Exploitation of peat resources

AUDIT REPORT

nr OSIV-2-6/05/71
14.07.2005

Exploitation of peat resources

Tallinn
2005

Summary

The State Audit Office (hereinafter SAO) audited the activities of the State in planning the use of peat resources and managing their extraction. The objective was to assess whether the State ensures a sustainable use of peat reserves. The use of peat reserves is coordinated by the Ministry of Environment. Today, according to the extraction permits issued by the Ministry, peat can be extracted in an area of 19,500 ha.

Peatlands are an important reservoir of clean water and an indispensable living environment for many species of flora and fauna. Peat extraction in and the draining of areas result in the disappearance of natural life in peatlands and the change of the water regime in the surroundings.

Peat is the second most important strategic energy source in Estonia after oilshale. The highly decomposed peat deposited in the lowest layers of a peatland can be used for heating and the production of electricity. In recent years, the extraction of low- decomposed peat from the upper layers of a peatland, which is used in horticulture, has been more dominant. Estonia holds the 3rd to 4th place in the world's export of horticultural peat.

In the course of the audit a questionnaire was sent to the county environmental departments in order to analyse the organisation of the environmental impact assessment of peat extraction and the rehabilitation of harvested production areas. The peat extraction permits issued in five counties, viz. Ida-Viru, Jõgeva, Pärnu, Saare and Tartu, - were examined more closely. Experts were asked for an opinion about the arrangement of environmental impact assessment and taxation of the mineral right.

Essential findings

The use of peat reserves has not been organised in a sustainable way

Enacted by the Government the annual rate of use of peat resources is 2,780,000 tons. According to the research made by the Institute of Ecology of Tallinn University in March 2005, all natural peatlands together generate only 400,000 to 500,000 tons of peat annually. Comparing these preliminary estimates of the scientists with the Government-permitted rate of use, it appears that the rate of use of peat exceeds its annual increment more than five times. Although the actual extraction rate of peat, due to the existing weather conditions has been lower than the permitted rate, it has still exceeded the increment two or three times.

So far the Government has treated peat as a renewable natural resource, whose use , according to the principles of sustainable development, must not increase increment. As the extraction volumes of peat exceed the increment, the use of peat reserves is not sustainable. At the same time, peat has to be treated as a non-renewable energy source pursuant to the Directive of the European Parliament and of the Council on the Promotion of Electricity Produced from Renewable Energy Sources in the Internal Electricity Market (2001/77/EC), and the Long-term Public Fuel and Energy Sector Development Plan approved by the Estonian Parliament. The treatment of peat as a non-renewable resource assumes a decision to be taken on how long peat deposits suitable for extraction should last. Such a decision has neither been taken nor has the purpose of the limited reserve been assessed. Despite of the decision whether to consider peat as a renewable or non-renewable natural resource, the State has to review the estimates of scientists and the permitted rates of use, to further research where appropriate, and decide whether and with which intensity peat resources may be used in the future.

The taxation of the mineral right is one of the possibilities to regulate the use of natural resources. The existing rates of charge for the mineral right are established without having investigated the impact of taxation on the environment, economy and social sphere. The State uses the charge for the mineral right as a tool neither for regulating the extraction volumes nor for directing extraction activities to certain regions.

Insufficient attention has been paid on the environmental impact assessment when granting peat extraction permits

Peat extraction causes an irreversible damage to the environment. Thus, it is necessary to assess the environmental impact of the planned activities before the decision on issuing an extraction permit and a permit for a special use of water is taken. In Estonia, the requirement for the environmental impact assessment has been in force since 1 January 2001.

The environmental impact assessment of the planned extraction activities is obligatory when the surface of the production area exceeds 150 ha, but as the audit established this requirement has not always been satisfied. In case of an area smaller than 150 ha, the Ministry of Environment and the county environmental departments had to decide each time on the need for the environmental impact assessment. Until today environmental impact assessment has never been required in case of an area smaller than 150 ha.

The SAO is of the opinion that the limit of 150 ha is not reasoned with respect to the environmental impact assessment requirement, because the draining of a peat quarry, no matter how small, always influences the environment and water regime of a larger area. Without carrying out the environmental impact assessment the extraction in valuable natural sites is not avoided. In the process of environmental impact assessment the opinion of local inhabitants about the planned extraction activities will also become clearer. In case the extraction permit will still be issued, more concrete measures can be taken on the basis of the results of environmental impact assessment in order to reduce the impact of extraction on the environment.

Regardless of the size of the production area every peat company should have a permit for a special use of water in addition to the extraction permit. The permit for the special use of water establishes more exact conditions for the draining of a peatland and the directing of the drainage water into natural watercourses. The permit also lays down requirements for monitoring the quality of the drainage water.

The audit showed that only a few peat production companies possessed a permit for the special use of water. If the drainable area is larger than 100 ha, the environmental impact assessment has to be carried out in the process of issuing permits for the special use of water as well. Until today this requirement has been followed only in 50% of cases.

Extraction permits do not lay down requirements for ensuring environmental safety

As the impact of peat extraction is significant, it is important that specific environmental requirements are conditioned in the extraction permits. The audit established that in most permits issued in the five counties examined neither environmental conditions nor the purpose of the further use of land damaged as a result of extraction have been laid down. As in most cases the environmental impact assessment had not been carried out before issuing the permits, peat companies had been set no requirements for reducing the environmental impact of extraction or monitoring it.

Degraded peatlands not rehabilitated

In Estonia, there are approximately 8,000 to 15,000 ha of abandoned areas that were earlier used for peat extraction, but which were not rehabilitated after production. In general, peat moss does not begin to grow spontaneously in drained and extracted areas and therefore no increment of peat takes place there. The degraded peatlands are a source of permanent environmental pollution and represent a great fire risk. Most of the abandoned production areas are owned by the State. Although the landowner must rehabilitate the abandoned areas, the State does not have an overview of the residual supply of peat in these areas and of environmental impact - whether these areas have to be re-extracted or rehabilitated. The State has not assigned finances to rehabilitate abandoned areas.

As the abandoned areas have been drained, the remaining peat starts to decompose. During the first 10 years after draining about 15 to 20 tons of peat per ha will be decomposed annually.[1] At the same time, CO_2, which is a significant factor of global climate warming, will be emitted into the atmosphere. In Estonia, the amount of CO_2 originating from the drained peatlands exceeds, for example, the amount of CO_2 from the traffic approximately nine times.

Upon approving the Long-term Public Fuel and Energy Sector Development Plan the Parliament decided that the draining of new peatlands should be stopped until 2025 and only the peat of already drained production areas should be used until that date. But this position has not been fixed in laws and preparations for taking new peatlands into use have not been stopped.

Main proposals to the Minister of Environment

- To consider the benefits and drawbacks of defining peat as a renewable or non-renewable natural resource. Thereafter to take a clear position on whether to treat peat as a renewable or non-renewable natural resource and, pursuant to the decision made, to initiate necessary amendments to the legal acts. Based on the amendments further reassess the critical and usable reserves of peat and its annual rates of use, and, where appropriate, carry out further scientific research to assess the increment of peat. On the basis of the outcome and the decisions taken, to initiate amendments to the legal acts in order to change the size of reserves and annual rates of use.

- To work out principles of charging for extraction. For this purpose, to conduct a research of the impact of charging for extraction and analyse the expediency of distribution and use of income, taking into account other taxes, external costs of use of peat, etc. With reference to the above, to initiate the alteration of the charge for extraction and the distribution of revenue (between the State and local).

- In case of the mechanized extraction of peat, always to demand the environmental impact assessment before issuing a new extraction permit, regardless of the size of the production area. To initiate accordingly amendments to the Environmental Impact Assessment and Environmental Management System Act.

- To require all peat producers the availability of permits for the special use of water as well as a regular monitoring of the quality of drainage water.

- To initiate amendments to the Earth's Crust Act to provide authorities issuing extraction permits with a right to change terms in the permits, i.e. to re-establish the procedure that was in force in the Earth's Crust Act until 31 March 2005. Thereafter to ensure the establishment of environmental requirements and the purpose of rehabilitation of degraded peatlands in all peat extraction permits.

- In order to direct peat extraction to abandoned, non-exhausted production areas, to suspend, until 2025, issuing new extraction permits in case of peatlands and parts of peatlands, which have not been affected by extraction also on the basis of the objectives set up in the Long-term Public Fuel and Energy Sector Development Plan. To initiate necessary amendments to legal acts, including the Earth's Crust Act, in order to attain objectives of the development plan.

- To initiate rehabilitation of these degraded State-owned peatlands whose re-exploitation is not feasible.

[1] According to the Long-term Public Fuel and Energy Sector Development Plan peat reserves are annually reduced by 2,5-3 million tons because of decomposing, which exceeds annual peat extraction more than twice.

- To develop a financing scheme to cover costs of rehabilitation in case a company becomes insolvent, e.g. by establishing a state guarantee fund or a sub-fund under some financial institution or requiring rehabilitation of the deposit from a company before issuing an extraction permit.

Replies of Ministers

The draft audit report was submitted for reply to the Minister of Environment, as well as to the Minister of Economic Affairs and Communications and to the Minister of Finance for information and for receiving comments concerning their domain.

The Minister of Environment concurred in his reply with most proposals made by the SAO. The Minister promised to initiate amendments to the relevant acts in order to abolish the limit of 150 ha established on the environmental impact assessment requirement, i.e. environmental impact has to be assessed before issuing new permits to extract peat. The Minister informed that it is planned to convert peat reserves in the quarries located in Natura 2000 sites from active reserve to passive. Guidelines for preparing a programme and report on an environmental impact assessment, including environmental impact assessment of peat extraction areas, are under preparation. The Minister also agreed to the proposal to initiate an amendment to the Earth's Crust Act so that the considerable environmental impact resulting from extraction should be a sufficient legal basis for refusal to grant an extraction permit. He also agreed that there is a need to review the extraction permits issued until today because of the need to specify environmental and rehabilitation conditions provided in the permits. Preparations for rehabilitation of abandoned peat production areas have been initiated.

According to the Minister of Environment one of the most essential shortcomings of the audit was that the SAO had based its proposal to change the rate of use of peat on the data about the increment of peat published by the Ecology Institute, Tallinn University, in March 2005. The SAO agrees that the data can not be treated as incontestable, marking at the same time that it is the only work in Estonia which has been completed concerning assessment of increment (accumulation) of peat mass and that the authors' competence in the study of wetlands is generally recognised. At the moment there are no more reliable data available on this field. The SAO finds it necessary to emphasize that if peat is treated as a renewable natural resource, the rate of use established by the State shall be based on data on the increment of peat and not merely on the estimated size of total reserve. In his reply, the Minister of Environment consented to launch supplementary studies to assess the increment of peat and decide on the need to alter the rates and reserves after the outcome of the studies, as well as to harmonize the conditions of extraction permits with new rates.

The Minister of Environment is of the opinion that peat producers need not hold permits for the special use of water to drain bogs and direct the drainage water into watercourses as this does not concern waste water and draining, in general, does not cause the sinking of the ground water level either. The SAO notes that county environmental departments under the Ministry have issued permits for the special use of water already in case of 14 peat production areas (i.e. ca one tenth of all areas) and that it is obligatory to assess environmental impact already today when draining areas bigger than 100 ha. The SAO is of the opinion that these measures have ensured an effective control over water pollution accompanying extraction activities.

The Minister of Environment is of the opinion that the SAO has not provided sufficient arguments why the Ministry should suspend, until 2025, the issue of extraction permits in case of peatlands and parts of peatlands that have not been affected by extraction.

In this connection the SAO considers it necessary to repeat what was stated in the draft audit report that the corresponding decision was taken by the Parliament in the end of 2004 by approving the Long-term Public Fuel and Energy Sector Development Plan. By stopping the issuing of permits concerning peatlands and parts of peatlands not subject to extraction yet in order to save peat resource as well as natural wetlands, the extraction will be directed to numerous abandoned areas with reserve not exhausted.

The Minister of Environment was of the opinion that it is reasonable to treat peat as a renewable natural resource and this treatment should not be harmonized with the treatment of peat as a non-renewable energy source. The SAO agrees with the Minister that the decision on defining peat as a renewable or non-renewable natural resource will not be sufficient in order to preserve peat as a natural resource and to ensure its sustainable use. At the same time, the content of other decisions to be taken on planning the use of peat will depend on this particular decision. The actuality of this question is demonstrated also by the Minister of Environment by stating that in the perspective of 20-30 years peat is undoubtedly a non-renewable natural resource (as it is treated in other parts of Europe).

The Minister of Economic Affairs and Communications had no supplementary proposals to the draft audit report, however, he emphasized that peat has to be treated as a non-renewable energy source pursuant to the legislation of the European Union. The Minister informed that the taxation issues concerning peat extraction would be discussed in the course of preparation of the ecological tax reform.

