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REGULATORY IMPACT ASSESSMENT ON THE NATIONAL ENERGY STRATEGY

FINAL REPORT

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ACRONYMS

AoG	Government Administration
BAU	Business as Usual
CAP	Climate Action Plan
CBA	Cost Benefit Analysis
CO_2	Carbon Dioxide
CSO	Civil Society Organization
EBRD	European Bank for Reconstruction and Development
EE	Energy Efficiency
EnCS	Energy Community Secretariat
ESCO	Electricity Market Operator
ETS	Emission Trade Scheme
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GEDF	Georgian Energy Development Fund
GEL	Georgian Lari
GGTC	Georgian Gas Transportation Company
GITA	Georgia's Innovations and Technology Agency
GNERC	Georgian National Energy and Water Supply Regulatory Commission
GOGC	Georgian Oil and Gas Corporation
GREDA	Georgian Renewable Energy Development Association
GSE	Georgian State Electrosystem
GSEP	Georgia's State Energy Policy
IRR	Internal Rate of Return
KfW	German State-Owned Development Bank
KPI	Key Performance Indicator
LEAP	Long-range Energy Alternatives Planning Model
LEDS	Low Emission Development Strategy
MARKAL	Long-Term Planning Model for the Energy Sector
MCA	Multi-Criteria Analysis
MEPA	Ministry of Environment Protection and Agriculture of Georgia
MoESD	Ministry of Economy and Sustainable Development of Georgia
MoF	Ministry of Finance of Georgia
NDC	Nationally Determined Contribution of the Country
NECP	National Energy and Climate Plan
NEEAP	National Energy Efficiency Action Plan
NGO	Non-Governmental Organization
NPV	Net Present Value
NREAP	National Renewable Energy Action Plan
PPP Agency	Public-Private Partnership Agency in Georgia
PSO	Public Service Obligation
R&I	Research and Innovation
RIA	Regulatory Impact Assessment
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change

USA	United States of America
USAID	US Agency of International Development
WB	World Bank
WEG	World Experience for Georgia

CONTENTS

1. EXECUTIVE SUMMARY

In December 2019, the Law of Georgia on Energy and Water Supply entered into force. The Law defines the main priorities for the development of the energy sector. According to the law, the Ministry of Economy and Sustainable Development of Georgia (MoESD) has to prepare an Energy Policy document which, among other things, must include sectoral strategies and the National Energy and Climate Action Plan (NECP).

MoESD plans to develop these documents in accordance with the recommendation of the Energy Community Secretariat (EnCS), by the end of 2020. Given the time constraints, the policy document and NECP that will be submitted to the Parliament for approval are likely to define only general development priorities and build on the existing documents. Presumably, the result will be a formal implementation of the law requirement and the Energy Community Secretariat's recommendation rather than an in-depth strategic process. There is a risk that the long-lasting problem of the sector will not be resolved and the systemic shortcomings caused by the lack of strategic planning will remain.

Such process does not satisfy the requirement of elaborating a comprehensive policy and relevant strategies and cannot help the country in developing its energy sector. Therefore, it is recommended to consider some alternative ways.

The purpose of this paper is *to evaluate the effective and optimal ways for developing the strategic planning of the country's energy sector, as well as an in-depth energy policy and relevant strategies, in order to identify the existing barriers and offer decision-makers possible measures for overcoming them*.

Alternative Option 1 (ALT 1)

The proposed scenario implies analyzes on the shortcomings of the existing practice of developing strategic documents and identification of the steps by the MoESD to address them. According to ALT 1, an **Analytical Team will be formed** within the MoESD in order to work on the issues related to the State Policy Document and the NECP. With the help of external consultants, the team will be responsible for preparing an updated Energy Policy Document by the end of 2023. The Analytical Team will start working on a modern planning model (Times or any other equivalent model) in order to ensure that the policy-making process is based on updated data. An additional budget is supposed to be allocated for energy research. The research results will facilitate evidence-based decision making.

The quality of the policy document and strategic process developed with the help of external consultants will be higher than in the baseline scenario, although its subject matter and depth, as well as further sustainability, will be relatively lower.

The work carried out with the help of external consultants will significantly improve the quality and content of the policy document, although sustainability and consistency of the processes will remain problematic. There is a risk that due to the limited human resources, the Analytical Team will have to work on different non-strategic issues at the MoESD.

Alternative Option 2 (ALT 2)

To ensure the sustainability of the processes, the proposed alternative envisages **establishment of an Analytical Center**, which will be responsible for the implementation of research and strategic processes. The establishment of this Center is one of the main recommendations of the International Energy Agency which implemented an in-depth assessment of the Georgian energy sector in 2015 and 2019. The necessity to establish a Center was also identified during consultations carried out with stakeholders on assessment of the impact of the abovementioned regulation.

According to ALT 2, the policy document will be prepared in compliance with Resolution # 629 of the Government of Georgia. Planning of the energy sector will be carried out according to detailed forecasts and scenarios which will be based on the final data of the planning model (Times or another equivalent model).

In this scenario, **liaison and collaboration with research organizations and academia is high**. Increased financial resources are used for conducting research activities and all key decisions are founded on the evidence-based analysis.

In case of this alternative, the level of the community engagement and stakeholder participation is increased, which contributes to a full-fledged strategic process. Most importantly, the **sustainability**

and consistency of the processes is maintained. Strategic planning of the energy sector becomes a constant process.

Assessment

The multifactorial analysis and cost-benefit analysis indicate the advantages of the ALT2 scenario. Unlike ALT 1 (and the baseline scenario), in the case of ALT 2 the key additional costs are meager compared to the benefits that can be obtained by implementing Alternative 2. This means a turnover of many hundreds of millions in a strategically important field. In particular, in the case of the implementation of ALT 2:

- In total, in case of implementing ALT 2, the discounted Net Present Value (NPV) for the period 2020-2030 is 7 billion GEL, and the ratio of benefits and expenses is 589.

In addition to the above, elaboration of a sound energy strategy and the development of strategic capabilities will increase energy security, reduce the risks of external influences, and give rise to parliamentary and public control, which is a necessary prerequisite for further refinement of the energy policy and sector development.

2. INTRODUCTION

The lack of a full-fledged energy strategy in Georgia has long been a matter of concern and dissatisfaction for local and foreign stakeholders. This problem was identified in an in-depth review of the energy sector conducted by the International Energy Agency in 2019, as well as in the USAID-commissioned energy sector assessment conducted by World Experience for Georgia (WEG) (in September-October 2019). Both studies indicate that the lack of an in-depth energy strategy and related planning and analytical support system for long-term strategic solutions is a major cause of problems in the sector.

In October 2019, MoESD approved Georgia's Energy Strategy 2020-2030. The document was prepared at the request of the Parliament in order to provide the Parliament with the vision of the sector development during the ongoing reforms. Even though the strategy formally meets the requirements of the Parliament and the public, it does not have the key features required for a full-fledged document: it did not undergo a proper analysis and decision-making process, and is not accompanied by a specific action plan outlining responsibilities and resources. In addition, the strategy development process was not transparent and open to stakeholders. The strategy was approved at the end of 2019, although it is not yet widely available.

From the same period, the Georgian energy sector is regulated by a new Law on Energy and Water Supply (hereinafter – the Law). According to Article 7 of the Law: “The Ministry, in cooperation with the Government of Georgia, the Commission and other relevant parties, shall develop the National Energy Policy for a period of at least 10 years and ensure its implementation after proper approval and publication by the Parliament of Georgia.” The National Energy Policy shall include “short-term, medium-term, and long-term strategies and priorities for the electricity and natural gas sectors” (Article 7 (a)) as well as other issues.

In addition, within the framework of the Energy Community membership, Georgia must develop a **National Energy and Climate Action Plan** (NECP) by the end of 2020. According to the Law, the NECP must be approved as an integral part of the National Energy Policy document or its annex.

In this process, proper planning and analysis become important because the Energy Policy and NECP required by the Law must determine further development of the energy sector. It should also be noted that besides the NECP, it is also necessary to prepare other climate related reports: The Climate Action Plan (CAP), the Nationally Determined Contribution of the Country (NDC), and the Low Emission Development Strategy (LEDS).

There are many obstacles that need to be overcome for ensuring proper implementation of this work. These obstacles are: lack of data, forecasting, analysis and reporting methods; lack of adequate professional and institutional capacity; scarcity of allocated resources; lack of communication with stakeholders and academia; focus on short-term goals; lack of transparency etc.

The purpose of this paper is *to evaluate the effective and optimal ways of developing strategic planning of the country's energy sector, in-depth energy policy and relevant strategies, as well as to identify the existing barriers and measures necessary for their elimination*.

The document is presented in the format of the Regulatory Impact Assessment Report approved in 2020. It describes the problem and the baseline scenario, presents and analyzes different alternatives, and offers recommendations to the MoESD regarding the optimal development of the process.

3. PROCESS DESCRIPTION

In the initial phase of the work, after formation of the project team and the development of a detailed action plan, an informative meeting was held with representatives of the USAID Energy Program. The main goals, expectations and technical approach were agreed upon. The next step was desk research, stakeholder review and analysis. The main stakeholder and beneficiary of the project is the Ministry of Economy and Sustainable Development. Therefore, a meeting with high-level representatives of the MoESD was held at the initial stage of the project. The goal was to get the Ministry's support, provide information about the expected results of the project and to understand their expectations. Representatives of the MoESD expressed high interest in the project and readiness to provide the necessary information, as well as to coordinate meetings with other stakeholders. The MoESD's involvement in the project is to some extent the guarantee for the project results to be shared and used by it.

Desk research and stakeholder analysis were conducted in parallel. The following documents were analyzed:

1. National Energy Strategy 2020-2030;
2. Rules for Elaboration, Monitoring and Evaluation of Policy Documents (Resolution # 629 of the Government of Georgia, December 20, 2019);
3. Law of Georgia on Energy and Water Supply;
4. Lithuania's "National Energy Independence Strategy";
5. Greece's "National Energy and Climate Action Plan" (NECP);
6. Azerbaijan's "National Action Plan for Sustainable Energy";
7. Norway's "National Strategy for Research, Development, Demonstration and Commercialization of New Climate-Friendly Energy Technologies";
8. Croatia's "National Energy and Climate Action Plan" (NECP);
9. Slovakia's "National Energy and Climate Action Plan" (NECP);
10. Estonian's "National Energy and Climate Action Plan" (NECP);
11. "National Energy and Climate Action Plan" (NECP) of the Czech Republic;
12. Finland's "National Energy and Climate Action Plan" (NECP);
13. Review of International Experience in National Strategy Development (WEG, 2013);
14. National Energy Strategy of Ukraine 2017-2035;
15. Moldova's "National Energy Strategy 2030".

Stakeholders were also analyzed according to their interests and influences, which allows to properly plan their involvement during the Project implementation.

As a result of the desk research and consultation with stakeholders and experts, a document on the **terms of energy policy development** was prepared, which covers the following issues:

- Compliance with the Law on Energy and Water Supply;
- Compatibility with other strategic documents and development priorities of the country;
- Compliance with international obligations;
- Process and quality assurance requirements;
- The content of the document and the matrix of compliance with the requirements of the law.

The document was reviewed and agreed with the MoESD, which uses it both for the development of Georgia's National Energy Policy (GSEP) and for starting environmental scoping.

At the next stage, the energy sector problems were assessed and analyzed using the "Problem Tree" method, which is often used in Regulatory Impact Assessment (RIA) documents to identify the problems' causes, consequences, and their links. The next step was to describe the baseline scenario and formulate alternatives. The methodology for analyzing the alternatives is presented in the relevant subsection. Stakeholders were consulted at all stages of the process.

4. ANALYTICAL OVERVIEW AND RESULTS

4.1 PROBLEM DEFINITION

The main challenges faced by the Georgian energy sector are related to energy independence and security. The country is largely dependent on external energy resources (> 70%) and this dependence is growing along with the growth of consumption. One of the energy security problems is dependence on the monopoly supplier in the gas sector (Azerbaijan) and its dominance in the domestic market. Another problem is growing electricity consumption in Abkhazia, which receives free electricity from the Enguri Hydro Power Plant (HPP). The issue of relations with Russia is constantly the subject of controversy and differences in the context of gas transit and procurement. The nontransparent environment in that matter raises many questions.

75% of the locally produced electricity in Georgia comes from hydropower, although the issue of climatic conditions and seasonality is problematic, because due to the reduction of water resources, HPPs cannot generate enough energy in winter, while construction of new generation facilities is delayed.

Accountability and transparency are also lacking due to the lack of public control over the energy sector. The interest of the population and politicians is mainly limited to the topic of tariffs, which is always a source of populistic statements.

Taking into account these and many other factors, the issue of developing a full-fledged energy strategy document and conducting the relevant process is constantly on the agenda. As a result, the country would be able to determine the direction of the sector development and the mitigation efforts for the existing threats. A strategy that includes evidence-based plans and measures to achieve specific goals is considered to be a key condition for the recovery of the energy sector, while the lack of such strategy causes problems, including:

- **Weak connection with national interests and priorities** – due to the lack of a strategy, the development of the sector is not in line with the development of certain sectors (economy, agriculture, etc.). There is no noticeable connection with the country's national interests and priorities for the achievement of which sectoral plans or policies should be developed.
- **Weak management of the sector and interagency coordination** – the responsibility for management of the energy sector is scattered across different agencies (sustainable development issues, climate issues, environment protection, transport, industry and agriculture). The level of coordination and cooperation between these agencies and institutions is low. Therefore, the synergy of goals and activities cannot be achieved and overlap of issues cannot be avoided. Systematic coordination is often replaced by working groups formed for specific goals. Thus, sustainability is rarely maintained and the working groups are formed anew for each individual initiative.
- **Risk of sub-optimal solutions and investment mistakes** – often investors are unclear about the vision of the country's energy development and the planned mix of generation. Written plans (e.g. transmission network development plan) change every year and have lost credibility. This has a negative impact on the volume of investments. There are questions even regarding the investments that have already been made. For example, it is known that an agreement has been signed with the European Bank for Reconstruction and Development (EBRD) on the rehabilitation of the Vardnili Cascade, but it is unclear whether this decision is part of a long-term vision that will resolve the issues of uncontrolled energy consumption in Abkhazia. Lack of strategy increases the risk of non-optimal investment decisions.
- **Lack of trust towards the decisions of the Government and MoESD** – resulting in increased public protests against infrastructural projects. Due to the lack of an appropriate strategy, the role of hydropower plants in energy supply is not clearly defined. The statements made by the Government and the MoESD about the "maximum development of hydropower plants" are not very convincing for the population. The argument about strengthening the country's security must be based on the data and strategy developed as a result of energy planning.
- **Poor coordination of the objectives and quality of donor assistance** – in the absence of pre-determined plans, assistance provided by donors often does not serve specific purposes and does not give real results. There are frequent cases of duplication and overlapping between projects and activities, caused by the lack of proper coordination.

- **Lack of the parliamentary and public oversight** – the energy sector is often seen as a technical field and public awareness of current energy issues is low. This situation is aggravated by the lack of a strategy that would allow relevant stakeholders to monitor current activities and determine their relevance and purpose. In the absence of such a plan, it is difficult to prove whether a specific project serves the proper purpose.

The result of all this is the weakness of regional energy policy and negotiations and the risk of external influences. The country does not have a strictly defined and established vision of what interests it has towards neighboring countries and what should be the consistent steps defined to achieve those interests. In the absence of such visions, Georgia's energy sector is often pursuing the interests of individuals (local or foreign), ultimately undermining the country's energy security and independence.

The lack of a strategy also hinders attractions of the strategic investments in the sector, because a long-term vision for the development of the sector is not available to investors. In the absence of such a vision, attracting and implementing investments is complicated and the need for already implemented investments is often questioned. The fact that the local population opposes construction of hydropower plants, demonstrates that it is often unclear why the country needs a specific facility and on what evidence substantiates its feasibility.

