

Gulf of Riga as a resource for wind energy - GORWIND

Deliverable WP4.1

Analysis of legal framework in context of use of wind energy

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Summary

The report analyzes the current situation in the field of legal regulations concerning the use of wind energy in Estonia and Latvia as it stands for 4 March 2011. We have included the general policy descriptions, the laws and regulations on choosing the development areas at the coastal zone and in marine locations, the construction of wind power plants, the licensing, the related environmental impact assessment. The differences between two countries are mostly in the details of procedures. Still, the problems and inconsistencies are quite in common – a missing stability in legislation and coordinated development of infrastructure to increase connection capacity for wind energy producers.

Background

Wind energy is one of the fastest developing technologies in energy sector and is expected to play an essential role in meeting the objectives of the new Energy Policy for Europe. The EU objective set for 2020 is to achieve a 20 % reduction of greenhouse gas emissions compared to 1990 and a 30% reduction, if other main industrialized countries join the initiative. Another objective established was to increase the share of renewable energy sources up to 20% in energy consumption and to have the share of biofuels up to 10 % in transport fuels provided that second-generation biofuels are developed successfully. The aim is also to achieve a 20% reduction in energy consumption by 2020¹.

Today electricity from wind provides a substantial share of total electricity production in only a handful of Member States, but its importance in EU level is increasing: more than 40% of all new electricity generation capacity added to the European grid in 2007 was wind (Fig. 1), making it the fastest growing generation technology except for natural gas. In 2010 wind power installations accounted for 17% (9.3 GW) of new electricity generating capacity in EU in 2010.

The overall market for renewable power capacity, including wind, solar, hydro and biomass, reached record levels in 2010, increasing 31% from 17.5 GW in 2009 to 22.6 GW in 2010.

¹ DIRECTIVE 2009/28/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 April 2009 on the promotion of the use of energy from renewable sources

Renewable energy accounted for 41% of all new installations while gas represented 28 GW (51%) of new installed power capacity last year, compared to 6.6 GW in 2009. The wind power capacity installed by the end of 2010 will, in a normal wind year, produce 181 TWh of electricity (up from 163 TWh), meeting 5.3% of overall EU electricity consumption (4.8% in 2009)².

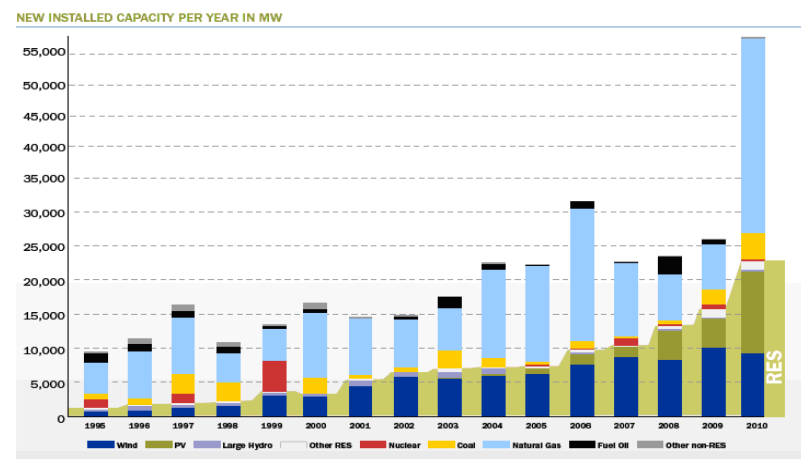


Fig. 1. New installed capacity per year in MW in EU³

While over several decades well established onshore installations are gradually declining – new onshore wind power installations (8.4 GW) were down 13.9% compared to 2009 (9.7 GW) and mainly supported by new installation in Eastern

² EWEA. Offshore and Eastern Europe new growth drivers for wind power in Europe.

³ EWEA. Wind in power 2010. European statistics. February 2011.

part of the EU (Romania, Poland and Bulgaria) the offshore wind power installations showed strength to grew 51% from 582 MW in 2009 to 883 MW in 2010. Strong development of the offshore wind market was led by the UK, Denmark and Belgium. Annual offshore capacity has been gradually increasing since 2000 and in 2010 it represented 9.5% of all new wind power installations in installed capacity (Fig. 2).

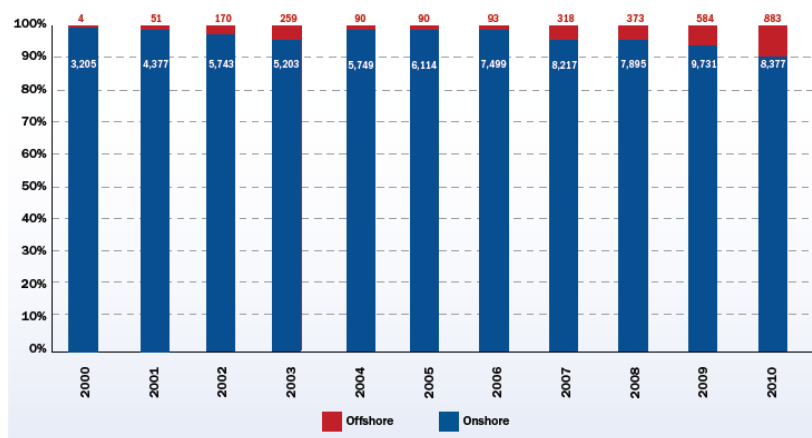


Fig. 2. Offshore's share of annual new installed EU wind power (MW) ⁴.

Between 1995 and 2005, cumulative wind power capacity in the EU increased by an average of 32% per year. While Denmark, Spain, Portugal, Ireland and Germany have the highest penetration of wind power in electricity consumption

(9.4-24%), the other states are low of EU average 5.3% (Fig. 3).

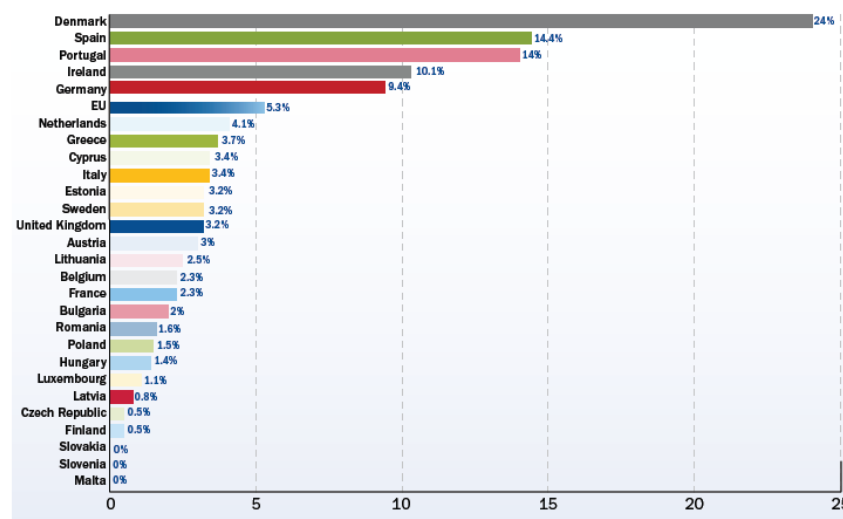


Fig. 3. Wind share of total electricity consumption as calculated by normal wind year and final electricity consumption in 2008 by Eurostat ⁴.

As for 2010 Estonia and Latvia are using wind power only onshore, but several offshore wind farms are currently planned, including offshore wind farms in Gulf of Riga by Eesti Energia Ltd. and feasibility studies in progress.

⁴ EWEA. Wind in power 2010. European statistics. February 2011.

Introduction

Wind energy is considered as one of the most promising renewable energy technologies for electricity generation in Estonia⁵, and Latvia⁶. There are several wind farms onshore operating in Estonia (total installed capacity 149MW in January 2011) and Latvia (total installed capacity 44MW in 2010), some of them operating in coastal zone of Gulf of Riga covered by study area of Interreg Estonia-Latvia Programme GORWIND project No. EU34711 (Fig. 4).



Fig. 4. Study area of Interreg GORWIND project.

⁵ Development Plan of the Estonian Electricity Sector until 2018; National Development Plan of the Energy Sector until 2020; Long-term Public Fuel and Energy Sector Development Plan until 2015

⁶ Renewable Energy Guidelines 2006 to 2013; Energy development Guidelines 2007 to 2016; The Latvian Long-term Development Strategy

Despite of several existing wind farms in Estonia and Latvia there are still many possibilities for developments and improvements to make electricity generation more effective, ecologically and socially acceptable, especially in offshore wind farms which are legislatively and technologically still novel even in general EU context where developing wind resources offshore is a particular priority⁷. Siting wind farms in an environmentally sensitive manner is important and the Commission has published guidance on this matter⁸, however the document has no binding character and there are many issues that are subject of national legislation and jurisdiction.

This deliverable aims to analyse national legislation and practice of Estonia and Latvia in context of wind energy development in coastal and offshore areas. Harmonization of legislation and planning procedures of neighbouring countries has got higher importance due to integration of energy markets, widening energy mix and due to increasing penetration of renewable energy that requires cooperation both on Baltic and EU level.

⁷ COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS. Offshore Wind Energy: Action needed to deliver on the Energy Policy Objectives for 2020 and beyond. Brussels, 12.12.2008. COM(2008) 768 final/2.

⁸ EU Guidance on wind energy development in accordance with the EU nature legislation.
http://ec.europa.eu/energy/renewables/wind_energy/doc/guidance_wind_farms.pdf

Current status

Currently there are only small wind farms on coast of Gulf of Riga, however several large scale wind farms are planned on land in the coastal regions (Urge-Rütavere, Ikla-Häädemeeste, Paikuse in Estonia) and several offshore wind farms are planned in Estonian side of the Gulf of Riga by Eesti Energia Ltd (Fig. 5). List of existing, planned and wind farms under construction in Estonian side of the Gulf of Riga region is given in Table 1.

Table 1. Wind farms in Estonian part of the Gulf of Riga.

Wind farm	Connection point	Total installed capacity, MW	Status
Skinest Energia	Rõuste	25,5	Operational
Esivere Tuulepark	Rõuste	8	Operational
Tooma Tuulepark	Rõuste	24	Operational
Virtsu I	Virtsu	1,8	Operational
Virtsu II ja Virtsu III Tuulepark	Virtsu	13,8	Operational
Mäli ja Tamba Tuuleenergia	Lõpe	17	Plan approved
Sauga Tuulepark	Sindi	50	Planning in process
Sauga Tuulepark	Sindi	100	Under planning
Orajõe Tuulepark	Sindi	999	Under planning
Piiri Tuulepark	Kilingi-Nõmme	204	Under planning

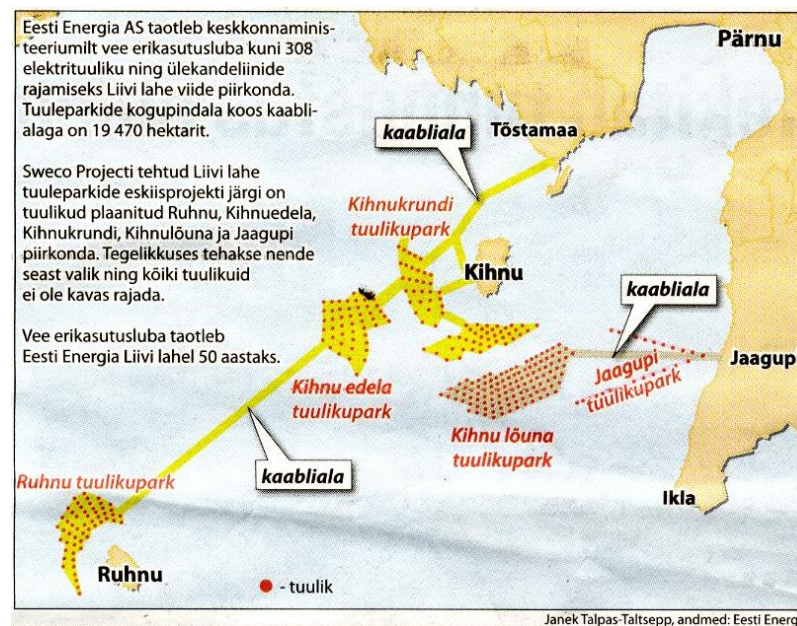


Fig. 5. Proposed layout of Eesti Energia Ltd. Offshore wind farms in Gulf of Riga. (*Pärnu Postimees*, 29.12.2009 cit. <http://www.tuuleenergia.ee/2009/12/eesti-energia-kavandab-liivi-lahte-300-tuulikud/>)

Similar wind energy development trends are existing in Latvia where Ainazi wind farm (1.2 MW) is operational since 1995 and new development possibilities are looked for on East coast of the Gulf of Riga in connection with planned new international overhead high voltage power line between Estonia and Latvia.