The Minister of Finance supported the proposal of the SAO to carry out environmental impact assessment in all cases, including the extraction of peat in areas smaller than 150 ha. In his reply the Minister emphasized the necessity for the re-exploitation or rehabilitation of abandoned production areas. The Minister was of the opinion that no separate financial units need to be established in order to finance the rehabilitation of peat production areas, but instead, the finances of the Earth's Crust sub-programmes of the Environmental Investment Centre should be used. The Minister considered it necessary to increase the charge for extraction considerably in order to cover the administrative costs of the State arising from planning of use of peat reserves as well as damages caused to the environment.

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Introduction

The objective of the audit was to provide an opinion on whether the State ensures a sustainable use of peat reserves.

The SAO audited the Ministry of Environment and the county environmental departments within its area of government, the Estonian Environmental Information Centre, the Estonian Land Board, and Plc Geological Survey of Estonia.

In the course of the audit, the SAO also consulted with the Ministry of Finance, the Ministry of Economic Affairs and Communications, the Estonian Peat Association as a body uniting enterprises, the Society of Estonian Wetlands that is engaged in protecting Estonian peatlands.

The period audited was from 1998 to 2004, but the audit also made use of the data for previous periods.

The audit group consisted of Ms Tuuli Rasso, Senior Auditor, and Ms Kärg Kama, Junior Auditor.

Introduction to the subject

Peat resources

Estonian mineral resources (including peat resources) are registered in the National Register of Earth Deposits[2], whose responsible processor is the Ministry of Environment, responsible executor is the Estonian Land Board and authorized executor is Plc Geological Survey of Estonia. Peat reserves will be included in the register of mineral deposits[3] as peat deposits after completion of geological explorations. The Minister of Environment decides on the registration of mineral reserves in the National Register of Earth Deposits, taking into account the opinion of the Committee of Estonian Mineral Resources[4]. The Geological Survey of Estonia draws up a composite balance sheet of mineral reserves, which contains data on deposits, mineral reserves and changes therein, as well as data relating to the mining of mineral resources. The reserves are divided into active ones that may be mined, and passive ones that are located in areas subject to restrictions on mining, e.g. nature conservation areas. According to the data of the Geological Survey of Estonia[5] 1,614 tons of peat in both active and passive peat reserves have been included in the National Register of Earth Deposits. Of the 1,614 tons, 16% is partly decomposed peat and 84%, decomposed peat. According to the data of the revision of peatlands[6] and peat deposits carried out more than 15 years ago, in Estonia total reserves of peat amounted to 2,365 mln tons. Taking into account of the level of explorability, not all reserves of peat estimated in the course of the revision, were included in the National Register of Earth Deposits.

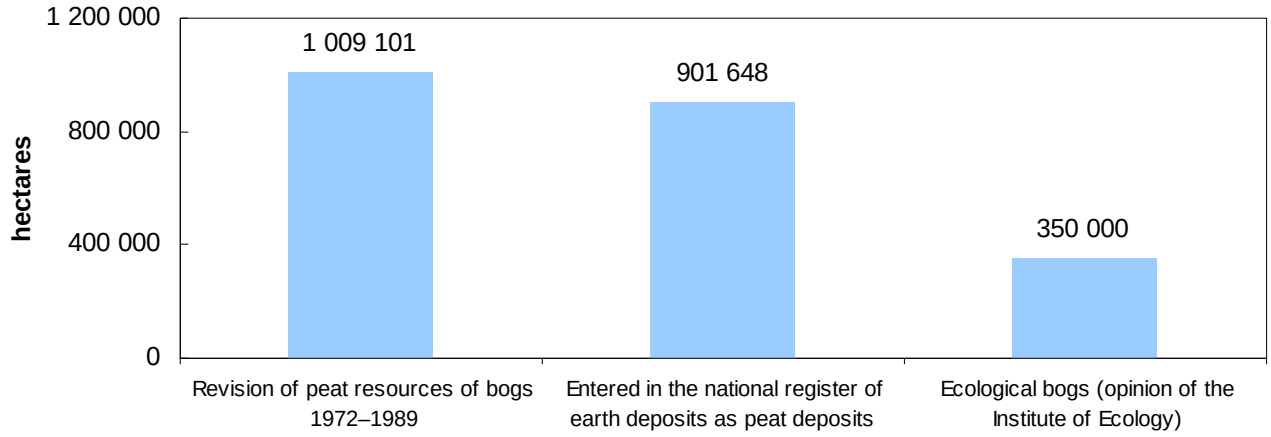
According to the revision, peatlands covered 1,009,101 ha. This is more than one fifth of the total area of Estonia (Figure 1). Currently the register of mineral resources includes 281 peat deposits whose

[2] Old Earth's Crust Act, Art. 7. Since 1 July 2005 the Environmental Register (new Earth's Crust Act, Art. 75) takes over the function of the National Register of Earth Deposits.
[3] Deposit is a layer or part of the layer described and explored as a result of general geological surveys or geological exploration and entered in the Environmental Register, whereby the whole layer or part of the layer which contains mineral resource with intermediate layers will be entered in the register as a deposit. New Earth's Crust Act, Art. 2.
[4] The main task of the Committee of Estonian Mineral Resources is to consult the Ministry of Environment on the issues of exploration and use of the crust of the earth, inventory of mineral resources, approval, qualification, writing off and protection of the supply of mineral resources. Experts in geology, mineral extraction, environmental protection and other fields are appointed to the Committee of Estonian Mineral Resources. The Committee consists of representatives of the Ministry of Environment, the Estonian Land Board, the Technical Inspectorate and professional associations. Staff members of the Committee of Estonian Mineral Resources are approved by the Minister of Environment. (new Earth's Crust Act, Art. 6).
[5] Composite balance sheet of the Geological Fund 2003, Geological Survey of Estonia.
[6] The revision of peatlands and peat deposits from 1972 to 1989 carried out by Geological Survey of Estonia

total area is a bit smaller than the figure established in the revision, because peatlands with an area under 10 ha and thickness of peat layer under 0.9 m are not included in the register as deposits.

According to the estimate of the Institute of Ecology of Tallinn University[7] approximately 270,000 to 350,000 ha of ecological peatlands have remained. This figure is about three times lower than the one ascertained in the revision. The reason is that, in the last century, many peatlands were drained for the extraction of peat or for forestry and agricultural purposes and therefore these areas are not in natural condition any more and no increment of peat takes place there.

Figure 1. Area of bogs, area of peat deposits and active raised bogs



Sources: Revision of bogs and peat deposits by the Geological Survey of Estonia, the National Register of Earth Deposits, estimate of the Institute of Ecology[8]

Peatlands (transitional fens, fens and raised bogs) have a genetic diversity of species. In view of the fact that in Europe, most of such wetlands have been damaged, Estonian peatlands are unique. Currently 103,000 ha of peatlands or *ca* 11% of the total area of registered peat deposits have been placed under nature protection. In general, mineral deposits that are located in the areas under nature protection, are considered passive deposits.

In the near future Natura 2000 bird habitat and nature conservation areas[9] will be added to the list of currently protected areas. According to the preliminary estimate, in the course of development of the Natura 2000 network of conservation areas, the area of protected peatlands will be increased up to 142,500 ha. A preliminary selection of proposed Natura 2000 sites has been done and the protected areas, to be added, have been taken under temporary protection. Temporary protection measures will apply until approval of the protection rules for the areas and establishment of constant protection upon the areas. A final selection of Natura 2000 sites will be made during negotiations with the European Commission in the years 2005 to 2007. The areas will have to be placed under permanent protection not later than by 1 July 2007.

[7] Turba juurdekasv Eesti soodes. [Peat increment in Estonian peatlands.] Final report on an applied research project of the Environmental Investment Centre. Drafted by M. Ilomets. Institute of Ecology, Tallinn University, 2005. (In Estonian)
[8] Same.
[9] Natura 2000 network of the European Union in Estonia consists of
1) areas hosting birds of which Estonia has informed the Commission pursuant to Council Directive 79/409/EEC on the conservation of wild birds (OJ L 103, 25.04.1979, pp. 1–18);
2) areas, which the Commission, pursuant to Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora considers to be of common European importance. (Nature Conservation Act, Art. 69)

Impact of peatlands on the environment

Natural peatlands are the only possible habitats for many species. For example, bean goose, whimbrel and red-throated diver nest only in raised bogs.

Peatlands are also areas of formation and preservation of water resources. As for extraction a peatland has to be drained, the exploitation of peat deposits jeopardizes first of all the water regime.[10] The level of water in many wells located near peat deposits has dropped after draining. Rivers and springs near the drained bogs also become more drought-sensitive.[11] The acidic water that flows out of the quarries contains plenty of humic substances and solid peat fractions that make the living conditions in water bodies for many living organisms unsuitable.

In natural peatlands the binding of carbon dioxide and accumulation of organic substance take place. At the present time, the balance of binding of carbon dioxide is disturbed, as in drained peatlands peat starts in contact with air to decompose[12] and CO_2 will be released[13]. In addition, CO_2 will also be emitted when peat is used for heating or in horticulture. Carbon dioxide is one of the greenhouse gases and thus the use or decomposition of peat has an indirect impact on global climatic processes as well.

Peatlands have also an impact on local climatic processes. The draining of peatlands will make the local climate dryer and fluctuations of temperature more drastic.[14]

The exploitation of peat deposits may also cause other inconveniencies to the inhabitants of the neighbourhood. In open peat fields the transportation of loose peat particles with wind to the neighboring areas takes place. Peat dust spreading with wind disturbs the inhabitants. Open peat fields are easily flammable; it is difficult to discover and extinguish fire.

Management of extraction

The exploration, protection and use of the earth's crust is regulated by the Earth's Crust Act. The Act was amended during the audit of the SAO. Therefore hereinafter the Earth's Crust Act that was in force until 31 March 2005 will be called an "old Earth's Crust Act" and the Earth's Crust Act that took effect on 1 April 2005 will be called a "new Earth's Crust Act".

So far the use of peat reserves has been regulated by the Government of the Republic Regulation "Sustainable Use of Peat"[15], which was enacted on the basis of the Sustainable Development Act. It specifies the size of the critical and usable reserves of peat on both national and county level, as well as its annual rates of use in counties.

The critical and usable reserves, as well as the annual rates of use in counties will be changed due to the adoption of new Earth's Crust Act. It is planned to approve a new Government Regulation "The Critical and Usable Reserves of Peat and Rates of Use"[16] on the basis of both the Sustainable Development Act and the new Earth's Crust Act.

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[10] Kink, Hella. Turba kaevandamine ohustab veevarusid. [Peat extraction endangers water reserves.] – Eesti Loodus 2003, nr 2/3. (In Estonian)
[11] Laanetu, Nikolai. Kuulakem ka argimõistuse häält. [Let's listen to the common sence.] – Eesti Loodus 2003, nr 2/3. (In Estonian)
[12] During the first ten years after the drainage the speed of decomposition of peat is 15–20 t/ha. (Tomberg, U. Turba vajumine soode kuivendamisel. [Reduction of peat after drainage of peatlands.] Saku: AS Rebellis, 2004). (In Estonian)
[13] According to the assessment of the Institute of Ecology, 11 million tons of CO_2 is released into the atmosphere annually as a result of mineralization of peat. Source: Peat increment in Estonian peatlands. Final report on an applied research project of the Environmental Investment Centre. Drafted by M. Ilomets. Institute of Ecology, Tallinn University, 2005.
[14] Interview with Mati Ilomets, specialist in peatlands, 18.03.2005.
[15] Government of the Republic Regulation No 213 of 14 August 1996.
[16] Draft Regulation http://eoigus.just.ee/?act=dok&subact=1&DOK_W=84855

In practice, the use of peat resources is regulated with the issue of extraction permits. Permits to extract peat in deposits of national importance[17] are issued by the Ministry of Environment. Permits to extract peat in deposits of local importance are granted by county environmental departments. Pursuant to the new Earth's Crust Act extraction permits may be issued for a term of up to 30 years. The permits in turn specify the size of active, passive and extractable reserves of peat in a specific extracting area, as well as maximum and minimum annual production.

Before 1995 mining enterprises were granted an authorization for use. After the adoption of the Earth's Crust Act, extraction permits were started to issue. The extraction permits will be issued after establishment of the right of use of land or the conclusion of a land lease contract. Enterprises had to submit an application to the Ministry of Environment in order to re-register old authorization for use by 3 April 1998 at the latest. The deadline for re-registration of old permits has been repeatedly postponed, the final deadline of this process is 1 July 2005.

