energy, the field of infrastructure, and the fields of industry, commerce and agriculture.

Table7 Outline of EBRD activities in Armenia

Item	Detail
Cumulative number of projects	165
Number of projects in operation	50
Loan balance	€312 million

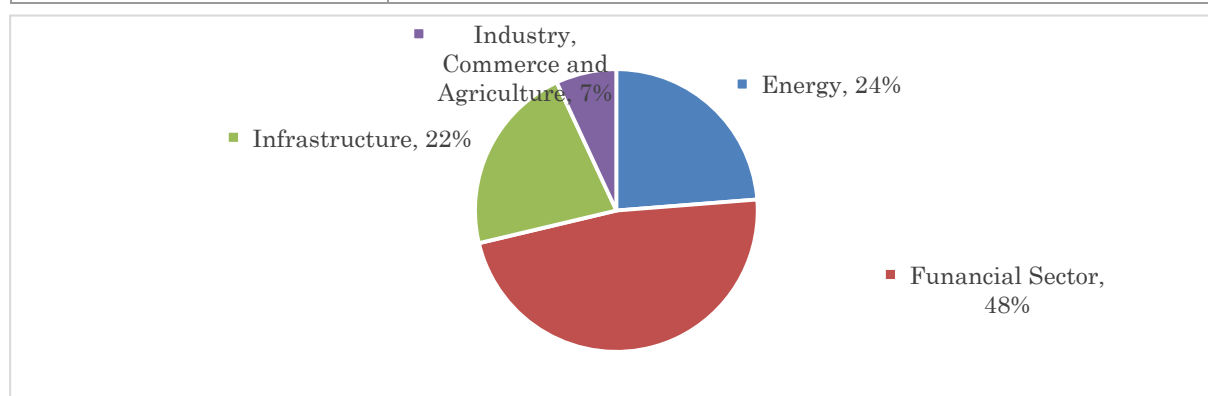


Figure5 EBRD's loan balance ratio in Arm divided by field

Main projects

The representative projects of EBRD in Armenia are as follows. EBRD is carrying out projects in the energy sector and transportation sector.

Table8 The representative projects of EBRD in Armenia

Sector	Project name	Year of approval	Amount approved	Detail
Energy	Modernization of Distribution Network	2016	\$80 million	Electric Networks of Armenia (ENA) support \$80 million loan from 2016 to 2020 and a \$200 million investment program in aid. Using this fund, it plans to introduce smart meters throughout Armenia.
Transportation, traffic	Yerevan Metro Rehabilitation Project Phase III	2015	7 million euros	7 million euros in aid for the renewal of rolling stock, railyard facilities, transformer substations and areal wiring repairs, ventilation facilities repairs, railroad track maintenance and change to barrier-free (elevator installation).

3.5.2. World Bank: WB

Areas of focus

The project implementation status of the World Bank in Armenia is shown in the figure below.

Financial support for the central government²⁰ accounts for 25%, followed by social protection and other industries, trade and services. In addition, in the infrastructure sphere, projects are being implemented in the (public) healthcare and energy sectors etc.

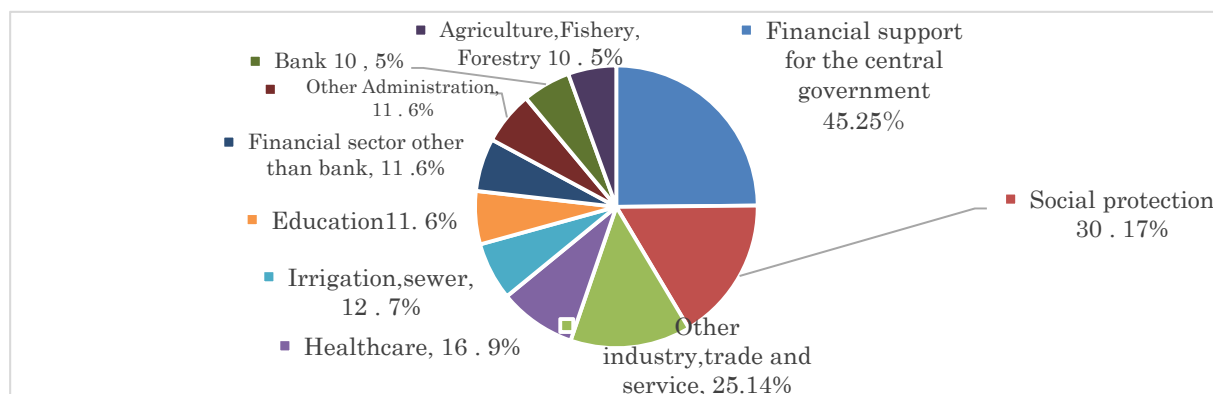


Figure6 Number of World Bank projects in Armenia by sector

Main projects

The World Bank Group is carrying out a number of projects in the electrical power sector. These include the repair of transformer substations, the renewal of power lines, the renewal of the Yerevan thermal power station and transformer substation repairs etc. Most recently, a bid was announced in December 2017 for construction support for a 55 MW steam power plant, in August 2018 the order was decided, and in March 2019 a scheduled for the conclusion of contracts what put forward. The IFC supports electric distribution companies and with the ADB and EBRD, emphasizes support for the renewal of the electricity supply network. In addition, the IFC has agreed to construct a second line of the Yerevan thermal power plant, the whole being an improvement of 250 MW of the thermal power plant, attaining the combined generation of the 20 MW turbine and the 50 MW steam power generator.

The World Bank is also consulting with the government in the environmental sector and is trying to improve the financing of the environmental sector.

²⁰ Program for Strengthening of the National Statistical System, Armenia Fourth Development Policy Financing, Public Sector Modernization Project III,

http://projects.worldbank.org/search?lang=en&searchTerm=&countrycode_exact=AM

Table9 The representative projects of the World Bank in Armenia

Sector	Project name	Year of approval	Amount approved	Detail
Energy	Electricity Transmission Network Improvement Project	2015	\$52 million	<p>The Electricity Transmission Network Improvement Project in Armenia will improve the reliability of the transmission line network, improve the management of the transmission line system, and support efforts for the borrower to guarantee the sufficient supply of power.</p> <p>This reconstruction brings about the following changes.</p> <ul style="list-style-type: none"> ① Project development goals are to improve the reliability of transmission line networks. ② A review of 1 (a) of Schedule 1 of the loan contract, including the rehabilitation of Ararat Thermal Power Station Unit No. 2.
Public health care	Family doctor development project	2010	\$19 million	<p>The World Bank has been developing family doctor programs since the 90's, and has trained 1,700 home doctors and 1,300 home nurses.</p> <p>Currently, it supports the construction and renovation of regional outpatient clinics, and plans to renovate blood centers, transplant centers and regional hospitals.</p> <p>The World Bank also supports the insurance system. The health insurance system report is being prepared. 43-44% of the budget is used for hospitals and not for primary care facilities (medical clinics) etc. In addition,</p>

Sector	Project name	Year of approval	Amount approved	Detail
				<p>rewards other than medical treatment fees are also routinely given. This does not mean that the basic package covers all the patient's needs.</p> <p>The World Bank also carries out nutrition management and promotes a healthier lifestyle within a disease management framework.</p>
	Disease Prevention and Control Project	2013	\$35 million	<p>The Disease Prevention and Control Project covers (1) prevention, early detection and management of non-infectious diseases at maternal, child health services and primary care levels, and (2) improvement of efficiency and quality of selected hospitals. The project includes three components, the first component is intended to improve maternal and non-infectious medical care, with a performance-based finance scheme at the primary care level, with a budget of \$4.3 million. Of this, \$ 1.8 million is the Health Results Innovation Trust Fund (HRITF) gratis aid.</p>
Transportation traffic	Community Road improvement project	2013	\$45,000,000	<p>The World Bank has been carrying out community road repair projects linked to markets where goods needed for daily life can be bought. It has been ongoing for 10 years. \$85 million worth of projects being implemented all reached the implementation stage last year.</p> <p>In urban areas, ongoing initiatives concern the local economy and have reached \$ 55 million.</p> <p>Progress is slow as there are many obstacles to advancing.</p>

Sector	Project name	Year of approval	Amount approved	Detail
Environment	Purification of Lake Sevan and expansion of forested areas	2017	\$2 million	As the forested area of Armenia is decreasing, there is a project aimed at increasing the forested area from 10.1% of the country to 20.1%
	Review of mining sector policy	2017	\$450,000	The Armenian government is conducting an environmental assessment of the mining sector and carried out an investigation in 2014 from a climate change perspective.

Potential for cooperation with JICA

The World Bank has confirmed its interest in supporting health care systems with JICA. Geothermal power generation is also considered to be a prominent field of cooperation.

3.5.3. Asian Development Bank: ADB

Areas of focus

ADB has provided aid to Armenia since 2005, carrying out 28 cases and \$1.37 billion in loans, and 27 cases and \$15.7 million in technical cooperation. The sectoral ratio is as follows, with the highest proportion in the transport sector, and a lot of support for water and other urban services, finance, energy and administration.

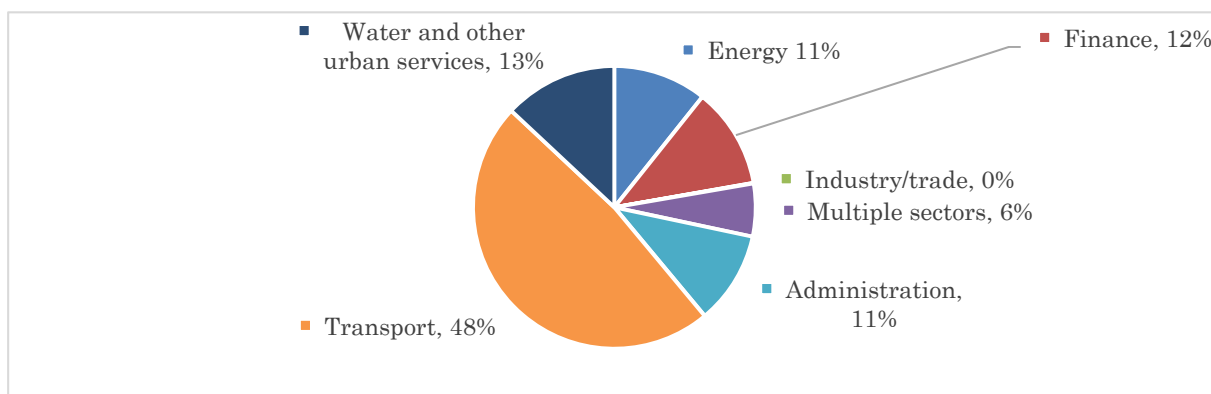


Figure7 ADB's project ratio by sector in Armenia

Main projects

Urban transportation is one area that ADB is focused on. Currently, it supports four projects related to the improvement of the North-South Road Corridor. ADB supports projects from Yerevan to the Georgia border. The healthcare sector, on the other hand, is a new area of support for ADB in Armenia.

Table10 The representative projects of ADB in Armenia

Sector	Project name	Year of approval	Amount approved	Detail
Public health care	Improving primary medical services	2018	\$225,000	<p>ADB's delegation is visiting Armenia and is continuing to exchange information.</p> <p>A feasibility study is planned to be conducted on the improvement of primary health services. In this project, e-Governmentization and health care systems in the field of public health care will be investigated.</p> <p>The project consists of a 30 million loan, a 25 million policy-based loan, and a 5 million euro loan for the construction and rehabilitation of a facility located in a remote area.</p> <p>There are also plans to dispatch officials from the Ministry of Health to learn about the examples of health care systems in South Korea and Thailand.</p>
Urban planning, transportation, traffic	Armenia-Georgia Border Regional Road (M6 Vanadzor-Bagratashen) Improvement Project	2016	\$50 million	<p>A project to support the development of the northern part of the North-South Road Corridor project in Armenia.</p>
Environment	Second Water Supply and Sanitation Sector Project	2016	\$400,000	<p>The proposed project covers the mountainous areas of Yerevan City, Ararat, Almabi and Aragatsotn. These areas have a total population of 1.8 million people and a majority of the country's citizens live there. The area is 5,400 square kilometers.</p> <p>The reason for focusing on this area is that it is economically important, and vulnerable to excess water-drawing and drought in the groundwater, vulnerable to climate change,</p>

				and there is no cross-sectional basin management plan.
Energy	High voltage transmission line maintenance project	2018	\$100,000	The Electric Network of Armenia has carried out borrowing and developed transmission lines and transformers.

Potential for cooperation with JICA

Although it is possible to cooperate with JICA, it is difficult if it is assumed that it will be for tied aid equipment manufacturers. It is necessary for ADB to make competitive bids in principle.

3.5.4. United Nation Development Programme: UNDP

Areas of focus

The UNDP has been active in Armenia for about 20 years, promoting renewable energy and energy saving in the housing and public sectors, reducing the effects of climate change, supporting participation in international cooperation mechanisms, and promoting green city development, to develop effective systems for disaster risk reduction and to protect and strengthen biodiversity.

Regarding energy, the main target of energy saving projects is buildings. In Armenia, 30% of the population is the energy poor and spend more than 10% of their income on energy costs. Armenia is an energy-dependent country that imports gas, and uranium fuel for nuclear power plants, from Russia, but has changed significantly in the last seven years. The most profitable investments have been in energy saving, not in projects to develop energy sources. 40% of energy consumption is in the home sector. Armenia is the tenth country to apply for the Green Climate Fund and has received a \$20 million grant for energy saving buildings. With regard to energy saving related to lighting, the UNDP is supporting the energy saving of road and airport lighting, and energy consumption has been reduced by 57% to 60%. The project covers 6 passages of road, saving \$125,000 per year. The energy saving of road lighting is being proceeded with in 13 other municipalities, 1 passage each. Energy saving measures for buildings are implemented as a separate project. As part of the \$20 million project, a single building has been renewed, achieving energy savings of 60%. In addition, 36 buildings are participating in the district heat supply project, and a co-generation system has been introduced, but no dedicated tariff (table of tariffs) has been prepared.

Next, there is interest in innovative funding mechanisms for public transport. Some concepts are being developed to use new mechanisms, such as Social Development Bonds and Impact Investment Bonds. With regard to impact investing, we are currently formulating regulations related to drones.

Regarding the health sector, the UNDP has not been particularly active in Armenia. The main reason is that there is no quantitative data that can simultaneously analyze people's health and the surrounding environment. Because not all statistical systems are collected for analysis, epidemiological analysis is difficult using collected data.

Lastly, although environmental, the removal of residual organic contaminants is a major challenge. 400 tons of soil

require biological removal technology. The NAERIT factory manufactured rubber products, but all the sites were contaminated. There is a plan to build a new building on this site, but there is a need to decontaminate it, and officials have already started discussions with the Ministry of Emergency Situations.

Main projects

The UNDP's main project in Armenia is the environmental sector's lake purification project.

Table11 The representative projects of the UNDP in Armenia

Sector	Project name	Year of approval	Amount approved	Detail
Environment	Sevan Lake Purification Project	2012	\$60,000	The Armenian government has taken various approaches to conserve the Seven Lake's ecosystem, but it is necessary to continue the attained balance of the implementation of the sustainable use of the ecosystem and water resources, and to restore the ecosystem balance of the collection basin and the lake.

Potential for cooperation with JICA

The UNDP is interested in models that analyze energy conservation efficiency.

It is also considered possible that JICA can support the Energy Service Company (ESCO) service that provides energy saving services to energy consumers.

3.5.5. German Agency for International Cooperation (GIZ)

Areas of focus

GIZ supports Armenia's market-oriented economic reform, democratization, and the establishment of the rule of law. GIZ provides assistance based on the German Federal Ministry of Economic Cooperation and Development (BMZ), the European Neighborhood Policy, and the partnership agreement between the Armenian government and the EU.

Main projects

The main project of GIZ is biodiversity management.

Table12 The representative projects of the GIZ in Armenia

Sector	Project name	Year of approval	Amount approved	Detail
Environment	Integrated biodiversity management in the South Caucasus	2015	n/a	Biodiversity of the South Caucasus is also important worldwide. However, species diversity and ecosystems are under threat. Local people, private companies, and governments are creating excessive development pressure on natural resources. Although there are national biodiversity strategies and action plans, their support in carried out in accordance with strategies for managing biodiversity and ecosystem services.

