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GAS DEVELOPMENT PLAN AND REGULATORY FRAMEWORK REVIEW AND ASSISTANCE – STRATEGIC ENVIRONMENTAL ASSESSMENT REPORT

16 January 2023





Document information

The Infrastructure Project Facility (IPF) is a technical assistance instrument of the Western Balkans Investment Framework (WBIF) which is a joint initiative of the European Union, International Financial institutions, bilateral donors and the governments of the Western Balkans which supports socio-economic development and EU accession across the Western Balkans through the provision of finance and technical assistance for strategic infrastructure investments. This technical assistance operation is financed with EU funds.

Disclaimer: *The authors take full responsibility for the contents of this report. The opinions expressed do not necessarily reflect the view of the European Union or the European Investment Bank.*

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TABLE OF CONTENTS

1 - NON-TECHNICAL SUMMARY	7
2 - THE CONTENTS AND THE MAIN OBJECTIVES OF THE GAS DEVELOPMENT PLAN OF KOSOVO (GDP).....	8
3 - OBJECTIVES AND STEPS OF SEA PROCEDURE	17
4 - THE FOCUS OF ASSESSMENT AND METHODOLOGY.....	20
5 - KEY CONCLUSIONS AND MEASURES/ RECOMMENDATIONS RELATED TO THE ASSESSMENT OF POTENTIAL IMPACTS AND ANALYSIS OF VARIANTS .	29



LIST OF FIGURES

Figure 1 – Geographical distribution of the potential gas demand.....	9
Figure 2 – Estimate of total distribution tariffs.....	9
Figure 3 – Kosovo gas transmission system large gasification scenario with average tariffs.....	11
Figure 4 – Kosovo gas transmission system small gasification scenario with average tariffs.....	13
Figure 5 – Kosovo gas transmission system industrial scenario w/o connections to Drenas and Skenderaj	15

LIST OF TABLES

Table 1 – Differences between considered scenarios.....	16
Table 2 – Review of the activities within the SEA procedure.....	18
Table 3 – The evaluation used in the impact assessment.....	24



1 - NON-TECHNICAL SUMMARY

This non-technical summary provides an overview of key assessments and activities conducted within the framework of the Strategic Environmental Impact Assessment for the Gas Development Plan of Kosovo. Summary is divided into 4 parts:

1. The main objectives of the Gas Development Plan of Kosovo (GDP)
2. Objectives and steps of the SEIA procedure
3. The focus of the assessment and methodology
4. Key findings and measures/recommendations related to the assessment of potential impacts and the analysis of variants



2 - THE CONTENTS AND THE MAIN OBJECTIVES OF THE GAS DEVELOPMENT PLAN OF KOSOVO (GDP)

The objective of this assignment was to prepare a Gas Development Plan (GDP) and Regulatory Framework Review and Assistance for Kosovo. In addition, the Strategic Environmental Assessment is developed and subjected to the national procedure in parallel with this document. After completing the Gas Development Plan, the Consultant will develop a Project Identification Plan to identify and rank a portfolio of feasible priority projects. The documents are developed in line with the national legislation of Kosovo, EU environmental and social laws, regulations, good international practice, and EBRD requirements, including those outlined in the 2019 EBRD ESP.

The timing of this assignment is concurrent with significant uncertainties and disruptions in the European energy market caused by the COVID-19 pandemic, conflict in Ukraine, and overall European endeavor to transform and decarbonize its energy sector. All these cause significant changes in energy and material prices, which significantly affect the economic analyses in this assignment.

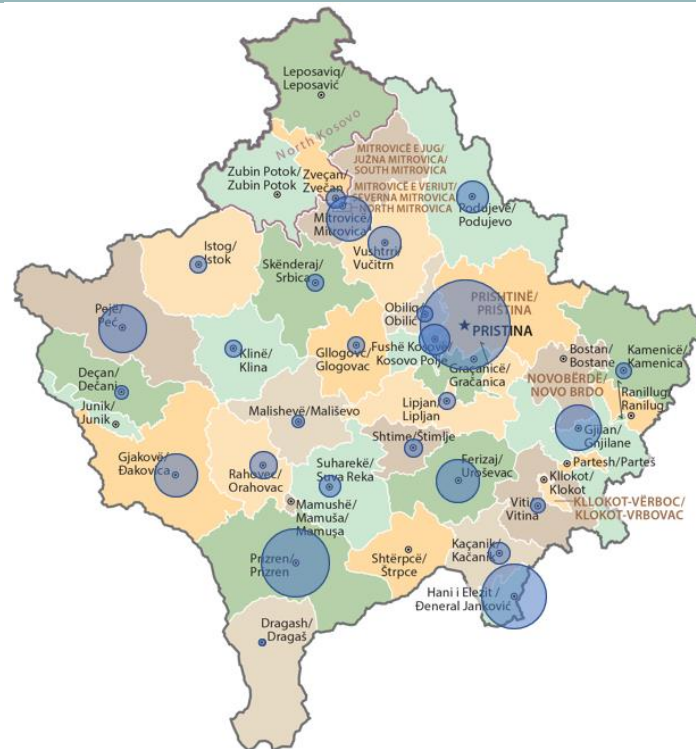
Gas in Kosovo is considered a transition fuel in the decarbonization of Kosovo's economy. Gas infrastructure is considered such that it can also transport hydrogen, in case future developments enable its widespread use.

It is considered that gas to Kosovo would be supplied via the SKOPRI pipeline connection between Skopje and Prishtina. Gas would, in turn, be sourced from Bulgaria via the existing pipeline from Zdihilovo to Skopje or Greece via pipeline Nea Mesimvria-Negotino currently in preparation for construction. Ultimate sources of natural gas for Kosovo could be gas from Russia, Greek LNG, TAP, or Croatian LNG (via IAP).

Usage of natural gas in Kosovo is expected in the residential, services, industry, and power generation sectors. Gas is potentially competitive in all considered sectors. Potential gas demand was developed based on modeling a number of parameters, including Gross domestic product, population, energy efficiency, and other parameters. Gas-to-power demand was estimated based on the input from the Beneficiary until 2040 and further modeled by the Consultant until 2060.

The estimated potential annual gas demand was geographically distributed, as provided in **Figure 1** (for settlements larger than 20.000 inhabitants). The size of the circle indicates the potential gas demand (excluding gas-to-power demand). Expected patterns of gas use and weather extremes were taken into account when estimating peak hourly gas demands needed for dimensioning the transmission system.

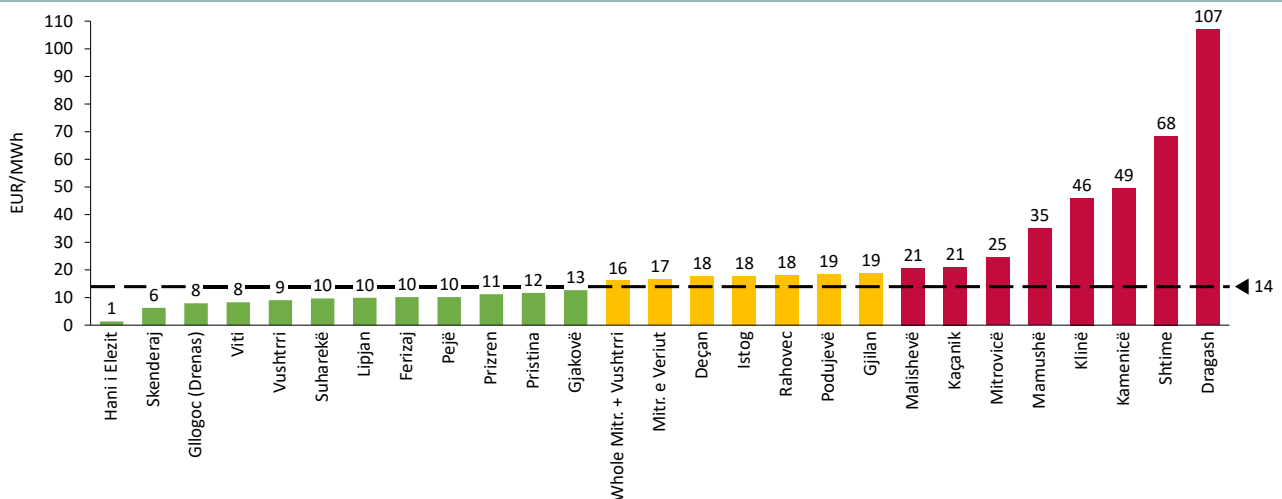
FIGURE 1 – GEOGRAPHICAL DISTRIBUTION OF THE POTENTIAL GAS DEMAND



Provisional distribution networks were developed for those settlements.

