Circular Economy with Focus on Waste, Renewable Energy and Sustainable Bioenergy in Estonia

KEY FINDINGS

- **Estonia has transformed its treatment of municipal solid waste (MSW)**, changing from a reliance on landfilling – which accounted for almost 80% of MSW treatment in 2010 – to a high level of energy recovery via waste incineration.

- A key challenge in terms of moving to a circular economy will be to strengthen recycling: despite recent improvements – as well as high rates of separate collection in cities including Tallinn – **Estonia is not on track to meet the EU’s 2020 targets for MSW recycling**. The institutional structure for MSW collection and management remains uncertain and does not support higher recycling levels.

- A further challenge will be to address the vast amounts of mining and industrial waste generated by the oil shale sector. Most of this waste is landfilled. Estonia has made significant investments to address the oil shale sector’s legacy of contaminated areas and poorly managed landfills.

- **The share of renewable energy has increased strongly in the past ten years**, due mainly to a growth in wind power and biomass, which is used for household heating and for district heating (with many facilities modernised to provide combined heat and power).

- The intensity of forest use is among the highest in the EU. As a large share of Estonian forests will reach maturity in coming years, **Estonia has the capacity to extract greater levels of biomass**. However, this would need to be balanced by sustainable forest management, as intensified forest management can pose a risk to biodiversity.

1. INTRODUCTION

This briefing reviews Estonia’s progress in the transition to a circular economy, focusing on a three crucial and related policy areas: waste, renewable energy and sustainable bioenergy. Estonia has a population of 1.3 million. Total land area is 45,000 km², with the population concentrated in urban areas. Tallinn, the capital, has a population of 420,000. About half of Estonia’s land – more than two million hectares – is covered with forest.

2. WASTE MANAGEMENT

Estonia’s waste and resource policies

In Estonia, several national policy documents support the transition to a circular economy (the box below provides an overview of EU policies for circular economy). Notably, the country’s current National Waste Management Plan (NWMP 2014-2020) focuses on the reduction of landfilling and the promotion of recycling: the Plan highlights the need to meet the EU’s 2020 targets to recycle at least half of four key household waste streams – glass, metal, paper and plastic (these targets, set in the EU Waste Framework Directive, are also
transposed into Estonian legislation). The Plan also cites the EU’s targets for the recovery and recycling of packaging waste, set in the EU Directive (94/62/EC as amended) on Packaging and Packaging Waste. The NWMP moreover contains Estonia’s Waste Prevention Programme, which sets the objective of decoupling economic growth and waste generation.

The EU Action Plan for the Circular Economy

The EU Action Plan for the Circular Economy is to maintain the value of products, materials and resources in the economy for as long as possible and minimise the generation of waste. A circular economy should lead to lower energy consumption and carbon dioxide emissions, modernise and transform the economy and support job creation.

In December 2015, the European Commission presented an EU Action Plan for the circular economy, which addressed the whole product lifecycle from design and production through consumption and waste management. This Action Plan formed part of the Circular Economy Package, which included proposals to revise key elements of the EU waste acquis: the Waste Framework Directive, the Landfill Directive, the Packaging Directive, and the Directives on end-of-life vehicles, batteries and accumulators, and waste electrical and electronic equipment (WEEE).

Since the publication of the Action Plan, the Commission has undertaken key actions in areas including food waste, eco-design, organic fertilisers, guarantees for consumer goods, and innovation and investments. In January 2017, the Commission published guidelines on the role of waste to energy in the circular economy: these underlined that waste to energy facilities can play a positive role, however, the EU waste hierarchy, which gives higher priority to waste prevention, reuse and recycling, must be respected.

