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Shnogh Hydro Power Plant Investment Offer



EnergyInvest
HOLDING



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Yerevan - 2017

Main Goal of the Project

The goal of the project is to construct a hydro power plant (HPP) in the northern section of the Debed river (Lori region, Armenia) by deploying modern tunnel boring technologies and installing state-of-the-art electromechanical and hydro-mechanical equipment.

The HPP will have a capacity of **76MW** and will increase the renewable energy sources' utilization ef-

iciency contributing to an increase of the country's energy independence and security.

Due to the favourable hydrological conditions, the hydro power plant will operate throughout the year and will satisfy around **4% of Armenia's current electricity demand**.

Expected Results

The most significant result of the project will be its contribution to the sustainable development and poverty alleviation of the Lori region – one of the poorest regions of Armenia with population of about 400,000.

Construction of a new hydro power plant with 76 MW installed capacity that will use domestic water resources will also contribute to the energy independence and security of Armenia.

The new hydro power plant with 76 MW installed capacity will also contribute to overall improvement of electricity regimes of the country's electric power system.

Specifically, this will contribute to:

1. efficient management of the power system at peak demand;
2. significant improvement in addressing voltage control issues that result from reactive power surplus in the power system;
3. reduction of electric power losses in the power system;
4. increase of the overall level of reliability and safety of the power system.

Legal Basis

According to the Law of the Republic of Armenia (RA) on Energy, one of the basic objectives of the Government's energy policy is to enhance the efficiency of domestic energy resources and to effectively implement economic and legal mechanisms by which it is possible to achieve this goal. Furthermore, according to the RA Law on Energy Saving and Renewable Energy, a fundamental focus of the state policy on energy efficiency and renewable energy is on increasing the level of supply to meet the demand for energy in the economy by employing domestic renewable energy resources.

To apply the above-mentioned principles of the state policies, the Ministry of Energy and Natural Resources¹ of the Republic of Armenia issued the National Security Strategy (Action Plan) in accordance with Decision No. 1296-N of the RA Government. The Action Plan, which was approved on November 1, 2007, clearly outlined the requirement for the construction of "Shnogh" HPP with a 76 MW installed capacity.

The Action Plan complies with the provisions of the RA National Security Strategy and is based on the "Energy Sector Development Strategy in the Context of Economic Development in Armenia," which was approved by the RA Government on June 23,

2005, and was subsequently included in the resultant Armenian Power Sector 2006 Least Cost Generation Plan.

By the Decree of the President of Armenia No. 182-N dated October 23, 2013, the "Energy Security Concept of the Republic of Armenia" (Concept) was approved. As stated in the Concept, since Armenia possesses limited fossil fuel resources, the large-scale use of energy resources, including renewable energy sources, have become imperative to ensuring the on-going energy security of Armenia.

Furthermore, according to the Decision of the RA Government No. 836-N dated July 31, 2014, the Action Plan for 2014-2020 to Implement the Concept of Energy Security of the Republic of Armenia was approved (Action Plan). The Action Plan specifies the actions that need to be implemented by 2020 to ensure an affordable, reliable and high-quality supply of energy that meets the domestic demand and those that emerge in emergency situations. The Action Plan also includes provisions for the construction of "Shnogh" HPP with 76MW installed capacity.

Prior to the development of the Action Plan, baseline studies were conducted to forecast the future

¹ In September, 2016 renamed to "Ministry of Energy Infrastructures and Natural Resources"

consumption of electricity and natural gas, the requirements for the development of the gas supply system, production capacities at minimal costs, power transmission and distribution network (power grid), renewable energy and energy efficiency, and the development of the relevant legislation.

The Decision of the RA Government No. 54-13 dated December 10, 2015, ratified the “Long-term (until 2036) development perspectives of the energy sector of the Republic of Armenia” program (Programme), elaborated with the support of USAID,

which is based on the Armenian Power Sector Least Cost Generation Plan.