This enabled a preliminary estimate of distribution tariffs for gas consumers in each settlement, as provided in Error! Reference source not found..

FIGURE 2 – ESTIMATE OF TOTAL DISTRIBUTION TARIFFS



Only settlements with an acceptable level of distribution costs (green and yellow) were selected for further analysis. Note that the settlements with distribution costs slightly above the provisionally assessed acceptable tariff of 14 €/MWh were allowed as well due to the possibility of applying a single average distribution tariff for all Kosovo consumers.

Based on the geographical distribution of selected settlements' demands, the transmission system was routed, and preliminary hydraulic calculations were performed. This resulted in the proposed construction of SKOPRI, the gas Ring, and several transmission branches, constituting a **Large gasification scenario**. That would enable

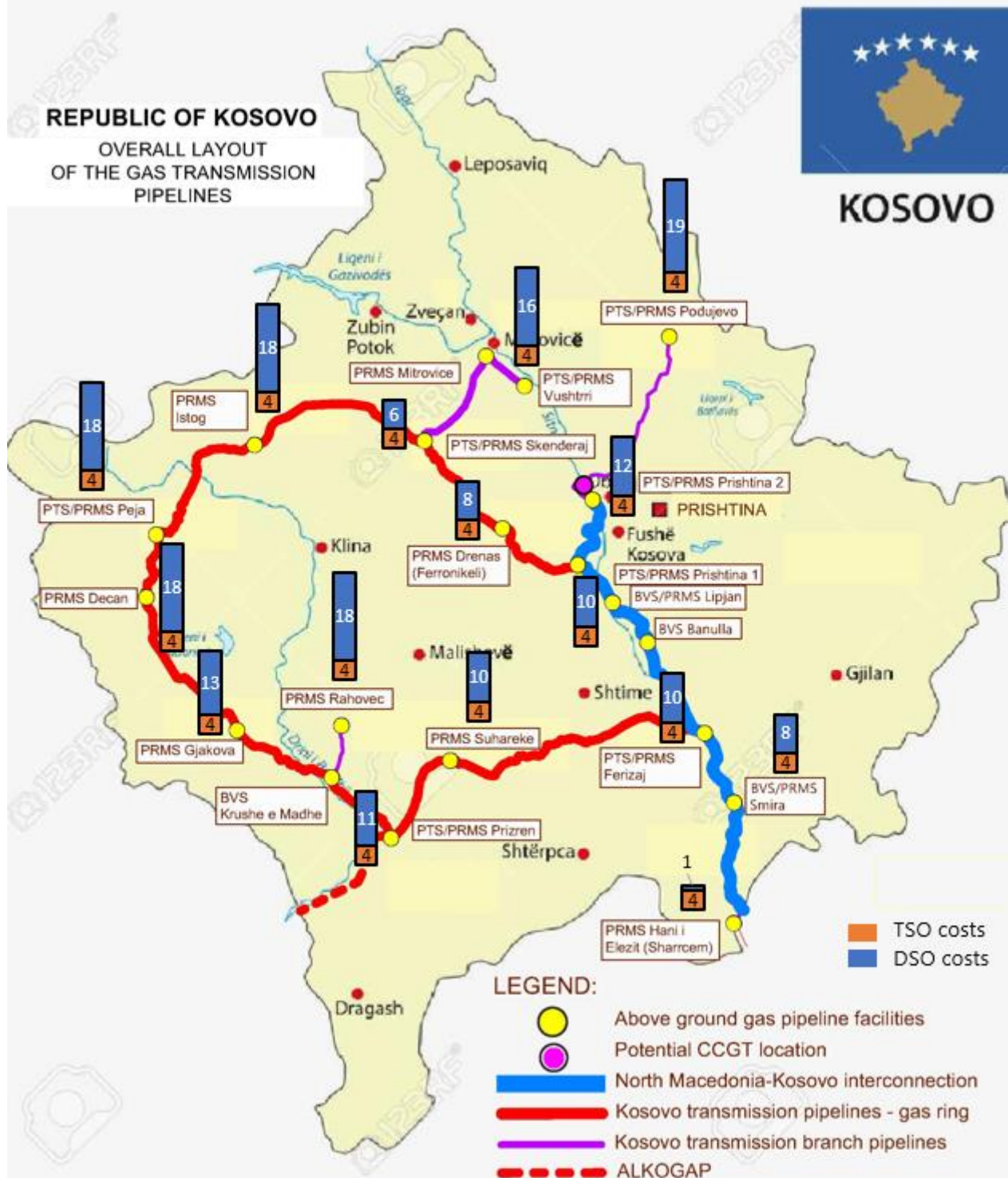


the gasification of the following distribution areas: Hani I Elezit, Skenderaj, (Drenas Viti, Vushtrri, Mitrovica e Veriut, Suharekë, Lipjan, Ferizaj, Pejë, Prizren, Prishtinë, Gjakovë, Deçan, Istog, Rahovec, Podujevë, and Gjilan. This scenario results in peak hourly gas demand of 226 000 m³/h, while peak annual gas demand of 655 mcm is reached in 2040. Obtained gas demand was used to reiterate the transmission system model and yield revised system parameters, including system CAPEX.

The overall length of the transmission system in this scenario is 279,6 km. CAPEX for construction of the transmission system is estimated at 165,8 mln € (with DN600 SKOPRI dimension) and 377,5 mln € for distribution systems, yielding a total estimated CAPEX of 543,3 mln €. Note that the distribution system CAPEX also contains the transmission branches necessary to connect the distribution areas to the main transmission system (Ring or SKOPRI). Distribution areas with existing or planned district heating networks could use natural gas in district heating plants, thus avoiding the gas distribution network costs.

The transmission system tariff is slightly below 4 €/MWh, while the distribution tariff varies from settlement to settlement in the range from 1 to 19 €/MWh. The average gas distribution tariff for all distribution consumers is 11,5 €/MWh, yielding the overall gas network costs for Kosovo consumers of 15,4 €/MWh. Error! Reference source not found. of the respective gas transmission system with average tariffs over the lifetime of the project is provided below.

