

## **NON-TECHNICAL EXECUTIVE SUMMARY**

for the 400 kV overhead power transmission line between the Alytus transformer substation and the Lithuanian – Polish border

**TABLE OF CONTENTS**

**LIST OF ACRONYMS AND ABBREVIATIONS .....3**

**1. INTRODUCTION AND BACKGROUND.....4**

**2. WHY IS THE PROJECT NEEDED? .....6**

**3. PROJECT STATUS .....7**

**4. PURPOSE AND SCOPE OF THIS ESIA .....9**

**5. DESCRIPTION OF THE PROJECT ..... 10**

**6. ARE THERE ANY ALTERNATIVES TO THIS PROJECT? ..... 16**

**7. ENVIRONMENTAL AND SOCIO-ECONOMIC BASELINE ..... 18**

**8. IMPACTS AND MITIGATION MEASURES ..... 20**

**9. NATURAL RISKS AND NON-REGULAR OPERATIONS ..... 34**

**10. ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN ..... 35**

**11. FREQUENTLY ASKED QUESTIONS ..... 36**

## LIST OF ACRONYMS AND ABBREVIATIONS

Contract -	IIDSF GA011-02 contract
Project -	Preparation of Territorial Planning and Environmental Impact Assessment documents and procedures for the 400 kV overhead power transmission line from Alytus transformer substation to the Lithuanian – Polish border
Consultant -	Sweco International AB in association with Sweco Lietuva UAB
Client -	Lietuvos Energija AB, A. Juozapavičiaus g. 13, 09311 Vilnius, Lithuania
Authorized Representative -	LitPol Link Sp. z o.o.
AB -	Public company
Alytus TS -	Alytus Transformer Substation
OPTL -	Overhead Power Transmission Line
PEA -	Planned Economic Activity
LitPol Link -	the planned double circuit 400 kV overhead power transmission line between the towns of Alytus (Republic of Lithuania) and Elk (Republic of Poland), with modern transformer substation in Alytus.
SEA -	Strategic Environmental Assessment
EIA -	Environmental Impact Assessment
SP -	Special Plan
TP -	Territorial Planning
SEP -	Stakeholder Engagement Plan
ESIA -	Environmental and Social Impact Assessment
EBRD -	European Bank for Reconstruction and Development

## FOREWORD

Note: The technical description of the Project in this Draft ESIA Report is based on the current design stage, which is not yet finalised. Therefore, minor changes to the technical details as included in this Report may occur in the future. Any substantial changes will be reflected in the final version of this Report.

This document provides a Non-Technical Executive Summary (NTES) of the Environmental and Social Impact Assessment (ESIA) Report of the new Overhead Power Transmission Line (OPTL) Project from Alytus substation (the Republic of Lithuania) to the border of the Republic of Poland. The document describes the proposed project and presents major findings of the ESIA. This includes a summary of environmental and socioeconomic conditions, a description of how the project would be implemented and how it could affect the environment and people and how these effects can be avoided or at least reduced.

### **The NTES copy at the websites:**

LitPolLink s.p. z o.o. site: <http://www.litpollink.lt>

EBRD site: <http://www.ebrd.com>

### **Printed copy of the ESIA document can be found at the following locations:**

Lietuvos energija, AB office in Žvejų str. 14, LT-09310, Vilnius, tel. (8 5) 262 68 22, (8 5) 278 20 82.

UAB "Sweco Lietuva" office in V. Gerulaičio str. 1, LT-08200, Vilnius, tel. (8 5) 262 2621.

### **Other locations:**

NTES and ESIA will also be left at the local Lazdijai and Alytus municipalities and wards. After the hearings according to the comments from the public, the ESIA report will be modified and the final ESIA will be issued.

## 1. INTRODUCTION AND BACKGROUND

LitPoL Link, a Lithuanian – Polish company, was established on 19 May 2008 for the coordination of preparatory works for the construction of the power transmission line between Lithuania and Poland. The shareholders of the company are Lietuvos Energija AB, a subsidiary of the Lithuanian national energy company Leo LT, and Polskie Sieci Elektroenergetyczne Operator S. A., a Polish power transmission operator ("PSE-Operator"), each holding 50% of the shares in LitPoL Link.

Authorised by both shareholders, LitPoL Link company acts as a coordinator of work in Lithuanian and Poland including the selection and obtaining agreements on the route for the planned 400 kV overhead power transmission line in Lithuania and Poland, assessment of the impact upon the environment in both countries by the construction and operation of the planned power transmission line, preparation of the technical project for the line, addressing of land ownership, permit and licensing issued, carrying out of other indispensable preparation works, and preparation of tender documentation for the selection of contractor for construction.

The power interconnection between Lithuania and Poland ("the LitPol Link") will consist of a double circuit 400 kV overhead power transmission line, approx. 150 km long, between the towns of Elk (Republic of Poland) and Alytus (Republic of Lithuania), with a reconstruction and extension of a transformer substation and construction of a back-to-back converter in Alytus. Approx. 100 km of the route will extend in the territory of the Republic of Poland (Podlaskie and Warmian-Masurian provinces) and approx. 50 km – in the Republic of Lithuania (Lazdijai and Alytus districts of Alytus County).

Lietuvos energija AB is considering obtaining financing for the Project from international financial institutions (IFIs), such as the European Bank for Reconstruction and Development (EBRD). This ESIA was undertaken to ensure compliance with local requirements and international best practice standards and EBRD policies.

**On the Polish side** of the Project a separate EIA is being undertaken due to the difference in national procedures and Project preparation time schedule.

As for the *status quo* the Localization study for the 400 kV overhead line "Elk – Alytus" was carried out. It included a document for "Optimization of investment". The purpose of this document was to pre-determine and compare the impact of the proposed activity on the individual elements of the natural environment and the human safety and health. Carried out as part of this paper, the preliminary assessment of the impact of the proposed overhead power line on the environment provides the starting material to develop a full scale environmental impact assessment, and sets out requirements for the scope of the EIA report.

According to the currently applicable procedure, the obligation to prepare an environmental impact report and its scope had been imposed on the Investor: by the decision of the Regional Director of Environmental Protection in Bialystok (see attachment No 1 to the General Project Introduction and EIA Scoping document for the Polish section at [www.litpol-link.pl](http://www.litpol-link.pl)), issued after obtaining the opinions of:

*Podlaskie State Voivodeship Sanitary Inspector in Bialystok*

and due to the fact that the line will pass through Warmińsko-Mazurskie Voivodeship:

*Regional Director of Environment Protection in Olsztyn and*

*Warmińsko-Mazurski State Voivodeship Sanitary Inspector.*

In addition, due to the fact that the planned project is likely to have a cross-border effect on the environment, the procedure on transboundary environmental impact, which resulted in the Lithuanian side expressing its willingness to consult the place of border crossing by the line in question with the Polish party, was performed. It is therefore necessary to settle an option of planned project crossing across the state border with the Lithuanian party. The need to carry out a transboundary environmental impact assessment was imposed by the decision of the Regional Directorate of Environmental Protection (please see attachment No 2 to the General Project Introduction and EIA Scoping document for the Polish section at [www.litpol-link.pl](http://www.litpol-link.pl)).

EIA report will be prepared according to the decision of the Regional Director of Environmental Protection in Białystok, and thus according to the procedures and principles laid down in Polish law, especially in the Act of 3 October 2008, on providing information on the environment and its protection, public participation in environmental protection and the environmental impact assessment, guidelines of the General Directorate for Environmental Protection and the Ministry of Regional Development on the above law, and procedures of environmental impact assessments.

In addition, due to the fact that this project is intended to be co-financed by EU funds, the environmental impact assessment of the investment will be made in accordance with the requirements of EU law (in particular Directive 85/337/EEC and Directive 92/43/EEC) and the guidelines in this regard.

## **2. WHY IS THE PROJECT NEEDED?**

The project on the construction of the Lithuanian – Polish power interconnection implemented by LitPol Link will connect, for the first time, the Baltic States' power system with the Continental European Network. At present, Lithuania's energy system is connected only to the Latvian, Estonian and CIS energy systems. The new power link will join the Baltic States' systems with the Western and Central European network (including Austria, Belgium, Bosnia, Bulgaria, Czech Republic, West Denmark, Greece, Spain, Italy, Montenegro, Croatia, Poland, Luxembourg, Macedonia, France, Holland, Portugal, Romania, Serbia, Slovakia, Slovenia, Switzerland, Hungary and Germany). The LitPol Link interconnection will enhance the energy independence of the Baltic States, contribute to the development of the common electricity market of the EU, and increase the reliability of energy supply. The construction of the

interconnection will also contribute to the reinforcement and development of the power transmission network in North-East Poland and South Lithuania.



Source: International Projects of the Lithuanian Energy System. Conference report. D.Virbickas. Alytus, 23 October 2009.

**The LitPol Link power transmission line**

**3. PROJECT STATUS**

The Project was prepared following requirements of (a) the national Lithuanian,(b) the international EBRD and (c) the national Polish procedures.

(a) The following environmentally-related activities had been undertaken as part of the national Lithuanian permitting process:

---

The 400 kV Overhead Power Transmission Line between the Alytus Transformer Substation and the Lithuanian – Polish Border.

- An Environmental Impact Assessment - EIA has been prepared by "Sweco Lietuva", UAB (Contractor).
- Territory planning to position the 400 kV OPTL is undertaken by "Sweco Lietuva", UAB (Contractor).

(b) The preparation of this ESIA, being done in parallel to the above mentioned procedures, surveys and detailed design work, reflects the international assessment procedures and best practices as per the policies of the EBRD.

(c) The following environmentally-related activities had been undertaken as part of the national Polish permitting process:

- An Environmental Impact Assessment – the environmental decision obtaining process was started by applying to Regional Direction of Environmental Protection which has issued the scope of future EIA report;
- In parallel – the bilateral SEA and EIA transboundary consultations were successfully carried out;
- The EIA consultant was procured and started biodiversity investigations as well as drafting EIA reports for the overhead line „Elk – border of the Republic of Poland“ and Elk substation;
- The procurement of consultant to obtain construction permit for the overhead line „Elk – border of the Republic of Poland“ was initiated, Terms of Reference prepared

As for more details regarding the status of Polish EIA, please see the General Project Introduction and Scoping document concerning Polish section of the Project.

The document can be found on [www.litpol-link.pl](http://www.litpol-link.pl) and [www.ebrd.com](http://www.ebrd.com) web sites.

To simplify the Project, the Lithuanian EIA and ESIA documents were prepared as a single report combining national and EBRD requirements.