Between 2014 and 2015 the RA Government, the Public Council, relevant government agencies and international financial organisations discussed the Programme extensively. The technical and economic parameters of the “Shnogh” HPP construction project were reviewed in the Armenian Power Sector Least Cost Generation Plan, and as per these parameters the project has been confirmed to be a **least cost development project among all alternative project options.**

Project Feasibility Aspects

The project feasibility is conditioned by the following factors:

- Hydro power resources are unlimited;
 - Even if a new nuclear power station is built, hydro power will remain a strategic priority for the Government for two reasons: *first*, it is the lowest cost energy option and, *second*, hydro-energy offers a higher level of energy security.
 - Revenues are secured by the Power Purchase Agreement (PPA) and a constant tariff is set by the Public Services Regulation Committee
- (PSRC) for the whole payback period (*see the following section*);
- The business is founded on environmentally friendly production and, thus, is safe for the environment.
 - The core equipment that is employed in hydro power plant is mechanical; as such, the technology involved is rather simple. Subsequently, the operation and maintenance does not require significant financial investment.

- Operational staff requirements are small, and the majority of roles do not require high qualifications or expertise; as such, the expenditure required to hire qualified staff is minimal.
- Indirect expenses, including marketing, advertisement and transportation, etc., are nominal because the business is state regulated.

Protection of Investor Interests and Guaranteed Return on Investment

“Armenia’s Strategic Development Programme for Hydro Power Sector” was approved by the RA Government on September 8, 2011, to promote the strategic development of Armenia’s hydro power industry. Under the Programme, the **tariff of “Shnogh” HPP was set at 6.5 cents** (without VAT).

The on-going legislative reforms in the energy sector have provided **insurance** to those who own a license for electricity production, and consequently, have also secured the interests of investors.

As the main regulatory mechanism, the RA Law on Energy assigns a specific set of responsibilities to the Public Services Regulatory Commission of the Republic of Armenia (PSRC). Specifically, the PSRC develops and registers **Power Purchase Agreements** that set the conditions of interrelations of the energy suppliers with power distributors and related services. These PPA’s are mandatory for the “Electric Networks of Armenia” CJSC.

Model PPA and associated service provision contracts have been approved by the PSRC Decision No. 109-N dated 14.09.2004.

Considering that the above-mentioned PPAs are “public contracts”, according to Clause 2 of Article 442 of the Civil Code, entities owning a distribution and transmission license in the Republic of Armenia (“Electric Networks of Armenia” CJSC and “High Voltage Electric Networks” CJSC respectively) shall execute PPAs with all those entities that have been granted a license to generate electricity in the prescribed manner.

Moreover, Article 21 of the RA Law on Energy defines the basic principles that regulate tariff setting for electricity, providing:

- Compensation for operation and maintenance costs that are essential for conducting a licensed operation in compliance with the license provisions, for depreciation of fixed assets and amortisation of intangible assets;

- An opportunity for reasonable profit.

To secure guaranteed payments to electricity producers, the “Electric Networks of Armenia” CJSC opens special accounts in the commercial banks accredited by PSRC.

“Electric Networks of Armenia” CJSC (ENA) shall credit the whole amount of electricity bill payments for a given month to special bank accounts. ENA has no right to make any expenses for its internal needs until it has paid all producers for the whole volume of electricity they have provided during the previous month.

This serves as a guarantee that electricity producers will be paid for the electricity they generate. The mentioned special accounts are monitored by PSRC.

All these provisions are stipulated in the PPAs executed by and between the “Electric Networks of Armenia” CJSC and the electricity producers.

The order of making payments from special accounts and using the guarantee amount was approved in Decision No. 111-N of the Public Services Regulatory Commission, which was adopted in September 16, 2004.

Proposed Scheme of the Investment

The investment details are provided below:

Installed Capacity (MW)	Annual Output (million kWh)	Required investment (million USD)	Electricity Tariff (USD/kWh)	Investment Payback Period (year)
76	300	150	0.065	15-16

The Shnogh HPP will use the hydro potential of the Debed and Marts rivers. The headworks will be built on the Debed river, and the plant will have a 22-km long headrace tunnel with an interjacent dam for collecting waters from the Marts river. The construction of the plant will incorporate modern TBM and

lining technologies and will take an estimated three years to complete. An updated Feasibility Study and Detailed Design documents will be prepared.