FIGURE 3 – KOSOVO GAS TRANSMISSION SYSTEM LARGE GASIFICATION SCENARIO WITH AVERAGE TARIFFS



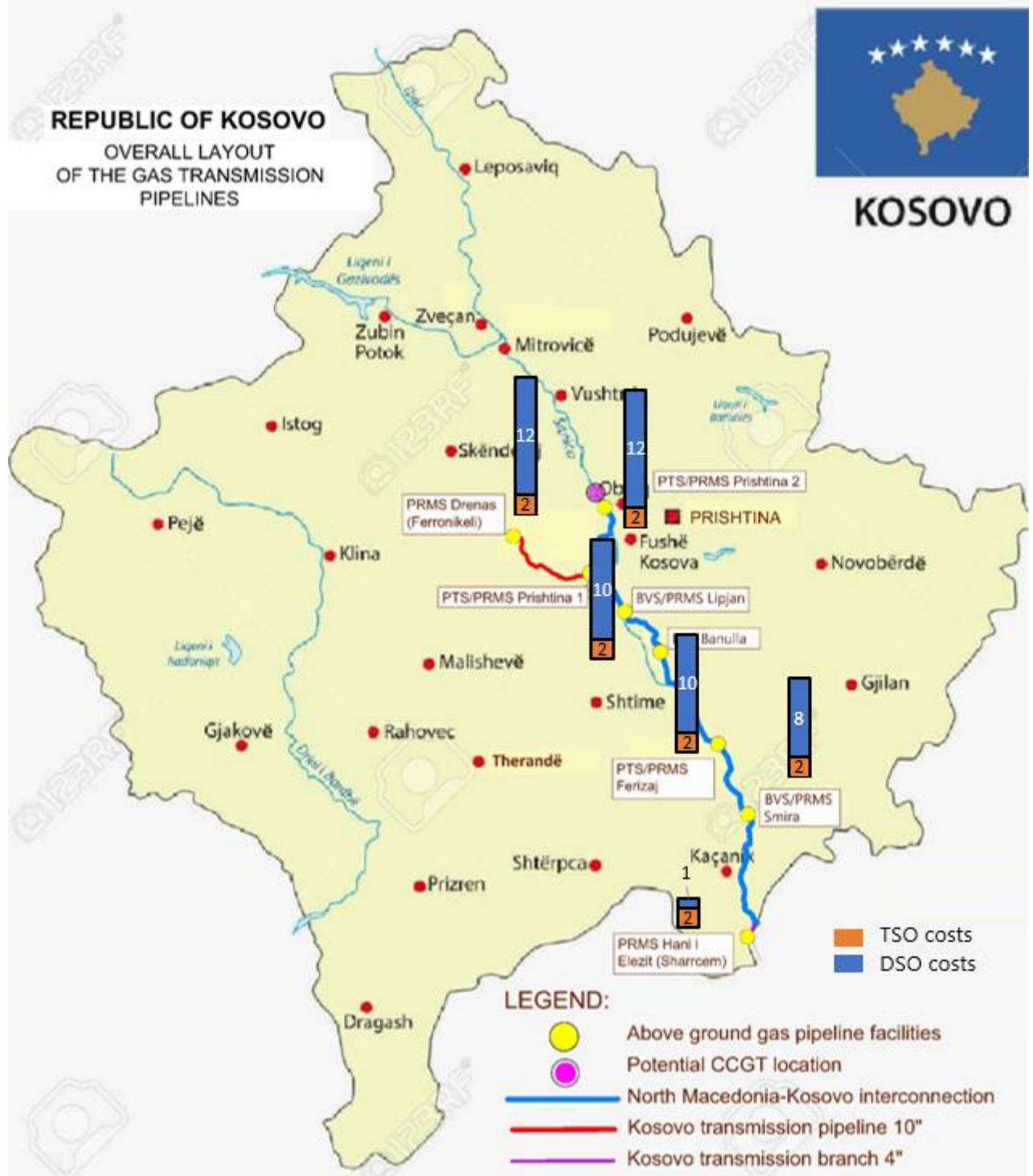
The Consultant also considered the **Small gasification scenario** that included the construction of SKOPRI with an extension to Drenas. That would enable the gasification of distribution areas along the SKOPRI route: Hani I Elezit, Viti, Ferizaj, Lipjan, Prishtinë , and Drenas. This scenario results in peak hourly gas demand of 157 000 m³/h (reached in 2045), while peak annual gas demand of 458 mcm is reached in 2036. Again, the obtained gas demand was used to reiterate the transmission system model and yield revised system parameters, including system CAPEX.



The overall length of the transmission system in this scenario is 90,2 km. CAPEX for construction of the transmission system is estimated at 69,9 mln € (with DN500 SKOPRI dimension), and 130,8 mln € for distribution systems, yielding a total estimated CAPEX of 200,7 mln €. Similarly as before, distribution areas with existing or planned district heating networks could use natural gas in district heating plants, thus avoiding the gas distribution network costs.

The transmission system tariff is 2,3 €/MWh, while the distribution tariff varies between distribution areas in the range from 1 to 12 €/MWh. The average gas distribution tariff for all distribution consumers is 9 €/MWh, yielding the overall gas network costs for Kosovo consumers of 11,3 €/MWh. Error! Reference source not found. of the respective gas transmission system with average tariffs over the lifetime of the project is provided below.

FIGURE 4 – KOSOVO GAS TRANSMISSION SYSTEM SMALL GASIFICATION SCENARIO WITH AVERAGE TARIFFS



Depending on the pressure on the MKD-BG border, the capacity of the SKOPRI pipeline may be sufficient for the gasification of additional settlements. The transmission tariff is gradually increasing as the system is expanded further from Drenas.

The supply of LNG to Kosovo is generally unfeasible compared to the supply of piped gas. However, that may be an option for a limited number of specific consumers if a transmission system isn't built. The average specific



cost of LNG transport is estimated between 5 and 6 €/MWh. The nearest LNG terminal from where LNG could be trucked or railed to Kosovo is currently in construction in Alexandroupolis.

CNG could be considered as an option for supplying gas to a limited number of specific consumers in case SKOPRI is built, but without a gas transmission system in Kosovo (Ring). Natural gas would be compressed in Prishtina and trucked to consumers across Kosovo. The average specific cost of CNG transport (from Prishtina across Kosovo) is from 19 to 21 €/MWh.

Based on the findings presented above, supplying gas to Kosovo can be done at acceptable infrastructure costs. The level of acceptable costs will determine the reach of gasification. SKOPRI is the backbone of the future Kosovo gas transmission system. Among others, it would supply a CCGT envisaged in Prishtina. That CCGT, as an anchor load, is also a key contributor to SKOPRI feasibility.

Considering the goal of decarbonization by 2060, the feasibility of the overall gas system development is burdened with an expected decline in gas demand after 2045 and overall limited time for investment recouping. It is possible that the pipeline will be in use after 2060 for the transportation of hydrogen and that hydrogen as an energy carrier will be able to sustain higher transmission tariffs. Using a conservative approach, none of those has been taken into account in this analysis.

In planning further steps, the key decision is whether to proceed with SKOPRI as DN500 or DN600. If natural gas pressure on the BG-MKD border is raised to 54 bar, DN500 SKOPRI could deliver 186 000 m³/h to Prishtina (at 30 bar necessary for the operation of CCGT). Under the same assumptions, and according to the Large gasification hydraulic model, DN600 SKOPRI could supply 260 000 m³/h to Prishtina. The addition of a compressor at the start of SKOPRI could significantly increase those figures. Note that DN500 SKOPRI CAPEX (KOS part) is estimated at 61,5 mln €, while DN600 SKOPRI CAPEX (again KOS part only) is estimated at 72 mln €. **In case Kosovo envisages large gasification, then DN600 SKOPRI is more appropriate. If Kosovo plans to start with limited (small) gasification, DN500 may be a more sensible approach.**

The Beneficiary has suggested considering additional scenarios: "industrial" and "industrial only". The industrial scenario assumes no development of distribution networks and increased development of the Kosovo industry sector. Therefore gas demand in that scenario does not include households and services gas demand and increases the estimated industry gas demand by 30%. "Industrial only" is a further modification considering only gas demand for industry (increased by 30% over small and large gasification scenarios), and no gas demand for power generation. Both of these additional scenarios have been considered with transmission system layout as in the small gasification scenario and, alternatively, without branch to Drenas. In case Drenas and Skenderaj are not connected, Vushtri and Mitrovica are connected via Obiliq. The layout of that transmission system is provided in Error! Reference source not found..

