1 EIA Summary

The proposed economic activity (hereinafter referred to as the PEA) - **construction of the Klaipėda – Kuršėnai gas transmission pipeline** - has been included into the list of activities presented in Annex 1 to the Law on Environmental Impact Assessment of the Proposed Economic Activity that are subject to an environmental impact assessment. Environmental impact assessment (hereinafter - the EIA) procedures are carried out in accordance with Law on Environmental Impact Assessment of the Proposed Economic Activity (hereinafter the Law on EIA) (Official Gazette, 1996, No. 82-1965; 2000, No. 39-1092; 2005, No. 84-3105) and other applicable laws of the Republic of Lithuania.

The main goal of the project of the Klaipėda – Kuršėnai gas transmission pipeline is to create sufficient capacities for transporting natural gas from the LNG terminal in Klaipėda to consumers in Lithuania and other Baltic countries (Latvia and Estonia), thus creating a possibility for the Baltic market participants to diversify the sources of gas supply increasing possibilities for liquefied natural gas import through the terminal and enhancing market competitiveness.

The project "Klaipėda – Kuršėnai gas transmission pipeline" was declared an economic project of national importance by Resolution No. 1195 of the Government of the Republic of Lithuania of 11 December 2013. The project will be implemented by the Lithuanian natural gas transmission system operator AB Amber Grid.

EIA relationship with planning and design documentation, publicity procedures

The proposed economic activity is provided for in technical infrastructure solutions of the Master Plan of the Territory of the Republic of Lithuania approved by Resolution No. IX-1154 of the Seimas of the Republic of Lithuania of 29 October 2002, the National Energy Independence Strategy [1], also in approved Master Plans of Klaipėda district municipality, Telšiai district municipality, Plungė district municipality, Rietavas and Šiauliai district municipalities, within the limits of the existing TP Panevėžys-Šiauliai-Klaipėda protected area [2].

EIA procedures shall be carried out in parallel to the prepared TP Klaipėda – Kuršėnai special plan (hereinafter referred to as the Plan) and technical project. Currently, the Plan conception and report on strategic environmental assessment (hereinafter - the SEIA) has been drawn up.

In parallel with the EIA and the Plan, a technical project of the construction is also being drawn up. The planned deadline for construction permits is Q3 of 2014, while the planned completion of the construction of Klaipėda – Kuršėnai gas transmission pipeline is end-2015.

The planned project implementation stages and terms:

- SP, SEIA preparation, establishment of easements — Q 3 of 2013 - Q 3 of 2014
- EIA — Q 3 of 2013 - Q 2 of 2014
- Preparation of a technical project — Q 4 of 2013 - Q 3 of 2014
- Construction — Q 4 of 2014 - 2015

EIA entities examining EIA documents:

Šiauliai district municipality administration; Telšiai district municipality administration; Plungė district municipality administration; Rietavas municipality administration; Klaipėda district municipality administration; Šiauliai Public Health Centre; Telšiai Public Health Centre; Klaipėda Public Health Centre; Šiauliai County Fire and Rescue Board; Telšiai County Fire and Rescue Board; Klaipėda County Fire and Rescue Board; Šiauliai territorial division of Department of Cultural Heritage; Telšiai territorial division of Department of Cultural Heritage; Klaipėda territorial division of Department of Cultural Heritage and the State Service for Protected Areas under the Ministry of Environment of the Republic of Lithuania.

The Environmental Protection Agency under the Ministry of Environment of the Republic of Lithuania is an institution in charge for adopting a decision on the permissibility of the planned economic activity in the selected location.

The PAV programme was agreed upon in the procedure prescribed by laws with EIA entities and approved by the Environmental Protection Agency under the Ministry of Environment (letter No. (2.6)-A4-4511 of the Environmental Protection Agency of 3 December 2013). Pursuant to the Description of the Procedure for Informing the Public and Public Participation in the Process of Environmental Impact Assessment of Proposed Economic Activity approved by Order No. D1-370 of the Minister of Environment of 15 July 2005, the public was informed about the drawn up EIA programme and report on the announcement boards of municipalities and neighbourhoods, on the websites of the developer and the preparer www.ambergrid.lt, www.ardynas.lt and in press:

- On the announcement board of Šiauliai district municipality;
- On the announcement board of Telšiai district municipality;
- On the announcement board of Plungė district municipality;

- On the announcement board of Rietavas municipality;
- On the announcement board of Klaipėda district municipality;
- On the announcement boards of neighbourhoods;
- In the national newspaper Lietuvos Žinios;
- In the regional daily Klaipėda;
- In the regional newspaper Banga;
- In the regional newspaper Plungė;
- In the regional newspaper Šiaulių Kraštas;
- In the regional newspaper Telšių Žinios.

There were no proposals on the EIA programme received from the interested public.

The organizer (developer) of the proposed economic activity: AB Amber Grid.

The preparer of the environmental impact assessment documents: UAB Ardynas, UAB AF-Consult.

1.1 Description of the proposed economic activity

The proposed economic activity - construction of Klaipėda – Kuršėnai gas transmission pipeline. The purpose of the TP is the transportation of natural gas.

Location of the proposed economic activity – TP Klaipėda-Kuršėnai is planned nearby the already existing Panevėžys- Šiauliai - Klaipėda gas transmission pipeline, from Klaipėda gas distribution station No. 2 (Kiškėnų village, Dovilų neighbourhood, Klaipėdos district municipality) to block valve lot No. 12M (Lapkasių village, Kuršėnų rural neighbourhood, Šiauliai district municipality).

The planned Klaipėda-Kuršėnai gas transmission pipeline crosses 5 municipalities and 17 neighbourhoods:

- Šiauliai district municipality (Kuršėnų rural neighbourhood, Raudėnų neighbourhood);
- Telšiai district municipality. (Upynos neighbourhood, Luokės neighbourhood, Viešvėnų neighbourhood, Ryškėnų neighbourhood, Žarėnų neighbourhood);
- Plungė district municipality (Žlibinų neighbourhood, Stalgėnų neighbourhood, Kulių neighbourhood);
- Rietavas municipality (Medingėnų neighbourhood., Daugėdų neighbourhood., Rietavo neighbourhood.);
- Klaipėda district municipality (Dovilų neighbourhood, Dauparų-Kvietinių neighbourhood, Vėžaičių neighbourhood, Endrijavo neighbourhood).