Based on phase of active wind energy development both in Estonia and Latvia, and frequently changing legislative background which often result in delay in planning process it is important to harmonize the legislation and planning procedures in accordance with EU directives. While planning process on land is sufficiently elaborated and uncertainties are mainly related to degree of severity of criteria in EIA process, the situation is much more complicated for offshore development. At the present moment the legislation is not clear enough and is in stage of frequent change.

In contrast to on land development areas there is lack of environmental research data relevant for decision-makers of offshore regions. Therefore maritime spatial planning⁹ and selection of suitable wind farm areas in the sea is hindered considerably, cross-border effect, both environmental and socio-economic remains unclear.

Therefore accurate information of marine wind field with high spatial and temporal resolution is needed. Rough ice conditions in the Gulf of Riga could impose a threat to construction and operation of offshore wind farms. At the same time Gulf of Riga is important habitat area for marine mammals and birds. They could suffer the most from operational activity of wind

parks. But socio-economic consequences may have similar extent due to impact on tourism industry, fishery, navigation and real estate/property. People are afraid that their living standards may suffer. In several cases it remains foggy how planned wind parks contribute to the energy needs of adjacent counties.

⁹ MARITIME SPATIAL PLANNING IN THE EU - ACHIEVEMENTS AND FUTURE DEVELOPMENT. Communication From The Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions.
http://ec.europa.eu/maritimeaffairs/pdf/com_2010_771_en.pdf

Estonia

National energy policy

Estonian energy sector is heavily dependent on fossil fuels but national policy is to increase significantly share of RES both in electricity and heat production, at the same time greenhouse gas emissions need to be reduced.

Governmental policy and legislative framework for the energy sector are very much shaped by the policies and legislation of the European Union. Main documents covering Estonian national energy policy are:

- Long-term Public Fuel and Energy Sector Development Plan until 2015;
- National Development Plan of the Energy Sector until 2020;
- Development Plan of the Estonian Electricity Sector until 2018;
- Estonian Renewable Energy Action Plan until 2020.

These documents and the government has spoken of improvement of energy sustainability, significant investments in energy efficiency technologies, energy-related research and development activities. Estonia is moving from a very concentrated and regulated energy market towards an open and more liberal market model. The policy also promotes increase of the share of renewable energy, however it has not been fully consistent through time and policy documents, especially in case of wind energy. In course of last decade the wind energy has got

Latvia

National energy policy

Latvia has a strategical long-term spatial development planning document – The Latvian Long-term Development Strategy (LIAS2030). It also considers energy issues. If energy policies will be successfully implemented, in 2030 the half of the total final energy consumption in the country should be provided by renewable energy sources (RES). Local key RES now are wood and water. ***The legislative base absence and absence of appropriate teritorial zoning are hindering the use of potential offshore wind energy.*** For example, in order to reach the output of 1000 GWh it would be necessary to distribute scatteredly 500 MW capacity of wind power plants (WPP) in the teritorial sea and continental shelf, and foresee up to 200 square km area for WPP location (Fig.6). It is also necessary to have areas for interlinking networks on the mainland. The preconditions of WPP installations are:

- optimal use of wind power facilities;
- better access to transmission networks.

WPP implementation at least initially will be relatively expensive, so it should be done gradually. If necessary, opportunities of reasonable state support for such investments should be secured.

LIAS2030 assumes that Baltic Sea region will have an unified power market. In a time frame of approximately 2 years a common stock market will be set up on a basis of *Nord spot* and integration will be ensured via the *Estlink I* connection.

In addition LIAS2030 predicts integration in the power grids of

better coverage and higher target share in policy documents.

Based on the Long-term Public Fuel and Energy Sector Development Plan until 2015 the strategic objectives of the Estonian fuel and energy sector are to:

- ensure fuel and energy supply with the required quality and at optimal prices;
- ensure the existence of local generating power to cover the domestic electricity consumption needs and the supply of liquid fuel in compliance with law;
- ensure that by 2010 renewable electricity forms 5.1 per cent of the gross consumption;
- ensure that by 2020 electricity produced in combined heat and power production stations forms 20 per cent of the gross consumption;
- ensure that the power network is completely modernised in approximately every thirty years;
- develop measures which enable the use of renewable liquid fuels, particularly biodiesel, in the transport sector;
- establish preconditions for the establishment of connections with the energy systems of the Nordic countries and Central European countries.

While the Long-term Public Fuel and Energy Sector Development Plan until 2015 envisage the main outline for Estonian energy sector, it remains rather general in context and quantification of use of renewable energy resources, delegating specific issues to other national development and action plans or laws.

The main regulation of the fuel and energy sector is provided for in the following Acts:

1. the Electricity Market Act (RT* I 2003, 25, 153; 2004, 18,

European Union. It has become possible since 2010 when the electricity market between the Baltic States is open. The open market gives completely new approach in the energy policy and strategy.



Fig.6. Possible wind power plant areas at sea in LIAS 2030

Latvia has two medium-term policy planning documents outlining plans for Latvian energy industry in nearest 10 years:

- Renewable Energy Guidelines 2006 - 2013;
- Energy Development Guidelines 2007 - 2016.

Renewable Energy Guidelines 2006 - 2013 contain an assessment that Latvia can install wind power plants with the total capacity of 600 MW. The theoretical wind power potential is estimated 250-1250 million KWh (or 0.8 to 4.5 PJ per year).

The largest problem for the establishment of wind

131; 30, 208),

2. the Natural Gas Act (RT I 2003, 21, 128; 2004, 18,131),

3. the Liquid Fuel Act (RT I 2003, 21, 127; 88, 591; 2004, 18, 131, 53, 365),

4. the District Heating Act (RT I 2003, 25, 154; 2004, 18, 131),

5. the Energy Efficiency of Equipment Act (RT I 2003, 78, 525).

* RT = *Riigi Teataja* = State Gazette, an official publication of legislative acts.

According to the Long-term Public Fuel and Energy Sector Development Plan until 2015 the potential of Estonian renewable energy primarily means combined heat and power production based on biofuel and the wind power; at the same time small-scale hydropower industry is developed and its technically applicable total resource is estimated ~40 MW. Waste also deserves to be mentioned separately and in particular upon application of the Directive 2000/76/EC on the incineration of waste.

Particularly the islands of West Estonia, the coastal areas of North-West Estonia and South-West Estonia, but also the coastal areas of North Estonia and Lake Peipus are seen as the the most perspective areas of application of wind power. However, the document is very conservative in context of use of wind energy – it states that taking into account the current situation of the power system, it is possible to install wind turbines in Estonia to the extent of 90-100 MW, but this would bring about deterioration of the operations quality of the power system and only 30-50 MW installed wind turbines can be used without any negative effects. The technical limit for the installation of wind generators in the Estonian power system is seen to be 400-500

parks is the wind volatility, which causes difficulties for successful wind park exploitation. The second important problem referred is the technical constraints – the possibility to integrate wind parks in electricity supply system.

One of the fundamental principles of energy policy is the self-promotion of nationally produced energy, i.e., need to increase the Latvian independence from imported energy as much as possible replacing it with native renewable energy sources.

Priorities mentioned are: to create favourable conditions for those energy production technologies which allow to increase the competitiveness of the RES with fossil fuels; applied scientific research on the latest technology transfer and adaptation for the Latvian conditions.

There are intentions to provide the financial support as a compulsory purchase for the RES manufacturers, determining the purchase price depending by the type of resources. To increase the number of participants of energy market and competitiveness between them, the state provides subsidized loans to energy market participants who are using RES (loans issued by LEIF - Latvian Environmental Investment Fund).

Energy Development Guidelines 2007 - 2016 envisage to support the transnational connections between Latvia and Poland, Latvia and Sweden.

The teoretical annual average potential of wind energy is 250-1250 million kWh conforming to Renewable Energy Guidelines.

The policy document infoms that Baltic states (Latvia, Lithuania and Estonia) have begun to work on coordination document „Baltic Network of 2025”.

It was expected that in 2010 will be installed wind power

MW. The main obstruction is seen in weak power networks, relatively small electric load, great unit capacity and poor manoeuvrability of the existent units and sets of power stations. The strong interconnection capacity of the Estonian power system with the Latvian and Russian power systems enables partly alleviate the unevenness of wind power, however additional investments to power networks and power stations to ensure the transmission and regulation are required.

In National Development Plan of the Energy Sector until 2020 is emphasized the need for increased use of RES. It states that the so-called climate package (Climate package, http://ec.europa.eu/climateaction/key_documents/index_en.htm) published by the European Commission on 23 January 2008 plays an important role in the options of Estonian electricity production. The most important parts of the climate package for Estonia are the draft amendment to the Greenhouse Gas Emissions Trading Directive, the draft Renewable Energy Directive and the draft Carbon Capture and Storage Directive. To conform with these directives Estonian National Development Plan of the Energy Sector until 2020 foresees to:

- reduce the share of oil shale in the energy balance based on the demand in Estonia in 2020 <30%;
- diversify the energy portfolio and increasing of the share of renewable energy in the final consumption of energy in 2020 to 25%;
- Development and implementation of support schemes for renewable energy sources.

Despite of foreseen increase of RES in energy balance there is no specific targets set for wind energy and offshore wind energy is not mentioned.

plants with capacity 135 MW (actually 44 MW).

Also these policy guidelines foresee the same support mechanisms for renewable energy producers:

1. mandatory purchase of produced electricity;
2. fixed purchase price if the electricity is generated using renewable energy;
3. earmarked subsidies for the investments.

In Latvian climatic conditions wind power stations cannot be installed as the base-load stations. WPPs in Latvian conditions have extremely low capacity utilization rate - number of work hours is approximately 1800 to 2200 h per year. In Latvia it is not possible to achieve higher number of hours of capacity utilization per year due to meteorological features.

The western coast of Latvia (on land) and marine area (without specification) are regarded as areas where installation of WPPs is technically possible. Wind power plants require balancing power (such as gas turbine unit) constituting at least 50% of the installed capacity of WPP.

Policy objective is to reach the self-sufficiency level of electrical power of 80% by 2012 and by 2016 – all 100% (includes all kinds of electricity, also the RES). To achieve this objective it is necessary to introduce not less than 700 MW of new capacity in all kind of RES, among them wind energy and including solid fuel utilizing power plant with 400 MW capacity. The use of RES should be enlarged in power production, thermal energy production and in transport.

The policy planning documents of other sectors also influence the development of wind parks in the marine areas – Guidelines for effective use of air space in 2009-2014, Guidelines for environmental policy in 2009-2015, Latvian

Development Plan of the Estonian Electricity Sector until 2018 maintain the doctrine of self-provision of electricity at least in extent of domestic final consumption and the share of renewable electricity in gross consumption is foreseen to be at least 5.1% by 2010 and increase at least 15% by 2015. Installed total capacity of onshore wind farms is expected to be 400 MW (2025) and offshore wind farms 200 MW in 2016 and 500 MW in 2025. However, the same total capacity of balancing units for wind power is expected to be installed (900 MW in 2025). In addition the construction of Estlink 2 (ready in 2014), the interconnections between Lithuania-Poland and Baltic States-Sweden are projects necessary for the Estonian power system for increasing security of supply (2018) and the synchronisation of the power networks of the Baltic States with the Central-European power network UCTE are considered of determinative importance in the light of ensuring the operation of the EU electricity market and increasing of security of supply.