The impact of peat extraction on the environment has been assessed since 1 January 2001 when the Environmental Impact Assessment and Environmental Management System Act entered into force. The Act was amended at the time when the audit was carried out. Therefore hereinafter the Environmental Impact Assessment and Environmental Management System Act that was in force until 2 April 2005 will be called an old Environmental Impact Assessment Act, and the Environmental Impact Assessment and Environmental Management System Act that took effect on 3 April 2005, a new Environmental Impact Assessment Act. Environmental impact assessment conditions of peat extraction have been enacted in both the acts similarly. It is obligatory to assess the environmental impact when the peat production area to be exploited is bigger than 150 ha. In case an area is under 150 ha, the environmental authority that issues the permit has to balance every time whether the environmental impact assessment is necessary or not.

The Water Act lays down conditions for a special use of water, including for decreasing the water level in peat fields and discharging the drainage water into recipient water. To drain a peat deposit a permit for the special use of water has to be applied.[18] County environmental departments issue permits for the special use of water, including permits concerning peat deposits of national importance. Upon draining an area bigger than 100 ha, it is obligatory to assess the environmental impact of draining according to both the new and old Environmental Impact Assessment Act.[19] The environmental impact of draining projects of peat fields is assessed in the course of processing a permit for the special use of water.

Pursuant to the Earth's Crust Act, the holder of an extraction permit has to pay for the right of extraction, use or damaging the supply of mineral reserves. The rates of taxes for the right to extract both the decomposed and partly decomposed peat are different (Table 1).

Table 1. Rates of taxes on mineral rights (EEK/ton)

	2000	2001	2002	2003	2004	2005
Decomposed peat	3,6	4,3	4,3	2,7	2,8	2,9
Partly decomposed peat	2,2	2,6	2,6	4,3	4,4	4,6

Source: Ministry of Environment

Taxes for the right of extraction in mineral deposits of local importance will be paid into a local budget. 30 % of the taxes for the right of extraction in mineral deposits of national importance will be paid into the state budget and 70 %, into a local budget.

[17] Six peat deposits of national importance: Ellamaa, Endla, Epu-Kakerdi, Lavassaare, Puhatu, Sangla.
[18] This obligation has been valid since 16 June 1994 when the Water Act entered into force.
[19] This obligation has been valid since 1 January 2001.

In addition to the tax for the right of extraction, the holder of an extraction permit has to conclude a lease contract with the owner of the land and pay rent (in case of public land 5 % of the assessed value of the land) and land tax.

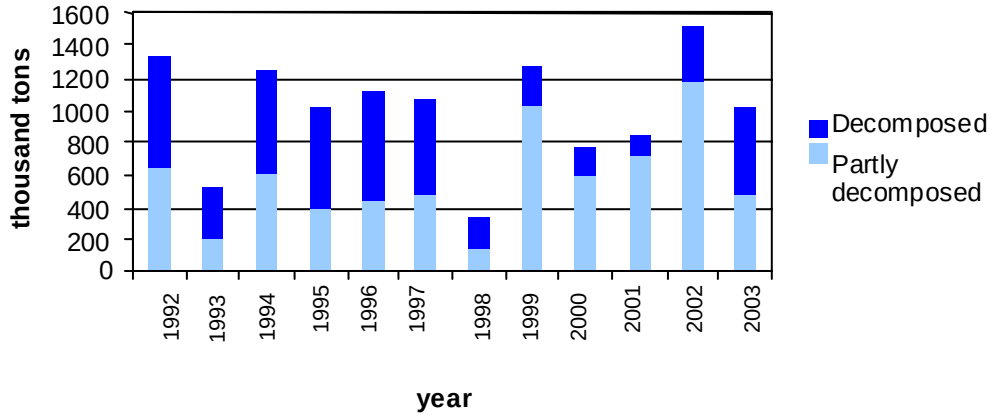
The fuel excise duty has not been imposed on using peat for heating.[20] The pollution charge for the release of CO_2 into the atmosphere upon using peat for heating has been imposed neither.[21]

Use of peat

In Estonia, peat production was the most intensive in the 1970s and 1980s when annual extraction capacity reached two million tons. Predominantly, the use of peat in agriculture was ended up in the beginning of the 1990s and its use for heating was also decreased. As a result, the production capacity was decreased and many open peat fields were left out of use.

In the last years the production of peat shows a rising tendency again (Figure 2). 1,540 employers worked in the peat industry in 2001.[22] In 2002, peat production formed 0.8 % of Estonian industrial output.[23] According to the data of the Estonian Peat Association 19,500 ha of peat production fields are used by enterprises.[24]

Figure 2. Peat extraction in Estonia



Source: Statistical Office of Estonia

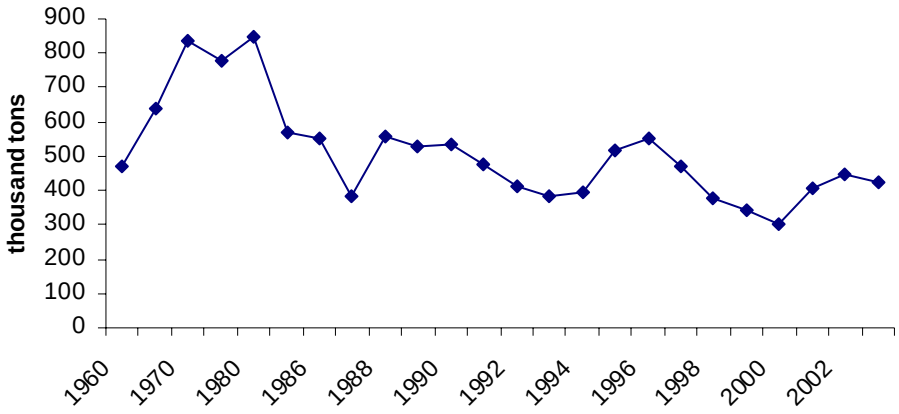
Currently, peat is used mainly for heating and in horticulture. Peat is the second most important national strategic energy source after oil shale. In the Long-term Public Fuel and Energy Sector Development Plan until 2015 peat is treated as a competitive local fuel. It is foreseen that the relative importance of peat will be increased gradually, first of all in the small-scale power industry.

[20] Alcohol, Tobacco and Fuel Excise Duty Act
[21] Pollution Charge Act
[22] Statistical Office of Estonia
[23] Statistical Office of Estonia
[24] Interview with the Managing Director of the Estonian Peat Association on 6 January 2005

According to the estimation of the Ministry of Economic Affairs and Communications the share of peat in the production of electricity may increase up to 2 % by the year 2010.[25]

The decomposed peat deposited in the lower layers and used as a raw material for the production of sod peat and briquettes, is suitable for heating. Combined peat-fired heat and power stations (Väo, Tartu) whose energetic efficiency is higher than that of peat-fired central heating stations are also under establishment.

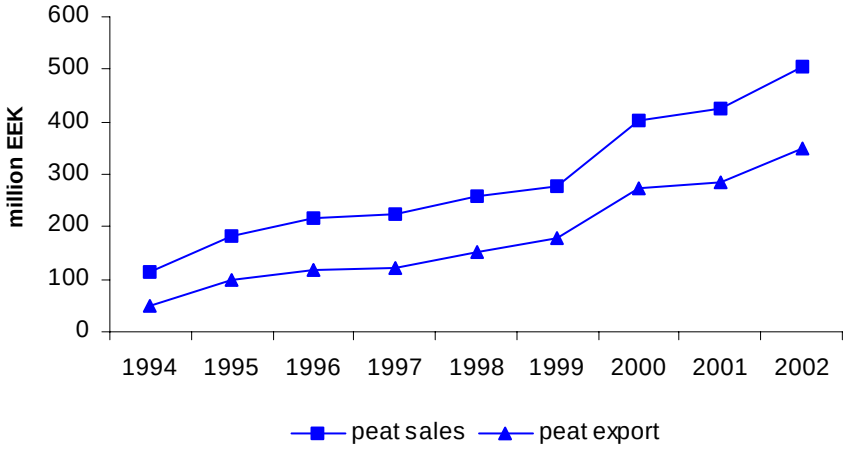
Figure 3. Use of peat as fuel



Source: Statistical Office of Estonia

The partly decomposed peat or the mixture of partly decomposed and decomposed peat, deposited mainly in the upper layers of bogs is used in horticulture. The majority of horticultural peat goes to export. Estonia occupies the third to fourth place in the world's peat export after Germany and Canada. Figure 4 illustrates the growth of peat export in the last years.

Figure 4. Sale and export of peat



Source: Statistical Office of Estonia

[25] Interview at the Ministry of Economic Affairs and Communications on 27 January 2005

Efforts have been made to find also other applications for peat. Exhausted peat production areas have been taken into use to cultivate cranberries and other berries. The curative effect of peat has been under investigation as well, but until today peat has not found use as drug.

Description of the audit

The audit "Use of peat reserves" was carried out in accordance with the work plan of the SAO in 2004 and 2005. The audit was carried out from December 2004 to April 2005, the legislation was assessed as at 30 April 2005. Decisions on the issue of extraction permits and permits for the special use of water and environment impact assessments were analysed as at 20 March 2005.

The audit concentrated on the following spheres:

- **planning of peat reserves-** data on peat reserves and the activities of the State in planning the use of resources were analysed;
- **environmental impact and a special use of water -** management of environmental impact assessment upon issuing extraction permits and permits for the special use of water was reviewed;
- **extraction permits -** conditions of permits necessary for extraction of peat were reviewed and laying down requirements for reducing the environmental impact of extraction was analysed;
- **rehabilitation of peat production fields** - problems relating to management of peat fields and abandoned peat fields were treated.

Methodology and acts of the audit

The use of peat resources was examined as an operational audit. The following acts were carried out to collect observations and for checking purposes:

- Interviews at the Ministry of Environment, the Ministry of Finance, the Ministry of Economic Affairs and Communications, the Estonian Environmental Information Centre, the Estonian Land Board, Geological Survey of Estonia.
- Consultations at the Institute of Ecology of Tallinn University, the Estonian Peat Association, the Society of Estonian Wetlands. A complete list of interviews and consultations is contained in Appendix 2 to the audit report.
- Analysis of the legislation proceeding from problems treated in the audit.
- Analysis of peat extraction management in five counties, viz - Ida-Viru, Jõgeva, Pärnu, Saare and Tartu counties. Counties as different as possible, as regards natural prerequisites and intensity of extraction, were included in the sample at random. Activities:
  - analysis of the composite balance sheet of peat resources, authorizations for use, extraction permits and conditions of permits for the special use of water;
  - interviews at county environmental departments.
- A questionnaire to environmental departments focusing on the arrangement of the assessment of environmental impact of peat extraction and rehabilitation of peat production areas. The questionary was made available via the Internet to all 15 county environmental departments and all responded.

- A focus group consisting of specialists in peatlands and peat, including representatives of state institutions, was set up. The focus group met twice.

  On 19 January 2005 the following issues were discussed:

  - different aspects of treating peat as a renewable or non-renewable natural resource and the consequent impact on the environment;
  - Arrangement of environmental impact assessment in the course of issuing extraction permits.

  On 15 March 2005 the following topics were discussed:

  - Taxation of use of peat resources and the impact of possible changes on the activity of peat extraction and environment;
  - Possibilities of rehabilitating abandoned production areas.

  The minutes of the meetings of the focus group are given in Appendix 3 to the audit report.

- Opinion was asked from two experts.

  - Expert opinion on the charge for the right of extraction. Ms Tea Nõmmann, a PhD student at the University of Abo Akademi, provided an opinion. Ms Nõmmann was involved because of her experience in analysing environmental taxes.[26] The expert opinion is presented in Appendix 4 to the audit report.
  - Expert opinion on the arrangement of environmental impact assessment and the legislation. The opinion was given by Mr. Raimo Pajula, explorer of peatlands and licensee in expertise of environmental impact assessment, scientist of the Department of Landscape Eecology of the Institute of Ecology, Tallinn University. The expert opinion is presented in appendix 5 to the audit report.

- Analysis of the practice of foreign countries on the basis of literature data and sources available on the Internet as well as requests for information submitted to contact persons of higher auditing institutions of: Finland, Latvia, Lithuania, the Netherlands, Sweden and the United Kingdom. Responses were recived from Finland, Latvia, Lithuania, Sweden and the United Kingdom.

[26] E.g.: Nõmmann, T.; Luiker, L. ja Eliste, P. Eesti arengu alternatiivne hindamine-jätkusuutlikkuse näitajad. [An alternative assessment of the development of Estonia – indicators of sustainability.] Tallinn 2002; Centre of Strategic Initiatives. 2004. Analysis of a macroeconomic impact of application of a tax on the release of CO_2 in Estonia. (Orderers of the work: KKM, MKM, Eesti Energia). (In Estonian)

1. Planning of the use of peat reserves

1.1. Lack of a uniform position on whether to treat peat as a renewable or non-renewable resource

The State is responsible for planning and managing the use of its natural resources. Pursuant to Article 5 of the Constitution the natural wealth and resources of Estonia are national riches, which shall be used in a sustainable way.