The **industrial scenario** results in peak hourly gas demand of 134 000 m³/h, while peak annual gas demand of 449 mcm is reached in 2036. The overall length of the transmission system in this scenario is 134,3 km, or 105,8 km, without connections to Drenas and Skenderaj. CAPEX for construction of the transmission system is estimated at 87,9 mln €, or 73,2 mln € without a branch to Drenas and Skenderaj. The transmission system tariff is 2,1 €/MWh. No distribution is envisaged, and thus all CAPEX is included herein. Note that in small and large gasification scenarios, several connection branches were included in the distribution CAPEX.

The **industrial-only scenario** results in peak hourly gas demand of 43 000 m³/h, while the peak annual demand of 213 mcm is reached in 2051. The overall length of the transmission system is the same as in the case of the industrial scenario. This scenario allows for decreasing in the pipeline diameter of SKOPRI to DN400. Thus the CAPEX is decreased to 78,7 mln €, or 64 mln € without a branch to Drenas and Skenderaj. The transmission system tariff is 4.6 €/MWh.

FIGURE 5 – KOSOVO GAS TRANSMISSION SYSTEM INDUSTRIAL SCENARIO W/O CONNECTIONS TO DRENAS AND SKENDERAJ





Table 1 summarizes the considered gasification scenarios.

TABLE 1 – DIFFERENCES BETWEEN CONSIDERED SCENARIOS

	Large gasification scenario	Small gasification scenario	Industrial scenario	Industrial only scenario
Gas to power	380 MW CCGT	380 MW CCGT	380 MW CCGT	-
Peak hourly gas demand	226 000 m ³ /h	157 000 m ³ /h	134 000 m ³ /h	43 000 m ³ /h
Peak annual gas demand	655 mcm (2040)	458 mcm (2036)	449 mcm (2036)	213 mcm (2051)
Transmission system length	279,6 km	90,2 km	134,3 or 105,8 km	134,3 or 105,8 km
SKOPRI dimension	DN600	DN500	DN500	DN400
Transmission system CAPEX	165,8 mln €	69,9 mln €	87,9 or 73,2 mln €	78,7 or 64 mln €
Distribution systems CAPEX	377,5 mln €	130,8 mln €	-	-
Total CAPEX	543,3 mln €	200,7 mln €	87,9 or 73,2 mln €	78,7 or 64 mln €
Transmission tariff	3,9 €/MWh	2,3 €/MWh	2,1 €/MWh ¹	4,6 €/MWh ²
Average distribution tariff	11,5 €/MWh	9 €/MWh	-	-

Ministry of Economy of Kosovo, the Beneficiary of this study, has declared the « Industrial Scenario » as its preferred scenario upon which further work should be based.

¹ Tariff for lower CAPEX – w/o connection to Drenas

² Tariff for lower CAPEX – w/o connection to Drenas



3 - OBJECTIVES AND STEPS OF SEA PROCEDURE

The main goal of SEA is to ensure a high level of environmental protection and to contribute to the promotion of sustainable development. SEA aims to improve the plan or program by suggesting new objectives or strategies, as well as reviewing proposed strategies and suggesting those that may be best in terms of protecting the environment and minimizing and preventing impacts and risks in the environment. SEA as a process should start in the initial stages of the plan preparation process and should be developed in parallel with the plan and fully integrated into it.

The proposed SEA aims to ensure the integration of environmental issues into strategic decision-making to support sustainable and environmentally sound development. In particular, the SEA process assists responsible authorities as well as decision makers to take these elements into account in their plans and programs:

- Key environmental trends - opportunities and constraints that may or may not be affected by the plan or program.
- Relevant environmental objectives and indicators of the plan or program.
- Potential and significant environmental effects of the proposed options as well as the implementation of the plan or program.
- Measures to avoid, reduce or mitigate harmful effects, and to increase positive effects.
- Views and information from relevant authorities, the public and - as appropriate and where relevant - from neighbouring countries which may be affected (in case of identification of potential impacts beyond the borders of a state).

SEA report is prepared in accordance with the:

1. legislative framework of Kosovo and the relevant EU requirements including "SEA" Directive
2. 2019 EBRD ESP and associated Performance Requirements (PRs)

Specific objectives of the SEA are:

- to identify the legal framework applicable to the plan;
- to present the identified options of the plan;
- to describe the main features of the preferred option;
- to describe the environmental and social baseline of the subject area and potential constraints on the construction and operation of the preferred option;
- to assist the planning by identifying aspects of location, construction, and operations, which may cause adverse environmental and social effects;
- to assess the potential negative and positive impacts and risks of the plan and plan-related activities on the environment and social issues;
- to recommend mitigation measures during construction, operation, and commissioning with the aim to avoid and mitigate identified adverse impacts.

The procedures for the approval of a Strategic Environmental Assessment are defined by Chapter III of the Law No.03/L-230 "On Strategic Environmental Assessment".

The SEA procedure can be summarized as follows:



1. An environmental report is prepared in which the likely significant effects on the environment and the reasonable alternatives of the proposed plan or programmed are identified.
2. The public and the environmental authorities are informed and consulted on the draft plan or programmed and the environmental report prepared.
3. As regards plans and programmers which are likely to have significant effects on the environment in another State, the State in whose territory the plan or programme is being prepared must consult the other State(s).

Obligatory steps under the SEA procedure are presented in the following Table.

TABLE 2 – REVIEW OF THE ACTIVITIES WITHIN THE SEA PROCEDURE	
Activity	Description/Time
A case-by-case examination – determination of need for SEA	7-10 working days
Information on determinations and directions	Within thirty (30) working days of making a determination under Article 5 paragraph 1 of SEA law, the responsible authority (MESPI) shall send to each consultation body.
Determination on the scope and level of detail on the information that must be included in the SEA report	When deciding on the scope and level of detail of the information that must be included in the report, the responsible authority shall consult the consultation bodies. Consultation body shall do so within the period of 5 (five) weeks (25 working days) beginning with the date on which it receives the responsible authority's invitation to engage in the consultation.
Consultation procedure	Thirty (30) days or more need to be ensured for the responsible authority to make a SEA report public available (to ensure an access to public documents) and public debate needs to be held.
Transboundary consultation	Optional
Plans and programmes of other countries	Minister invites the consultation bodies and the transboundary consultees to send him their opinions within a specified period, which shall end at least thirty (30) days before the end of the period that the Minister has agreed with the country concerned as reasonable for the duration of their consultations.
The responsible authority, where it is not the Ministry, shall send a copy of the draft plan or programme, draft SEA report, a report on the participation of the public and the consultation bodies and of the public debate, and any follow-up documentation to Ministry, for consent on SEA report	Based on its assessment, a draft decision will be prepared by the responsible body of the Ministry within sixty (60) days, of the date of receipt of the SEA report.
Decision for the Consent to SEA reports	Within fifteen (15) days of receipt of the proposal-decision from the responsible body of Ministry or the Commission, the Minister shall decide to grant or refuse Consent for the SEA report and convey this decision to the responsible authority the Government and the Assembly of Republic of Kosovo, in written form.



Decision for the Consent to SEA reports – refuse consent	The Minister notify in written form the Assembly of the decision that is taken to decline or amend the draft decision. The Government and the Assembly shall review, approve, refuse or amend Minister's decision to decline or amend the draft decision within thirty (30) days from the day the draft decision was submitted
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The SEA is usually developed by a Public Authority designed to finalize the corresponding section plan/programmed/strategy. This SEA report is developed by Ministry of Economy which is responsible for the preparation of the Gas Development Plan of Kosovo.