Estonian Renewable Energy Action Plan until 2020 conforms with wind energy related activities listed in Development Plan of the Estonian Electricity Sector until 2018 - planned installed capacity of offshore wind farms 250 MW and onshore installations 400 MW in 2020. Renewable Energy Action Plan bring out main instruments to achieve increased use of RES, however no new specific support instruments beside those stated in Electricity Market Act are planned for onshore wind farms while in case of offshore wind farms alternative support schemes outside of present tariff-related measures are considered in frame of joint implementation. As well soft planning measures are specified to support cooperation, decision-making, regional, socio-economic and security issues related to offshore wind farms.

fishing fleet capacity harmonizing plan for 2008 - 2013, Guidelines for the transport development in 2007 - 2013.

Current situation in the wind park development

The present legislation foresees setup and exploitation of wind power stations and wind parks only on the mainland of Latvia. Some separate power stations and parks already exist - at the western part of Latvia (Grobiņa, Liepāja, Sārnate, Užava, Alsunga) and in Ainaži with the total capacity 44 MW (2010). The share of wind power in the total consumption is planned 5,37% in 2011. Till 2020 this share will not be enlarged due to the expected total electric power consumption in future. Several wind parks are in the phase of development. Approximately 200 permits have been issued to introduce new industrial equipment or to enlarge the production capacity. The permits do not provide exclusive building rights on the particular licence area in the sea – other persons are not restricted to apply for investigations in the respective areas in order to install the wind power stations. In opposite, on land the permit is issued for a particular developer in a specified area and construction is allowed when all obligations are observed.

Present use of the Gulf of Riga

1. Natura 2000 territories – 5 marine and 4 land with marine part;
2. Licence areas of the investigation and extraction of Fe-Mn concretions (2 possible areas at the eastern and western coasts, Fig.7);
3. Ship routes – to the ports and the main Riga – Irbe Strait;
4. Fisheries;

5. Tourism (charter from Roja to Ruhnu, from Riga to Stockholm);
6. Heat pump near Salacgrīva, 500 m from the coast;
7. Ports and marinas (Roja, Mērsrags, Engure, Lielupe, Riga, Skulte, Salacgrīva; total turnover in 2009 – 50% of the Latvian ports in total);
8. Dumping areas for the ports;
9. Dumped ammunition ;
10. Ship wrecks (along the coast and in the Irbe Strait, partly recognized as cultural heritage);
11. Territories of military training (central Gulf).

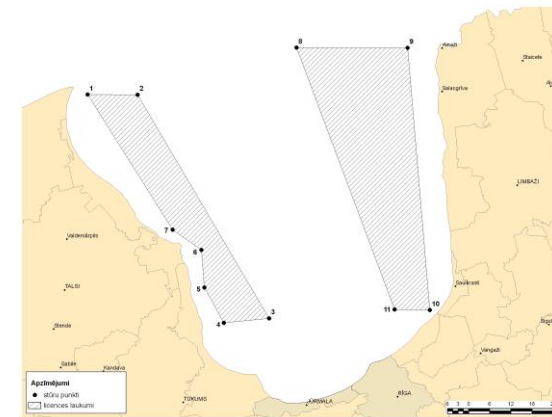


Fig.7. Extraction areas of iron (Fe) and manganese (Mn) concretions.

Legislative acts in the energy sector in Estonia

Laws governing wind energy development issues on land and at the sea:

Land	Sea
Law of Property Act	
Planning Act	(Water Act, Special water use permit)
Building Act	
	Maritime Boundaries Act; Maritime Safety Act
	Economic Zone Act
Environmental Impact Assessment and Environmental Management System Act	
Water Act	
Regulation No. 42 (04.03.2002) of the Minister of Social Affairs Noise level in residential and recreation areas, in dwellings and public buildings and noise measurement methods	
Nature Conservation Act	
Heritage Conservation Act	
Earth's Crust Act	
Aviation Act	

Laws and regulations of the Cabinet of Ministers in the energy sector in Latvia

Laws governing wind energy development issues on land and at the sea:

Land	Sea
Civil Law. Property law (1937);	
Law On Protection of Cultural Monuments (1992)	
On Spatially Protected Nature Territories (1993)	
On Aviation (1994)	
Construction Law (1995)	
Fishery Law (1995)	
Law On Subterranean Depths (1996)	
Protection Zone Law (1997)	
Energy Law (1998)	
On Environmental Impact Assessment (1998)	
On Public Utilities Regulators (2000)	
On Pollution (2001)	
Spatial Planning Law (2002)	
Water Act (2002)	
Electricity Market Law (2005)	
Electricity Tax Act (2006)	

Grid code
Electricity Market Act
<i>Technical Requirements for Connecting Wind Turbine Installations to the Power Network (Enterprise standard EE 10421629 ST 7:2001)</i>

Ownership, grid connection and tariffs for wind energy producers

Ownership and management of wind turbines both on land and offshore are regulated by Law of Property Act. Owners of wind turbines on land can be private person or legal person. Different of onshore development where land ownership may belong to private person, legal person or legal person in public law (incl. state) in case of offshore development should be consider that the territorial sea, inland sea, other transboundary bodies of water, and the seabed and other bodies of water specified by law are in the ownership of the state. Thus in offshore only legal person can be granted building permission as stated in Electricity Market Act §92 valid since 27.02.2010.

Onshore the immovable property ownership extends to the shore-line of the sea. The shore-line is the ordinary boundary of water of the sea. A construction located in the sea permanently attached to the bottom of the sea may be entered in the land register as an individual immovable pursuant to the procedure provided by law. However, if a construction or a part there of located in the sea permanently attached to the bottom of the sea which is constructed on a legal basis is not entered in the land register as an individual immovable and is permanently attached

	Marine Environment Protection and Management Act (2009)
Latvian Republic State Border Law (2009)	
Draft laws	
Renewable Energy Law	
Territorial Development Planning Law	

Ownership, grid connection and tariffs for wind energy producers

Civil Law. Third part – Property Law. (1937) – defines the border up to where the sea water at the coastal areas are regarded as public – up to the highest waves.

One of the problems associated with the use of the Gulf of Riga is a lack of an institution on behalf of the state which would lease the sovereign rights at the sea. This problem has been identified and solutions are currently being developed. At present this is one of the reasons delaying the development of wind energy production in the sea.

Only legal persons can be owners of the wind turbines at the sea.

Energy Law (1998) – stating wind power as a renewable energy resource.

According to Marine Environment Protection and Management Act (2009), permit or licence is necessary for the wind power plant construction in the sea. The licence is issued by the Cabinet of Ministers and before a concrete enterprise receives the licence for wind energy production, the licence area is also confirmed by the Cabinet of Ministers. The licence is

to the shore, the construction belongs to the immovable on shore. This is normally the case with submarine power cables of offshore wind farms which are connected to the main power grid.

According to the Law of Property Act the owner of the wind turbine(s) is responsible to damaging nuisances. The owner of an immovable does not have the right to prohibit the spread of heat, noise, vibrations and other such nuisances coming from another immovable to the owner's immovable unless this significantly damages the use of the owner's immovable or is contrary to environmental protection requirements. The intentional direction of nuisances to a neighbouring immovable is prohibited. If a nuisance significantly damages the use of an immovable but the person causing the nuisance cannot be expected to eliminate the nuisance for economic reasons, the owner of the nuisanced immovable has the right to demand compensation from the owner of the immovable causing the nuisance. Character, extent and mitigation methods to avoid or reduce damaging nuisances of wind farms must be assessed in accordance of Environmental Impact Assessment and Environmental Management System Act.

In order to generate electricity, except for generation by one producer using generating installations with a net capacity under 100kW, an activity licence is required. Licences are issued by the Energy Market Inspectorate.

Grid Code regulates the requirements applied to the security of supply of electrical power systems and the technical requirements for electrical installations arising from security of supply. This Regulation prescribes the requirements for the

valid for 30 years. State Environment Board, National Armed Forces and the State Border Guards control the use of the sea respective to the issued permits and licences.

Electricity Market Law (2005) – anticipates the necessity to issue the permits for wind park construction (the permit for increasing the production capacities and installation of a new production equipment). This permit is issued by the Ministry of Economy. The permit is valid for 5 years if the planned capacity exceeds 1 MW, and for 3 years if the planned capacity is less than 1 MW. Permits are valid both on the land and in the sea. These permits give a possibility to compete for the use of the licence area in the sea.

Related regulations include requirements for receiving the permit and description of permit issuing, cancelling and extension of validity. Ministry of Economy issues or declines the permit during 30 days.

The law defines support mechanisms for renewable power producers – mandatory purchase and price. Ministry of Economy organizes annual tender for the rights to sell the produced power as the mandatory purchase. For the mandatory purchase the price exceeds the market price. After the first 10 year the purchase price is decreased.

RES related electricity producers can participate at the mandatory purchase competition. Allowed amount for the selling within the mandatory purchase is calculated by multiplying the installed power with the working hours of power station, i.e. 3500h per year.

Regulation of the Cabinet of Ministers No.262 defines the obligatory share of RES in the total electricity consumption. For wind energy the share is 5,37% of the total consumption during the period of 10 years.

connection of electrical installations to the power network and the rights and obligations of the market participants related to balance responsibility. There is no differentiation between operation of onshore and offshore wind turbines but rather by rated power.

The project of the electrical part (wind turbine or wind farm) with rated active power up to 1 MW of a power plant to be connected to the network shall be approved by the network operator. For real-time measurement of the produced or consumed electricity at the power plant the producer shall install a bi-directional active and reactive energy meter with a load curve recorder with a remote reading device. In order to connect a power plant with rated active power from 1 to 10 MW to the network, the project of the electrical part of the power plant to be connected shall be submitted to the network operator for approval. If the power plant is connected to the distribution network, the distribution network operator shall coordinate the project with the system operator. As a rule, a power plant with rated active power of over 5 MW is connected to the transmission network.

Compared to other power plants there are several supplementary requirements applied to wind turbines and wind farms according to Grid Code:

The connection of a wind turbine to the distribution network shall be approved by the transmission network operator. The transmission network operator shall make the corresponding decision within 30 days after the receipt of the application;

The project of the electrical part of the wind farm shall be approved by the network operator. As a rule, the network operator makes the relevant decision within 30 days after the

No.	Type of renewable energy resources	In 2010 and further 10 years, %
1	Wind stations (power less than 0,25 MW)	0,27
2	Wind stations (power bigger than 0,25 MW)	5,10

According to Electricity Market Law, at the beginning of 2011 approximately 200 permits are issued for installation of new production powers. Only four of them are aimed to be in the offshore area of the Baltic Sea. No permits are aiming for the Gulf of Riga. The respective permits are not exclusive, though. A competition will be organized for the locations suitable for the wind park construction.

On Public Utilities commissions (2000) – the law determines inclusion of power industry in the list of sectors regulated by the commission. In the supply of electric power it is necessary to regulate the production of the power in the power stations where the installed capacity exceeds 1MW. The same applies to distribution if the electric voltage is between 1 kV and 110 kV, to transmission if the voltage is 110 kV and higher, and to trade if the total trade volume exceeds 4000 MWh per year.

The Public Utilities commission also regulates the prices of electric power.

Electricity Tax Act (2006) – the law determines that ***electric power obtained from the renewable resources is exempted from taxation.*** Otherwise the fee is 0,71 LVL per MWh. Release from the taxation is applied if the origin of the power is confirmed by:

- the type of power production defined in the permit or licence;

receipt of the application. If the circumstances require a more detailed inspection, the decision will be made within 60 days after the receipt of the application.

All wind farms with the rated active power of over 10 MW shall be connected to the transmission network and the following relay protection shall be installed to wind turbines: overload protection, overcurrent protection, overvoltage and undervoltage protection, frequency protection, overspeed protection.

In case of wind turbines with the rated active power of over 1 MW, a backup protection and a backup automatic disconnection shall be installed to a point from the connection point towards the network. It must be possible to control the power variation speed of the wind turbines and of the wind farms to be connected to the transmission network in case of changes in wind speed. The requirements for control shall be laid down in the connection contract.