Natural resources are divided into renewable (e.g. forest and fish) and non-renewable (e.g. oil-shale and gravel) resources. According to the principles of sustainable development[27] renewable natural resources may be used within the limits of regeneration only. Non-renewable resources should be used in such a way that these would not run out before industry and technology are able to replace them with other resources.

In Estonia principles of the use of renewable and non-renewable resources have been laid down in the Sustainable Development Act.[28] Pursuant to the Act the size of critical reserves of a renewable resources has to be established with the aim to ensuring a natural balance and regeneration of the resource, implementation of protection regimes and preservation of the biological and landscape diversity. The reserve that is not included in critical reserves is usable reserve for which the Government has to lay down annual rates of use. The use of non-renewable natural resources has to be based on the principle that the reserves would suffice as long as possible. In case of a non-renewable natural resource neither critical nor usable reserves are determined. The Government has to lay down annual rates of use use of non-renewable natural resources as well but until today no annual rates of use of any non-renewable natural resources have been laid down.

The Sustainable Development Act does not specify, which of the Estonian natural resources are renewable, and which are non-renewable. On the basis of the Sustainable Development Act, the Government of the Republic Regulation "Sustainable Use of Peat" came into effect in 1996 determining the critical and usable reserves of peat, as well as its annual rates of use in counties. By this Regulation it is assumed by default that in Estonia peat is a renewable natural resource.[29]

At the same time, pursuant to Directive 2001/77/EC of the European Parliament and of the Council on the renewable energy sources and Electricity Market Act[30] peat is non-renewable energy resource. In the European Union all natural resources that do not regenerate themselves during a period of one hundred years are considered fossil fuels, i.e. non-renewable energy resources. Peat is just such a natural resource. Current Estonian peatlands have been formed during the last 10,000 years. Even in the Long-term Public Fuel and Energy Sector Development Plan until 2015 peat is treated as a fossil fuel. At the same time, the Ministry of Economic Affairs and Communications has applied for leaving the use of peat without CO_2-taxation[31], i.e. a benefit that is applied to the use of renewable energy resources. Even in the previous fuel and energy sector development plan and earlier surveys on energy, peat has been treated rather as a renewable energy resource. Pursuant to the legislation of the European Union, it is no longer possible to define peat as a renewable energy resource.

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[27] Principles of sustainable development have been approved at the United Nations Conference on Environment and Development in Rio de Janeiro in 1992.
[28] Sustainable Development Act relies upon principles formulated at the United Nations Conference on Environment and Development in 1992.
[29] On 1 April 2005 a new Government of the Republic Regulation "The size of the critical and usable reserves of peat, and use rates"will enter into force drafted on the basis of both the Sustainable Development Act and the Earth's Crust Act. The Regulation does not change the total size of the critical and usable reserves of peat, and its annual rates of use in Estonia as a whole, but changes figures in different counties. In the Regulation it is assumed that peat is a renewable natural resource.
[30] Electricity Market Act recites renewable energy resources, but peat does not belong to those.
[31] Interview at the Ministry of Economic Affairs and Communications on 27 January 2005.

Treating peat as a renewable natural resource, however, has had a positive effect on environmental targets. Establishment of the critical and usable reserves and the rate of use will contribute to keeping extraction under control. In this case the requirement for rehabilitation is better grounded - in addition to the recovery of wetlands, also for enabling the regeneration of peat in these areas. Rehabilitation of wetlands will in turn inhibit the emission of CO_2 into the atmosphere and contribute to the principles of the Natura 2000 process.[32]

But a statement that peat is a renewable natural resource can be made use of by enterprises as an argument in order to intensify extraction, because "peat can be replaced!".[33] An understanding that peat will always be replaced does not favor its evaluation in research and development but rather promotes export of raw peat. This will also bring about leaving exhausted production areas without rehabilitation or considering them self- recovered without any restoration work. Benefits and drawbacks of defining peat as a renewable/non-renewable natural resource have been more precisely educed in Appendix 3 to this report.

Treating peat simultaneously as a renewable natural resource and non-renewable energy source has caused a terminological confusion and misunderstanding. Environmental authorities are not convinced that peat is currently used in conformity with the principles of sustainable development, i.e. reproduction of peat is proportional to the amount extracted. At the same time, enterprises do not understand why advantages that apply to the production of renewable energy are not applicable to the use of peat as a renewable energy resource.

1.2. Upon establishment of rates of use, the increment of peat has not been taken into account

Based on the principles of sustainable development, use of a renewable natural resource[34] shall not exceed its limit of regeneration. Therefore the actual increment of the resource should be taken into account while planning the use of reserves. As agreed, until today in Estonia, the increment of peat is considered 1 mm per year.[35] Before 2005, the increment of peat mass or accumulation (ton per ha) has not been tried to assess in Estonia.

In 1996 the Government established critical and usable reserves of peat as well as its annual rate of use. Audit was unable to elucidate which basic data and calculations were used to confirm the reserves. The estimation of usable reserves was probably based on the results of the revision of peat reserves made by the Geological Survey of Estonia in the whole of Estonia in the period of from 1972 to 1989. In the revision the total reserves of peat in Estonia were estimated at 2,365 million ton. Approximately two- thirds of this quantity, i.e.1,590 million ton, was decided to consider critical reserves and one-third (775 million ton) to define as usable reserves.[36] At the same time, supplementary measurement, adjustment, extraction and writing off of peat reserves have taken place after the revision. In the composite balance sheet of mineral resources in 2003, only 1,614 million tons of peat was included, i.e. roughly as much as defined as critical reserves which should not be extracted.[37]

It is not clear, to which extent and whether at all the total area of peat production areas and peat increment was taken into account upon establishing reserves and rates of use of peat in 1996. Probably, upon establishing the rates, the fact that peat will not be regenerated in areas damaged by

[32] Meeting of the focus group on 19 January 2005.
[33] Meeting of the focus group on 19 January 2005.
[34] So far the Government has treated peat as such.
[35] Linear increment has been estimated according to the average age and thickness of peat layer of Estonian peatlands.
[36] A. Marvet, Rabas targu talita. [Act wisely in bogs.] – Eesti Loodus 2003, nr 2/3, lk 65. Interview with the Chief of the Environment Management and Technology Department of the Ministry of Environment on 24 March 2005.
[37] The composite balance sheet of mineral resources contains active and passive usable and reserve supplies of peat. At the same time the balance sheet does not include predicted supply of peat which is geologically less studied than active and passive usable and reserved reserves of peat included in the balance sheet. (In Estonian)

draining, in abandoned areas, in areas under exploitation as well as in areas in Ida-Viru County where alkaline ash has been settling (thus prohibiting peat regeneration), has not been taken into account.

In March 2005, a report "Peat increment in Estonian peatlands" was published within the project carried out by the Institute of Ecology, Tallinn University.[38] The project estimates, for the first time, the total area of peat production areas, a more exact height of peat increment by moss species, and the increment of peat mass or accumulation (see Chapter 1.3). Earlier, the State had no scientific data available to assess an actual regeneration of peat.

According to the SAO, the critical and usable reserves as well as annual rates of use of peat established by the Government do not take into account its actual regeneration but are at the moment based only on the size of peat reserves that were known in 1989.

1.3. Permitted rate of use of peat exceeds increment fivefold

Both the total area of peat production areas and the increment of peat mass (accumulation) in different types of peatlands has to be taken into account when planning the use of the reserves of peat as a renewable natural resource. Based on the results of the project "Peat increment in Estonian peatlands" carried out by the Institute of Ecology of Tallinn University, it was found that in Estonia there were 270,000 to 350,000 ha of ecological peatlands where the increment of peat takes place. These peatlands generate 400,000 to 550,000 tons of peat annually.

The annual rate of use of peat, as established by the Government, is 2,780,000 tons.[39] Comparing estimates of the scientists of the Institute of Ecology with this figure, it turned out that the permitted rate exceeds the actual annual increment five times. Expecting that peat extraction would be continued in the permitted capacity, within the limits of increment, the total area of ecological peatlands should be 2.4 million ha, i.e. approximately 7 to 9 times bigger than at present or half the territory of Estonia. [40]

As at the end of 2002, the maximum annual extraction capacity (annual production), as fixed in permits issued to enterprises, totaled 2,431,800 tons or otherwise, it exceeded the actual increment of peat more than four times (Figure 5).

Comparing the increment of peat with the extraction capacity in 2002[41], the actual extraction has exceeded increment almost three times (Figure 5).[42]

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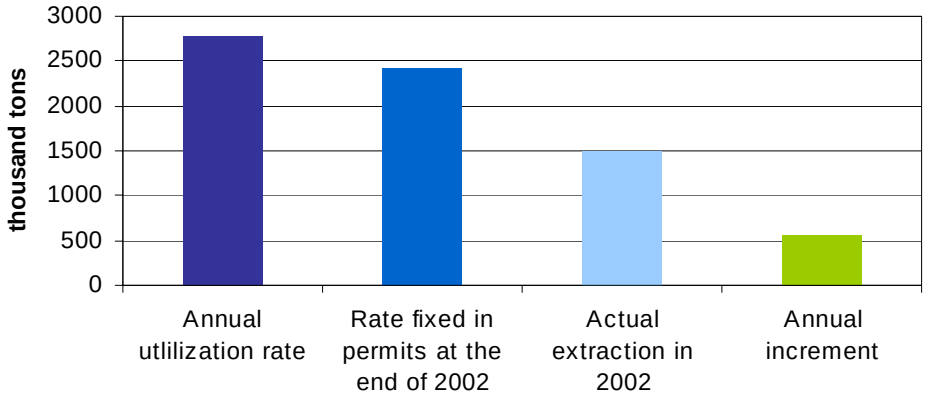
[38] Turba juurdekasv Eesti soodes. [Peat increment in Estonian peatlands.] Final report on an applied research project of the Environmental Investment Centre. Drafted by M. Ilomets. Institute of Ecology, Tallinn University, 2005. (In Estonian)
[39] Government of the Republic Regulation No. 213 of 1 January 2002 „Sustainable use of peat".
[40] According to the data of Mati Ilometsa (Institute of Ecology of the Tallinn University). Calculations are made on assumption that percentage of fens and raised bogs will remain the same as in 1950s. As raised bogs produce more peat than fens then the minimum necessary area of peatlands should be 1.7 million ha with the condition that all peatlands shall be mires without trees.
[41] 1,497,100 tonnes of peat was extracted in 2002. The SAO has based its calculations mainly on extraction data from 2002, because the weather conditions ensured ordinary production and other necessry data were available for the year 2002. In 2003 and 2004 extraction volumes were smaller than prognosis because of very unfavourable weather conditions.
[42] Calculations were made with accumulation 550,000 tonnes per year. According to the most optimistic prognosis, peat accumulation in 2002 formed 44 % of the maximum annual production as allowed in the permits and 37 % of the actual peat extraction.

Figure 5. Rate of use of peat, the rate fixed in permits, actual extraction and increment



Sources: Government of the Republic Regulation "Sustainable Use of Peat"; Ministry of Environment; Geological Survey of Estonia; Institute of Ecology[43]

It should also be taken into account that 103,000 ha of peatlands or one third of the total area[44] of natural peatlands have been placed under protection. The reserves in peatlands under protection are considered passive.[45] Although, in the long term, passive reserves will also be permitted to be used, it is unreal, in view of the targets of nature protection. Thus, the increment of extractable peat takes place in an area of 167,000 to 247,000 ha that is still a smaller part of peat areas with active reserves.[46]

The number of peatlands and the area covered with peatlands is different in different regions. Likewise, the conditions in different peatlands and the reproduction capacity of peat in regions, is also different. In Estonia, peat should not be extracted at the cost of perdition of peatlands and exhausting peat reserves in a certain region. Upon establishing rates of use of peat in a particular county the actual increment of peat in the county shall be taken into account.

The project of the Institute of Ecology also provided an estimate on the accumulation of peat in the counties. Comparing calculations of the scientists with the use rates established by the Government for the counties it turned out, that the permitted rate exceeds the limit of increment in all counties. The ratio of the permitted use rate to increment is different in different counties.

