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Governing for Growth in Georgia

ROAD MAP TOWARDS DAILY AND HOURLY ELECTRICITY TRADING IN GEORGIA

GOVERNING FOR GROWTH (G4G) IN GEORGIA

26 September 2015

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CONTRACT NUMBER: AID-114-C-14-00007

DELOITTE CONSULTING LLP

USAID | GEORGIA

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LANGUAGE: ENGLISH

26 SEPTEMBER 2015

DATA

Reviewed by: Jake Delphia

Project Component: Energy Trade Policy Improvement Component

Practice Area: Electricity Trading Mechanism

Key Words: Electricity, Road Map, Cross Border, Day Ahead

ACRONYMS

Acronym	Definition/Description
AMR	Automatic Meter Reading
BM	Balancing Market
BRP	Balance Responsible Party
CBETA	Cross Border Electricity Trading Agreement
DAM	Day Ahead Market
DAP	Day Ahead Planning
DAS	Day Ahead Scheduling
DSO	Distribution System Operator
EPIAS	Turkish Power Exchange Operator
ESCO	Electricity System Commercial Operator
ETM	Electricity Trading Mechanism
EU	European Union
G4G	USAID Governing for Growth in Georgia
GEMM 2015	Georgian Electricity Market Model 2015
GNERC	Georgian National Energy and Water Supply Regulatory Commission
GoG	Government of Georgia
GSE	Georgian State Electrosystem
gse	Georgian Stock Exchange
IFI	International Financial Institution
IOA	Interconnection Operations Agreement
MO	Market Operator
MoE	Ministry of Energy
MP	Market Player
PMUM	Electricity Market Operator in Turkey
PPA	Power Purchase Agreement
PSO	Public Service Obligation
PX Node	Power Exchange Node
RES	Renewable Energy Sources
ToR	Terms of Reference
TSO	Transmission System Operator (for electricity)
USAID	United States Agency for International Development
USoA	Uniform System of Accounting

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1. WHY IS ELECTRICITY TRADING MECHANISM (ETM) NEEDED?

Hydropower resources are the largest of Georgia's natural endowments and their further expansion requires a simultaneous domestic and export-oriented project development focus with merchant power plants, without sovereign and corporate guarantees. This is because the Georgian electricity market has a balanced mix of low-cost hydro and thermal power plants and the new power plants will have to locate multiple markets inside and outside of Georgia for selling their energy output year around. Hydropower development is also an economic growth driver with Foreign Direct Investment (FDI) and job creation. Regional export direction is towards the west, Turkey and Southeast Europe. This region is already operating on competitive electricity market basis with their respective standards for trading electricity and new cross-border trade of electricity by Georgian entities requires adaptation of these trading standards.

Therefore, USAID decided to propose an ETM that will facilitate FDIs with non-recourse project financing from International Financial Institutions (IFIs), according to competitive electricity market principles in line with European Union (EU) energy directives.

2. RETAIL MARKET OPENING

Retail electricity prices are increasing with growing electricity demand requiring new, market-priced energy. In addition, new government-guaranteed electricity sector commitments must be paid (debt on new infrastructure, PPAs) and government subsidies should be removed from tariffs, at least for the non-vulnerable customers. Artificial control over prices will discourage investors from entering the domestic market which, in the long run, will cause increased imports of electricity and/or generation fueled by imported fossil fuels.

Several factors must be considered while opening the retail electricity market:

