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ENERGY WEEK

25-27 ՀՈՒՆՎԱՐԻ, 2017Թ.

UNDERSTANDING POWER SECTOR OF ARMENIA

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General Overview

of the Armenian Power Sector

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POWER SECTOR OF ARMENIA

Technical Description:

Generation: Generation produces enough electricity to meet domestic demand, which is about 6,500 GWh annually with an average growth of 2 percent. The total operating capacity of all generation units is about 2,400 MW. Domestic demand is covered by 37 percent nuclear, 31.5 percent thermal, and 31.5 percent hydro generation. Peak electricity demand is about 1,300 MW and is observed during November through February. Summer peak demand is around 900 MW. There is no seasonal deficit. Generation surplus consists of TPPs; the possible exporting capacity are thermals.

Renewables: *About 170 private, small HPPs (under 30 MW) are operating in the system and were generally constructed during the last 10 years. Installed capacity is about 300 MW, and annual generation is approximately 700 GWh, covering about 11 percent of domestic supply. There are several small-size wind, bio, and solar plants that have limited impact on system supply.*

Technical Description:

Transmission: Armenia has had a reliable transmission infrastructure since Soviet times, it consists of 14 substations of 220 kV and 2 substations of 110 kV, which will be finally rehabilitated during the next 4 years. Currently grid is interconnected with Georgia (110 kV and 220 kV, dedicated island operation for now); Iran (220 kV, synchronous operation); and Turkey (220 kV, not in operation). The interconnection capacity with Georgia is about 200 MW and, with Iran, is 300 MW. Transmission system losses are around 1.8 percent. The Transmission Operator (TO) is a government-owned company ("High-Voltage Electric Networks (HVEN)" CJSC) that holds all the transmission assets within the country, but does not operate the system.

New Interconnections: *During next 3 years a new 400 kV line with capacity of 1000 MW, from Georgian to Iranian border will be commissioned including a B2B station on Armenia Georgia Border with first stage capacity of 350 MW.*

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POWER SECTOR OF ARMENIA

Technical Description:

Dispatch: The power system is dispatched by an ISO (separate dispatch and transmission companies), which is a government-owned company (EPSO CJSC). A supervisory control and data acquisition system has been installed on generation units and 220 kV substations.

Metering and Billing: The Settlement Center provides metering and billing services to wholesale power market participants. The data acquisition system installed in 2001 provides wholesale electronic meter data collection with 30-minute intervals at the Settlement Center for billing purposes.

Technical Description:

Distribution: The distribution system includes 0.4 to 110 kV lines and transformers. Access to the grid is close to 100 percent. The Distribution company (DISCO) serves about one million customers and also provides last-mile service. Household annual consumption is about 35 percent; large customers (i.e., industry, transport, water supply, and irrigation) account for about 30 percent; and the remaining 35 percent are public entities and small- to medium-size businesses. Distribution system losses are about 9 percent, metering is 100 percent, and the collection ratio is close to 100 percent. All customers of 35 to 110 kV and a large proportion of 6 to 10 kV customers are integrated into a data acquisition system; 30 percent of all customers are equipped with electronic meters. The DISCO is a private company ("Electric Networks of Armenia" CJSC) and holds and operates all the distribution assets within the country.

POWER SECTOR OF ARMENIA

Legal and Regulatory Framework:

Energy Law: Armenia's power sector is regulated by the Energy Law adopted in 2001. The Energy Law provides some basic principles for national policy. Ministry of Energy Infrastructures and Natural Resources is the main responsible governmental body for handing the national policy. Energy Law describes authorities given to the Public Services Regulatory Commission of Armenia (PSRC), which is a fully independent body.