The route of the proposed Klaipėda-Kuršėnai gas transmission pipeline is provided for in master plans approved by municipalities, within the boundaries of the existing TP Panevėžys-Šiauliai-Klaipėda protection area, thus the location of the route has been partially reserved. For these reasons this route is examined as the main alternative.

Maintaining the concurrency of the existing and proposed TP, the energy object corridor would be rationally used at the time of construction and operation, while expansion of territories reserved for the construction of the object would not be necessary in the preparation of territory planning documents.

TP technological parameters

The key PEA technical parameters are the following:

- length of the pipeline – about 110.0 km;
- diameter of the pipeline – 800 mm;
- design pressure – 5.4 MPa, minimum design pressure – 2.0 MPa;
- gas temperature t – (0+15) C;
- pipeline components produced of plain or structural carbon steel.

The planned width of the work area in forests is 14 m, in fields and other areas - 24 m.

The proposed methods for laying the pipeline are the following: open cut method - by digging a trench; closed method - horizontal ramming or horizontal directional drilling. When laying a pipeline using an open cut method, an excavator digs out a trench for laying pipes, the average depth of which is about 2m, the width at the bottom of the excavation is about 1.4 meters and in the upper part thereof - about 3 meters.

At crossings with roads, when the road crossing must be performed without damaging the existing road pavement and changes in pipe laying are slight, the application of horizontal ramming technology is planned. At crossings, on both sides of the road, pits shall be excavated. Gas pipe shall be mounted under the road in a protective case DN1000, which will be laid using a ramming method.

In those places of the route, where a pipe cannot be constructed in an open cut method or the burying level of a pipe needs to be changed due to technological or natural obstacles, the horizontal directional drilling technology is planned to be used.

A technology project of works to be drawn up by a company performing drilling works is necessary for the execution of drilling procedures. The project evaluates the nature of an obstacle and water basin mode, geological structure of the bottom and slopes is examined by conducting engineering explorations (boreholes, the depth of which shall be no less than the planned depth of directional drilling). The length of the directional drilling shall be determined in light of the width of an obstacle, mechanical properties of the gas pipe and data of geological explorations.

Geodesic service shall accurately mark the drilling axis in the plan. The drilling shall be carried out in three stages:

- Stage I - initial (pilot) drilling;
- Stage II - widening the hole to the necessary diameter and stabilizing it;
- Stage III - retraction of the working pipe.

Pipes of the gas transmission pipeline shall be laid at the depth of at least 0.9 meters from the existing land surface (in forests - at the depth of 1.2 meters).

The following infrastructure is planned in the installation of the gas transmission pipeline:

- Block valve lots (BVL) (10x10) with access roads and electric power supply – 8 pcs;
- Intelligent pig launcher/ receiver chambers – 2 pcs;
- Temporary access road during construction works;
- Cathodic protection stations (hereinafter - CPS) – 4 pcs;
  Production bases, technological lots during the performance of construction works (in areas with hard surface paving, (25x25) m).

Block valve lots. Disconnection fixtures - line block valves - are planned for suspending gas supply during an accident or repairs. Block valve structure ensures remote opening/ closing of valves from the central remote control. Line block valves and gas pipeline degassing spurs are installed in block valve lots. Electricity will be supplied to block valve lots from the existing electric power networks or solar/ small wind power plants. The plan is to have 8 BVL.

Intelligent pig launcher/ receiver chambers. The preliminary installation location of the first two-way launcher-receiver chamber is nearby Klaipėda gas distribution station No. 2 in Kiškėnų village, Dovilų neighbourhood, Klaipėda district, and of the second chamber - nearby the block valve lot No. 12M in Lapkasių village, Kuršėnų rural neighbourhood, Šiauliai district. The purpose of the intelligent pig launcher/ receiver chambers is the launch/ receipt of a pig used for the monitoring of technical condition of the pipeline into/from the gas transmission pipelines. With the help of electronics, the pig shall trace the technical condition of gas transmission pipeline, also the state of protective insulation.

Corrosion protection. The plan is to have passive and active gas protection from corrosion of steel pipes of the gas transmission pipeline. Passive protection is when steel pipes covered with polymeric insulation are used, while active protection from corrosion is when cathodic stations are mounted in the territory of a pipeline route. CPS locations are selected after the performance of comprehensive geological explorations and assessment of the properties of soil. The preliminary plan is to have four (4) BVL.

The designed pipes of the pipeline have overall positive buoyancy, thus, in order to ensure a stable position of the pipe, in places where the pipeline pipe will be laid in a watery or light soil (peat, soil with sandy and organic matter content, etc.) concrete makeweights shall be affixed to the gas pipe.

Examined alternative locations of the route

The following alternative locations have been examined in the EIA report:

Alternative locations No.	Location	Description
LA 1	Klaipėda district municipality, Dauparų –Kvietinių neighbourhood, Dauparų settlement in the south	The alternative was provided for in the absence of a possibility to construct the planned TP route nearby the existing gas transmission pipeline due to surrounding buildings. There are 2 residential houses built in the distance of 45 meters from the existing TP.
LA 2A	Plungė district municipality, Kulių neighbourhood, nearby Didžiųjų Mostaičių settlement.	The existing homestead will be bypassed. The distance between the existing TP and residential house is 50 m. The planned TP would be laid in the distance of 15 m from the existing TP and would come 35 m to the homestead. The minimum regulatory distance to a residential house (buildings) must be 47.5 m.
LA 2B	Plungė district municipality, Kulių neighbourhood, Rietavas	The above-mentioned homestead and Aukštamiškių swamps will be bypassed. In the bypass of swamps, TP would be constructed

	municipality, Rietavas neighbourhood nearby Didžiųjų Mostaičių settlement.	through forests in a new location, thus about 4.0 ha of forests would have to be cut out; the route would cross inventoried Natura 2000 habitats - natural grasslands rich in rare plant species.
LA 2C	Beginning: Plungė district municipality, Kulių neighbourhood, nearby Didžiųjų Mostaičių settlement. End: Klaipėda district municipality. Vėžaičių neighbourhood, nearby Pajuodupio settlement.	Construction works would move over to the other side of the existing TP in order to maintain a minimum distance to buildings. The distance between the planned TP to the buildings is 68 m. In case of this alternative, the plan is to lay the TP through Aukštamiškių swamp, however, the territory important for the protection of the scarce large blue butterfly (Natura 2000 BAST Rietavas forests) would be bypassed.
LA 3	Telšiai district municipality, Ryškėnų neighbourhood nearby Gaubelių settlement.	Bypassing the body of water.
LA 4	Telšiai district municipality, Viešvėnų neighbourhood nearby Klibės settlement	Bypassing the swamp.