Potential for cooperation with JICA

We would like to cooperate with Armenia in supporting Syrian refugees. Also, based on experience in Tokyo and Singapore, we would like to hold an exhibition with a partner in the field of tourism. In addition, we would like to cooperate in infrastructure development, technical support related to technology and business development, and the One Village One Product Movement.

3.5.6. AFD (Development Agency of France)

Areas of focus

AFD opened an office in Armenia in 2012 and has implemented projects for agriculture and land development, energy conservation and infrastructure development. In addition, AFD has also provided support for public policy reform and urban development.

Main projects

Currently, AFD is carrying out projects in the energy sector in Armenia. In particular, low-interest funds are provided for housing repairs to improve energy conservation performance in poor households, directly contributing to the reduction of natural gas imports and the reduction of greenhouse gas emissions, as well as aiming for the improvement of the living environment, and the reduction of energy expenditure and the interest payment burdens, of poor households.

Table13 The representative projects of the AFD in Armenia

Sector	Project name	Year of approval	Amount approved	Detail
Energy	Introduction of energy saving equipment and home improvement projects for poor households	2013	<ul style="list-style-type: none"> • Agreed amount of \$13.8 million • 1.5 million euros technical assistance 	<p>This is a program for households, aiming to reduce the energy expenditure of poor households, and reduce the interest payment burden by lending low-interest funds for carrying out energy saving improvements on residential buildings.</p> <p>As a result, it is possible to reduce the import volume of natural gas in Armenia as a whole, which also contributes to the reduction of greenhouse gas emissions.</p>

4. The current status of target sectors, and future plan and sector issues

4.1. Urban development, transportation, traffic

4.1.1. The current status of infrastructure development²¹

Roads

Road infrastructure strategy is mainly based on six areas. a) finance, b) maintenance management, c) construction and renewal, d) design standards, e) security, f) databases. The following is an arrangement of the main details of each area.

Table14 The road sector's strategy areas and their details

Area	Detail
Budget	<ul style="list-style-type: none"> (i) Integrate road network planning and budget allocation unconnected to implementation responsibilities. This includes strategic potential travel routes in Yerevan and community level roads. (ii) Continue to increase substantial budget allocations until 2020 (iii) Secure additional resources through the road maintenance organization which implement flexible strategies for regular maintenance control activities. (iv) To secure funds for medium to long term projects from aid organizations
Maintenance management	<ul style="list-style-type: none"> (i) To carry out preventative technical maintenance and asset management instead of renewal and rehabilitation (ii) To improve the efficiency of the technical maintenance management function by using good management principles (iii) Create a regular work plan for technical maintenance (iv) Develop strategic maintenance management plans for the long-term and sustainable maintenance of road networks (v) Investigation of the state of bridge construction and development of bridge asset management (vi) Introduction of perpetual evaluation indicators on major routes
Construction and renewal	<ul style="list-style-type: none"> (i) Focus on the Lifeline Road Network Project (LRNP), which emphasizes priority roads including major expressways (ii) Focus on the North-South Road Corridor according to the regional crossing project (iii) Connecting or bypassing missing links, construction of new, highly economic roads
Design standards	<ul style="list-style-type: none"> (i) The introduction of international design standards, in particular the design standards of road shapes and pavements
Security	<ul style="list-style-type: none"> (i) Prioritize road traffic safety projects and budget appropriately (ii) Establish and endeavor to maintain appropriate speed limits (iii) Improve the relationship between the Highway Police and the Ministry of Territorial Administration: MTA

²¹ Development strategy of Transport sector of the RA 2020

(http://mtcit.am/main.php?lang=1&page_id=527&id=0&page_name=default#)

Area	Detail
	(iv) Reduce U-turns or prohibit use of U-turn locations (v) Improve safety management of hardware and vehicles using natural gas (vi) Comprehensive improvement of road signals and indications signs (vii) Road shoulder extension in urban and rural areas to protect pedestrians
Data bases	(i) Development of a road asset management system including a database of technical maintenance management using information technology for budget acquisition

Railway

The railway sector's strategy puts emphasis on the introduction of concessions to increase traffic volume to accompany an increase in intermodal traffic and logistics, and to carry forward a general economic investigation of the development of the railway network.

Table15 The railroad sector's strategy areas and their details

Area	Detail
Concessions	(i) In the role of a support partner through the government, to successfully complete the application concessions (ii) Effective monitoring by the activation of concessions instillation, including safety monitoring (iii) Establishing a department to carry out railroad monitoring, within the Ministry of Territorial Administration (MTA) (iv) Provide necessary training for department staff (v) Development of marketing skills and promotion of transportation development
Network expansion	(i) Implementation of feasibility study and prioritization of plans for non-concession projects (ii) Nurturing industries that use rail transportation
Intermodal service and logistics	(i) Development of the intermodal cargo complex around Yerevan and Gyumri (ii) Continue development of intermodal service delivery system and container transportation system (iii) Development of necessary legislation to promote freight transport and passage of a bill through the National Assembly

Airports and aviation

The aviation sector's strategy focuses on the development of aviation-related national projects and the need for updating aviation navigation services in Armenia.

Table16 The airports and aviation sector's strategy areas and their details

Area	Detail
Aviation	Aviation systems' national project comprises of the following.

Area	Detail
system's national project	<ul style="list-style-type: none"> (i) The necessities of infrastructure, priorities, budget (ii) Necessity to develop Zvartnots Airport (the capital city's airport on the outskirts of Yerevan) and infrastructure (construction of new runway) (iii) Development of a new passenger terminal at Shirak Airport (evaluation of demand) (iv) Feasibility study on airport reopening (v) Create a vision for the development of domestic passenger services (vi) Establishment of a new Armenian transport organization (It is under consideration whether it will be for domestic flights or include both domestic and international flights)

As shown below, Armenia has 16 airports including those under the Civil Aviation Committee management and military management, but at this moment Erevan and Gyumri Airports are functioning for international flights.

In view of future tourism promotion and the improvement of convenience in domestic travel, the private aviation committee wants to further improve (4.) Goris and (8.) Stepanavan airports and attract international flights²². However, as of October 2018, detailed plans have not been formulated.

²² The numbers on the legend of the map on the next page match with the numbers written just before Goris and Stepanavan ((4) and (8)).

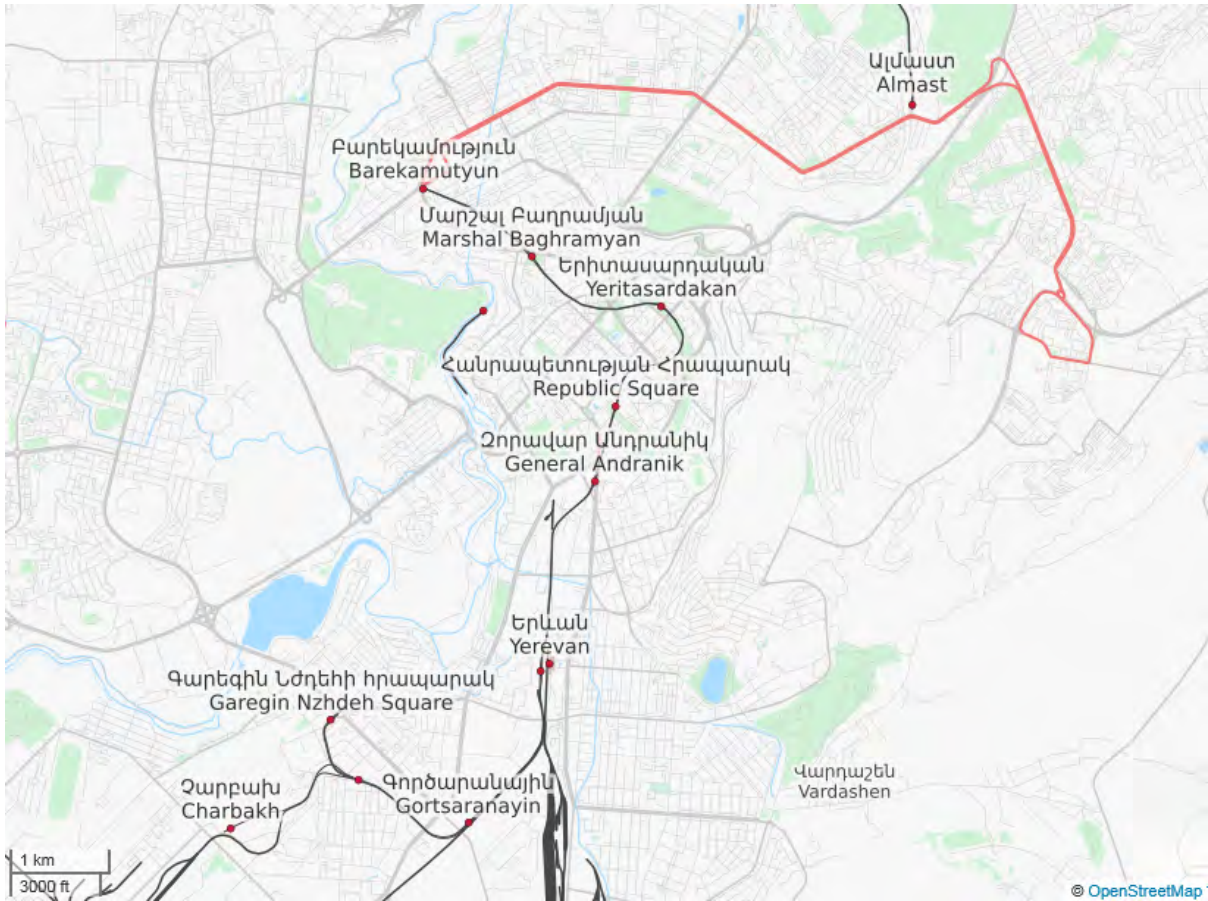


Figure8 List of airports in Armenia

City traffic

With regards to urban traffic, there is currently an issue with minibuses and buses causing congestion on central roads in Yerevan. In Yerevan, there is no planned servicing of the minibus and bus route network by the city, minibus operators apply for permission to operate to the city of Yerevan, on routes that are likely to increase revenue, and operate after receiving approval. Yerevan City is divided into several parts by river canyons and hills, and the urban area spread out spirally (Fig. 9). As road bridges are constructed to short-cut some of these spirals, there is an influx, with many minibuses crossing overpasses from the suburbs and concentrating on specific roads in urban areas. With this happening, multiple buses and minibuses in rows stop at bus stops along the road in the center of Yerevan city, two buses stopping is frequent (about once every 5 minutes during the day). As a result, traffic congestion occurs on the main streets in central Yerevan.

The mayor of Yerevan is considering the abolition of minibus operation authorization as of October 2018 to improve this situation. At the same time, he intends to change the fare system and the zone system. Due to the space structure of Yerevan City, alternatives such as bus and ride that uses the existing subway network etc., extend the time required for users to reach the city area, and the number of transfers also increases, with only a reduction in fares, there is a danger of user dissatisfaction increasing.



(Source) OpenStreet Map

Figure9 Yerevan's subway, national railway and main bus routes.



Figure10 The state of Yerevan City's Mesrop Mashtots Avenue's bus and minibus's file stops and congestion.



(Source) <https://armenpress.am/eng/news/956569.html>

Figure12 Engineering City conceptual drawing at completion

Crossing issues

There are multiple challenges in the ongoing management of the transport sector in Armenia and its implementation. These issues cross multiple fields such as the metro, the national railway, buses, minibuses, roads, etc., and are interdependent. These issues are related to the reorganization and operation of organizations, legal regulations, and mitigation of disaster impacts, tourism, nature conservation and social policy.

Table17 Cross-cutting issues and their details

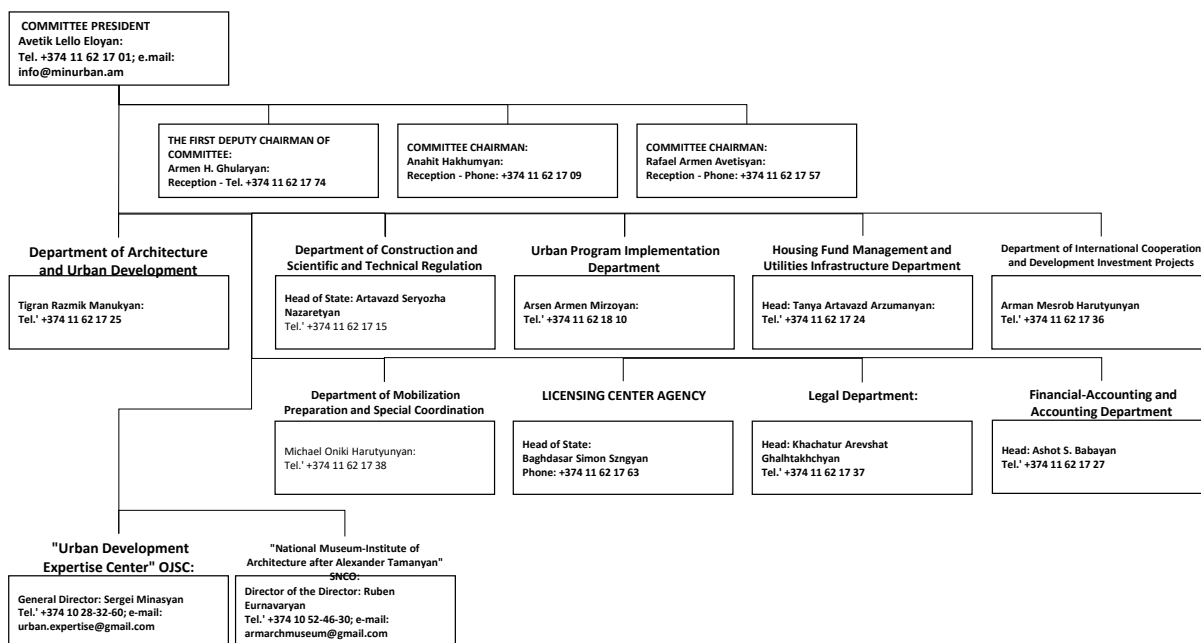
Area	Detail
Institutional framework and management	<ul style="list-style-type: none"> (i) Metropolitan Transport Authority: MTA's integrated responsibility (ii) Hire experts with experience working in international organizations for the last two years for the MTA, to support the development and implementation of five-year projects related to organizational and human resource management. (iii) Separate the regulation and procurement departments from the service supply (iv) Guarantee the independence of the regulatory body (v) Launch PSP/PPP unit (vi) Promote the application of the good management principle (vii) Re-examine the issues of civil aviation organizations (viii) Clarification of organizational process of urban traffic
Laws and regulations	(i) Participation in international / regional transport conferences and treaties and ratification regulations
Mitigation of disaster damage	<ul style="list-style-type: none"> (i) Establish two post-traffic-accident rehabilitation centers. One will be set up in Yerevan and the other will be set up in provincial city.