The European Parliament has played a key role in supporting the EU’s transition to a circular economy. In a July 2015 resolution, the Parliament urged the Commission to put forward ambitious proposals for this issue. In March 2017, the European Parliament adopted its position on the review of the four key waste directives with more ambitious targets and provisions compared to those in the Commission’s 2015 Circular Economy Package: for example, its amendments to the Waste Framework Directive set EU objectives for the reduction of food waste and marine litter, established targets for the preparation for reuse and recycling of municipal solid waste (at least 60% by 2025 and at least 70% by 2030), and also called on the Commission to examine the opportunity to set EU waste prevention targets; moreover, these amendments set stricter obligations for separate collection, removing Commission text that this should be carried out where ‘technically, environmentally and economically practicable’. The European Parliament’s amendments to the Landfill Directive called for a maximum of 5% of total MSW to be sent to landfills in 2030, compared to 10% in the Commission’s proposal.

Estonia’s current NWMP builds on the country’s two previous waste management plans. Among their prominent goals, these plans called for reducing halting the growth of municipal solid waste (MSW) generation, reducing the share of MSW sent to landfills, and closing non-compliant landfills, goals that Estonia met, as described in the following pages.

Estonia addresses resource efficiency in several policy documents (see Annex I). In April 2016, the Estonian government expressed support for the circular economy package of the European Commission. Moreover, Estonia has allocated about EUR 100 million from EU Cohesion Funds to support energy and resource efficiency actions in companies. Nonetheless, the country does not yet have an overall policy for the circular economy.

Since 2004, the European Commission has brought infringement cases against Estonia concerning ten EU waste directives, including referral to the Court of Justice of the EU for incomplete or unreported transposition of three directives: the Landfill Directive (Case C-195/10), the Mining Waste Directive (Case C-515/10) and the Directive on Waste Electrical and Electronic Equipment (Case C-528/09). All cases have been closed except for a formal notice concerning the Directive on lightweight plastic carrier bags (from January 2017).
Municipal solid waste

In 2015, Estonia generated just over 300 kg of MSW per inhabitant, well below the EU average of 475 kg/inhabitant. After declining from 2007 to 2012 (see Figure 1 below), MSW generation has increased (though this growth is magnified by an accounting change since 2012 to include the appropriate share of packaging waste)\(^{11}\). In its Waste Prevention Programme, Estonia sets two key targets to limit further increases in MSW: up to 2020, the growth in MSW generation should remain below half of growth in gross domestic product (GDP); and after 2020, there should not be any further growth in MSW generation.

Figure 1: Municipal waste generation and treatment, by type of treatment method (kg per capita)

Separate collection and recycling have improved, but Estonia is still short of reaching the 2020 recycling target of 50% as laid down on the Waste Framework Directive. With EU funds, municipalities throughout Estonia have built collection points for recyclable waste. Tallinn and other cities have strongly supported separate collection, with separate collection rates reaching 50% of MSW in Tallinn, among the highest for EU capitals\(^{12}\). Estonia’s many smaller municipalities, however, have moved more slowly, and though producer responsibility organisations (PROs, see below) have supported separate collection of packaging waste, their cooperation with municipalities is often limited\(^ {13}\). Due to the growth of separate collection, recycling and has also increased in recent years, reaching about 28% of MSW treatment in 2015, while composting of biological waste accounted for a further 4% (as shown in Figure 1).

The main avenue for MSW treatment, however, has become incineration which according to the waste hierarchy and the principle of resource efficiency is a less favourable option compared to recycling and may hamper development of recycling capacity. The state power company constructed a MSW incinerator with energy recovery near Tallinn that opened in 2013, and private companies built mechanical-biological treatment (MBT) plants that prepare refuse-derived fuel (RDF), which is sent to Estonia’s cement plant. The Estonian government steadily had increased its landfill tax to reach EUR 30 per tonne of MSW sent to landfills, creating the incentive for these investments. As a result, almost 60% of MSW was incinerated in 2015.

Due to these changes, landfilling has decreased drastically: less than 5% of MSW was landfilled in 2015 compared to almost 80% in 2010, as shown in Figure 1. Moreover, since its accession to the EU, Estonia has closed about 150 landfills that did not meet the standards of...
the EU Landfills Directive, leaving only five recently built and compliant landfills operating. Nonetheless, landfilling increased in 2016, in part due to a fall in production at Estonia’s cement plant and a resulting decrease in its consumption of RDF.

