

PROJECT INFORMATION DOCUMENT (PID) CONCEPT STAGE

Report No.: PIDC18418

Project Name	Electricity Transmission Network Improvement Project (P146199)
Region	EUROPE AND CENTRAL ASIA
Country	Armenia
Sector(s)	Transmission and Distribution of Electricity (100%)
Theme(s)	Infrastructure services for private sector development (80%), Other urban development (20%)
Lending Instrument	Investment Project Financing
Project ID	P146199
Borrower(s)	Ministry of Finance
Implementing Agency	High Voltage Electric Networks, Yerevan Thermal Power Plant
Environmental Category	B-Partial Assessment
Date PID Prepared/ Updated	08-Dec-2014
Date PID Approved/ Disclosed	19-Nov-2014, 08-Dec-2014
Estimated Date of Appraisal Completion	23-Jan-2015
Estimated Date of Board Approval	30-Mar-2015
Concept Review Decision	Track II - The review did authorize the preparation to continue

I. Introduction and Context

Country Context

Preliminary indicators show that Gross Domestic Product (GDP) growth slowed from 7.2 in 2012 to 3.5% in 2013, and is likely to settle at about 2.6% in 2014 as a whole. Growth of agriculture remained strong, mainly because of expanding livestock production. However, metallic mining output declined, and the construction sector also continued to decline. The bright spot remains the service sector, where the highest contributors to growth were the financial sector, telecommunications, and real estate.

Inflation had picked up significantly by mid-2013 largely due to gas and electricity price increases. However, twelve-month inflation slowed to less than 1 percent in August of 2014, below the lower bound of the central bank's 2.5-5.5% target range. The slowdown was mainly driven by deflation of food products. Prices of non-food products remained broadly stable during the first eight months of the year, and the 12-month price index increased by only 1.1% for this category.

Despite the economic recovery, poverty incidence continues to be higher since the 2009 economic crisis. In 2012, 32.4% of Armenians were living in poverty, little changed from 2009. In contrast, 27.6% of Armenians were considered poor in 2008. In 2012, rural and urban incidence of poverty were similar at about 32%. About 34% of female headed households were considered poor in 2012.

The slow poverty reduction pace is related to the slack in the labor market created by the decline of the construction sector. Employment and earnings, more than pensions or safety nets, are important for staying out of poverty. Over the 2007-09 period, construction was the largest contributor to growth and employment creation. Over this same period, consumption growth of the bottom 40% of the distribution—an indicator of shared prosperity—outpaced consumption growth experienced by the population overall (4.3% vs. 3.5%). The 2009 crisis undid the gains delivered by construction-driven growth and eroded the gains in consumption. The subsequent recovery between 2010 and 2012 and changed sectoral composition of employment led to positive consumption growth albeit from a lower base than in the pre-crisis period, and some poverty reduction. Overall, the recovery has benefited individuals across the distribution: on average, between 2007 and 2012, consumption of the bottom 40% grew at 1.4% per year while consumption of the overall population registered an annual growth of 1.6%. The crisis has left the income distribution slightly more unequal than in 2007, and the poor have not benefited as much from the economic recovery.

Sectoral and Institutional Context

During the first phase of reforms in 1990s and early 2000s the power sector achieved some remarkable results. The collection of electricity bills reached 100 percent of sales. The regulatory framework was stable and overall conducive to private investments. The explicit and implicit subsidies were eliminated. A competent and independent regulatory agency for the sector was established.

However, currently the power sector faces a number of major challenges that need to be addressed as part of the second phase of reforms. The key challenges currently faced by the power sector are: (a) emerging power supply gap; (b) threatened power supply reliability; (c) increasingly unaffordable electricity tariffs; and (d) deteriorating governance.

Supply Adequacy: The power system will need around 500 MW of new gas-fired generation capacity as soon as possible to: (a) stop buying power from old (>45 years) and inefficient (30% conversion efficiency) gas-fired Hrazdan Thermal Power Plant (TPP), which has the highest generation tariff in the system; and (b) preclude emergence of supply capacity gap by 2020.