The following requirements shall be applied to the control of active power of a wind turbine or a wind farm with the rated active power of over 200kW:

- the active power of the wind turbine or the wind farm shall remain within the limits prescribed by the transmission network operator, the permitted deviation is $\pm 5\%$;
- the limit of active power shall be controlled by one central signal. The limit value may be transmitted by an external signal by using the network frequency or the circuit-breaker or by other appropriate means;
- control algorithms and set points shall be changed by remote control;
- it shall be possible to reduce the active power output in case of quick curtailment at least to 20% of the rated

- confirmation of electric power origin (in respect to renewable resources);
- technical documentation of the industrial equipment – in connection with the autonomous producer or in case the producer does not hold the confirmation of the origin.

All other physical or legal persons producing, distributing, supplying or trading with electrical power should pay the tax. Also persons producing the electricity for self consumption and not exceeded 2 MW of total power are released from the taxation. Thus households installing small wind power stations and ensuring autonomous power supply are supported.

Currently a new version of Renewable Energy Law is developed for implementation of 2009/28/EC Directive. The draft law envisages the gradual increase of renewable energy share in the total consumption of electricity till 2020 as shown in the table below:

2011 - 2012	Not less than 34,08 %
2013 - 2014	Not less than 34,82 %
2015 - 2016	Not less than 35,93 %
2017 - 2018	Not less than 37,04 %
2019 - 2020	No less than 40,00 %

To achieve these aims Ministry of Economy is laying down an Action Plan for Latvian Renewable energy. Later also municipalities will be asked to develop similar plans.

Currently in Kurzeme wind parks with only 200 MW total capacity can be connected to the existing network.

More powerful network is mandatory for connection of larger capacities. Widening of high voltage network „Kurzemes

active power within less than 2 seconds.

The following requirements shall apply to the control of the reactive power of a wind turbine or a wind farm:

- the reactive power required for wind turbine operation shall be produced on site. The reactive power supplied to or consumed from the network must be minimum. The permitted deviation is $\pm 10\%$ of the rated active power.
- in case of network disturbances the network operator must have the possibility to control the reactive power output of a wind turbine or wind farm with the rated active power of over 200 kW in the whole extent of the technically possible reactive power reserve. Automatic control of reactive power may be necessary if switching on and off of the connected wind turbine or wind farm or the lines connecting the wind farm to the network causes inadmissible voltage fluctuations for the consumers;
- reactive power output shall be controlled by voltage on the upper-voltage or low-voltage side of the wind turbine. In the latter case current compensation shall be used;
- the reactive power output shall be controlled by one central signal;
- control set points and algorithms shall be changed by remote control.

If the rated active power of wind turbine or wind farm exceeds 200 kW, the measurement results of active and reactive power supplied to the network and voltage shall be sent to the control centre of the service area of the network operator in real time. For that purpose, the appropriate measuring devices shall be installed to the wind turbine or the wind farm in accordance with the connection contract.

loks” is currently ongoing and the expected completion is at the end of 2018. Afterwards additional 300 MW will be possible to receive in the network. Thus, a large share of now planned sea wind parks will not be connected to network, as already the issued four permits cover capacity of 1375MW. The transfer options of produced power are sought by the developers themselves – to conduct the power in the networks of other countries. In future several network connections with neighbouring countries – Estonia and Lithuania – are planned. These connections would enlarge the safety of the network and amount of connected power.

Networks ensure the link between the electricity producers and delivery to the end users. When transferring the electric power to the network the Grid Code Rule issued according to Electricity Market Law should be followed. Rule determines requirements for grid operators and transmission system operators, as well as technical rules for cross border connections and state inland grid.

Grid operator in the grid needs to maintain a certain power level:

- in 110 kV net – 100-123 kV;
- in 330 kV net – 300 – 362 kV.

In accordance with the Electricity Market Law, one transmission system operator acts in Latvia and its licenced activity zone is the whole territory of Latvia. The licence is issued to joint-stock company “High voltage network” until 2025.

The following special requirements shall be applied to wind turbines and wind farms:

- the remote control system must enable to switch the wind farm on and off the transmission network and to send there the position and fault signals and measurement results in real time (active and reactive power, current and voltage);
- the data on wind speed measurement and the data specifying the state of the wind farm or wind turbine and the reason for tripping of the wind farm shall be sent from the wind turbine or wind farm connected to the transmission network in real time. For that purpose, the devices specified in the connection contract shall be installed in the wind farm.

More specific requirements for connecting wind turbine installations to the power network are prescribed by Enterprise standard EE 10421629 ST 7:2001 “Technical Requirements for Connecting Wind Turbine Installations to the Power Network”.

Electricity Market Act regulates the generation, transmission, sale, export, import and transit of electricity and the economic and technical management of the power system. The Act prescribes the principles for the operation of the electricity market based on the need to ensure an effective supply of electricity at reasonable prices and meeting environmental requirements and the needs of customers, and on the balanced, environmentally clean and long-term use of energy sources. This act applies for wind turbines and wind farms generating electricity using installations which have a total net capacity exceeding 100 kW and which are connected to the system. It is important to stress that while the owner of wind turbine can be

private person or legal person then an electricity undertaking is according to the Electricity Market Act only a public limited company or a private limited company which is entered in the commercial register or is being founded. The share capital of a producer or seller shall be at least 31 950 EUR but this is not applicable if the producer generate electricity at generating installations having a total net capacity of less than 100 kW.

Wind energy producer has the right to sell electricity as fixed supply to a seller designated by the transmission network operator or to receive support from the distribution network operator for the electricity supplied and sold to the network.

A seller designated by the transmission network operator shall purchase, however not more than the fixed supply, the electricity actually generated and supplied to the network on the basis of the application of the producer producing energy from wind at a price which is 0.0537 EUR for a kilowatt-hour.

Conditions of support and purchase obligation for wind energy are valid only if:

- the electricity has been generated by means of a generating installation conforming to the requirements of this Electricity market Act and the Grid Code;
- a wind energy producer have valid environmental permits and do not contravene the permits;
- a wind energy producer have not got grant by state investment support scheme.

A clear limitation enacted by the Electricity Market Act is that a producer who uses wind as the source of energy may use the purchase obligation until the total amount of 600 GWh electricity is generated from windpower in Estonia in a calendar

year. A separate accounting is kept for each calendar year. To inform producers about actual quantity of energy in compliance with purchase obligation the transmission network operator shall publish on its website a forecast concerning the quantity of the electricity produced from windpower during the given calendar year by calendar months and a forecast for achieving the quantity of electricity specified as limit for purchase obligation (600 GWh as in 2011) for the current calendar year on the basis of the actual quantity of electricity actually generated from windpower during preceding months. The customer shall bear the expenses arising from financing of the wind energy support and the purchase obligation (except wind energy produced by installations on the basis of investment grants by state investment support scheme) according to the volume of consumption of the network services.

Planning and Building

Based on the Planning Act the Estonian spatial planning system represents a participatory, comprehensive hierarchical system including mandatory, legally binding top-down delegation from national via county level to municipalities. The emphasis in planning process lies greatly on municipalities followed by weakened county administration. The Planning Act ensures that planning synthesizes the interests of the society with respect to land use and contributes to the protection of the environment. On national level, spatial development policy's tasks lie generally with the Ministry of the Interior, assisted by the Ministry of the Environment which strengthens the connections between planning and environmental issues.

National planning (*üleriigiline planeering*) and county planning

Planning and Building

Territorial Planning Law (2002) – envisages the development of the territorial planning at three levels – of local, planning regions and national. The territorial plans identify the allowed types of land use for each respective territory. The law applies only in the mainland (up to the border of the highest waves or to the administrative border of the local municipality). The territorial planning of a municipality documents the actual land use and outlines the future utilization.

Nowadays a new planning law is elaborated (Territorial Development Planning Law) stipulating the start of maritime spatial planning till 1 January, 2014. The law will change the list of the documents necessary during the territorial planning.

On the national planning level the strategic planning is

(*maakonna planeering*) could be treated as strategic planning, while comprehensive and detailed planning pertain to land use, functional zoning and environmental and infrastructure planning. On the regional level, county governments ensure the implementation of national and regional objectives of spatial development, perform quality control and address planning appeals. County and comprehensive plans may be prepared as thematic plans with specific objectives. County planning formulates the strategy and concepts for the general physical and economic development of the county, balances national and local interests and forms the basis for long-term sustainable development. Comprehensive planning (*üldplaneering*) provides guidelines and a land use overview of development aiming to outline the main objectives of long-term sustainable development, establish general conditions for land use and functional zoning, and determine the location of principal technical network routes and engineering constructions. Detailed planning (*detailplaneering*) is the basis for land use, buildings, network and vegetation in plots. A detailed plan is prepared for a part of the territory of a rural municipality or city and it serves as the basis for building activities and land use in the short term. All major plans are subject to environmental appraisal.

Currently valid national plan Estonia 2010 (“Eesti 2010”) had no clear vision to use wind energy except small-scale wind farms in context of local regional development on West-Estonian islands and west coast e.g. Pakri. In new national plan under compilation Estonia 2030+ (“Eesti 2030+”) renewable energy, including wind energy and offshore wind farms and international power network connections have higher priority. In current working documents of the national plan Estonia 2030+

performed by the Ministry of Environment and regional development. At the lower levels the planning becomes more detailed. Municipalities carry out the planning at the local level – currently to a very detailed extent. The coming Territorial Development Planning Law will establish another procedures and at the rural areas the extent of planning will not be so detailed anymore. The planning will be necessary just for the cities, towns and villages

The current Latvian strategic document LIAS 2030 provides just approximate areas where the wind parks could be possible together with rough estimates of possible capacities.

On the regional level the planning regions of Kurzeme and Riga have their own development programmes where growth of RES and implementation of new energy sources are supported. The programme of Riga Planning region envisages the consideration of landscape and important migratory bird areas in the planning of wind power stations. In the programme of Kurzeme Planning region the possibility of self-ensuring regional power system is foreseen and chances to export the residual power to other areas or countries. Kurzeme has large rural areas and suitable locations for the power production can be found also corresponding to the requirements of environmental protection. However, no specific locations are determined for the wind farm construction.

On the level of local municipalities wind farms almost do not appear in the territorial plans - when most of the municipality plans were developed, installation of wind farms was not so important. Therefore none of the local municipalities bordering the Gulf of Riga has the thematic plan for the wind farm

offshore wind farms are envisaged in NW Estonia, west of major islands and in Gulf of Riga. Onshore wind farms are planned along coastal regions including eastern and northern coast of Gulf of Riga.

On land

A building permit, issued by the local municipality, is required for construction of wind turbines or wind farms (Planning Act, Building Act). In most cases, planning procedures and an (strategic) environmental impact assessment are prerequisites for issuance of the building permit.

Main planning procedure on land requires at least detailed planning in case of stand alone wind turbine for commercial energy production (>100 kW) or small wind farms (less than 5 wind turbines with total installed capacity up to 7.5 MW). However, prior conformity to comprehensive plan is highly recommended even in case of small scale wind farm development despite of possibility that in the event of justified need, a detailed plan may include proposals to amend an adopted comprehensive plan. This clause has been heavily utilized in Estonia in former years as only limited number of local governments have designated wind farm areas in their comprehensive plan (e.g. Noarootsi, Hanila). The situation is changed during last years when *ad hoc* planning of small wind farms has lessen, larger wind farms are subject of stricter planning procedure (“*object of significant spatial impact*”) and stronger public opposition has been observed.

Wind farms consisting of more than 5 wind turbines with total installed capacity higher than 7.5 MW or single wind turbine with installed capacity higher than 7.5 MW is called as “*object*

development.

On land

Binding regulations of the local municipalities

The territorial planning (TP) of local government and the regulations on territorial use and building should be considered when installing the wind parks on land. Approaches of TPs regulating the construction of wind parks differ. In most cases the installation of wind parks is between the allowed ways of utilization. Part of municipalities have not regarded the building of wind parks in their territories yet. In addition, detailed planning should be elaborated for the installation (*Territorial planning regulations of the local government*). The funding of detailed plan is covered by the developer or the local government. Supervision and confirmation of the detailed plan is also done by the local government. Owners of wind turbines on land can be private or legal persons.

