

C. ESTONIA

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1. INTRODUCTION

The first section of this chapter describes the factual situation with regard to the production and consumption of bioenergy in Estonia, including future prospects. Thereafter, the most important international and European legal instruments that directly influence the national legal framework for bioenergy in Estonia are explored. The third section focuses on the national laws and policies applicable to the fuel and energy sector followed by an analysis of Estonia's environmental legislation. The fifth section zeroes in on legislation applicable to forestry and the cultivation of energy crops. The review concludes by singling out the main features of the legal framework for bioenergy in the country.

1.1 Bioenergy in Estonia: the current situation

Wood-based bioenergy is the most important renewable energy source in Estonia. In 2006, the share of firewood in Estonia's primary energy balance was around 15 percent while the share of hydro and wind energy was around 0.2 percent. Wood-based biomass fuel is mainly used in heat-only boiler plants, sometimes co-fired with peat. Firewood is also used domestically for heating and cooking, especially in rural areas.²⁴ Small amounts of energy are generated from dung in the form of biogas, from wastewater sludge and from municipal and industrial wastes as landfill gas.

The share of bioenergy in Estonia's electricity production remains low. In 2007, the share of renewable energy in Estonia's electricity production was around 1.1 percent and the share of peat 0.1 percent.²⁵ The share of renewable energy increased from 0.3 percent in 2004 due to the construction of several large wind farms in 2005.²⁶ Estonia's Long-Term Development Plan for the Fuel and Energy Sector 2002–2015 also aims to increase cogeneration of heat and power to 20 percent of the total electricity production by the year 2020. Some of this would be based on wood fuels, while the main contribution is expected to come from peat, which is not classified as a renewable energy source.

²⁴ The Estonian Biomass Association, information available at www.eby.ee.

²⁵ Estonian Electricity Market Inspectorate. 2007. Estonian Electricity and Gas Market 2006. Tallinn (hereafter Estonian Electricity and Gas Market 2006).

²⁶ Ministry of the Environment. National Allocation Plan of Estonia for Greenhouse Gas Emission Allowance Trading for Years 2008–2012, available at www.ec.europa.eu (hereafter: Estonia's Second National Allocation Plan under the EU ETS).

Overall, the distinctive feature of the Estonian energy sector is its heavy reliance on oil shale, which is a type of sedimentary rock that is available locally. In 2006, the contribution of oil shale in Estonia's electricity production was 97 percent.²⁷ One of the most important questions for the future of the Estonian fuel and energy sector concerns the use of oil shale. The positive aspects of using oil shale include the security of energy supply and relative independence from the world market prices.²⁸ The currently operating oil shale mines are estimated to guarantee the supply until 2025, and with new mines, the total supply of oil shale could last until 2060.²⁹ The negative aspects of oil shale include environmental damage from the mining and burning of oil shale as well as its low calorific value.³⁰ In 2016, the transition period granted to Estonia for implementation of the EC Directive 2001/80/EC on the limitation of emissions of certain pollutants into the air from large combustion plants shall expire. This means that most of the oil shale-using boilers of the Narva Power Plant – which belongs to the state-owned Eesti Energia and the most significant energy producer in Estonia – will not be able to maintain the European limits for sulphur oxide and nitrous oxides. The question of future electricity thus played a role in Estonia's parliamentary elections in 2007, with opinions ranging from the modernization of the Narva Plants to the construction of more wind farms or the construction of a nuclear power station.³¹

1.2 Future prospects

In line with the European targets on renewable energy sources, the Estonian Government had previously undertaken to increase the share of renewable energy to 5.1 percent of the total energy consumption by 2010. The new EC Directive 2009/28/EC on the promotion of the use energy from renewable sources increases Estonia's national target to 25 percent by 2020 (see Annex I of the EC Directive). Estonia is bound by the European target to increase the share of biofuels and bioliquids in the transport sector to 5.75 percent by 2010 under EC Directive 2003/30/EC on the promotion of the use of biofuels or other renewable fuels for transport. The new EC Directive 2009/28/EC increases the proportion of biofuels to be used in the

²⁷ Estonian Electricity and Gas Market 2006, p. 13.

²⁸ Ministry of Economic Affairs and Communications. Estonia's Long-Term Development Plan for the Fuel and Energy Sector until 2015 (hereafter Estonia's Long-Term Fuel and Energy Sector Development Plan), available at www.legaltext.ee.

²⁹ Estonia's Second National Allocation Plan under the EU ETS, p. 2.

³⁰ Estonia's Long-Term Fuel and Energy Sector Development Plan, p. 3.

³¹ Estonian Electricity and Gas Market 2006, pp. 84 and 85.

transport sector to 10 percent by 2020 and introduces measures aimed at ensuring that the target is achieved in an environmentally sustainable manner.

However, some constraints have been identified to increasing the use of local bioenergy in Estonia. The Estonian Forestry Policy of 2002 attempts to balance the environmental and ecological value of forests with their ability to produce economic and social benefits, and is guided by the principles of sustainable forestry and efficiency of forest management. The maximum felling volume of around 13 million cubic metres in the Forestry Development Programme until 2015 has been characterized as relatively high but can be justified by the current prevalence of middle-aged and mature stands in private forests. After large forest areas reach maturity within the next 10–20 years, the availability of fuel wood is estimated to decrease by 2030.³² On the other hand, a large share of cut fuel wood and wood-processing waste is already being used in the energy conversion processes.³³ Logging waste could be a considerable additional source.

The Long-Term Development Plan for the Fuel and Energy Sector until 2015 estimates that planting of energy forests and energy grass plantations is not economically viable in Estonia. Feasibility studies are currently conducted on short-rotation plantations to cultivate bioenergy from fast-growing trees but their economic viability remains uncertain.³⁴ The Long-Term Fuel and Energy Sector Development Plan also mentions the possibility of using straw for energy production but highlights economic limitations due to the transport distance. According to the Plan, integrated manure handling systems for large farms to generate energy and produce fertilizers are not precluded. Given these constraints, in its second National Allocation Plan under the EU Emissions Trading Scheme for 2008–2012, the Estonian Government thus estimated that most of the new production from renewable energy sources would be based on wind power. "Only a minor increment" was foreseen from biomass in combined heat and power plants given that the most important fuel, peat, is categorized as fossil fuel."³⁵

³² Muiste, P., Roostalu, H., Padari, A., Paist, A., Kask, Y. & Orru, M. 2004.

³³ Estonia's Long-Term Development Plan for the Fuel and Energy Sector until 2015, p. 4.

³⁴ Personal communication with Katrin Heinsoo, Institute of Agricultural and Environmental Sciences, Estonian University of Life Sciences, 23 January 2008.

³⁵ Estonia's National Allocation Plan under the EU ETS, p. 32.

2. INFLUENCE OF INTERNATIONAL AND EUROPEAN LAW

International and European legal instruments have had an important influence on the development of Estonia's legal framework for bioenergy. Estonia is party to the UNFCCC (ratified on 11 May 1994), the Kyoto Protocol (ratified on 14 October 2002) and the Convention on Biological Diversity (ratified on 11 May 1994). It has been a World Trade Organization (WTO) member since 1999.

As a party to the UNFCCC and the Kyoto Protocol, Estonia is obliged to meet its 8 percent greenhouse gas emissions reduction target for the period 2008–2012. In addition, having been a member of the EU since 2004, Estonia participates in the formulation of European environmental and energy policies. It is also obliged to transpose the relevant European legislation into its national legal system. The European regulatory framework encompasses a number of recently introduced instruments that influence the legal framework for bioenergy in Estonia.

2.1 The UNFCCC and Kyoto Protocol

Unlike other countries in this study, Estonia is included in Annex I of the UNFCCC and has a quantitative emissions reduction target under the Kyoto Protocol. Accordingly, Estonia is obliged to reduce its greenhouse gas emissions by 8 percent from its 1990 levels under the Kyoto Protocol's first commitment period (2008–2012). As a new member state, Estonia is not party to the EU's internal burden-sharing agreement concluded in accordance with Article 4 of the Kyoto Protocol by the 15 states that were members of the EU when the EU ratified the Kyoto Protocol in 2002. Achieving Estonia's Kyoto target is not estimated to be problematic, as in 2004 its emissions were 49.7 percent below the 1990 levels.³⁶ This is mainly due to the reorganization and restructuring of the energy, industrial and agricultural sectors in the early 1990s.³⁷

As a country listed in Annex B to the Kyoto Protocol, it is possible for Estonia to participate in all three flexible mechanisms of the Protocol. These include the Joint Implementation (JI) and Clean Development Mechanism (CDM) which are project-based mechanisms and Emissions Trading. Of these, JI and emission trading may create incentives for increasing the use of

³⁶ UNFCCC: Report on the review of the initial report of Estonia (FCCC/IRR/EST), p. 5.

³⁷ Estonia's Second National Allocation Plan under the EU ETS, p. 9.

bioenergy in Estonia. JI is based on the idea that an Annex I country hosting a project that reduces greenhouse gas emissions or enhances their removal through sinks, can sell the remnant emissions (known as emission reduction units or ERUs) to another Annex I country. Thus, projects involving renewable energy, including bioenergy, are strong candidates for JI projects.

Given that emissions in most transition economies have declined from the 1990 levels even without conscious climate policy efforts, they are considered as potential sellers under the Kyoto Protocol's emission trading scheme. To make their 'hot air' more attractive and politically acceptable for buyers, many transition economies are planning to launch so-called Green Investment Schemes (GIS). While such schemes have no legal basis in the Kyoto Protocol, the basic idea of a GIS is that the seller country commits to investing revenues from emission trading in a way that reduces greenhouse gas emissions or leads to other environmental benefits. Depending on national preferences and conditions agreed with buyers, revenues from emission trading could also be used to promote bioenergy projects. Countries that have either already enacted legislation on Green Investment Schemes or are planning to do so include the Czech Republic, Hungary, Latvia, Belarus, Ukraine and Poland. There have also been plans to create a Green Investment Scheme in Estonia, but no legislation exists at the moment.

2.1.1 Estonia's eligibility to participate in the Joint Implementation (JI) and Emission Trading

A country's ability to take advantage of the opportunities provided by the Kyoto mechanisms depends on its fulfilment of the eligibility criteria defined in the international rules adopted under the Kyoto Protocol. The rules applicable to JI are contained in "Guidelines for the Implementation of Article 6 of the Kyoto Protocol",³⁸ while emission trading is guided by the 'Modalities, Rules and Guidelines for Emission Trading.'³⁹

According to the JI Rules, participation in JI requires that a country informs the UNFCCC Secretariat of its national focal point and its national guidelines and procedures for approving JI projects. Estonia has appointed the Ministry of the Environment as its national JI focal point and its national

³⁸ Decision 9/CMP.1 (FCCC/KP/CMP/2005/8/Add. 2, 30 March 2006).

³⁹ Decision 11/CMP.1 (FCCC/KP/CMP/2005/8/Add. 2, 30 March 2006).