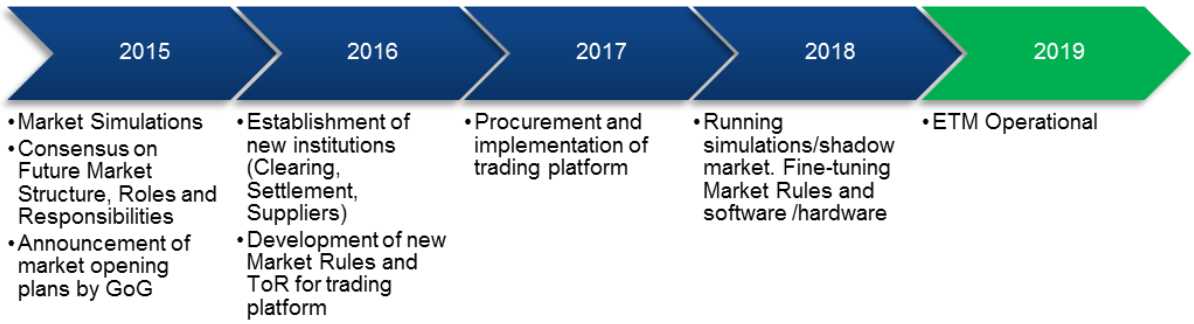
- Protection of vulnerable residential consumers and consumers that may become vulnerable if their electricity bills are significantly increased (taking into consideration other increased utility bills for natural gas and water as a result of new investments and reforms in these sectors).
- Support to vulnerable energy-intensive commercial and industrial customers, especially those that depend on exporting their goods in the competitive global market.
- Market opening requires the unbundling of the electricity distribution companies and the introduction of domestic competitive traders and brokers.
- The non-residential customers entering the competitive electricity market can be aided through government-supported energy efficiency programs to help reduce the average cost of production of goods and services.
- All generators should enter the competitive electricity market, albeit, some older generators will have increasing availability to join over time while new power plants will enter immediately.

The ETM will:

- Allow more competition, increased appetite for investors/developers and in the long run put downward pressure on end-user prices.
- Provide clear price signals both for investors/developers as well for consumers.
- Provide risk mitigation tools to allow market participants to operate on the market more efficiently.

Figure 1: ETM implementation plan

Activities for Market Opening and Introduction of Trading Software



3. GEORGIAN ELECTRCITY MARKET MODEL 2015

In order to achieve the ETM, certain changes in the Georgian electricity market model to allow competitive electricity trading and therefore the Georgian Electricity Market Model of 2015 (GEMM 2015) was created.

The Georgian Electricity Market Model (GEMM) is a strategy when implemented will enable Georgian market players to trade electricity cross border into the regional competitive power markets and at the same time provide long-term cost effective electricity to domestic costumers; it is harmonized with regional competitive power markets, carrying necessary minimal technical and legal requirements to benefit from the energy trade.

GEMM 2015 provides details of the required legal, regulatory reforms and sufficient institutional capacity building in the Georgian Government and its electricity sector-related agencies to implement a competitive electricity market in Georgia and provide the required enabling environment for competitive domestic and cross border trading.

The ETM is a product of GEMM 2015 and represents the move from a single-buyer, central dispatch with monthly balancing market model to an hourly balancing and competitive electricity trading-based market model.

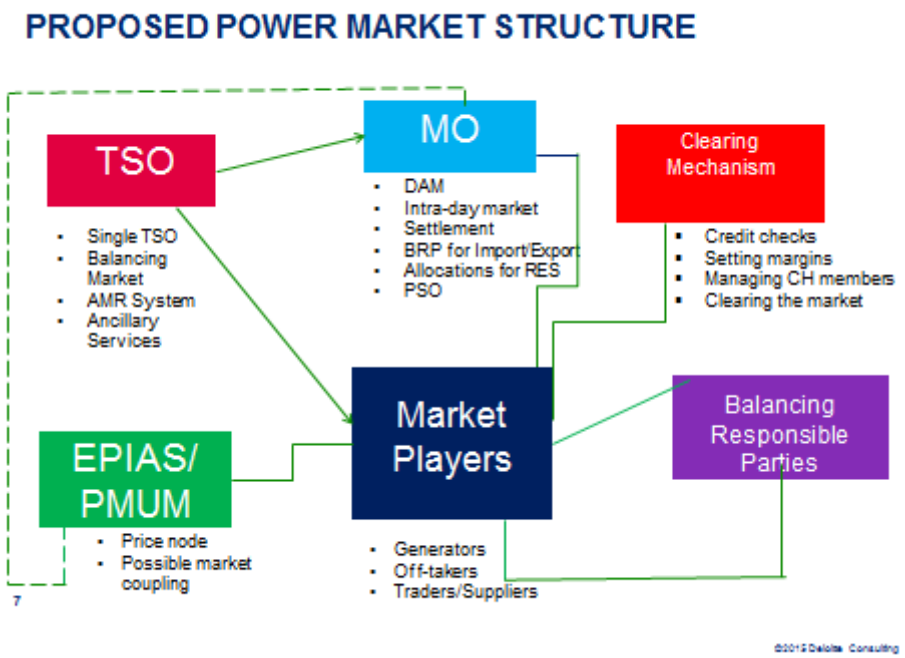
GEMM 2015 was adopted by the Ministry of Energy (MoE) as a core strategy for energy sector development. The MoE and USAID jointly signed a memorandum in January 2013 on GEMM 2015 implementation. And GEMM 2015 is included in the Georgia Economic and Social Strategy known as Strategy 2020.

