ENERGY COOPERATION BETWEEN THE EU, THE LITTORAL STATES OF THE BLACK & CASPIAN SEAS AND THEIR NEIGHBOURING COUNTRIES

PROGRAMME FUNDED BY THE EU

ACTIVITY COMPLETION REPORT

PREPARATORY ACTIVITIES FOR THE AZERBAIJAN, GEORGIA, TURKEY REGIONAL ELECTRICITY MARKET

GEORGIA: TYNDP review & System Services Concept Initial Assessment

(AHEF 121.AZ, & 122.GE)

INOGATE Technical Secretariat and Integrated Programme in support of the Baku Initiative and the Eastern Partnership energy objectives

Contract No 2011/278827

A project within the INOGATE Programme

Implemented by:
Ramboll Denmark A/S (lead partner)
EIR Global sprl.
The British Standards Institution
LDK Consultants S.A.
MVV decon GmbH
ICF International
Statistics Denmark
Energy Institute Hrvoje Požar

Document title	**Activity Completion Report** **"GEORGIA: TYNDP REVIEW & SYSTEM SERVICES CONCEPT INITIAL ASSESSMENT"** **(AHEF 121.AZ, & 122.GE)**
Document status	Final

	Name	**Date**
Prepared by	Konstantinos Perrakis, Nikos Tourlis and Nikos Patsos	01/04/2016
Checked by	Nikos Tsakalidis Adrian Twomey	04/04/2016
Approved by	Peter Larsen	24/05/2016

This publication has been produced with the assistance of the European Union. The contents of this publication are the sole responsibility of the authors and can in no way be taken to reflect the views of the European Union.

Acronyms

CBA	Cost Benefit Analysis
EC	European Commission
ENTSO-E	European Network of Transmission System Operators for Electricity
ESCO	Electricity System Commercial Operator (of Georgia)
EU	European Union
GE	Georgia
GNEWRC (also GNERC)	Georgia National Energy and Water supply Regulatory Commission
GSE	Georgian State Electrosystem
ITS	INOGATE Technical Secretariat
NRA	National Regulatory Authority
PV	Photovoltaic
RES	Renewable Energy Sources
SEW	Socio-Economic Welfare
SoS	Security of Supply
TSO	Transmission System Operator
TYNDP	Ten Year Network Development Plan

Table of Contents

1 PART 1 – EUROPEAN COMMISSION

1.1 Background

Assignment Title:	122.GE "Capacity improvement an preparatory actions for GSE to undertake its future TSO responsibilities with a focus on internal network strengthening and cross-border trading operations" (Georgian State Electrosystem)
Country and Dates:	Georgia, January 2015 – October 2015
Beneficiary Organisation(s):	Georgian State Electrosystem (GSE)
Beneficiary Organisation's key contact persons – name and e-mail address	Mr. Sulkhan Zumburidge, Director sulkhan.zumburidze@gse.com.ge
Deliverables Produced	A report comprising two parts: An assessment of The Ten-Year Transmission Network Development Plan of Georgia For 2015-2025 and A first hand review of the 'System Services Concept' paper
Expert Team Members	Mr Nick Tourlis, Senior Electricity Markets/Convergence Expert Mr. Konstantinos Perrakis, Senior Electricity Regulatory Expert

1.2 Essence of the Activity

The focus of the activity was to: engage GSE, Azerenerji and The Turkish grid operator TEIAS in a dialogue for the future development of a regional electricity market in southern Caucasus. It further aimed to provide the necessary knowledge base and practical guidance for the further development and standardization of planning functions of GSE as well as the legal & regulatory requirements for cross border trading in Azerenerji's strategy.

The specific objectives related to the mere Georgian part of the regional project comprised:

- A review the on-ongoing practices in regards to transmission planning in Georgia and compare with the relevant practices followed by EU TSOs as well as the requirements for contributing to ENTSO-E planning;
- Development of proposal amendments (if necessary) to current planning processes, document the planning steps and outline the transmission planning report in order to be informative and meaningful for the network users;
- Getting GSE acquainted with the EU experience in regards of development and integration of electricity markets;

1.3 Key Findings

GSE being a proactive and prudent TSO has in the meantime between the application and commencement of the project progressed considerably with regards to the development of the Ten Year Network Development Plan (TYNDP) 2015-2025. By June 2015 the GSE has communicated to the INOGATE team that a review of the already agreed TYNDP would be beneficial in view of the future revisions of the plan and that another work of GSE titled: 'Concept of System Services Arranging' would have been an interesting area for cooperation with INOGATE. It was therefore decided that the scope of work would be refined while staying relevant to the specific objectives of the project into two parts, namely:

- An assessment of The Ten-Year Transmission Network Development Plan of Georgia For 2015-2025 and
- A first hand review of the 'System Services Concept' paper

As a consequence there has been an assessment from INOGATE's end on the two aforementioned documents during the period between July and October 2015, which is presented herewith in this report.

Overall the GE TYNDP comprises a remarkable and noteworthy effort by a TSO in a region where transmission planning is not prudently exercised or it is not properly communicated in order to satisfy an important dimension of its usefulness – that is to provide a transparent and reliable set of information to current and prospective transmission system users.

Moreover the content of the Georgian TYNDP 2015-2025 is complete, methodologically sound and very well presented. On these premises the present review was submitted to GSE as an independent opinion having regard on several EU implementations of Transmission Planning documents and also the requirements placed on EU TSOs under the European and national relevant legal and regulatory framework. According to the feedback received by GSE three parties which have reviewed the TYNDP have coincided in certain remarks. The update of the TYNDP will take into consideration these comments on a priority order.

It is positively acknowledged that the Concept paper envisages a market-oriented way for provision of System services by the TSO, including participation of end-consumers of electricity. The Concept paper describes market aspects and includes several details concerning treatment of System Services in such a market-oriented way, including features such as capacity payments etc. Furthermore, timelines for procurement of some services are provided. While the definition, capabilities of the service provides and cost recovery issues are discussed as appropriate there are two major issues that need further consideration. The first one relates to the manner that the system services may (or may not) be procured in the market and how their procurement would be organized in the frame work of the overall Georgian Electricity Market Model. The second one refers to cost recovery issues and can be summarized under the observation that the cost of system services provision is mostly accounted on enabling the provision of the service (i.e. procurement and installation of the required equipment and communication infrastructure) and largely neglects the cost of the provision of the service (availability and/or usage cost).

1.4 Ownership and Benefits of the Activity

GSE following the development, consultation and subsequent review of the Georgian TYNDP 2015-2025 has received comments and suggestions for improvements by three external reviewers (which also basically provided some sort of guidance and assistance during the development of the TYNDP at an early stage) including the INOGATE team of experts. The main benefits of the activity for the Beneficiary are:

1. Enhanced investor confidence due to the third part positive evaluation of the ambitious transmission network investment plan

2. Enhance general public confidence in that the required investments are needed, they are properly costed, assessed and prioritised

3. Practical guidance on the level of integration required between the method of procurement of system services and the overall Electricity Market Model.