JI guidelines are available on the UNFCCC Secretariat's website.⁴⁰ In addition, to be eligible for the so-called JI Track 1 procedures and emission trading, a country must fulfil the following criteria: be a party to the Kyoto Protocol; calculate its Assigned Amount (which is the amount of greenhouse gas emissions that an industrialized country is entitled to emit in accordance with its Kyoto target); have a national greenhouse gas inventory system; have a national greenhouse gas registry; submit the most recent annual greenhouse gas inventory; and submit such supplementary information on the Assigned Amount as required under the Protocol.

The eligibility to participate in the Kyoto mechanisms also involves a review by an Expert Review Team (ERT) of the initial reports of Annex I parties, as well as their subsequent annual reporting. After the expert review, eligibility to participate in the Kyoto Mechanisms is considered by the Enforcement Branch of the Compliance Committee of the Kyoto Protocol. On 15 April 2008, the Enforcement Branch found that Estonia had fulfilled all the initial requirements and was therefore eligible to participate in all three Kyoto mechanisms, including the JI Track 1.⁴¹

2.1.2 Joint Implementation (JI) in Estonia

Prior to the adoption of the Kyoto Protocol and the launch of JI, Estonia had gained some experience on the potential of climate policy instruments to promote the use of bioenergy. In the early 1990s, Estonia and Sweden implemented 21 projects in Estonia under the Activities Implemented Jointly (AIJ) pilot scheme under the UNFCCC. Most of the projects involved the rebuilding of boilers to use local wood fuels instead of imported liquid fuel.⁴² Unlike JI under the Kyoto Protocol, the AIJ scheme did not involve the transfer of carbon credits between the host and investor countries.

As JI was launched in 2000, Estonia has been a relatively active JI host country. It has signed memoranda of understanding on JI cooperation with Finland, Sweden, the Netherlands and Denmark. It is also a party to the Agreement on a Testing Ground for the Application of the Kyoto Mechanisms on Energy Projects in the Baltic Sea Region (BASREC).

⁴⁰ Estonia's Joint Implementation Guidelines (available at www.ji.unfccc.int).

⁴¹ Eligibility under Articles 6, 12 and 17, A list provided by the UNFCCC Secretariat, available at www.unfccc.int.

⁴² Estonia's Fourth National Communication under the UNFCCC, November 2005, p. 80, available at www.unfccc.int.

Of Estonia's current JI projects, four involve the use of bioenergy. Three projects implemented in the early 2000s between Estonia and Finland relate to the conversion of boilers in district heating boiler plants from oil to wood chips. These small projects in Tamsalu, Kadrina and Paide are estimated to generate 178 000 tonnes of Emission Reduction Units (ERUs) by the end of 2012.⁴³ Estonia's fourth bioenergy project is the Saarenmaa Animal Waste Management Bioenergy Project between Estonia and the Baltic Sea Region Testing Ground Facility.

Estonia's largest JI projects, however, involve the construction of wind farms. Although it was the government's view that there would be more potential for bioenergy projects in Estonia, project developers (who tend to represent the private sector) have invested in wind energy.⁴⁴ Overall, Estonia's second National Allocation Plan under the EU emissions trading scheme proposed to set aside 948 531 greenhouse gas emission allowances (corresponding to 1 tonne of CO₂eq each) for existing JI projects during the Kyoto Protocol's first commitment period.⁴⁵ In addition, Estonia proposed to set aside a further 9 547 862 allowances for JI projects at various stages of development. Most of the new JI projects are expected to involve the rapidly developing wind energy sector.

2.2 Bioenergy under European Law

Estonia joined the European Union in 2004. Combating climate change ranks as a high political priority in the EU that has sought to play a leadership role in international climate change negotiations. To implement the Kyoto Protocol, the EU has adopted a number of instruments that have an important influence on the legal framework for bioenergy in Estonia. The most relevant of these are: the target to increase the share of renewable energy to 21 percent by 2010 (with individual targets for each member state); the target to increase the use of biofuels in transport to 2 percent by 2005 and to 5.75 percent by 2010; and setting a price and limitations for greenhouse gas emissions under the Emissions Trading Scheme (ETS).

EC Directive 2004/101 of 27 October 2004 made the EU emission allowance trading scheme compatible with the JI and CDM mechanisms of

⁴³ The website of the Ministry for the Environment contains a list of JI projects and the estimated emission reductions, available at www.envir.ee.

⁴⁴ Personal communication with the Estonian Ministry for the Environment, 25 January 2008.

⁴⁵ Estonia's Second National Allocation Plan under the EU ETS, pp. 7 and 8.

the Kyoto Protocol by enabling operators to use the Kyoto mechanisms in the allowance trading scheme in order to fulfil their obligations. Apart from those pertaining to land use changes and forestry activities (art. 11(3)(b)), credits from JI (emission reduction units) and CDM (certified emission reductions) are equivalent to EU emission allowances. This directive precludes the possibility of emission reduction units and certified emission reductions being counted twice where they result from activities which also lead to a reduction in, or limitation of, emissions installations covered by EC Directive 2003/87 of 13 October 2003 (see section 2.2.1 below) unless an equal number of allowances is cancelled from the registry of the member state of the certified emission reductions' (or emission reduction units) origin.

The EU has also been active in the negotiations relating to the post-2012 period after the expiry of the Kyoto Protocol's first commitment period, and it has already adopted a number of unilateral targets relevant for the post-2012 period. The guiding principle of the EU's climate policy is the "2°C target" – in other words, limiting the global average temperature increase to a maximum of 2° Celsius from pre-industrial times. In May 2007,⁴⁶ the European Council also established targets to: reduce greenhouse gas emissions unilaterally by 20 percent by 2020, or by 30 percent if other countries accept the same level of commitment in the context of global framework on climate change; increase the share of renewable energy in EU's energy consumption to 20 percent by 2020 with national targets for each member state; increase the share of biofuels in transport petrol and diesel to 10 percent in each member state by 2020; and save 20 percent of energy consumption by 2020 through improved energy efficiency.

In January 2008, the European Commission put forward a proposal for a comprehensive "Climate change and renewable energy package", which incorporates measures to fight climate change and promote renewable energy. It was adopted in December 2008 by the European Council and the European Parliament. The objective behind this package is to attain the EU's overall environmental target of a 20 percent reduction in greenhouse gases and a 20 percent share of renewable energy in the EU's total energy consumption by 2020.⁴⁷ Besides Directive 2009/28/EC on renewable energy, a key component of the legislative package is the Directive 2009/29/EC of 23 April 2009 amending Directive 2003/87/EC so as to improve and

⁴⁶ "20 20 by 2020", Europe's Climate Policy Opportunity, 2008.

⁴⁷ For more information see www.eur-lex.europa.eu.

extend the greenhouse gas emission allowance trading scheme of the Community.

The following contains a brief discussion of the key European legal instruments that influence the legal framework for bioenergy in Estonia. Since the new climate and energy legislative package was very recently enacted, it is necessary to provide an overview of the preceding EU instruments that have shaped Estonia's current legislative framework to date, as well as outline the country's commitments under the new directives which must be transposed into the Estonian legal system by 31 December 2012 for Directive 2009/29/EC and 5 December 2010 for Directive 2009/28/EC.

2.2.1 EC framework for renewable energy

Since the mid-1990s, the EU has sought to promote renewable energy. The policy is motivated, *inter alia*, by climate change mitigation objectives, the desire to enhance EU's energy security and to promote sustainable development as well as regional and rural development. The transport sector accounts for the most rapid increase in greenhouse gas emissions within the EU. In addition to the potential to reduce greenhouse gas emissions, biofuels could improve energy security by tackling oil dependence. However, they are more expensive to produce than other forms of renewable energy.

The EU renewable energy framework was underpinned primarily by two instruments, EC Directives 2001/77/EC on the promotion of electricity produced from renewable energy sources in the internal electricity market (RES-E Directive) and 2003/30/EC on the promotion of the use of biofuels or other renewable fuels for transport, both of which have now been repealed by EC Directive 2009/28/EC on the promotion of the use energy from renewable sources.

EC Directive 2003/30/EC on the promotion of the use of biofuels for transport set the minimum proportion of biofuels and other renewable fuels to replace diesel and petrol at 2 percent by 2005, and 5.75 percent by 2010 (art. 3). Any measures taken to meet these targets must consider the overall climate and environmental balance of various types of biofuels (art. 3(4)). The directive also contains reporting requirements of member states to the Commission. The different types of biofuels include bioethanol, biodiesel, biogas, biomethanol, biodimethylether, bio-ETBE, bio-MTBE, synthetic hydrocarbons, biohydrogen and pure vegetable oil (art. 2). According to the

Commission, the 2 percent target for 2005 was not achieved and the estimated share of biofuels by the end of 2010 stood at 4.2 percent in 2008.⁴⁸

Biofuels were estimated to need financial support to compete with conventional fuels. The Directive 2003/96/EC restructuring the Community framework for taxation of energy products and electricity⁴⁹ lays down a legal framework for fiscal and other national measures to promote biofuels. It contains specific provisions for reducing tax rates on energy from biomass and allowing for tax differentiation as a promotional measure. Other possible measures include the promotion of biofuels in public transport and information campaigns on the benefits and availability of biofuels.⁵⁰

The RES-E Directive created a medium-term framework that was designed to increase electricity generated from renewable energy sources. It established an indicative target of 21 percent for renewable energy sources in the total energy consumption of EU members by 2010. According to the Commission's assessment in 2008, the existing policies and measures were estimated to lead to 19 percent share of renewable energy in the EU's electricity production by 2010.⁵¹ The directive also defines indicative targets for each member state; the figure for Estonia was 5.1 percent by 2010. This target is reflected in Estonia's Long-Term Development Plan for the Fuel and Energy Sector, which will be reviewed in detail below. The RES-E Directive also encourages the use of national support schemes for renewable energy. As it will also be discussed below, Estonia's Electricity Market Act contains measures to support the production of electricity from renewable energy sources. The directive indicates that member states are to fulfil their national targets (which vary greatly) through mechanisms such as support schemes. The directive also provides for a system for guaranteeing the origin of renewable energy. Grid access is another key feature of the directive whereby states are required to take the necessary measures to grant guaranteed or where appropriate, priority access.

The new Renewable Energy Directive is similar in structure and content to the two directives it replaces. Directive 2009/28/EC stipulates that the mandatory national target for the overall share of renewable energy in gross final consumption of energy in 2020 is at least its national overall target for

⁴⁸ COM(2008) 30 of 23 January 2008, available at www.ec.europa.

⁴⁹ *Official Journal* L 283 of 31 October 2003.

⁵⁰ Fagernäs, L. *et al.* 2006.

⁵¹ COM(2008) 30 of 23 January 2008, p. 3, available at www.ec.europa.

the share of energy from renewable sources that year (art. 3(1)). The figure is established at 25 percent for Estonia. In order to reach this target Estonia is allowed, *inter alia*, to establish support schemes or undertake cooperation schemes with other countries. The directive contains provisions on joint projects between member states and third countries.