Area	Detail
Tourism	(i) Implementation of strategies for tourism development, implementation of investment in infrastructure projects, improvement of service quality, improvement of inter-state cooperation (ii) Removal of obstacles in the transportation sector for tourism development
Nature protection and social policy	(i) Implementation of strict environmental investigations and social investigations, implementation of monitoring and coordination with external cooperation agencies to mitigate the negative impact of traffic in the social environment sector (ii) Increase in means of transportation to the poor or vulnerable among the population (iii) Introduction and assistance of price policy for the poor

4.1.2. Infrastructure maintenance organization and personnel system

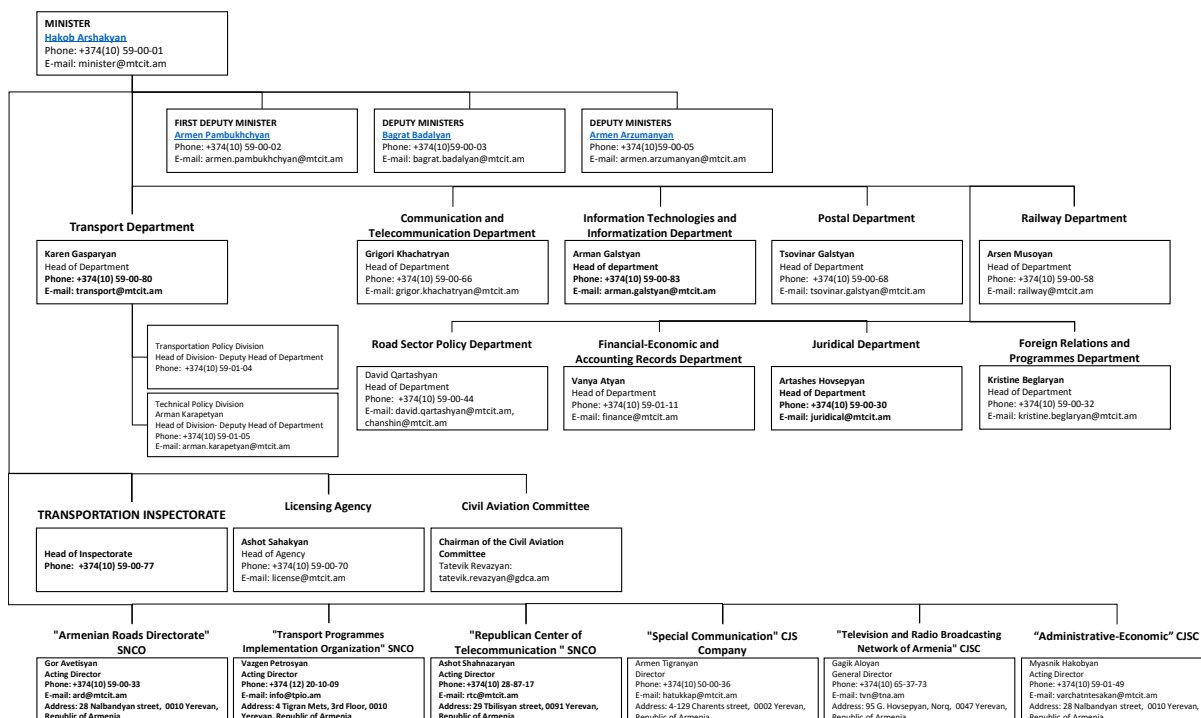
In the Armenian government, urban development and transportation systems are divided into two major ministries. Urban development is under the control of the Urban Development Committee, including the Department of Architecture and Urban Development, the Department of Construction, Science and Technology, the Department of Urban Program Implementation, the Housing Fund Management and Public Utilities Division. Urban development and water and sewage services are under the jurisdiction of the Urban Development Committee.

On the other hand, the transportation system is under the control of the Ministry of Transport, Communication and Information Technologies, and includes the Ministry of Transport, the Ministry of Railways, the Ministry of Traffic Safety Policy, the Civil Aviation Commission, etc. Furthermore, the Armenian Road Corporation and the Transportation Program Operations Corporation are included under this umbrella.



(Source) <http://minurban.am/am/structure>

Figure13 Organization chart of Urban Development Committee



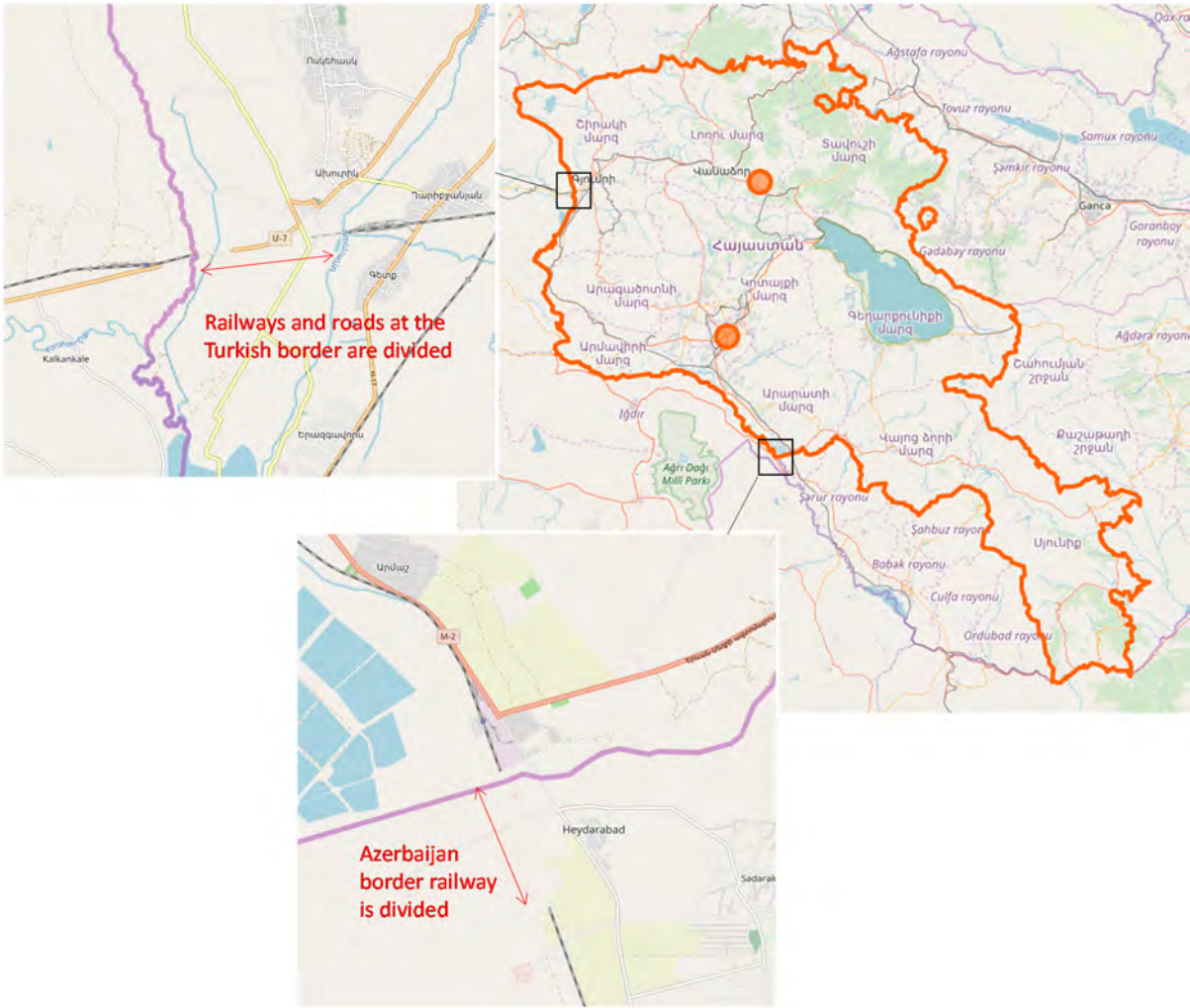
(Source) http://mtcit.am/main.php?lang=3&page_id=487#

Figure14 Organization chart of Ministry of Transport, Communication and Information Technologies

4.1.3. Cross-regional issues

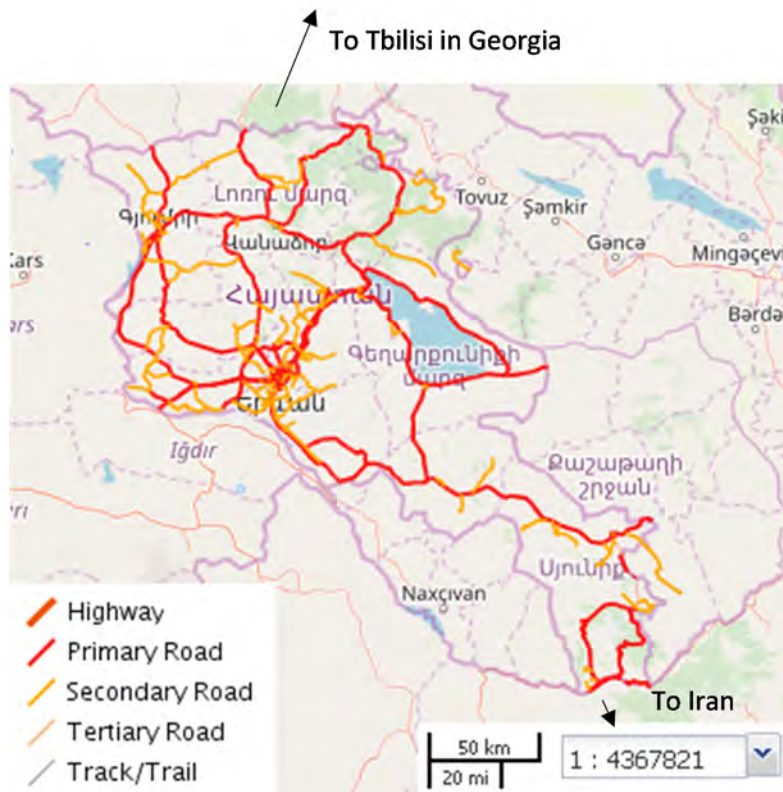
Armenia has closed the land border between Turkey and Azerbaijan, and currently there are no physical connections between railways and highways. Therefore, for Armenia, the road network to Georgia and Iran, the remaining neighbors, is the lifeline of land transportation. On the other hand, road maintenance in the north-south direction in Armenia is insufficient. There are several main roads maintained from Yerevan to the north towards Georgia, but for the south towards Iran, the section south of Goris is a mountainous area, and the maintenance of high standard roads is not sufficient. The Armenian government has already launched a north-south road improvement project to improve transportation in the north and south²⁴, but the development of the southern tranche 4 has been delayed.

²⁴ <http://northsouth.am/en>



Source) Openstreetmap

Figure15 The division of land traffic on the Azerbaijan-Turkish border

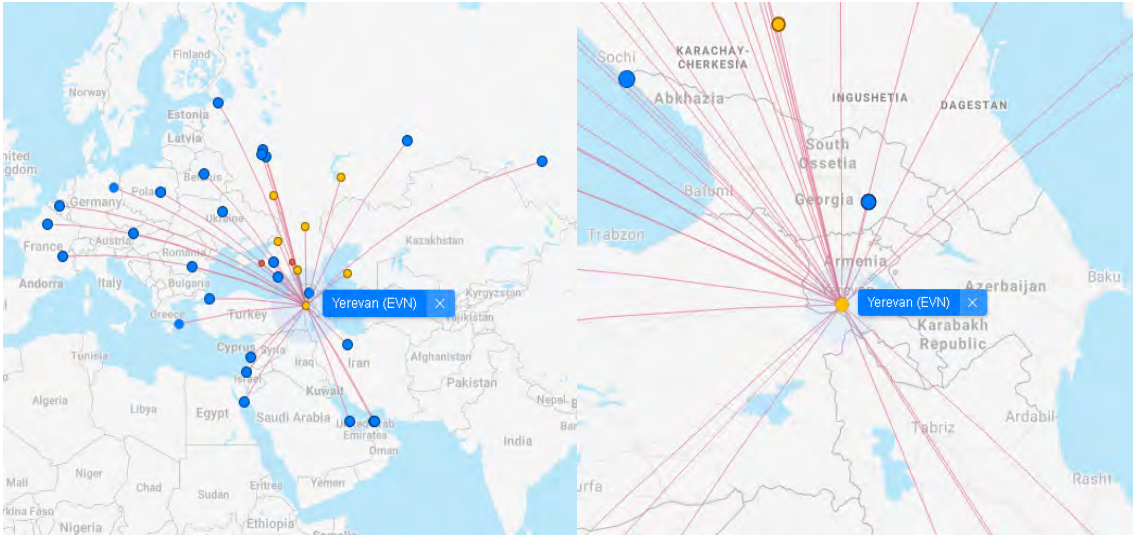


(Source) https://geonode.wfp.org/layers/ogcserver.gis.wfp.org/%3Ageonode%3Aarm_trs_roads_osm

Figure16 Armenian Road Network

Similarly, there are no direct flights to Azerbaijan. On the other hand, there is a direct flight line established to Istanbul in Turkey, it is possible for Armenians to visit Turkey if they go by air, and also for Turkish people to enter into Armenia.

Direct flights are established from Yerevan Airport in Armenia to the former Soviet Union countries; Russia, Belarus, Ukraine, Georgia as well as Germany, Belgium, France and other European countries, Israel, Egypt, Qatar and Middle Eastern countries such as the United Arab Emirates. According to the Civil Aviation Committee, because of Armenia's high clear sky rate, abundant tourism resources, and its location directly under air routes connecting Europe with the Middle East and South Asia, it is aiming to become a regional hub airport and is engaged in marketing activities to attract airmail. Furthermore, because of the particulars of Armenia training pilots in Yerevan Airport when it was a part of the former Soviet Union, it was announced that it would like to train pilots to compensate for the lack of pilots in the world.



(Source) <https://www.flightconnections.com/>

Figure17 Flight Network from Yerevan

Armenia is a landlocked country, and it is necessary to use Georgia's Port of Poti (or, in the future, the currently under development Anaklia Port) for long-distance logistics using shipping. For this reason, customs clearance procedures need to be identical or compatible with Georgia. Currently, Georgia is also considering introducing an efficient customs clearance system, and Armenia also needs to be adapted to Georgia's system in the future.



(Source)

<https://www.researchgate.net/publication/320345311> The Major Challenge for Armenia's Transport Security Obstacles and Prospects of Integration into the International Transport Corridors

Figure18 Image of transportation routes from Armenia to the Black Sea area and beyond via Georgia

4.1.4. Issues in advancing infrastructure development

The Armenian government is promoting PPP in the urban development, transportation and traffic sectors, and is actively using concessions in the operation of water and sewer services, airport terminals, and railway operation. For example, the management of the Armenian national railways has entrusted railway operations to South Caucasus Railway, CJSC, a subsidiary of Russian Railways OJSC, since 2008. In addition, the right to operate the Zvartnots International Airport in Yerevan and the Sirak Airport in Gyumri has been granted to Armenia International Airports CJSC, an Armenian subsidiary of Corporacion America, which has consigned airport concessions around the world, mainly in South America, since 2007. At the present time, there seems to be no major issues with these concessions, but in the infrastructure development of Armenia, the concession system is frequently used while the PPP system is not sufficiently developed. It is expected that the concession system will often be tried in future infrastructure development in Armenia.

In the field of urban development and transportation, as mentioned above, private investors are sought individually and conditions are decided individually in order to promote private sector investment in individual projects, while the PPP system is underdeveloped. For private investors, such a situation means high negotiation costs and a high degree of uncertainty, and it is difficult to negotiate with financial institutions because a government guarantee has not been ruled beforehand. The EBRD has already hired a consultant to review the PPP legal system, including concessions. It is expected that the Armenian government's PPP system will be reviewed soon based on the advice of the consultant.

In the field of urban transport, as mentioned above, the urban transport master plan of Yerevan City does not function, and route licenses, such as for minibuses, are not issued based on the master plan, it is applied from the viewpoint of the pursuit of the economic profit of private enterprise, and it is authorized by the city authority. For this reason, it is thought that the multiple parking of minibuses at bus stops etc., causes congestion on the main roads in the city. In order to solve this situation, it is essential to reestablish the urban transport master plan, and based on the urban transport master plan, it is necessary to rearrange route licenses such as those for minibuses, and to organize public transportation systems such as zone-based tariffs and the interconnection of main route traffic and feeder traffic.

4.1.5. Infrastructure development matters

Among the interviews conducted in this investigation, the infrastructure development projects raised in the urban development and transportation sector were; the improvement of the North-South Road Corridor tranche 4-2, the redevelopment of Stepanavan and Goris Airports, and the review of Yerevan City's urban transportation system. However, although interest was expressed in airport redevelopment in the interview with the director of civil aviation, information had not been provided by the end of December 2018. Also, there has been not detailed explanation for the lack of mayor's ideas regarding the review of the urban transportation system of Yerevan.

Regarding the need to strengthen airports, the Civil Aviation Committee (CAC) hopes to make renovations to help receive tourists at Goris and Stepanavan airports. As of December 2018, detailed plans have not been shared. However, since Goris Airport is under military control at present, in order to proceed with the renovation as a private airport, a change of control from the military to CAC is necessary. In addition, Stepanavan Airport is a hub airport for tourist

destinations in the northern part of Armenia, and during the Soviet era many international flights, including charter flights, were used. It is assumed that Stepanavan Airport will be redeveloped as a hub airport for northern tourism again.

As mentioned above, Armenia has a conflict with neighboring Turkey, Azerbaijan and Nagorno-Karabakh, regarding the North-South Road Corridor tranche 4-2, and these roads cannot be accessed by land. For this reason, the transportation network to Georgia and Iran is a matter of life and death. The North-South Road Corridor Project²⁵, promoted by the Armenian government, will pass through the second city, Gyumri, from Shirak on the Georgia border, through Yerevan, and improve the existing road to Iran. The project is a road construction project with a total cost of 1.5 billion USD and a total length of 556 km. It will try to improve the transport situation in the north and south of Armenian (Fig.19)

The project has already begun construction and some parts put into practical use. The project is supported by the Asian Development Bank (ADB), the European Investment Bank (EIB) and the Eurasian Development Bank (EDB), and is divided into five tranches. The sections of each tranche and their progress are as follows (Table 17).