Several cases are defined when the detailed plan is necessary for planning of wind farms:

- in the allocated area foreseen in the territorial planning of local government;
- new building in the protective zone of coastal dunes of the Baltic Sea and the Gulf of Riga;
- if the planned building creates necessity for complex technical solutions.

In addition a building permit, issued by the local government, is required for construction of wind turbines or

of significant spatial impact” in Estonian planning legislation context. Upon selection of the location for an object of significant spatial impact, the preparation of a comprehensive plan is mandatory. The size of the comprehensive planning area in the case of an object of significant spatial impact shall be determined by the county governor in co-operation with the local government concerned and concertation therefore shall be sought from the Minister of the Environment.

Due to cross-border character of larger wind farms and adjacent wind farms the thematic plans of wind energy can be compiled to specify or amend the comprehensive plan or county plan for the territories or parts of the territories of several rural municipalities or counties if there is mutual agreement between the local governments/counties concerned. First guidance material containing spatial wind energy thematic plan in extent of thematic county plan was compiled in 2001 in Saare County - Action Plan of Energy Use Strategy in Saaremaa Until 2015 ("Saaremaa energiakasutuse strateegia tegevuskava aastani 2015"), and first legally binding cross-border thematic wind energy county plan compiled jointly by 4 counties (Pärnu, Saare, Hiiu and Lääne County) is under preparation in 2010-2011.

Offshore

Different of on land planning procedure the main legislative regulation of offshore wind farm planning is related to the Water Act.

The Water Act regulates the use and protection of water, and relations between landowners and water users, the provisions of the Act also apply to the exclusive economic zone of Estonia. The state owns the inland sea, the territorial sea and the parts of transboundary water bodies located in Estonia that have

wind farms (Construction Law).

If a separate wind turbine is installed for the needs of a household and the protective zone of turbine does not exceed the borders of a plot, then the detailed plan is not required. Still, if the height of turbine is higher than 20 m, environmental impact assessment should be performed.

Currently the regulations by the Construction Law apply to onshore wind farm building. However, the Construction Law envisages to set a special regulation for building in the territorial sea and EEZ. This regulation is being developed and after the coming into force will be binding until the confirmation of Maritime Spatial Plan.

The opposition of local inhabitants towards construction of wind farms is increasing in the areas of local governments where building of wind farms has been initiated. Development of several wind farms has been stopped due to the negative attitude of locals. Further development of these wind farms depends on the sentence of Constitutional Court.

Offshore

Marine Environment Protection and Management Act (2009) – can be regarded as a basic law for marine wind park development in Latvia. The law anticipates issuing several regulations of Cabinet of Ministers in 2011 for wind park development procedure in the sea. The legislative base for the wind park development will be defined to a large extent when these regulations will come in force.

The law regulates actions in the continental shelf and EEZ as well as construction of buildings and islands in the marine territorial and inner waters.

importance in context of offshore wind farm development. Special use of water is the use of water with technical equipment, constructions or substances which could affect the condition of a water body or aquifer and this is regulated by the Water Act. A permit for the special use of water is required to operate offshore wind turbine or wind farm. For constructions of offshore wind turbines a building permission must be sought from the Ministry of Economic Affairs and Communications. The building permission is with a specified term (50 years) with option to prolong for additional 50 years period. The proposal for treatment of the submitted application of building permission by the Ministry of Economic Affairs and Communications will start after relevant supervision and concertation sought from the Ministry of the Environment, Ministry of Defence, Water Board, Aviation Board and National Heritage Board.

The owner of the structure not permanently attached to the shore must pay an annual charge for encumbering a public water body with such a structure. Payments for encumbering a public water body with offshore wind turbines are enacted by the Electricity Market Act. The area subjected to annual charge for encumbering a public water body is consisting of the width of the wind turbines and the area comprising of territory between single wind turbines within the distance of 1000 metres each other based on the width of the wind turbines and required supporting infrastructural objects.

If several building permission are sought for the same public water body the application that conform best to national social and economic interest, national strategic documents is accepted. If this distinction is not applicable building permission is granted to first applicant. Treatment of all other submitted applications of building permission is rejected by the Government.

Transition regulations envisage that Cabinet of Ministers decides on wind park location in the respective permit or licence area in the territorial sea, continental shelf and EEZ until the maritime spatial planning is not in force. The decision of Cabinet is coordinated by sectoral ministries and afterwards confirmed by the Cabinet.

Latvian Republic State Border Law (2009) – defines the borders of the state and also the baseline for separation of territorial sea and inland waters.

Law on the State Border of the Republic of Latvia defines that the Latvian part of Gulf of Riga consists of:

1. inland waters (the waters on the landwardside of the bide line);
2. territorial sea (from the baseline to the state border set by the intergovernmental contract).(Fig.8)

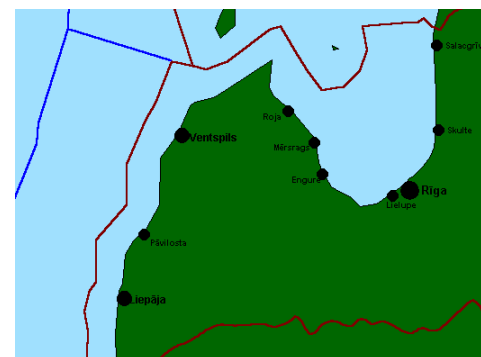


Fig. 8. Latvian territorial sea boundary in the Gulf of Riga

The owner of Latvian part of Gulf of Riga is the State of Latvia – according to the Civil Law. The state owns the sea

To build submarine power transmission cables permission has to be applied by Ministry of Communication and Economic Affairs and the decision is made by the Government. However, permission granted by the Government does not substitute the permit for the special use of water, requirements by the Economic Zone Act and the Maritime Safety Act nor any building and planning permissions required on shore in relation with cable, power network and buildings.

depths, waters and air space. The state owns seacoast up to the point which can be reached by the highest waves. Gulf of Riga waters are public waters.

Construction Law (1995) – ***Ministry of Economics is currently developing a new Construction Law.*** The law applies to all kinds of buildings in the Republic of Latvia both mainland and territorial sea. ***The law foresees that Cabinet of Ministers can establish a particular building regulation in the territorial sea and EEZ. The regulation is under development.***

Water Act (2002) – the law covers zone up to 1 nautical mile from the baseline and applies to the coastal and inland waters. The law envisages the rights of the water user to build if the permits are received and the limitations observed.

The current procedure for marine wind park installation according to the existing legislation:

1. The interested investor who wants to develop a marine WP has to submit an application to the Ministry of Economy (ME). Then the licence area in the sea is determined and harmonized with five other ministries – Environment and Regional Development; Agricultural; Transport; Defence; Internal Affairs.
2. In the duration of 30 days ME makes a decision and issues a permit to introduce new industrial equipment or to enlarge the production capacity, foreseeing the planned power and deadline. The permit does not provide exclusive rights on the particular licence area.
3. The Public Utilities Commission issues a licence for

production of renewable energy at the wind power station.

4. The Cabinet of Ministers issues an order allowing to perform investigations – elaborate a pre-project (while the MSP is not in force). The order is harmonized with the abovementioned ministries.

5. The investor develops a construction plan and performs EIA.

6. The Cabinet of Ministers makes a decision accepting the planned activities.

7. ME organizes a bid to rent the respective licence area for WP construction and power production.

8. The winner of the bid gets the permission to use the state's sovereign rights for 30 years (two taxes are paid – for the use of the licence area and nature resource tax for the obtained wind resources).

9. The Cabinet of Ministers makes a decision allowing to perform the construction at the respective licence area.

The current procedure for onshore wind park installation according to the existing legislation:

1. Ministry of Economics issues a permit to increase the power production capacity or to install new capacities.

2. The Public Utility commission delivers licence (if the installed capacity exceeds 1 MW);

3. Permit of Grid operator to connect the power station to the Grid.

4. Decision of Environment State Bureau on environmental impact assessment or technical regulations issued by State Environmental Service (if the height of wind turbine is more than 20m).

5. Permit of State Environmental Service to perform a polluting activity – the construction of large wind farms with the installed

capacity more than 125 MW is the C category polluting activity.

6. In case the producer aims at obtaining selling rights within the mandatory purchase, a decision by the Ministry of Economics on qualification for the purchase is necessary.

7. Electricity tariff confirmed by the Public Utility commission is needed.

Missing regulations:

1. Land rent in the sea - to determine the institution entitled to sign the rent contracts with the developers of WPs in the name of the state.
2. Regulation how the licence area is defined in the sea (should be ready till 01 April 2011, according to the 'Marine Law').
3. Regulation how the bid on the rights to use the licence area in the sea should be organized (should be ready till 01 April 2011, according to the 'Marine Law').
4. Regulation how the licence or permit to use the licence area in the sea should be issued, stopped or canceled (should be ready till 01 April 2011, according to the 'Marine Law').
5. Regulation on the taxation order and amount for the use of the licence area and on the possible immunity from the tax (should be ready till 01 April 2011, according to the 'Marine Law').
6. Changes in the Law on Natural Resources determining the need to pay the tax for the produced wind power (already announced in the State Secretary level);
7. Regulation on construction works in the sea, the exploitation of constructed objects and their deconstruction after the complete stop of activities (should be ready till 01 April 2011, according to the 'Marine Law').

Environmental Impact Assessment

Environmental impact shall be assessed upon application for or application for amendment of a development consent if the proposed activity which is the basis for application for or amendment of the development consent potentially results in significant environmental impact and always if activities are proposed which alone or in conjunction with other activities may potentially significantly affect a Natura 2000 site.

Environmental impact is considered as significant if it may potentially exceed the environmental capacity of a site, cause irreversible changes to the environment, endanger human health and well-being, the environment, cultural heritage or property.

According to the Environmental Impact Assessment and Environmental Management System Act the following wind energy related activities are considered with significant environmental impact:

- installation of wind farms in water bodies;
- construction of overhead electrical power lines with a voltage of 220 kV or more and a length of more than 15 km;
- activities for which the obligation to carry out environmental impact assessment arises from a strategic planning document which is the basis for the activities.

In addition based on Government regulation No. 224 (29.08.2005) a detailed list of areas of activities is enacted where assessment of environmental impact should be considered for in subject of energy:

- Installation of 5 or more wind turbines with total installed capacity 7.5 MW or more on land and
- construction of overhead electrical power lines with a

Environmental Impact Assessment

On Environmental Impact Assessment (1998) – depending on the selected location for the wind farm construction, it is necessary to perform:

- initial assessment or
- full environmental impact assessment.

If the wind parks are installed within the marine protected areas and Natura 2000 areas the environmental impact assessment should be performed.

The initial assessment is required for following activities:

1. construction of wind power stations, if the height of the building exceeds 20m;
2. construction of wind power station in the territorial sea and EEZ of Republic of Latvia.

The initial assessment is performed in order to estimate whether the intended activities require the impact assessment. The intended activities are coordinated with sector ministries.

If the activities are planned in inner waters, territorial sea or EEZ, necessary documents – application, report on environmental impact assessment and resolution of Environment State Bureau on the report – should be submitted at the Ministries of

- Environment protection and regional development;
- Defence;
- Internal Affairs;
- Transport;
- Agriculture;
- Economics.