Each member state is further required to fulfil at least 10 percent of its final consumption of energy from renewable sources in the transport sector by 2020 (art. 3(4)). National renewable energy action plans are to be adopted which set out national targets for energy from renewable sources in transport, electricity, heating and cooling in 2020 and the measures taken to achieve them (art. 4).

Article 15 of the directive refers to "guarantees of origin" for electricity, heating and cooling produced from renewable energy sources, for the purposes of proving to the final customer and to enhance transparency. A competent body shall be designated to issue guarantees of origin and maintain national registers. Under article 16, appropriate steps must be taken by member states to develop transmission and distribution infrastructure. System operators must provide for either priority access or guaranteed access to the grid, and shall make public their standard rules relating to the bearing and sharing of costs of technical adaptations. The directive also contains provisions facilitating administrative procedures and requires the latter to be clear, transparent and non-discriminatory. The use of renewable energy should be taken into account when renovating or constructing public buildings and incorporated in building regulations. It governs statistical transfers between member states, and accessing networks and information.

The sustainability criteria for biofuels and bioliquids contained in this directive have precipitated much international discussion in relation to trade concerns, particularly with developing countries. According to these criteria, the greenhouse gas emission savings from the use of biofuel and bioliquids must be at least 35 percent (the directive provides for the methods of calculating this). Biofuels must not be cultivated from areas with a high biodiversity value, or with high carbon stock (within or external to the Community). In addition, agricultural raw materials cultivated in the Community must comply with environmental requirements of Annex II to Council Regulation (EC) No. 73/2009 of 19 January 2009 establishing common rules for direct support schemes for farmers under the common agricultural policy and establishing certain support schemes for farmers. The

directive contains verification mechanisms to monitor compliance with sustainability criteria (art. 18).

Member states are required to report to the Commission on the promotion and use of energy from renewable sources by 2011 and then subsequently, biannually until December 2021, based on which the Commission will drop up a monitoring and analysis report (art. 22). One aspect of the report detail includes how support schemes consider "renewable energy applications that give additional benefits in relation to other, comparable applications, but may also have higher costs, including biofuels made from wastes, residues, non-food cellulosic material, and ligno-cellulosic material."

Specifically relating to the transport sector, the directive asserts in article 21(2):

For the purposes of demonstrating compliance with national renewable energy obligations placed on operators and the target for the use of energy from renewable sources in all forms of transport [...], the contribution made by biofuels produced from wastes, residues, non-food cellulosic material, and ligno-cellulosic material shall be considered to be twice that made by other biofuels.

2.2.2 EU Emissions Trading Scheme (EU ETS)

One of the most important elements of EU's climate policy is the emissions trading scheme, launched in 2005. The scheme is designed to help EU member states achieve their targets under the Kyoto Protocol. Through the EU ETS, some 10 000 installations have been given quantitative limits for their carbon dioxide emissions. As the first multinational emissions trading scheme in the world, the EU ETS has been a key force driving the rapidly emerging carbon markets. By setting a price for carbon dioxide emissions, the EU ETS can also be expected to create an economic incentive to increase the use of renewable energy sources, including bioenergy. "An EU strategy for biofuels", a Commission Communication dated 8 February 2006,⁵² highlighted the advantages of biofuels in terms of reduced emissions of greenhouse gases.

⁵² COM(2006) 34 final – *Official Journal* C67 of 18 March 2006.

The EU ETS was created through EC Directive 2003/87/EC establishing a scheme for greenhouse gas emission allowance trading within the Community. The initial phase of the EU ETS covered the period 2005–2007 and its second phase overlaps with the first commitment period under the Kyoto Protocol from 2008 to 2012. Directive 2003/87/EC mandates all installations carrying out activities in the energy sector among others, and which emit carbon dioxide to be in possession of a permit. (During the first and second phases, the coverage of the scheme is limited to carbon dioxide emissions). As noted in section 2.2 above, in 2004, the regulatory framework for the EU ETS was complemented by the Linking Directive 2004/101/EC, which made it possible for member states to allow installations to use credits from the Clean Development Mechanism and JI under the EU ETS.

To implement the first two trading periods under the EU ETS, member states were required to prepare a National Allocation Plan (NAP) for each trading period in consultation with the relevant stakeholders. The NAP determined and justified emissions allowances for each participating installation and set aside a reserve for new entrants. In formulating the NAP, member states had to take into consideration comments from the public. The European Commission reviewed and approved the NAPs. During the first phase of the ETS, the allocations in many countries proved to be close to "business-as-usual" emissions scenarios, which was reflected in the low prices of the European Emissions Allowances (EUAs) at the end of the first trading period. For the second period, the Commission took a stricter stance and requested several countries to tighten their proposed allocations. The Commission decided to cut Estonia's proposed allocation by approximately 50 percent but the Estonian Government has challenged the Commission's decision at the European Court of Justice.

As a part of the EU's comprehensive climate and renewable energy package, several important changes were introduced to the EU ETS. From 2012 onwards, the EU ETS will cover emissions from the vast majority of flights landing in and taking off from the EU, including foreign airlines.⁵³ During its third phase from 2013–2020, the EU ETS will also cover new industries and greenhouse gases, an annually declining EU-wide emissions cap will be introduced and the auctioning of allowances will be significantly increased.⁵⁴

⁵³ Directive 2008/101/EC of the European Parliament and of the Council of 19 November 2008 amending Directive 2003/87/EC so as to include aviation activities in the scheme for greenhouse gas emission allowance trading within the Community (2008) OJ L8/3.

⁵⁴ Directive 2009/29/EC of the European Parliament and of the Council of 23 April 2009.

In other words, the EU ETS will include carbon dioxide emissions from petrochemicals, ammonia and aluminium as well as nitrous dioxide and perfluorocarbon emissions from certain sectors from 2013 onwards (Annex I). Directive 2009/29/EC of 23 April 2009 (amending Directive 2003/87/EC so as to improve and extend the greenhouse gas emission allowance trading scheme of the Community) does not apply to installations used for research, development or testing, nor does it apply to installations *exclusively* using biomass (Annex I). All of the total quantity of allowances must be auctioned which are not allocated free of charge (art. 10). According to article 10(2), 88 percent of this total shall be distributed in shares that are identical to the share of verified emissions for 2005, or the average of the figure from the period 2005 to 2007 (whichever is higher); ten percent of the total shall be distributed amongst certain member states for the sake of solidarity and growth (Estonia is among these and benefits from an increase in percentage allowances to be auctioned of 42 percent); and the remaining 2 percent of allowances to be auctioned, are to be distributed amongst member states, the greenhouse gas emissions of which were at least 20 percent below their emissions in the base year applicable to them under the Kyoto Protocol (Annex II(b) establishes this figure as 6 percent for Estonia).

This directive replaces national allocations with an EU-wide cap, to be defined by the Commission in 2010 on the basis of allocations for the second trading period (art. 9). Importantly, the EU-wide cap will decrease in a linear manner between 2013 and 2020 (art. 9). Member states are required to ensure that operators of installations submit duly substantiated and independently verified emissions data in order for them to be taken into account for the adjustment of the Community-wide quantity of allowances (art. 9(2)). The directive also provides that at least 50 percent of the revenue from auctioning the allowances must be spent in order to, *inter alia*, reduce greenhouse gas emissions, develop renewable energies to meet the 2020 commitment of the EU or addresses social aspects in lower and middle-income households (art. 10). As the results of the post-2012 climate change negotiations under the UNFCCC are not yet known, the directive also foresees the possibility of measures to support energy intensive industries in the event of carbon leakage (art. 10(b)).

2.2.3 Combined heat and power generation

As a part of its environmental and energy policy, the EU has also adopted measures to promote combined heat and power generation. This is a process

where electricity and heat are produced simultaneously through a single process that has the effect of saving energy.⁵⁵ The EU's measures in this field are mainly based on the EC Directive 2004/8/EC on the promotion of cogeneration based on a useful heat demand in the internal energy market.

The short-term objective of the directive is to support existing combined heat and power generation (CHP) installations and create a level playing field in the market. In the long- and medium-term it also aims to ensure that high-efficiency CHP is considered when planning new capacity. Member states can also continue or create new support schemes for CHP. Given its climatic conditions, heating plays an important role in Estonia. As it will be discussed below, the Long-Term Development Plan for the Fuel and Energy Sector thus sets a target to increase cogeneration by 2020. From the beginning of 2007, Estonia's Electricity Market Act was amended so that certain cogeneration facilities can choose between a subsidy and a more favourable tariff.

2.2.4 Waste

The EU's regulatory framework contains a number of directives regulating waste, including: EC Directive 2006/12/EC on waste; Directive 1999/31/EC on the landfill of waste (known as the Landfill Directive); and Directive 2000/76/EC on incineration of waste.

One of the objectives of the Landfill Directive is to reduce methane emissions from landfills and enhance the separate collection of biodegradable waste (paras. 16 and 17 of the preamble). Therefore, the disposal of untreated biodegradable waste to landfills has to be reduced according to the timetable laid down in the directive (art. 5). This article stipulates that member states must adopt national strategies to comply with the targets contained in the directive. In addition, they will have to increase recycling, composting of biodegradable waste, production of biogas and other forms of recovery.

There are links between these directives and bioenergy use. According to the Directive 2009/28/EC landfill gas, sewage treatment plant gas and biogases are considered as renewable energy (art. 2). The primary motive for the

⁵⁵ Fagernäs, L. *et al.* 2006.

collection of landfill gas is reducing greenhouse gas emissions into the atmosphere; energy production provides an additional benefit.

3. THE NATIONAL LEGAL AND POLICY FRAMEWORK FOR BIOENERGY

3.1 Energy policy and legislation

The legal framework for the Estonian energy markets was created in 1998 through the enactment of the Energy Act. The Energy Act was subsequently replaced by four separate Acts: the Electricity Market Act (2003); the District Heating Act (2003); the Natural Gas Act (2003); and the Liquid Fuel Act (2003).

The Electricity Market Act is the most relevant for the legal framework for bioenergy, as it contains a support scheme for renewable energy and cogeneration of heat and power. The fuel and energy sector is also affected by the applicable tax laws, of which the Value Added Tax Act (subjecting all energy to 18 percent VAT rate) and the Alcohol, Tobacco and Fuel Excise Duty Act contain provisions relevant to bioenergy.

3.1.1 Electricity Market Act

The Electricity Market Act of 2003 (RT I 2003, 25, 153) regulates the generation, transmission, sale, export, import and transit of electricity, and the economic and technical management of the power system (art. 1). It defines the operating principles for 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 resources" (art. 1(1)).

Between 2003 and 2007, the Electricity Market Act contained an obligation for network operators to purchase electricity produced from renewable energy sources at a more favourable tariff of 81 Estonian Crown cents per kilowatt hour.⁵⁶ However, according to the Estonian Energy Market Inspectorate, the scheme was not transparent enough as customers did not have a clear picture of how much they were paying for renewable energy. From 1 May 2007 onwards, a new support scheme has been in place for

⁵⁶ Estonian Electricity and Gas Market 2006, p. 26.

energy produced from renewable sources and for heat and power cogeneration (RT I 2007, 23, 120, adopted on 15 February 2007 and in force since 1 May 2007). Accordingly, producers have two options. They can either sell electricity at a fixed, favourable tariff, or receive a subsidy and sell electricity at market price.