**The procurement tender** will be prepared by Lietuvos energija, AB after obtaining the Construction Permit (based on submittal of the above-referenced local permits and the ESIA), to contract a construction contractor that will implement further project activities. The selected contractor will be responsible for the preparation of the construction stage documentation. During Project implementation, Lietuvos energija, AB (and the Contractors) will be obliged to adhere to the requirements laid out in EIA/ESIA. Tendering for the construction contract is anticipated to finish in the autumn, 2011.

As for the **Polish section, tendering procedures** to obtain the Construction Permit for the overhead line „Elk – state border with Lithuania“ were already initiated by preparing complete Terms of Reference. It is planned to award the Consultant in the end of 2010 with anticipated contract delivery in the end of 2013. As for the Elk station, the Concept is being prepared at the moment, whereas the Construction permit is also planned to be delivered in the end 2013.

The tendering for Construction itself is planned for mid 2013 with contract delivery in the end 2015.

#### **4. PURPOSE AND SCOPE OF THIS ESIA**

Overall, the purpose of this ESIA is to ensure that future activities related to this Project (e.g. design and construction of OPTL and new substation, repair and maintenance during operation) will be performed in a socially and environmentally acceptable manner, in compliance with local legislation as well as EBRD Performance Requirements and best international practice. Key elements of the scope of this ESIA therefore were to:

- Initiate a consultation process with potentially affected people and relevant stakeholders to inform them about the Project and identify their concerns;
- Identify key environmental and socio-economic issues;
- Describe environmental and socioeconomic baseline conditions;
- Evaluate potential impacts (positive and negative) of the Project;
- Develop design and operating practices that will avoid, reduce, or compensate for significant environmental and social impacts;
- Develop monitoring programs to verify the Project is constructed and operated as intended, and to identify changes in environmental controls that may be needed.

## 5. DESCRIPTION OF THE PROJECT

The power interconnection between Lithuania and Poland (“the LitPol Link”) will consist of an approx. 150 km long double-circuit power transmission line from the town of Elk (Republic of Poland) to the town of Alytus (Republic of Lithuania), where the Alytus transformer substation will be reconstructed and extended by a back-to-back converter. Approx. 100 km of the route will extend in the territory of the Republic of Poland (Podlaskie and Warmian-Masurian provinces) and approx. 50 km – in the Republic of Lithuania (Lazdijai and Alytus districts of Alytus County).

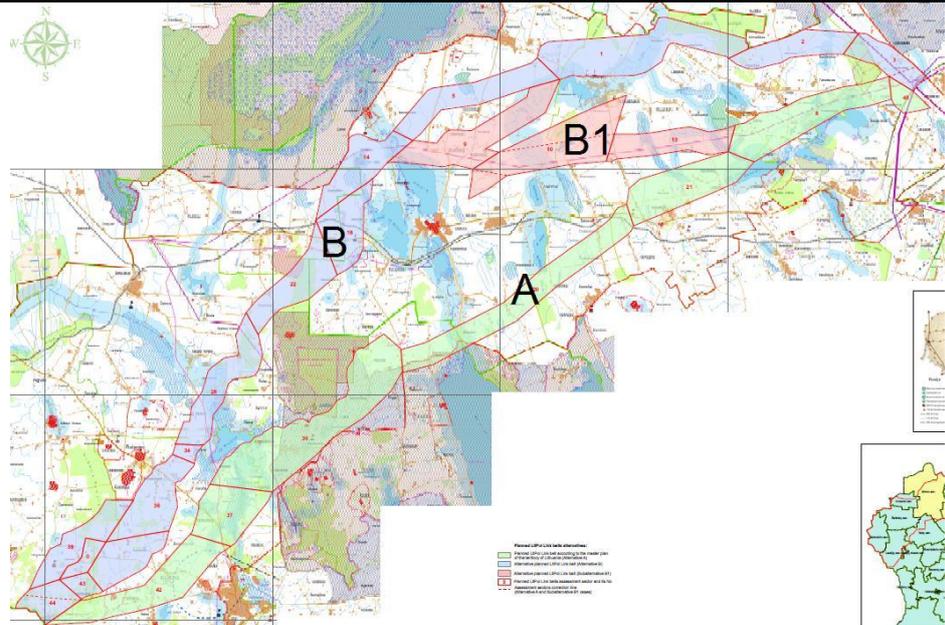
By 2015, electricity grids will be developed in North East Poland between the towns of Ostrołęka, Olsztyn and Białystok, while in Lithuania a new power transmission line Alytus – Kruonis pumped storage plant is planned to be built.

The following facilities will be designed:

- construction of a 400 kV double-circuit overhead power transmission line from the Alytus transformer substation to the Lithuanian-Polish border;
- construction of a 400 kV double-circuit overhead power transmission line from the Elk transformer substation to the Polish- Lithuanian border
- reconstruction of the Alytus transformer substation (mainly 330 kV switchyard) and its extension by a back-to-back converter and a 400 kV TS.
- full reconstruction of Elk substation

### ***Description of the technology and equipment***

Indicator	Description
Voltage	400 kV
Approximate length of the line*	In Lazdijai and Alytus districts in the territory of the Republic of Lithuania: Alternative belt A – approx. 45.5 km; Alternative belt B – approx.51.3 km; Sub-alternative belt B1 – approx. 49.0 km (approx. 24.2 km). (see description of the alternatives in chapter 6)

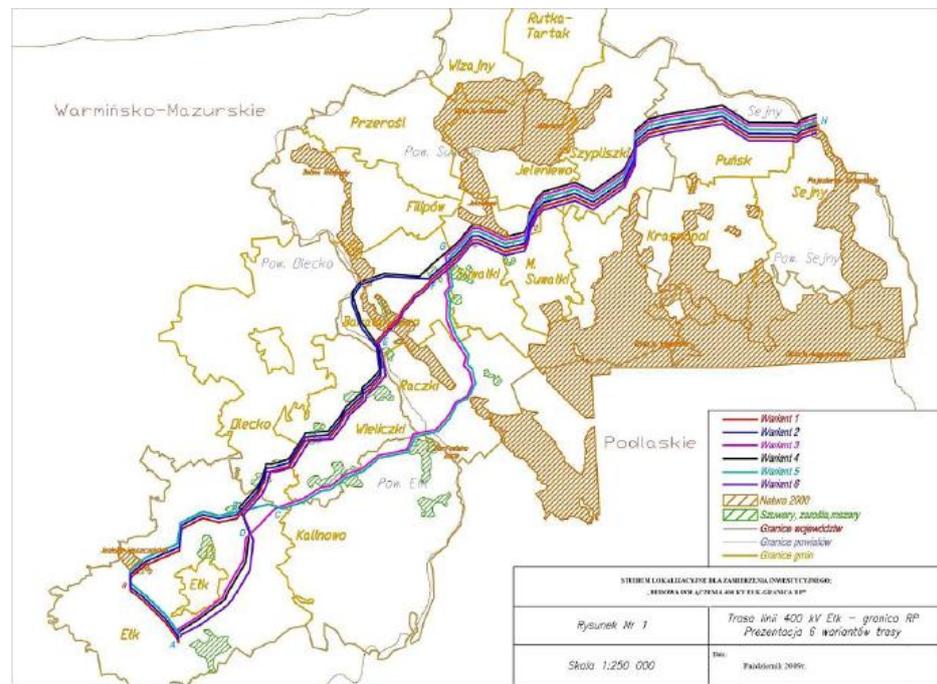


In Podlaskie and Warmińsko Mazurskie voivodships in the territory of the Republic of Poland (according to aforementioned Localization study)

Alternative 1 - 109,3 km, Alternative 2 - 114,9 km

Alternative 3 - 106,8 km , Alternative 4 - 107,9 km

Alternative 5 - 116,8 km , Alternative 6 - 102,1 km



Number of circuits	2
circuits	3 – in case of Subalternative B1 if the planned OPTL coincides with the

	present 110 kV line
Transmitted power	2 x 500 MW 2 x 600 MW**
Start of OPTL	Alytus TS at Butkūnų village Alytus district
End of OPTL	Lithuanian – Polish border (in the territory of the Republic of Lithuania) to the north from Galadusio lake in Lazdijai district

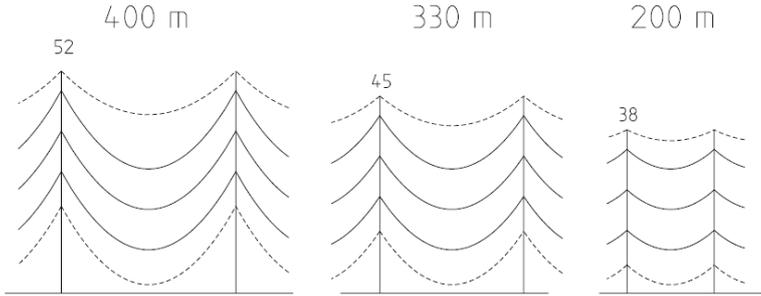
\* - the exact length of the line will be established only on completion of the special planning procedures

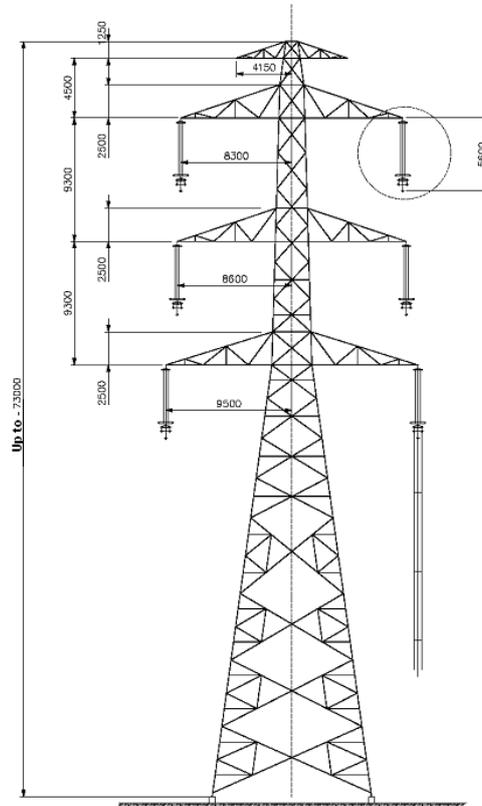
\*\* - technical feasibility is being considered.