1.2 Restriction on land use

Protected areas and lanes applicable to the gas transmission pipeline

The normative document "Gas system. Gas transmission pipelines. Design, materials and construction. Rules" approved by Order No. 86/146 of the Minister of Economy and Minister of Environment of the Republic of Lithuania of 9 March 2001 establish that when selecting a route for a pipeline: location class and design factor (f) shall be evaluated; an appropriate distance from the pipeline route to buildings shall be selected; gas transmission pipeline protection lane and area shall be marked in gas pipeline route design to avoid damage to a pipeline after the construction thereof done by third parties performing works nearby the operating pipeline; signs for marking the pipeline route shall be projected.

The gas transmission pipeline shall be subject to the Rules on Gas Transmission Pipeline Protected Area approved by Order No. 1-213 of the Minister of Energy of the Republic of Lithuania of 16 July 2010 (Official Gazette, 2010, No. 87-4625, Special Conditions for the Use of Land and Forests approved by Resolution No. 343 of the Government of the Republic of Lithuania of 12 May 1992 (Official Gazette, 1992, No. 22-652), normative document Gas system. Gas transmission pipelines. Design, materials and construction. Rules" (Official Gazette, 2001, No. 23-771 with its subsequent amendments)

Gas transmission pipeline protected lane. The width of the gas transmission pipeline protected area is 3 meters to each of the sides of the axis of the gas transmission pipeline.

The following is prohibited in the protected lane:

- To lay other underground networks in parallel with the gas transmission pipeline, except for drainage pipes, which can be laid only with the permission of the owner of the gas transmission pipeline;
- To plant trees and shrubs;

The following is permitted in the protection lane:

- To cultivate land at a depth no greater than 0.30 m;

Gas transmission pipeline protected area. Protected area is a safe distance from the gas transmission pipeline to residential, public buildings and other structures given the danger posed by the gas transmission pipeline under normal operation thereof and extraordinary situations. In accordance with paragraph 25 of Chapter VII of Resolution No. 343 On the Approval of Special Conditions for the Use of Land and Forests of the Government of the Republic of Lithuania of 12 May 1992 (Official Gazette, 1992, No. 22-652 and its subsequent amendments), the gas transmission pipeline protected area is:

- A strip of land along the pipeline route, the width of which is 25 meters to both sides of the axis of the pipeline;
- A strip of land along several-lane pipeline route, the width of which is 25 meters to both sides from the axis of bordering pipelines;
- Around the gas transmission pipeline facilities - a 25-meter-wide land strip around the territory of the said objects.

In the preparation for the construction of any of the buildings, facilities or other objects at a distance of 350 meters from the gas transmission pipeline route, pre-design proposals and design documentation must be approved with AB Amber Grid.

The following is prohibited in the gas transmission pipeline protected area without a written permission of AB Amber Grid:

- To construct buildings and facilities;
- To plant trees and shrubs, conduct main deforestation works;
- To store feed, fertilizers and other materials;
- To rick hay and straw;
- To install turnpikes for tethering horses and keeping cattle;
- To designate fishing areas, fish and catch aquatic animals;
- To install watering places, chop and cut ice;
- To install crossings via pipeline routes, parking lots for vehicles, tractors and other machinery;
- To conduct land reclamation, irrigation and drainage works;
- To carry out explosion works, flatten soil;
- To take geological pictures, conduct search, geodetic survey and other works related to installing boreholes and taking ground (except for soil) samples;
- To rebuilt, block up or break down distinguishing signs or control measuring points;
- To open up doors of unserved cable connection points of cathodic protection stations, to turn on/off valves, switch on/off electric power supply devices;
- To set up landfills, pour alkali and salt solutions;
- To disassemble gas pipeline equipment fencing;
- To burn fire and install open or close sources of fire;
- To dig land deeper than 0.3 meters

An organization operating a gas transmission pipeline is allowed to do the following in the protected area:

- To access pipelines by vehicles and other machinery following a scheme agreed upon with a land owner and/or user;
- To maintain and repair pipelines in the protected area, mow lawn, cut shrubs and perform other maintenance works; excavate in protected area having agrees upon (no later than 5 days in advance) these works with a land owner and/ or user;
- To cut forests in case of an accident in forests, having informed about the cutting of forest later on in the procedure prescribed by laws and removed debris left after cutting from cleared spaces.

The owner of the gas transmission pipeline shall have the right to carry out maintenance and repair works of the pipeline and the equipment thereof, compensating a land user (owner) for the damage done during the performance of works. The owner of the gas transmission pipeline shall clean up a 6-meter-wide clearance above the route at its own expense.

Location class unit is a territory in 200 meters to both sides from the axis of the pipe of the gas transmission pipeline, lasting for 1600 meters along the pipeline.

Setting easements

Easements and restrictions on economic activities shall be set in land plots of trustees of state land and privately owned land plots for the planned gas transmission pipeline.

Setting of easements is governed by the Civil Code of the Republic of Lithuania, Law on Land of the Republic of Lithuania and Rules for Setting Land Easements by an Administrative Act approved by Resolution No. 1289 of the Government of the Republic of Lithuania of 14 October 2004.

Pursuant to the Law on Land of the Republic of Lithuania, land easement means "the right to another's land plot or a part thereof, granted for the use of another's land plot or a part thereof (the servient estate), or the limitation of the land owner's right to use the land plot in order to ensure proper use of the land plot over which the easement is set (the dominant estate)".

The special plan forms the easement of such scope, size and area, which would ensure the proper construction, use and operation of the dominant estate, at the same time minimally limiting the rights of the owner of the servient land plot to use the land plot.

The proposal is to set easements with private land plot owners on the basis of notarial contract, reimbursing calculated losses for constructing the planned gas transmission pipeline, servicing and using it. Before the approval of the special plan, notarial easement setting agreements shall be signed with private land plot owners, discussing the proposed conditions for reimbursement of losses.