The Regulator: *Issues licenses for wholesale power market participants, including import and export transactions. Sets the tariffs for generation, transmission, and distribution, including end-user tariffs and service fees for the system operator and Settlement Center. The Regulator sets the tariffs for imported electricity as well. Sets the Market Rules in cooperation with the MEINR. Sets the distribution rules, including connection rules.*

Legal and Regulatory Framework:

Power Market: The wholesale power market of Armenia has no elements of competition; it is fully regulated by the PSRC. Only legal entities can participate in the wholesale power sector; unbundling between generation, transmission, distribution and other activities is required by the Energy Law, all the activities are Licensed.

De facto, wholesale market is a monopsony, with the DISCO acting as a Single Buyer on the wholesale level, and a monopoly on the retail level with the DISCO acting as a Single Seller. All the Model Contracts for both: wholesale and retail trade are set by the PSRC. Payments of DISCO to wholesale power market participants are guaranteed by a special mechanism through an Escrow account.

Renewables: *Renewables are supported with a special power purchase guarantee that is 20 years for the Solar, Wind, Bio and Geothermal units and 15 years for Small Hydro's (up to 30 MW).*

POWER SECTOR OF ARMENIA

Legal and Regulatory Framework:

Licensing: The Regulator issues a license within 80 working days of submission of the application. Generation units are receiving a single license for construction and operation for the time period covering both activities. For Solar Units that will be about 3-5 years for construction period and 20 years for operation. Licensee should provide a its legal documents, business plan, land permits, contact with an engineering company for design of the plant, payments to the state budget and a bank guarantee (2500 AMD/kW) that will be exacted to the state budget if the Licensee fails commissioning the unit.

Legal and Regulatory Framework:

PPA: PPA is a simple model contract set by the PSRC, parties are not allowed to change the contract. PPA is signed between the Power Producer and DISCO while the unit is ready producing the power. PPA will be signed for the 20 years and could be terminated in case of revocation of the Licensee by the Regulator.

POWER SECTOR OF ARMENIA

Wholesale Tariffs:

Large Generation: Large generation tariffs are differentiated by capacity charge and energy price. The current average wholesale tariff, exclusive of VAT, is about 4.5 U.S.¢/kWh (21.6 AMD/kWh). TPP's are producing most expensive electricity with the price of 6.4 U.S.¢/kWh (31.0 AMD/kWh) exclusive of VAT.

Renewables: RE types are supported by a feed in tariffs with an annual recalculation formula that adjusts for inflation and exchange rates. The current tariff, exclusive of VAT, for small HPPs on drinking water pipelines is 2.2¢/kWh (10.6 AMD/kWh); on irrigation systems, it is 3.3¢/kWh (15.9 AMD/kWh); on water flows, it is 4.9¢/kWh (23.7 AMD/kWh); and, for wind farms, biomass, and solar up to 1 MW it is 8.8¢/kWh (42.6 AMD/kWh).

Transmission and Services: Transmission, Dispatch and Settlement services tariffs for wholesale market and export (although fixed on the same level) are about 3.9¢/kWh (1.9 AMD/kWh) exclusive of VAT. There are no capacity charges.

Retail Tariffs:

Distribution: Distribution margin, exclusive of VAT, is about 2.4¢/kWh (11.8 AMD/kWh). Tariff for distribution services, that is set for the 110 kV, 35 kV and 6(10) kV networks only, varies from 1.1¢/kWh (5.2 AMD/kWh) to 2.3¢/kWh (11.2 AMD/kWh) exclusive of VAT. There are no capacity charges.

End Users: End-user tariffs are differentiated by voltage levels for day and nighttime. There are no capacity charges, peak tariffs, or service fees. Tariffs are cost recovery, there are no budget subsidies. End-user tariffs are among the highest in post-soviet union countries. Average end user tariff, exclusive of VAT, is about 6.9¢/kWh (33.4 AMD/kWh). Household tariff is about 35 present higher comparing to big industrials.

UTILITY SCALE SOLAR PROJECT UNDERSTANDING AND MITIGATING RISKS

CONTRACTUAL STRUCTURING

Best International Practices:

Varies on the power market structure and country risk.
For the countries with lower risks and competitive power market typically you should have a PPA signed between the Investment Company and Off-taker mitigating all the risks.
For the developing countries like Armenia typically a PPP agreement with the Government with back stop guarantees for the uncovered risks in the power sector and a PPA contract with the Off-taker, as well as a License Agreement with the Regulator (if any) should be signed.