### **Towers**

Tower	Pole or lattice structure for the support of conductors of the power transmission line at a safe distance from the ground surface.
Purpose	<p>According to purpose, towers can be intermediate (not under the tension force, carrying the conductors in straight sections); anchor (under the tension force on both sides; designed as one-sided tension towers); angular (installed at turns of the line; must bear permanent load), intersection (at intersections of the line with rivers or other obstacles); terminal (bearing one-sided tension force); branch (from which line branches are built).</p> <p>Towers of several types may be used as required according to the line's configuration. Specific types of towers will be selected in the technical designing phase.</p>
Tower type	<p>The towers can be metal or reinforced concrete. Steel towers are made of angular sections connected by welded or bolt or rivet joints. Reinforced concrete towers are made of concrete compacted by vibration or spinning methods. Reinforced concrete towers with pre-stressed reinforcement is the optimal approach. They require less metal, are inexpensive, easily assembled, long lasting, and their operation is cheaper and simpler. The higher the voltage, the less suitable are reinforced concrete poles, therefore, they are only used in power transmission lines up to 500 kV.</p> <p>Metal and/or reinforced concrete towers may be used for the OPTL construction. The final selection of the type will be made in the technical project phase.</p>
Span between towers	330 m on average, in individual cases may reach 600 m.
Height of towers	Up to 73 m, average height – 45 m.

The 400 kV Overhead Power Transmission Line between the Alytus Transformer Substation and the Lithuanian – Polish Border.

	<p>The height of the towers depends on the voltage of the power transmission line; stressing, diameter and allocation of conductors, permissible deflection and distance from the ground surface, characteristics of local conditions, wind and icing loads.</p> <p>When the span between towers is 330 m, the height of the towers can be up to 45 m, when the distance is approx. 400 m – 52 m, 200 m – 38 m. Trees must be preserved where it is purposeful and necessary; maximum height of towers can be used where larger water bodies are crossed.</p> 
<p>Number of towers</p>	<p>138 - 156 on average (in the territory of the Republic of Lithuania); the exact number will be determined in the technical design phase.</p> <p>Alternative A – approx. 138 (with the average span between towers 330 m);</p> <p>Alternative A – approx. 156 (with the average span between towers 330 m);</p> <p>Subalternative B1 – approx. 148 (with the average span between towers 330 m).</p>



**Example of typical tower for the planned OPTL**

***Public Health Aspects: Zoning due to electromagnetic fields***

Effective protection against external electric fields is provided by, e. g. walls of buildings, as distinct from magnetic fields. This means that internal factors (such as electrical equipment) are almost entirely responsible for the generation of electric field in residential buildings.

At most households, the average strength of magnetic field is approx. 0.01-0.2  $\mu\text{T}$  per day depending on the number of household appliances used and other factors. In individual cases the strength of magnetic field in buildings may reach up to 0.4  $\mu\text{T}$ .

Employees of electric grid companies are usually exposed to magnetic fields up to several  $\mu\text{T}$  strong (daily average). On the streets and roads under which different cables have been laid the strength of magnetic field can be 1  $\mu\text{T}$  or more.

Scientific investigations

Epidemiological studies are among the most popular and simplest studies. They involve monitoring of the prevalence of certain diseases among different groups of people, mainly

according to place of residence. Epidemiological studies are usually based on statistics, therefore, their results show the summary effects of factors to which a group is exposed and separating out the effect of, e. g. electromagnetic fields of the nearby power transmission line is not possible.

During the past thirty years, over 60 epidemiological studies analysing the effects of electromagnetic fields (including high-voltage lines) upon humans have been completed. **So far there exist no scientific data proving that there is a causal relationship between low-frequency electromagnetic fields forming in the environment of high-voltage power lines and transformer substations and grave long-term health disorders in adults, including different cancers.** This is also confirmed in the Environmental Health Criteria (2007), a monograph published by the World Health Organization (WHO) analysing the issue of effects of electromagnetic fields upon human body. The International Agency for Research of Cancer (IARC) assumes a similar position.

According to HN 104:2000 "Protection of Residents Against Electric Fields Generated by Electric Power Lines", a 250 minimal distance is recommended from 330 kV or higher voltage lines to residential buildings. For the purposes of designing of 330 and 400 kV OPTL, the HN allows reducing the 250 m distance to 30 m, provided that the EF strengths under the line do not exceed 5 kV/m.

For human safety and health purposes, agricultural crops that do not require long-lasting care are permitted in the SPZ, however, the following activities are restricted or prohibited:

1. building residential and public buildings, establishing recreational grounds or zones;
2. establishing vehicle service centres and oil products storage facilities;
3. storing flammable substances of any time and performing any work with them;
4. working with soil watering equipment if the water jet may reach the wires;
5. erecting long conductors without grounding (such as wire fences, metal nets etc.) at places which are accessible by people.

According to the regulations, residential buildings and private land plots may be preserved in the SPZ of a 330-400 kV OPTL on condition that the electric field strength inside and outside the residential buildings does not exceed 0.5 and 1 kV/m respectively. Thus a sanitary protection zone for 400 kV OPTL is established according to the strength of electric field of the EMF.

## 6. ARE THERE ANY ALTERNATIVES TO THIS PROJECT?

A number of alternatives based on different approaches (strategic, time, place) have been analysed:

- alternatives of the optimal belt for the OPTL construction;
- technological alternative constructing underground cable against the OPTL;
- possibility to plan the 400 kV OPTL in parallel to or together with the present 110 kV and 10 kV overhead lines;
- technological and location alternatives of reconstruction and extension of Alytus TS using the back-to-back converter.

### Environmental comparison

The following indicators have been selected for the evaluation of the belt alternatives according to the sensitivity of natural environment: protected nature areas, forests, valuable flora areas, surface water bodies (lakes and ponds), and mineral resources' deposits. The rivers, streams and canals in the belt were not included in surface water bodies as determining their area is quite complicated; on the other hand, most of them fall within the valuable flora areas.

**Alternative B is the most sensitive according to the current sensitivity of natural environment** (as it is least urbanised). Alternative A stands out only by the area of protected nature areas and surface water bodies (lakes and ponds). Subalternative B1 is intermediate between them according to the said aspects of evaluation.

### Social comparison

The largest area of residential territories is found in Alternative A (1020 ha) and accounts for approx. 16,68% of the total area of the belt. The lowest density of the residential areas is in Alternative B (489 ha and 6,89% respectively).

Alternative A is also characterised by the highest density of land plots (event though this belt is the shortest) – 2733 land plots might be affected. Alternative B, which is the largest by its length and area, the number of land plots is only 1957 (28% less against the Alternative B). These numbers are indicative of the distribution of potential socio-economic problems in the planning of the OPTL. Subalternative B is intermediate in this respect. Upon final determination of the OPTL route the number of land plots will be undoubtedly reduced, however, the relative distribution among the alternatives should remain similar.

Density and areas of cultural heritage values are also considered. In this respect, the area is the largest in Alternative A – 48,8 ha and 0,75% of the total belt area. The other two alternatives (B and B1) are identical from the point of view of the cultural heritage density.

To sum up, **Alternative A is most vulnerable according to the current sensitivity and load of social environment.** In this respect, Alternative B is less sensitive (least urbanised), subalternative B1 is very similar.

Upon evaluation of the findings of the belt alternatives conclusions were made:

- according to the current sensitivity and load of natural and social environment, Alternative B is most sensitive in terms of natural environment (as nature factor is prevailing there), while Alternative A is most sensitive in terms of social environment (as social factor is prevailing here). It should be noted that the difference is rather distinct. As a compromise, according to the current sensitivity and load of natural and social environment, Subalternative B1, which is partially formed of sections of Alternatives A and B and is intermediate between the according to the set evaluation criteria, would be the most acceptable.
- Subalternative B1 has the highest relative value according to the impact upon the both – the natural and the social environments.
- **the final conclusion of the evaluation is that Subalternative B1 is optimal for the construction of the OPTL upon selection of the technical alternative of combining the present 110 kV line and the newly designed 400 kV line;**
- construction of the OPTL is also feasible in other alternatives, however - less acceptable;
- from the economic point of view (if only construction cost is taken into consideration), the relatively shortest Alternative A would be most acceptable.

	<b>Overhead power transmission line</b>	<b>Cable</b>
Required area	Line width can reach 19 m, Protection zone width – 30 m on both sides of the adge wire, total approx 80 m	Underground cable is laid at a dept approx 1,5 m, it needs 13-50 m wide strip of land
Land use restrictions	No buildings inside the corridor. The towers reduce the area for crops. Reduced height of growing trees (usually growing Christmas trees is acceptable)	Ground cannot be dug deeper than 0,5 m over the place where the cable lays
Deterioration	Usually found out within a few hours. Checking power lines by running along the track.	Cable troubleshooting takes about 25 times longer than in overhead lines.
Typical deterioration	Lightning, physical contact of any object with the phase wire,	Insulation damage, particularly because of the longer duration

The 400 kV Overhead Power Transmission Line between the Alytus Transformer Substation and the Lithuanian – Polish Border.

	insulators failures, etc.	overloads and leaded overheating
Repair (operation)	After the repair the line can immediately be put into service at peak demand.	After the repair the power in the cable is increased slowly. The maximum capacity can be achieved in approx one week.
Environmental impact	The overhead line is clearly visible, however, the damage of the soil is relatively insignificant during the construction stage	Construction of cable makes a large-scale excavation. Probable fertile soil layer violations. In case of emergency expected oil spills.
Insulation	Insulated wires are used. They act as a barrier between the wire and pole. Wires cool naturally by spreading the heat into the ambient air.	Cables are insulated by oil-impregnated paper and polyethylene sheath. The heat emitted by the soil, which is much worse conductor of heat. Therefore cables are cooled worse and they can overheat.
Expenditure	One kilometre of 400 kV overhead line costs approx 1-1,5 mln. Lt	One kilometre of 400 kV cable can cost 15-25 times more than overhead line.

## 7. ENVIRONMENTAL AND SOCIO-ECONOMIC BASELINE

ESIA Report describes the key baseline Conditions of the Project area with respect to the following topics:

<u>Environmental topics</u>	<u>Social/Socio-economic topics</u>
<ul style="list-style-type: none"> <li>• Geographic units and Geomorphology</li> <li>• Geology</li> <li>• Soil</li> <li>• Groundwater</li> <li>• Surface Water</li> <li>• Climatic Conditions</li> <li>• Flora, Fauna &amp; Habitats</li> <li>• Protected areas</li> </ul>	<ul style="list-style-type: none"> <li>• Socio-economic conditions &amp; land use</li> <li>• Visual Amenity &amp; Scenery</li> <li>• Public &amp; Worker Health &amp; Safety (landscape)</li> <li>• Cultural Heritage</li> </ul>

The main baseline information is summarised below.