4. Increased awareness on how European TSOs and the ENTSO-E is addressing similar subjects in regards of transmission network planning and system services

The Beneficiary took ownership in the following way: The Georgian TSO following a consultation with the Ministry of Energy and GNERC has developed a Ten Year Network Development Plan TYNDP 2015-2025. The TYNDP is the key document describing "what the power system will look like in 2025". The TYNDP analyses new transmission projects collectively serving national & regional integration purposes that fall into three general categories: a)those that are merely cross-border projects; b)internal projects and c) those which are considered local. The TYNDP contains a technical assessment of all projects and proceeds with the Cost-Benefit Analysis (CBA) only for the projects included in the cross-border and internal categories.

1.5 Recommendations

Project finance for the TYNDP projects is sought to be performed by multisource borrowing and by properly blending of different financing instruments (grand/loans). The use of EU/NIF for the implementation of the Georgian-Turkish asynchronous interconnection was quite a success. GSE is currently discussing with IFIs and national stakeholders a possible replication of this EU/NIF experience - this time regarding the extension of the internal Georgian electricity transmission network.

Further elaboration is proposed in order to describe a possible way for adopting a market approach for the introduction and provision of System Services in Georgia on the basis of the hereby reviewed Concept Paper. The specific decisions that need to be made in regards of the System Services should be aligned to the overall Georgian Electricity Market Model. This of course is a decision that needs to be taken in coordination with the plans of the Ministry of Energy and in particular with regards to the time-schedule/roadmap for the introduction of a more competitive wholesale market in Georgia.

1.6 Challenges Faced

One of the key challenges faced during this assignment is that European legislation especially after the adoption of the 3rd Energy Package has become quite detailed and specific particularly in the areas of generation authorisation, Regulated Third Party Access and Unbundling of the Transmission System Operators. While these legal and regulatory provisions have gradually emerged as a mechanism for the integration the national European markets into the Internal Electricity Market their validity and transferability is becoming increasingly challenging in countries outside the EU. Georgia, on the other hand, as an Eastern Partnership country and in the light of the Deep and Comprehensive Free Trade Agreement which was signed with the EU as we well as its application to become a member of the Energy Community Treaty will eventually have to work towards the legal and regulatory integration with the EU. Another key limitation in this project had to do with time available particularly in respect of the second area on which our review has concentrated i.e. the concept for the development of system services. This report has eventually managed to indicate the areas on which a more thorough review is anticipated to develop under a future cooperation with GSE

1.7 Impact Matrix

There is no Cross Border Cost Allocation in the notion of Article 12 of Regulation (EU) 347/2013 and the investments are regulated. Hence, investment recovery is through the electricity tariffs. There are no plans for merchant interconnectors in the notion of Article 17 of Regulation (EC) 714/2009. On top of that financing of the internal network, which in part is needed for accommodating the transit flows as well, needs to be performed by means of a project finance scheme. It is therefore of an utmost importance that the concerned stakeholders including the tariff customers by which this investments are expected to be recovered to be adequately informed. The external review has therefore added to the credibility of the assessment and prioritization of investments that the Georgian transmission needs and has also set the basis for a continuous improvement process.

2 PART 2 - BENEFICIARIES

2.1 Executive Summary

The present report comprises the final deliverable of an assignment carried out under the Ad-Hoc Expert Facility (AHEF) of "INOGATE Technical Secretariat & Integrated Programme in support of the Baku Initiative and the Eastern Partnership energy objectives" project, funded by EC/Europeaid. Two applications for provision of Technical Assistance have been combined in this technical assistance assignment as they all shared common characteristics and comprised merits for addressing them collectively. The applications included:

- 121.AZ Development of Azerenerji's Cross-border Exchanges strategy and building its capacity towards that aim (Azerenerji)
- 122.GE "Capacity improvement an preparatory actions for GSE to undertake its future TSO responsibilities with a focus on internal network strengthening and cross-border trading operations" (Georgian State Electrosystem)

as they are filed under Component B: Electricity & Gas in the AHEF Registry. The two applications comprised obvious benefits should they were considered as a merged one. Indeed the joint evaluation and appraisal of the applications has led to the development of a single regional project titled AHEF 121.AZ/122.GE: "Preparatory activities for the Azerbaijan, Georgia, and Turkey Regional Electricity Market". The present report reflects on the activities performed in connection to the Georgian side of the assignment since delays on the Azeri side of the project prevented it to proceed as originally planned. The Georgian part of the assignment has been implemented over the period of January 2015 – October 2015.

2.1.1 Objectives of the study, key findings and recommendations

According to the ToR the assignment had to engage GSE, Azerenerji and TEIAS in a dialogue for the future development of a regional electricity market in southern Caucasus. It further aimed to provide the necessary knowledge base and practical guidance for the further development and standardization of planning functions of GSE as well as the legal & regulatory requirements for cross border trading in Azerenerji's strategy.

The specific objectives of the task included:

For GSE:

- To review the on-ongoing practices in regards to transmission planning in Georgia and compare with the relevant practices followed by EU TSOs as well as the requirements for contributing to ENTSO-E planning;
- To propose amendments (if necessary) to current planning processes, document the planning steps and outline the transmission planning report in order to be informative and meaningful for the network users;
- To get acquainted with the EU experience in regards of development and integration of electricity markets;

For Azerenerji:

- To understand and validate the export potential in terms of volumes and prices;
- To map the gaps and propose actions that need to be taken in terms of legal, regulatory and commercial arrangements so as to enable Azerenerji's participation to a regional market;
- To understand the context and discuss the key features of capacity allocation and auction mechanisms which need to be in place for the cross border exchanges to develop.

For All Beneficiaries:

- To get acquainted with the EU experience with regard to cross border arrangements in the EU;
- To discuss whether these principles would be in all or in part useful for developing a regional market in southern Caucasus.

2.1.2 Methodology and outputs

The approach involved mixed field work and homework effort that involved a mission to both countries in February 2015. The assignment commenced earlier on in January 2015 with homework and development of the necessary knowledge base in relation on the EU practices with regards to electricity transmission planning and cross border trading. Forward to this development, the purpose of the mission was to discuss the guiding ideas over which the analysis would deploy and also to get feedback on specific issues that were of an immediate and specific interest to the beneficiaries.

As far as Georgia is concerned, one of the results of the mission was that GSE has meanwhile between the application and commencement of the project progressed considerably with regards to the development of the Ten Year Network Development Plan (TYNDP) 2015-2025. On the other hand delays on the data collection process on the part of the project that regarded Azerbaijan led to a decomposition of the regional project so that the activities in the two countries to follow their own pace.

By June 2015 the GSE has communicated to the INOGATE team that a review of the already agreed TYNDP would be beneficial in view of the future revisions of the plan and that another work of GSE titled: 'Concept of System Services Arranging' would have been an interesting area for cooperation with INOGATE. It was therefore decided that the scope of work would be refined while staying relevant to the specific objectives of the project into two parts, namely:

- An assessment of The Ten-Year Transmission Network Development Plan of Georgia For 2015-2025 and
- A first hand review of the 'System Services Concept' paper

As a consequence there has been an assessment from INOGATE's end on the two aforementioned documents during the period between July and October 2015, which is presented herewith in this report. With a view to conclude on the project objectives which also involved activities at a regional level and in particularly a cooperation with Azerbaijan and Turkey, it has been agreed that GSE in its genuine interest as a TSO in the region will remain available and participate in a tri-lateral workshop

should this take place in Baku, Azerbaijan as it is also mentioned in the project's ToR.