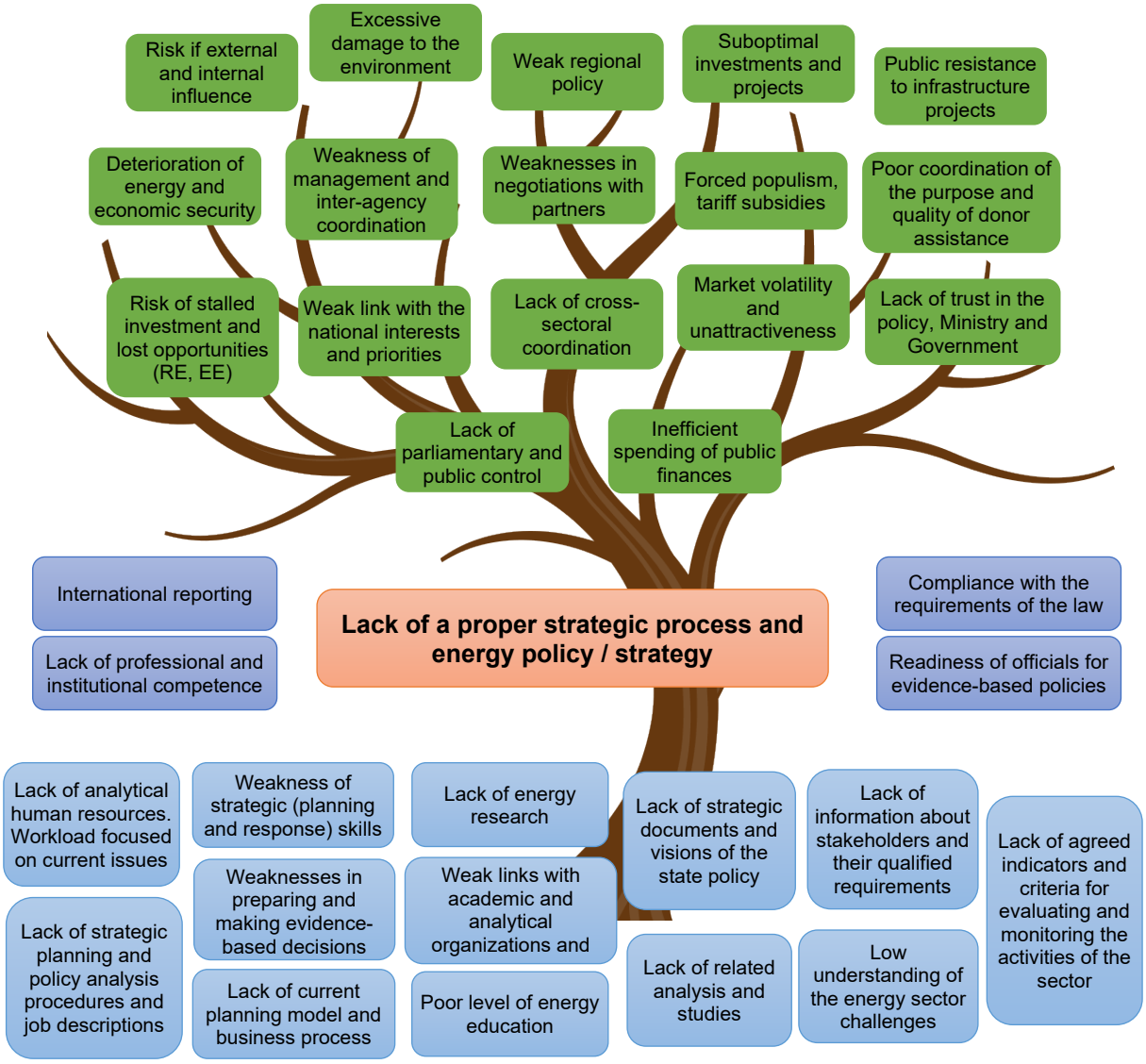
Similarly, chaotic activities lead to inefficient spending of public finance, which is an additional burden on the Georgian budget.

The lack of a sound energy strategy is caused by several reasons:

- **Lack of human resources** - It is difficult to attract and retain professionally qualified and motivated professionals in energy management. There is a frequent outflow of staff, which prevents the continuity of processes. The existing scanty human resources are mainly engaged in ongoing everyday activities and there is no time left for a continuous strategic planning process. There are no guidelines to strategic planning and policy analysis. Creating and sustaining such a process requires additional material and human resources, which the MoESD does not have today.
- **Lack of technical capabilities** - there is no technical base. There are no planning models needed to create a strategy. The country depends on one-time assistances in terms of planning, and the sustainability of the processes is not maintained after the completion of specific projects. Policy decisions are made for a specific purpose only and are not based on analytical evidence.
- **Lack of analysis and research** - in the energy sector, no research is done in Georgia, which would create a basis for preparing strategic documents. There is little cooperation with academia and research organizations, which is why it is not possible to coordinate existing research. The fact is that there is a shortage of such research centers and knowledge in the country, which in turn is caused by the low level of education in the field of energy. The energy is not a priority field for the education sector.
- **Lack of public control and demand** - low level of awareness about the energy sector issues and lack of qualified demand is often the reason for the low level of stakeholder involvement and qualified demand, resulting in less accountability on the part of policy makers.

Lack of agreed indicators and criteria for evaluating and monitoring the work of the sector - is also one of the factors that contributes to the lack of strategy.

Figure 1: Problem Tree



4.2 DESCRIPTION OF THE BASELINE SCENARIO (BAU)

Based on the recommendation of the Energy Community Secretariat (EnCS), MoESD is planning to develop the GSEP and the NECP by the end of 2020, which, according to the Energy and Water Supply Law, must be approved as part or annex to GSEP.

The requirements for the policy document are defined in accordance with the Law and include issues such as:

a) Strategies and priorities developed for short-term, medium-term and long-term periods for the electricity and natural gas sectors; strategic development of generation, transmission (internal and transboundary), distribution, gas storage and liquefaction activities;
b) Measures necessary to ensure safe and reliable supply of electricity and natural gas;
c) Physical and financial accessibility of electricity and natural gas for consumers - gradual overcoming of energy poverty;
d) Long-term demand-supply balancing plan, taking into account electricity and natural gas consumption trends;
e) Mechanisms for diversification of import sources, routes and suppliers of primary energy, electricity and natural gas;
f) Increase and improvement of electricity export from Georgia;

g) Measures and support mechanisms to encourage production and consumption of energy from renewable energy sources;
h) Promotion of electricity and heat cogeneration;
i) Measures to increase energy efficiency and support energy activities;
j) Issues related to increasing the efficiency of energy activities and reducing the negative impact on the environment, as well as their sustainable development in accordance with the environmental, economic, and social security policy of Georgia;
k) Measures to protect the rights and interests of the sector participants, including vulnerable customers;
l) Measures to encourage and attract investments, introduction of innovative, environmentally safe and "smart" technologies;
m) Measures to promote competition, transparency, non-discrimination, and legal clarity;
n) Measures to support scientific research and education, including state subsidies and attracting private investment;
o) Other important analyses, forecasts, opinions and recommendations.

The National Energy Policy must cover all energy resources used in the country.

It is unclear at this stage whether these requirements can be met by the end of 2020. Presumably, Georgia's State Energy Policy, which is expected to be submitted to the Parliament for approval, will set out only general development priorities and use existing documents, including the electricity and gas sector strategies developed for 2030.

As for the NECP, which, as already mentioned, will be annexed to the policy document, it must cover the period 2021-2030 and include a vision for 2050 to meet the policy objectives of the European Union, the Energy Community or the United Nations Framework Convention on Climate Change (UNFCCC). The NECP covers 5 main areas:

- Energy security and solidarity;
- Domestic energy markets;
- Decarbonization;
- Energy efficiency;
- Research, innovation and competitiveness.

The NECP must set out the objectives of these areas and the emission reduction targets. It must describe the policies necessary to achieve each objective and the measures needed for their implementation. The document must be developed based on coordination between different sectors and public discussions. Appendix I summarizes the key characteristics features of the NECP content based on the examples of several countries.

MoESD has already set up a working group to lead the process. The work on the NECP will be led by the MoESD with the support of an international expert, who was also involved in the development of the National Energy Efficiency Action Plan (NEEAP) and the National Renewable Energy Action Plan (NREAP).

Each chapter of the NECP will be prepared based on the existing documents:

a) Energy security - Strategy 2020-2030, and 10 year plans – an additional research is needed;
b) Internal Energy Market - Market Concept, Strategy 2020-2030, and 10 year plans;
c) Energy efficiency - NEEAP (an older, more extensive, and unapproved version of the document will be used);
d) Decarbonization - NDC/CAP, NREAP, LEDS, BUR2/NC4/NIRs;
e) Research, innovation, competitiveness - research is needed.

No planning model/tool will be used in the NECP development process. It will be based on the existing studies that were conducted using the Long-Term Planning Model for the Energy Sector (MARKAL) and Long-range Energy Alternatives Planning Model (LEAP) models.

All work will be carried out by the existing staff of the MoESD, using the existing budget. It is not planned to add human resources and create new data as a result of the research.

Public participation and involvement in the process is assumed to be low given the limited timeframes.

The key components of the baseline scenario - Business-As-Usual (BAU) are presented in the table below.

Table 1. Summary of the BAU

Parameters	BAU Scenario	Comments
Policy document preparation period (including NECP)	End of 2020 - submission 2023 – Implementation report and revision	Timeframes and obligations agreed with the Energy Community Secretariat in accordance with the EU Green Pact
Planning work and model	Use of already existing LEAP / MARKAL data, setting up a working group - gathering existing information and reviewing the document with stakeholder involvement, based on initial estimates.	Already existing data of this model will be mainly used in the NECP part. MARKAL data needs serious revision.
Working process	Inconsistent and fragmented, defined on ad hoc basis.	The existing practice will continue when working groups are set up for a specific, single purpose and the continuity and sustainability of the subsequent process is not maintained.
HR and institutional characteristics	Unchanged	
Budget	Existing budget	
Basic parameters for evaluation of the sector performance	EnC commitment targets for renewable energy/energy efficiency, and reduction of greenhouse gas emissions.	It is not planned to identify any other parameters or carry out an in-depth analysis.
Cooperation and coordination with other sectors	Sharing of the existing information and reflecting it in the NECP.	This activity is limited to sharing data from existing documents for a specific purpose.
Public hearings and community involvement	Superficial, formal dissemination of information	This activity is extremely important for success of the policy.
Participation of research institutions and academia	Low	

In the baseline scenario, the policy document and the NECP will combine (as much as possible) independently prepared documents and will be presented as Georgia's State Energy Policy. This means that the outcome will be formal implementation of the requirements of the law and the Energy Community Recommendation. More specifically:

- There will be no in-depth analysis and discussion of the energy sector's strategic issues, which would increase the credibility and sustainability of the document and create a real opportunity for development;
- The number of consultations and stakeholder participation will be minimal, taking into account the duration and resources of the process;
- Logistical costs will be based on the minimum process plan;
- It is not planned to attract additional qualified staff. It is expected to maintain the existing training mechanism, which is mainly dependent on donor projects, inconsistent and fragmented.

As a result, there is a risk that the problem will not be solved in the long run and systemic deficiencies will remain unchanged.

This scenario does not satisfy the requirements of a comprehensive policy and relevant strategies and cannot help the country to solve the problems accumulated in the energy sector.

4.3 GOALS

The goal of this document is to offer alternative development scenarios in order to facilitate the adequate process of energy planning and the development of relevant strategic documents.

Due to the fact that the baseline scenario does not lead to the desired results of the sector development, it becomes necessary to carry out additional interventions.

When developing alternatives, the requirements of the law should be taken into account, according to which it is necessary to create an energy policy document (which includes the relevant strategies) and the NECP. Accordingly, the alternatives discussed in the RIA concern the process of developing these documents and the optimal ways of strategic planning.

When developing alternatives, the requirements of the law must be taken into account, in compliance with which an energy policy document (which includes the relevant strategies) and the NECP must be prepared. Accordingly, the alternatives discussed in the RIA concern the process of developing these documents and the optimal ways of strategic planning.

To fully manage the process, the goals of the policy and strategy documents and requirements towards their content and quality must first be clarified.

4.4 ASPECTS OF THE ENERGY POLICY

The country's energy policy and corresponding strategy must include and take into account the following aspects:

Energy Security in the Context of the National Security - foreign policy and regional cooperation; diversification of supply and transit routes and sources; avoiding supply threats and increasing the sector's resilience.

Compliance with the economic policy of the country - meeting the expected demand for energy; energy prices and affordability, economic activity of the sector, market development, promotion of other sectors; innovation, research and technological development.

Compliance with the environmental protection policy - measures to mitigate climate change and adapt the sector; consideration of environmental protection and social policies in energy infrastructure projects.

Compliance with the social policy – reduction of the energy poverty; consumer rights and assistance to vulnerable consumers; protection of the rights of the population.

It is important to consider and balance the relationship between these aspects in accordance with the principles of sustainable development.

The proposed structure of the energy policy document and the issues covered by it are presented in more detail in Appendix II.

In order to develop a comprehensive policy and relevant strategy, it is necessary to:

The need for a long-term vision - it takes decades to recoup investment in infrastructure, while strategic infrastructure and policy decisions can determine the fate of a sector for decades. Therefore, energy policy and related strategies should be designed for the long term and protected from the influence of short-term political priorities. At the same time, however, there must be a mechanism for anticipating changes in strategic realities.

Evidence and data-based, realistic approach - In order to be concurrent and evidence-based, a strategy must be based on reliable data and thorough analysis. Including:

- High quality statistical data;
- High quality academic research;
- Knowledge of technologies and their development prospects;
- Forecasts and optimized scenarios based on tested methods and models.

Flexibility and Dynamics - in a dynamic, changing environment, with fluctuating energy prices, technologies and politico-economic circumstances, it may be necessary to reconsider the strategy itself. At the same time, in parallel with the development of the strategy, it is desirable to improve the short-term continuous analytical process that provides information for tactical solutions.

Optimization – the development of the energy sector is an extremely investment intensive task. It is associated with huge financial costs and use of natural resources. Therefore, the energy strategy must reflect the opportunities for optimal achievement of the economic goals, sustainable development and the objectives set by the energy policy. Given the economic, political, environmental and climate risks, it is necessary to define the scenario appropriate for the minimum costs of the sector. It is also necessary to take into account and optimize the opportunities provided by different energy types (fossil and renewable energy), energy efficiency and energy demand management, including smart and clean new technologies. This is achieved through special optimization programs.

4.5 ENERGY POLICY AND OTHER STRATEGIC DOCUMENTS

4.5.1 RELATED AND INCLUDED POLICY DOCUMENTS

The energy policy must be based on the country's other political and strategic documents, including:

- The concept of the country's national security, which defines the interests and values of the country;
- Environmental protection, economic and social security policy;
- Economic development strategies and forecasts.

The National Energy Policy must be formulated in coordination with other sectoral documents:

- Low Emission Development Strategy (LEDS) and Nationally Determined Contribution Documents (NDCs) - The energy sector and associated emissions play a major role in LEDS and NDC documentation. Therefore, these documents must be largely based on energy demand-supply scenarios and optimized plans. These plans, in turn, are based on energy policy decisions and relevant strategies and must be closely coordinated.
- The NECP, which must reflect energy efficiency and renewable energy targets, is a key document to be submitted to the Energy Community Secretariat and is an integral part of Energy Policy under the law.

The most important sources on which the Energy Policy must be based are studies, forecasts, and risk analyzes:

- Economic, social and demographic development forecasts;
- Foreign policy forecasts and risk analysis;
- Forecasts of energy markets and prices;
- Climate and hydrology forecasts;
- Forecasts of energy technology prices and efficiency, etc.

4.5.2 PERIODIC REPORTS

Biennial Reports on Security of Supply

Chapters XXXIII and XXXIV of the Law define the security issues of electricity and natural gas supply and reporting approaches which also define the issues of energy policy and strategy.

Every 2 years, MoESD prepares and publishes reports on security of electricity/natural gas supply in the country, which include the results of supervision and measures necessary to satisfy the existing and forecasted demand for electricity and natural gas, in particular: operational safety of networks; forecasted balances of supply and demand over the next 5 years; the prospect of security of electricity supply in the period from 5 to 15 years; investment plans for interconnected capacities; existing and prospective transmission lines; condition of gas storages, etc., as well as possible scenarios of generation, supply, transboundary flows, consumption, and energy trade, taking into account energy efficiency and demand management.