By signing the EU Association Agreement, Georgia committed itself to undertake actions to move towards EU's competitive market principles and approximate its legislation with EU directives. In July 2014 the Government of Georgia (GoG) approved the government action plan (2014-2018) which includes the following components of GEMM 2015:

Actions to be Undertaken by Georgia	Responsible Entity
Adoption of the Electricity Grid Code	GNERC
Adoption of standards term and conditions for various services	GNERC
Adoption of tariff methodology based on best EU practices	GNERC
Adoption of the Uniform System of Accounts (USoA)	GNERC
Normative losses, adoption of rules of calculation	GNERC
Development of electricity market	Min. Energy
Development of coordinated instructions for emergency situation	Min. Energy
Development of electricity trading platform	GSE

4. BASIC STRUCTURE OF THE ELECTRICITY MARKET

Figure 2: Proposed Market Structure



Successful operation of the competitive electricity market will require a market structure with specific roles and responsibilities for each of the key stakeholders shown in Figure 2 above.

5. STEPS FOR IMPLEMENTING THE ETM

In order to implement the ETM smoothly and to ensure changes on the market without significant price fluctuations, the following steps are envisaged:

Phase 1 – Introduction of Daily Trading and Transposition (2017-2018): The use of bilateral contracts only (no marginal price formation through buy and sell open offers). This period will not cause any change in prices, except for the small balancing requirements that will form a discipline in the market. Besides the existing generators, all new generators are welcomed to enter their bilateral contracts in the system.

1) Introduction of Daily Bilateral Contracts by transposing the long-term and monthly contracts into daily Day Ahead Scheduling (DAS) and new daily bilateral contracts – *long term (so called physical features) contracts need to be traded on the market through predefined, established maturities (weekly, monthly, quarterly and yearly) and some other unified futures. New rules need to be established for cascading long term contracts in shorter term contracts.*

2) Introduction of Day Ahead Scheduling and Day Ahead Planning. MPs will submit their DASs for approval and contracted volumes as notification to GSE/ESCO. In December 2014, Georgia State Electro system (GSE) introduced DAS software which allows MPs to submit their hourly nominations for the next day.

3) Splitting current ESCO's "balancing" practice into two types of balancing service:

   a. Day Ahead Balancing – This service is provided by ESCO, using pool type model to supplement Market Participants' directly negotiated bi-lateral contracts with the difference between next day energy volume and contracted (monthly and/or daily) volume. This will be the first step towards a Day Ahead Market. Day Ahead Balancing will set daily prices for energy. In this model, current GNERC approved rates will be applied to Generators and Consumers will be charged with Weighted Average Tariffs.

   b. Real Time Balancing – This service will be provided by GSE. The hourly balancing will be managed based on transmission system operator (TSO) instructions/software. Deviations from the DASs will be netted after the period and will be settled daily as an imbalance between the Market Participants (MPs). The MPs providing balancing services will be paid at GNERC approved rates. Premium payments, for example a 5% uplift, could be added to their approved energy tariffs. In order to provide incentives for better forecasting, different options could be applied such as: imbalance fees or lowest prices for generators and highest prices for consumers responsible for imbalances.

The settlement service will use bilateral contract prices for daily trades, weighted average tariffs for the Day Ahead Balancing and special tariffs for Real Time Balancing.