2.1.3 Limitations and further work

The aim of the study was to develop the necessary background for the beneficiaries in order to contribute in their turn in the national dialogue for the future development of the Southern Caucasus Regional electricity market. One of the key limitations identified during this assignment is that European legislation especially after the adoption of the 3rd Energy Package has become quite detailed and specific particularly in the areas of generation authorisation, Regulated Third Party Access and Unbundling of the Transmission System Operators. While these legal and regulatory provisions have gradually emerged as a mechanism for the integration the national European markets into the Internal Electricity Market their validity and transferability is becoming increasingly challenging in countries outside the EU. Georgia, on the other hand, as an Eastern Partnership country and in the light of the Deep and Comprehensive Free Trade Agreement which was signed with the EU as we well as its application to become a member of the Energy Community Treaty will eventually have to work towards the legal and regulatory integration with the EU. On the contrary Azerbaijan has so far shown limited progress or a solid plan to implement reforms in the electricity sector in order for the latter to gradually approximate primarily with those market rules that are currently seem to shape up in Georgia and Turkey and later on with the EU cross border trading rules. Another key limitation in this project had to do with time available particularly in respect of the second area on which our review has concentrated i.e. the concept for the development of system services. This report has eventually managed to indicate the areas on which a more thorough review is anticipated to develop under a future cooperation with GSE.

2.1.4 Structure of the report

The report comprises two major parts each one comprising a distinct thematic priority namely;

- An assessment of The Ten-Year Transmission Network Development Plan of Georgia For 2015-2025 which extends in Chapters 2 to 7, and
- A first hand review of the 'System Services Concept' paper which comprises Chapter 8

2.2 Approach and assessment criteria

In the present document, the transmission planning process, particularly in respect to the TSO methods, operational routines and structure of the transmission network development plan in Georgia is performed. To this objective, the main features of the Georgian TYNDP (GE TYNDP[1]) are analyzed as follows:

- The approach for treating the various subjects in the GE TYNDP is briefly described;
- The relevant EU practices are briefly mentioned (both at national and EU level, i.e. related to the ENTSO-E TYNDP development process) and remarks are provided vs. the approach taken in the GE TYNDP;
- The TYNDPs of France, Ireland and Greece were considered as benchmarks.

The document is structured as follows:

The overall context

- The electricity sector in Georgia (growth of sector, market conditions, decision-making bodies, etc.).
- 'History' and legal basis for the development of the GE TYNDP.

General features of GE TYNDP

- Overall structure, completeness and clarity of the GE TYNDP (methodology, presentation of results, etc.).
- Overall approach (sequence of steps followed, method followed for each step)
- Models and Tools used.

Technical features of GE TYNDP

- Planning criteria
- Main hypotheses (e.g. scenarios for demand , future generation, analysis of the regional context i.e. supply/demand in neighboring countries, interconnections, market issues, etc.)
- System adequacy requirements
- System flexibility requirements
- CBA approach
    - Analysis of projects' benefits
    - Cost of projects.
- Technical analyses performed
- Documentation / presentation of results

Treatment of regulatory issues

- Competencies regarding the GE TYNDP (drafting, opinionating, approval process).
- Involvement of stakeholders (e.g. public consultation).
- Discussion (qualitative) on the impact of TYNDP on transmission tariffs.

[1] http://www.gse.com.ge/new/wp-content/uploads/2015/05/TYNDP_GE_2015-2025_ENG.pdf

2.3 The Overall Context

2.3.1 The electricity sector in Georgia

The Georgian electricity sector has been deregulated over the last decade. The state electricity company has been unbundled into generation, transmission and distribution companies, and the generation and distribution sector is mostly privately owned. An independent regulator, Georgia National Energy and Water supply Regulatory Commission (GNEWRC), regulates the sector, while the Ministry of Energy oversees the whole sector of electricity in Georgia, sets policies and is responsible for facilitating large investment projects.

Installed generation capacity in Georgia totals 3530 MW[2] of which 2,800 MW is Hydro Power Plants. The other 730 MW are thermal power plants mainly used to meet winter demand. The average annual electricity generation in 2011-2012 totaled to 9,944 GWh, of which approximately 76% was generated by hydro plants, 24% at thermal power plants and the rest was imported. Peak load for 2014 was 1853 MW[3].

Energy exchange with the neighboring countries is taking place as follows: Power transit from Russia and Azerbaijan to Turkey, as well as for bidirectional power exchange between Georgia and Russia, Turkey, Azerbaijan and Armenia.

The electricity sector in Georgia is regulated to a significant extent. Electricity generators are divided into regulated, partially regulated and deregulated units. Regulated generators are HPPs with seasonal storage. Their tariffs are regulated by GNEWRC and set based on the full-cost principal (two of them, Enguri and Vardnili have fixed regulated tariffs of 0.7 USc/kWh). The rest of the regulated HPPs operate under partially deregulated tariffs that have ceiling rates. Small HPPs (less than or equal to 13 MW installed capacity) and HPPs that were built after August 2008 are fully deregulated and can sell their electricity productions with competitive prices either to ESCO or to any other market participant.

ESCO is a market operator and responsible for administration and settlement of direct bi-lateral contracts between the market participants. As a commercial entity, owned by the Georgian State, ESCO is responsible for balancing electricity demand and supply. The notion of balancing the Georgian context however deviates from the commonly accepted set of operations usually referred to as balancing in the EU context. We understand that being ex-post remuneration of deviations from contracted volumes balancing in the Georgian context can be considered as settlement.

Regulated and partially regulated HPPs provide low-cost electricity to regulated retail consumers in Georgia. Most if not all power sold by these HPPs is done so in bi-lateral contracts. GNEWRC calculates the average cost of generating power for each distribution company and the related costs of power from bi-lateral electricity trading is used within their calculations and embedded into retail electricity prices. The prices in the contracts between electricity off-takers and the regulated and partially regulated HPPs are subject to GNEWRC approval.

[2] GE TYNDP, p. 8

[3] GE TYNDP, p.31

In total there are three transmission licensees i.e. SakRusEnergo, EnergoTrans and GSE which also has the role of the national TSO.

EU Practice

EU electricity markets are liberalized, with a strong role of the national regulatory authorities. In addition, there is a strong regulatory framework at EU level.

Remarks

The salient feature of the Georgian power system in comparison with EU practices is that currently the decision making process is centralized, with the Ministry of Energy having the central role. Discussions concerning liberalization of the Georgian power sector are on-going (for example, see the USAID analysis[4]).

2.3.2 History and legal basis for the development and approval of the GE TYNDP

- The Ten-year Transmission Network of Georgia Development Plan for 2015-2025 (GE TYNDP) is the first TYNDP for Georgia.
- The GE TYNDP has been prepared by Georgian State Electrosystem (GSE), the Georgian TSO. GSE is 100% state-owned.
- The GE TYNDP is elaborated according Article 32 of "Law Of Georgia On Electricity And Natural Gas" and the amendment in paragraph 3 of Article 2 of "Law Of Georgia On Electricity And Natural Gas"
- According to the Georgian Law about "Electricity and Natural Gas" GSE shall, in agreement with electricity transmission licensees[5], annually, develop the draft GE TYNDP.