Reports on the security of supply also include: emergency action plans; drafting of legislation; assessment of energy potential; supply security rules, standards and their monitoring; regional solidarity and cooperation measures.

This list is closely related to the Energy Policy and related strategy issues.

Ten Year Network Development Plans

Pursuant to Article 52, Paragraph 1(b) of the Law, electricity and natural gas transmission system operators develop an annual Transmission System Development Plan for a period of ten years in accordance with the National Energy Policy and investment plans duly agreed with other system operators;

In compliance with Article 53, these plans should be based on the existing and forecasted supply and demand figures, and include information on:

- Existing and forecasted demand and supply;
- Domestic forecasted generation of electricity/production of natural gas and transboundary outflows;

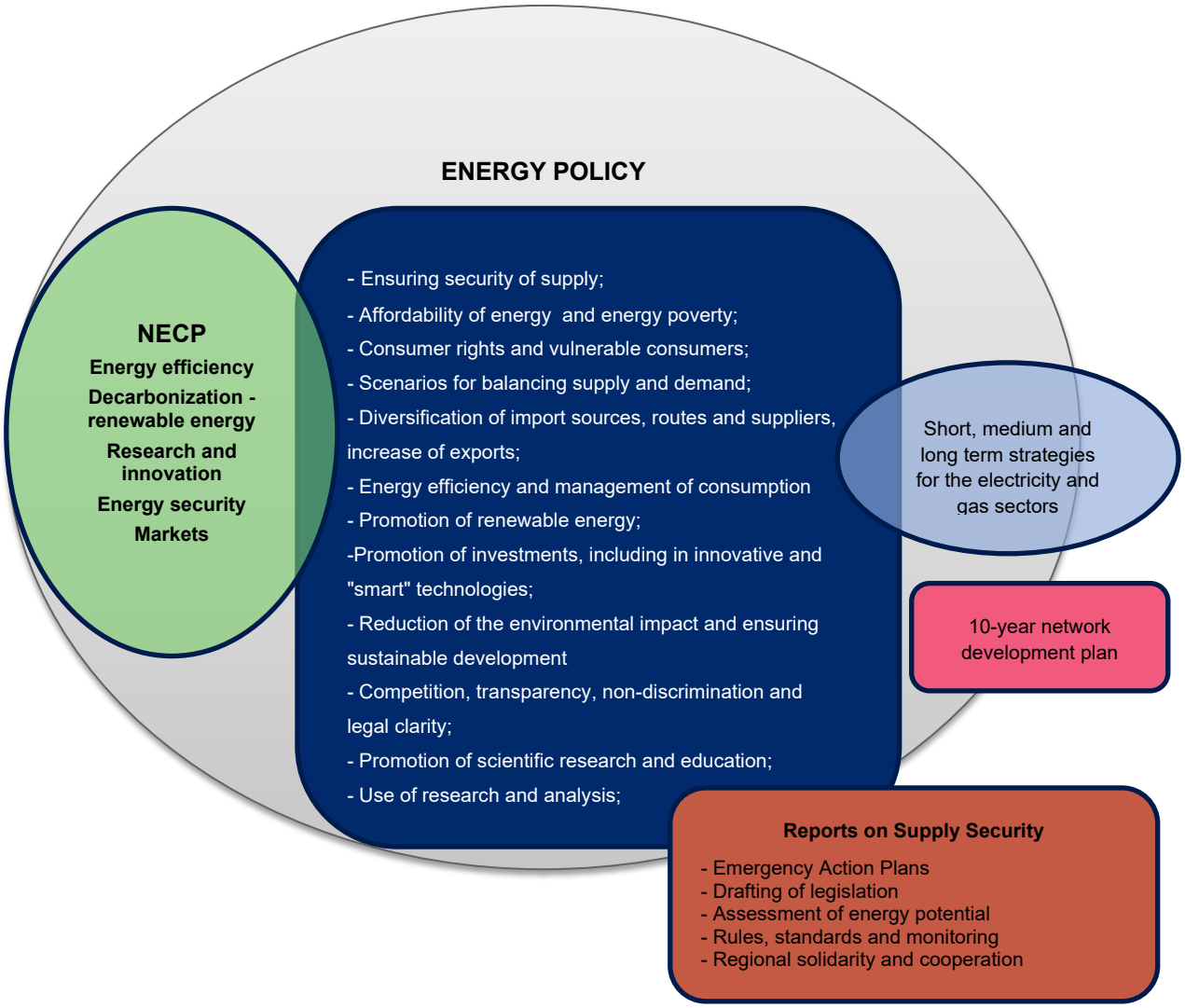
- Transmission infrastructure to be built within 10 years;
- Approved and new investments and specific terms;
- Integration of new generation facilities into the network.

It is logical that this information must be coordinated with the Energy Policy and strategies.

Pursuant to the Law, we can conclude that an Energy Policy is a set of documents that include strategies for the electricity and natural gas sectors, as well as the NECP. Accordingly, energy policy envisages measures and action plans for energy efficiency and renewable energy development, reduction of greenhouse gas emissions, research, and education and innovation promotion, which are based on a total forecasted energy demand and optimized and mutually agreed plans for covering this demand. The measures should take into account different development scenarios.

Based on these plans, security of supply is monitored, investments are planned, ten-year development plans are prepared, and low-emission, sustainable development plans are elaborated.

Figure 2: The Energy Policy and its Links with Different Strategic Documents



4.6 PROCESS AND QUALITY ASSURANCE

4.6.1 OFFICIAL REQUIREMENTS

The procedures, methods and standards for the development of strategic documents are defined by The Rules for Elaboration, Monitoring and Evaluation of Policy Documents adopted by Resolution #629 of the Government of Georgia, dated December 20, 2019. These Rules fully define the organization of the strategy development process, identification of stakeholders and other issues, as well as the content and methodological criteria. These Rules are not mandatory for those policy

documents that must be approved by the Parliament, although they can be used as guidelines needed for the implementation full-fledged, substantive and formal processes.

The criteria related to the document's content include the following key issues:

- Compliance with the policy documents of the national level (the government program; the national development strategy; the country's obligations under the EU Association Agreement; and other international obligations); concordance with relevant sectoral policy documents already approved in a similar or related field. Checking of overlaps and duplicates between documents.
- Compliance of the directions presented in the Policy Document with the existing international standards and best practices in the field (recommended criteria).

Methodological criteria:

- Compliance of each part of the Policy Documents with quality standards – it means that each part of the strategic document must satisfy the relevant standards and requirements defined by the Policy Development Rules.

The process of developing a quality policy document involves many different stages, including:

- In-depth, evidence-based situational analysis - this stage is an analytical process that requires mobilization of relevant human resources. Identified problems must be analyzed through building a Problem Tree, PESTEL[1] or SWOT[2] analysis.
- Public Consultations – public involvement is recommended at every stage of the document development process, including, in particular - the situation analysis, policy development, monitoring and assessment processes. However, it is mandatory to organize public consultations at least with regard to the final draft of the document, while its results must be presented in the introductory part of the policy document while the complete report must be attached as an appendix. The process of public discussions must be perceived as a way of communicating with stakeholders and addressing their awareness problem, which in itself is valuable and will facilitate further activities.
- Defining realistic and implementable tasks - it is necessary to consult with decision makers at this stage. The consultations will be based also on the findings identified at the stage of situation analysis.
- Logical chain and connection between vision, goals and objectives - goals must respond to the problems posed in the analysis of the situation. Tasks must respond to problems that arise in the situation analysis or the factors that cause the problem.
- In order to ensure the result-oriented management principle, it is important to define Key Performance Indicators (KPIs). These indicators must be developed based on so-called SMART[3] principle, preferably using SWOT analysis.

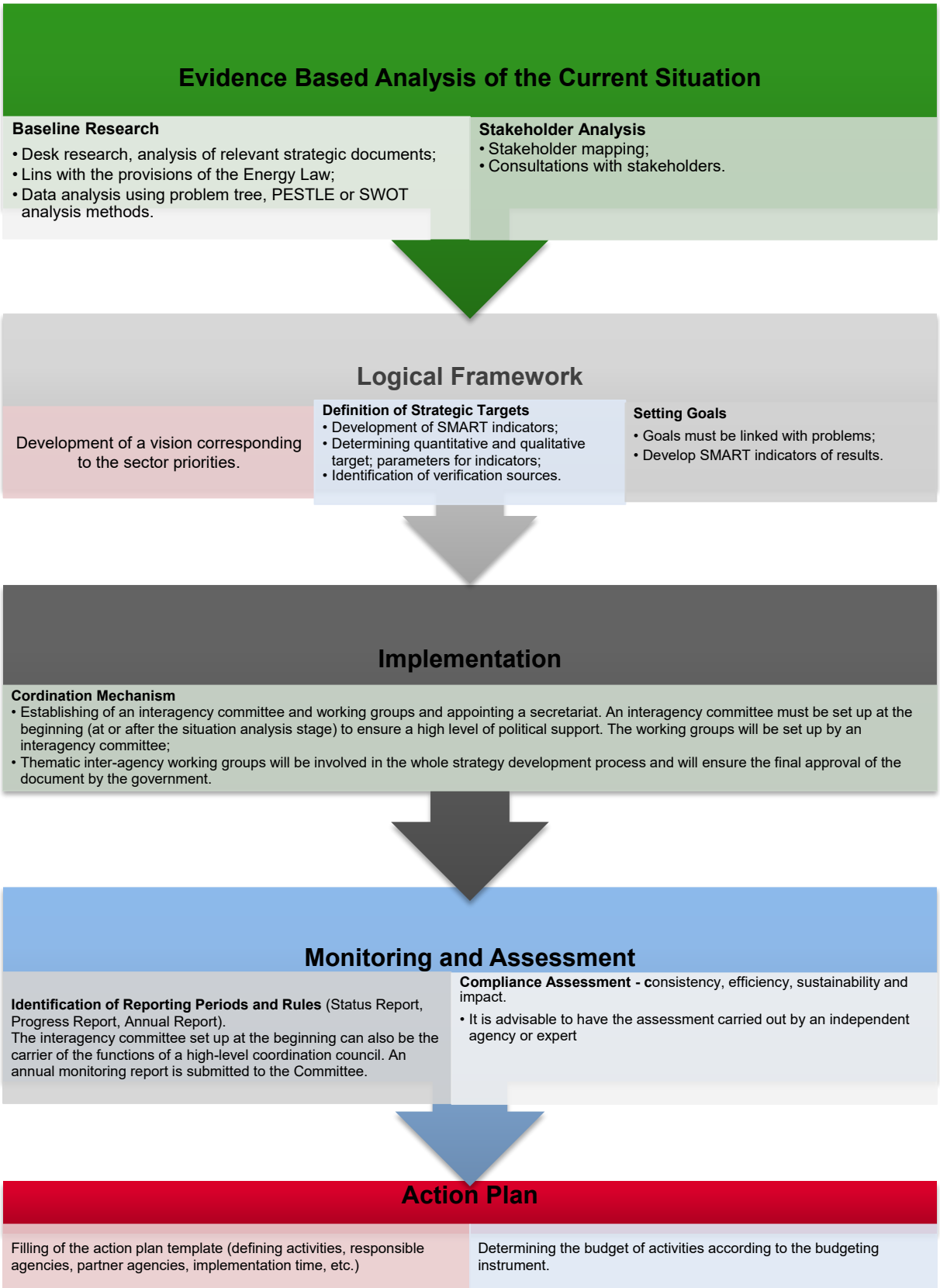
Besides:

- Coordination with various agencies is desirable not only at the level of policy and oversight, but also at the level of specialists working on the Low Emission Development Strategy (LEDS), the Climate Action Plan (CAP), the Nationally Determined Contribution of the Country (NDC), ten-year development plans and other strategic documents.

The matrix of coordination and cooperation with various agencies in the development of the National Energy Policy is given in Appendix II.

[1] Analysis of political, economic, social, technological, environmental and legal factors.
[2] Analysis of strengths and weaknesses, opportunities and threats.
[3] SMART- Specific, Measurable, Achievable, Relevant, and Time-bound.

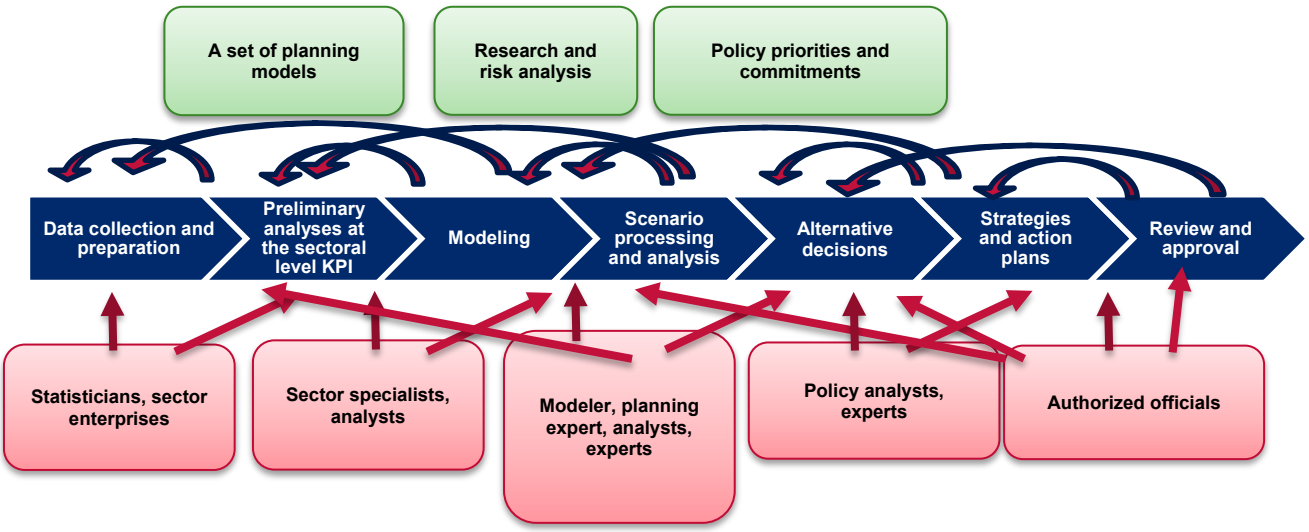
Figure 3: Key Stages of Strategy Development According to the Strategic Document Development, Monitoring and Evaluation Guide



4.6.2 ENERGY PLANNING WORK PROGRESS

The diagram presented below schematically describes the sequence of elaborating and analyzing development scenarios and key assumptions, as well as interactions between stakeholders. This process is the axis of the energy policy development.

Figure 4: Stages of Developing a Strategy and Action Plan within the Policy



The planning process for energy policy development includes the stages of collection and interpretation of data, identification and analysis of key indicators, optimization of measures under external constraints, development of scenarios, their analysis and decision-making based on these scenarios. It is an iterative process that requires close collaboration between different stakeholders, agreed procedures for reconciliation of analytical tools (including optimization programs) and reporting. An important part of this process is the development of KPIs, which should then be used to monitor the strategy implementation process.

At every stage of this chain, proper distribution of functions and an iterative specification process are of paramount importance. Analysts prepare decision options based on their cost-benefit analysis and risk assessments and ultimately the decision is made by the relevant authorities.

With the help of their programs, research, data processing capabilities, and analytical skills, universities and research organizations can make a valuable contribution to the development and improvement of energy strategies. It is desirable to develop this direction in the long run in order to achieve continuity of the process.

4.7 DEVELOPMENT OF ALTERNATIVE OPTIONS

4.7.1 ALTERNATIVE OPTION 1 (ALT 1)

According to this scenario, the shortcomings of the existing practice of developing strategic documents have to be identified and MoESD must take corresponding steps to address them. In particular, in this scenario, the existing policy document and the NECP are reviewed and improved as a result of a refined analytical processes.

The policy document is mainly improved with the help of external consultants hired by the MoESD or with donors' assistance. At the same time, MoESD will form an **Analytical Team** that will be involved in the NECP preparation process and devote significant time to the preparatory work necessary for developing the State Policy Document. The analytical team will be actively involved in trainings. With the help of consultants, it will prepare descriptions of the informative, analytical, organizational and procedural support processes and procedures, analyze alternative policy options and provide analytical support to the MoESD for making strategic decisions. Together with external consultants, this Team will lead and coordinate the process of preparing an updated energy policy document by the end of 2023. The analytical team will consist of 5 people, 2 of whom will be working on an energy planning model. It is assumed that the quality of the policy document developed with the assistance of

external consultants will be high, although it will not have a long-lasting effect in terms of further sustainability.