Ministries provide a resolution on the planned activity. The

voltage of 35-220 kV and a length of more than 15 km. However, assessment of environmental impact should be required in addition to above mentioned activities on the basis of the decision-makers preliminary estimate if any significant environmental impact is expected according to the following criterion:

- the environmental conditions of the site of the activity and its vicinity, e.g. the existing land use, the natural resources present in the site, the characteristics and regeneration capability of such resources and the absorption capacity of the natural environment. Assessment of the absorption capacity of the natural environment shall, above all, be based on the absorption capacity of wetlands, shores, banks of water-bodies, relieves, forests, protected natural objects, including Natura 2000 sites, sites where the requirements established by legislation are already exceeded, densely populated areas within the meaning of the Land Reform Act and sites possessing historical, cultural or archaeological value;
- the nature of the activities, including their technological level, use of natural resources, volume of waste generation and volume of energy demand, and other activities in the vicinity;
- the consequences associated with the activities, e.g. water, soil or air pollution, waste generation, noise, vibration, light, heat, radiation and smell;
- the possibility that emergency situations resulting from the activities arise;
- the presumed impact of the proposed activities on a Natura 2000 site or any other protected natural object;

decision to accept or reject the intended activity is drawn by the Cabinet of Ministers.

Environmental impact assessment and initial assessment are financed by the initiator of the planned economical activity.

The regional board of the State Environment Service carries out the initial assessment while the report on environmental impact assessment is produced by environmental expert, chosen by the developer. Experts do not need any license yet.

In case the building of wind farms is planned in inland waters, territorial sea or EEZ for realization of the initial assessment the initiator submits at least two alternatives regarding the location of the foreseen activity or the used technologies to the State Environment Board.

Environmental impact assessment is performed taking into account the following criteria:

- scale of the planned activities;
- mutual and cumulative effects of the planned activity and other actions,
- use of natural resources,
- waste generation,
- pollution and disturbances,
- risk of emergency situations (technologies or the utilized substances);
- current land use,
- density of population at the respective area,
- historically and archaeologically important landscapes or with a heritage value,
- impact of the planned activity on protected nature areas, internationally significant wetlands, small size restricted

- the magnitude, spatial extent, duration, frequency and reversibility, effect and cumulativeness of the impact and the transboundary impact and the probability of the impact.

Due to the number of above mentioned criteria attributable to the operation of wind turbines it is the contemporary good practice in Estonia that the Environmental Impact Assessment is required for installation of any commercial wind turbines (including stand alone turbines) or wind farms even so the strict criteria of the Environmental Impact Assessment and Environmental Management System Act do not require (e.g. installation of less than 5 wind turbines with total installed capacity less than 7.5 MW on land).

In context of EIA procedure it is important to bear in mind that a person who proposes an activity and intends to carry it out (developer) shall organise environmental impact assessment and the developer shall cover the expenses related to environmental impact assessment. Environmental impact shall be assessed or environmental impact assessment shall be directed by a natural person who holds a licence for environmental impact assessment, or a legal person through an employee holding a relevant licence (expert) and the licence is issued by the Minister of the Environment. An expert shall involve specialists in environmental impact assessment if the qualification of the expert is not sufficient for environmental impact assessment. The Ministry of the Environment is the supervisor over environmental impact assessment if the Ministry of the Environment issued a development consent or if potential environmental impact of the activities may become transboundary but in all other cases a supervisor over

areas, protected coastal zone of the Baltic Sea and the Gulf of Riga, protective zones around water scoops and water bodies,

- the potential effect of the planned activity on the protected species, their habitats and the protected biotopes,
- the magnitude, spatial extent, duration, frequency and reversibility, effect and cumulativeness of the possible impact, the transboundary impact and the probability of the impact.

During the process of the environmental impact assessment if the wind farm is planned onshore, the involvement of public should occur several times. At first the initial public discussion should be organized when the information about the planned wind farm construction is published in the local newspaper and local inhabitants have the opportunity to express their opinion. When the report on impact assessment is completed, it is made available for public through posting at the web page of the State Environment Service.

In case the small wind power stations (height less than 20m) are planned, a developer submits an application to the State Environment Service and technical regulations are issued.

environmental impact assessment is the Environmental Board. The decision-maker is the issuer of a development consent (normally in case of on land wind farms the Environmental Board, but in case of expected transboundary effect or offshore wind farms the Ministry of the Environment).

Limiting factors

The Nature Conservation Act is to:

- protect the natural environment by promoting the preservation of biodiversity through ensuring the natural habitats and the populations of species of wild fauna, flora and fungi at a favourable conservation status;
- preserve natural environments of cultural or esthetical value, or elements thereof;
- promote the sustainable use of natural resources.

Nature conservation is carried out by means of restricting the use of areas important from the aspect of preservation of the natural environment, by regulating activities involving specimens of species of wild fauna, flora and fungi, specimens of fossils and minerals.

The following protected natural objects are distinguished by the Nature Conservation Act:

- protected areas;
- limited-conservation area;
- species protection sites;
- protected species, fossils and minerals;
- protected natural monuments;
- natural objects protected on local government level.

Protected areas are national parks, nature reserves and landscape

Limiting factors

On Spatially Protected Nature Territories (PNT) (1993) – identifies PNTs in the Republic of Latvia. In the territories of the coastal municipalities 32 PNTs are located near the Gulf of Riga (22 restricted areas, 6 nature parks, 1 biosphere reserve, 2 national parks and 1 protected landscape area). Five marine protected areas are in the Gulf of Riga which will be determined as Natura 2000 sites in the future (Fig.10). Allowed activities are described in the regulations specific for each PNT or if these regulations are missing – in the general regulations on protection and usage of the territories. In some PNTs a construction of wind parks is allowed.

19 PNTs have the specific regulations on protection and usage of the territory
18 PNTs have not the specific regulations on protection and usage of the territory

In PNTs without the respective specific regulations the construction of wind parks is permitted at following locations:

Nature reserves	Severe regime zone	Optional activities are forbidden
	Controlled regime zone	Optional activities are forbidden
National parks	Severe regime zone	Optional activities are forbidden

conservation areas (Fig.9) They are maintained in a state unaltered by human activity or used subject to special requirements where the natural environment is preserved, protected, restored, researched or introduced.

Limited-conservation areas are areas designated for the conservation of habitats, for the preservation of which the impact of planned activities is estimated and activities liable to damage the favourable conservation status of the habitats are prohibited.

Species protection site is an area located outside of a protected area or in the limited management zone of a protected area, delimited and used pursuant to special requirements.

Protected natural monument is an animate or inanimate natural object such as a tree, spring, erratic, waterfall, rapid, bluff, terrace, outcrop, cave or karstic form or system which is protected on the basis of the Nature Conservation Act.

Natural objects protected on local government level are a landscape, valuable arable land, valuable natural biotic community, individual landscape object, park, green area or an individual object of a green area which has not placed under protection as a protected natural monument and is not located within a protected area of other categories.

	Controlled regime zone	Optional activities are forbidden
	Restricted zone	The small wind power stations are allowed – wheel Ø<5m or the highest point <30m.
	Protected landscape zone	The small wind power stations are allowed with the permission of NCA* – wheel Ø<5m or the highest point <30m.
Biosphere reserves	Restricted zone	The small wind power stations are allowed – wheel Ø<5m or the highest point <30m.
	Protected landscape zone	The small wind power stations are allowed with the permission of NCA* – wheel Ø<5m or the highest point <30m.
Restricted areas	Whole area	The small wind power stations are allowed – wheel Ø<5m or the highest point <30m.
Nature parks	Whole area	The small wind power stations are allowed – wheel Ø<5m or the highest point <30m.
Protected landscape areas	Whole area	The small wind power stations are allowed with the permission of NCA* – wheel Ø<5m or the highest point <30m.

*NCA- Nature Conservation Agency

The specific regulations on protection and usage of the territory are currently under development for the marine

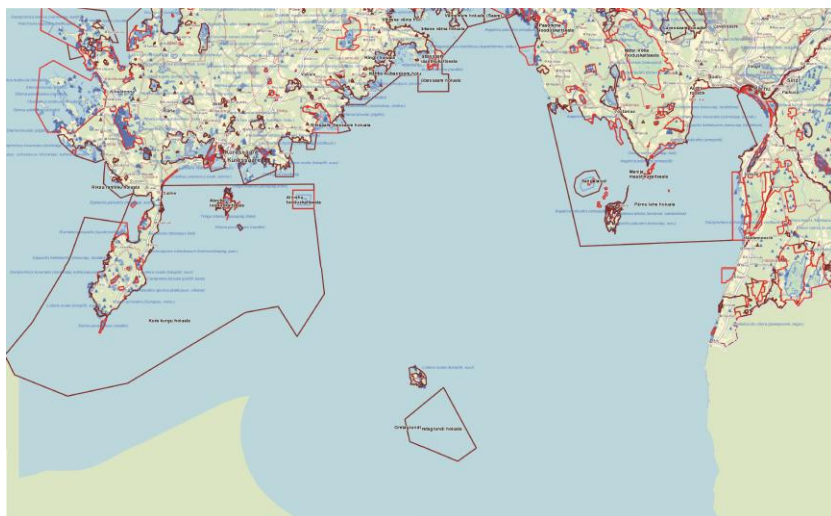


Fig. 9. Protected areas and protected sites in Estonian side of the Gulf of Riga.

While the Nature Conservation Act itself does not impose any wind energy specific restrictions or rules on installation of wind turbines, they are applied through the protection regime of the protected areas or natural monuments. The protection regime of a protected area, species protection site or protected natural monument are established by the protection rules. The protection rules set out the extent of one or several protective zones with equivalent or different degrees of strictness of restrictions, and determine whether the restrictions provided by this Act are applicable in part, in full, permanently or temporarily in each protective zone. General restrictions applicable according to the Nature Conservation Act are that without the express consent of the administrative authority (Environmental Board) of a protected natural object, the following is prohibited within a

protected areas.



Fig.10. Marine protected areas in Latvian part of the Gulf of Riga.

In the established protected areas or outside their borders small restricted areas can be determined for protection of animals, plants and fungi (Law on the Conservation of Species and Biotopes). Restricted areas for bird protection depend on the species and in the breeding sites can be 2-200 ha.

Protection Zone Law (1997) – defines that safety belt should be set on the mainland around the wind generators. The safety belts are established around the generators with capacity higher than 20 kW. The width of the safety belt should be 1.5 times wider than the maximal height of the generator. Within the belt construction of new buildings or reconstruction of existing buildings into dwelling houses is prohibited. The safety belts should be marked with special informative signs „Wind

protected area, limited-conservation area, species protection site or protective zone of a protected natural monument:

- to change the boundaries of the areas of the land use types and the intended use or uses thereof;
- to prepare a land readjustment plan and to perform land readjustment activities;
- to issue a forest management plan;
- to establish a detailed plan and a comprehensive plan;
- to grant consent for the construction of small construction works, including boat landings;
- to issue design criteria;
- to issue building permits.
- to create a new body of water the area of which is larger than five square metres if a permit for special use of water, building permit or consent for the construction of small construction works need not be issued therefor.

Strictly set exclusion zones in context of species protection sites extends up to 500 meters (e.g. surrounding area of nesting tree of a golden eagle) and a limited management zone with the radius of 50 meters is formed around the natural monument under protection unless a smaller radius for the limited management zone is established.

A shore or a bank of a water-body (land zone immediately adjoining a sea, lake, river, reservoir, brook, spring or land improvement system used pursuant to special requirements) is protected under the Nature Conservation Act, however this is not a protected natural object within the meaning of the Nature Conservation Act.

generator safety belt” which are positioned at height of 1,5-2 m. ***This safety belt is the only factor regulating the distance of the potential wind power stations from the border of neighbouring property. No regulations on flickering or vibration exist.***

In the coastal area the protected zone of the Baltic Sea and the Gulf of Riga is defined. It has 3 subtypes of protective zones:

- protective zone of dunes;
- maritime protective zone;
- zone of limited economical activity.

Building of wind farms is allowed at the whole protected zone of the Baltic sea and the Gulf of Riga if the respective territorial planning includes the building of wind power stations. The environmental impact assessment is required before the building and additional restrictions are in force at every of the protective zones.

At the coastal areas in the protective zone of dunes (150-300m) construction of wind parks is possible only in the towns and villages in coordination with the respective regional board of State Environmental Service (if the construction of the wind park is foreseen in the territorial planning of municipality). The building conditions are defined in the territorial planning of the local municipality. In addition the initial environmental impact assessment and the resolution of Environment State Bureau on final report, assessment report is necessary or technical regulations are issued in accordance with the requirements of Law on Environmental Impact Assessment.