Table18 Tranche, Support and Loan Amounts of the Armenian North-South Road Corridor Project

Tranche	Section	Donor	Loan amount
1	Yerevan – Ashtarak 11,4km Yerevan – Artashat 19,6km	ADB	USD 70,4 million
2	Ashtarak – Talin 42 km	ADB	USD 179,6 million,
3	Talin-Lanjik 18,7km Lanjik-Gyumri 27,5km	ADB	USD 100 million
		EIB	EUR 60 million + EUR 12 million grant
4	Artashat-Qajaran 304km	Pending In consultation with EBRD	Being recalculated as the estimated amount is high
	Qajaran-Agarak 42km	EDB	USD150 million
5	Gyumri bypass and Gyumri-Bavra section 62km	EIB	Implemented grant aid for planning. Financial support information regarding post planning has not been released as of the end of 2018.

(Source) Produced from <http://northsouth.am/en>

²⁵The Armenian government has launched a dedicated website for this project. <http://northsouth.am/en>



(Source) https://ic.pics.livejournal.com/spectat/12445712/224083/224083_600.jpg

Figure19 Overview of the Armenian North-South Road Corridor

4.1.6. The state of donor activity

Donors such as EBRD, WB and ADB have already been active in urban development, transport and traffic in Armenia. For example, EBRD conducts rehabilitation of the Yerevan Metro, and WB also supports the reconstruction of community roads and the introduction of the open sky policy. Furthermore, ADB, EIB, etc., are actively supporting the Armenian North-South Road Corridor construction project.

**Table19 Tranche, Support and Loan Amounts of the Armenian North-South Road Corridor Project
(reprinted)**

Tranche	Section	Donor	Loan amount
1	Yerevan – Ashtarak 11,4km	ADB	USD 70,4 million
	Yerevan – Artashat 19,6km		
2	Ashtarak – Talin 42 km	ADB	USD 179,6 million,
3	Talin-Lanjik 18,7km	ADB	USD 100 million
	Lanjik-Gyumri 27,5km	EIB	EUR 60 million + EUR 12 million grant
4	Artashat-Qajaran 304km	Pending In consultation with EBRD	Being recalculated as the estimated amount is high
	Qajaran-Agarak 42km	EDB	USD150 million
5	Gyumri bypass and Gyumri-Bavra section 62km	EIB	Implemented grant aid for planning. Financial support information regarding post-planning has not been released as of the end of 2018.

(Source) Produced from <http://northsouth.am/en>

4.2. Energy

4.2.1. Present situation concerning the infrastructure

The energy sector in Armenia fell into a fairly serious situation at the beginning of the 1990s. In recent years, however, the situation has improved as a result of government policy, legal restraints, and a re-examination of the system. The efficiency of operation including power transmission loss and the revenue ratio of the electric power charge has significantly improved, and commercially independent service providers as well are being nurtured. However, issues related to power supply, and issues concerning subsidies and the government, remain.

Armenia is presently confronted by three major issues.

- (i) The balance between supply and demand has been lost.
- (ii) The reliability of energy supply is low.
- (iii) There is no payable feed system

Armenia has no petroleum or gas reserves, and can supply only 35% of its own energy requirements. For this reason, the country depends upon imports for its energy resources. On the other hand, the level of energy conservation in Armenia is extremely low, and the government has enacted several laws aimed at promoting the use of energy conservation devices and utilizing renewable energy, in the home. From January 1, 2019, inefficient power plants are to be removed from the system.

The energy law stipulates the relationship between corporations in the energy sector in which electrical power, heat and natural gas are manufactured by the consumer and then transported. The energy conservation and renewable energy law stipulates the development of mechanisms for improving the energy utilization efficiency and also for developing additional resources for renewable energy. This law promotes the development of renewable energy resources and also mandates the purchase from a distribution company of all electric power generated by renewable energy.

The regulator of the electric power industry is the Public Service Regulatory Committee (PSRC). This committee sets the tariffs for newly constructed small-scale hydroelectric power plants, wind-powered generating facilities, and biomass plants. The PSRC guarantees that the license will be valid for a period of 15 years from the date of issue, concerning the tariffs for both purchasing and selling of electric power.

At present, Armenia has adequate electric power to meet internal demand, but the demand for electricity is increasing by 2 to 3% a year. Armenia's nuclear power plant is approaching the end of its life, and it is predicted that, with the end of the period of the natural gas grant currently being supplied by Russia, the demand for electric power will exceed the amount of power that can be supplied.

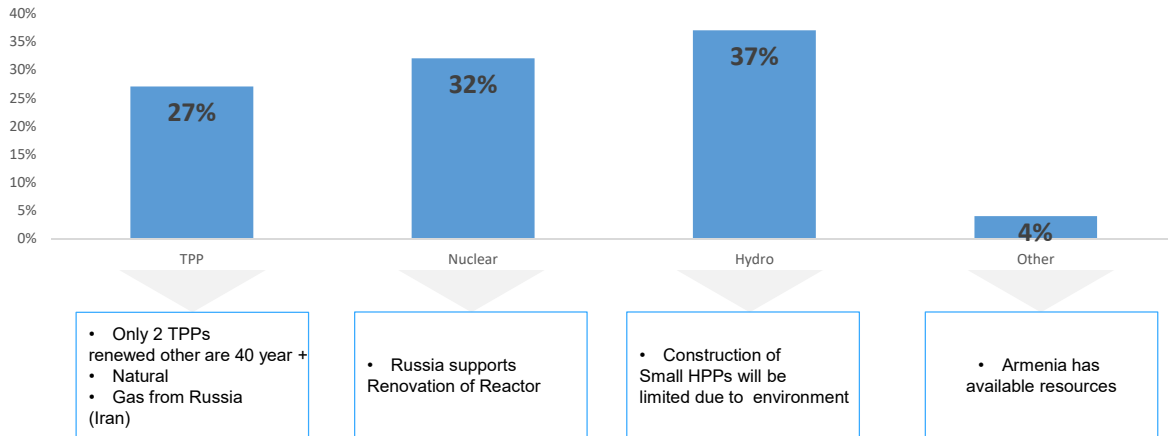
The composition of Armenia's power generation is as follows.

- 1) The Metsamor nuclear power plant (408 MW) supplies between 30 and 50% of the electric power generated internally. The actual percentage depends upon the period during which the plant can operate and also the amount of nuclear fuel that can be purchased. Armenia is currently under international pressure to scrap this plant from the viewpoint of safety. On the other hand, the Armenian government has agreed to extend the operating period to the

year 2028. The construction of power generating facilities that substitute for this nuclear power plant (ANPP) constitutes an extremely large issue concerning the supply of electric power in Armenia.

2) Hydroelectric power plants account for 20 to 40% of power supplied in Armenia. The exact percentage depends upon the rainfall.

3) Thermal power plants account for the remaining sources of electric power. The main type of fuel used is natural gas.



Source: Ministry of Energy Infrastructure and Natural Resources

Figure 20 Energy mix in Armenia

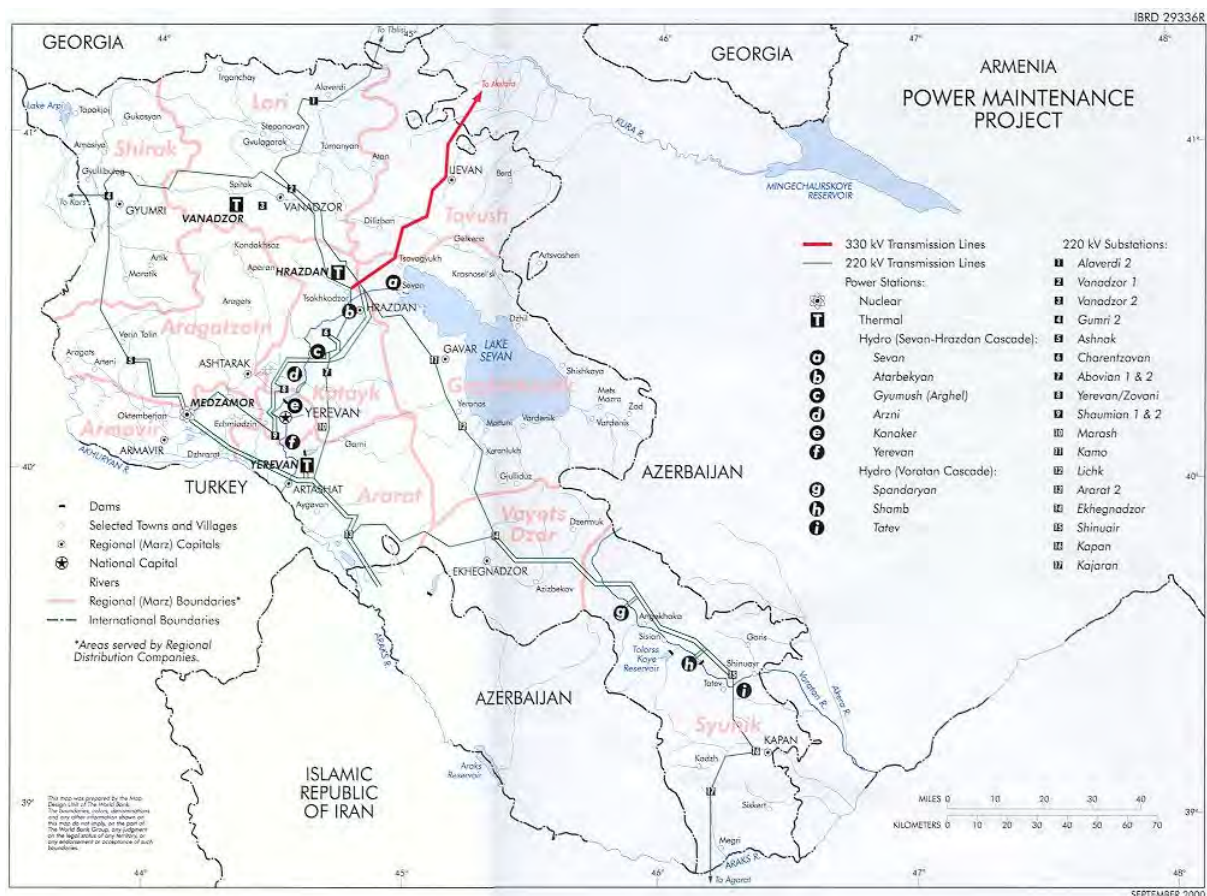
At present, the amount of electric power generated in Armenia is adequate for meeting the demands of the domestic market. Also, there exists a certain amount of surplus power which is intended for export. The power distribution network and the retail price of electric power are determined by civilian corporations, and electric power is generated by 6 independent power companies. One of these companies is involved in wind-powered electric power generation, two are involved with cogeneration, and the remainder consists of many small-scale civilian hydroelectric power plant operators. During the period of the Sustainable Development Programme (SDP), the Armenian government continued to introduce small-scale hydroelectric plants (SHPS).

In 2009, the Armenian government adopted a policy concerning the development of small-scale hydroelectric plants, and decided to construct an additional 90 small-scale hydroelectric plants having a total output of 100 MW. As a result, subsequent to 2008, 86 small-scale hydroelectric plants went into operation, and the total output was 169.2 MW. Also, the amount of electric power generated in one year is 524.11 million kWh. As of January 1, 2014, 154 small-scale hydroelectric plants are in operation. The total output is 260 MW, and the amount of electricity generated in one year is 720 million kWh.

Also, the work of constructing the Iran – Armenia gas pipeline stopped during the period of SDP, and a stable supply of gas from Iran commenced. The supply of electric power from Armenia to Iran also started. Regarding natural gas, rehabilitation of the underground facilities for storing natural gas was carried out by ArmRusGazProm. As a result, the storage capacity increased 1.8-fold, and the amount of gas that could be stored as of 2010 was 132.7 million m³. It is planned to further increase this capacity to 140 million m³.

The improvement of the infrastructure is carried out in the electric power system as well. The overall reliability of the electric power system has increased considerably, and cooperation between regions is being promoted. For example, the following efforts are being made.

- 1) In 2010, as a result of financial assistance provided by an international aid agency, three of the fourteen 220 kV substations were upgraded using the most up-to-date technology, and in addition nine facilities were partially upgraded.
- 2) In February 2014, the overall upgrading project carried out by KfW on the two 220 kV substations was completed.
- 3) In September 2010, rehabilitation of seventeen 110 kV substations was completed as a result of assistance provided by the Japanese government.
- 4) In October 2010, the first phase of the monitoring control system (SCADA)/communication system work was completed.
- 5) In 2010 and 2011, the capacity of the gas combined cycle was upgraded from 243.2 MW to 467 MW, and operation was started.



Source: The World Bank

Figure 21 Armenia's power transmission lines

The policy of the Armenian government concerning the implementation of these projects is as follows.

- 1) We will use our own resources and renewable energy resources to the maximum limit.
- 2) We will carry out further development of nuclear energy, and promote the construction of a new nuclear power plant, aiming at improving the safety level of the No. 2 unit of ANPP and increasing the period of use.
- 3) We will upgrade obsolescent energy-related facilities using the most up-to-date technology.
- 4) We will carry out integration between regions, aiming at diversification of the supply of energy resources.
- 5) We will promote energy conservation and also aim to use energy more efficiently.
- 6) We will improve the safety and reliability of our electrical system.

Armenia can acquire many economic benefits from improvements in energy efficiency. Because there are few industrial activities in this region, the energy density in Armenia is low. However, the latent effectiveness of energy conservation is considered to be extremely high. According to a survey²⁶ carried out by The World Bank in 2008, Armenia can expect to save 360 million dollars each year, which is equivalent to 4% of the GDP. Particularly, it is considered that the effectiveness of energy conservation for public facilities will be very high, and also the investment recovery period will be roughly between 2 and 10 years. However, the introduction of an energy conservation program has been postponed due to international, technical, financial and legal reasons. Improvement of energy efficiency is a major issue concerning the energy sector.

Concerning Armenia's electric power system, it is considered that the latency of sustainable energy due to the existence of domestic water resources for hydroelectric power and other sustainable energy sources is quite high. Specialists point out that if Armenia increases the amount of power generated by using sustainable energy, and reduces the cost of electricity, it will be possible to reduce the dependence on natural gas.