Possible options in Armenia:

Proposed Contractual Structuring for Armenia will be a Government support agreement, PPA with the DISCO (ENA) and a License Agreement with the Regulator (PSRC).

TO BE DISCUSSED
"Full back stop guarantees…": confusing, likely overreaching practice - changed

TO BE DISCUSSED
"PPP agreement" vs. "Government support agreement" - changed

DISPATCH

PLEASE TIDY UP WORDING

Best International Practices:

There are two structures generally accepted for mitigating the risk that the off-taker may not dispatch the generating facility.

Take or Pay: Usually the off-taker pays a fixed tariff comprising a capacity charge (a fixed amount that is paid for available capacity - no dispatch required) and an output charge (an amount paid in respect of energy actually delivered). This permits the power producer to cover its fixed costs with the capacity charge, including debt service, fixed operating costs, and an agreed equity return.

Take and Pay (typical for wind and solar): Usually the off-taker must take, and pay a fixed tariff for all energy delivered (no dispatch required). If energy cannot be physically taken by the off-taker and output is "curtailed," energy will be calculated and paid for on a "deemed" delivered basis.

Possible options in Armenia:

Armenia applies **Take and Pay** principle. Solar, Wind and Biomass are supported with an 20 year power purchase guarantee by the Energy Law. Off-taker is the DISCO (ENA). However, there are no certain rules if how will be calculated energy on a "deemed" delivered basis in case if the energy cannot be taken physically by ENA. The potential case could be the blackouts in distribution grid.

TO BE DISCUSSED
Message/issue flagged is unclear

TO BE DISCUSSED
As written, how is this materially different from TOP? Payment subject to dispatch is not a bankable proposal (limited recourse basis). Payment subject to availability is bankable.

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FIXED TARIFF, EXCHANGE RATE

Best International Practices:

It is important that the revenue of any PPA, whether "Take or Pay" or "Take and Pay," be a fixed amount per kWh generated to adequately cover the cost of operating the facility, repay the debt and provide a reasonable return on equity.

In order to avoid subjecting the power producer to currency risk, the PPA should be either denominated in or linked to an exchange rate of the currency of the power producer's debt, and there should be no limitation or additional approvals required to transfer funds to offshore accounts as required.

Possible options in Armenia:

Tariff for the Utility-Scale Solar projects will be set based on the results of bidding among the potential Investors. Currently other Renewables are set in Armenian drams, but those are recalculating on annual basis for inflation (35%) and exchange rates (AMD/USD, 65%).

However, for the Utility-Scale Solar projects could be provided different options:

1) Tariff fully linked to exchange rate (USD, EUR, proportional, other),
2) Same as for the current Renewables with any reasonable modification needed.

TO BE DISCUSSED
Has this been agreed by the GOA?
Who takes convertibility risk? Liquidity risk?
Transfer risk?
Has the GOA explored local bank financing?

CHANGE IN LAW, CHANGE IN TAX

Best International Practices:

The agreement should explicitly state which party takes the risk of the law or tax regime changing after the date of the agreement in such a way as to diminish the economic returns of the transaction for such party (e.g., increase in taxes on power producers reducing the producer's returns). In order for PPAs to be bankable, private sector investors require the off-taker to take this risk.

Possible options in Armenia:

This should be a part of the agreement between Government of Armenia and Potential Investor. Usually such a risk is covered by a tariff readjustment mechanism [instead of shifting that to the off-taker,] which means that in case of changes in Laws or Tax regimes tariff proposed by the Potential Investor during the bidding process will be recalculated to reflect adequately those changes.