Maritime protective zone applies from the site where homogeneous onshore vegetation starts up to the isobaths of 10 m depth in the sea. The restrictions are the same as at the coastal area protective zone. However, the ownership of the maritime protective zone is mixed – part of it is state property and in this

According to restrictions on use the following zones within the area of a shore or bank are distinguished:

- the limited management zone of the shore or bank;
- the building exclusion zone of the shore or bank;
- the water protection zone of the shore or bank.

The baseline for calculation of the width of the zones is the boundary of the water-body (the ordinary boundary of water) entered in the base map. The boundary of an area of repeated flooding on the sea coast is determined in a comprehensive plan. If the boundary of an area of repeated flooding has not been determined, 1 meter high contour line is deemed to be the boundary of the area of repeated flooding. On shore or bank terraces higher than five meters and located less than 200 meters from the water boundary, the limited management zone, water protection zone and building exclusion zone of the shore or bank consist of the area below the terrace extending to the water boundary and the width of the zone.

In the context of installation of wind turbines or wind farms on shore and banks is relevant the building exclusion zones. The width of the building exclusion zones of shores and banks is:

- 200 meters on the sea coast within Narva-Jõesuu city limits, and on the sea-islands;
- 100 meters on the sea coast, and the shores Lake Peipus, Lake Lämmijärv, Lake Pskov and Lake Võrtsjärv;
- 50 meters on the banks of water bodies within cities and towns, and built up areas of small towns and villages with clearly determined boundaries
- 50 meters on the banks of lakes and reservoirs with an area of more than ten hectares, rivers with a catchment area of more than 25 square kilometres, brooks, artificial

part the construction of marine wind parks are according to the respective marine construction requirements. In the other part, owned by the local government the building of wind parks is regulated according to the territorial plan of local government.

In the zone of limited economical activity which is defined as 5 km wide belt from the area where homogeneous onshore vegetation occurs the construction of wind parks is allowed if foreseen in the territorial planning of the local government.

In addition the protective zones near the surface water bodies are determined by law and the width of the zones differ between water bodies. Width of the zones are distinguishing also in rural and urban areas. For rivers and lakes in rural areas protective zone is 10-500m, in urban areas zone is defined in the territorial planning but it shouldn't be lesser than 10 m. In the flooding areas the building exclusion zone is the width of all flooding area.

The width of safety belts of navigation technical hardware (lighthouses, lights of breakwaters and navigation signs, navigation hardware within port aquatoria) is negligible for the construction of wind parks.

Near the electrical lines the width of protective belts depends on the voltage and the location – rural (6,5 – 30 m) or urban (2,5 – 12m) areas.

Fishery Law (1995) – Fish resources in the inland and territorial waters of Latvia are state administrated. Fishing industry is economically important in Latvia. The fisheries policy in the aspect of fish resources management is defined by Ministry of Agriculture. Fisheries business is regulated by issue of special permits and state tax has to be paid for receiving the permit. Ministry of Agriculture allocates catch limits for

recipients of land improvement systems;

- 25 metres in the case of springs and on the banks of lakes and reservoirs with an area of up to ten hectares, rivers with a catchment area of up to 25 square kilometres, brooks, artificial recipients of land improvement systems.

The extent of and restrictions to water protection zones of shores and banks are provided by the Water Act but are less (1-20 meters for natural water bodies and up to 200 meters in case of water scoops) than above listed building restriction zones.

A special case of nature protection is a Natura 2000 network of European Union. In Estonia, the Natura 2000 network of the European Union consist of areas hosting birds of which Estonia has informed the Commission pursuant to Council Directive 79/409/EEC on the conservation of wild birds (OJ L 103, 25.04.1979, pp. 1–18) and areas which, the Commission, pursuant to Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora, considers to be of common European importance. While Natura 2000 sites have so far considered by wind farm developers in Estonia as ordinary nature protection areas “no go” zone for wind energy development, the new EU Guidance on wind energy development in accordance with the EU nature legislation (http://ec.europa.eu/energy/renewables/wind_energy/doc/guidance_wind_farms.pdf) do not prohibit wind energy development but delegate the decision to the member state and require EIA as stated above in chapter Environmental Impact Assessment.

The Heritage Conservation Act regulates the rights and obligations of state and local government authorities and owners

physical persons and legal entities in the Baltic Sea and in the Gulf of Riga beyond the coastal waters. The coastal fishing zone is up to 20 m depth.

- The catch in the coastal waters was 2 643.7 t. in 2009 constituting 1,6% of the total catch in Latvia (marine fisheries). In 2010 the coastal fishing fleet contained 685 fishing boats (length below 12 m) or 86.4% of the total Latvian fishing fleet. However, the capacity of the coastal fleet makes only 2.4% of the total gross capacity and 9,3% of the total engine power.
- Beyond the coastal waters 97 fishing vessels (length between 12 and 40 m) were in operation at the Baltic Sea and the Gulf of Riga in 2010. The catch in 2009 was 73 589.5 tons - 97,0% of the total catch in the sea.

On aviation (1994) – if the height of wind power stations located in the territorial sea reaches 100m they affect the air transport. Special light signs for the airplane pilots should be placed on the wind power station in the sea. Before installation of wind park in the sea a permit issued by Civil aviation agency should be received. At onshore the permit from the agency is necessary before building if the height of the power station exceeds 100 m outside the airfield area (radius of 5 km) or 30 m within the 5 km radius around the airport. If the wind farm is planned in the takeoff area the permit is required independently of the station’s height.

On pollution (2001) – the law declares the installation of the big wind parks as a activity of C category, if the total capacity of WPS or wind park exceeds 125 MW. Activities of this category do not need any special permit.

and possessors of cultural monuments (hereinafter monuments) in organising the protection of monuments and heritage conservation areas and in ensuring the preservation of monuments and heritage conservation areas. Restrictions applicable on immovable monuments and in heritage conservation areas related to wind energy development are the same as applicable to any other development and are prohibited without the permission of the National Heritage Board and the rural municipality or city government. In order to protect immovable monuments protected zones are established. A protected zone is land extending 50 metres from the exterior or boundary of the monument, unless the legal instrument designating a monument prescribes otherwise. In order to avoid the closure of long-distance views to the heritage conservation area and to prevent near the construction the boundaries of the area of the buildings incompatible with those located in the heritage conservation area, the protected zones can be established around heritage conservation areas, within which the requirements and restrictions specified in the statutes of the heritage conservation area apply and this can have significant effect on wind farm development and have to be considered in EIA process.

Several acts impose safety and protection zones that are affecting development of wind turbines. The Aviation Act set that the immediate vicinity of an aerodrome or heliport is the area surrounding the aerodrome or heliport where, for the purposes of ensuring the safety of flight operations, elevation limitations are established for construction works, and where other human activity which may affect flight operations is regulated. The size of the immediate vicinity and the elevation

The Cabinet of Ministers regulates the limits of noise. A municipality has rights to define lower noise limits in order to save the quiet areas in the agglomeration (nowadays in force only in Riga City).

Regulation of noise limits:

No.	Use of the territory	Noise limit values ⁽¹⁾⁽²⁾⁽³⁾		
		L _{day} (dB(A))	L _{evening} (dB(A))	L _{night} (dB(A))
1.	One-storey dwelling houses, territories of hospitals, health resorts, nurseries and social care institutions	50	45	40
2.	Multi-storey dwelling houses, territories of cultural, educational, administrative and research institutions	55	50	45
3.	Buildings with various functions (with apartments)	60	55	45
4.	Territories of hotels, business, trade, servicing, sport and public institutions	60	55	50

The noise created by wind power stations is variable depending of technical parameters of WPP. If the measurements of noise are not required by procedure of environment impact assessment, then only WPP protection belt should be observed. Local municipalities can define the minimal distance between WPP and dwelling houses in their Building regulations.

limitations depend on the aerodrome or heliport category, the length of the runway, the nature of the aviation activities and the extent to which the aerodrome is supplied with air traffic control and radionavigation equipment. The exact measurements and elevation limitations of the immediate vicinity shall be determined by the Government of the Republic.

According to the Aviation Act local governments are required to obtain approval from the Civil Aviation Administration for detailed plans which include construction works which height above ground level exceeds 45 m. Permits for the use of construction works whose height above ground level exceeds 100 m may be issued only with the written consent of the Civil Aviation Administration. Before granting approval or written consent, the Civil Aviation Administration has the right to perform expert assessment of the detailed plan regarding air-navigation, air traffic and air safety. The technical conditions complying with the air safety requirements, the restrictions and a decision to permit construction of an obstacle which penetrates the immediate vicinity obstacle limitation surface issued with the approval of a detailed plan shall be valid for two years. If the designing of the construction works is not commenced in two years, a new approval shall be applied for.

The detailed plans and building design documentation of wind turbines and wind parks shall be approved by the Civil Aviation Administration, the Ministry of Defence and the Border Guard Administration. The Civil Aviation Administration, the Ministry of Defence and the Border Guard Administration have the right to file justified objections against a detailed plan or building design documentation within thirty days. The design criteria issued with a detailed plan shall be valid for two years.

Law On Subterranean Depths (1996) – applies both in the mainland and in the sea. Subterranean depths and all mineral deposits belong to the landowner (to the state in the sea). In inland waters, territorial sea and EEZ the subterranean depths are used within the licence areas regulated by the Cabinet of Ministers – licence of use or permit of use of natural resources is required. For use of subterranean depths in the territorial sea and EEZ a licence issued by State Environment Board is necessary.

The nature resource tax and the fee for use of the licence area should be paid when the wind farms are established.

Law On Protection of Cultural Monuments (1992) includes protection of:

- landscapes and particular areas of heritage value (ancient burial grounds, cemeteries, parks, memorial sites of historical events and outstanding persons),
- particular graves,
- equipment and objects,
- groups of buildings and separate buildings.

The Law contains the list of protected cultural monuments.

The usage of the cultural monuments for the economical or practical purposes is allowed only in the cases if the envisaged activities do not harm the monuments and do not reduce the historic, scientific and artistic value.

The protective zones around the cultural monuments are defined by the State Inspection for Heritage Protection. If not defined specifically then the width of the protective zone is 500 m in the rural areas and 100 m in the urban areas. Any economical or business activity in this zone should be approved by State Inspection for Heritage Protection and the owner of the cultural

Based on the Roads Act and the Railways Act a road/railway protection zone is defined with maximum width of 50 meters. As a good practice in wind farm planning there is additional buffer zone in use which is expressed as: hub height+1/2 rotor diameter. The same type of buffer zone (hub height+1/2 rotor diameter) is applied also along the overhead electrical power lines with a voltage of 35-330 kV instead of 40 meters protection zone defined for overhead electrical power lines with a voltage of 220-330 kV by the Electrical Safety Act. Protection zones of gas, heat and sewage pipes are up to 10 meters dependent of their pressure level.

Noise prevention is one of the main issues within the EIA of wind farm planning, however there is no specific requirements until February 2011 with respect of wind turbine noise. The noise level and noise emissions are assessed in case of wind farms as in case of any other source of noise based on Regulation No. 42 (04.03.2002) of the Minister of Social Affairs Noise level in residential and recreation areas, in dwellings and public buildings and noise measurement methods. Ambient noise level is measured according to ISO1996-1:1982, Acoustics – Description, assessment and measurement of environmental noise – Part 1: Basic quantities and assessment procedures and ISO1996-2:1987, Acoustics – Description, assessment and measurement of environmental noise – Part 2: Determination of environmental noise levels.

According to acceptable level of ambient noise all cadastral units are divided to 4 classes on the basis of comprehensive plan (Table 1).

Table 1. Requested ambient industrial noise levels (dB(A)) for

monument.

Cemeteries without the status of the cultural monument have a protective zone of 300m from the outside border of the cemetery. The local government can include additional restrictions for these protective zones in the territorial plans due to the ethical considerations.

Currently the underwater heritage – ship wrecks in the sea are not protected by this Law.