In Armenia, the most up-to-date kind of sustainable energy is hydraulic power generation. Concerning this, it is said that there is a possibility of realizing both large-scale hydroelectric power plants (the water source is Lake Sevan) and small-scale hydroelectric plants that utilize running water from rivers. The total potential from all of these hydroelectric plants is 1,032 GW. The hydroelectric plants on the Hrazdan River and the Vоротan River constitute the main hydroelectric plants in Armenia. The total electric power that can be generated by 6 hydroelectric power stations connected in cascade on the Sevan-Hrazdan is 561 MW, and the total that can be generated by 3 power plants connected in cascade on the Vоротan River is 404 MW. The Sevan-Hrazdan power generating system is owned by RAO Nordic which is a subsidiary of the Russian Rao-UES. In 2015, the Armenian government permitted the Vоротan cascade hydroelectric power station to be sold to the U. S. Contour Global. This company is scheduled to invest 70 million dollars, and to upgrade the facilities over a period of several years. At present, 102 small-scale hydroelectric plants are in operation, and the total output from

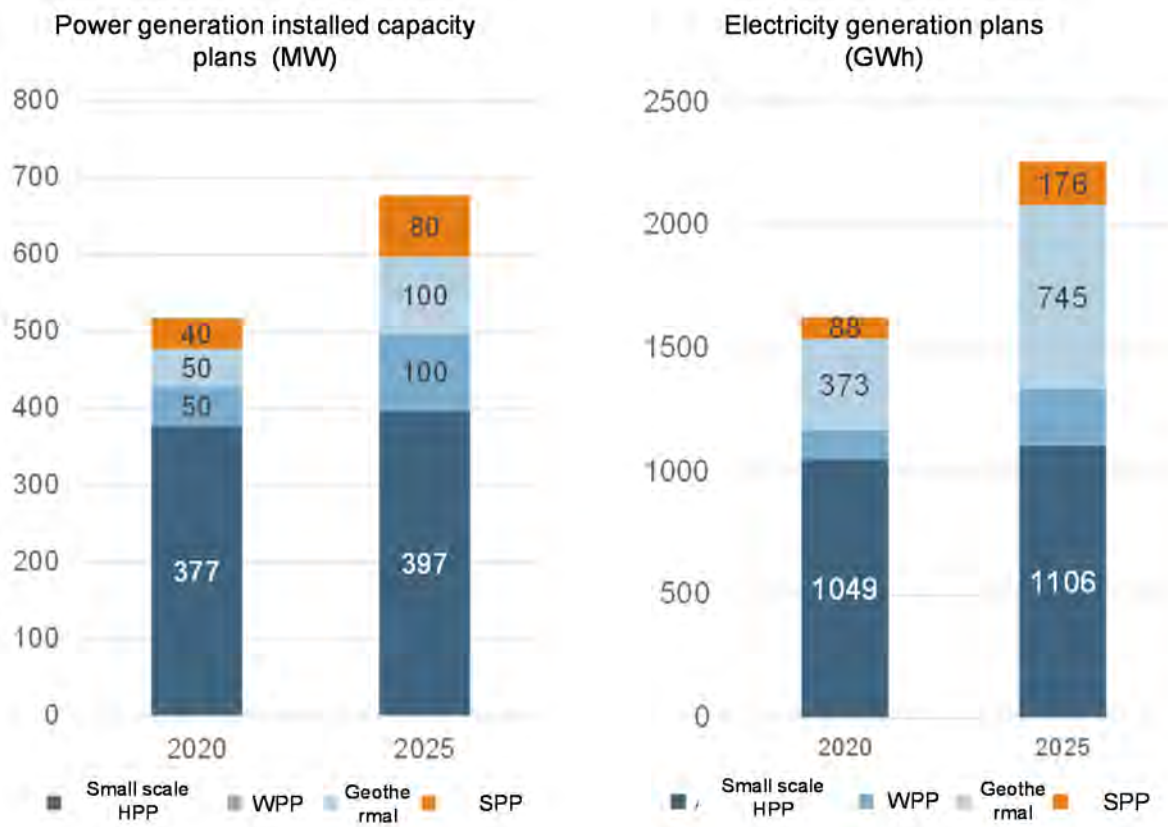
²⁶ This survey has also been mentioned in the information related to The World's Bank energy conservation project which was started in 2011. However, the report which constitutes the source has not been clearly indicated.

them is 132 MW. The Dzoraget hydroelectric plant is the largest plant, and the total power generating capacity for the 10 small generating units is 26 MW. Small-scale hydroelectric plants will meet the greatest part of the demand for electric power over the next 10 year. At present, about 23% of the yearly power generating capacity of the small-scale hydroelectric plants remains unused. In January 2015, according to the licenses that were provided, there are currently 56 small-scale hydroelectric power plants under construction which are capable of providing a total amount of 396 million kWh per year at the rate of 114 MW.

On the other hand, regarding wind-powered electricity generation, in 2003 the National Renewable Energy Laboratory (NREL) drew up a wind condition map which indicates that the most economical wind force that can be used is equivalent to 450 MW. A wind-powered generating plant that has undergone a feasibility study generates 195 MW, and an output is 0.55 GWh per year. The national target for developing wind-powered generating plants is the realization of 500 MW by the year 2025 for the system connection part. Regions in which the wind conditions are good include the Zod Pass, Bazum Mountain Range (Qaraqhach Pass or Pushkin Pass), Jaiur Pass, Geghama Mountain Range, Sevan Pass, Aparan region, the plain between Sisian and Goris, and the Meghri region.

A small-scale hydroelectric plant or a wind-powered generating plant is cheaper than a thermal power plant. On the other hand, it is fraught with various issues that are likely to slow its growth in the future. For example, there are issues that are not taken into consideration in a legal and regulatory framework, technical defects, and issues concerning business continuity. The most important technical issues related to Armenia's small-scale hydroelectric power plants are that automation has not been realized, and also that modern operation technology is not being used. Other factors include poor performance, poor reliability of facilities made in China or Iran, metallurgic and material issues arising due to the reuse of pipes recovered from irrigation systems, and also design that does not meet the standard, poor quality control during construction, and the discarding of hydroelectric generating facilities that were switched off.

Regarding solar-powered generation as well, Armenia has great potential. In Armenia, the amount of sunlight per m² in one year is 1720 kWh (the average value in Europe is 1000 kWh), and the country boasts an output of 1850 kWh/m² over 1/4 of its total area. Solar hot water heaters are already installed on the roofs of many buildings, and their installation on kindergartens, dwellings and medical facilities is being promoted with the backing of international aid organizations and charitable groups. Demonstration small-capacity solar panel modules have been introduced. The Fund for Renewable Energy and Energy Efficiency of Armenia has been established with support from The World Bank and the Global Environment Facility Trust Fund. This organization is currently carrying out a latency survey concerning whether or not the solar panel industry in Armenia is viable. Also, it has formulated a renewable energy investment plan. This fund also uses 40 million dollar fund for Scaling-Up Renewable Energy Program in Low Income Countries (SREP) of a climate investment fund. A 55 MW class commercial scale solar-powered generating facility has been developed in Armenia.



Source: Scaling Up Renewable Energy Program (SREP)

Figure 22 Plan for introduction of renewable energy in Armenia

Geothermal power generation is also a promising source of power in Armenia. The Armenian government is promoting the development of geothermal power, and considers it to be a usable form of energy, from the economical aspect as well, which is suitable as a base load power source that can be acquired from the local area. As a result, a geothermal energy resource contributes to the stability of supply of energy. Armenia’s potential geothermal power is estimated to be at least 150 MW. As a known source of geothermal power, the KarKar region is considered to be the most promising. The World Bank has a plan to invest in the development of a geothermal power plant using SREP in the KarKar region.

Under Armenia’s national electric power strategy, methane recovered from waste disposal sites is also considered to be a promising source of electric power. The Nubarashen final disposal site is located in a suburb of Erevan. International aid organizations are making efforts to improve Armenia’s final disposal sites, but construction of recovered methane gas power generating facilities is delayed.

4.2.2. Infrastructure preparation organization and human resource system

Armenia’s energy sector contains roughly 210 organizations and corporations. Of these, 6 are major corporations, 3 are power transmission and distribution companies, and about 200 are small-scale power plant operators. In the electric power sector, about 20,000 persons are employed. The main organizations of the electric power sector in Armenia are

described in sequence below.

Electric Networks of Armenia (ENA)

ENA, which was constructed in 2006, is the only Armenian electric power company. It is the largest corporation in Armenia, and is a tax payer. This company supplies electric power to 985 thousand customers, and has 11 branches throughout Armenia. For Erevan, there are 4 branches which supply power at 400 V-110 kV. One of these branches supplies power at 35-110 kV, and the remaining 3 branches supply power at 400 V. For the remaining regions in Armenia, there are 7 branches which supply power at 400 V-110 kV.

In 2015, the Russian corporation InterRAO, which was the previous owner of ENA, sold ENA for 720 million dollars to the Tashi Group which is a Moscow-based corporate group possessed by the Russian multi-millionaire Samvel Karakpetyan who comes from Armenia.

The High Voltage Energy Network (HVEN) of Armenia

HVEN is a monopoly corporation involved in high-voltage transmission, and is a non-public enterprise. The purpose of HVEN is to stably operate a 220-110 kV transmission line network. It carries out power transmission services, transmission line maintenance, upgrading of transmission lines, design, network expansion, and so on. HVEN has fifteen 220 kV substations, and 36 substation facilities. Overall, this network has 2561.0 MVA facilities. Also, it has 220 kV switch facilities at Agarak. HVEN has 1914.73 kM of overhead transmission lines. Of this distance, 127.62 km carry 330 kV, 1366.51 km carry 220 kV, and 420.6 km carry 110 kV.

Armenia's transmission line network is connected to Iran and Georgia. KfW has provided 250 million dollars of finance, and supports the construction of a 2nd transmission connecting Armenia to Georgia. This project includes the following.

- The first 350 MW module will be introduced into the B2B substation, and then connected to the 220 kV Alaverdi-Gardabani transmission lines (2015-2018). This permits 220-230 MW transformation.
- The first 400 kV transmission lines will be constructed at Hrazdan-Ayrum. Also, the second 350 MW modules will be introduced in 2017-2021, thus increasing the transformation capacity to 700 MW.
- The third 350 MW module will be introduced, the second 400 kV transmission lines will be constructed at Hrazdan-Ayrum, and the transformation capacity will be enlarged to 1050 MW.

Electro Power System Operator CJSC (EPSO)

This is a monopolistic organization involved with the operation of a power generating plant. The system is adjusted and operated from the technical and economic viewpoints. In addition, EPSO performs adjustment of power plant system operation and also draws up long-term plans. This takes into consideration electric power generation, import and export of electric power, and the supply of electric power based on existing contracts. EPSO owns a subsidiary called Energy Communication, which monitors the operation of the power generating system and dispatch control, and the interaction between the processes.

The Public Services Regulatory Commission (PSRC)

This commission creates the procedures concerning setting and re-examining of the tariffs. According to the Energy Law,

the PSRC can either set the tariffs individually, or create a clear formula that calculates the tariffs based on variables defined by the Energy Law. According to the Energy Law, the tariffs include the following.

- Cost of normal operation and maintenance
- Cost of interest payment
- Cost of conformity to the environmental standards
- Cost of theft of electricity and maintenance
- Cost of safely storing used nuclear fuel and also the necessary allocation to the nuclear power plant dismantling foundation
- Technical and business losses
- Other appropriate costs stipulated by legal restrictions

A tariff provides an opportunity to the operator for acquiring appropriate earnings. PRSC or a licensee (a person who acquires a power generation license) can request that the tariff be re-examined once every 6 months. Once a request is made, it is necessary to publicize the results of the re-examination within 90 days. In order to guarantee the safety of an investment, PSRC can set the tariff over a long period exceeding 6 months. In this case, once the tariff has been set, the licensee cannot request a change with respect to the tariff standards, and the only way to change the tariff is to re-examine the method of calculating the PSRC tariff.

Table 19 Electric power tariffs in Armenia

Item	Price (US cents/kWh)	
Retail price of electric power	Civilian consumer (400 V)	9
	For industrial use	6
Purchasing electric power	Renewables (including HPP)	4.5 for (<30MWt)
	SPP	4.19 (55MWt)
	NPP	2.2 (+capacity payment)
	TPP	4.5 (Erevan)
	Razdan (TPP)	12
	TPP (large size)	1.5~3

* The above tariffs include construction costs and depreciation costs but do not include VAT.

Source: Ministry of Energy Infrastructure and Natural Resources

4.2.3. Issues that extend across a region

Armenia has disputes with Turkey and Azerbaijan. For this reason, there is no interchange with Turkey or Azerbaijan, even in the energy field.

In January 2015, Armenia joined the Eurasian Economic Union (EEU). In the energy sector, the main electric power infrastructure is owned or run by Russian corporations, and Armenia's energy sector relies on Russia from the commercial and policy aspects.

Armenia imports petroleum and petroleum products from Georgia, Iran, Russia and Europe, and imports natural gas from Georgia via Russia. Armenia also imports some natural gas from Iran. This is based upon a gas-electric power swap

agreement between Armenia and Iran. Armenia also imports nuclear fuel from Russia. At present, 400 kV transmission lines are being constructed between Armenia, Georgia and Iran. These transmission lines are scheduled to be connected to a 220 kV transmission line network. In addition, 400 kV substations are being constructed, and it is expected that this will stabilize the supply of electric power to Georgia. As a result of these projects, Armenia's ranking in the energy supply section is expected to improve.

Armenia also signed a Comprehensive and Enhanced Partnership Agreement (CEPA) with EU in November 2017

4.2.4. Issues concerning the promotion of the construction of an infrastructure

The tariffs in the emergency sector constitute the key to reducing the dependency on Russia for resources. At present, Armenia obtains about 40% of its electricity from nuclear energy, about 30% from natural gas thermal plants, and about 30% from renewables. Of these, almost all nuclear fuel for the nuclear power plant and almost all of the natural gas for natural-gas thermal power plants are dependent on Russia. The dependency on Russia for energy resources has reached almost 70%. The Armenian government is aiming to increase the scope of utilization of its own energy sources, not only to secure replacement energy sources along with the aging of its nuclear power plant, but also to improve energy security as well. The proactive utilization of solar power, hydroelectric power, geothermal power, and other renewable energy sources is in line with this.

The Armenian government wishes to promote the use of domestic renewable energy by introducing tariffs that guarantee profits from renewable energy. On the other hand, this does not mean that it is possible to see how to achieve a balance between renewable energy and nuclear over the long term.

4.2.5. Projects concerning the preparation of an infrastructure

The following projects are scheduled to be realized by in the energy field.

- 1) Complete introduction of the SCADA system
- 2) 400 kV transmission lines will be newly constructed between Armenia and Georgia and also between Armenia and Iran. These systems will be connected to each other by 220 kV transmission lines. Also, a 400 kV substation will be constructed in order to ensure a stable supply of electric power to Georgia.
- 3) The 220 kV substation will be upgraded to a 450/500 kV substation.
- 4) Rehabilitation and upgrading of the Vоротan hydroelectric plant to a larger capacity
- 5) Test boring of a deep well for geothermal power generation based on the results of a geophysical survey
- 6) Re-examination of the sensor, re-arranging the statistics of the energy field, and introduction of a sustainable system
- 7) Introduction of a quality index and business result index aimed at participants in the energy market and introduction

of standards

In Armenia, renewable energy already has adequate competitive strength compared to conventional energy sources, and the project that is most feasible as a business is hydroelectric power generation. Large-scale rivers such as the Debed River, the Dzoraget River and the Araks River do not have power generating facilities installed on them, and the government is looking for business partners for the following hydroelectric projects. On the other hand, RusHydro, which is a Russian national corporation, has indicated its intention to sell the Sevan-Hrazdan cascade hydroelectric plant, the second most important hydroelectric plant in Armenia.

Table 20 Armenia's hydroelectric plant projects

Project name	Facility capacity	Generating capacity	River
Meghri HPP	130 MW	800 million kWh/Year	Araks River
Shnogh HPP	75 MW	300 million kWh/Year	Debed River
Loriberd HPP	66 MW	200 million kWh/Year	Dzoraget River

Next, ENA, which is an Armenian power transmission corporation, is planning a 500-million-dollar investment program, and is looking for a project partner.

Armenia has experience in solar technology as well, and has a wealth of raw materials for manufacturing solar panels locally. Also, regarding solar power generation, Armenia Renewable Resources and Energy Efficiency Fund (ARREEF) is currently searching for a private developer or a consortium that will carry out design, fund procurement, construction, possession, and operation DFBOO), concerning a 55 MW Masrik-1 solar-powered generating project which is system-coordinated in Mets Masrik in Gegharkunik State, upon request from the Ministry of Energy, Infrastructures and Natural Resources.

Although investment in energy conservation is also another investment opportunity, international aid organizations such as EBRD or UNDP are also showing interest.

On the other hand, regarding nuclear power plants, the Armenian government intends to construct a new nuclear power plant, and is interested in a small-scale module reaction furnace.

Table 21 Project for preparing an infrastructure for Armenia’s energy sector, and support/project owner and project scale

Classification	Project	Donor/Project owner	Project scale
Power transmission	ENA - Modernisation of Distribution Network	EBRD/ENA (Partner not decided)	500 million dollars
	Introduction of the SCADA system	ADB/National regulatory centre	13.6 million dollars
	Construction of new 400 kV transmission lines between Armenia and Georgia, and between Armenia and Iran, and upgrading of substations	The Export Development Bank of Iran (EDBI)/ Armenia’s High Voltage Electricity Network (HVEN)	117 million dollars
Hydroelectric	Rehabilitating and upgrading Vorotan hydroelectric plant	IFC	70 million dollars
	Meghri HPP (130 MW), Shnogh HPP (75 MW), Loriberd HPP (66 MW)	CBCA (Spain), The Export Development Bank of Iran (EDBI)/Armenian government	Undecided
Solar	Masrik-1 solar-powered generating plant project (55 MW)	Fotowatio Renewable Ventures (FRV) and FSL Solar consortium, WB/ENA	50 million dollars
Geothermal	KarKar geothermal plant	Undecided	
Energy conservation	Upgrading of public buildings in the Armenian capital, Yerevan	UNDP, European Investment Bank (EIB)/Yerevan City	7 million dollars
Nuclear-powered	Introduction of small-scale module reaction furnace	Russian government	300 million dollars

4.2.6. Situation concerning donor activities

In the energy sector, EBRD, The World Bank, ADB and UNDP are carrying out various activities. Details are as shown in Table 22.