Amendments to laws on forests and protected territories

Solutions of the proposed gas transmission pipeline route are planned pursuant to provisions of the Law Amending Articles 7 and 11 of the Forestry Law of the Republic of Lithuania No. XI-671 of 23 January 2014 and Law Amending and Supplementing Article 31 of the Law on Protected Territories No. XII-746 of 23 December 2013 (Official Gazette, No. 63-1188; 2001; No. 108-3902; 2011, No. 49-2365; 2013, No. 36-1726, No. 76-3830).

1.3 Waste

During the construction and installation of PEA objects (gas transmission pipeline, block valve lots, launcher/ receiver chamber lots, etc.) a certain amount of waste may form. Waste generated during the construction will be sorted, properly stored and transferred to respective waste handlers.

After the completion of the gas transmission pipeline construction works, during the operation of the newly installed gas transmission pipeline route, waste generation is not planned.

1.4 Possible significant impact of the proposed economic activity on different components of the environment

Methodology

Environmental impact assessment has been performed in accordance with applicable laws of the Republic of Lithuania, other acts and normative documents valid during the assessment process. The main of them is the Law on PEA PIA and its implementing legislation.

Material of the European Environment Protection Agency, EIA guides of the European Commission, publications of the EU countries, methodologies and recommendations presented therein, databases, archive and published sources of statistical information on environmental components were used in the assessment of potential PEA impact on the environment. Expert evaluation, multi-criteria analysis was used in the environment impact assessment; field studies and observations of environmental components (biodiversity, protected areas, cultural heritage, and surface water) were performed in the route under examination. Computer simulation programme CadnA 4.2 was used for the noise impact assessment. In the collection and analysis of the current situation data, EIA preparers consulted with relevant state institutions.

The environmental impact assessment period - start of the project operation - year 2015.

Examined territory: in the assessment of impact on environmental components, the examined territory will cover local alternatives of the gas transmission pipeline route and potential impact zones.

Water

The proposed TP route will be laid through the regions of basins of the Lithuanian coastal rivers, the Nemunas and Venta rivers. The current and proposed TP crosses 98 rivers, streams, ponds and drainage canals, with the most significant rivers being the rivers of Minija, Juodupis, Virvyčia, Luknė, Žvelsa, Smeltainė and Gerdaujė.

Surface or underground water will not be used in the operation of the TP, and there also be no wastewater. Surface water will be used only when cleaning the gas transmission pipeline and during hydraulic testing,

Impact mitigation measures. Complex measures (geotextile, stone paving, etc.) are planned for the reinforcement of shores (slopes). For the protection of sloping river and stream slopes of low susceptibility to erosion they are planned to be sown with perennial grasses.

The performance of the gas transmission pipeline construction works through the Minija River is recommended in the second-half of the summer and early fall (from 1 July to 1 October). Low water level and lower sediment wash-away is planned at that time. This would allow protecting the spawning grounds of salmonids from getting covered in sediments.

Restoration of damaged reclamation systems.

Conclusions: Having assessed the current situation and the proposed economic activity we claim that the potential impact of the PEA on water bodies during the operation will be no greater than it is now.

Ambient air

During its operation, the gas transmission pipeline will have no impact on the quality of ambient air (gas leaks into the environment may happen only in case of an accident). No stationary sources of pollution are planned in the gas transmission pipeline route during the operation thereof. Mobile sources of air pollution will be from servicing transport during the examination of the gas pipeline and its appurtenances (twice per year). Light utility vehicles will be used in periodic inspections, and their impact on the ambient air will be insignificant.

A short-term impact on air quality is possible during the construction works of the gas transmission pipeline. The sources of ambient air pollution are internal combustion engines of vehicles and servicing machinery. The following pollutants will be emitted from internal combustion engines depending on the type of fuel:

- Carbon monoxide;
- Carbon dioxide;
- Nitrogen oxides;
- Sulphur dioxide;
- Particulate matter;
- Hydrocarbons.

Impact mitigation measures:

- Only equipment in good working order shall be used during construction;
- During the project implementation, provisions of laws governing construction and operation works shall be followed.

Conclusions. In the implementation of the PEA, the increase in the number of stationary sources of pollution or traffic due to the PEA is not planned for, thus PEA is expected to have no significant impact on the quality of ambient air.

A short-term impact on the quality of ambient air is possible during the construction works and transportation of equipment.

The planned annual CO2 emissions from the consumption of electric power during the operation is 3.716 t CO2 eq./ year; it should be noted that 62.5 per cent of all the necessary electricity will be generated from renewable energy resources.

Soil

During the construction works of the proposed gas transmission pipeline route, an impact on soil is possible in work zone, the area of which in the fields and other places will reach up to 24 m and 14 m - in forests.

When laying the pipeline, before excavating the trench, the top soil layer will be dug out and stored separately, while after the completion of excavation works it will be placed back. Upon the completion of works, in the pipeline laying zone the restoration of mechanically damaged (compressed) soil by ploughing will be necessary.

Disruption of mechanically damaged forest floor in forests during the construction works and its mix up with the top soil layer will facilitate the restoration of fertility of the damaged soil.

In case of accidents, breakdown or gas leaks respective rectification, compensatory and restoration means provided for in legal documentation shall be applied.

Temporary access roads used in swampy areas during the pipeline construction works shall be removed.

Environmental impact mitigation measures. In order to minimize the threat of soil water erosion in hilly areas (districts of Telšiai and Plungė) in steep hill slopes, especially those with the slope greater than 10°, soil shall be rehabilitated by sowing them with deep-rooted perennial grasses. Erosion prevention in cliffs steeper than 15° shall be carried out by reinforcing slopes with support walls or other technical means, which will be selected during the preparation of a technical project, and by planting bushes and trees.

During the construction of the pipeline, machinery in working order shall be used, while the generated construction waste shall be removed from the construction site in a timely manner, thus minimizing potential chemical impact on the soil.

Underground

Pipes of the gas transmission pipeline shall be laid at the depth of about 0.9 meters in the fields (open areas) and at the depth of 1.2 meters in forests reiterating the terrain, thus the pipeline route will have a minimum impact on the structure of underground - only the top part thereof will be locally destroyed, which will have no impact on the manifestation of possible negative geological processes (pits, landslides, etc.).

Hydrogeological conditions in the analysed territory are favourable for the construction of the pipeline: the main aquifers (quaternary and pre-quaternary) around the route, from which water is supplied to both district water supply

systems and individual consumers using drilled wells, are buried sufficiently deep, thus no negative impact of the construction of the gas transmission pipeline or the operation thereof is planned.