Estonia today continues to face important challenges in terms of waste management and the shift to a circular economy. In particular, while recycling plus composting together treated almost one-third of MSW in 2015, Estonia is not on track to meet the 2020 targets for the 50% recycling of glass, metal, paper and plastic under the Waste Framework Directive: the European Environment Agency has underlined that achieving these targets will require a ‘major effort’ by Estonian authorities. Meeting the higher targets proposed for 2030 would require further efforts, including addressing the current role of incineration of municipal solid waste.

Addressing the institutional framework for MSW collection will be a key step. Municipalities currently issue tenders for waste companies to collect waste from households and businesses, but small municipalities lack capacity to oversee their work. For the most part, the private collection companies choose the most economically favourable option for treatment. Contrasting proposals for reform have created uncertainties: the previous government called for a complete removal of the municipal role and an unregulated system whereby each household would contract a waste collector, but this is not pursued by the government that took office in late 2016. A consolidation of small municipalities nonetheless is underway.

Further policy actions will likely be needed to achieve EU targets: for example, a ‘roadmap’ prepared for the European Commission (DG Environment) called for stronger local government oversight of waste management as well as the introduction of taxes on MSW sent to incineration and to MBT facilities to create stronger incentives for recycling.

Addressing these issues and increasing levels of MSW recycling – along with prevention and reuse – will be necessary for the move towards a circular economy. While waste-to-energy processes can contribute to the transition to a circular economy, as the European Commission noted in its communication on this topic of January 2017, the EU waste hierarchy that places prevention, reuse and recycling above incineration must be a ‘guiding principle’.

**Extended producer responsibility**

Extended producer responsibility (EPR) calls on the producers of products to take responsibility for them after the consumer stage of their life-cycle. Estonia requires EPR for six waste streams: packaging waste, waste electronic and electrical equipment (WEEE), end-of-life vehicles, used tyres, and batteries and accumulators, and agricultural plastic. Producers have joined into producer responsibility organisations (PROs) for four of these waste streams (see Table 1 on the following page).

Producer responsibility for packaging waste provides an example. Estonia’s 2004 Packaging Act transposes the EU Packaging Directive, and requires packaging producers and importers to organise the collection and recovery of this waste stream and meet minimum targets. Estonia has four accredited PROs for packaging waste (each must establish a nation-wide collection system). One of the four is Estonia’s PRO covering the deposit and refund of beverage bottles and cans, which has been particularly effective (see the box below).

According to combined PRO statistics, 60% of packaging waste was sent to recycling in 2014 and 82% in total to recovery plus recycling, thus meeting EU targets (for a minimum 55% recycling and 60% recovery plus recycling). Material-specific recycling targets were also met, except in the case of plastic packaging where the share of recycling was 29%: while this meets the EU Packaging Directive’s target of 22.5%, Estonia has set a higher national target of 45% to recycling.
Table 1: Extended producer responsibility schemes in Estonia

<table>
<thead>
<tr>
<th></th>
<th>Number of PROs</th>
<th>Targets reported as met</th>
</tr>
</thead>
<tbody>
<tr>
<td>Packaging waste</td>
<td>3 (general packaging) + 1 for deposit-return</td>
<td>2014: largely met</td>
</tr>
<tr>
<td>Batteries and accumulators</td>
<td>2</td>
<td>2013: yes</td>
</tr>
<tr>
<td>Waste electrical and electronic equipment</td>
<td>3</td>
<td>2014: no</td>
</tr>
<tr>
<td>End-of-life vehicles</td>
<td>none</td>
<td>2015: yes</td>
</tr>
<tr>
<td>End-of-life tyres</td>
<td>1</td>
<td>No</td>
</tr>
<tr>
<td>Plastic used in agriculture</td>
<td>none</td>
<td>n/a</td>
</tr>
</tbody>
</table>