Tariff readjustment means that the off-taker is taking the risk

FORCE MAJEURE

Best International Practices:

The agreement should excuse the power producer from performing its obligations if a force majeure event (an event beyond the reasonable control of such party) prevents such performance. The allocation of costs and risk of loss associated with a force majeure event will depend on the availability of insurance and in some cases the degree of political risk in the country/region.

Must differentiate between "Natural FM" and "Political FM".
Off-taker cannot claim FM and thus be excused from making the take-or-pay obligations

Possible options in Armenia:

Force majeure events will be covered on 3 levels:

- *PPP contract with the Government,*
- *PPA contract with the Off-taker (ENA),*
- *License Agreement with the Regulator (PSRC)*

TO BE DISCUSSED
(1) This should state intent for Armenia to follow best practice
(2) There should be no "3 levels". If properly documented, FM events should be included under the PPA only

DISPUTE RESOLUTION

Best International Practices:

The agreement should provide for offshore arbitration, in a neutral location, under rules generally acceptable to the international community (e.g. UNCITRAL or LCIA or ICC).

Which agreement? GSA yes, PPA no

Possible options in Armenia:

Dispute resolution also should have 3 levels of regulations:

- *PPP contract with the Government, that typically supports an offshore arbitration,*
- *PPA contract with the Off-taker (ENA), where the dispute resolution goes through the Regulator or a Local Court.*
- *License Agreement with the Regulator (PSRC), where the dispute resolution goes through a Local Court*

It all depends on the construct of the contractual risk allocation across the PPA and the GSA.
A simple construct would work with local dispute (PPA and license) and offshore dispute (GSA).

Suggest to keep it simple and state intent for Armenia to follow best practice
Dispute resolution does not necessarily mean "going to court"

TERMINATION

Best International Practices:

The PPA should set out clearly the basis on which either party may terminate the PPA. Termination by the off-taker may leave the project with no access to the market and thus should be limited to significant events. If the PPA is terminated for any reason, then in case of transfer of the facility to the off-taker, the off-taker shall provide a termination payment at least equal to the full amount of the power producer's outstanding bank debt, and in the case of the off-taker's default, a return on equity.

Which agreement? Could be PPA (preferably not) or GSA (preferable). No need to refer to this now.

Possible options in Armenia:

Termination and Termination Payments are usually the part of the PPP contract, where the Government taking obligation for providing a termination payment at least equal to the full amount of the power producer's outstanding bank debt, and in the case of the off-taker's default, a return on equity.

TO BE DISCUSSED

(1) Termination and Termination Payments may or may not sit in the same document.

(2) Has GOA agreed to take on PPA termination risk even when caused by ENA default? ENA obligation must not be confused with GOA obligation.

Suggest to keep it simple and state intent for Armenia to follow best practice

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PAYMENT SUPPORT

Best International Practices:

Depending upon the size of the project and the creditworthiness of the off-taker and the development of the energy sector in a certain country, short term liquidity instrument, a liquidity facility and/ or a sovereign guaranty will be required to support the off-taker's payment obligations.

Possible options in Armenia:

Payments of the Off-taker (ENA) to the all wholesale power market participants are guaranteed by a special mechanism through an Escrow account. While the Off-taker fails paying to the power producers there is an additional Bank Guarantee support.

TO BE DISCUSSED
We would like to discuss in detail the existing mechanism (and in what circumstances GOA can step in to provide additional liquidity)

INTERCONNECTIONS

Best International Practices:

The PPA should indicate which party bears the risk of connecting the facility with the grid and transmitting power to the nearest substation. The more significant these risks (due to terrain, distance, populated areas), the more the private sector will require the off-taker to bear all or a significant portion thereof.

Possible options in Armenia:

The Utility-scale Solar Plants will be connected to the Distribution Grid. Distribution Company will provide a Connection Point and technical conditions of connection. All the investments for connecting Plant to the Distribution Grid should bear the Potential Investor.

However, Feasibility studies to support this Projects are providing detailed information on the connection options and right now we are discussing all the technical conditions with the Distribution Company to provide best option.

THANK YOU !!!
QUESTIONS ?

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