Considering current county use rates[47], the increment of peat is somewhat ensured in Rapla County (use rate exceeded increment 1.3 times). The permitted use rate has exceeded increment the most in Saare County (22 times), followed by Võru (19 times) and Harju (14 times) counties (see Figure 6.).[48]

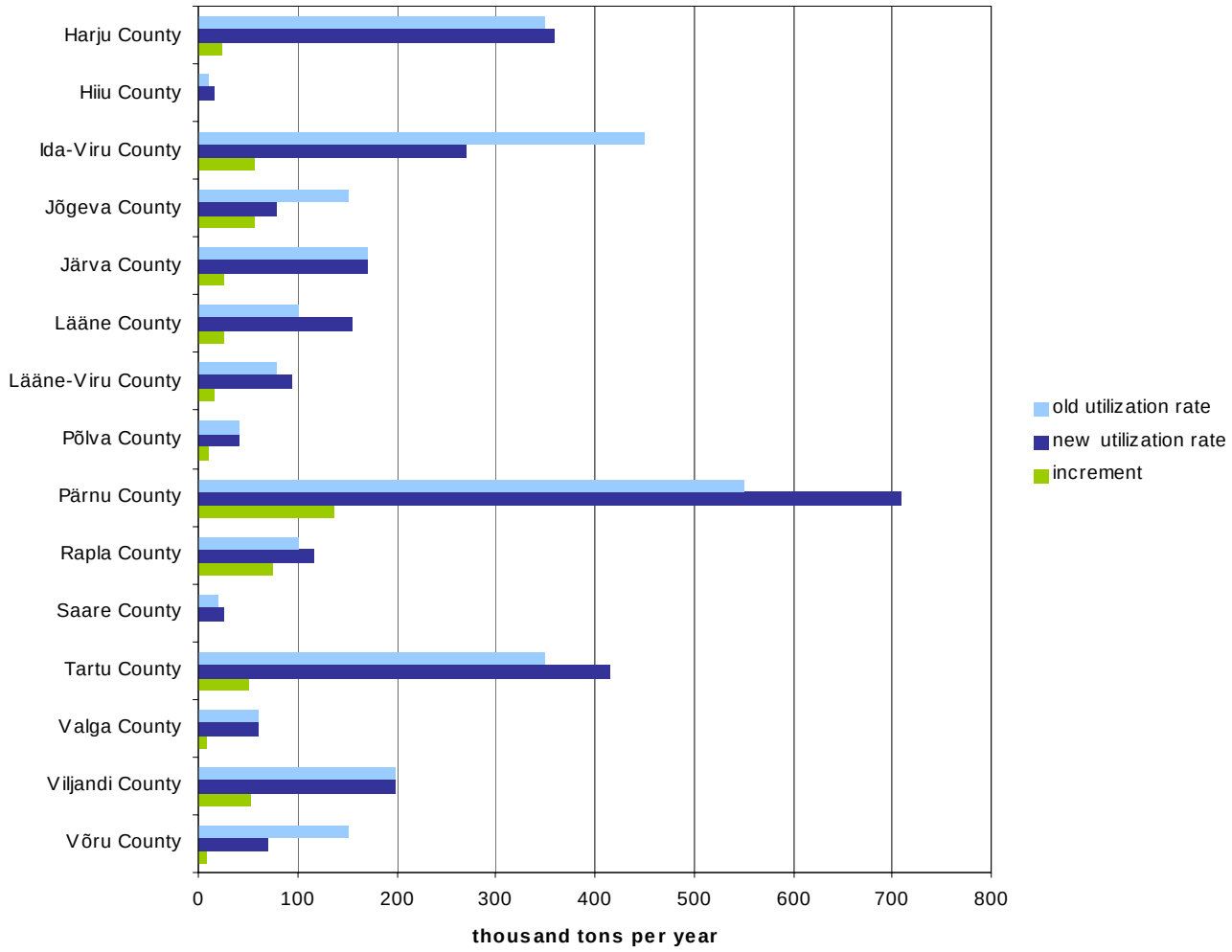
With the regulation[49] to be approved on the basis of the new Earth's Crust Act the Government has planned to change the distribution of use rates and critical reserves of peat between the counties. It is planned not to change the size of critical and usable reserves and annual use rate for the whole of

[43] Turba juurdekasv Eesti soodes. [Peat increment in Estonian peatlands.] Final report on an applied research project of the Environmental Investment Centre. Drafted by M. Ilomets. Institute of Ecology, Tallinn University, 2005. (In Estonian)
[44] Single drained peatlands or peat production areas may be located in conservation areas (e.g raised bog of Viru in Lahemaa National Park), therefore the area of peatlands in conservation areas may be somewhat smaller than 103,000 ha.
[45] The total area of protected peatlands will be ca 142,500 ha together with conservation areas formed in the course of process of Natura 2000, but peat reserves of new conservation areas are still not included in passiv reserve.
[46] Data of the project „Peat increment in Estonian peatlands" compared with the total area of protected peatlands. When taken into account the Natura 2000 sites, the number of peatlands will be even smaller, ca 127,500 ha (the minimum area where peat is reised subtracting the total area of protected areas and Natura sites).
[47] On the basis of Government of the Republic Regulation No. 213 of 14 August 1996 „Sustainable use of peat."
[48] Turba juurdekasv Eesti soodes. [Peat increment in Estonian peatlands.] Final report on an applied research project of the Environmental Investment Centre. Drafted by M. Ilomets. Institute of Ecology, Tallinn University, 2005. (In Estonian)
[49] Draft act of Government of the Republic Regulation "Size of the critical reserve and usable reserve of peat, and use rates".

Estonia. The size of reserves and use rates all over Estonia has been planned to establish at the level provided in the regulation of 1996.[50] The actual increment of peat will not be taken into account this time either. County quotas have been obviously changed proceeding from the interest of enterprises to extract peat in areas close to ports. It is planned to increase use rates in some counties in order to fit the extraction capacity fixed in the issued permits that illegally exceeded the quota, within the limits of the new use rate (Lääne, Pärnu, Rapla and Tartu counties).

Establishment of new use rates in counties would considerably deteriorate the ratio of increment to the permitted extraction capacity in all counties with harbours, except Ida-Viru County. As before, the new use rate exceeds increment the most in Saare County (27 times), but also in Harju (15 times), Tartu (8 times) and Lääne-Viru (6 times) counties.[51] (see Figure 6.).

Figure 6. Increment and use rates in counties



Sources: Government of the Republic Regulation "Sustainable Use of Peat"; draft Government of the Republic Regulation "Size of critical and usable reserves of peat and use rates"; Institute of Ecology.[52]

[50] Government of the Republic Regulation No. 213 of 14 August 1996 „Sustainable use of peat."
[51] Calculations of the SAO based on the results of the project "Peat increment in Estonian peatlands" and the draft legislation of Government of the Republic Regulation "Size of the critical reserve and usable reserve of peat, and use rates".
[52] Turba juurdekasv Eesti soodes. [Peat increment in Estonian peatlands.] Final report on an applied research project of the Environmental Investment Centre. Drafted by M. Ilomets. Institute of Ecology, Tallinn University, 2005. (In Estonian)

When comparing estimates provided by the Institute of Ecology on the increment of peat with the actual extraction capacity in 2002, then increment exceeded extraction capacity only in three counties. In Rapla County increment exceeded the actual extraction 1.4 times, in Jõgeva County 1.3 times. In Ida-Viru County extraction remained within the limits of increment. In the rest of the counties, the actual extraction exceeded increment considerably. For example, in Saare County peat extraction exceeded increment 16 times, in Harju, Pärnu and Võru counties, five times.

Comparative aggregated data on county increment figures, valid and new county use rates as well as actual extraction in 2002 are given in the table in Appendix 6 to the report.

As appears from the above, the State neither follows principles of sustainable development upon use of peat reserves, nor has ensured the regeneration of reserves by a proper management of use. The State has permitted the use of peat resources that exceeds limits of regeneration many times, whereby even the actual extraction has exceeded increment in most counties.

1.4. Peatlands of natural value are endangered by peat extraction

The preservation of peatlands of natural value should be ensured by placing them under protection as well as monitoring of the existence of critical reserves of peat. On the basis of the Earth's Crust Act, the reserves of peat deposits under protection have to be defined as passive and no extraction permits may be issued in case of an area with passive reserves. Nature protection targets shall also be taken into account when processing applications for permits to extract peat in certain peatlands.

The number of protected areas will increase by taking Natura 2000 bird habitat and nature conservation areas under protection. From 1 May 2004, the Natura 2000 preselection sites that remain outside of the existing protected areas are under temporary protection and in some areas new protection and conservation areas have also been established.

So far, peat reserves in the areas that will be placed under protection within the Natura 2000 process have not yet been defined as passive.[53] Consequently, some peatlands of natural value are still endangered by peat extraction. For example, the processing of an application for a permit to extract peat in the deposit of Illaste (Rapla County) has not been suspended, although an application has been submitted to include part of the peatland in the list of Natura 2000 sites. A new extraction permit has been applied for even for the production area of Laukasoo in the peatland of Sangla (Tartu County), which borders a Natura 2000 site.[54] The rural municipality of Koonga in Pärnu County and Tootsi Turvas have protested against defining part of Lavassaare deposit as a Natura 2000 site.[55] In some cases (Soosaare IV and Rannu), however, the issue of an extraction permit has been refused due to Natura 2000 protection targets.

Since 1997, the Ministry of Environment has been drawing up a list of so-called usable peatlands. The list shall specify unprotected peatlands that will be omitted from extraction and peatlands for the exploitation of which permits may be issued. The list has not been approved yet, but has been followed in practice when issuing extraction permits. At the same time, not all natural values have been managed to take into account when drawing up the list, and this has created problems with respect to some peatlands.[56]

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[53] Reply of Plc Geological Survey of Estonia to the request of the SAO.
[54] Interview in the environmental department of Tartu County on 24 January 2005.
[55] Interview in the environmental department of Pärnumaa County on 16 November 2004.
[56] E.g. in the case of the Peatland of Esssoo, the environmental department of Võrumaa County when deciding on issue of extraction permit did not order supplementary environmental research nor required environmental impact assessment from the enterprise, because the area was already in the list of used peatlands. In the course of later inventories it came out that the area had several nature values.

The new Earth's Crust Act obliges the Minister of Environment to validate the list of peatlands with critical reserves or "the list of non-usable peatlands". The list should have become effective on 1 April 2005 together with the Earth's Crust Act, but as at the end of April, the list was not completed yet. It was not clear, whether all passive peat reserves entered in the National Register of Earth Deposits will be automatically included in critical reserves or other principles will be worked out according to which peatlands will be included in the list. Unlike the list of usable peatlands, no public discussion will be organised before approvement of the list of peatlands with critical peat reserves.[57]

At the same time, pursuant to the new Earth's Crust Act, the critical reserves will be reduced in Järva and Jõgeva counties.[58] The reduction of critical reserves has been justified by a potential to open new production areas in these counties.[59] It has been planned not to change the size of Estonian total critical reserves, and therefore, the size of critical reserves in Võru and Ida-Viru counties will be increased.

The SAO is of the opinion that county reserves have to be reviewed systematically, not to change the size of critical reserves and use rates in individual counties, proceeding only from the interest of enterprises in extraction. Reduction of the size of critical reserves in the counties is not justified before completion of the assessment of peatlands entered in the list of peatlands with critical reserves.

As peat reserves of all protected peatlands and Natura 2000 preselection sites have not been defined as passive reserves and the list of peatlands with critical reserves has not yet been approved, the protection of peatlands of natural value is not guaranteed at the moment.

1.5. Peat reserves have found insufficient treatment in national strategic development plans

The State should strategically plan for what to use the limited peat resources and how to keep environmental damages at minimum level. The corresponding targets shall be set in national development plans.

Peat reserves have been treated only in one valid[60] national development plan, the Long-term Public Fuel and Energy Sector Development Plan.[61] The Plan deals with peat as a local energy resource. Problems of concern, mentioned in the Development Plan, are the disappearance of peat reserves and the emission of CO_2 in drained areas. According to the Development Plan, only peat from drained peatlands should be used and no new areas should be drained before the year 2025. The Development Plan assesses neither the perspectives of use of peat nor the sufficiency of reserves.

At the same time, the strategic development plans have no legal force. On the basis of the targets set in the above Development Paln neither the Ministry of Environment nor county environmental departments can refuse issuing extraction permits for new areas.[62] The development plans, as such, do not provide solutions to the sustainable use of a resource, as long as they are not supported by the corresponding laws (e.g. the Earth's Crust Act).

At the moment, a nature conservation programme is under preparation in the Ministry of Environment. The drafting of the Environmental Strategy for 2007 to 2030 and the Environmental Action Programme for 2007 to 2013" has been started. The Electricity Sector Development Plan until 2015 is under preparation in the Ministry of Economic Affairs and Communications.

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[57] Interview with the Head of the Environment Management and Technology Department of the Ministry of Environment on 24 March 2005.
[58] Draft act of Government of the Republic Regulation "Size of the critical reserve and usable reserve of peat, and use rates"
[59] Interview with the Head of the Environment Management and Technology Department of the Ministry of Environment on 24 March 2005.
[60] As at 30 April 2005.
[61] Long-term Public Fuel and Energy Sector Development Plan until 2015. Passed by the Riigikogu on 15 December 2004.
[62] Interview with the Head of the Environment Management and Technology Department of the Ministry of Environment on 24 March 2005.