The investment project will be implemented by the **“Energy Invest Holding” CJSC** via its newly

created subsidiary company which will construct and operate the plant, the “Debed Hydro” LLC. The **Investors Club of Armenia investment fund** will

co-invest 15% of the required investment amount into this project.

Investors Club of Armenia Provides Risk Mitigation

In early 2017, the “**Investors Club of Armenia**” (ICA), a non-public contractual investment fund, was registered by the Central Bank of Armenia (CBA) – the first non-public contractual fund ever registered in Armenia. Thus, the Fund operates within CBA’s regulatory framework. It also applies internationally recognized principles and mechanisms to combat the financing of terrorism and money laundering. The ICA has adopted three fundamental working principles: reliability, transparency and predictability.

The Fund will bring the following advantages to this investment project, in particular, and to corporate governance in Armenia, in general:

1. The Fund is a catalyst for attracting external financing by creating a real opportunity to finance large projects through the consolidation of small investments (financial resources).
2. The Fund consolidates resources provided by both private investors and international and regional donors, which it invests in the implementation of large projects (economies of scale).
3. The Fund contributes to increasing the economic growth rate and creating new jobs.
4. The Fund creates favourable conditions for private investors through individual cooperation and its transparent operations.
5. The Fund offers investors risk management and provides comprehensive analysis of economic trends and tendencies in a given sector.
6. Through long-term financing, the Fund contributes to boosting the economy. It also contributes to the free circulation of investments in the absence of active trade and stock exchange quotations.
7. The Fund does not compete with commercial banks since its investments are directed exclusively towards financing large-scale infrastruc-

ture projects with longer payback periods not financed by commercial banks.

8. The Fund ensures diversified investment by providing opportunities for portfolio and hedge fund investment.
9. The Fund diversifies investment risks by employing various guarantee schemes and providing specialised services in financial management.
10. The Fund offers the government the prospect of long-term development, trust, mutual em-

powerment and harmonisation at the micro and macro-economic levels.

Since its establishment, the Fund has partnered with the RA Government, signing a Memorandum of Understanding to promote cooperation between the Government and the private sector.

The Fund has been determinedly involved in long-term, sustainable investment projects, mainly in the Energy Sector, with “Shnogh” HPP being amongst these projects. It has committed to be engaged with its own resources, thus sharing the investment risks.

Advantages Energy Invest Holding Offers

The **Energy Invest Holding** operates three hydro power plants that it owns and the largest thermal power plant in the region, **Hrazdan Energy Company**. Thus, the Holding has

- sufficient qualified operations and repair staff;
- necessary equipment and technology;
- adequate experience.

Therefore, the Holding will

1. use the transport inventory of the **Hrazdan Energy Company**, significantly reducing transportation expenses for the HPP operation and the associated renovation and administrative requirements;
2. introduce environmental management standards in HPP. These will help to reduce the equipment downtime caused by ecological issues. ISO standards will be introduced and sustainable development will be ensured;

3. develop a unified system of accounting and reporting that will relieve the requirement for the HPP to have its own accounting system. This will reduce personnel costs and ensure transparent and adequate supervision of the company that operates HPP.

The Holding has created its own highly qualified and fully equipped maintenance and engineering

unit that draws on the technological and human resources of the **Hrazdan Energy Company**. Its qualified personnel, along with the unified procurement e-system, will substantially reduce the maintenance and renovation expenses (which tend to increase in parallel to HPP lifespan), as well as the prices of spare parts throughout the entire lifespan of the “Shnogh” HPP.

Project Implementation Organizations: Roles and Responsibilities

	Project Implementation Organization	Roles and Responsibilities
Borrower	ENERGY INVEST HOLDING CJSC	<ul style="list-style-type: none"> - Borrowing - Sub-loan to the Implementing Agency - Final release of invoices
Executing Agency	INVESTORS CLUB OF ARMENIA Investment Fund	<ul style="list-style-type: none"> - Coordination between all parties - Monitoring of loan disbursement and payment process - Providing 15% of total amount - Providing risk mitigation
Implementing Agency	DEBED HYDRO LLC	<ul style="list-style-type: none"> - Accounting and auditing - Oversight implementation and management - Secure technical and environmental approval - Ensure compliance with covenants - Invite bids, evaluate and prepare bid evaluation reports for investor approval - Award contracts - Oversee work of contractors - Reporting
Investors		<ul style="list-style-type: none"> - Ensure financial support - Oversight according to the financing/loan agreements