The supply gap can be reduced through improvements in tariff structure to promote more efficient energy consumption. Specifically, the existing electricity tariff structure does not reflect the large difference between the costs of supply during winter and summer months (AMD 28/kWh vs. AMD 8/kWh), which creates perverse incentives for consumers and promotes economically inefficient electricity consumption.

Supply Reliability: The average interruption frequency per line for 110 and 220 kV lines on the balance sheet of High Voltage Electric Networks (HVEN) is 2.5 times higher than for comparator well-performing utilities.

Affordability: In 2013-2014, the average electricity tariff for residential customers increased by

40% and the gas tariff increased by 19%. Those increases were estimated to have increased poverty by 3%. Moreover, bottom 20% of population (in terms of income) cannot afford adequate amount of energy for basic needs. The situation is expected to deteriorate further as much needed investments in the sector are made.

Governance: The power sector experienced some deterioration in the governance since 2011. The deterioration in governance was manifested through: (a) Inconsistent application of cost-recovery tariff methodology. This has resulted in under-spending on maintenance, significant increase of liabilities for the privately-owned distribution company and all state-owned companies (HVEN, Yerevan TPP, and ANPP), and reduced investments in improvement of power supply reliability and reduction of losses; (b) Large short-term borrowing by the state-owned companies for non-core business activities (e.g. financing of salaries of other distressed companies); and (c) Deterioration in transparency and public disclosure of information related to power sector challenges and issues..

The proposed project is consistent with the strategic energy sector objectives of the Government. Specifically, the Armenian Development Strategy for 2014-2025 (March 2014) prioritizes rehabilitation of critical transmission substations and power lines in order to ensure power supply reliability and security, which is important for promoting economic activity and growth, and reducing the poverty. The National Energy Security Concept (October 2013) also prioritizes rehabilitation of key power transmission network assets as a prerequisite for reliable power supply in the country.

The proposed project is closely aligned with the Bank's twin objectives of reducing poverty and boosting shared prosperity. Specifically, the proposed project will help to: (a) avoid increasing the share of expensive generation in the power supply mix. In case of critical failure of Yerevan TPP substation, the CCGT plant is disconnected from the grid. Therefore, the old and inefficient units of Hrazdan TPP will need to run to make up for the gap at the double of the cost of Yerevan TPP, which will increase the end-user tariff by 8% and the poverty by 0.3%, and (b) boost shared prosperity by improving power supply reliability to various small and large industrial enterprises in the project area, which employ around 18,500 people, including those in the region with the third highest poverty rate of 38.7%.

Relationship to CAS

The project is consistent with the current Country Partnership Strategy (October 9, 2013) for Armenia since it is centered on the Engagement Area 1.3 of the CPS (Improved access, quality, and sustainability of key infrastructure) to eliminate constraints to competitiveness and job create through selective energy sector investments.

II. Proposed Development Objective(s)

Proposed Development Objective(s) (From PCN)

The proposed project development objective (PDO) is to increase the reliability of the electricity supply in the project areas and strengthen the institutional capacity of HVEN.

Key Results (From PCN)

PDO Level Indicators:

Indicator 1 (Custom): Outages per year on the target transmission lines. This indicator will measure the number of outages on Lori and Toumanyanyan-1,2 lines caused by the technical factors (failure of

equipment, plant, and operations).

Indicator 2 (Custom): Plant and equipment failures per year in target substations. This indicator will measure the number of plant and equipment failures at substation of Yerevan TPP and Ashnak substation caused by the technical factors (failure of equipment, plant, and operations).

Indicator 3 (Core): System average interruption frequency per year in the project area. This indicator will be calculated by dividing the number of affected customers in the project area by the number of total customers. The SAIFI will be calculated only for interruptions caused by failure of substations and transmission lines rehabilitated under the project.

Indicator 4 (Custom): Improved capacity of HVEN to implement projects. This indicator will be calculated as the reduction in the total annual man-month of external consultants, selected to support with implementation of the project. Total annual man-month input under ongoing ESRP will be used as the baseline.