The pollution of groundwater in the pipeline route is possible during the construction thereof, if environmental requirements are not followed or if pollutants (fuel, oil products) get into the soil during an accident.

Given the engineering - geological conditions in the route, the construction of the pipeline route will have no practical impact on possible negative engineering-geological factors, except for a partial initial change of soil physical and mechanical parameters in the place of a trench of the pipeline route.

When planning the pipeline above the operated Ablinga oil field located in the territories of Plungė and Klaipėda districts, the operator of which is UAB Manifoldas, route configuration above the oil field should be agreed upon with the latter company.

At the very western edge of the TP, the route passes nearby the comprehensively explored (4 plots distinguished) Birbinčių sand and gravel deposit, the resources of which are currently operated and used for laying roads. Users of the oilfield are UAB Kraštovaizdžio tvarkymas, UAB Orgstatyba and UAB Vakarų verslo projektai, with which respective approval works should be carried out regarding potential restrictions of activities in the protection zone of the gas transmission pipeline.

Protected areas and biodiversity

Flora

In the assessment of the possible impact of the proposed economic activity from eco-systematic perspective, the most significant will be the impact on forest ecosystems. This is related to cutting trees in the pipeline route work zone.

The proposed TP route is planned via the forests administered by Kretinga, Rietavas, Telšiai and Kuršėnai forest stewardships. The following complexes of plantation are distinguished in the territory - forests, grasslands, swamps, agrarian territories. A significant part of the territory is covered by forest habitats, also, the route crosses NATURA 2000 territories and the territory of Varniai Regional Park.

For the presentation of information about flora and fauna in the territory, data collected during the survey carried out in 2013 and received from directorates of Žemaitija National Park and Varniai Regional Park, specialists from Kretinga, Rietavas, Telšiai and Kuršėnai forest stewardships was used. Also, information from the State Forest Service cadastre, material from field work reports of the project "Inventory of natural habitats of the EC importance, setting criteria for favourable protection condition and the development of monitoring system" as well as different scientific research material was used.

Forest habitats will be completely destroyed in pipeline installation work zone. In this case the impact is long-lasting, because forest will not be restored anymore. After the completion of construction works, having remediated these territories, grassy ecotone communities in forest glades and outskirts can form in these territories. In certain cases ruderal plant communities can emerge in these damaged territories. The width of the work zone in forests is 14 m.

When laying pipeline route in swamps, specific swamp grass and occurring woody vegetation will be destroyed in the work zone. Damage done in swamps takes quite a long time to recover. Changes in the hydrological regime are possible.

When performing works in meadows, grass vegetation will be destroyed in the work zone, however, after mechanical damage done in meadows, self-recovery process is quite fast.

In the performance of construction works an impact on agrarian territories is minimal. There are no natural values in arable land, pastures and sown meadows. The width of the work zone in territories other than forests is 24 meters.

Location alternatives of the proposed pipeline route location are planned nearby or cross territories valuable from biodiversity perspective. Such territories are main forest habitats and territories that meet criteria of a natural habitat of European importance.

Fauna

Fauna is affectionate to suitable specific biotopes, thus the diversity of fauna is determined by the diversity of biotopes. Information about fauna is presented based on the analysis of results of exploration works conducted in the territory and data collected during field surveys. Species of animals included into the List of Protected Species of Fauna, Flora and Fungi of the Republic of Lithuania (hereinafter referred to as the List of Protected Species) and Annexes II and IV of the Habitats Directive of the European Union (hereinafter referred to as the Habitats Directive) can be found in the territory.

In the construction of the pipeline, when deforestation works are performed during the breeding of birds, breeding birds are impacted by disturbances and destruction of eggs. During the breeding period, works cannot be performed:

Periods of bird breeding

Territory	Species	Breeding period (month, day)
Nearby the Minija River	Corncrake	04 (03) – 07 (08)
	Kingfisher	04 (03) – 07 (08)
Forest protection territories	Crane	04 – 06 (07)
	Black stork	04.01 – 07.15 Disturbance is not possible within a radius of 200 m around the nest.
	Lesser spotted eagle	02.01 – 08.01 Disturbance is not possible within a radius of 200 m around the nest.
	Buzzard	04 – 07
	Forest breeding birds	04 - 07

Disturbance can potentially impact local populations of lynx and wolves during the period of rearing; it is recommended that economic activity is not performed in forest areas during the period from May to August.

Protected territories. Also, protected are European ecological network NATURA 2000 areas, which fall under or are along the analysed gas transmission pipeline route:

Protected area	Distance, m
Minija River (SAC)	crosses
Minija Ichtiological Reserve	crosses
Minija Old Valley Landscape Reserve	15
Minija River Valley (SPA)	crosses
Minija River Valley (SAC)	15
Rietavas Forests (SAC)	crosses
Ablinga Geomorphological Reserve	658
Minija Break Landscape Reserve	crosses
Lauksoda Botanical-Zoological Reserve	363
Varniai Regional Park	crosses
Biržuvėnai Landscape Reserve	124

Impact mitigation measures.
The width of the work zone in newly inventoried NATURA 2000 meadow habitats should be decreased to 14 meters. When rehabilitating the territory, damaged areas should be left for natural regeneration spreading on them grasslands from nearby mowed meadows. Grasslands are mown in August. Also, no access roads (except for temporary ones during construction) and storage sites should be planned in these NATURA 2000 meadow habitat areas.

In LA 2B case (Viržintų meadows) the following would be impact mitigation measures in meadow habitats: the reduction of the width of work zone to 14 meters, without setting up any storage sites or access routes. When rehabilitating land, not to sow in any purchased grass mixtures (to avoid changes in flora). To leave damaged areas for natural regeneration, scattering on them grass lands mowed in adjacent meadows. Since this territory is valuable as natural meadows, there is a threat for natural values - their possible overgrowth with trees and shrubs. A possible compensatory measure is cutting out trees and shrubs in meadow habitats. Larger trees and shrubs can be left in the territory, but they shall cover no more than 10 % of the territory of meadows.

In the performance of construction works in swampy forest habitats, the existing hydrological regime should be left intact not allowing the habitats to dry out, as this could lead to a deteriorated condition of habitats in further areas. When constructing the pipeline through swamps - the main alternative route or LA 2C in Aukštamiškių swamp - formworks shall be used to reduce the destruction of swampy floor to the minimum. Upon the completion of construction works, it is important not to leave dug-out peat mounds and not allow the swamp to dry out for the rehabilitation of damaged areas. For the rehabilitation of damaged areas a partial replanting of swamp plant communities must be carried out so that swamp habitat is restored as quickly as possible.