Additional Information

The following additional files can be retrieved from <https://goo.gl/yIBQCY>:

- The Final Report on SHNOGH Hydroelectric Project for the Republic of Armenia, prepared in 1998 for the USAID;
- The Feasibility Study for Shnogh HPP along with three drawings prepared in 2010 by ArmHydroEnergo-Project CJSC;
- The state-provided investment guarantee mechanisms, such as:
- The RA Public Services Regulatory Commission's decision to set a 6.5 AMD tariff applicable for 20 years;
- The Power Purchase Agreement for the entire production of energy. It was a mandatory requirement that the grid operator, the Armenian Electric Networks company, signed this document.

Financial Model

Input Data and General Assumptions

<i>Construction period:</i>	3 years
<i>Installed capacity of HPP:</i>	76 MW
<i>Annual supply:</i>	300,000,000 kWh
<i>Tariff, VAT excluded:</i>	0.065 USD/kWh
<i>VAT rate:</i>	20%
<i>Tariff, VAT included:</i>	0.078 USD/kWh
<i>Depreciation period:</i>	50 years
<i>Total investments amount, VAT included:</i>	150,000,000 USD
<i>Of which, provided by the Investors Club of Armenia:</i>	22,500,000 USD
<i>Co-investment amount:</i>	127,500,000 USD
<i>NPV:</i>	98,919,430 USD
<i>IRR:</i>	7.26%
<i>Payback period²:</i>	13 years

² The company annually generates from 2,5 million to 6.4 million USD (depreciation and VAT prepayment) that could not be paid as a dividend according to legislation.