The envisaged steps will result in:

1) MPs will take responsibilities for their Day Ahead Plans.
2) MPs will improve forecasting skills.
3) Balancing entities will receive additional income.
4) Instead of monthly balancing price, there will be Daily Energy Price and Daily Balancing Price.
5) To introduce balancing responsible parties on the Georgian Energy Market should be one of the outcomes.

In order to implement Phase 1, new, relatively simple software should be developed.

Since trading will be based on GNERC's regulated tariffs (new tariffs could apply only to generators participating in real time balancing, for example 5% uplift to the approved tariffs), the proposed plan will not have significant impact on energy prices in Georgia. Actually, the average of daily prices will be same as monthly price if trading was done with current scheme, although simulations need to be introduced to analyze the price changes for different Market Participants. To mitigate the risks of unequal prices between distribution companies and other direct consumers, the following tools could be used:

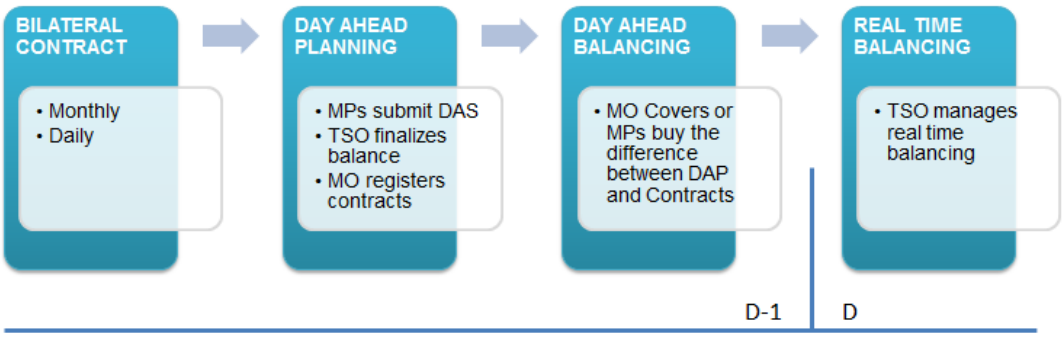
1) Partial Pool.
2) Monthly and Daily Contacts.
3) Selling surplus energy by distribution companies in Day Ahead Balancing market with a premium price.

Renewed emphasis will be put on retail market opening. Though at a later stage, gradual market opening should be introduced with freely negotiated prices between customers and market players, there is significant planning required before sustainable market opening can commence. Areas that require significant analysis, planning and implementation include:

- Infrastructure development
  - Metering, IT, Communications, Websites
- Unbundling of distribution companies
  - Legal unbundling of the distribution companies
  - Establishment of the DSOs
- Tariff reform
  - Transitional tariffs – to encourage non-vulnerable customers to enter market
  - Transmission wheeling tariffs
  - Protection of vulnerable residential customers
- Introduction of domestic electricity traders
  - Legislative development/reform
  - Eligibility and registration of traders
  - Establishing balancing groups and balancing responsible parties
  - Establishing a clearing mechanism
  - Establishing supplier of last resort

Figure 3: DAILY TRADING – 2017-2018

GEMM– Phase I Daily Trading Day Ahead Process



Note: DAS=day ahead schedules, MPs = market players, MO= market operator, TSO=transmission system operator, DAP = day ahead planning

After successful implementation of Phase 1, Phase 2 should be implemented.

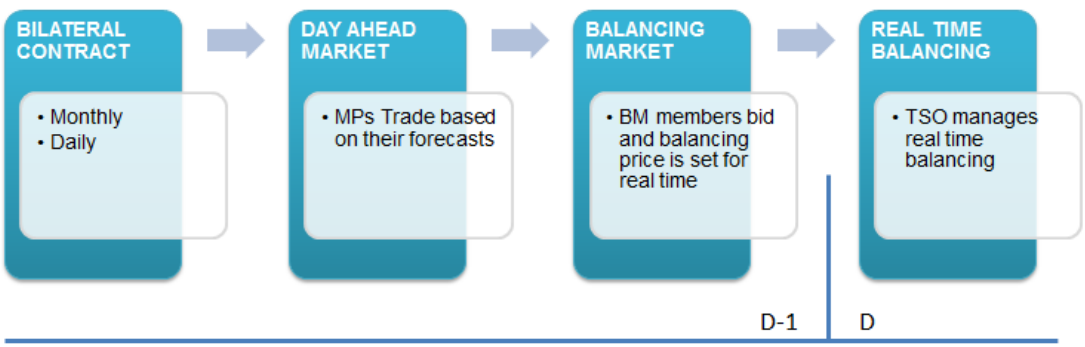
Phase 2 – Introduction of Hourly Trading and Balancing (2018-2019)