Presented below are also some Intermediate Results Indicators, which will be refined as the project preparation progresses.

Intermediate Result Indicator 1 (Core): Transmission lines constructed or rehabilitated under the project.

Intermediate Result Indicator 2 (Custom): Total number of substations rehabilitated under the project.

Intermediate Result Indicator 3 (Custom): Transmission network expansion plan and transmission line design software is operational and used by HVEN.

III. Preliminary Description

Concept Description

The project will achieve the development objective through implementation of the following two components: (i) strengthening of the power transmission network; and (ii) institutional strengthening of HVEN and support to Yerevan TPP to implement the project.

Component 1: Strengthening of the power transmission network. This component will finance:

- (a) Rehabilitation of substation of Yerevan Thermal Power Plant (Yerevan TPP). The substation is owned by Yerevan TPP and was commissioned in 1965, and has not been rehabilitated since then. All key plant equipment is in poor condition and requires urgent rehabilitation. The substation is used for evacuation of electricity from the modern and efficient Combined Cycle Gas Turbine (CCGT) plant with 243 MW of installed capacity.
- (b) Rehabilitation of Ashnak substation: The substation is owned by HVEN and was commissioned in 1983. No major rehabilitation was done since then. Most of the key plant equipment is in poor condition and requires urgent rehabilitation. The substation is essential for ensuring reliable power supply to consumers in Eastern and North-Eastern parts of Armenia.
- (c) Full or partial replacement of Lori 220 kV power transmission line: The Lori line with the

length of 50 km is owned by HVEN and was commissioned in 1968. Metal structures of the towers are rusted, conductors are worn out, and foundations are dilapidated. This transmission line is important for ensuring reliable electricity supply to residential and commercial consumers in the North-Eastern parts of Armenia.

(d) Replacement of Toumanyanyan-1 and Toumanyanyan-2 110 kV transmission lines: The lines with total length of 3 km are owned by HVEN and were commissioned in 1968. The above lines are severely dilapidated. Specifically, critical pieces of infrastructure, including tower foundations, towers, conductors and insulators require replacement. The lines are important for supplying residential and industrial consumers in the North-Eastern part of Armenia.

Component 2: Institutional strengthening of HVEN and support to Yerevan TPP to implement the project. This component will finance:

(a) Long-term expansion plan for transmission network considering the generation expansion plan of the Government, including load flow and stability studies.

(b) Development and adoption of a methodology for prioritization of investments in rehabilitation of power transmission network, which will also include an economic framework based on cost-benefit analyses.

(c) Development and adoption of standardized design templates for substations and power transmission lines to avoid versatile solutions offered by various vendors. This will help to avoid technical incompatibility issues and will make the operation of the power transmission system more reliable.

(d) Purchase and operationalization of internationally recognized power transmission line design software to allow HVEN to prepare and review transmission line designs in-house.

(e) Training to HVEN staff on technical, fiduciary, and safeguards aspects of power transmission project preparation and implementation.

(f) Construction of back-up dispatch center to be used in case of emergencies by the Electric Power System Operator (EPSO).

(g) Construction of a new administrative building for HVEN.

(h) Other technical assistance required for implementation of the project.

IV. Safeguard Policies that might apply

Safeguard Policies Triggered by the Project	Yes	No	TBD
Environmental Assessment OP/BP 4.01	x		
Natural Habitats OP/BP 4.04		x	
Forests OP/BP 4.36		x	
Pest Management OP 4.09		x	
Physical Cultural Resources OP/BP 4.11			x
Indigenous Peoples OP/BP 4.10		x	
Involuntary Resettlement OP/BP 4.12	x		
Safety of Dams OP/BP 4.37		x	
Projects on International Waterways OP/BP 7.50		x	
Projects in Disputed Areas OP/BP 7.60		x	

V. Financing (in USD Million)

Total Project Cost:	67.00	Total Bank Financing:	50.00
Financing Gap:	0.00		
Financing Source			Amount
Borrower			17.00
International Bank for Reconstruction and Development			50.00
Total			67.00

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