Until today, the State has not laid down targets for how long peat reserves should last, for which purpose limited peat resources should be used and, thereby, how to guarantee the attainment of environmental protection targets. The SAO is of the opinion that, if neither use of peat reserves is treated in the main planning documents, nor the laws are brought in conformity with development plans, the situation will enable controversial decisions to be made and lead to faster exhaustion of peat reserves suitable for extraction.

1.6. The bases for taxation of use of peat reserves are not clear

The taxation of use of natural resources is one of the possibilities to regulate their use. Pursuant to the Earth's Crust Act, the holder of an extraction permit has to pay for the right of extraction, and use of reserves of a mineral resource or for damaging them.[63]

In the European Union, the sustainable use of natural resources is a priority area. It is planned to draw up a strategy for a sustainable use of natural resources to pay more attention, inter alia, to fairer prices of natural resources and, as a result, to calculation of external costs[64] upon taxation of use of resources.

The states' options upon taxation of use of resources have been different, in view of a state's targets and valid legal and institutional structure. For example, in Norway, the Government collects back major part of oil production income as taxes on factor cost, subsidizing at the same time fisheries, to sustain employment in small fishing villages.

In some countries it is not the use of a natural resource but the resulting environmental pollution that is subject to tax. For example, in Finland where, unlike Estonia, the peat used for fuel is liable to CO_2-tax because of a high carbon content of peat. In order to achieve objectives of the Kyoto Protocol[65] Finland is aiming at reducing the emission of CO_2 into the atmosphere.

In Sweden, the sulphur contained in peat is taxed, as acid rains caused by sulphuric compounds have been a serious problem in the country. If previously in Sweden peat was mainly considered a local fuel and a material used in horticulture, then now the use of peat is significantly influenced by an understanding of the importance of wetlands (biological diversity, valuable habitats, hydrological services of wetlands) and concern about protecting peatlands (See appendix 4).

In Central and Eastern-European countries rates of taxes on the use of natural resource are relatively low and their influence on use of resources is insignificant.[66] In Estonia so far, 100 % of the taxes on the right of extraction in mineral deposits of local importance and 70% of the taxes on the right of extraction in mineral deposits of national importance have been paid into a local budget and the rest, into the state budget. Usually, the size of a local budget will not increase on account of the incoming tax on the right of extraction, because the government subsidy to local governments will be proportionally reduced. Neither commitments nor conditions have been set on local governments for the use of the money received. In 2003, 3.9 million kroons were paid as charges for the right of extraction of peat.[67] Of this amount, less than one million kroons was paid into the state budget. According to the assessment of the Ministry of Environment, the money paid for the use of peat resources does not cover public administrative costs of extraction.[68]

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[63] New Earth's Crust Act, Art. 39.
[64] External costs are understood as indirect costs created to the society (including damage caused to the environment).
[65] Kyoto Protocol to the United Nations Framework Convention on Climate Change was passed on 11 December 1997 in Kyoto and Estonia ratified it on 3 December 1998.
[66] "Source Book on Economic Instruments for Environmental Policy. Central and Eastern Europe", The Regional Environmental Center for Central and Eastern Europe (REC), 1999 and "Environmental Taxes in an Enlarged Europe. An Analysis and Database of Environmental Taxes and Charges in Central and Eastern Europe", REC 2001.
[67] Minimum charge for the right of extraction of peat is 2 kr/t and maximum charge 6 kr/t.
[68] Interview with the adviser of environmental economy and control of the Ministry of Environment on 27 January 2005.

The rate of taxes imposed on the use of natural resources should depend on national objectives and priorities. In Estonia, according to the Ministry of Environment, the rates of taxes on the mineral right (including peat extraction), have been formed historically, as an agreement between the State and enterprises and is not based on relevant explorations and analysis. Until today, the mineral right has been taxed on mainly with the purpose of collecting a symbolic tax and to discipline peat production enterprises.[69]

In the years 2001 to 2002, the Ministry of Environment started to prepare the Environmental Tax Act in order to establish environmental taxes until 2009. Even this time the main method for establishment of tax rates was negotiating and agreeing with enterprises, and not analyzing the impact of tax rates. During these consultations, the Ministry of Environment and enterprises have agreed upon the rate of the tax on the mineral right until 2015.[70]

Upon establishment of tax rates, the State could take interest in covering direct costs of administration of the resource, compensating for the damage caused to the environment or even receiving a supplementary income. From the position of business development it is important that the tax rate would not be too high thus impeding local economy.

It is possible to analyze the influence of the charge related to the use of a natural resource on the use of the natural resource by the method of resource rent[71].

According to the preliminary calculations, based on data about income and expenditure of peat industry (2001 and 2002)[72], the quantity of extracted peat and the charge rate for mineral right, the tax revenues from the resource rent of peat resources collected by the State forms approximately 4 % (see Appendix 4).

Actually this percentage is much smaller and is probably under zero (i.e. peat extraction is subsidized), because CO_2 emission[73], other external costs (e.g. draining of wetlands and changing of the water regime) and rehabilitation costs are not reflected in peat price. The collected charge for extraction right forms less than one percentage of the total industrial output of peat[74]. This percentage has increased during years (cf. in 1994, 0.3 % and in 2002, 0.9 %) (see Appendix 4).

According to the assessment of the expert, who consulted the SAO (see Appendix 4), the rate of charge for the right to extract peat cannot be considered adequate, in view of environmental considerations as this charge does not reflect external costs resulting from the use of peat resources. Even from the economic point of view, the charge for extraction right is obviously too low and does not motivate sufficiently the effective use of resources and creation of a surplus value. On certain social considerations, e.g. to provide regional employment, the low taxation of a natural resource is obviously preferred.

The rate of taxation of use of a natural resource depends on the objectives and priorities of the State. Without thoroughly analysing the impact of taxation methods and tax rates on the use of a resource, creation of the surplus value, employment and the society as a whole it is difficult to form a tax rate for the sustainable management of the resource and suitable for the society.

In Estonia, the influence of taxation of natural resources (including peat) has not been assessed and therefore the charge for the mineral right is not used as an instrument to plan the use of peat reserves.

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[69] Same.
[70] Same.
[71] Resource rent = (Production Volume) x (International Market Price – Average Unit Production Cost). Resource rent reflects the amortisation arising from the use of natural resources and environment. Such amortisation reduces the total substance of natural resource resulting with the reduction of the benefits or income of the use of natural resource in future. (World Bank. Expanding the measure of wealth. Indicators of environmentally sustainable development. Studies and Monograph Series No 17, 1997. Washington DC).
[72] The Statistical Office.
[73] According to the calculations of World Bank, the global marginal social cost of a metric ton of carbon emitted is assumed to be $20 in 1995. As the emission data is for CO2 and the damage for carbon, the emissions data is transformed by 12/44, in order to get the correct estimation. (Manual for Caculating Adjusted Net Savings. World Bank, 2002).
[74] The Statistical Office.

Proposals to the Minister of Environment

- To analyze benefits and drawbacks of defining peat as a renewable or non-renewable natural resource. Thereafter to take a clear position on whether to treat peat as a renewable or nonrenewable natural resource and pursuant to the decision taken to initiate necessary amendments to the legislation. Based on the amendments made, to re- estimate the critical and usable reserves of peat and its annual rate of use, and, where appropriate, to order a supplementary scientific research estimating the increment of peat. On the basis of the outcome and the decisions taken, to initiate amendments to the legal acts in order to alter the size of reserves and annual rate of use.

    - In case peat is defined as a renewable natural resource, to re-estimate its critical and usable reserves and annual rate of use, bringing them into concordance with the actual increment in peatlands. Likewise, to ensure that with the issue of extraction permits the actual increment of peat would not be exceeded, canceling for that reason, where appropriate, the permits issued or reducing the maximum annual output laid down in the permits.

    - In case peat is defined as a nonrenewable natural resource, to retain the definition of critical reserves and to establish the all-Estonian rate of use and county annual rates of use on the basis of Article 6 of the Sustainable Development Act and Article 64 of the Earth's Crust Act, proceeding from the principle that that the reserves would suffice for as a long time as possible.

Harmonization of the method of treatment and re-estimation of the use rate is necessary to ensure the sustainable use of peat reserves and to arrange the planning of reserves and contribute to the sufficiency of peat reserves suitable for extraction for as a long time as possible.

- To set up and harmonize objectives for protection of peatlands and use of peat reserves in environmental strategies, as well as in co-operation with the Minister of Economic Affairs in energy sector development plans. To initiate necessary amendments to the legislation, including the Earth's Crust Act, in order to legalize objectives laid down in strategies and development plans.

Setting and harmonizing objectives in different national strategies and development plans will promote the planning of use of peat reserves. The enforcement of the objectives set in planning documents provides a legal basis for their actual realization.

- To initiate inclusion of the peat deposits located in Natura 2000 sites (in both new protected areas, conservation areas and areas under temporary protection) in passive reserves.

Inclusion of the peat deposits in question in passive reserves is necessary to ensure the protection of peatlands of natural value and avoid extraction in Natura 2000 sites.

- To develop principles of charging for the right of extraction of peat. To this end

    - to conduct research of the influence of charging for the right of extraction of peat and to analyse the expediency of distribution and use of income, taking into account other taxes, external costs of use of peat, etc.;

    - to initiate, where appropriate, alteration of the charge for the extraction right and the distribution of revenue (between the State and local governments).

Analysis of the influence of charging for the right of extraction of peat and development of a new basis for charging is necessary to establish optimum charge rates, considering the impact of extraction on the environment, economy and social sphere.

2. Environmental impact and the special use of water

2.1. Environmental impact of extraction has not been assessed adequately

Developing the Thematic Strategy on the Sustainable Use of Natural Resources of the European Union, there has been reached a conclusion that, unlike the general opinion, the main problem resulting from use of natural resources is not exhaustion of non-renewable natural resources, but environmental impact arising from their extraction and use. Use of renewable natural resources to the quantity that exceeds the limits of increment is a significant environmental impact already in itself, because such an activity destroys the biological diversity.[75]

Environmental impact assessment (hereinafter referred to as EIA) will provide an authority issuing extraction permits necessary basic data in order to make adequate decisions, both based on environmental considerations and public interests. If there is not enough data to asses environmental impact, it is possible to require ordering of a supplementary environmental survey in the process of EIA. Arranging EIA will provide the public, including local inhabitants and environmental organizations, with information and ensure their participation in the process. In case a decision is taken to issue an extraction permit, EIA provides with necessary information, on the basis of which environmental and monitoring conditions can be specified in the permit.

Pursuant to the Environmental Impact Assessment Act[76], peat extraction that takes place in an area larger than 150 ha, has a significant impact on the environment, due to which environmental impact shall always be assessed while processing an application for an extraction permit. The Act does not specify whether this limit applies to a production area with a service area[77] or not. When granting a permit in case of an area smaller than 150 ha, the relevant authority shall decide each time, on the basis of the right of discretion, whether to require the assessment of environmental impact or not.

Since 1 January 2001 when the requirement for environmental impact assessment came into force, 21 applications for extracting peat in new production areas, untouched from extraction activities, have been processed in Estonia.[78] By now, extraction permits have been finalized for ten of them.[79] A further nine applications for extraction permits are being processed.[80] Two extraction permits were not issued.[81] An overview of the decisions on either to carry out environmental impact assessment or not, made in the course of processing an application for the extraction permit, is presented in Appendix 7 to the report.

Eight environmental impact assessments have been made or are being made in a total of ten production areas when processing the 21 applications for the extraction permit. In addition to environmental impact assessments, made upon issuing permits for new areas, EIA was also carried out in case of re-registering two old authorizations for use as extraction permits, viz. in Hiiesoo (Ida-Viru County) and Soosaare I (Viljandi County) together with other claims of Soosaare. Thus, nine environmental impact assessments have been made or are being made in 12 production areas.[82]

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[75] Communication from the Commission to the Council and European Parliament: Towards a Thematic Strategy on the Sustainable Use of Natural Resources, Brussels, 01.10.2003
http://europa.eu.int/eur-lex/en/com/cnc/2003/com2003_0572en01.pdf

[76] Environmental impact assessment conditions for peat extraction are same both in the new and the old the Environmental Impact Assessment Act.

[77] Service area is an area necessary for extraction of mineral resources, which remains outside the production area. Windbrakes, ditches, roads etc. are built on the service area of peat production areas.

[78] Issue of permits and environmental impact assessment was reviewed as at 20 March 2005.