1) All bilateral contracts will move from daily energy volumes to hourly volumes
2) Hourly Day Ahead Market will be introduced with free bids and offers with settlement and clearing mechanism
3) Hourly Balancing Market will be introduced with free bids and offers, with settlement, clearing mechanism.
4) Large consumers with the aid of energy traders and brokers will enter the competitive market for most or all of their electricity needs.
5) In order to ensure riskless financial and physical delivery, it should be introduced effective clearing entity, which will fill some very important gaps in the entire trading process – i.e. collateralization, margin requirements and riskless settlement procedures setting mechanism. In general it should be entity recognized as financial institution by its nature. One of the functions of the clearing entity should include provision of information to Power Exchange regarding transaction limits of market members.
6) By introducing new clearing entity to the electricity market, clearly defined operational and legally sound relationship should be established between clearing entity, power exchange and transmission system operator.

For Phase 2, more advanced and complex software should be developed to reflect all the specifications of the market (seasonality, Enguri/Abkhazia factor, cross border trading, technical specifications of the infrastructure, etc.). Phase 2 should run parallel to the existing market in simulation mode for at least one year. This will ensure smooth transition to the new market and eliminate uncertainties for all stakeholders.

Figure 4: Hourly Trading – 2018-2019

GEMM– Phase I Daily Trading Day Ahead Process



Note: BM=balancing market

In order to have a well-functioning, sustainable market, additional recommendations are provided below:

1) Energy prices should not be politicized and should be driven by the competitive electricity market, not by regulations and subsidizes from the State Budget. Public awareness campaign could be conducted. Market opening challenges and opportunities should be introduced to the public.
2) The electricity market should move from central dispatching to a self-dispatching concept, allocating responsibilities to MPs, without sacrificing system security and stability.
3) Competitive electricity traders should be introduced to the market.
4) Ancillary services should be introduced to the market.
5) Unbundling of distribution companies will be an important step towards competitive market and increased benefits to end consumers.
6) GoG should develop a vulnerable customer protection strategy for support during the transition from price-regulated to the fully competitive electricity market.
7) GoG should gradually abolish direct or indirect subsidies and develop coordinated plan how to allocate extra state revenues generated from gas transit fees.
8) Market Rules and Grid Codes should be under the same regulatory body.

MPs, private sector, local banks, IFIs and all other relevant stakeholders should be involved in development of the electricity market.

6. TRADING THROUGH PX NODE

The Turkish electricity market is designed to operate on a zonal basis similar to the developed European markets. Therefore, it may be hard to define a real node for Georgian electricity on the Turkish side. Instead of a real locational node, a virtual node (like a different price zone) may be defined in order to enable the Georgian HPPs sell energy into the Turkish competitive power market. In this mechanism, the Turkish market operator (EPIAS) can define the Georgian price zone as a virtual node; a single point where the electricity sales offer are injected into the Turkish price zone.

The software infrastructure of EPIAS will be able to define the Georgian PX Node as a separate price zone. However, the legal framework in Turkey does not allow participation of foreign entities in the market. The Turkish MO cannot take the counterparty risk of the Georgian participants. The Turkish MO must ensure financial security of the market and itself. Possible legal arrangements can be established to allow Georgian traders into the market. An example may be for Georgian exporters to establish Turkish affiliate companies or contract with a Turkish counterparty to trade on the PX. An alternative to aggregating the sales offers of Georgian generators in the PX node, a MO to MO agreement that allocates counterparty risk might be another approach.