Article 57(1) of the Act includes hydro, wind, solar, wave, tidal and geothermal energy sources, landfill gas, sewage treatment plant gas, biogases and biomass as renewable energy resources. Article 57(2) contains a definition of biomass as "the biodegradable fraction of products, waste and residues from agriculture (including vegetal and animal substances), forestry and related industries, as well as the biodegradable fraction of industrial and municipal waste."

The basis for the support scheme for renewable energy is contained in article 58(1), which provides that:

A 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 if it is generated:

- 1) from a renewable energy source with a generating installation which has a net capacity not exceeding 100 MW;
- 2) in efficient cogeneration regime of waste within the meaning of the Waste Act, peat or oil-shale processing retort gas is used as a source of energy; and
- 3) in efficient cogeneration regime with a cogeneration installation which is established instead of a power station which supplies customers with heat and which has the electric capacity not exceeding 10 MW.

Efficient cogeneration is thus subsidized if waste, peat or retorting gas from oil shale processing is used as source of energy production, or if the combined heat and power plant replaces existing district heating supply boiler plant with the capacity not exceeding 10 megawatts. Wind energy will be subsidized until the total annual wind energy production in Estonia exceeds 400 gigawatt hours (art. 59(4)). According to article 58(4), the purchase obligation tariff for renewable energy sources is 115 Estonian crown cents per kilowatt hour and 81 Estonian crown cents per kilowatt

hour for efficient cogeneration. The subsidy for renewable energy sources is 84 Estonian crown cents per kilowatt hour and 50 Estonian crown cents per kilowatt hour for efficient cogeneration (art. 58(6)). Both the subsidy and the purchase obligation are financed through the transmission network operator. At the beginning of each year, the transmission operator estimates the necessary amount of subsidy and divides it between distribution operators proportionate to their sale volume. The distributor adds the amount in their distribution service bills. The Estonian Electricity Market Inspectorate estimates that, within the next five years, the increase in consumer prices will be around 8.9 percent.

In addition to the support scheme in the Electricity Market Act, it has been possible to enhance the economic attractiveness of renewable energy projects through the sale of carbon credits under JI and Kyoto Protocol's emissions trading scheme. Taken together, JI and the Electricity Market Act have given an important boost to the production of wind energy in Estonia. In theory, similar incentives would be available for bioenergy projects but so far, most of Estonia's new renewable electricity production has come from wind power while biomass is used mostly for heating.

3.1.2 Alcohol, Tobacco and Fuel Excise Duty Act

The Alcohol, Tobacco and Fuel Excise Duty Act of 2003 (RT I 2003, 2, 17)⁵⁷ regulates excise duties on fuels and contains provisions to promote the use of biofuels by exempting them from the fuel excise duty.

Article 1(2) of the Alcohol, Tobacco and Fuel Excise Duty Act explains the Combined Nomenclature (CN) codes that are used for classification of goods in Europe. The CN codes used in the Alcohol, Tobacco and Fuel Excise Duty Act are contained in Council Regulation 2658/87/EEC as at 31 December 1992 and the commodity codes for fuel are based on the CN as at 1 January 2002. In the Act, CN codes are used, *inter alia*, to define biofuels.

In accordance with article 19(4) of the act, biofuel means fuel:

- 1) for which the first four digits of the CN code are 1507–1518;
- 2) which is produced from biomass, including fuel for which

⁵⁷ An English translation is available at www.legaltext.ee.

the eight digits of the CN code are 3824 90 55 or 3824 90 80–3824 90 99. The biodegradable fraction of products from agriculture, including vegetal and animal substances, products, waste and residues from forestry and the biodegradable fraction of industrial and municipal waste is deemed to be biomass;

- 3) for which the eight digits of the CN code are 2207 20 00 or 2905 11 00 and which are not of synthetic origin; and
- 4) which is produced from biomass, including fuel for which the first four digits of the CN code are 4401 or 4402.

Article 27 of the Act regulates exemptions from excise duty. Biofuels are exempt from excise duties after the issuance by the European Commission of a permit for the exemption of the biofuels from excise duty until the expiry of the permit. There is a separate provision exempting biofuels derived from biomass for which the first four digits of the CN code are 4401 or 4402 (art. 19(14)(4)). Where biofuel has been added to the motor fuel before the expiry of the permit issued by the European Commission, the amount of biofuel contained in that fuel is exempt for excise duty.

Article 69 covers biofuel permits and reporting. The rights to produce biofuel that is exempted from excise duty, to import such fuel to Estonia and to release such fuel for consumption is granted by biofuel permits. These permits are issued by the Tax and Customs Board for a period of six years. The holder of a biofuel permit must report annually to the Tax and Customs Board and provide: the name, CN code and quantity of biofuel released for consumption; the value of biodiesel released for consumption and the energy value of biofuel released for consumption (art. 69(5)). Failure to submit the report may lead to the suspension of the permit. The permit will be revoked if circumstances for its suspension continue after 30 days or if the biofuel permit holder applies to cancel the permit.

3.1.3 Long-Term Development Plan for the Fuel and Energy Sector until 2015

In 2004, the government adopted the Long-Term Development Plan for the Fuel and Energy Sector until 2015. The Plan is based on the Sustainable Development Act (1995, discussed in section 3.2.1 below) and is intended to direct the development of the Estonian fuel and energy sector until 2015. It also lays down some general trends until the year 2020.

The key strategic objectives of the Plan include ensuring fuel and energy supply with the required quality and optimal prices, and stabilizing Estonia's primary energy consumption at 2003 levels until 2010. The strategic objectives relevant for bioenergy include ensuring that by 2010, renewable energy forms 5.1 percent of the gross consumption; by 2020, electricity produced in combined heat and power production stations forms 20 percent of the gross consumption; and the development of measures which enable the use of renewable liquid fuels, particularly biodiesel, in the transport sector.

This Plan envisages, *inter alia*, the following steps for the development of the Estonian fuel and energy sector:

- increasing the proportion of peat, biofuels and wind power in the primary energy balance and decreasing the consumption of oil shale;
- continuing to increase the proportion of renewable energy beyond 2015;
- preserving the existing combined heat and power generation capacity and encouraging the establishment of new capacity. By the year 2020, the proportion of electricity produced through CHP increases from 13 percent to 20 percent; and
- developing measures necessary to enable the use of renewable liquid fuels in the transport sector.

The 5.1 percent target for renewable energy by 2010 was in line with Estonia's national target under the RES-E Directive. Directive 2009/28/EC on the promotion of the use of energy from renewable sources increases Estonia's target to 25 percent of total energy consumption by 2020, thereby requiring an update of the national policy and regulatory framework.⁵⁸

On the future prospects to increase the use of bioenergy in Estonia, the Plan indicates that a large share of cut fuel wood and wood-processing waste is already being used in the energy conversion processes. While logging waste could be a considerable additional source, the Plan identifies some constraints to increasing the use of bioenergy. First, the large-scale export of biofuels has resulted in a lack of local resources. Secondly logging waste contains a small heat load. Finally, new equipment producing only heat has already been installed in areas with a favourable heat load.

⁵⁸ See www.ecc.europa.eu.

The Plan estimates that the planting of energy forests and energy grass plantations is not economically viable in Estonia. It mentions the possibility of using straw for energy production, but highlights the economic limitations of this which arise due to the transport distance. It also states that after chopping, it is possible to use wetlands plants in addition to, for instance, wood chips. It also indicates that integrated handling systems for manure from large farms to generate energy and produce fertilizer should not be precluded.

The Plan highlights that damage to landscape resulting from the cultivation and production of bioenergy must be given sufficient attention, and stresses the utility of environmental impact assessments. It indicates that in order to integrate the energy sector and environmental policies, business people should be involved in the formation of ecological reserves, particularly in regions with renewable energy potential which are rich in oil shale resources.

The Plan stresses that peat is a competitive local fuel for small-scale power industries, in boiler plants and small combined heat and power production stations. Peat can also be burned with oil shale in the renovated energy blocks of the Narva Power Station. The Plan thus states that the use of peat in the Estonian power industry is slowly increasing. However, the peat supply decreases by 2.5–3 million tonnes every year through the decay process which actually increases the amount of carbon dioxide in the atmosphere. Furthermore, environmental protection objectives, including the Natura 2000, a European-wide network of protected areas which protects natural moors,⁵⁹ significantly affect the ability to use of peat. This means that only peat from drained swamp areas can be used and new areas cannot be drained until 2025.

The Plan envisages support measures to promote the use of renewable energy. Such measures include Joint Implementation under the Kyoto Protocol and the EU's structural instruments and the Cohesion Fund. Also included is the obligation in the Electricity Market Act for network operators to purchase renewable electricity at a more favourable, fixed price. It should be noted that this law came into effect in 2003 but was modified in 2007 to include the option for renewable electricity producers to choose a subsidy instead of a fixed tariff.

⁵⁹ See Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora.

When adopted in 2004, the Plan estimated that the main renewable energy sources in Estonia would be combined heat and power production based on biofuels and wind power, although small-scale hydro industries and Estonia's obligations concerning the incineration of waste based on Directive 2000/76/EC were also mentioned. In 2006, Estonia's second National Allocation Plan under the EU ETS estimated that most of the new production from renewable energy sources would be based on wind power. "Only a minor increment" was foreseen from the use of biomass in combined heat and power plants given that the most important fuel, peat, is categorized as fossil fuel.⁶⁰

The Plan indicates that the consumption of motor fuel is expected to increase by 1–3 percent annually due to the growing number of motor vehicles. Estonia has an obligation under Directive 2003/30/EC to ensure that the indicative proportion of biofuel and other renewable fuels was 2 percent of all the diesel and petrol fuels on the market for transportation purposes by 2006 and that it will be 5.75 percent by the year 2011, calculated based on the energy value of the fuels. The Long-Term Fuel and Energy Sector Development Plan thus envisages the development of measures to enable the use of renewable liquid fuels, particularly biodiesel, in the transport sector. Such measures have subsequently been adopted by exempting biofuels from the fuel excise duty.

3.1.4 Electricity Market Development Plan 2005–2015

The Estonian Electricity Market Development Plan 2005–2015, adopted in 2006 on the basis of the Electricity Market Act, complements the Long-Term Fuel and Energy Sector Development Plan. It specifies the targets for electricity production from renewable sources up to 2015 as shown in Box 1.⁶¹

⁶⁰ Estonia's second National Allocation Plan under the EU ETS, p. 32.

⁶¹ The Estonian Electricity Market Development Plan 2005–2015, p. 20, available at www.riigiteataja.ee.