In the Roads Act (1992) road is considered as a construction outside the border of town or city. All Latvian motor roads are classified according to their importance and ownership:

- state roads (main, regional, local);
- local government and municipality roads;
- merchant roads;
- house roads.

The safety belt along the state, municipal and merchant roads depends on the width of the road and number of lines and fluctuates between 9,5 to 25 m.

Protection Zone Law defines additional protective zones along the state and municipal roads between 30 and 100 m. Along the railway the Law foresees 25-50m wide protective zone in urban areas and 50-100m wide zone in rural territories. In these protective zones any building activities have to be allowed by the road/railway owner or administrator.

newly planned areas.

Land use	Day, dB(A)	Night, dB(A)
1. Natural recreation areas, national parks, recreation areas of hospitals and health resorts	45	35
2. Educational institutions, hospitals, health resorts, nurseries and social care institutions, dwellings, parks in urban regions	50	40
3. Mixed urban regions (dwellings, commercial and servicing, industry)	55	45
4. Industrial regions	65	55

Normally wind turbines and wind farms on land are planned in rural areas, their noise is dependent of wind speed and technical characteristics (i.e. unregulated) and may occur in any time of the day, thus considering their noise emissions as industrial and in EIA 40 dB(A) level is accepted.

As in February 21, 2011 the Ministry of the Environment has submitted for harmonization the draft decree “Planning requirements to reduce noise emissions in ambient air” (http://eoigus.just.ee/?act=10&subact=1&ESILEHT_W=317673). This decree is increasing discretion capacity of the local government to define lower noise limits in any particular area or to limit maximum allowable noise emissions from specific source. The draft decree is directly addressing wind energy as the potential source of annoying noise and call to include noise emission mapping for any wind farm planning activities. In addition it gives to local government the authority to define site specific noise requirements for wind farm plans, however not

retrospectively.

A general limitation that should be taken into account when planning wind farm on land or in offshore area is set by the Earth's Crust Act which limits any building activities in area of mineral reserve if this affects adversely quantity or condition of mineral reserves. If a mineral reserve in state ownership is located within the boundaries of a county or a local government, the county governor shall obtain the approval of the Ministry of the Environment for the county plan and the local government shall obtain the approval of the Ministry of the Environment for the comprehensive and detailed plans before their establishment.

List of relevant legal acts

Sustainable Development Act

<https://www.riigiteataja.ee/ert/act.jsp?id=874359>

Electricity Market Act

<https://www.riigiteataja.ee/ert/act.jsp?id=12894671>

Grid code

<https://www.riigiteataja.ee/akt/13351788>

Economic Zone Act

<https://www.riigiteataja.ee/akt/13318641>

Water Act

<https://www.riigiteataja.ee/akt/123122010041>

Planning Act

<https://www.riigiteataja.ee/akt/13328539>

Building Act

List of relevant legal acts

Civil Law. Property Law

<http://www.likumi.lv/doc.php?id=90221>

On Specially Protected Nature Territories

<http://www.likumi.lv/doc.php?id=59994>

On Aviation

<http://www.likumi.lv/doc.php?mode=DOC&id=57659>

Construction Law

<http://www.likumi.lv/doc.php?id=36531>

Fishery Law <http://www.likumi.lv/doc.php?id=34871>

Law On Subterranean depths

<http://www.likumi.lv/doc.php?id=40249>

Protection Zone Law

<http://www.likumi.lv/doc.php?id=42348>

Energy Law <http://www.likumi.lv/doc.php?id=49833>

On Environmental Impact Assessment

<http://www.likumi.lv/doc.php?id=51522>

On Public Utilities Regulators

<http://www.likumi.lv/doc.php?id=12483>

The Spatial Planning Law

<http://www.likumi.lv/doc.php?id=63109>

Water Act <http://www.likumi.lv/doc.php?id=66885>

<https://www.riigiteataja.ee/akt/13328816>

Environmental Impact Assessment and Environmental Management System Act

<https://www.riigiteataja.ee/akt/116112010013>

Nature Conservation Act

<https://www.riigiteataja.ee/akt/13342186>

Heritage Conservation Act

<https://www.riigiteataja.ee/akt/13335396>

Roads Act <https://www.riigiteataja.ee/akt/13319183>

Railways Act <https://www.riigiteataja.ee/akt/131122010021>

Maritime Boundaries Act <https://www.riigiteataja.ee/akt/24407>

Maritime Safety Act

<https://www.riigiteataja.ee/akt/131122010063>

List of relevant national policy documents

National Development Plan of the Energy Sector until 2020

http://www.mkm.ee/public/ENMAK_EN.pdf

Development Plan of the Estonian Electricity Sector until 2018

<http://www.mkm.ee/index.php?id=321328>

National Development Plan for the Use of Oil Shale for 2008–2015 <http://www.envir.ee/232764>

Estonian National Programme for Reduction of Emission Levels of the Pollutants Released into the Ambient Air by Stationary and Mobile Sources of Pollution for 2006–2015 (draft)

<http://www.envir.ee/462236>

Estonian National Strategy on Sustainable Development

Electricity Market Law

<http://www.likumi.lv/doc.php?id=108834>

Electricity Tax Act <http://www.likumi.lv/doc.php?id=150692>

Marine Environment Protection and Management Act

<http://www.likumi.lv/doc.php?id=221385>

Latvian Republic State Border Law

<http://www.likumi.lv/doc.php?id=201364&from=off>

Renewable Energy Law (draft)

<http://www.mk.gov.lv/lv/mk/tap/?pid=40190380>

Territorial Development Planning Law (draft)

<http://www.mk.gov.lv/lv/mk/tap/?dateFrom=2010-01-01&dateTo=2011-02-24&text=teritorijas+att%C4%ABst%C4%ABbas+pl%C4%81no%C5%A1anas+likums&org=0&area=0&type=0>

List of relevant national policy documents

The Latvian Long-term Development Strategy (LIAS2030)

<http://polsis.mk.gov.lv/docSearch.do?searchtype=ows&clearnav=true>

Energy Development Guidelines 2007 to 2016

<http://polsis.mk.gov.lv/docSearch.do?searchtype=ows&clearnav=true>

Renewable Energy Guidelines for 2006 to 2013

<http://polsis.mk.gov.lv/view.do?id=2091>

Marine Coast Spatial Development Guidelines for 2011 to 2017 (Draft)

<http://www.mk.gov.lv/lv/mk/tap/?pid=40174875>



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"Sustainable Estonia 21"

<https://www.riigiteataja.ee/ert/act.jsp?id=940717>

Estonian Environmental Strategy until 2030

<http://www.envir.ee/1045989>

Estonian Environmental Activity Plan for 2007-2013

<http://www.envir.ee/1045989>

Estonian Research and Development and Innovation Strategy
2007-2013 "Knowledge-based Estonia"

<http://www.hm.ee/index.php?03242>

Estonian Energy Technology Programme

<http://www.hm.ee/index.php?03242>

National plan Estonia 2010

<http://www.siseministeerium.ee/public/tais2010.pdf>

Other relevant documents

Andris Razāns and Anvar Samost, 2010. Lāti-Eesti tulevikukoostöö raport. Ziņojums par Latvijas-Igaunijas nākotnes sadarbību. Latvian-Estonian Future Co-Operation Report.

<http://www.valitsus.ee/et/uudised/taustamaterjalid/6335/eesti-lati-tulevikukoostoo-raport>

EU Guidance on wind energy development in accordance with the EU nature legislation. European Commission, October 2010.

http://ec.europa.eu/environment/nature/natura2000/management/guidance_en.htm

Wind Power in Estonia. An analysis of the possibilities and

Other relevant documents

Energoforums, The energy industry newsletter, discussion, analysis, Nr.5 (27), November 2010.

http://www.latvenergo.lv/pls/portal/docs/PAGE/LATVIAN/ENERGOFORUMS1/LE2010_NOVEMBRIS_LAT.pdf



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limitations for wind power capacity in Estonia within the next 10 years. Prepared by Ea Energy Analyses (Denmark) for Elering OÜ. 21.05.2010.

http://www.ea-energianalyse.dk/projects-english/1001_wind_power_in_estonia.html

Technical Requirements for Connecting Wind Turbine Installations to the Power Network. EE 10421629 ST 7:2001.

http://www.elering.ee/fileadmin/uploads./Klient/Technical_Requirements_for_Connecting_Wind_Turbine_Installations_to_the_Power_Network_01.pdf

Conclusions

Wind energy utilization rate in Estonia and Latvia varies in great extent. On land wind farms have clearly established themselves in Estonian landscapes and development activity in this sector has increasing trend while it is still moderate and mainly in planning stage in Latvia. This is partly due to different tariffs and support schemes but mainly due to constraints in connecting wind turbines to power network. Weak power network in windy regions is similar in both countries, but the problem is solved differently. In Estonia network connection is available until technical limits of the network, any upgrade or reconstruction needed is paid by the developer and the first applicant for grid connection is served first. In case of lack of necessary transmission capacity, the Energy Market Inspectorate in Estonia shall also be notified of refusal. The applicant shall be put to a waiting list and, if possible, a connection offer for maximum available capacity will be made. When additional capacity becomes available, the earliest application gets a connecting offer first. In Latvia grid connection is distributed on the bases of licence system which set strict limit to possible size and amount of wind farms developed in certain time period. In addition to the problems related to weak power networks in coastal regions, the more wide-spread use of wind resources is restricted also by relatively small electric load (both in Estonia and Latvia), great unit capacity and poor manoeuvrability of the existent units and sets of power stations (Estonia). The strong link (interconnection capacity) of the Estonian power system with

the Latvian and Russian, and Latvian system with Swedish, Polish and Russian power systems which enables covering of the unevenness of wind power alleviates partly the problem. The technical limit for the installation of wind generators in the Estonian power system is 400-500 MW as estimated by Elering OÜ or 600 MW before completion Estlink 2 with Finland and 900-1100 MW after Estlink 2 is in operation (Ea Energi Analyse, 2010; http://www.ea-energianalyse.dk/projects-english/1001_wind_power_in_estonia.html). Similar amount (600 MW) is assessed to be also maximum total capacity of wind power plants that can be installed in Latvia. But this requires investments to power networks and power stations both in Estonia and Latvia to ensure the transmission, regulation and the necessary reserves to cover fluctuations in wind power.

Beside grid code and electricity market the main legal framework for wind farm development in Estonia and Latvia is similar but legal acts of both nations have several specific issues regarding the scope, quotation of wind energy in detail or general aspect etc. In Estonia for example nature protection issues are covered by single law on land and marine areas while two separate legal acts are effective in Latvia. In Latvia national maritime spatial plan and Marine Law are developed to handle offshore issues while in Estonia the Water Act and the Electricity Market Act regulate main issues related to development of offshore wind farm construction and grid connection.

While environmental impact assessment regulations are similar in both countries it is better polished in Estonia, especially in context of on land wind farms, because of larger number of developed wind farm projects and higher number of court appeals that have gave basis to improve specific criteria and content of legislative acts. The same is partly valid for offshore wind farms as first full scale EIA are completed in Estonia after long delays due to missing or inconsistent legal acts in relation to planning offshore wind farms. Also, in Estonia there are established some planning restrictions on the basis of “good practice” that could be stricter than set by legislative acts, e.g. safety buffer around main road is set 50 meters by law but hub height + $\frac{1}{2}$ rotor diameter (appr. 120-160 m in most cases) is used according to good practice.

A distinctive difference in handling wind resources in Latvia and Estonia is that Latvia is considering changes in the Law on Natural Resources that determine the need to pay the tax for the produced wind power as already announced in the State Secretary level but Estonia do not have similar plans. As well, state managed licence area for wind farm development in Latvia is different approach than developer oriented site assessment in Estonia which has certain implications to planning paradigm – use of licence area approach enables authoritarian planning and puts higher responsibility on governmental institutions on area suitability/EIA acceptance while Estonias’ approach maintain participatory planning system, leaves area suitability/EIA acceptance as risk of developer, and favour the first developer in particular site.

Both countries need higher stability in legislation, competition between energy producers and co-ordinated development of infrastructure on the basis of long-term vision to increase connection capacity for renewable energy producers.