MoESD will start using Times or other equivalent modern model as a planning model, and implement it for the first time, identifying and comparing different scenarios. The policy-making process will be based on up-to-date data, which also addresses energy security and other issues developed on the basis of primary research and analysis. It is recommended that the process be based on the Rules for Developing, Monitoring and Evaluating Policy Documents, and use its key components to effectively manage and organize the process.

According to this scenario, the relative continuity of work processes is maintained and the cooperation with research and academic organizations is improved. Cross-sectoral coordination and data exchange are also improved.

The sector evaluation indicators and parameters are also more diverse. Today, only greenhouse gas emissions, renewable energy and energy efficiency indicators are used for such assessments, although the energy sector is not limited to these components and includes other parameters such as energy security, investment environment, etc. In this alternative option these additional parameters will also be defined.

Compared to the baseline scenario, the involvement and participation of stakeholders in the development (updating) of Georgia's National Energy Policy is high. The component of public hearings and citizen engagement is also improved, which leads to more credibility and support for the document.

The actual feasibility of the improved policy document and achievement of its results also become more likely.

Table 2: Alternative Option 1 - Summary

Parameters	Alternative 1	Comment
Policy document preparation period	End of 2020 - The and National Energy Policy documents are submitted. End of 2023 – documents are updated.	the work processes, decision parameters, planning models and processes will be developed in 2020 and the first half of 2021. Later, by the end of 2023, the GSEP and NECP will be revised to include additional data and strategies.
Planning work and model	Use of Times or another equivalent model; initial coordination and optimization. Initial comparison and analysis of the scenarios.	It is expected that the work on this model will star and the initial results be received at the end of 2023.
Working process	The core strategic workflow will be developed with the help of external consultants and experts. The analytical team of MoESD will also be involved in the process.	A baseline scenario will be developed, which will be used in various sectoral and state policy documents.
HR and institutional characteristics	Establishment of a 5-member analytical team: 2 modelers 2 Analysts 1 team leader.	The process is mainly done with the help of external consultants and donors. The analytical team of MoESD is involved in planning (modeling) activities and process coordination.
Budget	Increased	
Basic parameters for evaluation of the sector performance	Baseline indicators are defined for all sub-sectors.	Today, such indicators exist only with regard to greenhouse gas emission reduction, renewable energy and energy efficiency development.
Cooperation and coordination with other sectors	Increased – constant exchange and reconciliation of the sector data	
Public hearings and community involvement	Increased	This component is crucial to gaining credibility and support for a policy document.
Participation of research institutions and academia	Increased	

4.7.2 ALTERNATIVE OPTION 2 (ALT 2)

The Energy Policy document will be developed in accordance with the Rules for Drafting, Monitoring and Evaluating Policy Documents. As it has already been mentioned above, at present these rules are not mandatory for those documents that must be approved by the Parliament. However, taking into account the content and usefulness of these Rules, we consider it appropriate to extend them to GSEP and relevant strategies.

According to ALT2, an **Analytical Center** will be established, which will be responsible for the implementation of research and strategic processes. The establishment of this Center is one of the main recommendations of the in-depth assessment of the Georgian energy sector conducted by the International Energy Agency in 2015 and 2019. The need to establish the Center was also highlighted as a result of consultations with stakeholders in the impact assessment process of this regulation. In their opinion, it is important to have a neutral analytical Center, which conducts research and modeling impartially and independently, and whose data will be used by all agencies in the sector (including the Georgian National Energy and Water Supply Regulatory Commission, the Georgian State Electrosystem, etc.).

It is recommended for the Center to have the status of a legal entity under public law. The Ministry of Economy and Sustainable Development will be the state body controlling the Center, although the Analytical Center will be responsible for the documents prepared it.

In order to establish the Centre, it will be necessary to develop an organizational arrangement / structure, select and train the personnel, write and conduct processes, which is a long-term process associated with large financial resources. However, its advantage lies in maintaining sustainability and continuity of the strategic planning process, which, as has been repeatedly stated, is a necessary precondition for the development of the sector.

According to ALT 2, planning of the energy sector will be carried out according to the detailed forecasts and scenarios, which will be based on the final data of the used planning model. Particular attention will be paid to establishing key planning criteria, including: energy security and economic viability criteria and baseline indicators, which require in-depth research and involvement of decision makers.

In this scenario, liaison and collaboration with research organizations and academia is high. Funding for research activities is significantly improved and all key decisions are based on policy analysis and planning.

The Analytical Center monitors the implementation of the strategy and participates in the adjustment of measures and priorities in a changing environment. It also prepares information materials and recommendations for experts and officials in related fields.

There is also a high level of community involvement and stakeholder participation, which contributes to a full-fledged strategic process.

Table 3: Alternative Option 2 - Summary

Parameters	Alternative 2	Comment
Policy document preparation period	2023	Both alternatives are calculated for the same period
Planning work and model	A full-scale Times model is based on the demand forecast and final optimization data of the model	
Working process	Maintaining the continuity of the strategic work process by using permanent internal resources.	
HR and institutional characteristics	Creation of the Analytical Center	Formation of a legal entity of public law.
Budget	Increased	
Basic parameters for evaluation of the sector performance	Properly developed and approved	
Cooperation and coordination with other sectors	Full-fledged - building a permanent coordination and data exchange system	

Parameters	Alternative 2	Comment
Public hearings and community involvement	High	Stakeholder engagement will be perfectly achieved throughout the whole process.
Participation of research institutions and academia	High	

4.7.3 SUMMARY OF THE SCENARIOS

All three scenarios take into account both the requirements of the law and the recommendations of the Energy Community Secretariat, according to which the National Energy Policy Document and the NECP must be prepared by the end of 2020. The latter must be revised in 2023. The scenarios differ mainly in the quality of this revision process and the sustainability of subsequent strategic processes.

According to the baseline scenario, given the tight deadlines and limited resources by the end of the year, these documents can only be prepared schematically by reconciling existing official documents. Alternative scenarios offer different processes and characteristics to decision makers. The main difference, along with the content characteristics, is the human and professional resources allocated by the state for strategic planning.

In the baseline scenario strategic documents are still prepared mainly by consultants and in the form of one-off projects. In alternative scenarios, an appropriate Analytical Team or Analytical Center is established, which works on further strategic analysis and planning. The document adopted by the end of 2020 is not the final document and will be revised and refined in the following periods until 2023.

Alternative scenarios differ from each other according to the amount of allocated human, analytical and administrative resources, course of the processes and content of the final documents. The depth of analysis, stakeholder engagement, and the degree of trust are also different.

In both alternative scenarios, special attention is paid to establishing key planning criteria, including the definition of energy security and economic viability, sustainable development, and other criteria and benchmarks that require in-depth expert research and the involvement of senior officials. A brief summary of the scenarios is presented in the table below.

Table 4: Comparison of Scenarios According to Key Criteria

	Baseline Scenario	Alternative 1	Alternative 2
Period of preparing the documents	Year 2020: NECP and Policy Document - imperfect Year 2023: NECP and Policy Document - imperfect	Year 2023: Improved Policy Document and NECP	Year 2023: Thorough Policy Document and NECP
Work process	One-time and inconsistent, using the current resources; The process restarts when reporting is needed.	Starting of a continuous development process	Establishing a continuous and consistent process; Further rapid development.
Planning model	Use of old results from LEAP and MARKAL.	Times or an equivalent model; initial results.	Times (or PLEXOS) - a complete model, compatible with power planning models.
Planning activities	A superficial process, without reconciliation and optimization of sub-sector data; less connected with the Country Development Plan.	Initial forecast - agreed with the agencies; Initial coordination and optimization of scenarios; Initial analysis and comparison of scenarios.	Full-fledged forecast - agreed with economic and social development forecasts; Full analysis and comparison of scenarios; Effective planning procedures.
Involvement of Stakeholders and level of trust	Minimum dissemination of information and **low level of trust**.	Increased level of information dissemination and **medium level of trust**.	Full-scale information dissemination and **high level of trust**.
HR and institutional characteristics	Unchanged – Reduced	Analytical Team 5 people 1 Team Leader	Analytical Centre 10 people 1 Team Leader

	Baseline Scenario	Alternative 1	Alternative 2
		2 Modelers 2 Analysts Participation at the sector and consultant levels.	2 Modelers 2 Analysts 2 Administrative personnel Detailed instructions and assignments.
Key indicators and parameters of sector evaluation	Target indicators for EnC reporting.	Indicators defined in all fields.	Perfectly defined indicators based on studies.
Sectoral Involvement and Coordination	The existing information shared and reflected in GSEP and NECP	Exchange and reconciliation of sectoral information.	Involvement in the development of plans and forecasts - development of harmonized plans.
Participation of research institutions and academia	Minimal	Average	High

5. IMPACT ANALYSIS

5. 1 METHODOLOGICAL APPROACH

Multi-Criteria Analysis (MCA) is used to analyze and compare alternatives in conjunction with cost-benefit analysis. Multi-criteria analysis aims to identify and evaluate the positive and negative impacts in a single framework, which simplifies the comparison of alternatives. The MCA is represented by a so-called performance matrix that uses both quantitative and qualitative criteria to assess impacts and compare alternatives. The MCA includes the following key steps:

- Identification of the criteria used to compare alternatives;
- Assigning weights to the criteria in order to reflect the comparative advantage of each criterion during the decision making process[4];
- Scoring (-5; +5) for each alternative according to the criteria; the scores are awarded compared to the initial/baseline scenario[5];
- Calculation of the final results based on the scores and weights and ranking of the alternatives.

Various criteria are used to evaluate and compare scenarios, including:

- Results of cost-benefit analysis, NPV of each alternative;
- Economic criteria;
- Social criteria;
- Sustainable development and environmental protection criteria;
- Political criteria;
- Process and quality assurance criteria.

Cost-Benefit Analysis (CBA) is also used as a quantitative method of economic analysis when evaluating alternatives. The cost and benefits of each alternative are evaluated and expressed in monetary terms. NPV and Internal Rate of Return (IRR) are calculated for each scenario. The 7.02% real discount rate is used to calculate the net present value in terms of costs and benefits is obtained using the 10.24%[6] nominal interest rate and 3% target inflation on 8-10-year government bonds in Georgia. A key feature of the CBA is that costs and benefits are considered from the perspective of the whole community, given the wide range of impacts. The CBA is one of the criteria used for the multi-criteria analysis and recommendations are based on MCA results. Sensitivity analysis is used for the reliability of the cost-benefit analysis results, in which the net present value is calculated for different discount rates and different costs and benefits data.

A 10-year time horizon for the 2020-2030 period is taken to assess the impact of the given alternatives.

5.2 IDENTIFICATION OF POSSIBLE IMPACTS

Possible impacts were identified based on pre-defined criteria. Economic, social, environmental protection, process & quality assurance and other criteria were used. The Table given below describes in detail and summarizes the development of the baseline scenario and alternatives options according to these criteria.

[4] The weighting "ratio may range from 0 to 1 and shall be determined by an authorized person of the agency responsible for the RIA. If the authorized person does not determine the assigned ratio, the assigned ratio shall be 1. (Resolution of the Government of Georgia N35, on the Approval of the Regulatory Impact Assessment Methodology).

[5] The score assigned to the qualitative results of the multi-criteria analysis may range from (-5) to (5). Scores between (-5) and (-1) indicate a deterioration in the inaction scenario, with (-5) indicating a significant and (-1) a slight deterioration. (0) indicates leaving the situation unchanged in relation to the inaction scenario. Points (1) to (5) indicate an improvement in the situation, where (1) indicates a slight improvement, and 5 a significant improvement.

[6] Source: National Bank of Georgia, April 2020 - https://www.nbg.gov.ge/index.php?m=304

Table 5: Criteria for Assessment of Different Scenarios

Assessment Criteria	BAU	ALT1	ALT2
Economic Criteria			
1. The volume of investments increasing due to external strategic investments.	Lack of long-term vision and plans is an obstacle to investment.	Having an evidence-based policy and strategy ensures the stability and consistency of the national plans, which in turn leads to confidence from investors and banks and encourages investment.	This scenario repeats ALT1 actions, but with greater volume and higher probability.
2. Reduction of investment by the state	Due to the lack of private investment, the state is forced to build its own energy facilities (generation, gas distribution, etc.).	Implementation of a sound strategy will increase the confidence of investors which will make it possible to privatize energy facilities, and the state will gradually phase out economic and commercial activities.	This scenario repeats ALT1 actions, but with greater volume and higher probability
3. Financial self-sufficiency of the energy sector; reduction of tariff subsidies.	A large amount of budgetary resources are spent on indirect and direct subsidies of tariffs.	Economic analysis and professional strategic planning will stimulate and enable the MoESD to act in accordance with the best global and European practices – gradual phasing out tariff subsidies.	This scenario repeats ALT1 actions, but with greater volume and higher probability.
4. Reduction of import costs and increase of export revenues.	As a result of the accumulated unresolved problems, investment has slowed down and consumption has increased, leading to increased import volumes.	The strategy will promote optimal reduction of imports and increase of exports.	This scenario repeats ALT1 actions, but with greater volume and higher probability
5. Optimizing investment and operating costs of the sector	Under the current practice, the construction of generation facilities is chaotic. It is carried out without a specific plan and long-term optimization.	The strategy and action plan will formulate an optimal plan - corresponding to the lowest costs - which will reduce both investment and operating costs.	This scenario repeats ALT1 actions, but with greater volume and higher probability
Social Criteria			
1. Increase of employment	New jobs will be created in new projects planned in the field of energy efficiency and renewable energy.	Increase of investments leads to the increase of employment level.	This scenario repeats ALT1 actions, but with greater volume and higher probability
2. Reduction of energy poverty.	It is planned to reduce energy poverty through phased construction of gas pipelines, which is not economically viable and often fails to achieve results.	The same goal will be achieved in a more appropriate way, using a wider range of technologies and energy (including renewable biomass) and implementing energy efficiency measures.	In this scenario, the same measures will be implemented as in ALT1, although more quickly, at higher quality, consistency and probability.
3. Involvement of citizens in the process of decision-making and review of strategic documents.	Lack of strategy complicates citizen participation, leading to a lack of trust in policy and infrastructure decisions.	Strengthening of the MoESD analytical capacity will increase the possibility of public communication and involvement of citizens.	The quality of the policy document and public's trust towards it, as well as communication and public participation will increase.
Sustainable Development and Environment Protection Criteria			
1. Development of energy efficiency and renewable energy	Development of energy efficiency and renewable energy continues without any integrated plan and optimization.	Using the planning models and analytical work, the optimal shares of energy efficiency measures and renewable energy will be determined and integration of variable renewable energy into the network will be promoted (60% probability).	This scenario repeats ALT1 actions, but with greater volume and higher probability (80% probability).
2. Reducing environmental impact	Due to the non-optimized development of	Environmental impact parameters will be agreed and optimized.	More quality research will be initiated, the quality of

Assessment Criteria	BAU	ALT1	ALT2
	renewable energy sources and transmission infrastructure, environmental damage per installed kilowatt is higher. Since biomass (firewood) is not replaced with other resources, the negative impact on the environment is relatively high.		research will increase, not only in the field of energy but also in related fields (e.g.: protection of environment).
3. Reduction of greenhouse gas emissions	The current trend of greenhouse gas emissions from the sector will continue.	Greenhouse gas emissions will be reduced in parallel with the development of renewable energy resources and energy efficient technologies.	This scenario repeats ALT1 actions, but with greater volume and higher probability
Political Criteria			
1. Strengthening of the energy security	The country has accumulated many unresolved energy security problems. This process is promoted by the lack of long-term vision and strategy. If the situation is not changed, it is expected that the problem will be aggravated.	Research on energy security will begin. The established Analytical Team will implement a support and coordination functions.	The Analytical Center will play a leading role in the preparation and implementation of the decisions.
2. Improvement of regional cooperation in the energy sector	Taking into account its location and hydro resources, Georgia can have high potential in regional energy exchange and trade, and can function as an appropriate hub, which opportunity is not used at present.	The Analytical Team and policy planning will create more preconditions for deepening regional relations.	Establishing an Analytical Center and policy planning will create the preconditions and incentives for greater activity in the region.
3. Compliance with national interests and priorities of energy policy.	General	Perceived and analyzed; Partially implemented.	Full compliance.
4. Quality and timeliness of fulfilling the commitments to the EU and the Energy Community.	Formal and superficial implementation.	Primary decisions are made with average probability of implementation.	Calculated and reconciled decisions are made with a high probability of implementation.
5. Degree of trust in the State Energy Policy	Lack of rational analytical basis and accountability of decisions leads to a lack of trust in MoESD and its decisions.	The use of analytics and planning methods, community involvement, consistency and continuity to some extent overcome distrust.	Strong Analytical Center's resources will increase both the quality of the policy as well as stakeholder engagement opportunities.
Process and Quality Insurance Criteria			
1. Quality of the document and its development process	The Rules for Elaboration, Monitoring and Evaluation of Policy Documents ensure high quality of such documents, efficiency of the elaboration process and better strategic capabilities. However, compliance with this Rule is not required for the Energy Policy document	The Energy Policy document is prepared taking into account the key components of the Rules for Elaboration, Monitoring and Evaluation of Policy Documents.	Energy Policy document is fully compliant with the provisions of the Rules for Elaboration, Monitoring and Evaluation of Policy Documents.