Table 22 Representative projects in the energy field

Donor	Project name	Contents
EBRD	Modernization of Distribution Network	A loan of 80 million dollars is being provided to Electric Networks of Armenia (ENA) between 2016 and 2020. This donor also supports a 200-million-dollar investment program. These funds will be used to introduce smart meters throughout Armenia.
The World Bank	Electricity Transmission Network Improvement Project	<p>The project for improving the transmission line network in Armenia is intended to increase the reliability of the distribution line network, improve the management of the transmission line system, and support efforts to guarantee that the borrower has an adequate supply of electric power.</p> <p>This reconstruction brings about the following changes.</p> <ul style="list-style-type: none"> ③ The project development target is the improvement of the reliability of the transmission line network. <p>Also includes rehabilitation of the No. 2 plant of the Ararat thermal power plant by re-examining 1(a) of Schedule 1 of the loan contract.</p>
ADB	Project for constructing high voltage transmission lines	Electric Network of Armenia borrows funds, and installs transmission lines and substation equipment.
UNDP	Reduction of energy consumed by road and airport lights	The object of the project consists of 6 roads. The project realizes a 57 to 60% reduction of energy, which translates into a saving of 125,000 dollars/Year. In addition, conservation of energy used for road lighting is being promoted in each of 13 municipalities.

4.3. Environment

4.3.1. Situation concerning the preparation of an infrastructure

Environmental issues and natural protection are issues that have a high priority for the Armenian government as well. In recent years, the government is making an all-out effort to reduce the environmental risks as far as possible. Concretely, the following activities are being carried out.

- 1) The environmental risks increase along with the degree of progress of expansion in the mining industry. In Armenia, however, the environmental risks originating in mining increase along with the increase in the price of industrial resources.
- 2) Illegal logging of forests is increasing along with the increase in the price of gas.
- 3) Excessive water resources are used due to variations in the weather and rapid development of industries that use underground water.
- 4) Desertification is advancing.

The development priority sequence in the environmental field is based on the main items 1) to 15) below. At the present time, the overall legal system concerning the environment has not been prepared.

- 1) In the environmental field, it is necessary to improve and reform the environmental regulations and the legal system, and in recent years environmental policy laws have been enacted.
- 2) The environmental impact evaluation and environmental management system have been re-examined. The economic entity will be requested to adopt a different approach according to the environment impact. This promotes the introduction of the optimum environmental protection technology and energy conservation technology to replace old technology. Also, it is necessary to set conditions that enable public entities to participate in inadequate environmental management.
- 3) In order to reduce the risk of corruption concerning environmental regulations, it is necessary to introduce a simple and clear electronic government system. In order to promote natural protection activities, energy conservation and conservation of resources, it is necessary to develop PPP, eco-labeling and self-monitoring systems.
- 4) At present, compensation income from levies attendant to natural use and environmental use is between one 32nd to one 40th of the damage that actually occurs. Particularly, regarding the sector which constitutes part of the economy, it is extremely dangerous from the viewpoint of environmental protection to give additional preferential treatment at 0% interest or below, for conservation of the environment and the use of resources. Regarding this point, it is desirable that the economic mechanism of environmental policy be re-examined using the following directionality.
 - a. In the main macroeconomic prediction, methodology will be developed for evaluating environmental pollution and overuse of the environment, and actual calculations will be made.
 - b. By gradually raising the fees for utilizing the environment and nature, the efficiency of utilizing natural resources

- is improved, and additional income is offered to the state finances. From this, the budget for protection of nature will be increased.
- c. “Green economy” in the taxation system will be promoted, and the approved fee will be revised so that the circulative utilization of resources will yield profits from an economic viewpoint.
 - d. Introduction of technology for conservation of energy and resources, and products: The existing standards and technical regulations necessary for procuring products that are ecological and of high quality will be utilized.
- 5) In order to maintain the applications of the land, prevent the land from deteriorating, and suppress any undesirable tendencies, appropriate economic mechanisms and monitoring mechanisms will be developed and applied. In this way, the amount of waste material from future industries and homes will be reduced, and the financial resources required for sustainable land management will be secured.
- a. A network for monitoring soil pollution will be developed, and information concerning the top layer of the soil on the land which is related to mining and also the situation concerning the land will be stored as a database.
 - b. Different taxation systems that promote the use of sustainable, safe agricultural land will be developed.
 - c. Financial and systematic mechanisms that promote the rejuvenation of arable land that has been left fallow will be developed. To this end, the Green Climate Fund, REDD+, adaptation fund and other international cooperation organizations under the United Nations Framework Convention on Climate Change will be utilized.
- 6) Continuation of improvement of the management system in the nature reserve: This assumes the improvement of the legal system and the extension of the system, the setting of the ecosystem maintenance area in the Shikahog maintenance zone, the development of a bioresources recording and monitoring system, and the development of a sustainable management and community participation mechanisms, and so on. Particularly, a special survey for exploring new branches in the Vayk Karst caves (Mozrov cave and Bear cave) will be implemented, and also maintenance and tourism development will be carried out.
- 7) A national forest program will be developed, and implemented. Under this program, forests will be replanted or new forests will be planted, aiming at improving the condition of the forests and increasing the forested area. Also, along with replanting and new planting, mechanisms to prevent illegal logging will be improved.
- 8) Methods will continue to be implemented according to the 2009 working committee which covers the issues of Sevan.
- 9) A comprehensive water resource management plan that covers reservoirs will be developed, and the management functions will be decentralized.
- a. Strategic water storage for water resources will be enlarged. Particularly, the flow of water in rivers will be regulated, water leakage will be reduced, and monitoring and control systems for underground water resources will be improved.
 - b. The government will strive to reduce the turbidity of water by participating in international cooperative

mechanisms, such as by improving fluid or by repairing the infrastructure.

10) The environmental management system will be improved, and a comprehensive monitoring approach and standard will be guaranteed, in order to collect reliable information concerning the environmental situation and also to collect statistical information from other information sources.

11) The environment situation in areas where there are dwellings, particularly the living environment in urban areas will be improved. Particularly, the following will be carried out.

a. Appropriate use and introduction of spatial management planning tools

b. Introduction of modern mechanisms for waste disposal

c. Development and use of mechanisms for mitigating emissions from the traffic field, which is the main cause of air pollution in Yerevan City

12) In accordance with the decision to hold a UN Rio+20 sustainable development summit, related economic and legal mechanisms will be developed along with the acquisition of national or international support, and the introduction of green innovation will be promoted.

13) The Armenian government will continue to provide comprehensive support to the local administration for developing and implementing an ecological plan.

14) An eco-city pilot project will be implemented.

15) Realization of complex methods of ecological training, approaching general citizens' awareness and population participation will be activated.

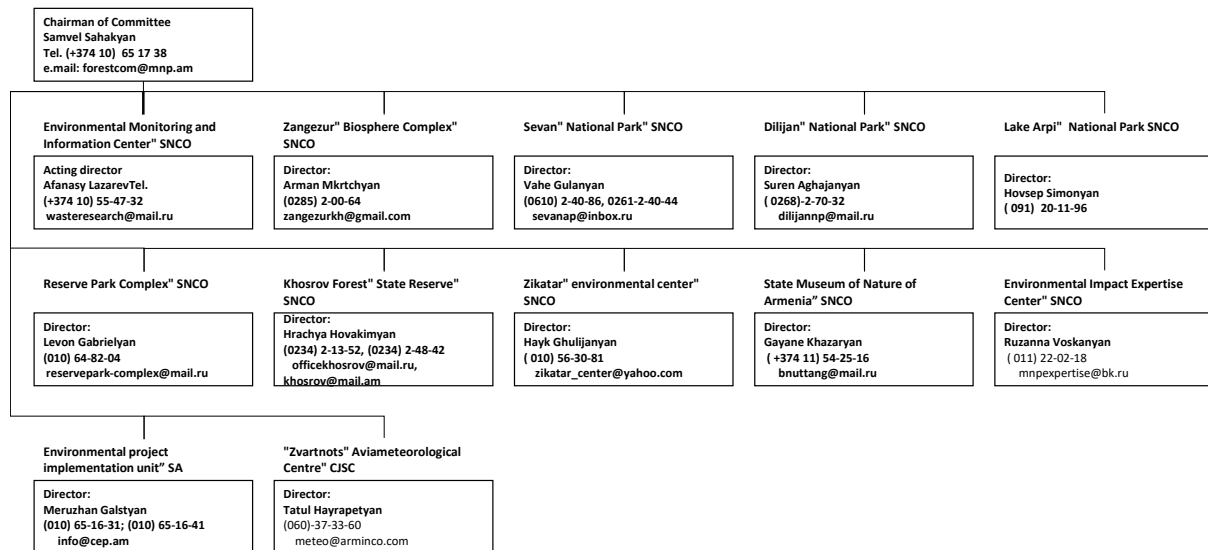
On the other hand, it is urgently necessary to improve the actual method of carrying out waste treatment throughout Armenia. At present, in Armenia, waste matter is simply buried at unmanaged landfill sites according to standards that are inadequate, from the technical and environmental viewpoints, for maintaining citizens' health and the natural environment. Sustainable waste management in Armenia is not only a technical issue consisting merely of improving physical facilities and equipment, but also includes regulations, regional plans, environmental impact, legal frameworks, financial frameworks, cost recovery, fee resetting, and awareness training. Historically, in Armenia, strategic plans failed to be drawn up by regional authorities for processing waste matter.

Yerevan has the Nubarashen burial type waste disposal site, the largest of its kind in Armenia. This site commenced operation during the 1960s, and since then has been operated without the adoption of adequate environmental protection policies. For this reason, it is considered necessary to take appropriate action such as decommissioning, rehabilitating buried facilities, or moving the site to another location.

4.3.2. Infrastructure maintenance organization and personnel system

Concerning waste processing, in Yerevan City there is a single garbage collection company called Sanitek. According to a lease contract, another company called Veolia Jur has the right to carry out sewage treatment in Yerevan, AWSC, Lori, Shirak, and Nor Acounk. Details of the organizational diagram of these corporations are not disclosed.

The organization of the Ministry of Nature Protection is set out in Fig. 23 below.



Source: <http://www.mnp.am/en/pages/158>

Figure 23 Organizational diagram of the Ministry of Nature Protection

4.3.3. Issues that extend across a region

In the field of the environment, the greatest issue that extends across a region is the issue of the decommissioning of the No. 2 reactor of the Metsamor nuclear power plant. This nuclear power plant is a first-generation pressurized water reactor type nuclear reactor which does not have a primary containment vessel. It was developed by the Soviet Union in the 1970s and is the same type as the reactor of the Chernobyl nuclear power plant whose core underwent a meltdown. When the reactor was put back into operation in 1995, a safety policy was added, and subsequent to the Fukushima nuclear power plant accident in 2011, Armenia received requests from countries such as Azerbaijan, which does not have diplomatic relations with Armenia, and also Turkey which is next to Armenia, Georgia, Europe, and the US to shut down the Armenian plant. On the other hand, power plants in Armenia other than its nuclear plant had limited power generating ability, so the Armenian government was unable to shut down its nuclear plant. To enable this plant to be shut down, it is necessary to provide an alternative source of electric power.

4.3.4. Issues concerning the construction of an infrastructure

Waste disposal in Armenia as well is normally the responsibility of the local administration. However, because the local administration lacks the necessary knowledge, for example, and also because there are no nationwide statistics or standards, the Ministry of Territorial Administration is attempting to take control. After a new government came into being in May 2018, the prime minister has been issuing instructions to promote improvement of the situation concerning matters directly related to the daily lives of the people.

In order to draw up a waste disposal policy, it is necessary to carry out a survey of the composition of garbage. However, at present, the local administration does not have the ability to carry out such a survey. Also, the standards used for processing garbage have remained unchanged since days of the Soviet Union. In the rural areas, the exhaust amount is about 0.2-0.4 kg/Person/Day or 0.5-0.7 kg/Person/Day. However, in consideration of the actual collected amount, the Ministry of Territorial Administration estimates that a much greater amount of garbage is generated in a large city such as Yerevan or Gyumri. Note, however, that because an appropriate survey has not been carried out, it is still not possible to obtain an accurate numerical value.

In the future, it will be necessary to prepare a waste material processing plan, and also carry out capacity building for control of waste disposal by the government, in order to promote the preparation of a management type waste display site, the preparation of intermediate treatment facilities, and also the implementation of recycling.

4.3.5. Items concerning the preparation of an infrastructure

The item of greatest interest to the Armenian government concerning the environmental field is the re-examination of the waste disposal policy. The environmental field has issues related to environmental countermeasures in the vicinity of a mine, those related to countermeasures against excessive logging, and those related to water resource management. However, during an interview held at the time of a local survey, no request was made concerning a project for preparing an infrastructure.

On the other hand, along with the re-examination of the waste disposal policy, the government was interested in the re-preparation of the waste disposal site, the introduction of recycling facilities, and also the introduction of intermediate processing facilities. However, at the present time, it is not possible to obtain an accurate grasp of the amount generated waste, and also adequate results cannot be obtained, even when support is provided by an assistance organization described in the next sub-section. First, it is necessary to possess survey knowhow to prepare a master plan for waste disposal, and then carry out capacity building of the planned preparation knowhow. Although capacity building is not an infrastructure preparation project itself, it is important first of all to improve the ability of the staff of the Armenia central government that draws up policies and also the staff of the local administration that carry out the actual work of waste disposal.

4.3.6. Situation concerning donor activities

In the Gegharquniq district and the Kotayq district, consultation concerning the design and construction of a final disposal site is being carried out with the support of EBRD. By way of a preliminary survey, consultants from Austria and Denmark carried out a prediction of the amount of general waste generated in their respective regions, and it was found that the results were completely different. Because a survey of the composition of garbage is not carried out, the Armenian government wishes to have the survey carried out once again.

4.4. Healthcare

4.4.1. Situation concerning the preparation of an infrastructure

Present situation and trends

Armenia has public hospitals and private hospitals. Public hospitals are classified as belonging to the nation, state, or city. Specialized hospitals are mainly under the control of the national government. Among healthcare facilities under the control of cities are health clinics called polyclinics, which are used by many people regardless of their income. If a person who has been examined at a polyclinic is found to require medical treatment, he or she goes to a specialized hospital to undergo treatment. This system is an extension of the family doctor system employed in old Soviet era.

A polyclinic is registered as a clinic used by residents in each region. Children of 6 years of age or below receive a free examination once a year. Also, patients of 18 years of age or below receive a free diagnosis once a year, and treatment is at charge. In addition, a certificate of notification to a school, for example, from a student who is not feeling well, or an introduction to a relatively large hospital is issued only by a polyclinic. Polyclinics, which are visited by some 3 million person a year, are very important entities for Armenian citizens. However, a polyclinic does not possess examination equipment, so the kinds of ailments that can be examined are limited. Also, salaries for physicians are limited, which makes it difficult for polyclinics to obtain high-level physicians. As a result, the improvement of medical technology and specialization are important issues.