Box 1: Targets for electricity production from renewable sources up to 2015

year	wind (%)	solid biofuels (%)	others (%)
2005	1.0	0.2	0.3
2010	2.2	2.5	0.4
2015	4	3	0.5

3.2 Environmental policies and legislation

Environmental law in Estonia has developed rapidly in two phases: the period following Estonia's independence in 1991 until 1996 was marked by the rapid adoption of the most urgent laws. The period from 1997 onwards has seen the transposition of European environmental regulations into the Estonian national legal system.⁶² This transposition was based on Estonia's National Programme for the Adoption of the *Acquis*.⁶³

3.2.1 General environmental laws

The basic environmental law in Estonia is the Sustainable Development Act of 1995 (RT I 1995, 31, 384), which lays down general principles of sustainable development and serves as the basis for all environment-related legislation and relevant national programmes. The principles contained in the Act are reflected in laws and regulations concerning the energy, industrial and transport sectors.⁶⁴

In addition to the Sustainable Development Act, other general environmental laws affect the overall legal framework applicable to

⁶² Veinia, H. 2007. Codifying environmental law in Estonia: reasons, objectives and choices. *Juridica VII*.

⁶³ Estonia's National Programme for the Adoption of the *Acquis*, available at www.dspace.utlib.ee. The Community *acquis* refers to the body of common rights and obligations, which binds all the EU member states. It comprises: the content, principles and political objectives of the Treaties; legislation adopted in the application of the Treaties; the case law of the European Court of Justice; international agreements concluded by the EC/EU; and soft law instruments adopted by EU institutions. Applicant countries to the EU have to accept the Community *acquis* as a condition to join the Union and have to implement it from the date of accession.

⁶⁴ Estonia's Fourth National Communication under the UNFCCC.

bioenergy by laying down requirements for environmental impact assessment, environmental permitting, environmental supervision, etc., that influence the utilization of Estonia's forest resources as well as waste management, animal farming and agriculture. One such law is the Environmental Monitoring Act of 1999 (RT I 1999, 10, 15)⁶⁵ that regulates environmental monitoring as well as the processing and storage of the data obtained (art. 1). The objective of environmental monitoring is to assess, *inter alia*, the state of the environment and changes, and the amount and state of renewable natural resources, as well as to obtain information on the development of programmes and development plans (art. 2).

The Environmental Impact Assessment and Environmental Management System Act of 2005 (RT I 2005, 15, 87),⁶⁶ regulates environmental impact assessment and strategic environmental impact assessment (art. 1). It also covers participation in the European Community Eco-Management and Auditing Scheme (EMAS) and the issuance of eco-labels (art. 1). Activities with significant environmental impacts that are subject to mandatory environmental impact assessment include closure of landfills of more than 1.5 hectares; construction of facilities for large-scale rearing of pigs, poultry and bovine animals; and conversion of forest lands and wetlands of more than 100 hectares (arts. 5 and 6). Decision-makers are also required to determine whether activities in fields such as agriculture, energy, food production, waste management, waste water treatment and disposal of animal waste are expected to have significant environmental impacts (art. 6). The Act lays down detailed procedures governing environmental impact assessments and strategic environmental impact assessment, including supervision by the Ministry of the Environment, experts qualified to perform assessments and their licensing, publication of programmes and reports as well as interpretation of the results (arts. 14–20). Similar detailed requirements are also included for strategic environmental impact assessment of legal acts and strategic planning documents. The Act stipulates that legal acts that regulate, *inter alia*, agriculture, forestry and energy must be subject to strategic environmental impact assessment (arts. 31–33).

The Integrated Pollution Prevention and Control Act of 2001 (RT I 2001, 85, 512)⁶⁷ defines environmentally hazardous activities and lays down principles for the integrated prevention and control of pollution from such

⁶⁵ An English translation is available at www.legaltext.ee.

⁶⁶ *Ibid.*

⁶⁷ An English translation is available at www.eel.nl.

activities (art. 1). It contains procedures for the issuance of integrated environmental permits (chapter 2). Activities requiring integrated environmental permits that could be relevant for the production of bioenergy include animal farming, electricity production, waste management, as well as disposal and recovery of animal waste (art. 7). Chapter 3 of the Act contains provisions on access to information on integrated environmental permits, including granting a right to the general public to make written proposals to the person responsible for issuing permits before a draft permit is sent to the applicant for opinion, and the obligation of the issuing authority to hold public sessions under certain conditions.

The Environmental Supervision Act of 2001 (RT 2001, 56, 337)⁶⁸ specifies the rights and obligations of persons and agencies that either enforce, or are subject to environmental supervision. For the purposes of the Act, environmental supervision means an inspection of the legality of activities which use natural resources or affect the status of the environment (art. 2). It also covers compliance with planning and land use requirements. The institutions responsible for environmental supervision are the Environmental Inspectorate, the Land Board and local government bodies and agencies (art. 3). Environmental protection inspectors may issue precepts to ensure the legality of environmental protection and use of natural resources (arts. 21–24). The Act provides that the Environmental Inspectorate and Land Board must analyse the effects of environmental legislation in the relevant sectors and make proposals for enhancing environmental protection (art. 8).

The Nature Conservation Act of 2004 (RT I 2004, 38, 258, 53, 373)⁶⁹ is designed to protect the natural environment by promoting biodiversity conservation by ensuring the protection of natural habitats and populations of wild flora, fauna and fungi species, and preserving natural environments of cultural or esthetical value, as well as promoting the sustainable use of natural resources (art. 1). The Act regulates protected areas and lists Estonia's natural parks and several other types of protected areas. It contains provisions on protected natural objects and identifies building exclusion zones. Chapter 8 of the Act contains detailed provisions on protected species.

The Environmental Liability Act of 2007 (RT I 2007, 62, 396) transposes Directive 2004/35/EC on environmental liability for the prevention and

⁶⁸ An English translation is available at www.legaltext.ee.

⁶⁹ An English translation is available at www.envir.ee.

remedy of environmental damage,⁷⁰ which requires those who cause significant physical damage to the environment to restore the condition of the natural setting where the damage occurred.

The Waste Act of 1998 (RT I 1998, 57, 861)⁷¹ is the primary instrument for waste management in Estonia. It seeks to prevent waste generation and its associated health and environmental hazards (art. 1). The Act also regulates waste recovery, which includes energy production. According to the Act the use of waste recovered as raw material or any other material shall be preferred to its use as a source of energy; (art. 7). To date, there is no significant energy production from waste in Estonia. For example, landfill gas that is collected from the Pääskula landfill is used to generate heat for 1 000 flats, while electricity generation commenced in 2001.⁷²

Two environmental laws contain specific provisions relevant to bioenergy – the Ambient Air Protection Act and the Environment Charges Act and will be reviewed next.

Ambient Air Protection Act

The Ambient Air Protection Act of 2004 (RT 2004, 43, 298) was enacted to harmonize Estonia's legislation with the relevant European standards. The Act regulates activities which involve the emission of pollutants into the ambient air, damage the ozone layer, and cause climate change (art. 1). The 2006 amendment of the Act concerned, *inter alia*, greenhouse gas emissions trading, greenhouse gas emissions registry and reporting, ambient air quality and requirements for ozone depleting substances.

According to article 14, ambient air quality is described by the characteristics of the composition of ambient air which are assessed based on its level of pollution. Article 15 lists the primary pollutants that must be considered in the assessment and management of ambient air quality. Chapter 1 of the Act contains detailed provisions on modelling and measuring ambient air pollution levels as well as on the obligation of authorities to publish such information.

⁷⁰ *Official Journal* L 143, 30 April 2004.

⁷¹ An English translation is available at www.legaltext.ee.

⁷² Roos, I. and Soosaar, S. 2004.

The Act governs measures to reduce ambient air pollution, including environmental requirements for fuels. According to article 58, fuel means "combustible material or substance which is used in combustion plants for the purposes of obtaining energy. Unsorted waste, whether or not it contains combustible substances, is not deemed to be fuel." According to articles 58–60, the Ministry of the Environment is responsible for issuing regulations on environmental requirements for liquid fuels, as well as for monitoring the sale of liquid fuels in Estonia.

Provisions governing ambient air pollution permits and special pollution permits address the content of such permits and procedures for their issuance. Chapter 6 of the Act concerns the protection of the ozone layer, including a definition of substances that deplete the ozone layer (art. 106) and provisions on handling of such substances (art. 107). The production, use, placing on the market, import into and export from Estonia of ozone depleting substances is either restricted or prohibited under this Act (art. 109).

Greenhouse gases and climate change also therefore fall within the remit of the Act. According to article 117, the Ministry for the Environment is responsible for organizing activities relating to climate change on the basis of the UNFCCC and the Kyoto Protocol. Chapter 7 also transposes EU provisions on the ETS, national greenhouse gas registry and reporting into the Estonian national legal system. The Ministry of the Environment is in charge of issuing 'trading licences' to installations participating in the ETS (art. 120). Article 121 governs the application process and contents of the trading licences. Article 122 details the annual reporting requirements for installations covered by the ETS.

Environment Charges Act

The Environment Charges Act of 2005 (RT I 2005, 67, 512)⁷³ regulates charges for the use of natural resources, including pollution charge rates and the procedures for calculating and paying them. It also regulates the use of revenue from related payments. Significantly, article 19 exempts biomass, peat and the use of waste as an energy source from the pollution charge related to carbon dioxide emissions. Pollution charges do not apply to: biomass as defined in the Electricity Market Act (see section 3.1.1 for the

⁷³ An English translation is available at www.legaltext.ee.

Act's definition of biomass); the incineration of peat (or fuel produced from peat); and the use of waste as a source of energy.

An environmental charge has been defined under the Act as the price of the right to environmental exploitation (art. 2). The general objective of environmental charges is to prevent or reduce environmental damage. Proceeds are divided between the state budget and local budgets. Proceeds going towards the state budget must be used for "maintaining the state of the environment, restoration of natural resources and remedying environmental damage" (art. 4(3)). Proceeds from the use of renewable natural resources (fishery, forest and game) are to be "directed for the restocking and protection of such resources" (art. 4(4)).

The Act regulates charges for the emission of pollutants into the ambient air, groundwater or soil, and upon waste disposal. The charges only apply to polluting activities that require environmental permits (art. 14) issued in accordance with relevant laws. For instance, according to article 5, environmental permits include a forest notification by the forest owner concerning planned cuttings, reforestation activities and forest damages in accordance with article 14 of the Forest Act of 2006 (RT I 2006, 30, 232). Environmental permits also include integrated environmental permits issued under the Integrated Pollution Prevention and Control Act, as well as ambient air protection permits, special air pollution permits, permits for carbon dioxide emission allowance trading under the Ambient Air Protection Act, and waste permits covered by the Waste Act. Those found carrying out activities without permits will be subject to increased environmental charges (art. 5).

Article 19(3) specifies pollution charges for carbon dioxide. The pollution charge for carbon dioxide per tonne was 15.56 Estonian crowns from 1 January 2006 until 31 December 2007, and 23.5 Estonian crowns as of 1 January 2008. The charge will be 31.3 Estonian crowns as of 1 January 2009. The charge is payable "by electricity undertakings within the meaning of the Electricity Market Act and by persons or agencies engaging in heat production who use boiler equipment" (art. 19(4)).