Note: Two PROs until the end of 2016

**Eesti Pandipakend: Estonia’s deposit-refund scheme**

The deposit scheme covers both refillable packaging (glass, plastic) and non-refillable packaging (glass, plastic and metal) for beer, low-alcohol beverages and soft drinks. Eesti Pandipakend OÜ (EPP) is an accredited deposit organisation/PRO established to organise the collection and recovery of this packaging subject to the payment of a deposit, and is the only operator for Estonia’s deposit refund scheme. EPP brings together beverage producers and importers that participate via four industry associations, each holding an equal share. Today Estonia has about 850 collection points in shops, and about 95% of the bottles and cans are collected from reverse vending machines, so most plastic and metal containers are compacted.

The deposit rate is set by the Ministry of the Environment and is now 0.10 euro per container, regardless the material or size. The deposit system in Estonia has been very successful, with close to 90% of PET and glass bottles returned in 2015, and 70% of metal cans, while providing transparency. The system has thus helped to fulfill Estonia’s packaging recycling targets and has significantly reduced litter problems in the country. Since the beginning of its operation in 2005, Eesti Pandipakend has collected about 3.2 billion beverage containers.

While EPR schemes have increased recovery and recycling of these waste streams, and according to reported statistics have largely met their targets, they face a series of challenges. For several waste streams (such as packaging waste, WEEE and tyres), competition among PROs has led to producer fees that are too low to finance proper collection, recovery and recycling: for example, end-of-life tyres that should be recycled and recovered are left at storage sites18, and one of Estonia’s two PROs for this waste stream closed at the end of 2016. A lack of transparency for several EPRs, together with weak government enforcement and oversight, creates uncertainty over statistics and the achievement of targets19.

Despite these problems, the implementation of EPR has supported the transition to a circular economy by increasing recycling and recovery for key waste streams. Moreover, Estonia is one of the few EU countries to have a scheme to recover plastic used in agriculture (such as covers for silo bunkers for silage and wraps for bales of hay or grain). Estonia nonetheless needs to address key issues for EPR and PRO governance to ensure the long-term sustainability of the schemes and to continue to move towards a circular economy.

**Waste from the oil shale sector**

The overwhelming majority of total waste in Estonia is generated by mining and quarrying, energy production, and manufacturing (see Figure 2 below) – and for all three sectors, the mining, combustion and processing of oil shale, the country’s main energy source, have been
the main sources of waste. Waste rock (mineral waste and aggregates) from oil shale mining constitutes 70% of Estonia’s non-hazardous waste, and oil shale combustion and processing account for over 90% of the country’s hazardous waste generation, including ash from the combustion of oil shale for energy as well as hydrocarbon wastes from the processing of oil shale into liquid fuels and chemicals.

**Figure 2: Total waste generation in Estonia**

Most oil shale-related waste is still landfilled. Moreover, waste from oil shale mining, processing and combustion has left an expensive legacy of contaminated sites: Estonia has devoted significant resources, including almost EUR 50 million from EU Cohesion Funds, to address this problem.

While government policy calls for the recycling of oil shale mining waste, the gravel that can be produced from waste rock is costly to transport to the main areas where it could be used, such as the city of Tallinn. Recovery rates reached 90% in 2011 and 2012 due to road and other construction projects in Estonia’s northeast near the oil shale mines but fell to 45% in 2014 (Estonian statistics do not distinguish between recycling, reuse or reclamation and other forms of recovery). The newly adopted National Development Plan (NDP) for Oil Shale Use for 2016-30 sets 2020 targets relating to mining efficiency and the environmental impact of oil shale mining and use. These targets, however, are not ambitious and often call for maintaining existing performance levels. Current national policy sets the waste rock recovery target for 2020 at just 40%.

Estonia will need to decide the future of this highly resource intensive sector in the context of the move to a circular economy. At the same time, oil shale represents an important component of the economy, in particular in the less-developed northeastern area of the country.