**Geomorphology & Soil:** Geomorphologically area is characterised by high diversity of terrain in terms of age, origin and structure. The main orographic complexes from plains to hilly highlands occur here, characterised by very different terrain characteristics and wide range of altitudes.

The majority of the soils prevailing in the area is classified as soils resistant to chemical contamination (sand and sandy loam) or soil with medium resistance (clay loam). Only small

areas of soils formed on clayey rocks are not resistant to chemical contamination. Organogenic peaty soils accounting for a large part of the project area are inclined to accumulate chemical pollutants, in particular heavy metals.

**Groundwater & Surface Water:** In the area of Alytus district municipality, groundwater occurs at the depths of 10 – 20 m or deeper, near the Dusia and Meteliai lakes – at the depth of 1 - 3 m, while in the most part of Lazdijai district – at 5 – 10 m.

Quaternary intermoraine aquifers (Q) are important for the supply of fresh groundwater to the Alytus town and settlements in the Alytus and Lazdijai districts. In this region, the intermoraine Nemunas deposits aquifer, the Medininkų – Žemaitijos intermoraine aquifer, and the Žemaitijos – Dainavos intermoraine aquifer are found.

The paleogenic aquifer occurring in this region is exploited by the Lazdijai town wellfield.

No wellfields used for the central supply of water fall within the areas of the alternative belts. Part of the belt at Lazdijai town falls within the sanitary protection zone of the Lazdijai wellfield. Information on the investigated aquifers and exploited drinking water resources in the Alytus town and Alytus and Lazdijai districts that are closest to the belts as well as the level of protection of the resources.

Two types of deposit areas can be identified according to lithological composition and filtration properties. The first type includes clay, clay loam and sandy loam soils. The second type of loose sandy – pebbly soils includes different alluvial sands, fluvio-glacial and sandy limnoglacial formations of higher degree of. In such sections the protection level of groundwater is lower.

In Alytus District, lakes occupy 3,2% of the total area. There are 70 lakes in the territory of the Alytus district municipality. The density of the river network in Alytus district is 1,0 – 1,25 km/km<sup>2</sup>.

In Lazdijai district, waters account for 8,2% of the total district area, while the national average is just 2,6%. The area of lakes in the district is double compared to the rate of the Alytus District (3,20%) and accounts for 6,1% of the territory of the district. In Lazdijai District, the density of the river network is 1,00 – 1,25 km/km<sup>2</sup>.

**Flore/Fauna/Habitat:** The considered area extends through the botanical geographic regions of the highlands and plains of South Lithuania. The Southern Lithuanian highlands are characterised by forests of broad-leaf trees growing in fertile soils with very rare mountain species, pine forests with the endemic species of the eastern part of Central Europe *Koeleria grandis* and *Festuca psammophila*; by pine forest, forest outskirts, and slope communities with mountain relicts and thermophilic species. The region of the Southern Lithuanian plains is characterised by oak and hornbeam forests and pine or pine-oak edaphic climax forests.

The area under consideration is not homogenous – urban areas and agricultural lands form a mosaic together with the areas of natural ecosystems that are damaged to a higher or lesser extent; in larger formations, ecosystems undamaged by anthropogenic activities can be found. The natural ecosystems are very diverse and includes forests, bogs of various types, meadows, standing and flowing water ecosystems.

The planned OPTL will extend along the habitats that are characterised by widest biodiversity – forests and lakes and will cross agrarian landscape.

In an agrarian landscape, valleys of rivers of different size, often straightened as a result of land reclamation, are of the highest significance for the preservation of biodiversity. Therefore, these habitats are related to the identification of the most valuable natural areas. In individual cases, agrarian areas are also important but often for migrating birds only.

**Socio-economic conditions and land use:** According to the solutions provided for in the master plans of Alytus and Lazdijai districts, the OPTL will mainly cross agricultural and forest areas.

**Cultural heritage:** Immovable cultural heritage of Alytus district is separated out from other Lithuania's municipalities by its integrated character. A large part of protected sites are interrelated by visual or historical semantic ties and form places of accumulation of cultural heritage.

The largest areas of the accumulation of immovable cultural heritage have formed in the south eastern and south western parts of the Alytus District, in the areas near the Nemunas River around Alytus town and in the northern part of these areas. Prevalence of archaeological sites, namely, later-period castle mounds is a characteristic feature of Alytus district's cultural heritage. Many architectural heritage sites have high historical value, with sacral structures prevailing among them.

Cultural heritage of Lazdijai district has been investigated to a quite large extent. Immovable cultural heritage is classified according to structure and significance. The oldest historical sites of the district are castle mounds with settlements, burial mounds, burial sites, ancient settlements and manor places.

## **8. IMPACTS AND MITIGATION MEASURES**

This chapter describes the potential impacts to the key baseline topics and some key measures to avoid or mitigate/minimise the impacts. A more comprehensive elaboration of all mitigation measures is contained in the ESAP.

### **Impact upon water:**

---

The 400 kV Overhead Power Transmission Line between the Alytus Transformer Substation and the Lithuanian – Polish Border.

## OPTL

The OPTL will unavoidably cross rivers and streams. The planned economic activity can potentially have an adverse impact upon rivers and streams as well as their valleys and habitats. In order to avoid the negative impact, it is proposed that no pylons would be constructed in the river protection belts and no construction sites are installed near water bodies and within their protection zones.

A comparison of the line belt alternatives shows that Alternative B will produce less adverse impact upon the surface water bodies compared to the Alternative A or Sub-Alternative B1 as:

- Alternative B covers 10 rivers, while A – 11 and B1 – 12;
- Alternative B covers 2 lakes, while A – 7 and B1 – 6.

No wastewater will be generated in the OPTL construction and operation phases.

## Alytus TS

There are no surface water bodies in the Alytus TS area, therefore, the planned activity will have no direct impact upon such bodies. No impact during the construction and operation phases is projected. However, domestic and surface wastewater might be generated. The number of the TS employees will not increase after the extension, therefore, no increase in the amounts of domestic wastewater is projected. Having regard to quite a long distance from the 400 kV substation to the present amenity premises, it will be decided, as part of the technical project, whether designing of domestic water-supply and sewerage lines for the substation is necessary.

Capacity of the surface wastewater will be determined in the technical documentation. According to estimations, the following surface wastewater amounts will be generated in the Alytus TS area:

- 330 kV TS area – 8 700 m<sup>3</sup>/year;
- 400 kV TS area – 26 200 m<sup>3</sup>/year.

Part of the surface wastewater generated in the area of 330 kV TS will be directed to the accumulation tank 85 m<sup>3</sup>, then to the treatment facility (TERA-20 oil catcher) and finally discharged into the Mikasa stream. The other part will be directed to the surface wastewater treatment facilities being designed and discharged into the nearest surface water body. Issues of surface wastewater management will be detailed in the technical project phase upon evaluation of technical feasibility.

Surface wastewater generated in the area of the 400 kV TS will be treated in the newly designed surface wastewater treatment facilities. The facilities will be designed depending on technical feasibility (distance to the treatment facilities, slope of terrain). The type of the

wastewater treatment facilities and the supplier will be selected on tender basis. The contamination level of the wastewater upon treatment must not exceed the set normative requirements.

Sand and petroleum products are removed from the treatment facilities on a regular basis for delivery to a wastewater management company.

Wastewater after its treatment to the degree meeting the environmental requirements may be directed to local streams

It is estimated that the best option is the discharge into the Rudelė stream which is closest to the area under consideration and the terrain is sloping towards the stream.

*Mitigation: In the planning (special plan) and (technical) design stages:*

- construction of pylons and cutting of forests is prohibited in the shore protection belts,
- clear cutting of trees and bushes on the slopes exceeding 10° is prohibited in the protection zones of water bodies,
- mechanical destruction of plant cover of natural bogs is prohibited

*Towers of the power transmission line will not be located in the protection belts of surface water bodies. Construction sites will not be located near water bodies or within their protection belts.*

#### **Impact upon soil:**

##### OPTL

Soil may be damaged (by compacting, mixing, digging off) during the construction and installation of the power transmission line. It is estimated that approx. 2 500 m<sup>2</sup> of soil will have to be removed for the construction of a support (excluding access roads leading to construction sites). Considering the average number of supports to be constructed, the area of soil that can be damaged during the construction may total 390,000 m<sup>2</sup> (39 ha). It should be noted that the accurate figure will be known during the preparation of the technical design, after the exact number of supports has been determined. Approx. 135,000 m<sup>2</sup> (13.5 ha) should be added for potential damage of soil caused by the building of temporary access roads. The approximate total area of soil affected during the power transmission line construction may reach 525,000 m<sup>2</sup> (52.5 ha).

The power transmission line may cross forest territories, therefore, clearcutting is possible in some sections; soil structure and individual soil characteristics may be affected as well.

No impact in the operation phase is probable. Only a short temporary impact is possible during the power transmission line's maintenance or in case of emergencies (related to manoeuvring of heavy-weight vehicles).

##### Alytus TS

Additional land plots will be required for the construction of new buildings and facilities in the process of reconstruction and extension of the Alytus TS. It is estimated that approx. 200 000 m<sup>2</sup> (20 ha) will be required. The site will be built up with structures and facilities. Part of the area under the facilities will be covered with hard covering (asphalt, concrete, crushed stone), with the greenery planted in the remaining areas. The fertile soil layer will be removed from this area for good. The removed soil may be used for site management works in the access areas, recultivation of territories damaged during the power transmission line construction, and other site management works.

No chemical, entomological, parasitological, radiation or other types of soil pollution is anticipated during the construction of the PEA facilities.

Impact in the operation phase is hardly probable. There is a risk of potential impact only during emergencies.

*Mitigation: Scheduling the work considering the time of the year (removing frozen soil). Careful removal of the fertile soil layer. On completion of the construction works soil layer must be returned back.*

#### **Impact upon ambient air:**

##### OPTL

Some insignificant pollution may be caused by the operation of the OPTL. Small amounts of ozone and nitric oxide are released from the air due to electric discharge when it intensifies or under humid weather conditions. The intensity of this phenomenon, however, is not high, i. e. the content of these compounds at the distance of several tens of centimetres from the electric cables is within a normal range. Certain periodic emissions from mobile pollution sources are possible during inspections or repairs of the OPTL.

The approximate amount of emissions from mobile pollution sources during the construction of an OPTL support can potentially reach 0,25 t. The total amount of emissions during the OPTL construction depends upon the length of the selected line belt alternative and the number of supports. It is estimated that the emissions into the ambient air would be the largest in case of selection of Alternative B (40,9 t).

##### Alytus TS

Vehicles and other equipment with internal combustion engines will be used during the reconstruction and extension of the Alytus TS (during construction of main facilities).