Relevant Kosovar institutions and administrative bodies were contacted during SEA preparation and data collection in the period September 2021 – May 2022. The key project information, overview of the main issues analyzed in the GDP and a proposal for how to address these issues in the SEA., main environmental issues and whether they are relevant for processing in the SEA Report and to what extent were presented within the SEA Scoping report. SEA Scoping report was submitted to the stakeholders for their comments (Ministry of Economy, EBRD, Ministry of Environment, Spatial Planning and Infrastructure, Ministry of Finance, Labor and Transfers, ERO, KOSTT, KEDS, NIPAC Kosovo, EUO Kosovo, WBIF Focal Point, Kosovo involved in the project. The institutions involved gave comments, findings, and recommendations for the SEA Scoping report.

The Scoping report on SEA has been officially submitted into procedure on December 17th, 2021. pursuant to the national environmental legislative framework. – submitted to the Ministry of Environment, Spatial Planning and Infrastructure. There were no additional comments, recommendations compared to previously submitted.



4 - THE FOCUS OF ASSESSMENT AND METHODOLOGY

Main legislation affecting the SEA procedure is the Kosovan Law No.03/L-230 "On Strategic Environmental Assessment". The EC Directive 2001/42/EC on SEA has been fully transposed in Kosovo's legislative framework by the subject Law. The purpose of the Law is to ensure that environmental consequences of certain plans and programs are identified and assessed during their preparation and before their adoption. Kosovo's SEA legislation follows the general principle that the SEA process should be carried out in parallel with the assessed plan preparation process and it should be finalized prior to plan's approval in order to include necessary changes or corrections into the plan.

In compliance with the Law No.03/L-230 "On Strategic Environmental Assessment" a SEA report is obligatory for plans and programs from spatial planning and city planning field, on land use, agriculture, forestry, fisheries, hunting, energy, industry, mines, traffic, waste management, water management, telecommunication, tourism, which give a frame for future development projects, which undergoes environmental impact assessment according to the Environmental Impact Assessment Law (Law No.03/L-214), as well as, plans and programs which, taking into the consideration location in which they realize, can have an effect on nature protected zones, on nature habitats and in wild flora and fauna.

The SEA law requires that the SEA procedure contains:

- Preparation of the SEA report on the significant effects of the project plans or programs;
- Consulting of the relevant bodies and the general public, on the draft plan or program and attaching the SEA report;
- Review of the SEA report and the result of the consultation in the decision making;
- Communicating the results of the SEA and the inclusion of its results in the plan or program;

Ministry of Environment, Spatial Planning and Infrastructure - MESPI is responsible for implementation of the Environmental Law, including the SEA procedure.

The SEA included two steps:

- Supporting the design of the plan and assessing impacts

In this stage, the GDP was taking shape and specific objectives, and alternative ways to achieve them, are proposed. SEA has the purpose of contributing to the identification of the most suitable courses of action in order to improve the environmental quality of the area, or at least to minimize the negative effects of the plan on it. This required the following key tasks:

- Testing the plan objectives against the SEA objectives
- Identifying and comparing alternatives
- Assessing the effects of the draft plan
- Proposing mitigation measures

These tasks were integral to the planning process and cannot be performed effectively in isolation from it. At this stage, it was important to use SEA as more than a mere set of tools to double-check the sustainability of the GDP but rather as a creative participatory process that aims at mainstreaming environmental concerns into the Plan or Program, from its earliest stages.

- Preparing the SEA Report



The following step was to present the predicted environmental effects of the GDP, in the form of a report which includes alternatives, and is suitable for public consultation and use by decision-makers. It is important that the report clearly explains how the different alternatives have been assessed, how the key issues were identified, how uncertainty has been managed, etc.

Major issues/problems and approach on how these issues have been addressed within the SEA report

On the basis of baseline characteristics of the GDP, it was concluded that major adverse impacts may be expected during the development of gas pipeline network and therefore the focus of the SEA Report should be directed on the analyses of potential adverse impacts on specific components of the environment within the suggested gas pipeline transport network corridors, and if proven necessary, even wider.

Based on a preliminary analysis of potential impacts, it was concluded that in the SEA Report it was necessary to elaborate in more detail, for each of the proposed gas pipeline corridors:

- Climate and climate change
- Water
- Soil and agriculture
- Geohazards
- Biodiversity
- Protected areas
- Population and settlements
- Population main economic activities
- Cultural Heritage

The following environmental issues, given the strategic level of both documents, the fact that no significant impacts are expected, and that SEA will be implemented at lower project levels, have not been needed to be analyzed in more detail in the SEA, but have been reviewed and, if necessary, environmental protection measures and guidelines that will need to be taken into account during the next steps of project implementation has been prescribed.

- Air and existing emission load
- Landscape
- Noise and vibration
- Human health
- Infrastructure and public services
- Waste
- Accidents

Based on the description of the main features of the GDP, it was concluded that the main impacts can be expected from the development of the transport gas pipeline network, and in accordance with that, SEA Report was focused on the analysis of possible impacts on individual parts of the environment within the proposed corridors of the pipeline transport system (200 + 200 m both sides of the axis).



Impacts

Based on the description of the main characteristics of GDP, it was concluded that the main impacts can be expected from the development of the gas pipeline network, and accordingly, the SEA Report focuses on analysing possible impacts on certain parts of the environment within the proposed pipeline transport corridors.

The development of the gas pipeline distribution system has not been analysed in detail in the SEA, as they are mostly placed under public roads, in parallel with other communal infrastructure elements, respecting the rules and standards of distance from buildings, other above-ground facilities and parallel underground utilities. from them.

The following table shows the methodology for assessing the impact on each component of the environment.

Topic	Impact assessment methodology
Air and existing emissions load	Project impact on air quality is assessed by determining the emissions of air pollutants during construction and normal operation of the project. Recognised emissions sources during construction are the construction works and heavy machinery needed for the construction. During normal operation, some emissions are expected from the boiler rooms in the aboveground facilities.
Climate and climate change	Impacts of the climate change on the project is assessed in accordance with the European Commission's <i>Technical guidance on the climate proofing of infrastructure in the period 2021-2027</i> . The guidance is based on the sensitivity, exposure, and vulnerability assessment of the project. Impacts of the project on climate change is assessed by calculating the emissions of greenhouse gases and potential reduction of emissions because of the reduction in use of other fossil fuels and biomass.
Geohazards	The study area is affected by geological hazards like active tectonic faults, potential landslide and and flooding. In order to estimate how construction activities can increase effect of geohazards (landslides, erosion) in project area or how geohazards can affect the project (active faults, liquefaction, earthquakes), potentially hazardous areas have been identified by type along the project routes. Possible effects have been described for each geohazard type.
Waters	Main negative impact on waters is caused by the construction of pipelines. Using geoinformatics systems pipeline routes and water bodies intersections are determined and assessed. The impact of pipeline construction will be determined on the length of intersections and intensity of earth works. Sensitive areas that can be affected by the Project construction works are watercourses and groundwater. The project pipeline routes traverses mainly relatively small to medium sized watercourses which are mainly intermittent with expressed seasonality and discharge rate. The potential impact on surface and ground waters can potentially arise from different construction activities that can cause water pollution or water abstraction. The assessment of Project impacts on water resources have been based upon local characteristics of watercourses (e.g. type, seasonality) and on hydrogeological characteristics of the aquifers over which pipeline routes traverses. Construction activities that can cause adverse effect on waters are river crossings (open-cut method) and hydrotesting (water abstraction in low flow season and discharge). The aquifers along the pipeline can be also affected in accidental situations (spills and leakages of fuel, oil, lubricants etc.) if topsoil of low permeability layer is missing or is very thin.
Soil and Agriculture	The soil impact assessment of the project is based on the analysis of existing data (Digital map of soil types in Kosovo), while the analysis of the impact on agricultural land is based on the analysis of existing land cover (CORINE). As a basis for determining the most common types of land around routes and their corridors, data obtained by GIS technology of overlapping gas pipeline routes with available vector data of soil types in Kosovo were used. The impact assessment on agriculture considered the extent to which they pass through agricultural areas and pastures, and whether there are possible impacts on existing and planned agricultural production. From the aspect of soil analysis, the basic types around routes were examined, as well as their possible pollution during the construction and application of the planned routes. Special emphasis during the assessment was placed on permanent plantation (orchards and vineyards).