The performance of gas pipeline construction works through Minija River is recommended in second half of summer and early fall (from 1 July to 1 October). At that time water level is low and lower sediment leaching is expected. This would allow protecting the spawning grounds of salmonids; also, this is the time when corncakes have already hatched and can move from the work zone to adjacent territories.

When constructing the route in Viržintų meadows, in order to reduce the impact on the population of large blue butterfly, the following measures are allowed: the reduction of the width of work zone to the distance applicable in

forest areas - 14 m; when rehabilitating the territory, avoid sowing in purchased grass mixtures. Leave damaged areas for natural regeneration, scattering on them grasslands from meadows mown nearby. Grasslands are morn in August. Not to plan any access roads and storage sites in this territory. Also, a compensatory measure can be applied and the condition of adjacent meadow habitats could be improved. A compensatory measure is cutting out trees and shrubs and removing biomass from the meadow. Larger trees and shrubs may be left in the territory, but hey cannot cover more than 10% of the meadow area. That way the condition of the entire meadow important for the protection of large blue butterfly would be improved. This compensatory measure shall be agreed upon with the promoters of the 2012-2014 action plan for the protection of large blue butterfly (Maculinea teleius) in Viržintų meadow.

Forests are not to be cut out during the breeding season of birds.

Landscape

In accordance with the classification of the Lithuanian landscape morphological structure, the route of the Klaipėda-Kuršėnai gas transmission pipeline under examination falls into several major morphological sections of the country's landscape - morphological landscape areas, regions and sub-regions. Landscape sub-regions are classified by different terrains, lithological composition, soils, hydrological conditions, vegetation biotopes as well as intensity and diversity of economic assimilation.

In the assessment of impact of the gas transmission pipeline and its localized alternatives on the landscape, a comparative analysis using a balance method was performed. When using this method, the selection of alternatives being evaluated is established based on the balance of significance indices (priorities) received in a way of relative comparison.

When drawing up the matrix for the assessment of local alternatives of the Klaipėda - Kuršėnai gas transmission pipeline, the significance of alternatives was determined and alternatives were compared following four directions of the analysis of aspects of the impact on the landscape (morphological, geo-ecological, conservational and perceptual):

- Impact on forest plantations;
- Impact on protected areas;
- Impact on natural building;
- Impact on the picturesqueness of the landscape.

Conclusions: Due to the relatively narrow route corridor (the width of the work zone is 14 m is forests and 24 m in other areas), outside which the area remains absolutely natural, and due to the fact that throughout most of the length of the route the pipeline is reiterated with forest clearings of the already existing gas transmission pipeline, the impact of forest areas will not be essential.

Impact mitigation measures. In order to retain natural landscape forms, the works of construction of pipes should be performed particularly carefully in valley zones and zones crossing ridges, where the scope of land works should be reduced to the minimum and great attention devoted to rehabilitation measures.

Given the fact that the planned gas pipeline route reiterates the existing pipeline, in order to avoid/ reduce consequences on the landscape, it is necessary to maintain the planned work and established gas transmission pipeline protection areas. Measures for reducing the impact on landscape are first of all related to the necessity to rehabilitate the damaged soil surface by reinforcing it with perennial grasses.

Social and economic environment

The National Energy Independence Strategy of Lithuania approved in 2012 provided for the achievement for three main goals - energy independence, competitiveness and sustainable development. The plan is to have the first goal - of energy independence - implemented by 2020. For the implementation of this goal several most important energy sector projects were planned, among which was the construction of the LNG terminal and infrastructure necessary for it, including the connection of adequate permeability with the existing gas transmission system. In order to use the potential of the LNG terminal being built, the expansion of the infrastructure connecting it with the existing gas transmission system and the renovation or the existing infrastructure are necessary. In the operation of the existing pipeline only, the level of the security of supply specified in the EU legislation will not be reached.

The main goal of the Klaipėda – Kuršėnai gas transmission pipeline is to create sufficient capacities for transporting natural gas from the LNG terminal in Klaipėda to users in Lithuania and other Baltic countries (Latvia and Estonia), thus allowing Baltic market participants to diversify sources of gas supply increasing possibilities of liquefied natural gas import through the terminal and enhancing market competitiveness.

Possible impact of the installation of the Klaipėda – Kuršėnai gas transmission pipeline is possible not only for the environment of Klaipėda, Plungė, Rietavas, Šiauliai and Telšiai district municipalities, but for socio-economic environment of Lithuania as well: for labour market, economic conditions, investments and material values.

A positive impact on the socio-economic environment is also planned due to the services rendered and goods sold to construction companies during the construction; the creation of stable number of jobs or new jobs during the construction of the object and the operation thereof; during the operation, a positive impact is planned not only for Klaipėda and Plungė alternatives.

The construction of the new gas transmission pipeline line will not cause any negative changes in prices of real estate or land, will not have a negative impact on the development of forest and agricultural, recreational or residential areas, because the route will be laid nearby the already existing operated gas pipeline route, in the adjacency of which respective activity restrictions are already in force.

Impact mitigation measures. Compensations for losses incurred by the set easements and protection area of the gas transmission pipeline will be paid to land owners, whose land will be crossed by the planned gas transmission pipeline. Also, losses for destroyed crops and cut forest will be calculated and compensated. Compensations shall be calculated pursuant to the procedure established by laws of the Republic of Lithuania.

Cultural heritage

The examined Klaipėda – Kuršėnai gas transmission pipeline route does not fall under the territory of registered immovable cultural values. The route crosses the protection area of Kvietiniai barrow cemetery (6187) in Klaipėda district municipality.

The planned gas transmission pipeline route and its local alternatives have been selected so that they do not get in the territory of registered cultural values, thus avoiding negative impact on cultural heritage.

Construction machinery storage sites and block valve lots necessary for the construction of the gas pipeline cannot be provided for in the territories of cultural heritage objects and sites or in their protection from physical impact areas.

During the environmental impact assessment, pursuant to the regulation PTR 2.13.01:2011 archaeological explorations have been performed, at the time of which potential locations having features of archaeological or cultural heritage have been identified, where further research is planned for during the construction.