As specific technical solutions are not yet available in this PEA planning stage it would be complicated to assess the potential air pollution and to provide even approximate amounts of pollutants.

After specific approaches and sequence of works are identified during technical designing of facilities, an assessment of emissions of pollutants into the air during construction will be made.

Certain periodic emissions from mobile pollution sources are possible during maintenance or repairs of the facilities.

Both in the present Alytus TS and in the facilities to be designed, electric heaters are/will be used for the heating of the premises.

*Mitigation: Good construction and best management practices need to be adopted to avoid the described potential emissions.*

### **Impact upon flora**

The power transmission line can affect the diversity, structure and valuable components (rare species, habitats of European significance) of the plant cover in almost all the sectors assessed.

No impact upon the diversity of plant cover is projected in two of the Sectors.

The impact of the power transmission line upon the diversity of plant cover is most probable during the construction of the line (installation of construction sites, storage of soil, building of temporary access roads, installing power transmission wires). In this respect, some Sectors are most vulnerable as it is characterised by hilly terrain, a mosaic of contours of natural plant cover, and a poorly developed road network.

*Mitigation: Towers of the power transmission line will not be located in the areas where valuable flora is situated. Transportation cannot enter areas where valuable flora is situated at any cases during the construction or operation of the OL. Construction sites will not be located near areas where valuable flora is situated.*

### **Impact upon fauna**

No alternative will produce a significant impact upon the communities of protected invertebrates and amphibians, provided that the needs of species protection are taken into consideration during the construction of the line and works are planned accordingly.

An assessment of all the belt alternatives allows to conclude that **the adverse impact upon fauna, and protected species and important accumulations in particular, will be minimised if the alternatives are combined.**

Impact upon fauna during the construction of OPTL can be minimised by reasonable planning of the timing of construction works, selection of locations for supports and construction sites, and preservation of hydrological conditions in streams, structure of the shores, and natural meadows.

*Mitigation: Towers of the power transmission line will not be located in the areas where valuable fauna is situated. Transportation cannot enter areas where valuable fauna is situated at any cases during the construction or operation of the OL. Construction sites will not be located near areas where valuable fauna is situated. Plan construction works for the cold season when the young are nearly grown up and able to move away from mechanisms, in addition, less damage to soil will be done when the ground is frozen. Use caterpillar rather than wheel mechanisms where possible: this will lower the probability of perishing for mammals living in burrows close to the ground surface. If works are carried out in spring or summer every day prior to starting work an expert in living nature should inspect the section and move away any hedgehogs, hares etc. found.*

### **Impact upon cultural heritage values**

The special planning conditions state that the power transmission line may not be designed in the visual protection zones of cultural heritage sites. These conditions will be taken into consideration in the selection of the route for the line.

The construction of the power transmission line will cause visual pollution at some places. The wires and supports of the line will be seen from the nearest castle mounds. Where technically feasible, efforts will be made not to erect supports near and in the vicinity of castle mounds.

It is probable that archaeological discoveries will be made in the course of earthworks, therefore, it is recommended that archaeological supervision over earthworks is provided for.

A comparison of the belt alternatives shows that Subalternative B1 will produce a lower negative impact upon the cultural heritage values compared with Alternatives A and B.

*Mitigation: Towers of the power transmission line will not be located in the areas where cultural heritage is located or visual protection area is established without the approval of the appropriate state institution. Plan construction works paying special attention to the protected heritage areas. A cultural heritage expert must be present when construction takes place nearby (<100 m away) any cultural heritage site.*

### **Impacts on Land use; Impacts on Income, Property Issues**

For temporary and permanent use, the Republic of Lithuania Law on Energy states that servitude on land and other real estate is imposed within the limits of the power line's protection zones in order to ensure maintenance and operation of electric energy facilities. Protection zones for planned OPTL will be 30 m from each marginal cord.

The SP for OPTL imposes a servitude – the right to build, use and service central (public) engineering networks (underground and above-the-surface service lines) in the land plots owned by the ownership right, over the width of the planned overhead line route.

The SP imposes servitude to construct, use and run the dominant object with the minimum restrictions on the rights of the owner of the servient land plot to use it. According to the national laws compensations are paid to the land plot owners.

Servitude is not a requisition or redemption of land or a similar act; it means that certain restrictions on the relevant land plot will be imposed.

Upon conclusion of the agreement on the imposition of a servitude, which will also specify the size of the compensation for the construction and operation of the planned OPTL, employees of electric power grid companies will be permitted free access to the OPTL's protection zone, and during the operation and repairs works – the right to drive and to excavate upon warning the land owners or users. Felling of trees beyond the clearing will only be allowed upon agreement with the forest manager or owner and upon execution of tree-felling documentation.

### **Land Management Regulation Procedures**

Negotiations with land plot owners will be conducted in order to ensure smooth land management regulation procedures.

Stages of the land management regulation procedure:

- Identification of private land plots and land plots leased from the state or local authorities that fall within the areas necessary for the OPTL development. Land plots' registration data, owners and users (names, addresses) are identified; information from the Mortgage Register is retrieved;
- identification of the area of applicable restrictions (servitude) and the losses arising from the land servitude that must be compensated for each land plot falling within the areas necessary for the OPTL development;
- personal delivery of information about the estimated area of servitude and the estimated compensation;
- conduction of the negotiations;
- conclusion of agreements on imposition of servitudes and indemnification for losses with owners of private land plots, upon obtaining of consent of free will; the agreements to be notarially certified;
- identification of land plots on which servitudes may only be imposed by an administrative deed, i. e. public land, land plots whose owners cannot be found or land plots with whose owners no agreement can be reached.

### **Indentification for losses arising from servitude**

In case servitude is imposed on a land plot, compensation will be paid to the land owner, i. e. losses incurred by the land owner due to the building of new power lines and the operation of electric power companies will be indemnified for.

Indemnifiable losses due to land servitude include losses incurred as a result of:

1. destruction of crops and plantings during construction;
2. cut forest;
3. lost opportunity to use the land plot or a part thereof according to its main intended purpose and method and/or type of use.

If there is a forest in a land plot on which a servitude is imposed and the forest will have to be cut, the servitude holder is obliged to obtain any documents necessary for the cutting of the forest with the cutting volumes specified, to submit a copy of this documentation to the owner against signature, and carry out the forest cutting works at his own expense. All the wood material must be transferred to the owner on conditions agreed in advance. Prior to transfer of the wood material to the owner under a transfer-acceptance certificate, the servitude holder assumes responsibility for its storage.

The right of the land owner to cut the forest prior to construction of the OPTL is not restricted, however, in such a case the servitude holder is not obliged to indemnify the owner for the expenses related to the obtaining of the land plot management documents, cutting of forest, cleaning of land plot etc.

### **Imposition of Servitude by Administrative Deed**

As it has already been mentioned, a servitude entitling a person to build, use and service central (public) engineering networks may be imposed on both public and private land plots. In all cases pertaining to public land and in cases where the owner of a private land plot cannot be found, does not give his consent to the imposition of servitude etc., servitude may be imposed by an administrative deed. In such a case a compensation calculated according to the methodology established by the Government of Lithuania is paid. Servitudes are imposed, according to the procedure established by the Government, by the County Governor based on an approved territorial planning (TP) document.

The prepared of the TP document must design the servitude of such size, area and boundaries which would ensure appropriate use of the dominant object and minimal restriction of the servient land plot owner's rights to use the land plot.

Upon coming into effect of the TP document in which the servitude has been designed, the County Governor adopts a decision, by an administrative deed, to impose the land servitude.

### **Requisition of Land for Public Needs**

According to the Republic of Lithuania Land Law, requisition of land for public needs is the purchase of land from land owners according to the procedure established in the laws (at a fair compensation) after the County Governor decides that the land is needed for the public interest.

The Land Law explicitly states that land can only be taken from private land owners for the public interest in *exceptional* cases. There must be a well-grounded justification that a specific public interest exists and that it will only be satisfied upon requisition of a specific land plot.

Normally there is no such need in the planning of power transmission lines and this construction and establishment of protection zones do not require requisition of land. In the OPTL protection zone, which will coincide with the servitude imposed on the land plots, economic activities will be restricted but not prohibited.

11 private land plots were already purchased for the extension of the Alytus transformer substation.

*Mitigation: Notify affected owners and users of land plots near the temporary allocated land areas via registered mail. Negotiate nearby land plot owners, sign agreements and compensate. After construction works are completed, conduct cleanup and restoration of site. Ensure grievance procedure is functioning*

### **Impact upon the interior of the earth**

#### OPTL

Construction of the facilities of the power transmission line will involve penetration into the upper layer of the earth interior (mostly into the aeration area, at places into the upper aquifer, and sometimes into deeper layers).

Temporary measures to lower the water level may be required in the said areas during the construction period. If work safety and environmental requirements are complied with, the impact upon the earth interior will be minimal, i. e. it will manifest itself only in temporary hydrodynamic changes without a significant impact upon the subsurface hydrosphere. Foundations of each support will require excavation of a pit up to 400 m<sup>2</sup> in area and 2,5 m deep (with the volume of removed soil amounting to approx. 1 000 m<sup>3</sup>). Considering the average projected number of supports for the longest alternative belt – Alternative B, their construction may require penetration into the earth interior within an area of approx. 62,400 m<sup>2</sup> (6,2 ha).

No direct impact upon the interior of the earth is projected upon putting into operation and during normal operation of the facilities.

#### Alytus TS

For the purposes of reconstruction and extension of Alytus TS, foundations of structures and installations will be constructed in the upper layer of the earth interior. Depending on technology selected, drilled or monolithic belt foundations may be installed, which will determine the size of excavations. It is estimated that the planned average depth of excavations will reach 3 m.

In those areas where groundwater occurs within the limits of the above-mentioned penetration, flooding of the excavations is possible, therefore, temporary measures to lower the water level may be required during construction. If work safety and environmental requirements are complied with, the impact upon the earth interior will be minimal, i. e. it will manifest itself only in temporary hydrodynamic changes without a significant impact upon the subsurface hydrosphere.

At Alytus TS, any impact upon the earth interior is only in case of emergencies, i. e. if dangerous substances get onto the soil and penetrate the underground water-bearing layer. Transformer oil used in the current Alytus TS and the new facilities to be designed (back-to-back converter and 400 kV TS) poses the highest risk.