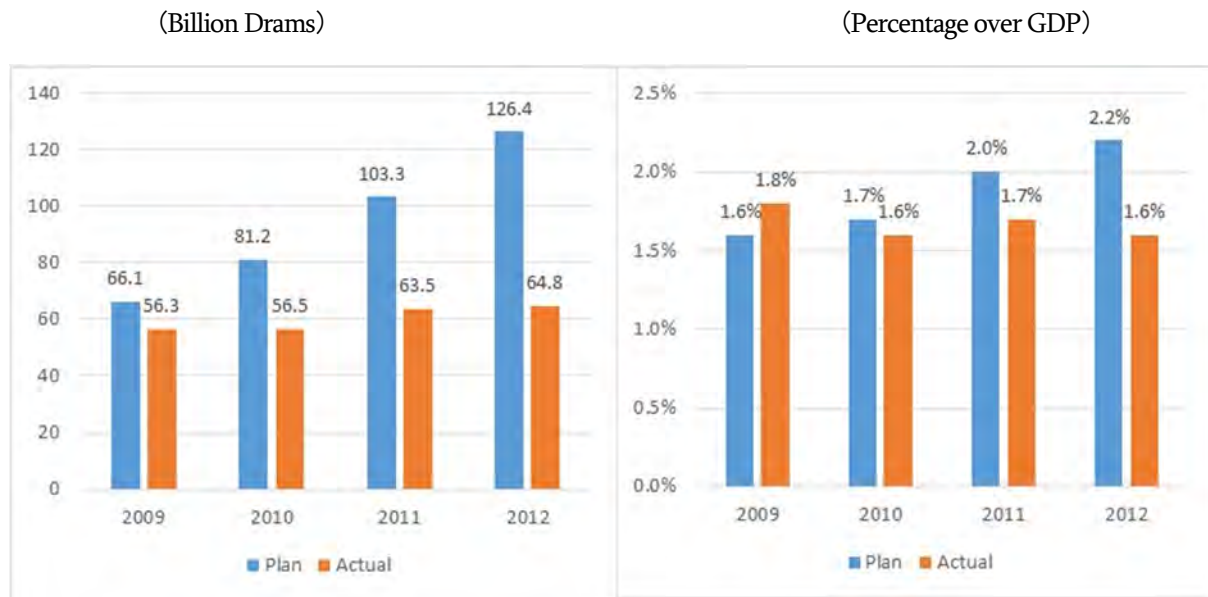
Regarding emergency medical care, ambulances are under the control of the Ministry of Emergency Situations rather than the Ministry of Health, and ambulance calls are handled within the non-chargeable range as a public service. It is possible that the destination of an ambulance may be both a public hospital and a private hospital. Only the initial examination is inside the range of non-chargeable examinations. Medical treatment and the 2nd and subsequent examinations are at charge.

Many private hospitals consist of public hospitals that have been privatized by acquiring equity. Most of the private hospitals in Yerevan acquired equity through the transfer of stock from Yerevan City, which was a stockholder, to the private sector. According to the Ministry of Health, as of October 2018 there were 127 hospitals in Yerevan City, and about one half of these had been privatized. The reason why privatization was carried out was because it enabled medical-related expenses to be greatly reduced. Regarding the use of private hospitals, the patient takes out voluntary insurance offered by an insurance company, and subsequently undergoes examinations and medical treatment at a private hospital that comes under this insurance.

Regarding the social insurance system, the social insurance fee is levied according to the income of the insured party. Health insurance and pension insurance are separate from each other. Also, because Armenia is in a state of conflict with its neighboring countries, it runs a social insurance scheme the premiums of which are levied to support its armed forces. At present, it is necessary to re-examine the social insurance system, and a study has just started using the South Korean health insurance scheme and the Thai pension scheme as models. Also, it is intended to introduce an advisor.

As mentioned above, along with the reduction of finances which are affected by Armenia's financial difficulties, the budget in the field of healthcare was reduced. On the other hand, the proportion of the GDP occupied by healthcare has

increased.



Source: Objectives of ADP, RA State Statistical Service and RA Ministry of Finance

Figure 24 National budget and costs in the healthcare field (2009-2012)

In the field of non-communicable diseases, the incidences of cardiovascular disease, cancer, and diabetes are increasing. The death rate as well is increasing due to cancer and blood-related illnesses. Particularly, the increase in the number of people suffering from diabetes is an issue, and is considered to be a matter of urgency by the Ministry of Health.

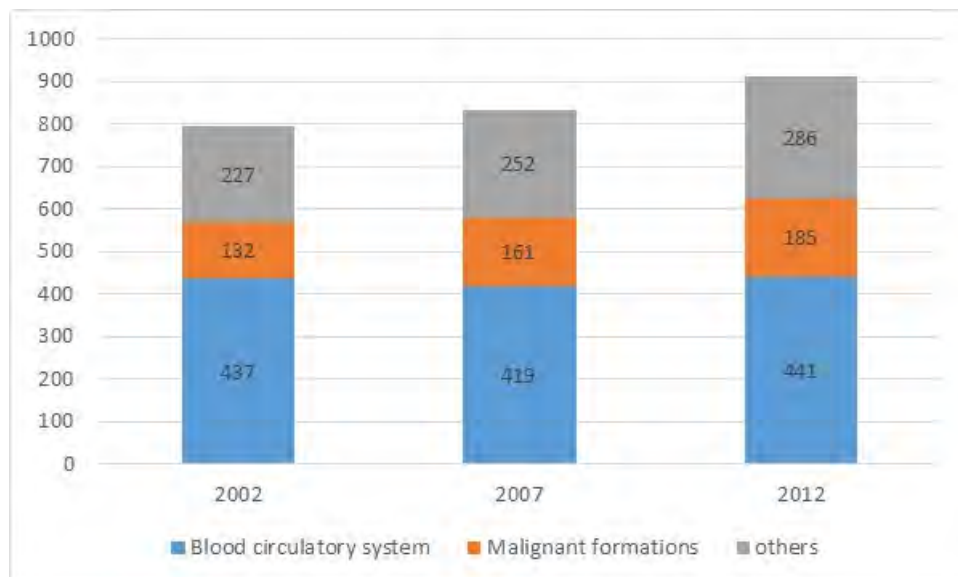
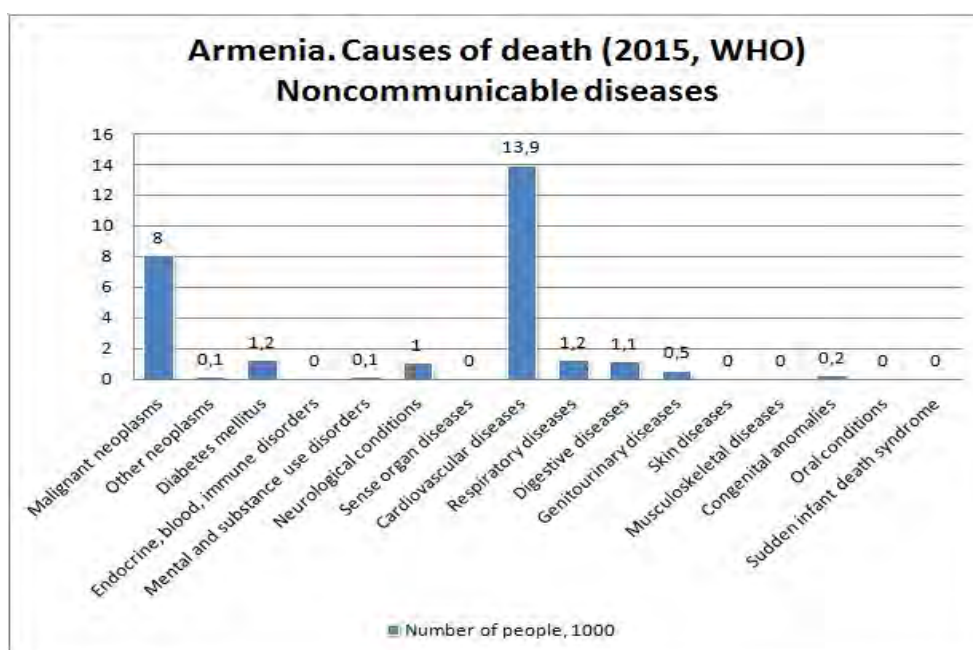


Figure 25 Death rate in Armenia for each cause (deaths per 100,000 population) (2002-2012)



Source: WHO

Figure 26 Death rate in Armenia for each cause in the field of non-communicable diseases (deaths per 1,000 population) (2015)

4.4.2. Infrastructure preparation organization and personnel setup

The healthcare sector is under the control of the Ministry of Health. Emergency medical care is under the control of the Ministry of Emergency Situations rather than the Ministry of Health. On the other hand, polyclinics, handicapped facilities and schools are under the control of each local administration, which is a city in most cases. Furthermore, regarding privatized hospitals as well, stocks sometimes remain in the city, resulting in hospitals that are under the control of the local administration.

Regarding the social security system, the national budget is under the control of the Ministry of Finance, However, the design and operation of the social security system is under the control of the Ministry of Health.

Table 23 Statistics of the Armenian healthcare system

Item	Quantity
Number of physicians of all specialities	13,148
Number of hospital facilities	129
Number of ambulatory-policlinic facilities	505
Number of medium-level medical personnel	17,464
Number of hospital beds (thousand)	12.5
Physicians density	44 physicians/10,000 population
Hospital bed density	41.8 beds/10,000 population

4.4.3. Issues that extend across a region

Because medical care and insurance systems differ from one country to another, there are no cases in which Armenia is connected cross-sectionally to its neighboring countries. Also, the issue of enabling poor people to gain access to medical care was an issue not only in Russia but also one that was common to the former Soviet Union as well. Like its neighboring countries, Armenia advanced as a small community while cross-breeding, so it is a region in which there are many persons with blood-related diseases. Because industrial regulations were in force during the Soviet era, the medical industry has not advanced very much, and there is a pressing need for a blood center.

In the provinces, Armenia has few specialized hospitals or hospitals that can carry out surgery. For this reason, it is sometimes the case that a patient has to be transported by ambulance to Yerevan some 3 hours away. Some hospitals in the provinces or mountainous regions only carry out medical examinations, and many persons go to a neighboring town to receive medical treatment. Generally, people living in sparsely populated areas use hospitals in a neighboring urban area. Also, many tourists visit or reside in the city of Yerevan, so the needs for medical facilities in the provinces and mountainous areas are not increasing in proportion to the increase in tourists.

4.4.4. Issues related to the promotion of an infrastructure

In summary, in Armenia the field of healthcare has low priority. The needs of the government consist mainly of support for preparing an infrastructure by means of grant aid.

Regarding the social insurance system, the situation is such that advisors are necessary, and a study is currently being carried out using South Korea and Thai as models.

For each field, the degree of interest shown by the government, together with concrete issues and their degree of importance are as shown in Table 24.

Table 24 Issues in the field of healthcare

Field	Degree of interest	Concrete issue theme	Importance of issue
Introduction of medical equipment + technical support	Normal	<ul style="list-style-type: none"> • The needs concerning technical cooperation such as training in medical equipment are high. • Public hospitals are becoming increasingly obsolescent, and it is necessary to renew medical equipment. • Regarding examination equipment as well, because obsolescence is advancing, it is also recognized that this poses an issue that is likely to impair precision diagnosis. 	Major <ul style="list-style-type: none"> • Regarding public hospitals, there are increasingly strong needs for medical equipment. • There is only a need for grant aid. • There is also a need for an electronic medical chart.
Strengthening	Strong	<ul style="list-style-type: none"> • From the viewpoint of lifestyle habits and 	Major

Field	Degree of interest	Concrete issue theme	Importance of issue
of kidney center		<p>eating habits as well, there are many patients with cardiovascular disease regionally. Also, the number of persons with diabetes is rapidly increasing.</p> <ul style="list-style-type: none"> • The number of children suffering from kidney disease is also increasing 	<ul style="list-style-type: none"> • The steep increase in the number of persons with diabetes, has resulted in insufficient capacity, so the needs in this field are high. • Interest in kidney transplants is also high.
Reformation of the medical system	Strong	<ul style="list-style-type: none"> • It is necessary to re-construct the social insurance system (health insurance and pension insurance). This is a field which poses major issues. 	<p>Major</p> <ul style="list-style-type: none"> • This is the field to which the Ministry of Health is also giving priority.

4.4.5. Projects concerning the preparation of an infrastructure

As of the end of November 2018, there are no projects that have been implemented or scheduled. Although ADB is interested in reforming the social insurance system, a study of projects concerning preparation of an infrastructure is not being carried out at the present time.

4.4.6. Situation concerning donor activities

Basically, the center of donor activities related to the field of healthcare is grant aid. In the past, Japan gave large-scale medical equipment free of charge to children's hospitals and also to the obstetrics and gynecology department of hospitals. Subsequently, in 2018, Japan provided support for children with hearing difficulties as a grass-roots activity. Also, China in 2018 donated an ambulance to a children's hospital, and also provides small-scale grant aid.

As the background to this, concerning the procurement of medical equipment, the Armenia government has set the lending interest rate stipulated by the financial organization to 1% which is lower than the lending interest rate set to other industries (as of October 2018). For this reason, medical institutions in Armenia can procure funds under more advantageous conditions by borrowing funds from a domestic financial organization rather than borrowing funds from an aid organization.

In addition to this, if a medical organization is receiving assistance when it wishes to purchase the latest model of medical equipment that becomes available during the loan payback period for the target medical equipment, there will be a tendency for that medical organization to avoid a situation in which it is unable to purchase the latest model.

For these two reasons, it is considered difficult to set up an ODA yen-based loan.

5. Situation Concerning Activities by Japanese Corporations in the Regions Concerned

5.1. Urban Development, Transport and Traffic

5.1.1. State of Activities by Japanese Corporations

Japanese corporations that are active in the fields of urban development, transport and traffic do not exist.

5.1.2. SWOT analysis of Japanese corporations and services, and predominant subsectors

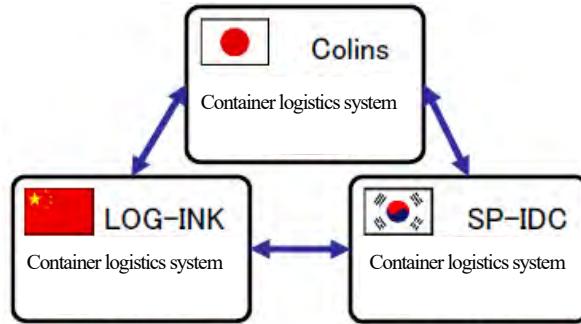
In the field of urban development, an engineering city is scheduled to be developed as a smart city. Although there is a possibility of energy saving products such as equipment and materials entering this city, the total investment amount will be 30 million dollars (about 3 billion yen), and also the amount of facilities investment is not necessarily large. It can therefore be said that the possibility of the supply of products being examined by a Japanese corporation is low in this case alone.

Next, tranche 4-2 which is a project for constructing a north-south road corridor is a mountainous section which is said to consist of a succession of bridges and tunnels. The mountainous regions in Armenia consist of folded mountains which are similar to the mountains in Japan. In the JICA project for constructing an east-west road through Georgia, the section in which assistance is provided for the road building is mountainous, and like the tranche 4-2 project for constructing the north-south road corridor in Armenia, it is considered that Japan's tunnel excavation technology, bridge-building technology, and also its know-how for preventing rock falls onto road slopes can be adequately developed.

Regarding the field of air transportation, studies are being carried out with a view to revamping Goris Airport and Stepanavan Airport. At present, no detailed plans have been drawn up, and like Yerevan and Gyumri, the study assumes the refurbishing of the terminal building based on a concession contract. At present, there are few examples of Japanese corporations participating in the construction and running of an overseas airport. The only ones are the participation in the construction and running of the passenger terminal of Khabarovsk Airport by Sojitsu, Japan Airlines Building, and Japan Overseas Infrastructure Investment Corporation for Transport & Urban Development (JOIN)²⁷. It is considered difficult to compete against Corporacion America which already manages the Yerevan and Gyumri airports.

Finally, in the field of logistics, Armenia, which frequently exports goods via Poti harbor and Anaklia harbor in Georgia places importance on a custom clearance system that is connected to Georgia. Japan is a member of a 3-country customs clearance system operated jointly by Japan, China and South Korea (North-East Asia Logistics Information Service Network (NEAL-NET)), which went into operation in August 2014. This NEAL-NET is connected to Colins of Japan, SP-IDC of South Korea and LOG-INK of China. It has been designed to permit mutual exchange of information.