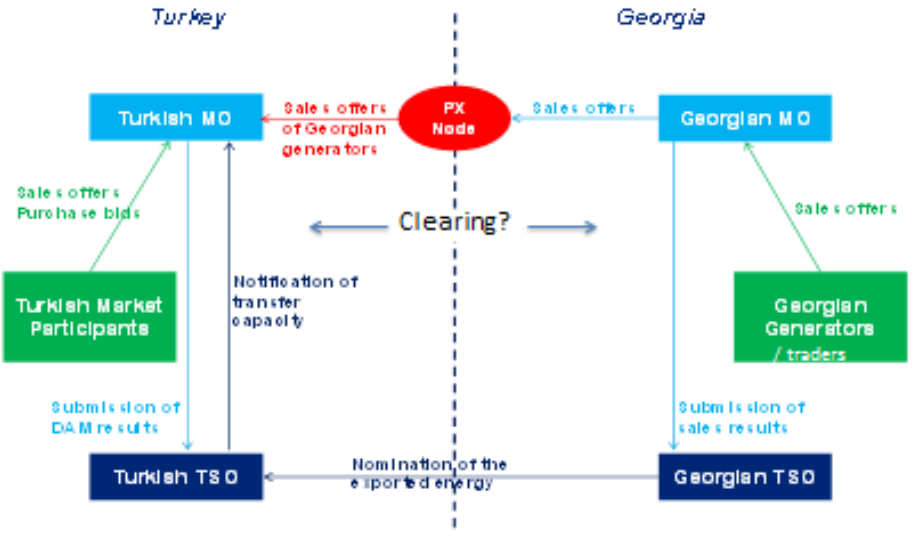
The best possible approach, although, would be the establishment of Clearing House for cross border trade between Georgia and Turkey.

In principle, the Clearing House might be an existing bank or commodities house, or it could be newly established special purpose entity. (For example, Georgian Stock Exchange (gse) can set subsidiary or daughter company be a clearinghouse). Anyone who has appropriate provision to act as a clearinghouse, could enter the market – equity adequacy, proper corporate governance, established risk management procedures and processes, proper IT equipped and some other mandatory requirements are typical requirements to be entitled as Clearing House. This provision will be the product of a competitive tendering process and will operate under a clear set of rules that are transparent to clients and clearing house members. Clearinghouses in other countries sometimes provide services to only one exchange; others serve a group of exchanges. What is important for cross-border trading Georgian clearing house should be recognized as eligible clearing member for international Central Counterparties if Georgian electricity has to be traded cross border.

In future Georgia should structure its energy products according to established practices on Power exchanges:

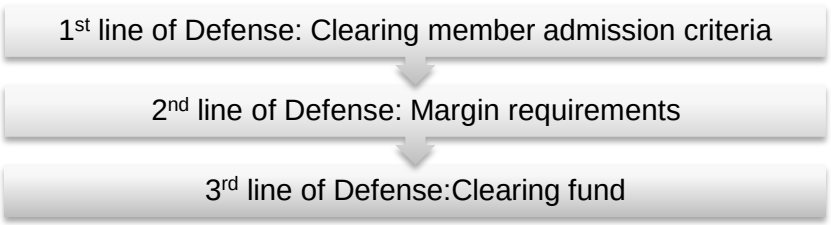
- Spot Markets
- Derivatives
  - With physical delivery obligations
  - With Financial delivery obligations

Figure 5: Pricing Zone on EPIAS Power Exchange - Clearing



The daily activities of the market clearinghouse (MCH) include: reporting (monitoring), clearing, funds administration, real-time surveillance, information dissemination and to ensure that all trades are settled in accordance with market rules, even if a buyer or seller becomes insolvent prior to settlement. Along with the daily activities, the MCH performs periodical administration related to: membership, funds, reporting, dispute resolution, ex-post operations monitoring, and management of instructions and notices. Figure 5 shows the explicit functions of the MCH described by the “Three Lines of Defense” in its organizational structure.