**Construction and demolition waste**

The generation of construction and demolition waste has increased sharply in recent years, due in part to the implementation of EU-funded construction projects; however, in 2015, Estonia recovered 88% of this waste, with most of it used for road construction. Estonia thus met both the EU target for 2020, 70%, as well as its national target, slightly higher at 75% (both the EU Waste Framework Directive and the Estonian Waste Act set their targets...
for the ‘preparing for re-use, recycling and other material recovery’ of construction and demolition waste; Estonian statistics do not differentiate among the types of recovery).

**Civil society initiatives**

Estonia’s active civil society has undertaken two prominent initiatives that support waste management and the transition to a circular economy.

The non-profit organisation *Uuskasutus* was established in 2004 by the Good Deed Foundation, the Estonian Fund for Nature, the Caritas Foundation, and two individuals. Citizens are encouraged to donate usable, goods in a good condition to its centres, located in five cities. Uuskasutus then sells the goods at a reasonable price, making second-hand products as attractive as cheap new products, or passes them on to charity partners. Goods are re-designed or repaired as necessary for reuse.

The *Let’s Do It!* (*Teeme Ära!* in Estonian) campaign began in 2008, with over 50,000 people (4% of the population of Estonia) participating in coordinated activities to clean-up illegal garbage in the forests and countryside. Almost 10,000 tons of waste were collected in one day. Since then, further activities for this annual campaign have been decided by communities, organisations and active citizens. The initiative promotes civil society’s role in environmental protection as well as the idea that environmental clean-ups do not need to be expensive.

The Let’s Do It Foundation in Estonia has since taken the idea globally, and in 2016, an estimated 3 million volunteers in over 100 countries participated in clean-up actions for Let’s Do It! World. The organisation is now planning the next World Cleanup Day for September 2018.

### 3. RENEWABLE ENERGY

**Policy framework**

Estonia has adopted the EU Renewable Energy Directive (2009/28/EC) and the European Union 2020 Climate and Energy Package targets to bring the share of renewable energy in final consumption rates to 25% by 2020 and achieve a 10% share of renewable energy in the transport sector’s final consumption. Already in 2008, Estonia had established a feed-in tariff for electricity from renewable sources. The country has also provided financing from EU funds and national sources, including the sale of surplus carbon credits for renewable energy, for example to convert district heating facilities to combined heat and power using biomass.

The Estonian National Development Plan of the Energy Sector Until 2030, currently under the development, is expected to set objectives and targets in line with the goals of the European Union 2030 Climate and Energy Framework: current drafts of the National Plan call for at least 28% of total primary energy consumption to come from renewable energy by 2030. Among its provisions, the draft National Plan calls for further growth in the use of local fuels, mainly biomass, in district heating.

With renewable energy providing 28.6% of final energy consumption in 2015, Estonia is well on track to meet the 2020 renewable energy target set out in the Renewable Energy Directive. The European Commission’s 2016 proposal to amend the Directive sets out a collective target for the EU of 27% of renewable energy in gross final consumption in 2030, a level that Estonia currently meets. However, Estonia’s transport sector shows slow progress in increasing the renewable energy share and the Commission’s proposed 2030 target – a minimum of 6.8% of advanced biofuels in total transport fuels – could present a challenge.

**Evolution of renewable energy**

Estonia’s energy sector in the 20th century mainly consumed fossil fuels, in particular domestic oil shale, though many houses used wood for heating. Over the past 10 years, due largely to EU and national policies, the use of renewable energy has increased dramatically.
As a result, Estonia met its 2020 target – at least 20% renewables in final energy consumption – already in 2012 (see Figure 3). The extensive use of biomass, in particular wood, for heat and power production played a key role in this shift. Wood biomass (together with biogas and waste) provided about 12% of all energy in Estonia in 2015 – much higher than the EU average of 8% but below levels in Member States including Austria (17%), Lithuania (19%) and Sweden (25%)\(^2\).