The system will be revised starting from 1 January 2009 (art. 19(6)). From then on, all undertakings engaged in the sale of electricity must pay excise duty on electricity instead of the pollution charge for carbon dioxide in the same extent. "The excise duty on electricity shall be paid pursuant to the

procedure provided by law" (art. 19(6)). The text of article 19 also provides that the proceeds from the excise duty on electricity shall be used for environmental protection.

3.2.2 Environmental policy

One of the key instruments guiding Estonia's environmental policy is the National Environmental Strategy, adopted by its Parliament in 1997. The Strategy provides general guidelines for environmental management and protection, and establishes key tasks and objectives. Based on these, the National Environmental Action Plan is formulated in consultation with stakeholders and is subject to regular revisions. The Ministry of the Environment is in charge of implementing the action plan. In 2005 the National Strategy on Sustainable Development (*Säästev Eesti 21*) was also adopted which elaborates principles for Estonia's long-term sustainable development until 2030 with the objective of linking social, economic and environmental concerns and adjusting mutual interests. These general policy instruments are complemented by more specific policy documents, including the National Programme for Greenhouse Gas Emission Reductions 2003–2012 and the National Allocation Plans to implement the EU's Emissions Trading Scheme, which are examined in detail below.

National Programme for Greenhouse Gas Emission Reductions for 2003–2012

The National Programme for Greenhouse Gas Emission Reductions for 2003–2012 (RT I 2004, 59, 990) was adopted in 2004. Its key objective is to ensure that Estonia complies with its commitments under the UNFCCC and the Kyoto Protocol. It contains an overview of Estonia's obligations under the Kyoto Protocol and identifies necessary action measures. It emphasizes the strategy, structure and costs of greenhouse gas emission trading and Joint Implementation.

The objective of the Programme is to reduce greenhouse gas emissions by 21 percent from 1999 levels by the year 2010. Achieving this objective involves a reduction of 20 percent in carbon dioxide emission and 28 percent reduction in methane emissions. The Programme also foresees a 9 percent increase in nitrogen dioxide emissions. In addition, the Programme addresses issues related to JI and increasing the energy efficiency of the Estonian economy.

Estonian second National Allocation Plan under the EU ETS highlights the need to update the National Programme for Greenhouse Gas Emission Reductions, as the forecasts by sectors and by activities and the long-term macroeconomic indicators are no longer valid.

*Implementation of the EU Emissions Trading Scheme
and the National Allocation Plan*

The projected impact of the EU Emissions Trading Scheme is to improve the competitiveness of biomass compared with fossil fuels. Given the price set for carbon dioxide emissions, installations have a new economic incentive to switch to bioenergy. This is particularly relevant for those Estonian installations covered by the EU ETS that already use biomass. For these installations, it has been assumed that a fuel switch to biomass will take place from coal, peat and oil shale.⁷⁴ As explained in section 2.2.2, emissions allowances are distributed to installations covered by the ETS based on the National Allocation Plan (NAP) prepared by the national government and approved by the European Commission.

As is the case with many other EU member states, Estonia's first NAP proved relatively generous and the actual emissions between 2005 and 2007 were less than the total allocation of emissions allowances. Estonia's NAP for the second phase of the EU ETS covered 50 installations and proposed to allocate an average allocation of around 24.3 million allowances. The proposed emissions during the period 2008–2012 were higher than 2005–2007. The justification was the significantly higher gross domestic product (GDP) growth rate of around 10 percent a year, while the growth rate used for the first NAP in 2004 had been 5.3–5.9 percent. The second NAP also predicted changes in the energy sector, including the large-scale export of electricity through the new sea-cable between Estonia and Finland and a planned new cable between Estonia and other Nordic countries by 2010.

In its assessment, the European Commission did not agree with Estonia's proposal, and rather reduced the allocation by nearly 50 percent.⁷⁵ According to the Commission, Estonia's emissions in sectors covered by the ETS in 2005 were 12.6 million tonnes in contrast to the proposed annual allocation of 24.3 million tonnes for 2008–2012. The Commission explained that the

⁷⁴ ET-Bioenergy. Country Report on Estonia, 12 May 2006, p. 17, available at www.eubionet.net.

⁷⁵ Decision by the European Commission of 4 May 2007.

emission figures given by Estonia for earlier years were not independently verified, and the 2005 data thus represented the most reliable basis for the allocation. Based on its recalculation using the 2005 emissions data and relative development factors of GDP and carbon intensity for the 2005–2010 period, the Commission found that Estonia's annual average excess allocation was over 11.5 million tonnes. Like several other member states, Estonia decided to challenge the Commission's decision and commenced legal proceedings at the European Court of Justice.

3.3 Forests and forest biomass resources

Given the significance of forests and forestry-related activities to the Estonian economy, an in depth look at this sector is warranted. More than half of Estonia's territory is covered with forests. The export of forest products accounted for more than 13 percent of the total exports in 2001. The forestry sector is the main source of employment in rural areas while tax revenues from forest management are an important source of income for local municipalities. Also, firewood constitutes a cheap and locally available energy source for the rural population.⁷⁶

Much of Estonia's bioenergy potential is also related to wood and wood waste.⁷⁷ In fact, most of Estonia's capacity for bioenergy production is sourced from wood-based fuels, namely firewood, wood by-products (pellets, briquettes, wood chips and granules), forest residues and waste wood. The wood processing industry is well developed and waste from wood processing can be efficiently collected even if so-called 'second generation' processing technologies are still rather expensive. In 2002, 95 percent of waste wood was used for energy production.⁷⁸ Almost all firewood, including the wood waste, briquettes and pellets, is used for heat production in boilers.⁷⁹ There are also several companies producing wood chips, briquettes and pellets.⁸⁰ Some 17 percent of the wood fuel (including briquettes and pellets) was exported in 2006.

⁷⁶ Ministry of the Environment, Estonian Forestry Development Programme until 2010, p. 7, available at www.metsad.ee (hereafter Estonian Forestry Development Programme until 2010).

⁷⁷ Muiste, P., Roostalu, H., Padari, A., *et al.* 2004.

⁷⁸ Roos, I. & Soosaar, S. 2004.

⁷⁹ Miskins, V., Slihta, G. & Rudi, Y. 2006

⁸⁰ Roos, I. & Soosaar, S. 2004, p. 7.

In addition to their economic and biomass potential, Estonian forests are rich in biodiversity. The biodiversity indicators of Estonian wooded meadows are among the highest in the world, and Estonian forests have been preserved better than in most European countries given their low-intensity management and small share of introduced tree species.⁸¹ Overall, Estonia's forest policy attempts to balance economic and environmental considerations with sustainability and efficiency. Cutting volumes are restricted, which has the effect of limiting the use of wood resources for energy production.⁸² The optimal cutting volume of around 13 million cubic meters in the Forestry Development Programme until 2010 has been characterized as relatively high, but has been set considering the high number of middle-aged and mature stands in private forests. After large forest areas have reached maturity within the next 10–20 years, it has been estimated that the available quantities of wood fuel could gradually decrease by 2030.⁸³ It has been proposed that Estonia's biomass potential could be increased through better use of forest residues, waste wood and brushwood.⁸⁴

The key instruments concerning the use of Estonia's wood resources are the Forestry Development Programme until 2010 and the Forest Act. This section reviews the key elements of these two instruments. It also contains an overview of the current regulatory framework for short-rotation plantations in Estonia.

3.3.1 Forestry Act

The basic law applicable to the forest sector in Estonia is the Forest Act, which first entered into force in 1998. In 2006, a revised version of the Act was adopted (RT I 2006, 30, 232)⁸⁵ and entered into force in the beginning of 2007. While this extensive piece of legislation does not have any explicit provisions on bioenergy, its provisions have an important impact on biomass resources derived from forests and the availability of biomass for energy production.

The Forest Act regulates forest management and forest surveys and contains provisions governing compensation for damage caused to the environment

⁸¹ Estonian Forestry Development Programme until 2010, p. 7.

⁸² Miskins *et al.* 2004, p. 3960.

⁸³ Muiste *et al.* 2004.

⁸⁴ Roos, I. & Soosaar, S. 2004, p. 8.

⁸⁵ An English translation is available at www.remk.ee.

and liability for violations of the Act (art. 1). Its objective is to ensure the protection and sustainable management of forest as an ecosystem (art. 2.1). Forest management is sustainable if it "ensures biological diversity, productivity, regeneration capacity and vitality of forests, and the possibility of multiple uses of forest in a way that satisfies ecological, economic, social and cultural needs" (art. 2.2). To ensure the environmental interests and multiple uses of forest, at least 20 percent of Estonia's mainland must be state forest (art. 5.1).

The overall supervision of the forestry sector is the responsibility of the state and a forestry development plan must be prepared by the Ministry of the Environment every ten years and submitted to the Parliament (arts. 6 and 7). The Act regulates the Centre for Forest Protection and Silviculture, a government agency responsible for forest inventory, forest management plans, reforestation and protection, and databases (art. 8). It also covers the Private Forest Centre, a state-established foundation that assists private forest owners (art. 9).

The Forest Act contains provisions on forest management planning, including forest inventory (art. 14) and forest management plans (art. 15). Under this law, forest management is defined as reforestation, tending and use of forest and forest protection (art. 16). The Act divides forests into three categories: *protected* forests, *protection* forests and *commercial* forests (art. 17), and contains detailed management guidelines for each. In protected forests, the objective of forest management is the maintenance of natural objects, while the objective in protection forests is to protect the state of the environment. Commercial forests are those designated to generate income.

Article 24 on reforestation activities stipulates, *inter alia*, that only species suitable for the forest site may be used and that these are determined by the Ministry of the Environment (who is also responsible for preparing a list of permitted alien species). Article 25 contains an obligation for reforestation in commercial and protection forests. According to article 26, a forest owner who is planning to clear-cut forest may be required to pay a deposit to ensure reforestation.

The Act also regulates the tending and cutting of forests (arts. 27 and 28). Article 28(4) contains a list of permitted cutting types that includes regeneration cutting (clear cutting and shelterwood cutting), improvement cutting, selection cutting, track cutting and deforestation. Provisions also

elaborate on each cutting type; for instance, article 29 explains what is meant by clear cutting and the conditions under which it can be carried out. The Act sets out the obligations of forest owners, for example they are obliged to submit forest notifications on planned cuttings, reforestation and forest damage (art. 41). The Forest Act also establishes the obligation to prove the legality of cutting rights and timber transport (art. 37), as well as to notify cutting rights and timber sales (art. 38). These extensive provisions have an important impact on the overall utilization of Estonia's biomass resources, thereby also affecting the conditions for obtaining fuel wood.

The Act further regulates forest protection and empowers local environmental authorities to apply penalties in cases where environmentally damaging activities are not terminated (art. 40). According to article 40(4), for instance, all cutting areas, except clear cutting areas, must be cleared of logging waste in accordance with procedures established by the Ministry of the Environment. During reforestation and cutting, the soil must not be damaged more than permitted under law (art. 40(5)). There are also detailed provisions on the management and use of state forests and the powers and functions of State Forest Management Centre (arts. 43–65). Compensation for damage to forests and liability provisions can also be found in the Act.