[79] Sausti, Rae II, Tammermaa, Raja III, Paekna, Laiküla II, Keava, Elbu IV, Möllatsi, Raba-Jaani.

[80] Riisipere III, Riisipere IV, Koordi, Kaseraba, Illaste, Soosaare II, Soosaare III, Aimlametsa, Ess-soo.

[81] Rannu and Soosaare IV. Both peatlands were included in the proposed list of Natura 2000 sites.

[82] Sausti, Möllatsi, Rannu, Hiiesoo, Koordi, Kaseraba, Illaste, Aimlametsa and 4 production areas at Soosaare.

Environmental impact was not assessed on eleven occasions when extraction permits were issued in peatlands or parts of peatland where peat had not been extracted earlier.

On three occasions a permit to extract peat in an area bigger than 150 ha was issued without carrying out EIA, although according to law, the environmental impact assessment was obligatory. The Environmental Department of Lääne County did not require environmental impact assessment when issuing an extraction permit for the production area of Laiküla II in July 2001, although the size of the area was 206 ha. Later, however, a joint EIA was carried out in Laiküla II and Laiküla production areas in the course of processing a permit for the special use of water. In January 2002, the Ministry of Environment granted, without requiring the environmental impact assessment, an extraction permit in case of production area of Elbu IV in Pärnu County whose area is over 500 ha. On the initiative of the Environmental Department of Pärnu County environmental impact assessment was carried out later in the course of processing a permit for the special use of water. The Environmental Department of Harju County did not require the environmental impact assessment while issuing an extraction permit in case of the production area of Rae II in March 2005, although the size of the production area was 149,6 ha, and with the service area, 186 ha.

On ten occasions the size of the production area was smaller than 150 ha and the authority issuing the permit had to decide on the basis of consideration whether to demand environmental impact assessment from an enterprise or not. On eight occasions the authority issuing the permit decided that environmental impact assessment was not necessary.[83]

The Environmental Department of Tartu County demanded environmental impact assessment in the course of processing the extraction permit in case of production area of Möllatsi (148 ha)[84], but taking into account the service area, the total size of the production area was 218 ha. The environmental impact assessment was also made in case of extraction activities in the production area of Soosaare II (49 ha), but together with three other production areas of Soosaare, with the total area of 614 ha. Thus, authorities issuing extraction permits have practically never used the right of discretion in order to demand environmental impact assessment in case of peat production areas smaller than 150 ha.

In connection with re-registration of authorizations for use as extraction permits EIA has been carried out on rare occasions only. The old Earth's Crust Act did not enact the requirement for environmental impact assessment in connection with re-registration of authorizations for use as extraction permits.[85] Under certain circumstances (changing of extraction capacity, widening of production area) it has been possible to demand EIA when re-registering the permits. Since the entry into force of the Environmental Impact Assessment and Environmental Management System Act in January 2001, some twenty or thirty authorizations for use have been re-registered. EIA has been carried out in connection with re-registering two authorizations for use as extraction permits.[86]

Thus, the experience of authorities issuing permits to extract peat has been acquired in the process of nine environmental impact assessments only. On eleven occasions a new extraction permit has been

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In the the deposit of Soosaare, one environmental impact assessment was carried out for four production areas (Soosaare I, Soosaare II, Soosaare III and Soosaare IV). In case of Soosaare I, it was a re-registration of the authority for use, for Soosaare II and III a new extraction permit is being issued and for Soosaare IV permit was not issued.

[83] Tammermaa, Raja III, Paekna, Raba-Jaani, Riisipere III, Riisipere IV, Keava, Ess-soo.

[84] Issue of Möllatsi extraction permit was based on the decision made by Tartu County Governor several years ago. The decision of Tartu County Governor contained a requirement for supplementary environmental expertise. As the issue of the permit was delayed due to the conclusion of a land lease contract and meantime the Environmental Impact Assessment and Environmental Management System Act entered into force, the Environmental Department of Tartu County decided to require EIA instead of environmental expertise. Interview in the Environmental Department of Tartu County 24 January 2005.

[85] The old Earth's Crust Act, Art. 85 paragraph 1.

[86] Hiiesoo (Ida-Viru County) and Soosaare I (Viljandi County). In Hiiesoo the enterprise desired to increase the maximum annual extraction. Requirement of EIA was based on the facts that the area was over 200 ha and surveys had been done long ago. In Soosaare an EIA was made simultaneously for four production areas, of which three were new applications for permits and one was the authorization for use. Thus, current extraction impact on the production area of Soosaare I had been assessed. In all other cases environmental impact assessment has not been required in the course of re-registration of permits.

issued without conducting an environmental impact assessment, whereof on three occasions even in case of areas bigger than 150 ha. The authorities issuing permits have had to consider the need for EIA also in case of peat production areas smaller than 150 ha, but so far, environmental impact assessment has been required in none of the cases.

2.2. Environmental departments are unable to decide on the necessity for environmental impact assessment

Deciding on the necessity for environmental impact assessment in case of peat production areas smaller than 150 ha will require a high professional competence and expertise from the authorities issuing permits.

According to the interview conducted by the SAO, 14 county environmental departments out of 15 estimated their capability to make competent decisions on the basis of considerations as rather good or very good. At the same time, according to the assessment of the expert who consulted the SAO (see Appendix 5), so far the environmental departments do not have enough experience so far in the environmental impact assessment of peat extraction.

On six occasions out of the eight mentioned above where the production area was less than 150 ha and the authority issuing permits did not require environmental impact assessment, this concerned permits granted by the Environmental Department of Harju County. The most controversial decision that came public was made by the Environmental Department of Võru County (so- called case of Ess-soo). The Environmental Department of Rapla County granted a permit for Kaeva production area without the environmental impact assessment, but this area had already been damaged by the previous illegal peat extraction activity. So far, the other environmental departments do not have any experience in deciding on the necessity for environmental impact assessment in case of peat production areas smaller than 150 ha.

According to the assessment of the expert, who consulted the SAO (see Appendix 5), the capability of environmental departments issuing permits is reduced because of their inadequate knowledge of peatlands, gaps in the scientific information and monitoring data available as well as an unpredictability of impact on bordering areas. Making competent decisions will require prolonged explorations in which enterprises are not interested.

In the interviews conducted in the course of the audit the officials of environmental departments named pressure on the side of enterprises and the weakness of their own position as factors why EIA had not been required in case of areas smaller than 150 ha. Some officials of environmental departments interpreted the law so that in their opinion, they had no legal basis at all for requiring the environmental impact assessment.

If an environmental department or the Ministry of Environment decides, upon issuing an extraction permit, not to require EIA from the enterprises, an active participation of the public in the process will not be ensured either.

Namely, the authorities issuing a permit provide information about receiving an application for the extraction permit and the decision on issuing the permit only in *Ametlikud Teadaanded*,(Official Announcements) on the Internet, while public discussions and possibility to comment on EIA documents should accompany the process of environmental impact assessment. Pursuant to the new Environmental Impact Assessment Act, there in no need to notify about the decision on not requiring EIA before informing of the decision about the issue of an extraction permit.[87] The fact that local people did not learn about the decision on not requiring EIA and the issue of an extraction permit

[87] The Environmental Impact Assessment and Environmental Management System Act, Art. 11, paragraph 9.

made two years earlier till the permit was in registration, was one of the reasons for disputes in case of Ess-soo peatland.

At the meeting organised by the SAO the focusgroup found that there is a want of continuous training of environmental departments to enhance their competence to take considerations-based decisions. Specific guidelines for carrying out environmental impact assessment in case of different development projects (including peat production) are also missing. Guidelines are necessary for both authorities issuing permits and enterprises as well as experts assessing environmental impact to draft the EIA program, to order supplementary environmental studies and to assess a completed EIA report.[88]

2.3. The limit of 150 ha is not justified

Pursuant to both the new and old Environmental Impact Assessment Acts, the extraction of peat in an area bigger than 150 ha has a significant impact on the environment. This areal requirement has been directly taken over from Directive 97/11/EC of the European Parliament and of the Council, although it would be possible to make this requirement stricter by law, proceeding from the interests of a Member State. Pursuant to the legislation the authority issuing a permit has to consider each time in case of a production area smaller than 150 ha whether it is necessary to carry out environmental impact assessment or not. The decision on not requiring EIA that is based on the right of discretion would be justified only if the impact on the environment would be really minimal and the area would not be an object of public interest for the locals.

According to the assessment of the expert who consulted the SAO, the mechanized extraction of peat always creates significant environmental impact, despite of the size of the production area[89], because draining, milling and extraction destroy natural life in the area and influence strongly even the neighbouring areas (see Appendix 5). Namely:

- The impact of draining on natural life and water regime reaches even the neighboring areas of claim, as a result of which the size of the affected area is always bigger than 150 ha. This applies to all extracted areas, whatever the size.

- Discharging the drainage water into recipients is deemed to be a special use of water and the assessment of the environmental impact assessment of the draining is obligatory starting from 100 ha.[90] The limit of 150 ha is not in conformity with this requirement.

- The modern mechanized peat extraction technology influences people as well (noise, dust, transport, fire risk) if the extraction area is located near a settlement.[91]

In addition to the wide spread of environmental impact that accompanies extraction activities, the omission of environmental impact assessment is not justified for the following reasons either:

- The capability of environmental departments to decide on the necessity for EIA need is not sufficient.

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[88] Meeting of the focus group on 19 January 2005.
[89] Definition of the significant environmental impact according to the new Environmental Impact Assessment Act: "Environmental impact is significant if it may potentially exceed the environmental capacity of a site, cause irreversible changes to the environment, endanger human health and well-being, the environment, cultural heritage or property."
[90] Pursuant to Environmental Impact Assessment Act, conversion of wetlands with a total area of more than 100 ha by draining causes significant environmental impact, therefore environmental impact shall always be assessed in these cases before issuing a permit.
[91] The expert, Raimo Pajula is of the opinion that if the production area were not located in the neighbourhood of settlements then regarding impact to the people, the principle of right of discretion could be allowed. See appendix 5.

- The process of environmental impact assessment will ensure that the position of local inhabitants and environmental organizations is elucidated, as they can participate in publication meetings and comment on the documents of EIA. This will help anticipate and avoid conflicts with the public interest.

Therefore, setting the limit of 150 ha is artificial, particularly when considering the mosaic configuration of Estonian landscape and the small size of peatlands. The application of the areal limit to requiring/not-requiring EIA is not justified, because the extraction of peat may cause the destruction of several peatlands of natural value and bring along adverse effects on people (problems with wells, fire, dust, noise).

2.4. Permits for a special use of water have been issued in case of some peat production areas only

Pursuant to the Water Act, an enterprise, in addition to holding the extraction permit, has to apply for a permit for the special use of water, irrespective of the size of the area, in order to be allowed to discharge the drainage water into receiving water.[92] The water that is directed out of production areas in the course of draining, pollutes the environment. This changes significally acidity of watercourses and carries humic substances and peatdust to the water. For example, the Institute of Ecology has calculated, when assessing environmental impact in connection with the application of Ltd Tootsi Turvas for a permit for the special use of water that 91 tons of peat is carried to the Audru River with drainage water annually.[93] The draining of production area, in turn, may affect neighbouring natural peatlands, the level of ground water and thereby the level of water in the neighbouring wells.[94] A permit for the special use of water lays down requirements for changing the water regime and use of water (e.g. conditions for construction of settlement tanks), as well as conditions for a regular montoring of the quality of water.

As at 1 January 2005, according to the official publication *Ametlikud Teadaanded*, there were 93 valid authorizations for use and extraction permits. In addition, there are many old authorizations for use whose period of validity had expired by the beginning of 2005, but which have not been replaced with extraction permits.

Nine permits for the special use of water have been issued to discharge the drainage water from peat production areas, in case of 14 production areas in total.[95] This forms only one-tenth of all authorizations for use and extraction permits. In the rest of peat production areas, drainage and the discharge of drainage water into recipients has taken place without a permit for the special use of water.

2.5. Environmental impact assessment is not always arranged when issuing permits for the special use of water

Pursuant to both the new and old Environmental Impact Assessment Acts, the draining of a wetland bigger than 100 ha has a significant environmental impact as a result of which its assessment is obligatory. The environmental impact of draining of peat production areas and discharging the drainage water into receiving water is assessed in the course of processing a permit for the special use of water.

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[92] This requirement is in force since 16.06.1994, when the Water Act came into effect.
[93] Interview with Mati Ilomets, the expert of peatlands, on 18 March 2005.
[94] H. Kink, Turba kaevandamine ohustab veevarusid. [Peat extraction endangers water reserves.]; N. Laanetu, Kuulakem ka argimõistuse häält. [Let's listen to the common sense.] Eesti Loodus, 2003, nr 2/3. (In Estonian)
[95] Sausti, Sooniste, Hiiesoo, Elbu (Torfex), Elbu IV, Möllatsi; joint permit for the special use of water is given to the production areas of Laiküla and Laiküla II; Niibi and Niibi III; Lavassaare, Siunina, Pööravere and Elbu (Tootsi Turvas).