**Figure 3:** Renewable energy in Estonia as a share of total energy supply and as a share of electricity supply (%)

Biomass from wood moreover was the largest single renewable source of electricity: biomass, biogas and municipal waste accounted for almost 56% of all renewable electricity (see Figure 4 below), with nearly all coming from wood biomass. (Municipal waste supplied only about 2.5% of the electricity generation from renewables; official Estonian statistics do not, however, provide detail on the separate components of biomass, biogas and municipal waste.)

The main other source of renewable energy is wind power from Estonia’s coastal zone, providing 46% of renewable electricity. The first wind park was completed in 2002 in Virtsu, in the coastal area of western Estonia, and by the end of 2016 the country’s total wind energy capacity was almost 310 MW from more than 140 wind turbines\(^2\). Other renewable sources remain more limited: Estonia’s solar energy capacity increased from 1.5 MW in 2013 to 10 MW in 2016, though the yield of solar energy is roughly similar to that in Germany (the weaker solar radiation is compensated by the lower temperature, which makes collectors work more efficiently in Estonia); the country has about 1.5 MW of hydropower generating capacity in numerous mini and micro plants\(^2\); conditions for geothermal energy are not favourable.

**Figure 4:** Renewable source of electricity in Estonia, 2016

4. FORESTRY AND BIOMASS

With its large expanse of forests, timber extraction is an important activity in Estonia. At the same time, more than one-third of Estonia’s forests receive protection. This includes protected forest, where no management for timber extraction is allowed, covering 10% of total forest land (in total about 236,900 ha). In addition, a further 25% of forest land, 333,600 ha, is subject to restrictions on forest management activities.

The state owns 44% of forest land, while 47% is owned by the private sector – and the majority of private forest land is in small plots (average size of 6.4 ha). The remaining share of forest land (about 9%) is in the process of privatisation.30

Forestry policy

The Estonian Forest Policy, approved in 1997, sets two principal long-term objectives: sustainable forestry and efficiency in forest management. The current Estonian Forestry Development Plan, for 2011 to 2020, sets the objective of the productivity and viability of Estonian forests along with their efficient and diverse use. It calls for:

• ensuring the preservation of forests as living and natural environment,
• creating preconditions for competitiveness and adaptability of forest sector as well as improve the development opportunities for the forest sector (including retaining and creating jobs)
• increasing investment in forestry and in research and development,
• strengthening the forest sector identity and reputation,
• diversifying the recreational and leisure activities in the forests, and
• improving the management of private forests.

The Plan sets the potential level of utilisation of forest resources in Estonia: it contains three scenarios for potential wood supply (active, moderate and shrinking). The legal framework for the management of the forests is provided by the Forest Act. Nature conservation and management of protected areas, including the protected forest area network, are regulated by the Nature Conservation Act.

Lahemaa National Park

This park was established for the protection, study and popularisation of nature and cultural heritage, including ecosystems, biodiversity, landscapes, ethnic culture and sustainable use of natural resources of North Estonia. Created in 1971, it is a conservation area for woodland, wetlands and coastal ecosystems and also for semi-natural communities, geological monuments (the Baltic Klint) and historical and architectural monuments. The total area of Lahemaa National Park is 747.8 km², of which 479.1 km² of mainland and 268.7 km² of marine area. 70% of its terrestrial area is covered with forest.

Lahemaa is one of Europe’s most important forest conservation areas, hosting large mammals including moose, wild boars, brown bears and lynxes: these and other fauna also roam in the large forested area of Kõrvemaa, south of the park. Lahemaa’s forests provide several ecosystem services: recreation, berry and mushroom picking, hunting, habitat provision, cultural water and flood regulation. The State Forest Management Centre has been involved in visitor management in the Lahemaa National Park since February 2009 and has set up facilities for forest recreation.