EU Practice

EU Member States used to have different time-horizons for transmission planning, while collaboration between TSOs took place on an ad-hoc basis. Harmonisation of the whole process took place with Directive 72/2009 and Regulation 714/2009:

- At national level, according to Directive 72/2009, TSOs have to develop and comply with a ten-year network development plan (TYNDP) monitored by the national regulatory authority (NRA). The TYNDP is approved by the competent Ministry or the NRA.
- At Regional level, according to Regulation 714/2009 EU Transmission system operators have to establish regional cooperation within the ENTSO for Electricity and, among others, publish a (non-binding) regional investment plan every two years, and may take investment decisions based on that regional investment plan.

[4] http://hydropower.ge/user_upload/5.USAID_HIPP_REPORT_GEMM_2015_AND_ETM_Updated_May_2013.pdf

[5] In total there are three transmission licensees in Georgia.

- At EU level, according to Regulation 714/2009 the ENTSO for Electricity (ENTSO-E) should draw up, publish and regularly update a (non-binding) Community-wide ten-year network development plan (Community-wide network development plan). Viable electricity transmission networks and necessary regional interconnections, relevant from a commercial or security of supply point of view, should be included in that network development plan.

Remarks
The newly established Georgian practice for development of a transmission plan with a 10-yr horizon and annual update complies with the practice of EU Member States at national level. However, although regional features are taken into account in the development process of GE TYNDP (e.g. opportunities for export) there is no evidence for formally established regional collaboration in the development process of GE TYNDP.

2.4 General Features of the GE TYNDP

2.4.1 Overall structure, completeness and clarity of the Report

Main entities as follows:

Major steps for GE TYNDP development (pp. 5, 26):

i. data collection
ii. data processing (scenarios, electricity balances, etc.)
iii. modelling and technical analyses
iv. design of optimal transmission network to remove/mitigate any deficiencies
v. Drafting of GE TYNDP document

The drivers for the GE TYNDP development are clearly identified (pp. 6-8)

- Responding to the (naturally) growing demand in the power system
- Connection of new energy resources / integration of new HPPs into the network;
- Alleviate network bottlenecks; Uninterruptable transmission of the existing generation;
- Fulfillment of single contingency (N-1) criterion (improvement of reliability)
- Increasing network potential with respect to power transit;

Identified projects are categorized in 3 groups[6]:

A. Cross-border projects
B. Internal
C. Local projects (for connection of new HPPs of less than 100 MW of capacity)

CBA has been performed for 11 projects of categories A and B above.

Results are presented for 3 horizons[7]:

[6] p. 12

[7] pp. 81-82

- Three years (2015-2017), i.e. projects for which feasibility studies are already under performance or completed by consultant companies
- Five years (2018-2019), i.e. projects for which feasibility studies have not been started so far.
- Ten years (2020-2025), i.e. projects for which feasibility studies have not been started so far. However, the necessity of such projects has already been determined.

EU Practice

Remarks
The GE TYNDP constitutes an overall well organized document, with structure similar to TYNDPs developed by EU TSOs.

2.4.2 Models and Tools used

The following are mentioned in the GE TYNDP[8]:

- PSS/E software tools for power flow, short circuit and system reliability
- Digisilent Power Factory s/w for harmonic analysis

EU Practice
The above mentioned tools are used by several TSOs in EU.

Remarks
GSE uses state-of-the-art tools for power system analysis, similar to the ones used by TSOs in the EU and around the world.

[8] p. 29

2.5 Technical Features of the GE TYNDP

2.5.1 Planning criteria

The GE TYNDP is developed using to the following planning criteria[9]:

1) *Planning of the transmission network shall be based on maintaining the standard power quality parameters under forecasted load and generation values;*
2) *Transmission network development planning shall provide avoidance of system emergencies; and*
3) *implementation of system stability measures during expected contingencies that may be caused by:*
   a) *Failure of a single system element (N-1);*
   b) *Failure of any system element plus emergency outage of one thermal/hydro power unit (N-G-1);*
   c) *Failure of any system element during maintenance outage of other element (N-1-1).*

EU Practice

Remarks
The GE TYNDP uses planning criteria similar to the ones adopted by EU TSOs.

2.5.2 Main hypotheses

(Scenarios for generation and demand -sources, methodology, prospects for cross-border trade, supply/demand in neighboring countries, interconnections, market context)

The Ministry of Energy[10],[11] provides the forecasts for demand[12] and generation[13], as well as the system development strategy[14]

The estimated annual demand growth rate of 5% approved by the Ministry of Energy is applied as the 'base' scenario, along with 3% and 7% growth rates for "optimistic" and "pessimistic" cases.

Concerning generation prospects, the following categories are assumed for the 'base' scenario[15]:

- Category 1 Power plants under construction, which are provided with relevant executed Memorandums;

[9] pp. 24-25

[10] http://www.energy.gov.ge/projects/pdf/news/Electricity%20DemandSupply%20Scenario%20of%20Georgia%2020152030%201096%20eng.pdf

[11] http://www.energy.gov.ge/projects/pdf/news/List%20of%20Power%20Plants%201105%20eng.pdf

[12] p.11, 60

[13] p.26, 60

[14] p.26

[15] p.71

- Category 2 Power plants that are objects of interests formally expressed by reputable investor companies, which feasibility studies have been commenced;
- Category 3 Large strategic power plants of country wide importance, which feasibility studies will commence in the nearest future.

The scenario with 5% demand growth and assuming all plants (categories 1, 2 and 3) are installed is used for the GE TYNDP calculations. The rest of the scenarios are also used for sensitivity calculations.
The GE TYNDP assumes a significant extent to projections regarding exports to neighboring countries: 36% of the generated energy in 2025 will be exported[16].

EU Practice
While demand forecasting is in most cases entrusted to the TSO in several countries in Europe, future generation capacities and their construction schedules are retrieved by the authority that grants generation licenses (e.g. NRA or Ministry as the case might be). TSOs develop also generation adequacy studies in order to establish an own view on the security of supply levels but also provide market signals[17] to the prospective generation investors as to where and what type of new capacities might be required by the system during the planning horizon.

Remarks
Cross-border power exchange is one of the key drivers of the GE TYNDP. Thus, more detailed presentation of such prospects and opportunities should be available in the TYNDP (or in referenced sources).
While the demand forecast developed and agreed with the Ministry of Energy is an overall good practice there is little information on the methodology and the key drivers considered for the development of the scenarios. For instance GDP increase and demographic development demonstrate good correlation with the long term development of the electricity consumption.
On the other hand, though electricity consumption is adequately used for the development of the supply/demand balance scenarios the evolution of the annual/seasonal peak demand forecasting is hardly explained. Contrary to the evolution of electricity consumption peak demand seems to be correlated most with temperature. Considering energy balances without the estimation of Loss-of-load-probability (LOLP) as a measure of adequacy may least to over-dimensioning. The issue of adequacy is also pointed out in the following paragraph.