Assessment Criteria	BAU	ALT1	ALT2
	that must be approved by the Parliament. This may impair the quality of the document.		
2. Increased professional and institutional capacity	Analytical support of policy decisions and planning is not developing.	A Team responsible for the implementation of analytical work and planning was formed, however there is a risk of leakage of human resources.	A new Analytical Center is established. This institution that has its own funding and detailed work processes, is capable of institutional development, can retain its staff and raise their qualification.
3. Sector management, coordination, and inter-sector coordination.	Weak management and coordination, without any strategic vision.	Sector management and coordination improved in certain areas.	Sector management and coordination is facilitated by the processes of strategy development and vision sharing.
4. Coordination of the goals and quality of donor assistance	Fragmented activities, little coordination	Coordinated in the main areas	Well-coordinated - donors have a high quality document that can be used as a guide

5.3 COST-BENEFIT ANALYSIS

MAIN FACTORS OF THE COST-BENEFIT ANALYSIS

The cost-benefit analysis was conducted by analyzing those factors of the Problem Tree the quantitative assessment and development trends of which can be predicted. The assumptions and forecast trends used in the projections are partly based on recent trends and are often more conservative than in some official documents.

It should be noted that the estimates and forecasts are approximate and mainly indicate relative importance of the factors under consideration. For more accurate quantitative analysis, analytical research and planning models are needed, the lack of which causes the strategic weakness, which is the main subject of the current regulatory impact assessment.

5.4 MAIN ASSUMPTIONS

FINANCIAL PARAMETERS AND ENERGY PRICES

- 7.02% real discount rate is obtained using 10.24% - nominal interest rate of government securities for 8-10 years [7] and 3% target inflation rate;
- The main financial calculations are based on prices in USD, while the exchange rate of USD to GEL is fixed at 3 GEL /1 USD;
- The value of electricity imports is a benchmark of 5 US cents, which is maintained until 2030 as a reference value of imports;
- The regional market value of natural gas in the next decade is assumed to be 185 USD per thousand cubic meters.

ASSUMPTIONS FOR THE BASELINE SCENARIO

Investments in the energy sector

- Foreign Direct Investment (FDI) in the energy sector – the data taken from the National Statistics Office, 193.9 million USD, 2019.
- State investments in energy - estimated based on the state budget data, plus the investments made by state-owned companies in the competitive fields of the energy sector (e.g.: gas-fired thermal power plants).

In the baseline scenario, we assume that both the current level of foreign investment and the current level of public investment will be maintained until 2030 - not taking into account the fact that in recent

[7] The National Bank of Georgia, interest rate for government securities during 8-10 years 8, April, 2020.

years the share of foreign investment has been declining and the need for public investment has been increasing (even in the competitive areas).

INCREASED DEPENDENCE ON IMPORTS

In recent years, electricity and natural gas imports into the country and outflow of relevant funds from the country has been increasing, some of the reasons for which are:

- Construction of generation facilities is lagging behind due to investment suspension and public resistance;
- Irrational tariff policy that encourages overconsumption and hinders the development of energy efficiency and renewable energy;
- Possible influence of foreign interests.

In the baseline scenario, the growth rate of net electricity imports in 2020-2030 is assumed to be 6%. Till 2030 the volume of net imports will increase by an average of 6% compared to the previous years and will reach 2.6 TWh by 2030. However, it should be noted that the net import volume (CAGR 2017-2019 - 31%) increased sharply in 2017-2019, partly due to the temporary closure of the Enguri HPP. In 2018-2019, this growth was much higher and stood at 50%[8].

Reduction of natural gas imports is not considered in the comparison of scenarios because possible scenarios that envisage replacement of gas imports with internal resources require additional analysis.

SUBSIDIZATION OF THE GAS TARIFF

In order to subsidize gas and electricity tariffs, the state subsidizes the price of gas for the population and thermal power plants. For this purpose, the state uses optional and additional gas received for transit through the South Caucasus Pipeline. Gas-fired thermal power plants are supplied with gas for 143 USD per thousand cubic meters, while the prices for the population are different and according to our estimates equal in average about 90 USD. As a benchmark for the regional gas prices, we took 185 USD per thousand cubic meters, which remains unchanged for the coming period. In order to estimate the subsidy, the difference between the regional gas price and the reduced gas prices given to the population & thermal power plants was multiplied by the gas volumes consumed by the population and thermal power plants.

In the baseline scenario, the dynamics of gas consumption by the population and thermal power plants is estimated at the average of the last five years (CAGR), which is 4.3% for the population and 0.5% for the thermal power plants. Accordingly, the subsidy costs are also increasing.

SUBSIDIZATION OF THE GROWING CONSUMPTION IN ABKHAZIA

For years, Abkhazia has been consuming the electricity generated by the Enguri HPP free of charge, without any limitation. We believe that it is a (forced) subsidy provided by the state.

The baseline scenario assumes that Abkhazia's consumption will increase by an average of 3.5% over the last five years, while the current tariff of 1.358 tetri/kWh (excluding VAT) is used to calculate the total amount of subsidies. Nevertheless, there are periods when the generation of the Enguri HPP is insufficient and the country has to import additional electricity to meet Abkhazia's demand.

ENGURI HPP AND SUBSIDIZATION OF THE ELECTRICITY TARIFF

Enguri HPP is also used to subsidize electricity consumer tariffs. Besides, it is planned to use the Enguri HPP to fulfill so called „Public Service Obligations" (PSO) and presumably sell its electricity to consumers at a price lower than the market price.

Based on consultation with experts, we believe that the Enguri tariff does not cover significant capital costs, such as e.g. the total cost of repairing the outlet pressure tunnel, the cost of compensating electricity, the cost of removing sediment from the reservoir, and other technological improvement needs. In view of the above, it is estimated by experts that the long-term tariff of the Enguri HPP generation is 2.2 US cent. Accordingly, to estimate the amount of subsidy provided by the station, the

[8] Source: www.esco.ge

difference between the estimated and actual tariffs is multiplied by the amount of electricity supplied from the station to the rest of Georgia, except Abkhazia[9].

The baseline scenario assumes that the Enguri tariff will remain at the current levels, while the amount of electricity supplied by it to the rest of Georgia will be reduced due to the increase in Abkhazia's consumption.

5.5 ALTERNATIVE SCENARIOS

Alternative scenarios differ from the baseline one in the quality and scope of the strategic documents, the depth of their development process, and the resources required for this purpose, namely:

- The first alternative scenario implies that a 5-member Analytical Team will be formed in the MoESD (2 - Data and Information Analysts, 2 Modelers/Planners and 1 Policy Analyst); half a million GEL will be allocated annually to other research and academic institutes for auxiliary research in the energy sector.

Implemented work:

- Optimized model of configured planning; developed baseline scenario, with demand forecast and optimized coverage plan, where the key assumptions are reconciled with policy makers and used in other sectorial policy documents, as well as in international reporting and energy sub-sectorial plans.

In the second alternative scenario, a separate Analytical Center will be established, with 12 staff members, where, together with the listed specialists, there will be analysts in the related to energy field - economics, politics and security. 1 million GEL will be spent annually on the research in the energy sector, while the energy sector policy and strategy will be developed in accordance with the Rules for Elaboration, Monitoring and Evaluation of Policy Documents approved under Government Resolution #629 (2019).

Implemented work:

- Alternative scenarios are developed and compared based on which analytical summaries are prepared and submitted to policy makers;
- Periodic information is prepared on regional and global energy trends and news the fields of policy, economy, technologies, security, and prices. This information is provided to various agencies;
- Policy recommendations and opinions are prepared based on the latest research. Strategic and tactical priorities are reviewed periodically;
- Procedures for the development and revision of the energy strategy are established and in force. Procedures for coordination with various agencies will also be outlined in this process;
- All sub-sectors are thoroughly covered and coordination between them takes place;
- Research and information dissemination has increased which has made industry data more accessible to politicians, donors, the private and non-governmental sectors.

In understanding these scenarios, it is important to take into account not only human resources, but also the need to establish appropriate work processes and coordination mechanisms, which should be provided by the Ministry of Economy and Sustainable Development in coordination with other ministries.

BENEFITS OF DEVELOPING THE STRATEGY AND ESTABLISHING THE STRATEGY DEVELOPMENT PROCESSES IN ALTERNATIVE SCENARIOS

Development of strategy documents and relevant work processes and professional skills, will improve management of the sector, increase communication efficiency, credibility, and stakeholder coordination, reduce the risk of adverse impacts, and promote effective sector development. Without proper planning and analytical work, it is impossible to directly link the strategy, strategic processes and skills development to economic outcomes. Therefore, in this analysis we assume that these factors will lead to improvements in the main areas and we try to use conservative, modest

[9] The impact of this assumption on the outcome has been assessed by means of a sensitivity analysis and its impact on the main findings of the report is negligible (see Excel table).

parameters of the results, which is mainly serve to form the stakeholders' opinion and do not claim to have accurate predictions.

REDUCTION OF THE SECTOR SUBSIDIES

Reducing inefficient subsidies in energy sector is in line with international best practice and is a requirement of international organizations (OECD, Energy Charter, IEA, IMF).

For the purpose of evaluating alternative scenarios it is assumed that the development and implementation of energy strategies and appropriate strategic capabilities will help to reduce the amount of subsidies and, consequently, will free up state resources for economic, social or other programs.

For the purpose of comparing alternative scenarios it is assumed that: in the ALT1 scenario, the volume of subsidies will be reduced by 20% by 2030, while in the ALT2 scenario, a 50% reduction is planned. This assumption was made based on experts' assessments, together with a sensitivity analysis (10-25% and 30-60%, respectively) conducted for the reliability of the final results.

INCREASE OF FOREIGN INVESTMENTS

Foreign investments lead to the grows the country's economy, create jobs, strengthen the country's infrastructure, and introduce new technologies. The influx of strategic Western investments also increases stability and reduces the country's foreign political risks. Foreign investments make direct contributions to Gross Domestic Product (GDP). By developing a strategy and long-term vision and establishing appropriate strategic process the country will increase the capacity, efficiency and stability of the sector. Accordingly, this will increase investors' confidence and the inflow of foreign direct investment

In the ALT1 scenario, based on the assumptions, the foreign direct investment increases by 20% compared to the baseline scenario. In the ALT2 scenario, the FDI increases by 50% compared to the baseline scenario. This is an assumption made based on expert assessments, with a sensitivity analysis (10-25% and 30-60%, respectively) conducted to assess the impact on the final results.

PRIVATIZATION AND REDUCTION OF PUBLIC INVESTMENTS

In recent years, the state has made significant investments in the energy sector: the construction of electricity generation facilities, gas networks and other facilities. In case of cost-effectiveness, such investments should be made by the private sector, and the released public funds should be directed to strengthening the country's defense and economic potential, education, social, health and other programs. In addition, the opportunities for privatization of state assets will increase if the vision of the sector's future is clear.

The ALT1 scenario implies that the development and implementation of an energy strategy will reduce the need for the state's financial intervention, which will lead to reduction of public investments in the non-monopoly market and a greater likelihood of privatization. The total effect of these factors is a 20% reduction in public investment costs compared to the baseline scenario. The reduction in the ALT2 scenario is 50% compared to the baseline scenario. This is an assumption based on expert assessments, with a sensitivity analysis (at 10-25% and 30-60% intervals, respectively) for the reliability of the final results.

REDUCTION OF THE ELECTRICITY AND GAS IMPORT

It is assumed that data and evidence-based, well thought-out and targeted activities carried out for the development of energy efficiency and renewable energy resources and optimization of energy consumption, will reduce the speed at which the country's import dependence is growing and increase energy security, which is the key objective of the energy strategy. Accordingly, compared to the baseline scenario, electricity import costs will be saved.

- In the ALT1 scenario, in contrast to the baseline scenario, the net import rate is halved by 2030 and reaches 1.3 TWh, which is equivalent to a 1% annual decrease in net imports of 2019 (1.383 TWh);
- In the ALT2 scenario, net imports will be zero in 2030. It should be noted that this scenario is much more modest than the official forecasts, according to which Georgia was expected to become a major exporter of electricity in the coming years.

OPTIMAL DEVELOPMENT

The energy sector is an extremely capital-intensive field in which different sub-sectoral projects influence each other's efficiency. For example, interrelationships between generation and transmission projects, development of renewable and thermal power plants, increase of generation or energy efficiency, and other unplanned, non-optimized development leads to loss of capacity and unjustified increase in costs, which is undoubtedly a characteristic feature of the baseline scenario. In contrast, ALT1 and ALT2 scenarios are expected to optimize both investment and operating costs, including various types of energy and energy efficiency measures, thus saving both investment and operating costs for the sector. This assumption is reinforced by the fact that long-term planning models and relevant plans serve to optimize precisely these costs. According to expert estimates, optimization of development and implementation of an optimal plan can save 5-10% of future investment and operating costs compared to the chaotic development. At this stage, it is difficult to estimate the value of fully optimized operating sector costs, therefore in alternative scenarios we consider only the optimization of investment and gas consumption costs:

In the ALT1 scenario, we assume that the implementation of the optimized plan will reduce investment and gas purchase costs by 2%.

In the ALT2 scenario, we assume that the cost savings obtained through more efficient and extensive optimization and implementation of the plan will equal 5%.

Based on the above assumptions, we received the following results for the alternative options:

In the ALT1 scenario, the discounted NPV is 2.9 billion GEL for the period 2020-2030, while the benefit-cost ratio is 569.

In the ALT2 scenario the discounted NPV is 7 billion GEL for the period 2020-2030, while the benefit-cost ratio is 589 GEL.

For more details on data, assumptions and results, please see Appendix III.

QUALITATIVE BENEFITS

In addition to the above, elaboration of a sound energy strategy and development of strategic capabilities will:

- increase energy security, reduce the risk of external influences and increase the likelihood of detection and use of opportunities;
- increase public confidence in the state energy policy, reduce the resistance to infrastructure projects, and promote infrastructure development;
- create the possibility of parliamentary and public control, which is a necessary condition for further refinement of the energy policy;
- reduce the total impact on the environment, which is expected in case of non-optimal development with more negative cumulative effects;
- reduce greenhouse gas emissions and enable optimal achievement of target indicators;
- facilitate the achievement of commitments regarding energy efficiency and renewable energy;
- promote coordination within the sector as well as across different sectors and facilitate identification and achievement of the country's interests and priorities;
- facilitate coordination of donor projects and international assistance and increase efficiency;
- make a positive impact on employment (in energy projects implemented in the field of renewable energy and energy efficiency);
- reduce energy poverty.

SENSITIVITY ANALYSIS

Sensitivity analysis of individual factors was performed for the reliability of the cost-benefit analysis results[10]:

1. Increase in FDI compared to the baseline scenario:
    a. Alternative 1 – from 10% to 30%;
    b. Alternative 2 – from 25% to 60%.

[10] The results of the sensitivity analysis are given in Appendix IV.