Nature conservation work is based on the restriction rules of Lahemaa National Park.31. There are three land management zones in the park:

• nature reserve (0.1 % of the park’s territory). Esku reserve and Remnispea reserve are closed to the public.
• special management zone (18% of the territory). Picking berries and mushrooms is permitted, but other economic activities are forbidden. The zones at Ulkkari, Alvi and Kasispea are closed for visitors during the breeding season of birds, from April 1st to July 15th.

• limited management zone: activities which meet restriction requirements are allowed.

Lahemaa National Park is officially managed by the Environmental Board (under the Ministry of the Environment) even though the land belongs both public and private owners. All forest activities must be approved by the Environmental Board, including wood extraction. Although in the early 2000s, restrictions were violated and more forest was felled than allowed, no incidents have occurred in recent years.

Wood for biomass

Wood for fuel is a major product from Estonia’s forests: total annual felling in recent years for all purposes has been on the level of 8-10 million m³; of this total, about 20% (1.8-2.2 million m³) has gone directly for fuelwood32. The other major source of wood for energy is residues from the wood industry (including from sawmills, pulp and paper mills and furniture production). Further sources include wood from non-forest land, a small share of imports and other wood waste (see Figure 5 below). In total, Estonia consumed about 4.8 million m³ of wood for energy in 2015 and exported a further 2.7 million m³.

Figure 5: Sources of wood for energy (left) and main consumers (right)


There have been concerns that forest felling is high, as Estonia’s rate of felling is among the most intensive in Europe: Figure 6 on the following page presents a comparison for 2014, when the level exceeded 90% (the latest national data indicate that felling in Estonia has fallen to about 70% of annual increment33). One reason Estonia has a high rate of felling is that many of its forests are mature. Nonetheless, intensive forestry can pose a threat to biodiversity, as it reduces the share of older forests which typically are richer in biodiversity. Indeed, the average age of trees in Estonian forests is decreasing, underlining the importance of sustainable forest management34.

In the coming 20 years, large areas of Estonia’s forests will reach maturity. Much of this will be mature aspen and grey alder stands in private forests, and their main use would be fuel wood. If the private forest owners harvest large amounts of this low-quality wood, it can be
expected that the available quantities of wood fuel in subsequent years will decrease step by step.

Estonia’s National Development Plan of the Energy Sector Until 2030 forecasts an increase in the use of fuel wood, from the current levels, about 4.8 million m$^3$, to 6.2 million m$^3$, both from direct felling and from industry residues, to supply increased energy production from biomass. This level of extraction is based on the moderate scenario of the current Forestry Development Plan. Consequently, Estonia has the capacity to use greater levels of biomass for energy. However, this would need to be balanced by management that ensures the multifunctionality of its forests, providing a range of ecosystem services.

**Figure 6: Intensity of forest use: Estonia compared to selected EU Member States (2014 or latest year available)**


Note: The intensity of forest use is calculated based on felling compared to annual productive capacity, typically estimated as the annual growth of existing stock. There may be variations in country calculation methods.

### Protected areas

Estonia has five national parks that protect forests, wetlands and coastal and marine habitats, as well as a range of other protected areas. Natura 2000 sites cover 17% of the country’s territory, and are split more or less equally between terrestrial and marine areas. Some sustainable extraction activities are allowed in parts of national parks and other protected areas, as described in the box on the next page on the Lahemaa National Park.

### 5. CONCLUSIONS

Estonia has made important changes in waste management. The country has transformed its treatment of municipal solid waste from a reliance to landfilling to a system based to a large extent on incineration. A high share of construction and demolition waste is recovered. Much work remains, in particular to raise the level of recycling to meet EU MSW targets. Strengthening national and local institutions for waste management can play a key role in addressing these challenges.

Estonia has also taken major steps for the development of renewable energy. Wind power has become an important source of electricity generation, while biomass from forestry has grown as a source of heat and power.
Endnotes


32 Environmental Agency, 2016, Yearbook Forest 2014, Tallinn

33 Estonia Environmental Agency statistics, 2017