[16] GE TYNDP, p. 74

[17] This is perhaps an area where Georgia is rather different to most of the EU countries in terms of generation development over the past decades. In Europe most of the new generation capacities have recently came as either RES or natural-gas fired power plants. With the former there is limited site selection flexibility whereas in the case of the latter several regulatory tools including transmission charges have been adopted. Georgia on the contrary seeks to develop its remainder hydropower potential and therefore generation expansion planning seems to be highly coordinated.

2.5.3 Analysis of system adequacy requirements

As already noted previously, the Georgian generation system in the next few years will become 'over-adequate' by 'design', i.e. due to the planned HPPs to be installed by 2025. By 2025 the Georgian power system is designed to export about 35% more electricity than domestic demand.

EU Practice

Electricity systems in the EU, being since several years now in a 'mature' stage, aim more to increase interconnectivity between them as well as to increase flexibility, in order to face challenges such as facilitating and fully establishing the internal electricity market, integrate intermittent RES (PV, wind) and reduce overall costs by sharing reserves.

Remarks

The centrally planned power system of Georgia aims to expand in order to become a significant exporter of electricity to neighboring countries in a ten year horizon. In such a context, the inherent risk of changing conditions (need for imports, costs of domestic electricity, etc.) should be properly evaluated and counterbalanced.

2.5.4 Analysis of system flexibility requirements

The GE TYNDP does not refer to system flexibility issues. The need (or not) for flexibility, the methodology for evaluation of flexibility opportunities and the assessment of options in terms of their techno-economic performance would be expected (particularly in regards to the system operation close to the 2025).

EU Practice

Flexibility tends to become an issue in several power systems in EU due to high penetration of intermittent RES (Wind, PV plants) and high stock of 'inflexible' generation (nuclear, coal, lignite plants).

Remarks

Flexibility is not an issue for the Georgian power system (large installed capacity of Hydro plants, several OCGTs, very limited –if any- intermittent generation). On the other hand there is substantial dependence on the Russian system for balancing over certain periods through the year. Perhaps the deployment of adequate balancing resources would make economic sense at a national level (depending on the cross-border balancing cost).

2.5.5 CBA approach

2.5.5.1 Analysis of projects' benefits: The projects were appraised against the following criteria:

- **Increase of Network Transfer Capacity,** providing estimate of the incremental power transfer capacity between two cross-border points of transmission system (MW);
- **Project Cost,** specifying estimated total project value (mln Euros);

- **Social and Environmental Impacts,** reflecting level of certainty with respect to the planned
- **commissioning time** of the project and its impacts on the environment;
- **Security of Power Supply,** evaluating project impact on reliability status of the connected part of the network;
- **Socio-Economic Welfare**, specifying annual income generated by operation of the project (mln Euros/year);
- **Integration of Renewable Energy Sources (RES)**, estimating installed capacity of the renewable power plants (major Georgian HPPs) integrated into the network (MW) via the planned project;
- **Effect on Transmission Losses (Energy Efficiency)**, comparing losses (in MWs) relevant to the scenarios with and without project (or its specific components);
- **Effect on CO2 Emissions**, specifying changes in carbon emissions in result of project implementation as proportional coefficient determined for RES;
- **Technical resilience / system safety margin**, evaluating project influence on entire system reliability;
- **Reliability / Flexibility,** specifying dependence of the specific project on various factors (RES
- integration, load growth, etc.); Project is assessed as flexible if its implementation remains necessary for any alternative development scenarios.

Each project is assessed in terms of compliance with above criteria applying the scores from 0 to 3.

2.5.5.2 Cost of projects

The cost of new projects / investments in the GE TYNDP is calculated based on unit costs as in pp.49 & 82 of the document.

EU Practice

Remarks

a) The scores shown as results of the CBA[18] do not provide quantitative information regarding the benefits of the proposed investments.
b) In several projects the GE TYNDP states that the 'Feasibility study is ongoing'[19]; this comes in contrast to the fact CBA is provided as economic decision making tool for this category of projects.
c) The EU Regulators, working together under ACER coordination, have recently compiled a study[20] concerning costs of transmission infrastructure. The output (report) has already been forwarded to GSE for future reference.

[18] pp. 104-109

[19] pp. 84-103

[20] http://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Publication/UIC%20Report%20%20-

2.5.6 Documentation / presentation of results

The identified projects and investment needs in the GE TYNDP are described according to the following template[21]:

- **Project Name**;
- **Project importance**: (e.g. 'System' or 'Transit')
- **Commissioning Year**;
- **Forecasted Investment,** specifies the estimated project implementation costs in million Euros; The values derived applying Method 1 are marked in dark blue, and the same determined by Method 2 in red.
- **Current Status** describes ongoing progress status of specific project.
- **Capacity of Integrated HPPs**, specifies installed capacities (in MW) of the HPPs to be integrated into the network by relevant project.
- **Reduction of Losses** specifies incremental network losses to be incurred without specific project or any of its critical elements.
- **Increase of Network Transfer Capacity** (Normal/Emergency Modes), specifies incremental network transfer capacity of the network (in MW) under steady state and contingencies (loss of parallel line) after implementation of specific project.
- **Project Flexibility Level**, specifies dependence of the project implementation on forecasted commissioning/network interconnection dates of HPPs, bulk increase of the load at specific node, etc.
- **Project Components** lists appropriate OHLs, autotransformers, reactors and other elements of the transmission system included into the specific project scope.
- **Purpose of Project** specifies project objectives.
- **Brief Project Description** provides short narrative about project purpose, terrain conditions, etc.

Remarks The following remarks are drawn from the description of the proposed projects (pp. 83-118):

-The GE TYNDP provides only 'scores' for parameters like Socio-Economic Welfare (SEW), losses, SoS, which should be fully monetized in order to provide a quantitative assessment.
-There is no detailed description of the CBA for the 11 projects – a more elaborated CBA description per project was anticipated (please see below description)
- Investment costs: the estimates according to the two methods used in the GE TYNDP differ by more than 50% ('Simplified method' vs. the FICHTNER method).

%20Electricity%20infrastructure.pdf

[21] p.84

From the above it may be stated that the GE TYNDP provides a comprehensive description of new projects as well as a qualitative assessment of their benefits, an estimate of their cost and a plan for their implementation. However, these elements alone do not provide to stakeholders enough information in order to assess the necessity and economic justification of the proposed projects. The GE TYNDP has to be complemented with full information concerning the techno-economic viability of the proposed projects[22]. This requirement becomes more critical for the case of the proposed interconnections, as the results of the techno-economic analysis depend heavily on assumptions about the electricity sector (evolution of demand, development of new generation, level of wholesale electricity prices, need for imports, etc.) of several neighboring countries (Russia, Turkey, Armenia, Azerbaijan, Iran).

2.5.7 Technical analyses performed

The following studies have been performed for checking the planned network reliability status[23]:

- Power flow analysis
- Short circuit analysis
- Voltage analysis
- Stability analysis
- Harmonic analysis

EU Practice

Remarks
The GE TYNDP performs a full set of technical analyses.