The most efficient and cost-effective method of archaeological explorations in the territories of homesteads and probable ancient settlements registered in the oldest (mid-19th century) maps, where continuous cultural layer has not been detected (**Annex No. 4**) is archaeological surveying during the excavation of the top layer of the ground with testing of uncovered structures. One object present in the route zone (bunker No. 3) is not archaeological heritage (it simply will be left there).

Detailed archaeological research will be needed on 5 sites:

- Kvietiniai barrow cemetery (Annex No. 4, Figure 4-3);
- Sendvaris manor (Annex No. 4, Figure 4-8);
- Sendvaris settlements (Annex No. 4, Figure 4-8);
- Saulažolių walls (Annex No. 4, Figure 4-2);
- Kvietiniai military fortifications (Annex No. 4, Figure 4-3).

Pursuant to Article 9(3) of the Law on the Protection of Immovable Cultural Heritage of the Republic of Lithuania (Official Gazette, 2004, No. 153-5571), "where in the course of construction of other operations, archaeological findings or valuable properties of an immovable item are discovered, the managers or the persons carrying out the operations must notify thereof the heritage protection subdivision of a municipality, and the latter shall inform thereof the Department. The Department may suspend operations for 15 days. Within this time limit, it must, in conjunction with the heritage protection subdivision of the municipality, verify the notification and take a decision whether or not to initiate the registration of a discovered immovable property, the declaration of an object of cultural heritage protected or the making of the discovered valuable property known and the revision of the protection requirements."

Acoustic noise

The majority of the route of the proposed gas transmission pipeline in Plungė district municipality, Rietavas district municipality, Šiauliai district municipality, Telšiai district municipality crosses unbuilt territories. The area of Klaipėda district municipality is populated more densely. The nearest residential areas from the proposed TP and infrastructure are located at the following distances:

- Klaipėda district municipality, Dauparių village - 520 m from the planned temporary storage site;
- Klaipėda district municipality, Dauparių village, Šlapšilės village - 65 m from the planned TP route;
- Klaipėda district municipality, Dauparų village - 51 m from the local route alternative LA 1.

Temporary and short-term increase in the level of noise and vibration is possible during construction works and transportation of equipment. Typical construction works result in a short-term local increase in noise and vibration.

During construction, noise and vibration will be limited by managing work hours and the movement of construction vehicles in respective transportation route and using equipment in good working condition. Advance work planning and limitation thereof is important for protecting natural environment and people living nearby from potential negative effect and disturbances as much as possible. Only machinery, which is in good working condition and complies with the requirements of STR 2.01.08:2003 Management of the Noise Emission in the Environment by Equipment used Outdoors will be used in the construction works.

No significant sources of noise and vibration are planned for during the operation. Having performed a noise simulation in Lapkasių village block valve lot in accordance with noise characteristics provided by the producer of the planned pressure relief valve, the results show that noise limit values (Lday Levening, Lnight) will not be exceeded outside the land plot; the highest noise value was determined to the north outside the plot reaching 41dBA and accounting for 91 per cent of the permissible Lnight limit value. It should be noted that there are no residential or public buildings in the land plot, and the purpose of adjacent land plots is agriculture. The nearest residential environment is at the distance of 350 m (Lapkasiai, Kuršėnų rural neighbourhood, Šiauliai district municipality) from the main alternative of the TP.

Public Health

Factors occurring during the construction of the proposed Klaipėda-Kuršėnai gas transmission pipeline (air pollution, noise, vibration) will be short-term and episodic, works shall be performed during the day. Construction work noise levels shall comply with the provisions of HN 33:2011 Acoustic Nose. Noise Limit Values in Residential and Public Buildings and their Surroundings, Article 14(2) of the Law on Noise of the Republic of Lithuania and STR 1.05.06:2010 Building Design.

During the operation of the Klaipėda - Kuršėnai gas transmission pipeline, none of the examined pollution factors - air pollution, noise or vibration in adjacent territories of residential and public objects will exceed the largest limit values allowed in residential and public environment established by legal normative acts on public health safety.

One residential house, located at Klaipėda district municipality, Dauparų-Kvietinių neighbourhood, Šlapšilės village, Šlapšilės street 25, gets in the protection zone of the main alternative of the proposed Klaipėda-Kuršėnai TP route, thus we suggest that in the design of the TP route, TP route LA 1 is provided for in this location - in such a case the residential house will be in a distance of 55 meters from the TP route and will not get into the protection zone of the gas transmission pipeline.

Annex No. 1 to the Rules on Setting Sanitary Protection Zone Limits and Mode and their amendment of 21 December 2009 approved by Order V-586 of the Minister of Health of the Republic of Lithuania of 19 August 2004 (Official Gazette, 2004, No. 134-4878 and Official Gazette, 2009, No. 152-6849, Official Gazette, 2011, No. 46-2201) (hereinafter referred to as the Rules) governs sanitary protection zone limit values applicable when public health impact assessment is not performed. Sanitary protection zone limit values for gas supply equipment are not established by this legal act.

1.5 Monitoring

The monitoring of the following environmental components is recommended:

- Surface water;
- Soil;
- Landscape;
- Living nature.

Surface water pollution monitoring. Monitoring of the performance of river valley reinforcement measures shall be performed. The monitoring of river and stream valley reinforcement measures shall be performed during the maintenance, walking around the gas transmission pipeline, inspecting soil structure (observing ground surface cracks, landslides, erosion, etc.). Also, the inspection of underpasses through natural barriers (observation of shores of rivers and streams) will be performed. Observations in the gas transmission pipeline route will be performed twice - immediately after the construction works and two years afterwards. Upon the detection of any alterations, respective rectification works shall be performed immediately (for example, reinforcement of slopes, etc.).

Soil monitoring. The aim and tasks of soil monitoring is to assess the damage done to soil and efficiency of rehabilitation in order to avoid erosion threats in the gas transmission pipeline route.

Landscape monitoring. The aim and tasks of landscape monitoring is to assess changing landscape due to the emergence of small sized TP infrastructure lots and launcher/ receiver chambers, identify most damaged and sensitive areas in order to minimize the destruction of the natural structure of landscape.