Topic	Impact assessment methodology
Biodiversity and Protected areas	<p>The SEA analyzed whether corridors significantly passed through areas of sensitive habitats and biodiversity centers in order to identify conflict areas. GIS data of protected areas - national parks, regional parks and European nature information system (EUNIS) database was used.</p> <p>Also, local biodiversity action plans were reviewed, as well as other documents, when available, to identify hotspots or some other areas considered significant at lower levels.</p> <p>The assessment of the impact on forest cover was performed by analysing existing land cover map (CORINE), global tree canopy height (glad.umd.edu), and the most valuable Sentinel-2 multispectral satellite imagery. The territory of Kosovo is covered by four Sentinel-2 satellite images which were merged and later analysed by their spectral signature which resulted in a generation of the so-called NDVI, the normalized difference vegetation index. In simple terms, NDVI shows the abundance of vegetation, i. e. plant biomass, on a certain area and is widely used for the mapping of forest areas.</p> <p>Another valuable data source was the digital terrain model (DTM) acquired from the Copernicus website (https://land.copernicus.eu/imagery-in-situ/eu-dem/eu-dem-v1.1). These data were used to define sensitive areas prone to erosion (areas with inclination greater than 15°), whilst Sentinel-2 imagery and global tree canopy height were used to determine the type of forests (thicket/shrubbery, coppices, high forests). Based on these data, a map of sensitive areas was prepared, and the impacts of the project were assessed, and contingent mitigation measures were prescribed.</p> <p>Additionally, Map of EUNIS habitat types and CORINE land cover will be used as complementary data for the determination of forest types. This information will be used as indicative due to their low resolution, while Sentinel-2 data with a resolution of 20 meters will be used for a more precise determination of the forest cover along the routes.</p>
Landscape	<p>Valuable landscape areas in Kosovo have been determined using a topographic map and orthophoto map, as well as through the analysis of protected natural areas and valuable geomorphological forms that also contain high landscape values. The landscape impacts are defined as:</p> <ul style="list-style-type: none"> ■ direct physical impacts on the landscape elements, ■ visual impacts and change of landscape character, <p>Orthophotos and topographic maps were used to assess the impact on the landscape. The routes and the associated corridor 200 + 200 m were overlapped, so it was analysed whether there are conflict areas where there could be significant negative impacts on very valuable landscape areas.</p>
Cultural heritage	<p>The potential impact on the cultural and historical heritage is considered from the aspect of potential negative impacts in the form of possible physical destruction or disruption of the cultural context. The zone of a potentially negative direct physical impact is defined as zone with increased distance of valuable cultural heritage sites. All available professional literature and an overview of a wide range of maps serve as a source of data. During the construction phase physical impact is possible during the operation of the construction machinery and the excavation of soil. Indirect impacts on cultural heritage are possible through the negative perception of the proximity of a cultural heritage site and the pipeline elements. The facilities related to the planned pipeline have a technogenic character and as such have features that may be contrary to the elements of cultural heritage and cultural heritage context.</p>
Human health	<p>Human health issues (air quality, evaluation of the quality of drinking water, infectious and venereal diseases etc.) was described using documentation (relevant studies, reports, plans, policy briefs, strategies, articles etc.).</p> <p>The SEA assess at a general level the potential risk on human health as a whole. Possible impacts on the community health during operational phase can occur in case of leakages of the pipeline or accident situations. Public Health and Safety during operation has been considered in the design of the facilities and the risk assessments undertaken. The use of the gas pipeline will not have the potential for an increased incidence of infectious diseases, so it will not lead to deteriorating health. The project will not affect access to health care in any way.</p>
Population and settlements	<p>The assessment of impacts on population and settlement in Republic of Kosovo by proposed development was assessed using spatial data of the planned gas pipelines routes and available data of demographic indicators provided by Kosovo Agency for Statistics, OECD, World Bank Data and other publicly available reports including census data, data from yearly statistical reports as well as other relevant written sources in order to identify any possible conflict areas where populated areas are within corridor of gas pipeline routes.</p>



Topic	Impact assessment methodology
	<p>The assessment considered the guidelines from the document "EBRD's Environmental and Social Policy 2019", supporting the EIA procedures at the later project stage.</p> <p>Noise levels data was described using legislation (noise standards), maps and other documentation (relevant studies, reports, plans etc.)</p> <p>The impact of noise and vibration was not addressed by the SEA, as it can be expected almost exclusively during the construction phase if the works are carried out in the immediate vicinity of populated areas. During the operation phase, impacts can be expected on above-ground facilities. Impacts, especially at this level of processing, are considered negligible.</p>
Population main economic activities	<p>For the purpose of impacts assessment, impacts were defined according to activity performed for the purpose of pipeline construction:</p> <ul style="list-style-type: none"> ▶ impact due to establishment of working strip ▶ impact due to construction of above ground facilities <p>For the purpose of impacts assessment, impacts were defined according to activity performed for the purpose of pipeline operation:</p> <ul style="list-style-type: none"> ▶ priority safety zone - 5 meters to each side of the pipeline axis (safety zone or right of Way) no plants with deep roots may be planted. ▶ safety zone - 30 m to each side from the pipeline axis no individual houses or other buildings will be allowed. ▶ impact due to above ground facilities – permanent impact
Noise	<p>Noise levels data was described using legislation (noise standards), maps and other documentation (relevant studies, reports, plans etc.)</p> <p>The impact of noise and vibration was not addressed by the SEA, as it can be expected almost exclusively during the construction phase if the works are carried out in the immediate vicinity of populated areas. During the operation phase, impacts can be expected on above-ground facilities. Impacts, especially at this level of processing, are considered negligible.</p>
Infrastructure and public services	<p>Infrastructure system elements (transport, electricity, etc.) was described using maps, and other documentation (relevant studies, reports, plans, policy briefs, strategies, articles etc.).</p> <p>The SEA analyse at a general level the potential impacts of increasing traffic. No construction time is planned at this stage.</p>
Accidents	<p>The SEA provided only a general overview of the potential impacts of accident situations. The SEA will analyse at a general level the potential impacts of the occurrence of accident situations to detect conflict zones where such events could lead to significant impacts on human life and health and the environment.</p>
Waste	<p>Trough SEA report the review of waste management legislative framework was conducted and assessment of available existing waste management infrastructure for waste recycling/disposal.</p>

The area of potential impact is the area in which direct or indirect impacts on the physical, biological, social or cultural environment could occur. With that respect following area of influence has been defined depending on the component concerned.

For SEA purposes, the area of potential impact from the pipeline is defined as the 400 m corridor along the proposed pipeline axis (200 m wide from each side of the pipeline route) and 400 m from the boundary of proposed above-ground objects.

When assessing the significance of possible impacts, the following classification was used.