3.3.2 Estonian Forestry Development Programme 2002–2010

During the 1990s, the Estonian forestry sector experienced some significant changes stemming from the emergence of private forest ownership, the rapid development of the forest and wood industry, as well as the increased option for public participation in development of the forestry sector. The Estonian Forest Policy, launched in 1995 and finalized in 1997, has been characterized as one of the first broad-based participatory processes in Estonia, involving all stakeholder groups. In order to coordinate the implementation of the Forest Policy and allocate the necessary resources, the Ministry of Environment started developing Estonia's Forestry Development Programme, approved in 2002.

The Forestry Development Programme until 2010 recognizes the high environmental and ecological value of the Estonian forests and the need to protect them in accordance with international legal instruments binding on Estonia. On the other hand, the Programme also emphasizes the capacity of the Estonian forest sector to produce material and social benefits. It states that

the utilization of this capacity will be encouraged "to the extent that the other values and benefits, including environmental ones are not lost or reduced."

The Programme highlights two basic objectives for the Estonian forestry sector, namely the sustainability of forestry and efficiency of forest management. The sustainability of forestry is defined as "the management of forests in a manner, and to the extent, that maintains their biological diversity, productivity, capacity for regeneration and vitality as well as their potential to fulfil at present and in the future ecological, economic and social functions at the local, national and global level without damaging other ecosystems." The efficiency of forest management is defined as entailing "the efficient production and effective utilization of all the forest-based goods in the short and long run".

The Programme establishes the optimum cutting volume totalling 12 597 000 m³. It indicates, however, that the volume will be adjusted in parallel with the improvement of the statistical information and calculation methods. The Programme lays down measures for the period 2002–2010 aimed at the protection of ecosystems and increasing the 7.2 percent share of strictly protected forests to 10 percent in order to preserve all characteristic forest types.

The Programme explains that Estonian forest resources are mainly used in support of the wood, paper and furniture industries, which also encompass wood processing, pulp and paper, printing and publishing. These forest-related industries are important both economically and as source of employment in the region. The Programme advocates improving the international competitiveness of the Estonian forest and wood industry, and increasing the local use of its production to ensure the maximum consumption of timber production as an aspect of forest management.

The Programme also refers to the Long-Term Development Plan for the Fuel and Energy Sector and indicates that as a part of the plan, "possibilities for promoting timber as an environmentally friendly fuel will be analysed to increase its use as an energy resource." The objectives of the Forestry Development Programme are mainly implemented through the provisions of the Forest Act.

3.3.3 Laws and regulations applicable to short-rotation forestry

As discussed in the foregoing section, it has been estimated that the availability of forest biomass in Estonia could decrease by 2030. Furthermore, at the turn of the century it was estimated that some 300 000 hectares of former agricultural land had fallen out of active use and were undergoing afforestation.⁸⁶ The question has been raised whether such lands could be exploited for the cultivation of energy crops.⁸⁷

There are ongoing feasibility studies on the use of short-rotation plantations in Estonia to cultivate bioenergy from fast growing trees. Such plantations have been characterized as "highly efficient biomass production systems with additional contributions as biological filters to low-cost and environmentally safe biological wastewater and sludge treatment."⁸⁸ According to analysis carried out by researchers at the Institute of Agricultural and Environment Sciences, the Estonian University of Life Science,⁸⁹ there are a network of laws and secondary regulations applicable to short-rotation which thus warrant examination under this section. However, it should be noted that estimating the feasibility of short-rotation plantations (SRPs) in Estonia is proving difficult⁹⁰ and the Long-Term Development Plan for the Fuel and Energy Sector estimates that SRPs are not economically viable.⁹¹

Hundreds of hectares of agricultural land in Estonia are temporarily out of use and nearly half of such land is owned by the state. The Land Reform Act of 1991 (RT I 1991, 34, 426) permits agricultural producers to use such land by usufruct (art. 34). There has been some interest in using state-owned unused agricultural land for willow plantations, however the usufruct period granted under the act is up to only 10 years (art. 34). This can be contrasted with short-rotation plantation periods which can be up to 25 years. For this reason, unused agricultural lands owned by the state cannot currently be used for short-rotation forestry as its lifetime exceeds 10 years.

⁸⁶ Estonian Forestry Development Programme until 2010, p. 10.

⁸⁷ Koppel, A. and Heinsoo, K., 2005.

⁸⁸ European Biomass Industry Association, see www.eubia.org.

⁸⁹ Based on personal communication with Katrin Heinsoo on 23 January 2008. *Existing and proposed legislation related to SRP* – analysis carried out in the framework of the BIOPROS project; for more information see www.biorpos.info.

⁹⁰ Personal communication with Katrin Heinsoo, 23 January 2008.

⁹¹ Estonia's Long-Term Development Plan for the Fuel and Energy Sector until 2015, p. 4.

The provisions most relevant to short-rotation forestry in the Nature Conservation Act of 2004 (RT I 2004, 38, 258, 53, 373)⁹² relate to the planting of alien species. This is because the only poplar tree species that is native to Estonia is *Populus tremula*. According to the Nature Conservation Act, the introduction of non-native species is prohibited (art. 57). The definition of non-native species is based on a list drawn by the Ministry of the Environment (art. 57). The only permitted species suitable for short-rotation plantations is hybrid aspen (*Populus tremula* × *P. tremuloide*). The Act also prohibits economic activities in nature reserves while in other types of protected areas, the applicable restrictions depend on the level of protection (Chapter 4). In most cases, the establishment of SRPs as well as the use of herbicides and biocides in protected areas would be prohibited.

Slightly over a half of the agricultural land in Estonia is under drainage systems. The roots of a willow (which is suitable for short-rotation plantations in Estonia) may cause damage to the drainage system. In cases where willows would be grown in areas with drainage systems, permission by the local land improvement bureau is necessary. Such aspects fall within the purview of the Land Improvement Act (RT I 2003). Where the drainage system relates only to the area where short-rotation forestry is planned, obtaining a permit is likely, but not for example, where the drainage system is linked to neighbouring lands and damage to the drainage system will affect the interest of the neighbouring landowners.

Concerning the use of wastewater sludge as a fertilizer for short-rotation plantations, several laws and secondary regulations are applicable. According to the Waste Act of 1998 (RT I 1998, 57, 861), sludge is not classified as waste (art. 1). Therefore, the use of wastewater as fertilizer has not been taken into account or regulated in these laws. Secondary legislation on the Requirements for Reuse of Sludge in Agriculture, Greenery and Recultivation contains some relevant provisions, including the prohibited use of untreated wastewater sludge in agriculture, although it can be used in greenery and for recultivation.

The Water Act of 1996 (RT I 1996, 40, 655)⁹³ contains, among other things, requirements for the use of fertilizers and chemicals in agriculture. Spreading wastewater and fertilizers on frozen land is prohibited, while other limitations depend on the type of fertilizer (wastewater is not classified as a

⁹² An English translation is available at www.envir.ee.

⁹³ An English translation is available at www.legaltext.ee.

fertilizer under article 26(1)), crop demands (SRP species are not included in the list) and the region (the requirements are stricter on nitrate-sensitive areas where groundwater is endangered). Using fertilizers, chemicals and sludge is forbidden in water protection areas (art. 29). In addition to the Water Act, secondary regulations laying down a Regime of Wastewater Disposal to a Natural Waterbody or Ground and Requirements for Sewerage Constructions contain provisions on the establishment and operation of wastewater treatment plans, which could be relevant for SPRs in Estonia.

Overall, the key regulatory gap concerning short-rotation plantations concerns the use of wastewater sludge as fertilizer. This together with the rapidly changing market conditions have made it difficult to estimate the economic feasibility of increasing biomass availability through the cultivation of fast-growing trees.

4. CONCLUSIONS

As this study has demonstrated, Estonia's national legal framework for bioenergy is fairly developed. This can be partly explained by Estonia's abundant forest resources and the importance of the forestry sector to Estonia's national economy. However, the European *acquis communautaire* has played an important role in defining the legal framework for bioenergy, especially concerning laws applicable to renewable energy, climate change and environmental protection. Overall, the legal framework for bioenergy in Estonia is comprehensive and seems to cover the main issues relevant to the production of bioenergy. Sustainability concerns associated with plans to increase the consumption of biofuels in the transport sector are addressed through the transposition of the EC directive on the promotion of the use of renewable energy sources.

Some feasibility studies are ongoing concerning the potential of short-rotation plantations to cultivate bioenergy from fast-growing trees such as willows. However, estimating their economic viability is characterized as difficult given rapidly changing market conditions. The main shortcomings identified in this study concern the legal framework applicable to short-rotation forestry, including the short cultivation period under certain laws which preclude the use of idle agricultural land and also the limitations concerning the use of wastewater sludge as a fertilizer for willow plantations.

Overall, the agricultural sector has only limited potential for bioenergy production in Estonia. Therefore, questions concerning the relationship between food security and the production of bioenergy are not prevalent in Estonia. Given the availability of abandoned agricultural land, the role of land use considerations is also limited.

The use of forest resources, the main source for bioenergy in Estonia, is comprehensively regulated in a way that considers the environmental, economic and social benefits associated with Estonia's forests. The main objective of the Estonian Forest Act is to ensure the protection and sustainable management of forest as an ecosystem (art. 2) and the lengthy law contains detailed provisions on forest management in different forest categories. Importantly, it restricts felling volumes which limits the availability of wood resources for energy production.⁹⁴ In contrast to some other countries, deforestation is not a serious problem in Estonia and the forested area has actually increased since Estonia's independence in 1991 partly as a result of afforestation initiatives on idle agricultural land. Also, the formulation of Estonia's forest policies in the Forestry Development Programme 2002–2010 has been described as one of the most participatory processes in the country's history and the interests of private forest owners as well as other stakeholders have been considered in defining the maximum felling volumes.

The sectors relevant for bioenergy production in Estonia, namely forestry, energy, waste and agriculture or animal farming, are governed by several general environmental laws, imposing detailed obligations on environmental impact assessment, environmental permitting, monitoring and supervision as well as liability to restore damage to the natural environment. These laws also contain numerous provisions on public participation in environmental decision-making.

Concerning the fuel and energy sector, Estonia has adopted several legislative measures to promote the use of bioenergy and other renewable energy sources. These are in line with its obligations under the Kyoto Protocol and European law to reduce greenhouse gas emissions and promote the use of renewable energy. The Estonian Long-term Development Plan for the Fuel and Energy Sector until 2015 adopts a 5.1 percent target for renewable energy sources by 2010. Thus, in line with the RES-E Directive,

⁹⁴ Miskins *et al.* 2004. p. 3960.

the Electricity Market Act has, since 2003, contained a support scheme obliging network operators to purchase electricity generated from renewable sources at a more favourable tariff. At the beginning of 2007, the scheme was amended to increase its transparency for consumers and its coverage was extended to cogeneration of heat and power. Under the current system, producers of renewable electricity may choose between a fixed and more favourable feed-in tariff or a subsidy (art. 58). Amendments to the existing legislation are necessary to transpose EC Directive 2009/28/EC on the promotion of the use of energy from renewable sources which increases Estonia's target for renewable energy to 25 percent of gross consumption by 2020. Further incentives for renewable energy might also be necessary to ensure that Estonia meets the new targets that are binding under EU law.