2. Reduction of state subsidies compared to the baseline scenario:
    a. Alternative 1 – from 10% to 30%;
    b. Alternative 2 – from 25% to 60%.
3. Reduction of public investments compared to the baseline scenario:
    a. Alternative 1 – from 10% to 30%;
    b. Alternative 2 – from 25% to 60%.
4. Reduction of net import of electricity compared to the baseline scenario:
    a. Alternative 1 – from 25% to 60%;
    b. Alternative 2 – from 50% to 100%.
5. Reduction of the sector's costs using the optimization programs compared to the baseline scenario:
    a. Alternative 1 – from 0.5% to 2%;
    b. Alternative 2 – from 2.5% to 5%.
6. Enguri HPP tariff for the next 10 years - from 0.014 GEL/kWh to 0.066 GEL/kWh for both alternatives.

5.6 COMPARISON OF ALTERNATIVES

Multi-criteria analysis combines quantitative and qualitative assessment of alternative impacts. The impact of the alternatives was compared to the baseline scenario according to individual criteria. In the first stage, a wide range of criteria was used to compare alternatives, including economic, social, political, environmental protection and other specific criteria.

Stakeholders were consulted to determine weight ratios. They were provided with detailed information on alternatives, criteria and relevant indicators. Questionnaire were also distributed during the consultations in order to assign appropriate weighting coefficients to the criteria. According to the completed questionnaires, each criterion was assigned a weight (see Table 6 below).

In the multi-criteria analysis, the scores given for each criteria in order to evaluate the alternative options range from (-5) to (5). Scores between (-5) and (-1) indicate a deterioration in relation to the baseline scenario, with (-5) indicating a significant deterioration and (-1) a slight deterioration. (0) indicates that the situation does not change compared to the inaction scenario. Points (1) to (5) indicate an improvement in the situation, where (1) indicates a slight improvement, and (5) a significant improvement.

In the cost-benefit analysis, the benefits estimated for each alternative include the following:

- Increased volume of investments in the sector as a result of private strategic investments;
- Financial self-sufficiency of the energy sector, reduction of tariff subsidies;
- Reduced import costs and increased export revenues;
- Optimized investment and operating costs of the sector.

While the costs estimated for each alternative include the following:

- Salaries and office expenses of additional specialists (Alternative 1);
- Annual costs of research conducted in the energy sector;
- Costs of establishing and operating an Analytical Center (Alternative 2);
- Annual costs of research conducted in the energy sector (Alternative 2).

Table 6. Comparison of Alternatives

Assessment Criteria	Weight Ratio	ALT 1 Assessment	ALT2 Assessment	ALT1 sum	ALT2 sum	Indicators
Economic Criteria						
Cost-Benefit analysis results - CBA	6.8%	3	4	0.21	0.27	NPV, B/C
Social Criteria						
Increased employment	4.8%	3	4	0.14	0.19	Number of jobs in sector development

Assessment Criteria	Weight Ratio	ALT 1 Assessment	ALT2 Assessment	ALT1 sum	ALT2 sum	Indicators
Reduction of the energy poverty	5.5%	3	4	0.16	0.22	An indicator of energy poverty and access to clean energy
Stakeholder involvement and transparency	6.2%	4	5	0.25	0.31	Timeliness and quality of communication
Sustainable Development and Environment Protection Criteria						
Development of energy efficiency and renewable energy	6.8%	3	5	0.21	0.34	Annual turnover of energy efficiency and renewable energy businesses; Energy intensity of energy and other sectors;
Reducing environmental impact	5.5%	3	4	0.16	0.22	Impact of infrastructure projects on the natural and social environment, ecological footprint, and impact on ecosystem services.
Reduction of CO_2 emissions	5.5%	3	4	0.16	0.22	Reduction of CO_2 emissions in the energy sector.
Political Criteria						
Strengthened energy security	6.8%	3	4	0.21	0.27	Energy security indicators (need to be developed); HH index of energy supply sources; dependence on import; reliability of supply.
Improved regional cooperation in the energy sector	6.2%	3	4	0.18	0.25	Volume of energy trade with neighboring countries; development of transit projects; new projects and initiatives.
Consistency of the energy policy with national interests and priorities	6.8%	3	5	0.21	0.34	Degree of coordination and harmonization with national strategic documents and policies.
Quality and timeliness of fulfilling the commitments to the EU and the Energy Community.	6.2%	4	5	0.25	0.31	Monitoring of results; timeliness and quality of fulfilling obligations.
Degree of trust in the State Energy Policy	6.2%	3	5	0.18	0.31	Results of public opinion studies.
Process and Quality Assurance Criteria						
Quality of the document and its development process	6.8%	3	5	0.21	0.34	The level of compliance with the requirements of the Rules of Elaboration, Monitoring and

Assessment Criteria	Weight Ratio	ALT 1 Assessment	ALT2 Assessment	ALT1 sum	ALT2 sum	Indicators
						Evaluation of Policy Documents.
Increased professional and institutional capacity	6.8%	3	5	0.21	0.34	The number and qualifications of specialists constantly working on the energy policy; Number and quality of professionals involved in strategic research and the number and quality of research conducted by them.
Sector management, coordination, and inter-sector coordination.	6.8%	3	5	0.21	0.34	Existence of coordination and optimization mechanisms between energy sub-sectors, and activities.
Coordination of the goals and quality of donor assistance	6.2%	3	5	0.18	0.31	Mechanism and effectiveness to ensure donor projects coordination with the energy policy.
Sum	1			**3.12**	**4.59**	

Comparison of the alternatives based on the results of multi-criteria and cost-benefit analysis clearly demonstrates that Alternative 2 can bring more benefits at a lower cost than Alternative 1. The discounted NPV in the ALT1 scenario is 2.9 billion GEL for the period 2020-2030, while the cost-benefit ratio is 569 GEL. That is, 1 GEL spent can bring in a benefit of 569 GEL. In the ALT2 scenario, the discounted NPV for the same period is 7 billion GEL and the cost-benefit ratio is 589 GEL.

At the same time, Alternative 2 ensures the sustainability and consistency of the strategic planning process, which is why its results are not one-time, but long-term and focused on the development of the sector.

6. CONSULTATIONS WITH STAKEHOLDERS

In order to plan the consultations, the stakeholder description (mapping) and analysis was carried out for, taking into account their interests and influences. The analysis matrix is presented in Figure 5.

Figure 5: Stakeholder Matrix

Influence		
	Low interest, high impact	**High interest, high impact**
	1. Government administration (AoG); 2. Parliament.	1. Ministry of Economy and Sustainable Development (main recipient); 2. Energy Community Secretariat; 3. Ministry of Environment Protection and Agriculture; 4. Ministry of Finance; 5. Energy companies and GNERC (ESCO, GSE, GEDF, GOGC, GGTC. GNERC).
	Low interest, medium or low impact	**High interest, medium or low impact**
		1. Ministry of Education, Science, Culture and Sports; 2. Ministry of Healthcare; 3. Donors and International Financial Institutions; 4. Developers and associations (e.g.: GREDA); 5. Local and international investors; 6. NGOs and CSOs working in the sector, including environmental organizations.
Interest		

ESCO – Electricity Market Operator; GSE – Georgian State Electrosystem; GEDF – Georgian Energy Development Fund; GOGC – Georgian Oil and Gas Corporation; GGTC – Georgian Gas Transportation Company; GNERC – Georgian National Energy and Water Supply Regulatory Commission; GREDA – Georgian Renewable Energy Development Association; NGO – Non-Governmental Organization; CSO – Civil Society Organization.

MINISTRY OF ECONOMY AND SUSTAINABLE DEVELOPMENT

All stages of the proposed regulation's impact assessment were carried out in close coordination with the Ministry of Economy and Sustainable Development. At the initial stage of the project, a meeting was held with the Deputy Minister in charge of Energy Sector and representatives of the Department of Energy Reforms and International Relations. During the meeting the goals and objectives of the project were discussed in detail and the format of the relationship was defined. It should be noted that the representatives of the MoESD expressed great interest and support from the very beginning, which facilitated the relations in terms of consultations and data exchange in the later stages.

The baseline scenario was discussed and described with the participation of the representatives of MoESD. Afterwards, the requirements for the policy document were prepared. This document will be submitted by the MoESD to the Ministry of Environmental Protection and Agriculture and Ministry of Health for scoping to determine the need for a strategic environmental assessment of the Energy Policy Document.

At the next stage of the consultation, alternative scenarios were discussed in detail and their compliance was determined. Representatives of the MoESD assessed the possible development indicators for separate components and talked about the existing barriers and challenges.

THE MINISTRY OF FINANCE

At the final stage of the consultation, a meeting was held with the Head of the Macroeconomic Analysis Division and the Head of the Fiscal Risk Management Division of the Ministry of Finance. The purpose of the meeting was to familiarize the Ministry with the data obtained from the cost-benefit assessment and to receive recommendations on alternatives, as the position of the Ministry of Finance is crucial in allocating additional funds to the MoESD.

Representatives of the Ministry of Finance talked about the procedure related to the allocation of funds in the budget for the Analytical Center or Analytical Team. A relatively simple way is to add an Analytical Team to the MoESD, which can be done by reorganizing the ministry. A change in the budget for the establishment of a Analitical Center in the next year is unlikely. MoESD should carry out lobbying of the decision and request for budget funds.

THE ENERGY COMMUNITY SECRETARIAT

The main purpose of the consultation with the Energy Community was to discuss the recommendations and challenges for the development of the NECP. It was noted that Georgia should develop the NECP by the end of the year, although the issue of time is problematic, as a few months are not enough for the full-fledged process and the creation of the document. Energy Community said that the document can be submitted subject to further updates. They will also provide technical assistance to the MoESD.

The key characteristics of the document's content were also discussed. Emission reduction targets for the Energy Community countries are not agreed upon, so each country sets its target rate individually.

The conversation also touched upon the main challenges in the energy sector of Georgia and the need for a strategy to overcome them.

LOCAL NGOs

The meeting with local NGOs was part of the Eastern Partnership Platform 3 Working Group Meeting. Group members were presented with a document prepared by WEG on policy development processes and the objectives of the regulatory impact assessment were explained.

The main time of the meeting was dedicated to the analysis of the Problem Tree and the review of the challenges in the sector. The members of the group shared their vision on the necessity of having a strategy and talked about the shortcomings caused by the lack of it.

It was stressed that it is important to ensure the participation and involvement of civil society organizations in the process of developing policies and relevant strategies from the very beginning and to change the current practice when already drafted documents are published for public discussion and these discussions are not complete.

DONORS AND INTERNATIONAL FINANCIAL INSTITUTIONS

The main purpose of the consultations with donors and international financial institutions was to discuss the problem in the energy sector, alternatives developed within the RIA and to hear their views on ways of solving these problems. The meeting was attended by almost all major donor organizations involved in the development of the Georgian energy sector (USAID, United Nations Development Programme (UNDP), German state-owned development bank (KfW), World Bank (WB), EC, EU Delegation).

The meeting participants shared WEG's vision about the problems in the sector and discussed in detail the cost-benefit part of evaluating the alternatives, its numerical indicators and assumptions.

Much of the discussion focused on the establishment of an Analytical Center. It was almost unanimously stated that the existence of a similar type of center is necessary, although emphasis was placed on the risks and impediments, among which the position of the Ministry of Finance about establishing another LEPL was predominant. According to them, the Ministry of Finance will find it difficult to allocate additional resources, especially in the context of the coronavirus pandemic, when the country's efforts are aimed at reducing administrative costs. Representatives of the donor organization themselves confirmed their readiness to support the idea of creating an Analytical Center, taking into account that it is needed for the development of the sector.

PRIVATE BUSINESSES WORKING IN THE FIELD OF RENEWABLE ENERGY

In terms of investing in the development of renewable energy, the focus was made on the problems in the investment environment and the inconsistency of decisions made by the government or other agencies. For example, the 10-year transmission network development plan, which is one of the main documents for investment planning, is constantly changing. As a result, an investor who plans to build a station on the assumption that a transmission line will be built at a specific location is unable to make the investment because the information about these lines changes and the location is no longer included in the 10-year plan. This document has lost its credibility.

There are also no clear indicators of how the state's views on future generation portfolio. It is necessary to decide whether the development of wind energy or hydropower potential is a priority and what must be the ratio between the different energy sources. This information is vital for investors, so that they can properly plan and calculate investments. There are cases when the development of a specific area is not mentioned in any of the documents, although the state still supports such projects.

The lack of project evaluation criteria is an important problem. It is unclear to investors what parameters are used to evaluate and select specific project applications.

Attention was also drawn to the lack of coordination between different agencies, which is why there are cases when, for example, a permit is issued for the construction of a project, however, it later becomes clear that a specific place belongs to the cultural heritage protection zone and construction there is not allowed. This is an additional burden for the investor, as previous preparatory work is often carried out and financial costs are incurred.

Thus, it is important to define strategic priorities and develop appropriate criteria on the basis of which projects or investments will be selected to implement these priorities.

INDEPENDENT EXPERTS

The main purpose of consulting with independent experts was to discuss alternatives, clarify the data for evaluation according to the criteria and determine the importance of the criteria.

7. CONCLUSIONS AND RECOMMENDATIONS

The analysis and consultation with stakeholders reaffirmed the high importance attached to the development and implementation of a comprehensive energy strategy and the establishment of a strategic analytical base and work processes.

Discussions conducted during the regulatory impact assessment have shown that the proposed options and numerical assessments deserve to be trusted by stakeholders and can become the basis for coordinated action.

The economic assessment shows that the key costs incurred by the state in establishing of the strategic process are incomparably small compared to the expected benefits. Based on modest estimates, it is possible to get an economic benefit of five hundred laries per one spent lari. Of course, there are also other, non-economic benefits.

The multi-criteria and cost-benefit analysis revealed that the best way to develop is to establish an independent Analitical Center responsible for full-fledged planning of the energy sector (using modern, complex planning methods), strategic analytical support of the sector and coordination of strategic research with academia. The Center can also play a leading role in informing various branches of government and the public on strategic issues of the energy sector.

According to conservative expert assessments discussed with stakeholders, the development and implementation of a sound strategy will make it possible to reduce public expenditures and increase public benefits, the current discounted net present value of which is 7 billion GEL for the period 2020-2030, while the benefit-cost ratio is 589.

In addition to the above, elaboration of a sound energy strategy and development of strategic capabilities will increase energy security and reduce the risks of external influences. It will also create the possibility of parliamentary and public control, which is a necessary condition for further refinement of energy policy. This will improve coordination in terms of donor assistance and create new jobs. Energy poverty will also be reduced, which will directly affect the well-being of citizens.

In view of the above, the Ministry of Economy and Sustainable Development is recommended to:

- Make a final decision on the optimal version of the strategy, based on the proposed RIA and start lobbying for its implementation;
- Develop a detailed, timely action plan for the development of the energy policy and strategy; also, to establish the principles for coordination of work processes and agencies;
- Establish a list of priority directions and issues for strategic research in the field of energy; start consultations with the Ministry of Education, Culture and Sports, and Rustaveli Foundation, universities, and donor organizations in order to organize and fund such research;
- Define the preconditions for the establishment of an Analytical Center and make decisions regarding its structure and the budget process; start lobbying in order to get the funding;
- Determine the rules for elaboration and updating of the Energy Policy; make the conditions of Government Resolution #629 mandatory for the process of preparing the energy policy;
- Communicate with donor organizations to attract the financial resources and technical assistance needed to establish and maintain the Center.

It is recommended that the donor organizations:

- In their current and planned projects, take into account the need to develop strategic capabilities and, in coordination with each other and the MoESD, support as much as possible implementation of long-term strategic analysis and planning, strategy implementation and monitoring procedures;
- Assist the MoESD in lobbying for the establishment of a strategic Analytical Center and in its development and financing at the first stage;
- Help the MoESD to establishment sound practices and working environment in the sector in order to improve the investment environment, reduce tariff subsidies and long-term planning;
- Include in their programs the measures necessary for the establishment and operation of the Analytical Center; develop a job description for the person responsible to prepare an energy strategy and a list of information, analytical tools, workflows, etc.