TABLE 3 – THE EVALUATION USED IN THE IMPACT ASSESSMENT

Evaluation	Significance	Description
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+2	Significant positive impact	A significant contribution to the achievement of the environmental protection objective is expected. Measures are aimed at enhancing the expected impact.
+1	Moderate positive impact	A moderate contribution to the environmental protection objective is expected. Measures are aimed at enhancing the expected impact.
0	Negligible impact	Negligible to low contribution to the achievement or negligible to low aggravation of the environmental protection objective is expected. The implementation of the GDP will not have an impact on the achievement of the environmental protection objective. Measures are aimed at mitigating negative or amplifying positive impacts.
-1	Moderate negative impact	Moderate difficulties in achieving the environmental protection objective are expected. Environmental protection measures are aimed at mitigating the expected impact.
-2	Significant negative impact	Significant difficulties in achieving environmental protection objectives are expected. The implementation of the plan could prevent the achievement of the environmental protection objective. Environmental measures are necessary to make the program acceptable.

To assess the impact of the GDP on the environment, the following is a general overview of the impact of the entire gas pipeline network in Kosovo on individual components of the environment.

Tables containing the following elements were used to assess the environmental impact of each pipeline:

- the first column lists the environmental issues,
- the second column describes the impact of each pipeline for each environmental issue,
- in the third column the impact was assessed using the ratings shown in **Table 3**. If the potential impact is assessed at the same time as positive and negative, both ratings are presented.



Summary of the potential Impacts

	Climate and climate change		Geohazards	Waters	Soil and Agriculture	Biodiversity	Protected areas	Landscape	Cultural heritage	Population and settlements		Population main economic activities/Livelihood	
	+1	-1								+1	-1	+1	-1
Gas pipeline North MKD/KOS border to Prishtina	+1	-1	-1	-1	-1	-1	-1	-1	0	+1	-1	+1	-1
Gas pipeline Ferizaj – Prizren	+1	-1	-1	-1	-1	-1	-1	0	-1	+1	-1	+1	-1
Gas pipeline Prizren – Gjakova	+1	-1	-1	-1	-1	-1	-1	-1	-1	+1	-1	+1	-1
Gas pipeline Gjakova – Peja	+1	-1	-1	-1	-1	-1	0	0	-1	+1	-1	+1	-1
Gas pipeline Peja – Istog	+1	-1	-1	-1	-1	-1	0	0	-1	+1	-1	+1	-1
Gas pipeline Istog – Skenderaj	+1	-1	-1	-1	-1	-1	0	-1	0	+1	-1	+1	-1
Gas pipeline Pristina 1 – Drenas	+1	-1	-1	-1	-1	-1	0	0	0	+1	-1	+1	-1
Gas pipeline Drenas – Skenderaj	+1	-1	-1	-1	-1	-1	0	-1	0	+1	-1	+1	-1
Gas pipeline Skenderaj – Mitrovica	+1	-1	-1	-1	-1	-1	0	-1	0	+1	-1	+1	-1
Gas pipeline Mitrovica – Vushtrri	+1	-1	-1	0	-1	0	0	0	0	+1	-1	+1	-1
Gas pipeline Krushe e Madhe – Rahovec	+1	-1	-1	0	-1	-1	0	0	0	+1	-1	+1	-1
Gas pipeline Ferizaj – Gjilan	+1	-1	-1	-1	-1	-1	0	0	0	+1	-1	+1	-1
Gas pipeline Prishtina – Podujevo	+1	-1	-1	-1	-1	-1	0	-1	-1	+1	-1	+1	-1



	Climate and climate change		Geohazards	Waters	Soil and Agriculture	Biodiversity	Protected areas	Landscape	Cultural heritage	Population and settlements		Population main economic activities/Livelihood	
Gas pipeline BVS Hani i Elezit to Sharrcem	+1	-1	0	0	0	-1	0	-1	0	+1	-1	+1	-1
Gas pipeline Prizren – ALB/KOS border	+1	-1	-1	-1	-1	-1	0	-1	-1	+1	-1	+1	-1
Gas pipeline Obiliq - Vushtrri	+1	-1	-1	0	-1	0	0	0	0	+1	-1	+1	-1





5 - KEY CONCLUSIONS AND MEASURES/ RECOMMENDATIONS RELATED TO THE ASSESSMENT OF POTENTIAL IMPACTS AND ANALYSIS OF VARIANTS

Overview of the conclusions drawn during the preparation of this report and implementation of the activities that preceded it (determining of the content of the Report on SEA) is given in the following paragraphs:

- 1) Based on the description of the main characteristics of GDP, it is concluded that the main impacts can be expected developing of the gas transmission pipeline network. According to that SEA is focused on the analysis of possible impacts on individual parts of the environment within the proposed corridors of gas pipeline (200 + 200 m on both sides around axis).
- 2) Development of distribution system of gas pipeline is not thoroughly analysed in SEA due to the fact that pipes are installed under the public roads, parallel to the other utility infrastructure elements respecting the rules and standards of distance from buildings, other above-ground facilities and parallel underground utility installations, as well as cross-distance from them.
- 3) Significant negative impacts have not been identified within the assessment of each of the proposed gas pipeline route. Most of the identified moderate negative conflicts of routes are expected by realization of the ring gas pipelines routes Prizren - Gjakova. These conflicts are related to the geohazard, waters, soil and agricultural land, biodiversity and protected areas and cultural heritage. Therefore, it is necessary to examine those routes and find technical solutions which would mitigate their impact.

Cumulatively, the largest number of conflicts caused by realization of Gas pipeline ring is connected with agricultural land, waters (crossing of the rivers, streams), destruction of landscape values. The smallest number of conflicts is tied to the protected areas and potential destruction of the cultural heritage.

Recommendations in the purpose of improving during the implementation of the GDP

- 1) Proposed mitigation measures should be applied and implemented within the further phases of the development and implementation of the GDP.
- 2) Corridors for gas pipelines shall precisely be defined in lower spatial-planning documentation. In particular, justified and documented cases these corridors may vary from corridors defined in plans of higher order.
- 3) After defining of the exact routes of the gas pipelines and implementation of all legislative procedures, the routes should be included in the spatial-planning documents.
- 4) If the routes of gas transmission pipelines are passing through the construction area of the settlement or at the distance less than 30 m from constructed (residential) buildings, the gas pipelines must have greater wall thickness, greater depth of installation and should be protected with reinforced concrete slabs, in order to ensure additional security requirements.
- 5) Throughout different educational and promotional materials the interested public should be informed about operation and activities of the gas pipeline at least once a year or as it is needed.
- 6) In case that flood hazard, maps and flood risk maps cannot be developed until the period of realization of the gas pipeline, it is recommended to use cartographic data on hitherto recorded floods with the necessary hydrological analyses.



General measures

Topic	Mitigation measure
Climate and climate change	When developing projects, prepare project documentation taking into account the issues of climate change, mitigation and achieving climate neutrality, as well as adaptation to climate change.
Geohazards	<p>In the preparation phase, detailed pipeline corridors planning should consider: construction works in flood areas should be carried out during dry/low flow season.</p> <p>Geological engineering mapping and geotechnical investigation should be carried out in order to identify hazardous/unstable slopes and potential liquefaction locations along the route.</p>
Waters	<p>In the preparation phase, detailed pipeline corridors planning should consider:</p> <ul style="list-style-type: none"> • to construction works on watercourses should be carried out during summer months (likely low flow season). • after constructions riverbeds should be restored to previous conditions. <p>Water Crossing Plan which will indicate construction methods to be used and protection measures to be implemented should be prepared.</p> <p>Erosion and Sediment Control Plan which will indicate how the banks of the water bodies should be reinstated and protected from erosion, and how slopes adjacent to waterbodies will be stabilised to prevent erosion from the slopes discharging into waterbodies should be developed.</p>
Soil and Agriculture	<p>In the preparation phase, detailed pipeline corridors planning should consider greening the slopes and planting native grass mixtures and shrubs of the steep terrains should be carried out.</p> <p>Restoration and rehabilitation plan should be prepared and implemented.</p> <p>Erosion and Sediment Control Plan should be prepared and implemented. During the more detailed planning phase, it is recommended to avoid a valuable arable land and arable land during site selection for setting up access roads and above ground facilities (to minimise the economic displacement).</p> <p>Owners and right holders that have permanent crops (crops with roots that grow deeper than 1 m or crops that need soil treatment deeper than 0,5) in the 5 + 5 m zone from the pipeline route should be compensated for the leased area.</p>
Biodiversity	<p>In the preparation phase, detailed pipeline corridors planning should consider:</p> <ul style="list-style-type: none"> • avoiding sensitive areas along the route (steep slopes, forest-covered areas, aquatic habitats, and wetlands). • on all sites where vegetation cover will be removed or damaged, mixture of grasses and legumes should be sowed immediately after termination of construction works and ROW reinstatement in order to prevent soil erosion, introduction and spreading of invasive plant species. • in forest areas, after the finishing of the construction works, adequate (in types and amounts) tree and shrub species should be planted within working corridor (not including the safety corridor