2.6 Regulatory Issues Regarding the GE TYNDP

2.6.1 Competencies regarding the TYNDP (drafting, opinionating, approval process)

The following have been identified in the GE TYNDP:

- Development scenarios and visions were prepared by the Ministry for Energy and GSE (p.28)
- Commissioning years of the planned hydropower plants were provided by the Ministry for Energy
- The GE TYNDP is prepared by GSE and submitted to the Ministry of Energy and the Georgian National Energy and Water Regulatory Commission (GNEWRC)
- The GE TYNDP is discussed and agreed by the Government
- The GE TYNDP is approved by the Ministry of Energy
- The implementation of the GE TYNDP is controlled by the Ministry of Energy
- Tariffs for transmission and dispatch services are approved by GNEWRC

[22] See also previous remark of previous paragraph, about providing CBA scores for projects for which 'Feasibility study is ongoing'

[23] p.12

EU Practice

TSOs prepare the national TYNDPs based on own methodologies and assumptions, of course respecting national official forecasts concerning the country's economic growth, etc. The NRAs or competent Ministries approve the national TYNDPs. NRAs monitor the implementation of the TYNDP.

Remarks

The Ministry of Energy in Georgia has an important role regarding the TYNDP process: provides the forecasts for demand[24] and generation[25], as well as the system development strategy[26] and approves and monitors the TYNDP.

2.6.2 Involvement of stakeholders

The Ministry of Energy, GNEWRC, GSE, the electricity transmission licensees, other agencies and interested (parties) took part in discussions of GE TYNDP[27]. There is no evidence that a formal public consultation has taken place.

EU Practice

According to Directive 72/2009, '*The regulatory authority shall consult all actual or potential system users on the ten-year network development plan in an open and transparent manner. Persons or undertakings claiming to be potential system users may be required to substantiate such claims. The regulatory authority shall publish the result of the consultation process, in particular possible needs for investments.*'

Remarks

Major stakeholders took part in the discussions regarding the GE TYNDP[28]; however it is not clear if / how all interested parties participated in the process.

There is no direct reference to a formal public consultation on the GE TYNDP. Not available any minutes / results of discussions held during the GE TYNDP development process.

2.6.3 Impact of the TYNDP on transmission tariffs

Total forecasted investment value of the GE TYNDP projects amounts to **623-824 million Euros.** This gives an average of 70 MEuros/year[29].

[24] p. 11, 60

[25] p.26, 60

[26] p.26

[27] P.2

[28] See back of cover page of the GE TYNDP: "*Ministry of Energy, Georgian National Energy and Water Supply Regulatory Commission the transmission system operator, electricity transmission licensees, other agencies and interested took part in discussions of Ten Year Network Development Plan*".

[29] As a comparison, the CAPEX regarding Transmission for Greece has been of a similar order of magnitude, while the country's system is 5 times bigger energy-wise and 3 times bigger in terms of installed generation capacity. However, this is a rather 'mature' system and does not include costs for new interconnections of islands (Cyclades, Crete).

Transmission tariffs are set by the energy regulator, GNERC[30]. The tariff design is a one-part price based on the energy (kWh) transferred, (i.e. energy tariff) and the cost of transmitting electricity is the same regardless of distance within the country, i.e. it is not distance related.
The tariffs for transmitting electricity are as follows:
- for GSE: 0.3 USc/kWh for the 35 -110 -220 kV line, 0.67 USc/kWh for the 6 -10 kV lines
- for SakRusEnergo: to 0.11 USc/kWh
In addition, GSE receives a dispatch tariff of 0.09 USc/kWh.

In the aforementioned USAID document (2013), two options for transmission tariff are discussed:
1. Set two different tariffs for domestic transmission and for export-import purposes;
2. Set one entire tariff for all transmission line users
No further info is available in the above document except the fact that the Government of Georgia spent over €250 million for the new transmission facilities[31], both for export and to improve domestic system reliability.

EU Practice
Costs of transmission investments are recovered through the transmission tariffs imposed to end-users (in some cases also to Generators). According to Regulation EC/347/2013 an analysis of impact on tariffs is performed for projects with cross-border which require EU funding (step accomplished during the cross border cost allocation (CBCA) process performed by the national Regulators.

Remarks
There is no analysis of the impact of the GE TYNDP on the transmission tariffs. Although this is not a practice even in the EU region, it should be taken into account that such analysis becomes important in cases where the volume of investments becomes significant, as is the case of Georgia,

2.7 Conclusions

Overall the GE TYNDP comprises a remarkable and noteworthy effort by a TSO in a region where transmission planning is not prudently exercised or it is not properly communicated in order to satisfy an important dimension of its usefulness – that is to provide a transparent and reliable set of information to current and prospective transmission system users.

Moreover the present text is complete, methodologically sound and very well presented. On these premises the present review is submitted to GSE as an independent opinion having regard on several EU implementations of Transmission Planning documents and also the requirements placed on EU TSOs under the European and national relevant legal and regulatory framework.

[30] http://hydropower.ge/user_upload/5.USAID_HIPP_REPORT_GEMM_2015_AND_ETM_Updated_May_2013.pdf

[31] P.88, although not clear over which period.

The individual remarks per evaluation area (i.e. general, technical and regulatory features of the TYNDP) are envisaged to be considered as the starting point for GSE as soon as a revised version of the TYNDP emerges.

2.8 The System Services Concept

2.8.1 Introduction

Georgian State Electrosystem (GSE) in its competence as the Georgian Transmission System Operator) has recently (July 2015) issued a document titled: 'Concept of System Services Arranging' (the 'Concept paper').

The Concept paper addresses with the following System Services for the Georgian Power System:

1. Frequency Containment Reserve (Primary Reserve)
2. Frequency Restoration Reserve (Secondary Reserve)
3. Replacement Reserve (Tertiary Reserve)
4. Voltage Control
5. Black Start Capability
6. Transmission Losses
7. Synchronous Operation with Zero Exchange

The main drivers for introducing and developing the above services are[32] a) technical, b) economic and c) institutional.

The Concept paper:

i. identifies the types, needs, goals, minimum technical requirements and implementing actors of System Services necessary for Georgian power system.
ii. analyses current technical status of Georgian power system and identifies the plants/units that are in need of rehabilitation in order to be able to provide the aforementioned services.
iii. estimates the expected costs needed for ensuring such rehabilitation and comprehensively introducing system services, as well as their impact on tariffs are calculated.
iv. elaborates on the possible regimes of capacity reserve mobilization through static and dynamic stability simulations.
v. provides for the need of the papers need to l be updated during 2016, after all the details of technical status of power plants in Georgian power system have been determined more precisely
vi. finally, provides a comprehensive Action Plan for full implementation of the proposed 2-stage process and launching of the System Services market in Georgia by January 1 2018.

In the present report the Concept paper is reviewed with the aim to provide further guidance concerning System Services in Georgia by identifying areas which could be further improved. Areas of improvement have been preliminary identified to relate to the technical or economic approach followed in the Concept paper in which provision of further documentation or justification maybe re-

[32] See pp. 13-14 of the Concept paper

quired. More specifically, areas of improvement may on a non-exhaustive basis include: further elaboration on the underlying assumptions and methodology used and/or an enhancement of the relevant descriptions in order to improve the clarity and credibility of the approach.