It is recommended that the civil society and experts:

- Contribute to dissemination of information and awareness raising of politicians and general public about the challenges faced by the energy sector. Provide information about the benefits that the country and its population will receive as a result of the proposed measures (increase in investments, reduction of subsidies, reduction of import dependence, increase of energy security, etc.).
- Contribute to strengthening of the strategic capacity of the state; disseminate information and increase public awareness about the need for similar processes.

APPENDIX I: COMPARISON OF NECP IN THE EU COUNTRIES BY KEY DIMENSIONS

Country	Decarbonization, Including Renewable Energy	Energy Efficiency	Energy Security	Internal Energy Markets	Research, Innovation and Competition	Energy Poverty
Croatia	Target parameters: ETS Sector - reduction of emissions by at least 43% compared to 2005. Other sectors (not ETS) - reduction of emissions by at least 7% compared to 2005. Adaptation measures, which are also related to decarbonization, are specified in a separate adaptation strategy and relevant action plan (approved by the Parliament). Target share of renewables in energy consumption is defined for 2030 (broken down by sectors such as electricity, transport, heating/cooling). The share is also broken down by energy sources (solar, wind, biomass, etc.).	Target parameters: primary energy consumption by 2030 - 8.23 MTOE; final energy consumption by 2030 - 6.85 MTOE. The country has a strategy to attract investment for upgrading buildings (adopted in 2014 and plans to adopt a new one after 2020, which will be in line with the country's Energy Sector Development Strategy).	Main goals: diversification of supply sources; increase energy storage capacity (including gas); Increase of the power system's resilience; Protection of critical infrastructure and mitigation of risks related to cyber security and climate change. the dependence on imports must be reduced by increasing the share of renewables; measures to be implemented by different sectors are described.	The country has already met (and even exceeded) the EU's 15% network interconnectivity requirement, so no specific figures are set for 2030. Measures for improving the electricity transmission and gas transportation infrastructure are defined.	At this stage, the country has not defined target parameter for financing private or public initiatives related to research and innovation. It has identified the most important sectors in this regard.	A program for energy poverty reduction will be prepared separately (linked to the renovation of buildings). The activities envisaged in this program are: offering consultations in the field of energy; development of indicators for measuring and monitoring energy poverty (for energy-poor population and risk groups); establishment of an energy efficiency system.
Slovakia	Target parameter: Reduction of emissions by 2030 - by 40% compared to 1990 levels. Increase of the share of renewable energy to 32% of final consumption by 2030 (the indicators are broken down by sectors).	There are two scenarios - realistic and ambitious (28% and 30%). Regarding the buildings, a note has been made that a long-term strategy for the renovation of buildings will be developed separately and relevant issues will be reflected in that strategy.	Issues of security of electricity and gas supply and appropriate measures are discussed. It mainly reviews the legal acts related to these issues and the current situation.	Will meet the 15% target for 2030; the electricity and gas transmission infrastructure and its improvement plans are described.	The current situation is described. 1.02 million euros were spent on this issue in 2017. There is a draft of R&D programs for 2020-2024, which needs to be approved by the government,	The statement on the energy poverty is general. It is considered in the context of social policy and linked to general poverty. Although, it is stated that a deeper approach is needed because energy poverty is not only the result of financial problems and other aspects need to be considered. In this regard, there are no specific target indicators or factual data.
Estonia	Target parameters: by 2030 to reduce emissions by 13% compared to 2005 level; in order to achieve this goal, in 2019 the	Target parameters: by 2030 it is planned to reduce the primary energy consumption by	Goals: Ensuring the flexibility of the electricity sector (includes many issues, such as construction of new	The rate of integration into the EU network is 63%, which is much higher than the	There are no separate targets for the energy sector. The country has a	The country does not have a separate plan or document related to energy poverty. Based on the data from the

Country	Decarbonization, Including Renewable Energy	Energy Efficiency	Energy Security	Internal Energy Markets	Research, Innovation and Competition	Energy Poverty
	Prime Minister established the Committee on Climate and Energy (defining the requirements for the committee members and responsibilities). The share of renewals must be 42% by 2030 (broken down by sectors and sources).	15% compared to the peaks of the previous years (2013 - 69.4 TWh), while the final energy consumption will remain the same. Targets are broken down by sectors; In 2021-2030 it is planned to upgrade 170,000m^2 of buildings.	transmission lines, the share of domestic resources, the share of imported energy, etc., each with a target parameter). Similar detailed targets are presented for the gas sector.	mandatory 15%. The goals set for gas transportation and electricity transmission systems are given.	strategy for 2014-2020. The current situation id reviewed; work on a 2021-2035 strategy is going on.	Energy Poverty Observatory it is stated that the country does not have a significant problem in this regard. The only significant problem is cooling (23% of the population has this problem). No target parameters are not set.
Czech Republic	Target parameters: by 2030 to reduce emissions by 30% compared to 2005 level; increase the share of renewable energy in the final consumption to 22% by 2030 (broken down by sectors and sources).	The documentation states that according to the directives it is not mandatory to define the target parameter is not mandatory, therefore the parameter is not specified. It considers that it is more appropriate to determine the national energy efficiency target of the economy. Therefore, it indicates the target level of reducing energy intensity. Building renovation parameters and required financial resources are presented. 3 types of building renovation scenarios (light, medium and thorough) are considered).	The goals set in the electricity and gas sector in terms of improving energy security are discussed. Diversification targets are given broken down by sources (for example, if the share of coal was 40% in 2016, it should become 11-17% in 2040) the share of renewables and nuclear energy is increasing.	The country has already met the EU's 15% network interconnectivity requirement. It is considering A and B Scenarios (with a 10% difference in imports and exports). Target conditions for upgrading the power transmission and gas transportation networks and other domestic energy market issues are specified.	No measurable target parameter has been developed for this component. The document describes current plans and initiatives.	The term “Energy Poverty” is not defined in the legislation. Assessments are made based on certain indicators. It is clear that socio-economic groups, which are particularly vulnerable to energy poverty have not been identified. There is no target parameter for this issue.
Finland	Target parameter: to reduce level of emissions by 39% compared to 2005, in compliance with the ESR	Energy savings rates are set for different sectors. A long-term strategy for renovation	It is based on a document on energy security developed by the government, which defines what should be the	Target parameter: It is planned to preserve a level	The country is making significant investments in the development of new	There were 3 studies on energy poverty in the country. It is clear that there are already quite thorough

Country	Decarbonization, Including Renewable Energy	Energy Efficiency	Energy Security	Internal Energy Markets	Research, Innovation and Competition	Energy Poverty
	regulation; The country has developed a national plan for adapting to climate change. The target indicators for the share of renewables are set by years (and broken down by sectors and sources).	of buildings is under development (to be completed in 2020). An energy efficiency working group has been formed which also includes experts. They have selected the measures that promote energy saving. These measures and the savings rates are indicated.	bases of energy security (well-functioning energy markets, long term strategy that encourages investment and energy efficiency).	higher than the mandatory 15%.	technologies (the level is higher than the EU average in this regard).	protection schemes and plans. No Target parameter or additional measures are specified.
Greece	Target parameters: by 2030 to reduce emissions by 40% compared to 1990 level; The country has separately developed a climate change adaptation strategy. According to the plan the share of renewable energy in the final consumption must be 35% (broken down by sectors and sources.	38% improvement of energy efficiency in the final consumption. Renovation parameters for buildings (public buildings) are given. Plans to renovate up to 60,000 buildings (fully or partially)	Main goals are: Diversification of supply sources; Optimal use of internal sources; Greece's role as a regional hub. Reducing the degree of energy dependence; the challenges faced by the country for ensuring the system's adequate capacity are specified.	The current situation and challenges are described.	It is stated that this component is one of the most important strengths of the Greek economy. Its share in GDP is specified (0.13% by 2030 in the energy and environment protection sectors).	It is noted that the situation in terms of energy poverty has deteriorated in recent years and significant measures need to be taken in this regard. (Factual data reflecting the condition based on studies are given). The target parameter is set: minimum 50% reduction by 2025, by 75% compared to 2016 and below the EU average by 2030. 75% reduction compared to 2016 and going below the average EU level by 2030. An Energy Poverty Action Plan is being developed and should be completed by 2020. The plan will include specific measures and monitoring tools.

APPENDIX II: COORDINATION MATRIX FOR THE NATIONAL ENERGY POLICY DEVELOPMENT

N	OBJECTIVE	LINKS WITH OTHER OBJECTIVES	IMPLEMENTING AGENCY	THE DOCUMENT THAT SETS THE OBJECTIVE
GEORGIA'S ENERGY POLICY				
1	Safe and reliable supply of electricity and natural gas.	2,3,4,5,7,10	MoESD, GNERC, GSE, GOGC/GGTC	A-G
2	Planning of the long-term balancing of energy supply and demand, scenarios/forecasts.	1,3,4,5,7	MoESD, GSE, GGTC, Analytical support group	A-I
3	Diversification of the sources of electricity and natural gas imports, routes and suppliers; increase of export opportunities.	1,2,7	MoESD, MoFA,	A-G
4	Use and promotion of renewable energy resources; promotion of combined generation of electricity and heat.	1,2,3,4,6,7,9	MoESD, PPPA, GNERC, GEDF, GOGC,	A-C, E, G, H, I
5	Improved management of energy efficiency and consumption.	1,2,4[11],6,7,9,10, 11	MoESD, GNERC, GSE, GGTC	A, B, E, F, G, H, I
6	Increase of the efficiency of energy activities and reduction of the negative impact on the environment; their sustainable development in accordance with the environmental protection, economic and social security policy of Georgia.	4,5,7[1]	MoESD, MEPA	A, B, G
7	Encouraging and attracting investments.	1,3,4,5,6	MoESD, GNERC, GSE, GGTC, GEDF, MoF	A-G
7[1]	Introduction of innovative, environmentally safe and "smart" technologies in the gas and electricity sectors.	1,4,5,9	MoESD, GNERC, GSE, GGTC	
8	Promotion of competition, transparency, non-discrimination and legal clarity in energy activities.	1,3,4,7	MoESD, GNERC	B
9	Promotion of scientific research and education in the field of energy.	1,2,3,4,5,7[1]	MoESD, Ministry of Education, GEDF, Rustaveli Foundation, Georgia's Innovations and Technology Agency, academia	B, G
10	Physical and financial access to energy; overcoming energy poverty	1,3,4,5,6,8,11	MoESD, GNERC	B, G
11	Protection of the rights and interests of vulnerable customers	5,8,10	MoESD, GNERC, Energy Ombudsman, MoF, Ministry of Healthcare	B, E, F, G
CONSOLIDATED NATIONAL ENERGY AND CLIMATE PLAN				
12	Energy security	1,2,3,7,9	MoESD, GNERC, GSE, GOGC/GGTC, GEDF, Analytical Support Group	NECP
13	Internal energy market	3,8	MoESD, GNERC, ESCO, GOGC	
14	Energy efficiency	5	MoESD, GNERC, GSE, GGTC	
15	Decarbonization	2,4,6	MoESD, MEPA	
16	Research, innovation, competitiveness	8,9	MoESD, Ministry of Education, GEDF, Rustaveli Foundation, Georgia's Innovations and Technology Agency, academia	

[11] Consumer level

Strategic Documents:

A. Energy policy - for minimum 10-year period;
B. 10-year power transmission network development plan - annual;
C. 10-year gas transportation network development plan - annual;
D. Consolidated report on security of electricity supply - biennial, until July 31;
E. Consolidated report on security of gas supply - biennial, until July 31;
F. NECP – for 10-year period – years 2021-2030, outlook 2050;
G. NDC/CAP – years 2021-2030;
H. LEDS – concept, until 2050.

APPENDIX III: COST-BENEFIT ANALYSIS SPREADSHEETS

Assumptions

Main Assumptions	
Nominal discount rate	10.24%
Time horizon (years)	2020-2030
Inflation target	3.00%
Real discount rate	7.02%
Currency exchange rate GEL/USD	3.00

Business As Usual (BAU) Main Assumptions	
Annual FDI in Sector (mln GEL)	581.70
Annual State Investment in Sector (mln GEL)	263.00
Growth rate of net electricity import	6.0%
Net Import of Electricity 2019 GWh	1,383
Price of Imports (GEL/kWh)	0.150

Alternative 1 (ALT1)

BENEFITS vs BAU	
Increase in FDI vs BAU	20%
Reduction in state subsidization to sector vs BAU	20%
Reduction in State Investment to sector vs BAU	20%
Reduction in net Imports by 2030 vs BAU	50%
Cost reduction due to optimization	2%
COSTS vs BAU	
Analytical Team added to MoESD (person)	5
Average Salary (GEL/month)	3,500
Equipment and inventory (GEL)	5,000
Office costs (GEL/month)	1,000
Project for setting-up (GEL)	150,000
Annual budget for Energy research (GEL)	500,000

Alternative 2 (ALT2)

BENEFITS vs BAU	
Increase in FDI vs BAU	50%
Reduction in state subsidization to sector vs BAU	50%
Reduction in State Investment to sector vs BAU	50%
Reduction in net Imports by 2030 vs BAU	100%
Cost reduction due to optimization	5%
COSTS vs BAU	
Analytical Center Staff (person)	12
Average Salary (GEL/month)	4,500
Equipment and inventory (GEL)	5,000
Office costs (GEL/month)	2,000
Project for setting-up (GEL)	300,000
Annual budget for Energy research (GEL)	1,000,000

Assumptions on Subsidization	
Consumption growth in Abkhazia	3.5%
Power (marginal) cost for Abkhazia Supply (GEL/kWh)	0.130
Enguri HPP Annual output (TWh)	3,500
Enguri HPP cost-recovery tariff (GEL/kWh)	0.066
Actual Enguri HPP tariff (GEL/kWh)	0.014
"Social" Gas price for TPPs (GEL/1000m3)	429
"Social" Gas price for households (GEL/1000m3)	270
Regional Gas Price (GEL/1000 m3)	555
Gas consumption annual growth	2.4%
Gas consumption annual growth TPPs	0.5%
Gas consumption annual growth households	4.3%

RESULTS Alternative 1	Mln GEL
Discounted Benefit PV(B)	2,911
Discounted Cost PV(C)	5
Discounted Net Benefit NPV (B-C)	2,906
Benefit/Cost ratio (B/C)	569
Total Benefit (mln GEL)	4,578
Total cost	8

Alternative 2	Mln GEL
Discounted Benefit PV(B)	7,042
Discounted Cost PV(C)	12
Discounted Net Benefit NPV (B-C)	7,030
Benefit/Cost ratio (B/C)	589
Total Benefit (mln GEL)	11,028
Total cost	18

BENEFITS

ALTERNATIVE 1

Alternative-1 Increase in FDI vs BAU (mln GEL)	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
	-	116	116	116	116	116	116	116	116	116	116
FDI in BAU (mln GEL)	582	582	582	582	582	582	582	582	582	582	582
Reduction in state subsidization to sector vs BAU (mln GEL)	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
		125	128	131	135	138	142	146	150	154	158
Reduction in State Investment to sector vs BAU (mln GEL)	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
	-	53	53	53	53	53	53	53	53	53	53
State investment to sector- BAU (mln GEL)		263	263	263	263	263	263	263	263	263	263
Reduction in State Investment to sector vs BAU	20%										
Reduction in electricity net-import vs BAU (mln GEL)	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
	-	15	32	49	67	86	106	127	149	172	197
Net-import of Electricity (GWh)	1,466	1,554	1,647	1,746	1,851	1,962	2,080	2,204	2,337	2,477	2,626
Alternative-1 Net-import of electricity (GWh)	1,466	1,451	1,435	1,420	1,405	1,389	1,374	1,359	1,343	1,328	1,313
Energy system cost reduction due to optimization (mln GEL)	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
		44.28	45.09	45.94	46.82	47.72	48.66	49.64	50.65	51.70	52.80
Total investment in the Energy Sector (mln GEL)	845	845	845	845	845	845	845	845	845	845	845
Gas consumption (excluding Azoti) BCM	2.00	2.05	2.10	2.14	2.20	2.25	2.30	2.35	2.41	2.47	2.52
Regional gas price (GEL/1000 m^3)	555	555	555	555	555	555	555	555	555	555	555
Electricity net import (GWh)	1,466	1,554	1,647	1,746	1,851	1,962	2,080	2,204	2,337	2,477	2,626
Electricity net import price (GEL/kWh)	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Cost reduction due to optimization	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Total benefit in ALT 1 (mln GEL)		**353**	**374**	**395**	**417**	**441**	**465**	**491**	**518**	**547**	**577**