Wildlife monitoring. The impact of the construction of the gas transmission pipeline on meadow, swamp and forest habitats differs. Impact on meadow habitats is evaluated as short-term, if remediation of damaged zones is properly performed. Monitoring in valuable meadow habitats in necessary in order to capture potential sowing in ruderal plants

in a timely manner, and to destroy beds of undesirable plant species on time. Due to cutting and deforestation, meadow habitats with their characteristic flora and fauna will form in forest habitats instead of forests.

The aim and tasks of the monitoring are: to clear up the impact of the gas transmission pipeline on the formation of habitats, observation of the recovery of damaged territories. The monitoring plan of living nature lists monitoring locations in case of local alternatives of the gas pipeline route.

Monitoring of the implementation and efficiency of protective measures against erosion is necessary. The monitoring of these measures shall be implemented by the PEA organizer. The monitoring shall be carried out during construction and upon the completion of construction works.

1.6 Emergencies

Preliminary (initial) analysis and quantitative analysis of general nature conducted under the scope of the environmental impact assessment report does not include the detailed evaluation of risk control and risk management tools. This stage identifies potential hazards, place of origin of hazards, potential of the emergence of major accidents, expected accident development scenarios, scope of effects and dangerous impact zones, and defines risk criteria. Also, it evaluates hydrometeorological conditions, environment, identifying the type of the land use in surrounding territories, the nearest residential environment and population density, sensitive public objects, nearest enterprises.

Risk analysis of the examined economic activity shall be conducted pursuant to R41-02 Recommendations on the Assessment of Risk of Potential Accidents of Proposed Economic Activity approved by Order No. 367 of the Minister of Environment of the Republic of Lithuania of 16 July 2010. Risk analysis shall be carried out taking into consideration all the possible local alternatives of the gas pipeline route, i.e. the worst case scenario for all affected objects shall be assessed.

Having performed qualitative risk assessment of the proposed economic activity it was determined that regardless of the selected local alternative of the route the proposed gas transmission pipeline is attributed to the medium risk category. The calculated risk is considered acceptable and additional risk mitigation measures are not necessary, though technically feasible.

The greatest risk is posed by large-scale gas leakage fires. The probability of such fires is seen as absolutely unlikely (<10-6), but effects on all affected objects can be significant. Accident probabilities were calculated pursuant to statistical analysis of accidents in the European gas transmission pipelines.

A whole range of process control and protection systems are provided for accident prevention and mitigation of potential consequences. Passive and active protection of steel pipes is planned for corrosion protection of the pipeline. The implementation of these measures shall ensure sufficient gas pipeline safety.

1.7 Conclusions on the analysis of alternatives

Analysis of local alternatives of the TP route is presented from the perspective of environmental components most sensitive to impact caused by the PEA:

- From the perspective of biodiversity and protected areas;
- From the perspective of cultural heritage values;
- From the perspective of landscape;
- From technical perspective with respect to the existing buildings.

Main conclusions of the analysis of alternatives:

In Klaipėda district, LA 1 is more acceptable, as the extent of deforestation is lower. Having selected, LA 2C, Viržintų meadow (intended for the protection of large blue butterfly) will be bypassed.

In case of LA 2A and main alternative related thereto as well as LA 2C, the extent of deforestation is similar. In case of LA 2A a small swamp will be bypassed. These alternatives are equivalent.

In case of LA 2B Aukštamiškių swamp is bypassed, however, the extent of deforestation is greater; the route is planned through Natura 2000 habitats and the major forest habitat. In case of the main alternative, the extent of forest deforestation is lower, however, the route is planned through Aukštamiškių swamp, containing natural values that meet criteria of Natura 2000 natural habitats.

From the perspective of impact on landscape, given the balancing assessment of sections of the main route of the proposed gas transmission pipeline and offered local alternatives, it can be stated that all local alternatives are essentially equivalent, LA 1, LA 2C, LA 4 and LA 2B, are relatively more acceptable.

From the perspective of cultural heritage values, in accordance with the number of distinguished territories where possible archaeological or different cultural values have been identified, in the route under examination all alternatives

are essentially equivalent, only LA 2B can be considered a priority as compared with the respective section of the main alternative.

In the assessment of minimum regulatory distances to buildings, distances are retained in examined alternative locations. In case of LA 2A, the gas pipeline shall be laid in-between two buildings, thus its priority is lower. Due to dense distribution of residential houses in Klaipėda district, the priority is given to LA 1, bypassing the residential houses.

From the technical point of view the priority is given to the retention of parallel between the existing and the proposed TP; in such a way the energy object corridor will be rationally used, while the expansion of territories reserved for the construction of the object will not be necessary. Thus having performed a comprehensive inspection of the route on site and assessed technical possibilities, the proposal is to reject LA 3 and LA 4, i.e. to plan the TP in parallel to the existing gas pipeline.

From the technical point of view LA 2B is given a lower priority due to the construction of the TP in the new territory, and reservation of new territories. The priority is given to LA 1 and LA 2C alternatives.

Given the results and conclusions of the analysis of alternatives, TP route with LA 1, LA 2C alternative locations is recommended.

Comparison of the PEA with *0 activity alternative*

The analysis of alternatives by comparing the PEA with 0 activity alternative is conducted on the basis of the methodology presented by the European Environment Agency (EEA) and multi-criteria analysis - the Leopold matrix. In the application of the multi-criteria analysis, potentially significant direct, indirect, short-term, mid-term, long-term, constant-term, temporary, positive and negative impacts on environmental components are assessed. When using the multi-criteria analysis:

- 0 activity alternative – the current state, the project is not implemented;
- The Klaipėda-Kuršėnai TP project is implemented.

are compared.

The main aspect of this methodology is to determine significance criteria for each impact, granting different "weight coefficients" for individual impacts, which will help to better reflect the importance of impacts (for example, the contamination of drinking water is a more important impact than impact on landscape). The result of multi-criteria analysis is the expression of impacts on individual components in numerical value.

Conclusions:

1. During the operation, no significant negative impacts on the environment are expected. Positive total socio-economic impact due to the implementation of project goals - security of gas supply, ensurance of gas supply from alternative sources of supply - is expected. Insignificant negative impact during the operation is related to TP repair and service works and activity.
2. Negative impact on groundwater and geology is possible during construction works because of additional materials used in the performance of works in a way of closed drilling.
3. During the operation, in case of 0 alternative impact on individual environmental components is very similar to the TP implementation alternative, because currently the works of service and maintenance of the existing TP are carried out. If the project is not implemented, negative impact on socio-economic environment is expected due to non-implementation of goals of the project.