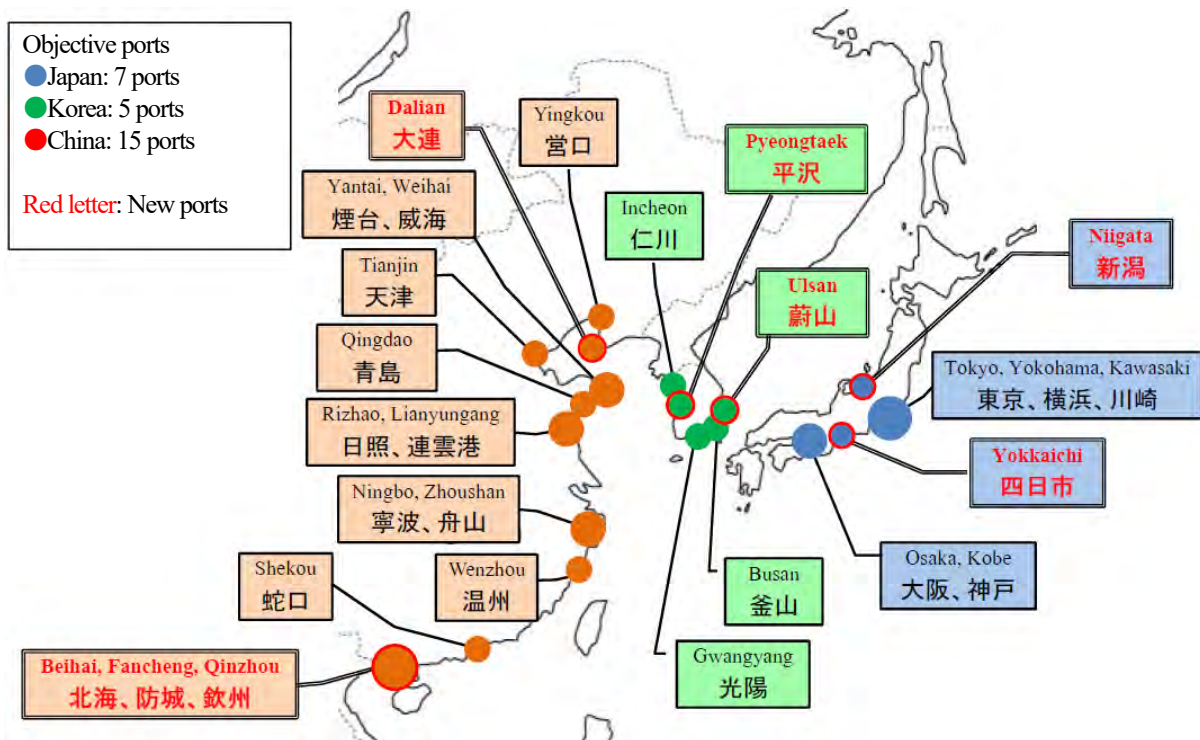
²⁷ <https://www.sojitz.com/jp/news/2018/12/20181218.php>



Source: <http://www.mlit.go.jp/common/001254138.pdf>

Figure 27 NEAL-NET image

NEAL-NET enables (1) arrival and departure times of container vessels, (2) cargo loading and unloading times, and (3) information concerning the gating-in and gating-out of containers to be rendered visible among the three member countries. It is therefore expected that (1) work related to verification of the location of cargo can be reduced, (2) stock can be reduced, and (3) prompt action can be taken against a delay risk. As of September 2018, this network covers a total of 27 Japanese, Chinese and South Korean harbors. It is considered important to jointly develop, and interconnect the elements of, a container customs clearance system between Georgia and Armenia, thus enabling Japan to develop its knowledge.



Source: <http://www.mlit.go.jp/common/001254138.pdf>

Figure 28 List of ports and harbors where NEAL-NET can be used

5.2. Energy

5.2.1. State of Activities by Japanese Corporations

In the energy field, the activities of Japanese corporations are limited. However, the Yerevan Combined Cycle Co-generation Power Plant Project (YCCPP) was carried out by means of a JICA yen-based loan. Tokyo Electric Power Services Co., Ltd. (TEPSCO) acted as a technical consultant, and a consortium consisting of Mitsui and Co., Ltd. and GS Engineering and Construction Corp (South Korea) were commissioned to carry out the project. The main equipment used was manufactured by Alstom.

5.2.2. SWOT analysis of Japanese corporations and services, and predominant subsectors

In order to improve the self-sufficiency of energy, the Armenian government is promoting the use of geothermal power, wind power and solar power. Particularly, regarding solar power, great interest is being shown in domestic production of panels because molybdenum which is a key material for making CIS type solar cells can be produced in Armenia. However, at present, there are not necessarily many solar projects that are potentially on a commercial scale, and it is predicted that it would not be economically viable to construct a panel factory to meet the domestic demand alone.

Regarding hydraulic power generation, there are potential development projects for medium size hydroelectric plants and small hydroelectric plants. However, the influence of hydroelectric generation technology in Europe as well is strong, and when logistics costs are taken into consideration, there is no cost benefit to a Japanese corporation. Also, from the viewpoint of separation of the market from a European corporation that has concluded a licensing agreement with a Japanese corporation, there are also companies in regions where they cannot carry out business as Japanese corporations. From the foregoing, it would appear that, in the hydroelectric field, Japanese corporations are not likely to exhibit superiority as Japanese corporations.

Concerning wind-power generation as well, regions of European and Indian influence have a geographical advantage, and when logistics costs are taken into consideration, there is no cost advantage for a Japanese corporation.

A contrasting method of electric power generation is geothermal power. Three Japanese corporations (Fuji Electric, Toshiba, MHPS) have a high market share of flash type geothermal power systems even on a world scale. These corporations have received orders to carry out EPC projects in Turkey and Kenya, and have little resistance to carrying out a similar project in Armenia. If the results of an analysis concerning the potential of geothermal resources performed by a reliable major geological survey company are available, it is quite conceivable that one of the abovementioned three corporations can offer a steam turbine as the main equipment for the project.

From the foregoing, it can be said that, regarding the energy sector in Armenia, geothermal power is a promising subsector that Japanese corporations can participate in.

5.3. Environment

5.3.1. State of Activities by Japanese Corporations

Shimizu Corporation is carrying out a CDM project to recover methane from waste disposal sites and use it to generate electricity.

5.3.2. SWOT analysis of Japanese corporations and services, and predominant subsectors

Regarding waste processing, at present waste material is not sorted or subjected to intermediate processing, and also the burial type landfill sites are not managed disposal sites. In order to improve this situation, the Armenian government intends to re-examine the field of waste processing, but at present there are no signs of concrete progress. It is necessary, first of all, to provide support to the government and the local administrative bodies which are responsible for making policy changes.

For example, the waste processing department in each of Japan's local administrative bodies, such as the Tokyo 23 wards cleaning office work union, carries out training by invitation together with an assistance organization, for the person in charge of making policy and also the person in charge of actual implementation concerning processing of waste in developing countries. It is possible to carry out training by invitation for the person in charge of the Armenian government, the person in charge of Yerevan, and others. It is considered important to provide an introduction to these persons in charge concerning examples of activities carried out in Japan, and also for the Armenian side to work together with the Japanese side through training workshops, in order to clarify the issues concerning the field of waste disposal in Armenia.

It is necessary for Armenia to determine how to construct each step in the sequential flow of waste processing (sorting, collecting, intermediately processing (incinerating), burying in a managed type landfill site, recycling, generating electric power from the heat emitted from the incinerators). It is also necessary to determine the present situation concerning each of these steps, the size of the gap that exists, the persons who are to rectify issues, and the method of solving these issues. Finally, it is necessary to arrange the results of the examination as a roadmap, and offer equipment and materials, and also technical support at each step.

5.4. Healthcare

5.4.1. State of Activities by Japanese Corporations

Throughout Central Asia and the Caucasus there is insufficient local information available, and also the markets in these regions are small, so Japanese corporations do not show much interest, and no particular progress can be seen in the field of healthcare.

The population of Armenia is even less than those of surrounding countries. It is completely landlocked, and also has disputes with neighboring countries. It is thus recognized as a country that is difficult to study.

5.4.2. SWOT analysis of Japanese corporations and services, and predominant subsectors

The government of Armenia is not interested in the preparation of an infrastructure, but rather places importance on system design. In addition, regarding the preparation of an infrastructure as well, there are needs for small-scale grant aid projects, and technical cooperation needs related to organ transplant technology, medical operations, and a blood center. However, because the resources on the Japanese side are restricted, there are no fields that have high potential.

6. Appendices

6.1. Objectives of literature and desktop studies

6.1.1. URLs for desktop study

Following URLs are used for desktop study.

- Ministry of Energy Infrastructure and Natural Resources of the Republic of Armenia (<http://www.minenergy.am>)
- Ministry of Nature Protection of the Republic of Armenia (<http://www.mnp.am>)
- Minister of Territorial Administration and Development of the Republic of Armenia (<http://www.mtad.am>)
- Ministry of Health of the Republic of Armenia (<http://www.moh.am>)
- Minister of Emergency Situations of the Republic of Armenia (<http://www.mes.am>)
- KPMG Armenia (<https://home.kpmg.com/am/en/home.html>)
- Invest in Armenia (<http://www.investinarmenia.am/en>)
- Sustainable Urban Development Program (<https://sudipyerevan.am/en/>)
- B24 (<https://b24.am/en/>)
- Trading Economics (<https://tradingeconomics.com>)

6.1.2. Literatures for the study

Following literatures are used for the study

- Development strategy of Transport sector of the RA 2020, http://mtcit.am/main.php?lang=3&page_id=527#
- Development Program of the RA Government for 2017-2022, <http://www.gov.am/files/docs/2219.pdf>
- Donor Assistance to Armenia. Special report 2017, https://events.developmentaid.org/uploads/2017/armenia/report_armenia.pdf
- Energy Sector Management Assistance Program (ESMAP)(2011) GOOD PRACTICES IN CITY ENERGY EFFICIENCY: Yerevan, Armenia – Water and Sewerage Management Contract, https://www.esmap.org/sites/default/files/esmap-files/Armenia_Yerevan_Water_Case_Study.pdf
- KPMG (2017) Armenian Banking Sector Overview, https://home.kpmg/content/dam/kpmg/am/pdf/2017/Armenian%20Banking%20Sector%20Overview_2017%20Q4_Eng.pdf
- KPMG Armenia: Great country, smart opportunities. 20 years in Armenia,

<https://home.kpmg/content/dam/kpmg/am/pdf/2017/Great%20country.Smart%20opportunities%20revised.pdf>

- Kudelitch, M.I. and Khachatryan A.V. (2018) Участие финансовых органов Республики Армения в процессах государственно-частного партнерства (Participation of Financial Bodies of Armenia in Public-Private Partnership Process), Financial Journal, 4, pp. 76-89, DOI: 10.31107/2075-1990-2018-4-76-89, https://www.nifi.ru/images/FILES/Journal/Archive/2018/4/statii_4/07_fm_2018_4.pdf
- Government of Armenia (2017) Policy Statement on Public-Private Partnerships of the Republic of Armenia, https://library.pppknowledgelab.org/documents/5425/download?ref_site=kl
- Yerevan Development Program, <https://www.yerevan.am/en/development-programs/>
- Roger Henneberger, David Cooksley and John Hallberg (2000) Geothermal Resources of Armenia, Proceedings World Geothermal Congress, 1217-1222.
- Scaling Up Renewable Energy Program (SREP) https://www.climateinvestmentfunds.org/sites/cif_enc/files/meeting-documents/armenia_srep_investment_plan_final_0.pdf
- Strategic development plan for 2014-2025 of the Republic of Armenia (https://eeas.europa.eu/sites/eeas/files/armenia_development_strategy_for_2014-2025.pdf)
- United Nations Economic Commission for Europe International PPP Centre of Excellence (ENECE) (2016) International PPP Forum: “Implementing the United Nations 2030 Agenda for Sustainable Development through effective, peoplefirst Public-Private Partnerships” , Compendium of Case Study Material, https://www.unece.org/fileadmin/DAM/ceci/documents/2016/PPP/Forum_PPP-SDGs/PPP_Forum_2016-Compendium_All_Presentations.pdf

6.2. List of interviewees

Following is the list of interviewees in the report.

6.2.1. List of interviewees in preliminary interviews

Table 20 List of preliminary interviewees for the study

Organization	Interviewees
The Government of the Republic of Armenia	Ms.Srbuhi GHAZARYAN, Adviser to the Prime Minister of the Republic of Armenia
Ministry of Nature Protection	Mr.Erik Grigoryan, First Deputy Minister
Ministry of Energy Infrastructures and Natural Resources	Mr.Hayk BADALYAN, Head of Energy Department Mr. Daniel Herbert Stepanyan Head of the Renewable Energy Division
Sustainable Urban Development Program	Mr.Vardan KARAPETYAN, Technical Specialist
Ministry of Emergency Situations	Mr. Hovhannes YEMISHYAN, Deputy Director of Rescue Service Mr.Artur MURADYAN, Head of the Department on Population Protection and Elimination of Disaster Consequences Ms.Margarita HAKOBYAN, Representative of Ministry of Emergency Situations in other countries, international organizations and other state entities of the RA
Ministry of Transport, Communications and Information	Ms.Kristine BEGLARYAN, Head of the Foreign Relations and Programme Department Ms. Victorya, Staff of Foreign Relations and Programmes Department Mr.Qajik QABABYAN, Head of Department on Road sector policy
Transport Projects Implementation Organization SNGO, Ministry of Transport, Communications and Information Technologies	Mr.Vazgen PETROSYAN, Acting General Director Ministry of Transport, Communications and Information Technologies
Ministry of Health	Mr.Hayk GRIGORYAN, Head of the Department of Foreign Relations
Minister of Territorial Administration	Mr.Ashot GILOYAN, Head of Local Self Government Department Ms.Lusine. Staff of Foreign Relations Department
Ministry of Economic development and Investments	Ms. Marina, Head of Department of Investment projects and PPP

6.2.2. List of interviewees in the field study

Table 21 List of interviewees in the field study

Organization	Interviewees
Ministry of Healthcare	Mr.David Melik Nubaryan ,Head of the Healthcare Policy Department Mr.Hayk Grigoryan ,Director Department of International Relations
Ministry of Energy Infrastructures and Natural Resources	Mr.Hayk BADALYAN, Head of Energy Department Mr.Daniel Herbert Stepanyan ,Head of the Renewable Energy Division
Ministry of economic development and investment	Mr.Vahagn Lalayan ,Head of Investment attraction and coordination department
Ministry of Transport, Communication and IT	Armen Pambukhchyan, Deputy Minister Kristine Beglaryan, Head of Foreign Relations and Programmes Department Robert Melkonyan, Project Manager, Transport Project Implementation Organization (SNCO), Mr.Gor Avetisyan, General Director of "Armenian Road Directorate" SNGO
Civil Aviation Committee	atevik Revazyan , Chair of Civil Aviation Committee
Ministry of Territorial Administration	Davit Gevorgyan, Deputy Minister
Ministry of Emergency Situations	Artrak Nahapetyan, Director of Rescue Service, Colonel, Dr. Valeri Arzumanyan, Head of Network Observation and Information Analysis Department, Ministry of Emergency Situations, National Survey For Seismic Protection Agency,
Yelevan City Hall	Mr.Hayk Marutyan, the Mayor Ms.Iva Marutyan, Assisntant of Hayk,
Shengavit Medical center	Alexander URUMYAN, Executive Director Sergey URUMYAN, General Director Davit MKHITARYAN, Deputy Director, General Doctor Ruben BOROYAN, Deputy Director, Head of Urology Department
Medical center Surb Astvatsamayr	Nikolay DALLAKYAN, Director, Professor Davit DALLAKYAN, Deputy Director Andrias HAMBARDZUMYAN, Executive Director, Professor
National Center of Oncology	Armen TANANYAN, Director, Chief Oncologist MH RA, Head of Oncology Department of YSMU, Professo
Republican Institute of Reproductive Health, perinatology, obstetrics and gynecology	Razmik ABRAHAMYAN, Director, Academician of RA NAS

Organization	Interviewees
Asatur MKRTCHYAN	Head of Preliminary Healthcare Center of Areni village, Vayots Dzor Marz (Region)
Asian Development Bank	Mr. Huiping Huang Head, Project administration unit Mr. Grigor Gyuriyan Associate Economics Officer
World Bank	Mr. Emil Zalinyan Energy Specialist Ms. Arusyak Alaverdyan Senior Agriculture Specialist Ms. Nora Mirzoyan Infrastructure Consultant Ms. Marianna Koshkaryana Health Consultant Ms. Narine Tadevosyan Mining Governance consultant
UNDP	Mr. Armen Martirosyan Manager for Sustainable growth and resilience portfolio Ms. Tatevik Koloyan Environmental Program Officer, sustainable growth and resilience portfolio
GIZ	Ms. Anne Dorit Kempa Country Director Mr. Wilhelm Hugo Team Leader Armenia

6.3. Statistics

Following statistics are used in the report.

Table 22 List of statistics and data sources

	Information source	URLs
1	Statistical Committee of the Republic of Armenia	https://www.armstat.am/en/
2	CIS Statistical Committee	http://www.cisstat.com/
3	Ministry of Energy Infrastructures and Natural Resources of the Republic of Armenia	http://www.minenergy.am/en
4.	CIA World Fact book	https://www.cia.gov/library/publications/the-world-factbook/`