ALTERNATIVE 2											
Alternative 2 Increase in FDI vs BAU (mln GEL)	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
		291	291	291	291	291	291	291	291	291	291
FDI in BAU (mln GEL)	582	582	582	582	582	582	582	582	582	582	582
Reduction in state subsidization to sector vs BAU (mln GEL)	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
		312	319	328	336	345	354	364	374	385	396
Reduction in State Investment to sector vs BAU (mln GEL)	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
		132	132	132	132	132	132	132	132	132	132
State investment to sector- BAU (mln GEL)		263	263	263	263	263	263	263	263	263	263
Reduction in State Investment to sector vs BAU	50%										
Reduction in electricity net-import vs BAU (mln GEL)	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
		35	71	108	146	184	224	265	307	350	394
Net-import of Electricity (GWh)	1,466	1,554	1,647	1,746	1,851	1,962	2,080	2,204	2,337	2,477	2,626
Alternative 2 Net-import of electricity (GWh)	1,466	1,319	1,173	1,026	880	733	586	440	293	147	-
Energy system cost reduction due to optimization (mln GEL)	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
		110.70	112.74	114.85	117.04	119.31	121.66	124.10	126.63	129.26	131.99
Total investment in Energy sector (mln GEL)	845	845	845	845	845	845	845	845	845	845	845
Gas consumption (excl. Azoti) BCM	2.00	2.05	2.10	2.14	2.20	2.25	2.30	2.35	2.41	2.47	2.52
Regional gas price (GEL/1000m3)	555	555	555	555	555	555	555	555	555	555	555
Electricity net-import (GWh)	1,466	1,554	1,647	1,746	1,851	1,962	2,080	2,204	2,337	2,477	2,626
Net-electricity import price (GEL/kWh)	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Cost reduction due to optimization %	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
	2020	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
Total benefit ALT 2 (mln GEL)		**880**	**926**	**973**	**1,021**	**1,071**	**1,122**	**1,175**	**1,230**	**1,286**	**1,344**

ALTERNATIVE 1

Administrative costs

Analytical Team in the MoESD (mln GEL)	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
	0.397	0.222	0.222	0.222	0.222	0.247	0.222	0.222	0.222	0.222	0.222

Analytical Team added to MoESD (person)	5
Average Salary per staff (GEL/month)	3,500
Equipment and inventory per staff (GEL)	5,000
Office costs (GEL/month)	1,000
Project for setting-up (GEL)	150,000

Research costs

Annual budget for Energy research (mln GEL)	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
		0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
	2020	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
Total costs in ALT 1 (mln GEL)	**0.397**	**0.722**	**0.722**	**0.722**	**0.722**	**0.747**	**0.722**	**0.722**	**0.722**	**0.722**	**0.722**

ALTERNATIVE 2

Administrative costs

Analytical Center in Energy (mln GEL)	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
	1.032	0.672	0.672	0.672	0.672	0.732	0.672	0.672	0.672	0.672	0.672

Analytical Center staff (person)	12
Average Salary per staff (GEL/month)	4,500
Equipment and inventory per staff (GEL)	5,000
Office costs (GEL/month)	2,000
Project for setting-up (GEL)	300,000

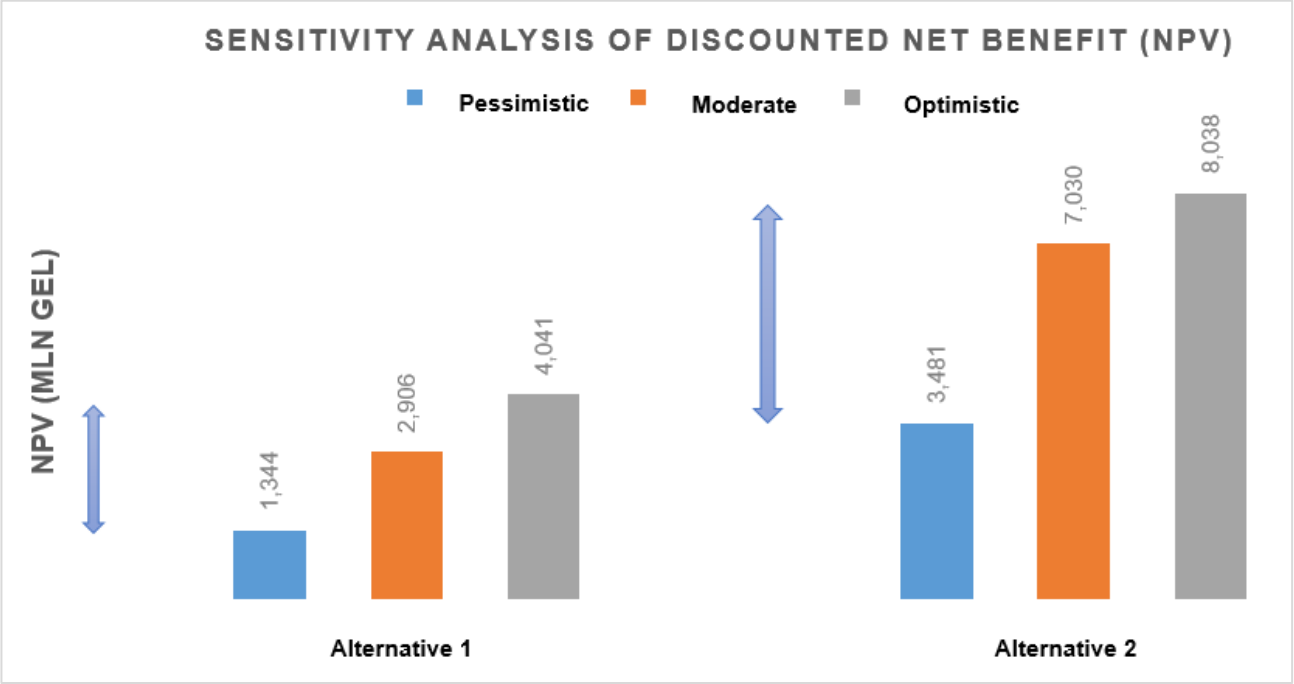
Research costs

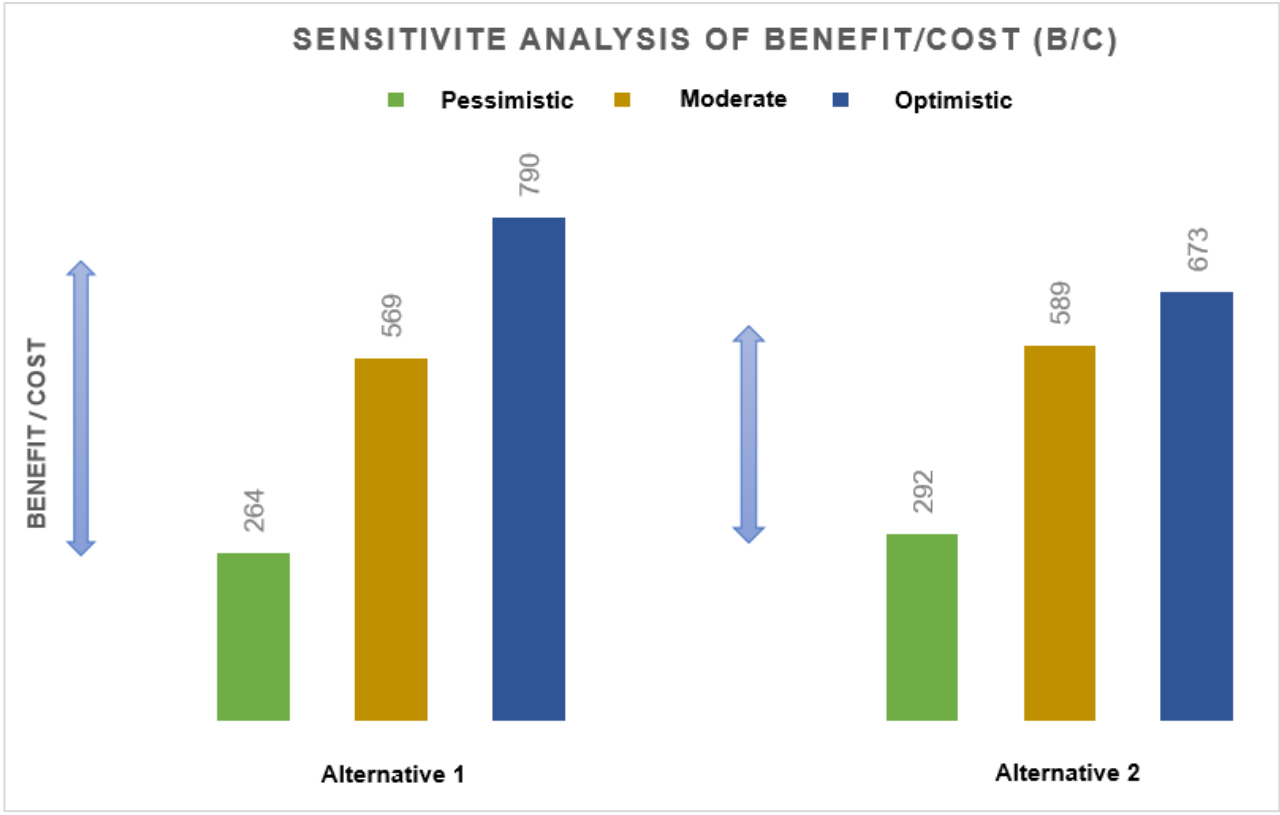
Annual budget for Energy research (mln GEL)	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
		1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
	2020	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
Total costs in ALT 2 (mln GEL)	**1.032**	**1.672**	**1.672**	**1.672**	**1.672**	**1.732**	**1.672**	**1.672**	**1.672**	**1.672**	**1.672**

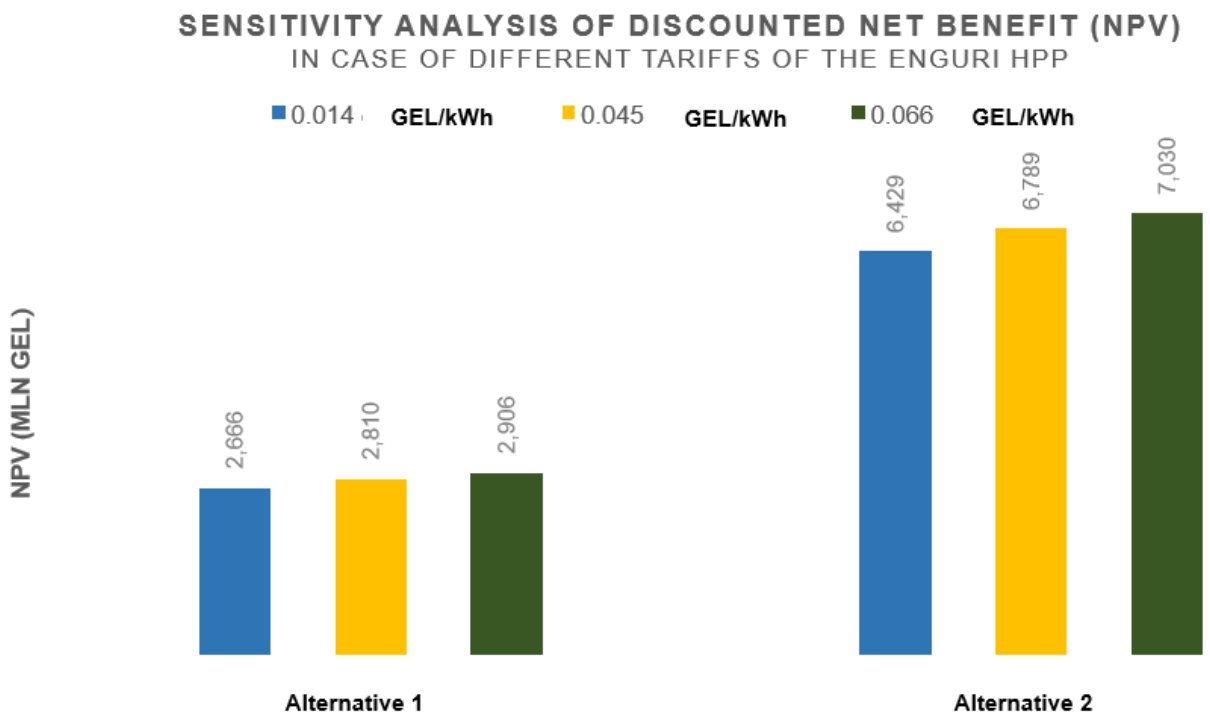
Subsidizing electricity supply to Abkhazia	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Electricity supply to Abkhazia (GWh)	2,060	2,131	2,205	2,282	2,361	2,443	2,528	2,615	2,706	2,800	2,897	2,998
Electricity price (GEL/kWh)	0.0660	0.0660	0.0660	0.0660	0.0660	0.0660	0.0660	0.0660	0.0660	0.0660	0.0660	0.0660
Amount of subsidy (GEL)	**135,953,400**	**140,670,330**	**145,550,914**	**150,600,831**	**155,825,956**	**161,232,368**	**166,826,356**	**172,614,429**	**178,603,320**	**184,799,997**	**191,211,669**	**197,845,795**
Enguri HPP tariff subsidy	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
Enguri HPP generation (GWh)	3,341	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500
Electricity supply to Abkhazia (GWh)	2,060	2,131	2,205	2,282	2,361	2,443	2,528	2,615	2,706	2,800	2,897	2,998
Electricity supply to Georgia from Enguri HPP (GWh)	1,281	1,369	1,295	1,218	1,139	1,057	972	885	794	700	603	502
Enguri HPP cost-recovery tariff (GEL/kWh)	0.0660	0.0660	0.0660	0.0660	0.0660	0.0660	0.0660	0.0660	0.0660	0.0660	0.0660	0.0660
Actual Enguri HPP tariff (GEL/kWh excl. VAT)	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014
Amount of subsidy (GEL)	**67,170,988**	**71,743,656**	**67,867,289**	**63,856,431**	**59,706,415**	**55,412,413**	**50,969,430**	**46,372,297**	**41,615,666**	**36,694,002**	**31,601,580**	**26,332,476**

APPENDIX IV: RESULTS OF SENSITIVITY ANALYSIS

Sensitivity Analysis	Pessimistic		Base		Optimistic	
Increase in FDI vs BAU	10%	25%	20%	50%	30%	60%
Reduction in state subsidization to sector vs BAU	10%	25%	20%	50%	30%	60%
Reduction in State Investment to sector vs BAU	10%	25%	20%	50%	30%	60%
Reduction in net Imports by 2030 vs BAU	25%	50%	50%	100%	60%	100%
Cost reduction due to optimization	0.5%	2.5%	2.0%	5%	2.0%	5%
Results / Parameters	**ALT 1**	**ALT 2**	**ALT 1**	**ALT 2**	**ALT 1**	**ALT 2**
PV(B) (mln GEL)	**1,349**	**3,493**	**2,911**	**7,042**	**4,046**	**8,050**
PV(C) (mln GEL)	**5**	**12**	**5**	**12**	**5**	**12**
NPV(B-C) (mln GEL)	**1,344**	**3,481**	**2,906**	**7,030**	**4,041**	**8,038**
B/C	**264**	**292**	**569**	**589**	**790**	**673**
Total Benefit (mln GEL)	**2,127**	**5,472**	**4,578**	**11,028**	**6,342**	**12,575**
Total cost (mln GEL)	**8**	**18**	**8**	**18**	**8**	**18**




SENSITIVITE ANALYSIS OF BENEFIT/COST (B/C)
Pessimistic
Moderate
Optimistic
BENEFIT / COST
264
569
790
292
589
673
Alternative 1
Alternative 2


SENSITIVITY ANALYSIS OF DISCOUNTED NET BENEFIT (NPV)
IN CASE OF DIFFERENT TARIFFS OF THE ENGURI HPP
0.014 GEL/kWh
0.045 GEL/kWh
0.066 GEL/kWh
NPV (MLN GEL)
2,666
2,810
2,906
6,429
6,789
7,030
Alternative 1
Alternative 2

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