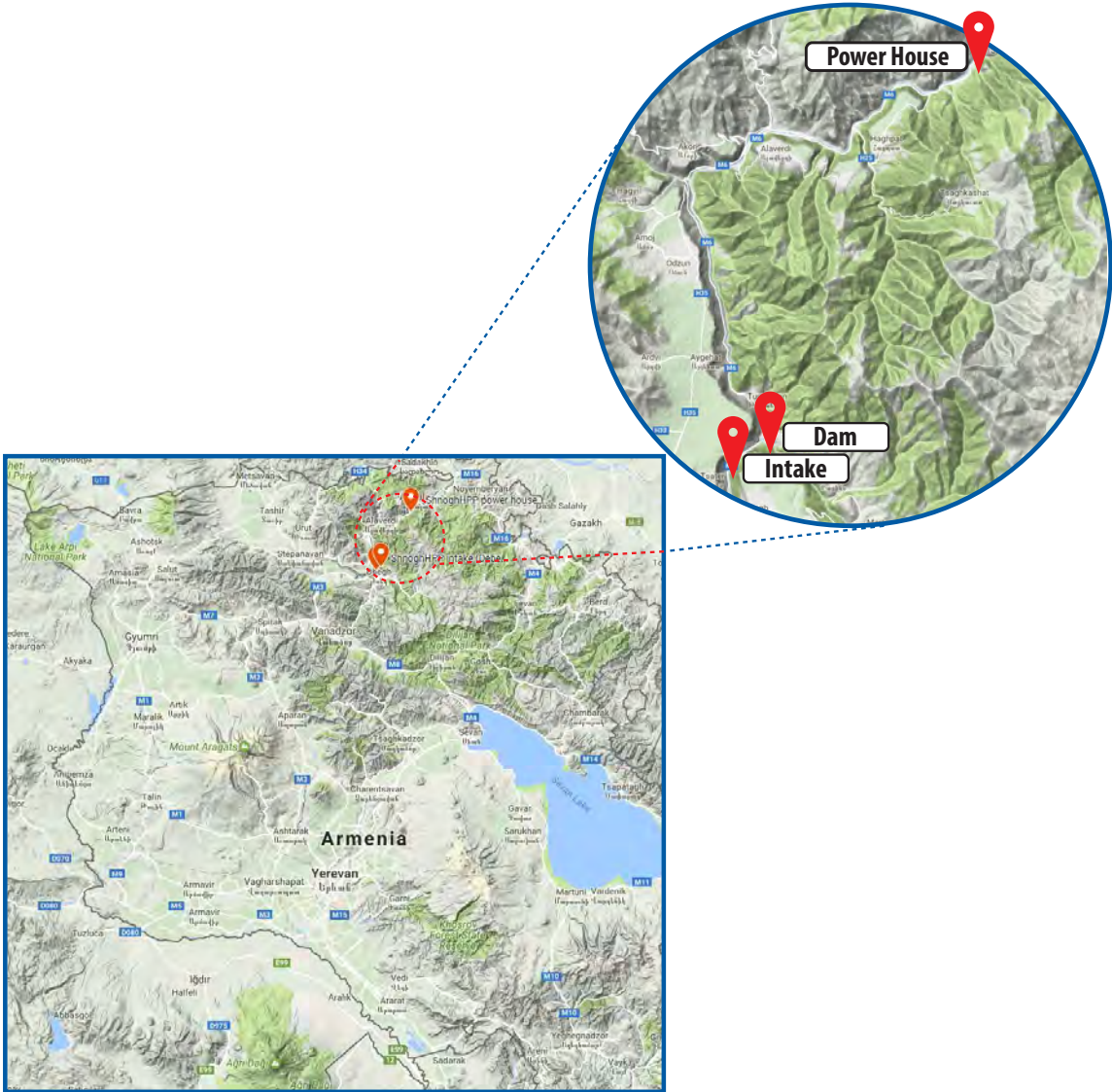
P&L Statement	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Revenue	-	-	-	19,500,000	19,500,000	19,500,000	19,500,000	19,500,000	19,500,000	19,500,000
Fixed costs	-	-	-	975,000	975,000	975,000	975,000	975,000	975,000	975,000
Depreciation	-	-	-	3,000,000	3,000,000	3,000,000	3,000,000	3,000,000	3,000,000	3,000,000
Income tax	-	-	-	3,105,000	3,105,000	3,105,000	3,105,000	3,105,000	3,105,000	3,105,000
Net profit	-	-	-	12,420,000	12,420,000	12,420,000	12,420,000	12,420,000	12,420,000	12,420,000

CF Statement	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
CF from Operations	-	-	-	15,420,000	15,420,000	15,420,000	15,420,000	15,420,000	15,420,000	15,420,000
CF from Investing	(50,000,000)	(50,000,000)	(50,000,000)							
CF from Financing										
Net CF	(50,000,000)	(50,000,000)	(50,000,000)	15,420,000	15,420,000	15,420,000	15,420,000	15,420,000	15,420,000	15,420,000

2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
19,500,000	19,500,000	19,500,000	19,500,000	19,500,000	19,500,000	19,500,000	19,500,000	19,500,000	19,500,000	19,500,000	19,500,000	19,500,000
975,000	975,000	975,000	975,000	975,000	975,000	975,000	975,000	975,000	975,000	975,000	975,000	975,000
3,000,000	3,000,000	3,000,000	3,000,000	3,000,000	3,000,000	3,000,000	3,000,000	3,000,000	3,000,000	3,000,000	3,000,000	3,000,000
3,105,000	3,105,000	3,105,000	3,105,000	3,105,000	3,105,000	3,105,000	3,105,000	3,105,000	3,105,000	3,105,000	3,105,000	3,105,000
12,420,000	12,420,000	12,420,000	12,420,000	12,420,000	12,420,000	12,420,000	12,420,000	12,420,000	12,420,000	12,420,000	12,420,000	12,420,000

2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
15,420,000	15,420,000	15,420,000	15,420,000	15,420,000	15,420,000	15,420,000	15,420,000	15,420,000	15,420,000	15,420,000	15,420,000	15,420,000
15,420,000	15,420,000	15,420,000	15,420,000	15,420,000	15,420,000	15,420,000	15,420,000	15,420,000	15,420,000	15,420,000	15,420,000	15,420,000

Location on Map





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