Topic	Mitigation measure
	<p>of 5+5 m) in order to mitigate effects of fragmentation and to prevent establishment of invasive plant species.</p> <ul style="list-style-type: none"> riparian vegetation near the river and permanent streams habitats (if present) should be restored in previous condition after the finish of construction work. downstream transport of sediment should be minimized while performing open-cut crossings during low flow conditions. <p>If caves or caverns have been found during the construction within the karst terrain, all works should be temporary stopped. Legal authorities should be informed about these findings. Further construction works should be continued in accordance with instructions of legal authorities.</p> <p>Riparian vegetation near the river and permanent streams habitats (if present) should be restored in previous condition after the finish of construction work.</p> <p>Downstream transport of sediment should be minimized while performing open-cut crossings during low flow conditions.</p>
Protected areas	<p>In the preparation phase, detailed pipeline corridors planning should consider that all construction works within wider area of protected wetland Ligatina e Hencit should be performed outside of the period of nesting of most wetland birds that have been recorded in the wider project area.</p>
Landscape	<p>During the design phase, it is necessary to ensure the best possible integration of the pipeline into the landscape.</p>
Cultural heritage	<p>In the further design phases of the Project, following should be considered:</p> <ul style="list-style-type: none"> above-ground parts of the pipeline should be adapted to the local cultural conditions by shape and material. the route and visually inadequate above-ground parts should be covered with indigenous plants. cultural heritage resources and all reasonable efforts should be taken to avoid known cultural heritage sites/ objects during the design preparation <p>Cultural heritage resources should be considered and included in further design phases of the Project and all reasonable efforts should be taken to avoid known cultural heritage sites/ objects during the design preparation.</p> <p>If the gas pipeline route passes near (up to 200m) the elements of the architectural heritage, cultural zones and culturally valuable areas, national parks and the areas under the protection of UNESCO and their buffer zones, after the execution of works, it is necessary to repair areas with identical materials and return them to the original state.</p> <p>In case of chance findings, it is necessary to take actions according to the Chance Finds Procedures which needs to be prepared, implemented, and communicated with all construction personnel at construction fronts.</p> <p>If archaeological rescue is required at a chance find, the rescue will be conducted according to international and national standards and with oversight and involvement of the appropriate government institutions.</p>
Population and settlements	<p>Planning of gas transmission pipeline should be based on using of the best available technology, if it is possible, in the existing joint infrastructure corridors, i.e., in new corridors when technical, economic, and environmental conditions allow that, with the necessary implementation of protection measures.</p>



Topic	Mitigation measure
	<p>In further phases of the project design:</p> <ul style="list-style-type: none"> • densely populated areas should be avoided. • If the routes of gas transmission pipelines are passing through the construction area of the settlement or at the distance less than 30 m from constructed (residential) buildings, the gas pipelines must have greater wall thickness, greater depth of installation and should be protected with reinforced concrete slabs, in order to ensure additional security requirements. • carrying out the construction in compliance with construction procedures and schedule, and good construction site management practices. <p>Stakeholder Engagement Plan with emphasis on affected people, vulnerable people and those who will experience economic displacement should be developed.</p> <p>Consultations with affected people, especially identified vulnerable groups, where all information about possible impacts and mitigation measures can be clearly and simply presented, together with the overall benefits from the project should be held during the all phase of the project. Information on compensation rights that will be applied, as well possibility to submit the grievance should be provided. Use most appropriate consultation methods - Public meetings, Focus group meetings, Project leaflet, Road signs, Project website.</p> <p>Information campaigns are to be held in communities along the route to ensure that no further buildings are planned or built within the 30+30 m safety zone and that restrictions for the priority safety zone are followed.</p> <p>Compensation for the affected land and asset owners or rights-holders are entitled to compensation for the restrictions imposed on the safety zones</p>
Population main economic activities/Livelihood	<p>Local employment and procurement of goods from local suppliers should be maximised.</p> <p>All potential job opportunities and ways to apply should be clearly communicated and information must be given not only during presentations and consultations, but also via Project leaflets, Project website and information must be always available within each Municipality crossed by pipeline.</p> <p>A phased capacity building program that will enable local companies to achieve qualifications and potentially certification with the relevant standards and requirements well in advance of the tendering process should be implemented.</p> <p>As part of the tendering process contractors should be required to develop a purchasing strategy that stipulates how local purchase of goods and services will be optimized.</p> <p>All openings should be advertised by local authorities in ways that are accessible to local communities. Clear information on the number and skills requirements for employment opportunities should be provided.</p>



Topic	Mitigation measure
	<p>Hold consultation and provide information on compensation rights that will be applied within the Project, as well as on possibility to submit a grievance. Focal group meetings should be held with Agricultural and forest landowners, right-holders, and workers in agriculture and forestry in the project area that are mostly impacted with pipeline construction. During these meetings, all information on the project, including compensation rights will be given and possible impacts and benefits presented, as well as information on how to submit a grievance. Legal help should be offered. Livelihoods Restoration Plan should be developed and implemented.</p> <p>In case of compensation for purchase of easement right in respect of long-term operational restrictions in Restriction Zones (5+5 and 30+30) compensation entitlement will be applied.</p>
Waste	<p>Waste Management Plan in compliance with international standards and national waste management legislation, dealing with the organization of temporary storage areas (including special conditions for hazardous waste storage), waste minimisation and recycling measures and disposal dynamics should be prepared. A waste register should be established and maintained. A registered company should be contracted for the collection and the recycling of recyclable materials. Hazardous waste must be handled stored and disposed in accordance with EU standards only to authorized companies.</p>
Other	<p>Infrastructure, Procedure for determining the "original" condition of infrastructure elements which are crossed by the pipeline or laid along the route which includes documenting of the "original" condition by means of photographing and video recording should be established.</p> <p>The construction should be carried out in compliance with construction procedures and schedule, and good construction site management practices.</p> <p>The Contractor should provide each of its drivers with a map at the appropriate scale of the roads authorised for the execution of the works, clearly indicating the maximum speeds authorised, and ensures their understanding.</p> <p>Temporary access to settlements for local inhabitants should be provided by placing steel plates over ditches during limited hours; in case where limitations on access cannot be avoided, alternative solutions to be determined in consultation with local authorities and community leaders.</p> <p>Accidents Emergency Response Plan should be prepared in consultation with the competent authorities, emergency services/civil defence and the municipality administrations along the pipeline route. Adequate adsorbents to collect spilled liquid fluids (petroleum products, chemicals, etc.) near fuel refuelling and storage sites, truck and heavy machinery parking and construction fronts should be provided.</p>