To our view the Concept paper represents a significant step towards setting the basis for improving the reliability and the quality of power provided by the Georgian Power System. Overall our appreciation is rather positive as the Concept approaches the subject in a complete and detailed manner i.e. equally discusses the technical, economic and commercial perspectives related to the introduction and provision of System Services in the Georgian electricity system. This largely improves the practicality of the text as a basis of a consultation and gives room for more elaborate and targeted review on certain aspects.

Our remarks and suggestions aim to provide some extra views and hopefully take the discussion a bit further in regards to the introduction and provision of System Services under technically and economically optimal conditions. We furthermore review this Concept Paper taking as a basis the EU experience and practices but we still remain flexible on the part of understanding and eventually adapting to the specificities of the Georgian power system.

2.8.2 Current Situation Concerning System Services in the Georgian Power System

As already mentioned, the Concept paper represents a significant step forward towards establishing the necessary conditions aiming to improve the quality and reliability of the Georgian power system. However, a background description and analysis of what is in place today with to the topics treated in the Concept paper (e.g. quantification of main system service requirements, providers and associated costs), would add to the value of the whole exercise and increase understanding about the challenges faced by the system. Thus, additional information to be included in the Concept paper might include:

- An analysis of the starting point i.e. how does the distinct services identified in the paper are treated by the existing market model; i.e. how is the frequency control organised to date; is the service bundled to the generation of electricity and therefore not separately procured; how balancing or provision/allocation or losses are generally organised in the country.
- Existing rules, regulations etc. concerning system Services; status and main contents of the Grid Code relevant to System services; main practices followed today and main points of improvement under the Concept paper proposals.
- Main challenges faced by the Georgian system which are associated to System Services (eg. difficulties in keeping frequency limits, blackouts, level of losses, etc.) and how these may be faced with the adoption of the Concept paper rules;
- Estimates of the costs for providing System services under the current regime.

2.8.3 Technical Issues

a) <u>Assessment and sizing / quantification of required of System Services</u>

According to the ENTSO-E Operational Handbook[33]

> *Different methodologies for sizing the control reserves (Secondary and Tertiary) reflect and define in general the different operational needs in CONTROL AREAS of UCTE, due to different characteristics and patterns of generation (including hydraulic, thermal and HVDC link) and demand (including balance responsible parties and forecast qualities). The sizing of the SECONDARY and TERTIARY CONTROL RESERVE is done by reference to deterministic and / or probabilistic approaches.*

According to ENTSO-E, several methodologies are relevant[34] for secondary and tertiary control.

A more detailed description of the basis and assessment of the approach adopted in the Concept Paper for sizing primary and secondary reserve is deemed useful in order to increase transparency and ensure the challenges mentioned in the Concept paper are met appropriately. Towards this aim, assumptions regarding system conditions (e.g. islanded or interconnected operation, presence of intermittent generation, etc.) taken into account for the proposed sizing have to be clearly stated.

The above remark holds true for two more of the proposed System services, namely **Voltage Control** and **Parallel Operation** with neighboring system.

b) Transmission losses

According to the Concept Paper the appropriate level of losses (normative losses) is defined by the NRA. The TSO has to plan regimes and operate the combined Generation-Transmission system so as to achieve the loss target.

Some remarks drawn from the above are as follows:

a. The EU practice with regards to the regulatory treatment of technical losses is not quite authoritative (i.e. adopting normative losses) as at the end of the day losses will emerge as a result of the physics' laws (i.e. higher demand leads to higher energy losses). The regulatory approach that involves target setting in respect to losses relates with the provision of the respective incentives to the network operator.
b. the way to define target of losses should not be confined to 'minimize the (quantity) losses' but to minimize the cost of the losses and, more general, total system operation. This generally relates to the fact that energy needed for covering the losses does not have a static year-round value (price)
c. in EU there is a variety of issues related to the regulatory treatment of losses (i.e. valuation, allocation, procurement, etc.)

[33] https://www.entsoe.eu/fileadmin/user_upload/_library/publications/entsoe/Operation_Handbook/Policy_1_final.pdf

[34] A. Empiric Noise Management Sizing Approach ("Control Capability for Variations") for SECONDARY CONTROL RESERVE. A square-root formula is used as an empiric sizing approach for the recommended minimal amount of SECONDARY CONTROL RESERVE R of a CONTROL AREA.

B. Probabilistic sizing approach for the total required reserve (secondary and tertiary) is based on a requirement to enable the control of the AREA CONTROL ERROR to zero in for example 99,9 % of all hours during the year.

C. Largest Generation Unit or Power Infeed

We believe that a further analysis including the review of the EU experience in this regard might reveal useful.

2.8.4 System Services in the electricity market

It is positively acknowledged that the Concept paper envisages a market-oriented way for provision of System services by the TSO, including participation of end-consumers of electricity (chapter 9). The Concept paper proceeds in describing market aspects and several details concerning treatment of System Services in such a market-oriented way[35], including features such as capacity payments etc. Furthermore, timelines for procurement of some services are provided (e.g. the volume of Frequency Restoration reserve to be provided shall be determined annually - not later than November 1).

As the electricity market design has to be conducted in a consistent way, such specifications have to be aligned with requirements concerning the overall design of the future wholesale market, including the balancing market. More information and analysis on this aspect is necessary so as to ensure that the wholesale market and the planned system services market are aligned in broad terms.

In considering a possible market for ancillary services, Eurelectric's views[36] are that some ancillary services[37] (i.e. black start capacity, remote automatic generation control, emergency control action) need longer contracts (e.g. a year), others can be procured on a daily or shorter basis (spinning reserve, standing reserve). Thus, dealing in a market-oriented way with ancillary services might be as follows:

- frequency control: negotiated or auctioned contracts
- voltage control: negotiated or auctioned contracts
- spinning reserve: open market with bidding
- standing reserve: open market with bidding
- black start capacity: negotiated or auctioned contracts
- remote automatic generation control: negotiated or auctioned contracts
- emergency control action: negotiated or auctioned contracts.

It also noted that the role of the appropriate stakeholder(s) (e.g. Ministry of Energy, GNERC, private sector) in the process of designing the markets for the System Services (including Ancillary Services) and the respective rules should be in our opinion come at much earlier stage of the Action Plan[38]. We understand that GSE is currently underway consultations with the aforementioned parties but we may also stress that an early involvement and increase of awareness is always beneficial towards a timely and transparent adoption of new methods.

[35] See pp. 42-50 of the Concept paper (Chapter 9: 'Scheme of Purchase and source Selection, Service Tariff and Account Settlement of System services')

[36] Eurelectric, *Ancillary Services: Unbundling Electricity Products – an Emerging Market* (2004)

[37] Note that the Eurelectric report dates back to 2004 and therefore the services definitions are not perfectly aligned to the current definitions introduced by ENTSO-E

[38] See p. 52-53 of the Concept paper

In our hasty review of the Concept paper we sense a sort of ambiguity in the reference on tariffs referred to as in Chapter 7 and relate to the recovery of the investments required for the selected generators in order for the latter to be able to offer the defined services and the tariffs referred to us in Chapter 9 where compensation for the provision of each service is provisionally discussed. Our reading leads us to assume that increase of generation tariffs as it is discussed in Chapter 7 reflects on the recovery of the investment taking into account a predetermined schedule of provision of the service over the year. An alternative mechanism that would allow for the recovery of the investments required for enabling specific services may imply the setting of a price (or perhaps a fixed and a variable component of remunerating the service) which would in turn be high enough to incentivize the generator to go forward with the investment. This latter option would work through the remuneration of generators (or loads as the case might be) as it is described in Chapter 9. In conclusion, the recovery of required investments to enable the services can be recognized as the one leading to a lower financing risk but on the other hand it places a constraint on the development of a future more competitive and liquid wholesale market – at least for the 5 year period for which the recovery of system services provision-related investments are meant to be recovered.