### **Impact upon landscape**

Adverse impact upon landscape can be twofold. First of all, if the LitPol Link will cross a landscape that is urbanised to a high extent, i. e. damaged landscape, the impact upon natural landscape will be minimal. In case of the line's extending across natural components of the environment the impact would be considerably stronger. In such a case visualisation of the line should be reduced to the highest extent possible, increasing it only at those places where this is necessary to protect both migrating and local birds. In the construction phase, the forms of the ground cover or even terrain can be restored by recultivating former construction sites and restoring former features of landscape.

### **Alternative A**

The negative impact of this alternative would be concentrated on the Verstaminų hill range and the natural frame. Dense network of settlements, intensive agricultural activities and undoubtedly adverse impact upon ecosystems of the Meteliai regional park would make the works of designing and building of the LitPol Link difficult.

### **Alternative B (in combination with Subalternative B1)**

This OPTL alternative is considered to be the optimal one for the following reasons:

1. Approx. 47% of the length of the planned power transmission line would be built along the current high-voltage line, which would facilitate the line building works and protect landscape against new fragmentation of the ecosystems and additional eco-visual pollution.

2. If the power transmission line is not built in the section between the assessment sectors 3, 2, 1 and 5, the following will be avoided:

2.1. fragmentation of landscape in the aforementioned areas and new technogenic invasion into an agrarian area which is being intensively used;

2.2. negative impact upon ecosystems of the Žuvintas biosphere reserve which has the status of a Natura 2000 area important for the protection of birds and habitats.

3. If this alternative is selected, decisions unfavourable to landscape will have to be adopted in the construction of the line in the northern part of Kalniškių forest.

4. A weakness of this alternative is that the belt of the power transmission line crosses the natural frame marked in the master plans. In order to reduce the negative impact upon the natural frame, it is necessary to preserve the natural landscape components to the highest extent possible and to promote their restoration by special measures that support and strengthen the natural aspect of landscape.

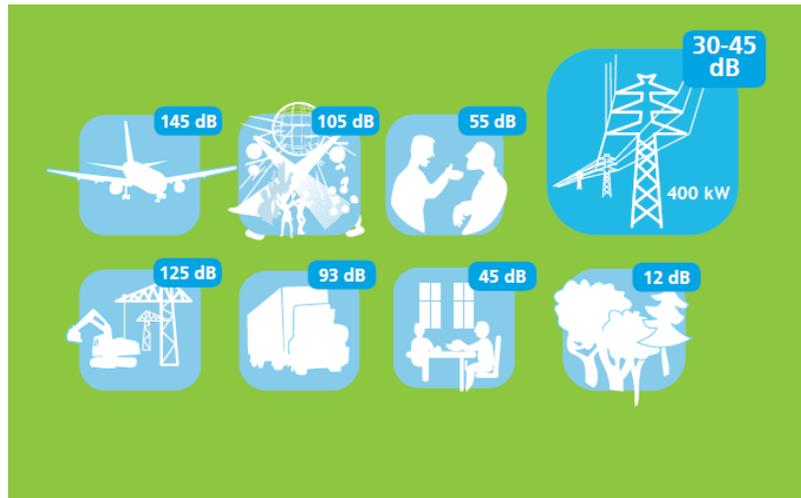
5. A settlement network of lower density and less intensive agrarian activities (compared with Alternative A) would create more favourable conditions for the carrying out of the power transmission line's designing, coordination and construction works in Alternative B (in combination with Subalternative B1).

*Mitigation: The visual landscape characteristics will be partly preserved via limiting as far as possible the cutting of trees, bushes and other important landscape elements. Re-cultivation of disturbed areas during tower construction will be enhanced via prompt re-contouring of the soil and re-vegetations.*

#### **Impacts through Noise:**

Noise studies have established that:

- the day-time acoustic noise caused by current converters L<sub>dn</sub> reaches the normative level of 65 dBA at the distance of 105 m, while the night-time acoustic noise L<sub>n</sub> reaches the normative level of 55 dBA at the distance of 160 m;
- the day-time acoustic noise caused by voltage/current transformers and filters L<sub>dn</sub> reaches the normative level of 65 dBA at the transformers, while the night-time acoustic noise L<sub>n</sub> reaches the normative level of 55 dBA at the distance of 16 m.



The day-time and night-time noise exceeding the threshold limits is depicted in the acoustic noise dispersion map. The adopted zone of noise exceeding the limits is 160 m according to the level of the night-time acoustic noise  $L_n$ .

The substation being designed will be at the distance of over 250 m from the residential buildings, therefore, no exceeding of the levels of acoustic noise either from current or designed facilities is projected at the residential buildings.

*Mitigation: appropriate scheduling of working hours will be applied to minimise disturbance when the construction is in the vicinity of settlements near the OPTL or at the Alytus substation and the housing areas.*

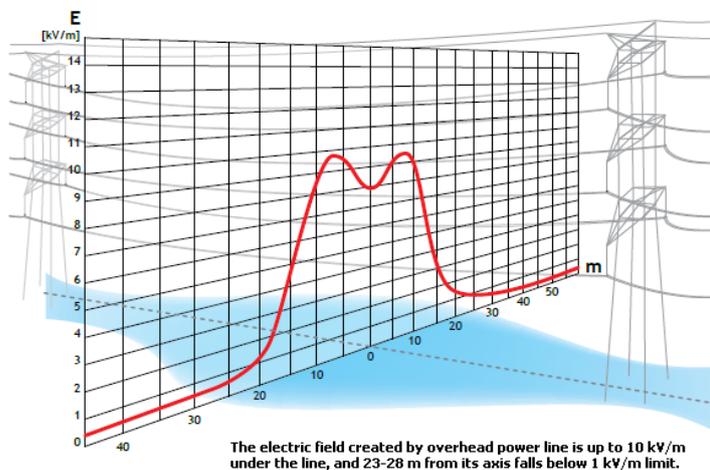
**Impact upon public health:**

The PEA will not impact public health provided that the following conditions are met:

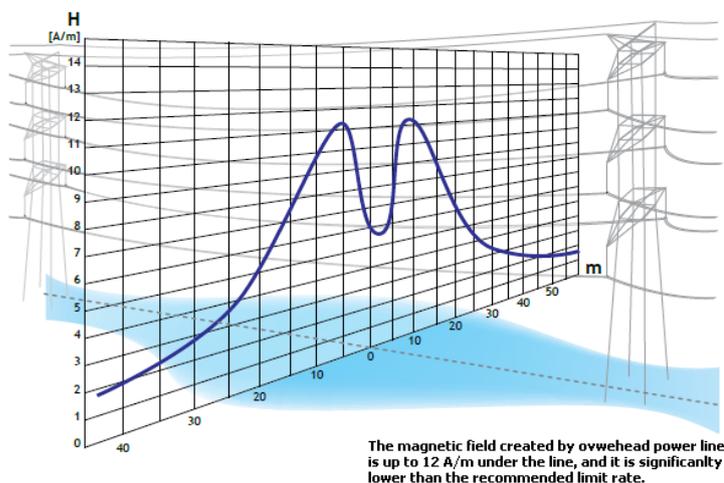
1. An integrated 30 m wide protection and sanitary protection zone is provided for the OPTL;
2. It is recommended that a sanitary protection zone at the distance of 16-160 m from the transformers and filters is established for the Alytus TS upon reconstruction and extension and the new back-tot-back converter and the 400 kV substation according to the acoustic noise dispersion investigations provided that no technical measures to lower the noise level in excess of the normative one are implemented (such as containing noise sources in closed premises, installation of noise-reducing walls) or noise-reducing systems that ensure limiting of the night-time noise level to 55 dBA at the boundaries of the designed land plot are implemented;
3. Appropriate compensations to residents for losses incurred in connection with the PEA and the imposed restrictions on the use of land plots are provided for.

*Mitigation: Distribute info brochures on EMR safety-maximum working times to all land users along TLs annually. Information of local public by newspapers: status of current, safe exposure times for adults working beneath the lines, information that children should be kept out of sanitary protection zone risks from climbing the towers, electrocution, tower toppling in case nuts and bolts are stolen. An integrated 30 m wide protection and sanitary protection zone is provided for the OPTL. It is recommended that a sanitary protection zone at the distance of 16-160 m from the transformers and filters is established for the Alytus TS upon reconstruction and extension and the new back-to-back converter and the 400 kV. Appropriate compensations to residents for losses incurred in connection with the Planned Economic Activity and the imposed restrictions on the use of land plots are ensured. Personnel employed for maintenance of power lines should raise awareness of population regarding safe behaviour near power lines.*

Electric field strength variation



Magnetic field strength variation



**Impact upon protected natural areas:**

The 400 kV Overhead Power Transmission Line between the Alytus Transformer Substation and the Lithuanian – Polish Border.

Only Sabališkės state pedological reserve, small parts of Meteliai regional park (including its areas significant for the protection of birds and habitats (BSPA and HSPA)) and parts of Žuvintas biosphere reserve (with its areas significant for the protection of habitats (HSPA)) fall directly within the corridor of the PEA.

Sabališkės pedological reserve contains a model ground cover of the Eastern Lithuanian highlands sod gleyic loam and clay type which is under protection. It could only be affected by a direct damage to soil in the course of the PEA.

Impact of the PEA would be most significant upon the protected species of birds in the nearby territories during their migration.

The PEA will have no impact upon the protected immovable values, protected animal species' finding places and birds' breeding places in the Žuvintas biosphere reserve, Meteliai regional park, Gulbynės ornithological reserve and Balbieriškis forest proving ground as the power transmission line does not directly cross these areas. The PEA may only influence migration of protected birds and certain other species in these areas, after their leave their breeding places.

The HSPA of the nearby Meteliai regional park, Žuvintas lake and Bukta forest with their protected immovable values will not be affected either as there will be no direct impact upon the growth places. There will be no significant impact upon the protected animal species in these areas as the PEA will not have direct influence over their habitats.

*Mitigation: Avoid entering the protected areas. Investigate possible indirect impact to the habitats of the protected areas and select the option with the least potential impact.*

**Cumulative Impacts:**

Transmission lines do not generate direct emissions of pollutants to air, water or land during their operations, and thus there are no relevant cumulative effects in this respect with any other pollutant emitters in the region.

Cumulative impacts may occur due to the visual characteristics of the transmission line structures – the landscape changes because of the OPTL towers and wires; the cumulative impact can also be to the certain flora, i.e. forests cut because of the land use restrictions in the protection zone. The cumulative impact can also occur by the interaction with other transmission lines, roads, and other linear structures. Where possible, the routes of the Project OPTL and diversion lines have been planned to be bundled with other existing structures, i.e. to run in parallel and as close as reasonable.