Figure 6: Three Lines of Defense



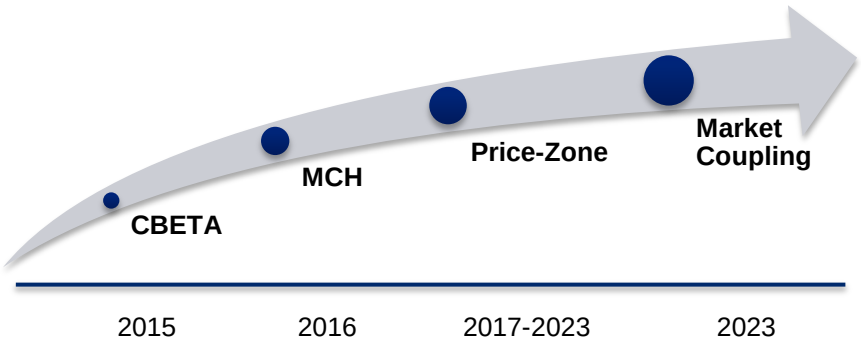
Steps that should be completed for this mechanism to become operational:

- Establishment of a Georgian MO (or determination of a responsible central body)
- Preparation of MO-MO trading agreement that covers the details of the mechanism and responsibilities of the both parties
- Definition of operational procedures for Georgian generators (submission of offers, daily planning and scheduling, collateral liabilities, payments, etc.)
- Updating the necessary regulations (balancing and settlement, collaterals, daily payments etc.) corresponding to the defined operational procedures
- Development (or purchasing, leasing, etc.) of the software that will be used for offer submission by market participants in Georgia
- Enhancing the coordination between the MO and TSO in Georgia, and TSO’s of both countries.

In order to establish competitive trading between Turkish and Georgian Power Markets, the following actions need to be taken:

- Bring consensus for the MCH development amongst the MoE, GSE, ESCO and the gse.
- Invite Takasbank and EPIAS for possible cooperation and suggestions.
- Prepare required legislative framework, mandates for market clearing, registration-licensing and regulation.
- Establish a parallel process with WB and GoG stakeholders for IT infrastructure-hardware and software with available WB loan.
- Ensure that GoG stakeholders are leading the process, with required G4G technical assistance.
- Changes in Cross Border Electricity Trading Agreement (CBETA) and the Interconnection Operations Agreement (IOA) to allow simultaneous bidirectional trade, daily capacity allocation and price zone trading.
- MO to MO agreement needs to be developed and signed.
- New customs regulations in Georgia must be developed to allow bidirectional, simultaneous trading.
- MoE, GSE, MO and GNERC should continue working closely with Turkish counterparties to harmonize technical and commercial regulations for cross border power trading.
- MoE may consider gradually moving the clearing of bilateral trading to the MCH
- MoE may consider to open the ancillary services procurement to sub-regional market.

Figure 7: Next Steps



7. MARKET COUPLING AND IMPLICIT AUCTIONS

In the medium term, following the start of an operational balancing market in Georgia with at least hourly settlement periods and introduction of a day-ahead market (centralized electricity spot market where “next day delivery” hourly products are traded), an implicit auction is recommended as a possible efficient trading method in the market coupling of two countries.

This market coupling approach has important differences from trading through a PX node. In this arrangement, Georgia would have its own day-ahead market operated by the Georgian MO. There would be separate market mechanisms that are run by the MO’s of the two countries. The Georgian MO may have its own market software or can contract for market software. Day-ahead market procedures of the two countries would be conducted separately and market information would be sent to the coupling software. Market results combined with the coupling results would be announced to the market participants. The role of the TSO’s for both countries are the same as the other trading mechanisms; determination of the transfer capacity, nomination and control of the energy flow on the interconnection, etc.

From all of the mechanisms described above, it is highly recommended to implement market coupling and using implicit auctions for cross border trade. Implicit auctions do not require having a capacity allocation right and guarantees the optimal utilization of transmission capacity. By conducting implicit auctions, exporters avoid the unclear decision of whether transmission capacity should be purchased first and then the energy should be sold second, or vice versa. With an implicit auction methodology, all qualified participants become capable of trading in the market mechanism. However, prior to implementation of an implicit auction mechanism, Georgia must have an hourly designed market mechanism, and should also have the corresponding collateral mechanism. After implementation of a day ahead market mechanism in Georgia, EPIAS might provide settlement and invoicing services to Georgian side, within the context of a coordination agreement.

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