In view of the above, further elaboration is proposed in order to describe a possible way for adopting a market approach for the introduction and provision of System Services in Georgia on the basis of the hereby reviewed Concept Paper. This of course is a decision that needs to be taken in coordination with the plans of the Ministry of Energy and in particular with regards to the time-schedule/roadmap for the introduction of a more competitive wholesale market in Georgia.

2.9 Key Findings

Overall the GE TYNDP comprises a remarkable and noteworthy effort by a TSO in a region where transmission planning is not prudently exercised or it is not properly communicated in order to satisfy an important dimension of its usefulness – that is to provide a transparent and reliable set of information to current and prospective transmission system users.

Moreover the content of the Georgian TYNDP 2015-2025 is complete, methodologically sound and very well presented. On these premises the present review was submitted to GSE as an independent opinion having regard on several EU implementations of Transmission Planning documents and also the requirements placed on EU TSOs under the European and national relevant legal and regulatory framework. According to the feedback received by GSE three parties which have reviewed the TYNDP have coincided in certain remarks. The update of the TYNDP will take into consideration these comments on a priority order.

It is positively acknowledged that the Concept paper envisages a market-oriented way for provision of System services by the TSO, including participation of end-consumers of electricity. The Concept paper describes market aspects and includes several details concerning treatment of System Services in such a market-oriented way, including features such as capacity payments etc. Furthermore, timelines for procurement of some services are provided. While the definition, capabilities of the service provides and cost recovery issues are discussed as appropriate there are two major issues that need further consideration. The first one relates to the manner that the system services may (or may not) be procured in the market and how their procurement would be organized in the frame work of the overall Georgian Electricity Market Model. The second one refers to cost recovery issues

and can be summarized under the observation that the cost of system services provision is mostly accounted on enabling the provision of the service (i.e. procurement and installation of the required equipment and communication infrastructure) and largely neglects the cost of the provision of the service (availability and/or usage cost).

2.10 Ownership and Benefits of the Activity

The Georgian TSO following a consultation with the Ministry of Energy and GNERC has developed a Ten Year Network Development Plan TYNDP 2015-2025. The TYNDP is the key document describing "what the power system will look like in 2025". The TYNDP analyses new transmission projects collectively serving national & regional integration purposes that fall into three general categories: a)those that are merely cross-border projects; b)internal projects and c) those which are considered local. The TYNDP contains a technical assessment of all projects and proceeds with the Cost-Benefit Analysis (CBA) only for the projects included in the cross-border and internal categories.

2.11 Recommendations

Project finance for the TYNDP projects is sought to be performed by multisource borrowing and by properly blending of different financing instruments (grand/loans). The use of EU/NIF for the implementation of the Georgian-Turkish asynchronous interconnection was quite a success. GSE is currently discussing with IFIs and national stakeholders a possible replication of this EU/NIF experience - this time regarding the extension of the internal Georgian electricity transmission network.

Further elaboration is proposed in order to describe a possible way for adopting a market approach for the introduction and provision of System Services in Georgia on the basis of the hereby reviewed Concept Paper. The specific decisions that need to be made in regards of the System Services should be aligned to the overall Georgian Electricity Market Model. This of course is a decision that needs to be taken in coordination with the plans of the Ministry of Energy and in particular with regards to the time-schedule/roadmap for the introduction of a more competitive wholesale market in Georgia.

2.12 Challenges Faced

One of the key limitations identified during this assignment is that European legislation especially after the adoption of the 3rd Energy Package has become quite detailed and specific particularly in the areas of generation authorisation, Regulated Third Party Access and Unbundling of the Transmission System Operators. While these legal and regulatory provisions have gradually emerged as a mechanism for the integration the national European markets into the Internal Electricity Market their validity and transferability is becoming increasingly challenging in countries outside the EU. Georgia, on the other hand, as an Eastern Partnership country and in the light of the Deep and Comprehensive Free Trade Agreement which was signed with the EU as we well as its application to become a member of the Energy Community Treaty will eventually have to work towards the legal and regulatory integration with the EU. Another key limitation in this project had to do with time available particularly in respect of the second area on which our review has concentrated i.e. the concept

for the development of system services. This report has eventually managed to indicate the areas on which a more thorough review is anticipated to develop under a future cooperation with GSE

2.13 Impact

There is no Cross Border Cost Allocation in the notion of Article 12 of Regulation (EU) 347/2013 and the investments are regulated. Hence, investment recovery through the electricity tariffs and there are no plans for merchant interconnectors in the notion of Article 17 of Regulation (EC) 714/2009. On top of that financing of the internal network, which in part is needed for accommodating the transit flows as well, needs to be performed by means of a project finance scheme. It is therefore of an utmost important that the concerned stakeholders including the tariff customers by which this investments are expected to be recovered to be adequately informed. The external review has therefore added to the credibility of the assessment and prioritization of investments that the Georgian transmission needs and has also set the basis for a continuous improvement process.

2.14 Annexes

A Letter of Appreciation

საქართველოს სახელმწიფო ელექტროსისტემა / Georgian State Electrosystem
საქართველო, თბილისი 0105, ბარათაშვილის 2, Baratashvili str., Tbilisi 0105, Georgia; ტელ./ფაქსი/Tel/Fax: +995 322 98 37 04; +995 322 51 01 01

30.10.15 № 4771/1

თქვენი_____

On behalf of the Georgian State Electrosystem (GSE) I would like to acknowledge the assistance offered by the INOGATE Technical Secretariat Project in the framework of AHEF 121.AZ/122.GE: "Preparatory activities for the Azerbaijan, Georgia, Turkey Regional Electricity Market".

GSE intends to make use of the review and recommendations prepared by INOGATE experts on the Ten-Year Transmission Network Development Plan of Georgia for 2015-2025 in the upcoming revision of the document for 2017.

On the given stage we are focused on the process of obtaining ENTSO-E observer membership application and support of INOGATE Technical Secretariat in this regard would be highly appreciated.

We furthermore appreciate the initial review on our document titled: 'Concept of System Services Arranging' and declare our willingness and interest to continue this discussion in the frame of a future assignment by INOGATE Technical Secretariat. Besides, the opportunity for GSE experts to participate in ENTSO-E working group discussions would enable them to receive necessary information and recommendations for the purpose of successful realization of System Service reforms in Georgia.

I am looking forward to a continuation of our productive cooperation with INOGATE.

Yours sincerely,

Sulkhan Zumburidze
Chairman of the Management Board/
Rehabilitation manager