*Mitigation: the final conclusion of the evaluation was to propose subalternative B1 for the construction of the OPTL upon selection of the technical alternative of combining the present 110 kV line and the newly designed 400 kV line.*

## 9. NATURAL RISKS AND NON-REGULAR OPERATIONS

Analysis of potential emergencies has shown that emergencies may arise due to:

- external factors, the highest risk being related to actions by third parties – individuals and organisations;
- equipment failure (short circuit, leakage of chemicals);
- human factor.

In the risk analysis, the probability of emergencies was determined based on the statistical analysis of data on failures in the Lithuanian power transmission networks.

The risk of the most dangerous emergency characterises the risk of the facilities as a whole. If the highest emergency risk identified is „low“, then the weaknesses of emergencies' prevention and management are considered to be weaknesses for information only; where the risk is „medium“ – it is recommended that the weaknesses are taken into consideration; and where the risk is „high“ – elimination of the weaknesses is indispensable in order to carry out the activities safely.

The highest risk assessment for the OPTL is “practically impossible“. In this case, proposals for the implementation of additional preventive measures or elimination of weaknesses are not mandatory.

The highest risk assessment for TS area is “quite probable“. Such risk is possible due to the large numbers of equipment in the PEA area. However, a drainage system is in operation and the water-supply and passive fire water system has been extended in the TS area being designed. Therefore, it is probable that in case of oil spillage, the oil will flow to the designated subsurface oil collection tank through the chutes. Only small accumulations of pollutants would remain on the surface; in case of fire (which can occur e. g. in case of transformer overheating) it would be localised effectively.

No material weaknesses that could potentially influence the risk level of the facilities have been identified in the fire water supply system, both the current one and the system upon extension.

The preventive and response measures to be implemented in the territory of the facilities are sufficient for the staff to carry out primary localisation and rescue works and to ensure adequate response to small-scale emergencies before special rescue teams arrive.

According to the Regulations Governing the Industrial Emergencies' Prevention, Response and Investigation, materials planned to be used by the operator – Lietuvos Energija AB due not meet the criteria for dangerousness set out in these Regulations, therefore, the materials

are not considered to be dangerous. The area to be managed by the operator is not classified as dangerous facilities. The economic activity to be carried out in the area is not dangerous, therefore, the criteria and requirements set out in the Regulations are not mandatory.

In the technical projects for the PEA area, both territory and infrastructure must be designed according to the current fire safety regulations and other normative requirements. The approaches in technical designs for structures must be based on calculations and normative documents, taking the risk-reducing factors into consideration.

## 10. ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN

An Environmental and Social Assessment Plan (ESAP) was developed as part of this ESIA. It summarises the organizational requirements, actions and monitoring plans to ensure that the necessary measures are taken by Lietuvos energija, AB to avoid potentially adverse effects - and maximise potential benefits - of the Project, and to operate in conformance with applicable laws and regulations. The overall responsibility for the ESAP lies with "Lietuvos energija", AB, whereby a number of the specific actions will be carried out by the third-party Contractors in the different stages under supervision of Lietuvos energija, AB.

Lietuvos energija, AB will provide for the following measures throughout the Project.

- **Provide Organisational Capacity:** Lietuvos energija, AB must establish and maintain an organisational structure that defines roles, responsibilities, and authority to implement the ESAP, including aspects such as the designation of a Senior Manager with overall responsibility for specific areas or stages of the ESAP or a Statement of commitment by Senior Management to devote the necessary human and financial resources to achieve conformance with the ESAP.
- **Contractor Management Plan:** Much of the Project work will be done by various contractors engaged by Lietuvos energija, AB such as design firms, surveyors, and especially the main Construction Contractor. Thus it is important for Lietuvos energija, AB to implement procedures in a Contractor Management Plan to ensure that the Contractors are fully aware of the relevant ESAP issues and similarly committed as is Lietuvos energija, AB to the successful implementation of the ESAP. As main components the Contractor Management Plan includes training and awareness sessions, inclusion of specific relevant ESAP provisions into tender documents or ensuring the bidding contractors' capacity to meet the ESAP requirements.

- **Annual ESAP Performance Monitoring and Reporting:** As the Lietuvos energija, AB will be obliged to retain qualified specialists to undertake periodic monitoring/audits throughout the period of EBRD involvement with the Project. An initial ESAP Audit will take place within six months of the start of each new Project Stage, and subsequent audits at least annually. The ESAP Audit results must be documented and reviewed by senior Lietuvos energija, AB representatives and the EBRD; also, the results must be disclosed to the relevant parties/stakeholders affected by the ESAP. Depending on the findings, it may be necessary to revise the original ESAP to better reflect the changing situation with the Project implementation, and/or the social, environmental or regulatory framework conditions.
- **Specific Mitigation Items:** The more specific action-mitigation items related to the various environmental and social topics are describes in the chapters above and in more detail in the ESIA report.

## 11. FREQUENTLY ASKED QUESTIONS

### 1. What is the basis for preparation of the special plan?

Order issued by the Minister of Energy of the Republic of Lithuania “Concerning drawing up of the special plan for the construction of a 400 kV overhead power transmission line “Alytus transformer substation – Lithuanian-Polish border“ No. 1-190 of 12 October 2009 (Žin., 2009, No. 133-5802).

### 2. Main participants in the project

Planning organiser:	Lietuvos Energija AB Žvejų g. 14, 09310 Vilnius, Lithuania tel. (8 5) 278 2408, fax (8 5) 212 6736 e-mail: mindaugas.mikalcius@lpc.lt
Project coordinator:	LitPoL Link Sp. z.o.o. Wojciecha Górskiego 9, 00-033 Warsaw, Poland tel. +48 223233461 e-mail: k.sankovskis@litpol-link.eu
Project documentation preparer:	Sweco Lietuva UAB

V. Gerulaičio g. 1, 08200 Vilnius, Lithuania

tel. (8 5) 219 6574, fax (8 5) 261 7507

e-mail: LitPolLink@sweco.lt

### 3. Why overhead power transmission line and not underground cable?

A comparison of both technical alternatives is presented below:

	<b>Overhead line</b>	<b>Underground cable</b>
Area required	The width of the line may be up to 19 m; width of protection zone – 30 m to both sides from outermost wires, totalling approx. 80 m.	The cable is laid at the depth of approx. 1.5 m and requires a belt of land 13-50 m wide.
Restrictions on land use	See the answer below.	In the belt where the cable has been laid no digging deeper than 0.5 m is permitted. No trees or bushes are allowed above the cables. Any vehicle traffic is forbidden above unarmoured cables.
Failures	Detection within several hours at maximum. Inspections are carried out by driving along the route.	Elimination of failures in cable lines takes approx. 25 times longer compared with overhead lines; sometimes it can take several days or even weeks.
Typical failures	Lightning, physical contact between an object and phase wire, isolator failures etc.	Damaged insulation, in particular due to long overloading resulting in overheating.
Repairs/operation	After repairs the operation of the line at full capacity maybe restarted practically immediately.	After repairs, transmission power in the cable is increased gradually and maximum capacity can be reached after approx. one week.

Impact upon Environment	Overhead lines are very visible but soil damage is relatively insignificant during construction.	Large-scale earth excavation works are carried out for the laying of the cables and damage to fertile soil layers is possible. Potential oil spillage can occur during an emergency.
Insulation	Special insulators between the wires and the towers are used. The cooling of the wires is natural, with the heat emitted to the ambient air.	Cables are insulated by a sheathing made of oil-impregnated paper and polyethylene. The heat is emitted into the soil which with markedly poorer heat transmission properties, therefore, the cooling of the cables can be insufficient resulting in overheating.
Costs	The average cost per kilometre of a 400 kV overhead power transmission line is LTL 1 – 1.5 million.	The average cost per kilometre of a 400 kV underground cable can be 15-25 times higher than the cost of OL.

The link with Poland is not the only project implemented by Lietuvos Energija AB. Power transmission lines in Lithuania are relatively old, therefore, renovation is required. Furthermore, upon decommissioning of the Ignalina power plant the balance of the electric power generation and consumption centres in Lithuania has changed and the need for new internal links has arisen. All these projects are fully or partially financed by Lithuanian customers of electric power in the form of electricity tariff rates. This obligates Lietuvos Energija AB to implement the projects in a responsible and rational manner, without unjustified expenses. Available financial resources are not unlimited and, in case of realisation of unreasonably costly technical approaches, part of the projects will remain unimplemented or implemented upon increase in the electricity tariff rates.

4. What is the procedure for the examination of comments and proposals concerning the EIA received from the public?

Any proposals and comments received from the public are examined according to the provisions of order issued by the Minister of Environment “Concerning approval of the Procedure for Public Awareness and Participation in the Process of Environmental Impact

Assessment of Planned Economic Activities“ No. D1-370 of 15 July 2005 (Žin., 2005, No. 93-3472).

Any proposals and comments received from the public are registered and examined. A summary of proposals received from the public is prepared and written replies are sent to persons that have made the proposals.

5.What is the procedure for the examination of comments and proposals concerning the SACE and special plan received from the public?

Proposals and comments received from the public concerning

- the SACE are examined according to the provisions of order of the Minister of Environment of the Republic of Lithuania No. D1-455 of 27 August 2004 “Concerning approval of the Procedure for the Public Participation in the Strategic Assessment of Consequences for the Environment of Plans and Programmes and for the Information of Subjects of Assessment and the EU Member States“ (Žin., 2004, No. 136-4970);
- the special plan are examined according to the provisions of resolution of the Government of the Republic of Lithuania No. 1079 of 18 September 1996 “Concerning approval of the Regulations on Public Participation in the Territorial Planning Process“ (Žin., 1996, No. 90-2099; Žin., 2004, No. 112-4189; Žin., 2007, No. 33-1190).

All the proposals received are examined, considered, evaluated and accepted or rejected by the planning organiser jointly with the entity responsible for the drawing up of the special plan. The planning organiser adopts decisions on the approval or rejection of proposals.

The planning organiser send well-founded responses to persons having made the proposals **within 30 working days** from the date of receipt. In case of rejection of a proposal the planning organiser must specify the reason therefor.

6.When meetings with representatives of the public will be held?

A public meeting is a measure ensuring publicity of the special plan and SACE and EIA documentation at which these documents and the proposals received are discussed.

Notices of public meetings are published in national daily newspapers as well as in local newspapers of Alytus and Lazdijai districts, on notice boards of relevant municipal and neighbourhood offices, and websites of the planning organiser (Lietuvos Energija AB) and the project coordinator (LitPol Link). Notices may also be published in the websites of public authorities (Ministry of Energy, Alytus County, municipalities etc.).

The notices will be published not later than 20 working days (for the purposes of discussion of SACE Report) and 10 working days (for EIA Report and territorial planning documentation) prior to the public meeting.