In line with the European regulatory framework, Estonia must also increase the use of biofuels in the transport sector. The EU's biofuels target for 2010 is 5.75 percent. In line with the Directive 2003/96/EC restructuring the Community's framework for taxation of energy products and electricity, Estonia's Alcohol, Tobacco and Fuel Excise Duty Act exempts biofuels from the fuel excise duty. Such fiscal incentives were deemed necessary to improve the competitiveness of biofuels. EC Directive 2009/28/EC on the promotion of the use of renewable energy sources has important implications on the legal framework concerning the production and consumption of biofuels in Estonia. Most notably, the Directive sets up mandatory requirements to ensure the sustainability of biofuels count towards the 10 percent target (10 percent of the total transport energy consumption by 2020 must be from renewable sources). These would include a requirement to demonstrate that greenhouse gas emissions savings from biofuels are at least 35 percent (art. 17) and that biofuels, domestically produced or imported, do not originate from lands with high biodiversity and high carbon stock (art. 15). Given the concerns over the sustainability of the EU's 10 percent target, these new measures are necessary to ensure that the production of biofuels used in Estonia's transport sector do not promote deforestation or loss of biodiversity either in Estonia or in countries where imported biofuels have been produced. The key legal uncertainty here relates to the compatibility of the proposed sustainability criteria with WTO law as discussed in Chapter 1 of this study. However, this is something that must be addressed at the European level, if necessary.

Between 2000 and 2012 it is possible to enhance the economic attractiveness of renewable energy projects through the sale of carbon credits under JI and

Kyoto Protocol's emission trading scheme. Taken together, JI and the Electricity Market Act have given an important boost to the production of wind energy in Estonia. In theory, similar incentives would be available for bioenergy projects but so far, most of Estonia's new renewable energy production has come from wind power. On the other hand, Estonia has been planning to launch a Green Investment Scheme to improve its possibilities to participate in international emission trading under article 17 of the Kyoto Protocol. Generally, the idea of such schemes is that the government invests revenues from the sale of carbon credits in a way that further reduces greenhouse gas emissions and facilitates transition towards a low-carbon economy. Bioenergy projects could be listed as one of the beneficiaries of Estonia's possible Green Investment Scheme.

The key climate policy instrument in the EU and Estonia is the Emissions Trading Scheme in which Estonia has participated since its inception in 2005. By setting a price for carbon dioxide emissions, the ETS improves the economic competitiveness of bioenergy in comparison with fossil fuels. The ETS entered the second trading period at the beginning of 2008 with tighter allocations than during the initial period 2005–2007. The stricter stance has been motivated by the limited environmental impact of the first trading period given the lenient allocations in many European countries. EC Directive 2009/29/EC on the improvement and extension of the emissions trading system starting from 2013 expands coverage to encompass additional greenhouse gases and economic sectors. This directive replaces national allocations with an EU-wide cap and introduces rules to auction 100 percent of the total allocations. As this Directive is very recent, legislative changes have yet to take place in Estonia and have an important impact on current and new installations covered by the ETS.

The development of the international regulatory framework, especially the ongoing negotiations on the post-2012 period under the UNFCCC and Kyoto Protocol, may lead to some changes relevant to the use of bioenergy in Estonia. The deadline for completing the international negotiations is the 15th Conference of the Parties to the UNFCCC to be held at the end of 2009.

Furthermore, the European Council has decided in May 2007 that the EU will unilaterally reduce its emissions by 20 percent by 2020 regardless of what other countries will do. This commitment will be implemented through the comprehensive climate and energy policy package, adopted by the Council and the European Parliament in December 2008. Decision No. 406/2009/EC

of the European Parliament and of the Council of 23 April 2009 on the effort of member states to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020 allows Estonia to increase its emissions of greenhouse gases *not covered* by the EU ETS by 11 percent during the period from 2013 to 2020.⁹⁵ Other greenhouse gas emissions between 2013 and 2020 are subject to the EU-wide emissions cap. According to EC Directive 2009/29/EC, the Commission shall publish by June 2010 (or by September 2010 for certain adjusted quantize) the absolute EU-wide quantity of allowances for 2013 based on the total quantities of allowances issued by the member states in accordance with the Commission decisions on their national allocation plans for the period from 2008 to 2012 (art. 9). In addition, the EU has accepted to reduce emissions by a further 10 percent (amounting to a total of 30 percent) if other developed countries and most advanced developing countries also take appropriate action. This means that the EU's climate and energy legislation may be reviewed and changed after the ongoing post-2012 negotiations under the UNFCCC have been completed.

It is clear, however that the climate change challenge and the need to increase the use of renewable energy, including bioenergy, will not stop at 2020. Calculations in the Fourth Assessment Report by the Intergovernmental Panel on Climate Change indicate that achieving the EU's 2°C target means that global greenhouse gas emissions must peak within the next ten to fifteen years and then be halved by 2050. Some recent scientific reports indicate that even this may not be adequate to prevent dangerous climate change. Achieving the climate policy objectives that Estonia has adopted together with the other EU member states thus means that the potential to increase the use of bioenergy, including biofuels, must be carefully assessed. This should be done by paying due attention to environmental and social considerations, including the need to ensure sustainable forest management and agricultural production.

⁹⁵ See Decision 2008/0014.

REFERENCES

PUBLICATIONS

Fagnäs, L., Johansson, A., Wilén, C., Sipilä, K., Mäkinen, T., Helynen, S., Daugherty, E., den Uil, H., Vehlow, J., Käberger, T. & Rogulska, M., 2006. Bioenergy in Europe: opportunities and barriers. *VTT Research Notes* 2352, Espoo, available at www.bioenergy-noe.com.

Koppel, A. and Heinsoo, K., 2005. *Renewable energy from biomass in Estonia: Current status and outlook*. Estonian Agricultural University, paper presented on 7 October 2005 in Tallinn.

Miskins, V., Slihta, G., & Rudi, Y., 2006. Bioenergy in the Baltic states: Current policy and future development, *Energy Policy* 3 (2006) 3953. p. 3960.

Muiste, P., Roostalu, H., Padari, A., Paist, A., Kask, Y. & Orru, M., 2004. *Sustainable balance of bio-fuels supply demand in Estonia*, available at www.eby.ee.

Roos, I. and Soosaar, S., 2004. *Renewable energy policy review Estonia: status of renewable energy development and review of existing framework conditions for RES in Estonia*, Tallinn University of Technology and European Renewable Energy Council, p.10, available at www.erec-renewables.org.

LEGAL INSTRUMENTS CITED

EUROPEAN COMMUNITY LEGISLATION

(available at www.ec.europa.eu)

Decision by the European Commission of 4 May 2007 concerning the national allocation plan for the allocation of greenhouse gas emission allowances notified by Estonia in accordance with Directive 2003/87/EC

Directive 2009/31/EC of 23 April 2009 on the geological storage of carbon dioxide

Directive 2009/30/EC of 23 April 2009 as regards the specification of petrol, diesel and gas-oil and introducing a mechanism to monitor and reduce greenhouse gas emissions.

Directive 2009/29/EC of 23 April 2009 to improve and extend the greenhouse gas emission allowance trading scheme of the Community.

Directive 2009/28/EC on the promotion of the use energy from renewable sources.

Directive 2004/101 of 27 October 2004 establishing a scheme for greenhouse gas emission allowance trading within the Community, in respect of the Kyoto Protocol's project mechanisms.

Directive 2003/96/EC restructuring the Community framework for taxation of energy products and electricity.

Directive 2003/87/EC establishing a scheme for greenhouse gas emission allowance trading within the Community.

Directive 2003/30/EC on the promotion of the use of biofuels or other renewable fuels for transport.

Directive 2001/80/EC on the limitation of emissions of certain pollutants into the air from large combustion plants.

Directive 2001/77/EC on the promotion of electricity produced from renewable energy sources in the internal electricity market.

NATIONAL LEGISLATION

Alcohol, Tobacco and Fuel Excise Duty Act (RT I 2003, 2, 17).

Ambient Air Protection Act (RT 2004, 43, 298), original: *Välisõhu kaitse seadus*.

Electricity Market Act (RT I 2003, 25, 153).

Environment Charges Act, (RT I 2005, 67, 512).

Environmental Impact Assessment and Environmental Management System Act (RT I 2005, 15, 87), (*Keskonnamõju hindamise ja keskkonnajuhitmissüsteemi seadus*).

Environmental Liability Act (RT I 2007, 62, 396) (*Keskonnastutuse seadus*).

Environmental Monitoring Act (RT I 1999, 10, 15) (*Keskonnaseire seadus*).

Environmental Supervision Act (RT 2001, 56, 337) (*Keskonnajärelevalve seadus*).

Fertilizers Act (RT I 2003, 51, 352).

Forest Act (RT I 2006, 30, 232) (*Metsaseadus*).

Integrated Pollution Prevention and Control Act (RT I 2001, 85, 512) (*Saastuse kompleksse vältimise ja kontrollimise seadus*).

Land Improvement Act (RT I 2003).

Land Reform Act (RT I 1991, 34, 426) (*Maareformi seadus*).

Nature Conservation Act (RT I 2004, 38, 258, 53, 373) (*Looduskaitse seadus*).

Sustainable Development Act (RT I 1995, 31, 384).

Waste Act (RT I 1998, 57, 861) (*Jäätmeseaduse*).

Water Act (RT I 1996, 40, 655) (*Veeseadus*).

OTHER SOURCES

20 20 by 2020, Europe's Climate Policy Opportunity. Communication by the Commission to the European Parliament, the Council, the Economic and Social Committee and the Committee of the Regions. COM(2008) 30, 23 January 2008, available at www.ec.europa.eu.

Estonian Electricity Market Inspectorate, *Estonian electricity and Gas Market 2006*, Tallinn 2007.

Estonian Ministry of Economic Affairs and Communications, Estonia's Long-Term Development Plan for the Fuel and Energy Sector until 2015, available at www.legaltext.ee.

Estonian Ministry of the Environment, Estonian Forestry Development Programme until 2010, available at www.metsad.ee.

Estonian Ministry of the Environment. National Allocation Plan of Estonia for Greenhouse Gas Emission Allowance Trading for Years 2008–2012, available at www.ec.europa.eu.

Estonia's Fourth National Communication under the UNFCCC, November 2005, pp. 79–89, available at ww.unfccc.int.

ET-Bioenergy. *Country report on Estonia*, May 2006, p. 17, available at www.eubionet.net.

Existing and proposed legislation related to SRP – analysis carried out in the framework of the BIOPROS project, for more information see, www.biorpos.info.