For additional information about the meetings to be held please contact the project preparer (Sweco Lietuva UAB).

7.What is the procedure for organisation of public meetings?

At a public meeting, any proposals and comments received before the meeting are discussed, any changes that have been made are presented, and reasons for rejection of certain proposals are explained. Questions put during the meeting are answered.

Participants in the public meeting or their representatives are registered in a list of participants and minutes of the meeting are taken.

If no participant arrives within one hour from the set hour of opening of the meeting, it is deemed that the public is not interested in the planned economic activity and that the public meeting procedure is completed. This is recorded in a minutes of the meeting.

8.What is the procedure for taking minutes of the meeting and for familiarisation with them?

All proposals and comments received during the public meeting are recorded in the minutes. The organiser of the meeting must permit all interested parties to familiarise themselves with the minutes except personal data on participants which is not public information.

The minutes of the meeting specify:

- date and place of the meeting;
- list of participants in the meeting;
- name of documents under consideration (special plan, SACE or EIA);
- general information on the project;
- brief description and evaluation of proposals and comments received before the meeting;
- answers to the questions put during the meeting;
- information on the order of familiarisation with the minutes.

The minutes of a public meeting intended for the discussion of the special plan and/or SACE are executed not later than within 3 working days after the meeting and are to be signed by a person authorised by the planning organiser.

The minutes of a public meeting intended for the discussion of the EIA are executed not later than within 5 working days after the meeting and are to be signed by the chairperson and secretary of the meeting (specifying the date).

3 working days are allotted for familiarisation of members of the public with the minutes. Any comments on the minutes are to be presented to the organisers of the meeting in writing,

specifying the name and address of presenter of the comments (natural or legal persons) and the submission date.

Organisers of the meeting examine any comments on the minutes received and approve or reject them. In all cases, comments on the minutes are appended thereto.

9. Why it is not possible to design the electric power line only along the outskirts of land plots, abandoned land or cleared forest spaces?

It would be complicated to design an electric power line which extends only along the outskirts of land plots, through infertile or unused meadows, without crossing of forests or crossing them only at present cleared spaces, as the direction of the line would have to be changed every 50-100 m. This is usually impossible or simply unreasonable (see Answer 3).

It should be noted that, upon construction of a power transmission line, the land plot remains physically undivided and agricultural activities can be continued in the land plot.

10. What if construction of residential buildings was planned in the land plot?

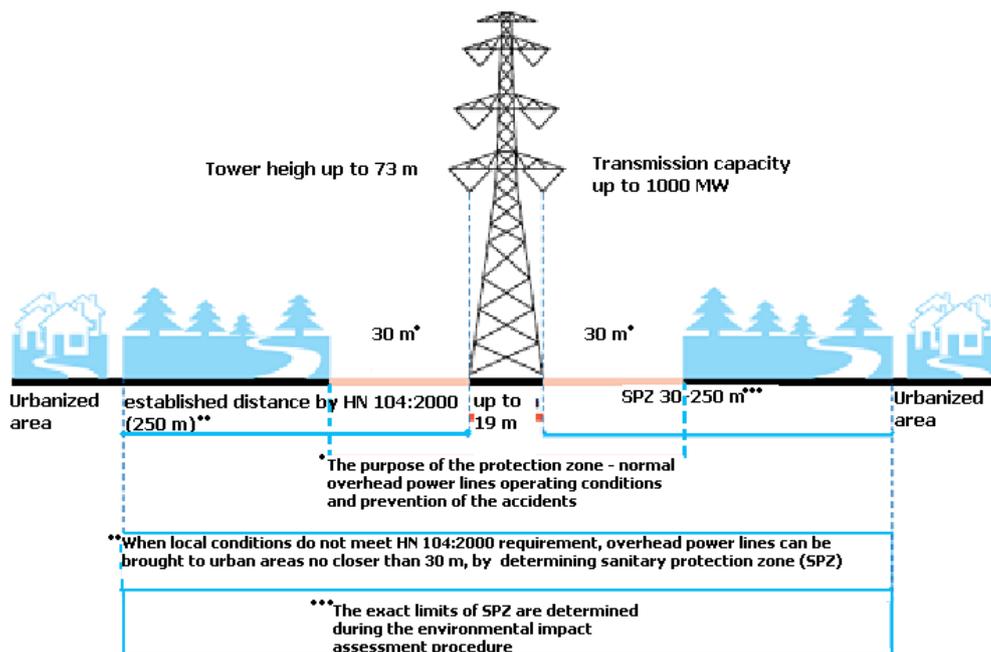
Only those plans to construct residential buildings will be taken into consideration which can be proved by territorial planning documents (detailed plans or rural development management projects), either completed or in preparation. Such documents must be submitted to the planning organiser or the preparer of the special plan to the addresses provided in Answer 2.

11. Are maps of the areas in which the power transmission line is planned updated and correct?

Maps of the areas under consideration are prepared using the latest georeference database received from their authors (the Lithuanian Geologic Survey, the Cultural Heritage Protection Department etc.) which are responsible for maintaining such information and make updates/corrections if errors are found.

The project preparer requests to provide any information on inaccurate markings or omissions in the maps to the addresses provided in Answer 2.

12. What is the width of the belt of land required for the electric power transmission line?



### 13. What restrictions are imposed on the power line protection zone?

According to resolution of the Government “Concerning approval of the Special Conditions for the Use of Land and Forests” No. 343 of 12 May 1992 (Žin., 1992, No. 22-652, as amended), the following activities are prohibited in the electric power transmission line’s protection zone:

- fitting out playgrounds, stadiums, marketplaces, public transport stops, grounds for any machines and mechanisms; organisation of events with a large number of participants;
- storage of feedingstuffs, straw, fertilisers, wood etc.;
- fitting out of filling stations, fuel and oil storage facilities;
- fitting out of landfills, contamination of soil and air, lighting bonfires;
- obstruct roads leading to electric grid facilities;
- fly kites and other flying objects or otherwise damage insulation of the power line;
- stop any vehicles except railway transport (within protection zones of 330 kV and higher voltage electric power lines).

The following is prohibited in the protection zones of electric power lines **unless a written permission is obtained from the electric grid company:**

- construction, capital repairs, reconstruction or demolition of buildings, structures and engineering networks;
- mining, loading, earth excavation and levelling, explosion, land reclamation and watering works;
- planting or cutting of trees and bushes;
- driving vehicles or other mechanisms whose height, with or without the cargo, exceeds 4.5 m from the road surface (within OPTL protection zone);
- fitting out of animal keeping grounds, erecting wire barriers and metal fences.

Restrictions on activities only apply to that part of the land plot to which servitude has been imposed. No restrictions will apply to the remaining part of the plot. Any activities not subject to restrictions can be continued.

14. What rights are granted to employees of the electric grid company upon conclusion of agreement on servitude?

Employees of electric grid company are entitled to freely access the power line's protection zone; during operation and repair works – to drive in this area and to excavate soil upon giving a notice to land owners/users. Cutting of trees beyond the protection zone is only allowed upon agreement with the forest manager or owner and upon due execution of tree cutting documents (Žin., 1992, No. 22-652 as amended).

15. Who will pay land tax on the part of the land plot upon which servitude is imposed?

Land tax is payable on agricultural land. The planning organiser (Lietuvos Energija AB) will not purchase any land plots but will seek, through servitude, to establish its right to use part of land lots for other purposes not included in the current purpose of use. As the land plot will remain undivided and owned by the same owner who will be able to continue agricultural activities therein even upon imposition of servitude, the land tax will be continued to be paid by the land owner.

16. What is the procedure for indemnification for damages caused by emergencies in the power transmission line?

Damages inflicted upon land plots due to emergencies in the line will be indemnified according to the procedure established in the Civil Code of the Republic of Lithuania.

17. How long will line construction works last?

It is expected that construction works will be completed by 2015. Construction of a tower takes from 2 weeks to 2 months approximately.

18. Who will finally decide on the permissibility of the planned economic activity?

The decision will be adopted by the responsible authority, in this case – the Alytus Regional Environmental Protection Department. The responsible authority must publish information on the decision on permissibility of PEA in its website and in the website of the Ministry of Environment within 10 working days from the adoption of the decision.

19. Where can I get information on whether any towers will be constructed in my land plot or not?

Decisions on specific technical characteristics (type, height, are, location of towers etc.) will be adopted in the course of preparation of the technical design, i. e. in a later phase of the project as preparation of the technical design can only be started upon approval of the special plan.

20. Why not requisition of land is planned, i. e. why it is not taken for public needs?

According to the Republic of Lithuania Land Law (Žin., 2004, Nr. 28-868), requisition of land for public needs is the purchase of land from land owners according to the procedure established in the laws (at a fair compensation) after the County Governor decides that the land is needed for the public interest.

The Land Law explicitly states that land can only be taken from private land owners for the public interest in exceptional cases, i. e. there must be a well-grounded justification that a specific public interest exists and that it will only be satisfied upon requisition of a specific land plot.

There is no such need in the planning of the power transmission line as it does not require requisition of land as distinct from construction of a road or railway. There is an alternative way to meet the public need and the procedure of requisition of land for public needs is not applicable.

21. What is the procedure for the imposition of servitude?

According to Article 4.39(1) of the Civil Code, title can be restricted by the owner itself, under the law, or by court decision. This is a general provision. It is detailed in Article 4.124(1) of the Civil Code which states that servitude can be imposed by law, transactions, court decision or administrative deed.

22. Will compensations be paid to land owners?

Lietuvos Energija AB will pay compensation for the servitudes imposed on land lots. Compensation principles and terms of agreement will be defined separately.

23. Is there infringement of title of the land owner when servitude is imposed?

According to the Constitution of the Republic of Lithuania (“the Constitution”), the Lithuanian state has a social orientation. Article 23 of the Constitution states that “Property is inviolable.

Title to property is protected by law“, however, paragraph 3 of the same Article contains an exception to the effect that „property can only be taken according to the procedure established by the law for public needs, which shall be compensated for appropriately“, i. e. title is not absolute and public needs have a priority over personal needs.

In its resolution of 24 January 1996, the Constitutional Court has emphasized that operations of certain facilities have a priority for the functioning of the national economy and vital functions (postal, telegraph, energy supply etc.). It is recognised that electric power supply facilities and their operators satisfy extraordinary public needs, therefore, these activities are based on public interest, which, according to the said constitutional provisions, justifies restrictions on title to immovable property (i. e., land plots) to be used for the electric power transmission and/or distribution facilities (resolution of Supreme Court of Lithuania No. 3K-3-315/2007).