Environmental impact assessment has been accomplished in case of five permits for the special use of water out of nine, which have been issued to drain peat production areas comprising nine production areas.[96] Of them, in two cases[97], no separate environmental impact assessment was accomplished, instead, a report on the environmental impact assessment made earlier in the course of processing the application for an extraction permit, was used. An overview of all permits for the special use of water and environmental impact assessments is given in Appendix 8 to the report.

Environmental impact assessment was not made while issuing four permits for the special use of water (in five production areas)[98]. The results of the environmental expertises, made in the course of processing the application for an extraction permit were used only in case of Niibi (Lääne County).[99] All these production areas are bigger than 100 ha, which means that according to law, environmental impact assessment was obligatory at the moment of issuing the permits.

As for most peat production areas (more than 90 %) neither the permit for the special use of water has been prepared nor environmental impact assessment accomplished, the impact of draining on the water regime of the surroundings and impact of discharging drainage water into natural watercourses has not been assessed. No regular monitoring of the quality of water takes place in these areas either. Although permits for the special use of water have been prepared for single production areas, the impact of the special use of water on the environment has been assessed only in half of the cases, although according to law this was obligatory.

2.6. The Earth's Crust Act does not name environmental impact assessment as a basis for refusal to issue an extraction permit

Pursuant to the old Earth's Crust Act the issue of an extraction permit had to be refused, when the loss of mineral resources at extraction did not satisfy environmental protection needs or when extraction activities inflicted a considerable damage on the environment.[100]

So far in Estonia, a permit to extract peat has not been issued on two occasions after the environmental impact assessment had been accomplished in the course of processing the application for the permit. Nevertheless, the reason for refusing the issue of the permit was not the report on environmental impact assessment, but the fact that peatlands were included in the list of proposed Natura 2000 sites.[101] Thus, there has been no case when the environmental impact assessment made in the course of processing the application for an extraction permit were directly the basis for refusal to issue the permit.

The new Earth's Crust Act that entered into force on 1 April 2005 also recites the bases for refusal to issue an extraction permit. Unlike the old Earth's Crust Act, neither the detrimental impact on the environment nor environmental protection needs has been specified as the basis for refusal.

In addition to the Earth's Crust Act, the bases for refusal to issue a license are also treated in the new Environmental Impact Assessment Act. The Act specifies that when deciding on issuing a permit or

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[96] Hiiesoo; Laiküla and Laiküla II; Elbu IV; Möllatsi; Lavassaare, Elbu, Siunina and Pööravere (Tootsi Turvas).
[97] Hiiesoo, Möllatsi.
[98] Sausti, Sooniste, Niibi and Niibi III, Elbu (Torfex).
[99] Environmental impact assessment was not carried out when issuing extraction permit of Niibi.
[100] The old Earth's Crust Act, Art. 34.
[101] Environmental impact assessment report of Rannu (Ida-Viru County) deposit permitted peat extraction in one part of the peatland. Participation of local people in the process and strong opposition to extraction activity lead to new inventories as a result of which the peatland was included in proposed Natura 2000 sites. Environmental impact assessment to the production area of Soosaare IV (Viljandi County) was carried out together with other production areas of Soosaare. Also this part of the peatland was included in proposed Natura 2000 sites. EIA carried out to the area did not assess impacts from the aspect of Natura 2000. Also Illaste (Rapla County) area is included in proposed Natura 2000 sites, but processing of extraction permit has not been terminated yet, but, instead, assessment of a new environmental impact has been initiated, because the first EIA did not assess the impacts to Natura site.

refusing to do so, one has to take into account both the results of environmental impact assessment and environmental requirements attached to the relevant report.[102] At the same time, the Act does not specify that the outcome of environmental impact assessment alone could be the basis for the refusal to issue the permit.

The SAO is of the opinion that in practice the issue of permits will not be refused on the basis of the results of environmental impact assessment if this possibility has not been specified in the Earth's Crust Act with the other bases for refusal to issue a permit. The omission of such a provision from the Earth's Crust Act enables peat to be extracted in all peatlands that are not under nature conservation, despite of the actual environmental impacts associated with extraction activities.

Proposals to the Minister of Environment

- In case of the mechanized extraction of peat, to demand always an environmental impact assessment before a new extraction permit will be issued, regardless of the size of production area. Accordingly, to initiate amendments to the Environmental Impact Assessment and Environmental Management System Act.

Environmental impact assessment before issuing new permits to extract peat contributes to applying measures to reduce the impact of extraction on the environment and to exclude starting of extraction activities in small peatlands not suitable for that purpose.

- To develop guidelines for environmental impact assessment which would be appropriate to be used by both authorities issuing permits and experts assessing environmental impact as well as enterprises.

Development of the guidelines for environmental impact assessment is necessary to have an ancillary material to draft a program of environmental impact assessment and for assessing a completed report on EIA, so that in the course of assessment experts could take into account all significant environmental impacts accompanying extraction activities and enterprises would be able to plan extraction activities and, where appropriate, could order supplementary environmental expertises.

- To require permits for the special use of water and a regular monitoring of the quality of drainage water from all peat producers.

Laying down requirements for the special use of water and arranging water quality monitoring in all peat production areas is necessary to reduce changing of the water regime or water pollution resulting from peat extraction as well as to monitor regularly the quality of drainage water discharged into natural watercourses.

- To initiate amendments to Article 34 of the Earth's Crust Act "Refusal to issue an extraction permit", including the significant environmental impact accompanying extraction activities in the list of the reasons for refusal to issue a permit.

Such an amendment to the Act provides the authority issuing an extraction permit with the basis for a refusal to issue a permit in case of a significant environmental impact accompanying extraction activities as was possible on the basis of the old Earth's Crust Act until 31 March 2005.

[102] Environmental Impact Assessment and Environmental Management System Act, Art. 24.

3. Extraction permits

3.1. Permits do not lay down environmental conditions

Peat extraction has always an impact on the environment and in order to reduce this impact, appropriate requirements for extraction activities have to be established. Pursuant to the Earth's Crust Act, the authority issuing a permit has a right to stipulate restrictions and conditions in the extraction permit, to ensure a rational use of reserves and reduce harmful effects of extraction activities on the environment as well as on the original purpose-oriented use of the immovable.[103]

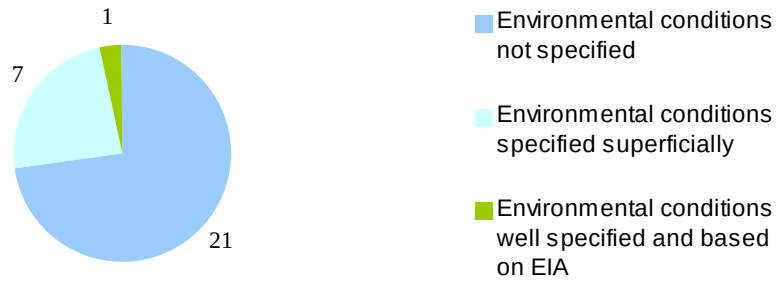
In the form of the extraction permit[104], there is no separate field to lay down environmental conditions. In practice, the authority issuing a permit has set environmental conditions, the purpose of use of the rehabilitated land and conditions for rehabilitation under the subdivision of the permit "Special conditions and restrictions".[105] The same subdivision had also been included in the format of the old authorization for use.

In the course of the audit, authorizations for use and extraction permits issued for peat extraction activities were analyzed and interviews in environmental authorities of five counties, Ida-Viru, Jõgeva, Pärnu, Saare and Tartu, were conducted. Together with the specialists of environmental departments 29 valid permits were reviewed, including the environmental conditions, stipulated in the permits. Of the permits analyzed, 18 were authorizations for use and 11, extraction permits. Of them, 14 permits had been issued by the Minister of Environment to extract peat in deposits of national importance.

It came out that in most permits no environmental conditions had been imposed on enterprises (Figure 7). Environmental conditions had been set in seven permits, but superficially and for environmental impacts connected with some extraction activities only. Only in one permit (Möllatsi, AS Tartu Jõujaam) environmental conditions had been specified in detail and comprehensibly. In this area environmental impact assessment had also been made, while environmental conditions were based on this. In addition, Tartu Jõujaam had been issued the permit for the special use of water that laid down conditions for water use and water monitoring separately.

[103] The old Earth's Crust Act, Art. 32, The new Earth's Crust Act, Art. 35 ("requirements laid down to ensure protection of earth's crust and rational use of mineral resources and in order to reduce harmful effects on human health, property and environment resulting from extraction").
[104] "Approval of Legislation on the Use of Earth's Crust" (including "Procedure for Application for and Grant of Authorisation to Extraction of Mineral Resources"), Regulation No. 3 of the Minister of Environment of 1 February 1995.
[105] In some permits, requirements on conclusion of land lease, re-registration of permits, preparation of permits for the special use of water etc. have been added under the same subdivision.

Figure 7. Environmental conditions in authorizations for use of peat and peat extraction permits of five counties



Source: Analysis of authorizations for use of peat and peat extractrion permits made by the SAO in five counties (Ida-Viru, Jõgeva, Pärnu, Saare and Tartu)

In addition to Möllatsi, no environmental conditions had been specified in extraction permits in case of five more production areas, but conditions for neutralization of drainage waters and for water quality monitoring have been specified in permits for the special use of water issued later.[106]

Environmental departments have no other guidelines for finalizing permits than the Government of the Republic Regulation laying down the procedure for the issue of the extraction permit.[107] The regulation does not mention the necessity to set environmental conditions, while at the same time, the Earth's Crust Act provides the authority, issuing permits, with such a right. As the authorities issuing permits lack uniform standards and guidelines for determining the conditions, the level of detail of environmental conditions laid down in the permits was very different. Setting conditions was different in different counties. No environmental conditions were laid down in the permits issued in Jõgeva and Ida-Viru counties. Although environmental conditions had been laid down in the permits issued by the Environmental Department of Saare County, they were similar down the line in all permits. Environmental conditions were missing in 12 permits out of 14 issued by the Ministry of Environment.[108] In the last years, however, new permits have set more environmental conditions than earlier permits.

In addition to the right to impose environmental conditions, the authority, pursuant to the old Earth's Crust Act, had a right to change the conditions of the extraction permit within five years from its issue.[109] In practice, however, no conditions have been changed in any of the permits in connection with peat extraction.[110] The environmental departments issuing permits on the basis of the new Earth's Crust Act do not have such a right. Pursuant to the new Earth's Crust Act an extraction permit may be changed only on condition that "the pollution resulting from the activities specified in the permit, is so intensive that it causes substantial harmful changes in the site specified in the permit and in the surroundings".[111]

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[106] Hiiesoo, Elbu (Tootsi Turvas), Elbu (Torfex), Elbu IV (Ahtol) and Pööravere.
[107] "Approval of Legislation on the Use of Earth's Crust" (including "Procedure for Application for and Grant of Authorisation to Extraction of Mineral Resources"), Regulation No. 3 of the Minister of Environment of 1 February 1995.
[108] Permits of four deposits of national importance (Endla, Lavassaare, Puhatu, Sangla) were reviewed in the course of audit. The permits of Ellamaa and Epu-Kakerdi were not analyzed as the corresponding counties were not selected for audit.
[109] The old Earth's Crust Act, Art. 40, paragraph 2.
[110] Interview with the Head of the Environment Management and Technology Department of the Ministry of Environment on 24 March 2005.
[111] The new Earth's Crust Act, Art. 42.

Therefore at present, the authorities issuing permits have no longer any legal basis for changing the conditions of the permits. For example, it is not possible to impose or set supplementary environmental conditions in the permits issued without environmental impact assessment, except in cases when harmful changes have already taken place in the environment. The Act does not allow changing other conditions, e.g. maximum annual production.

At the same time, there may be an urgent need to set or change environmental conditions in an extraction permit. E.g. an AS Strengel company in Pärnu County has been holding a permit to extract peat in the production area of Nurme II since1997, but the entrepreneur has not yet started extraction activities. At the time while the permit was issued there was no legal basis for requiring the environmental impact assessment from the entrepreneur. At the same time, in the extraction permit no environmental conditions have been imposed on this entrepreneur. For the area a permit for the special use of water has not been applied either, although the draining project has been approved by now.[112] At the moment the matter concerns part of the peatland in natural condition on which the entrepreneur has the right of extraction, but in case of which neither environmental impact assessment has not been carried out nor any requirements have been set to reduce environmental damage created as a result of extraction activities.

The SAO is of the opinion that the extraction permit shall always lay down requirements for reducing impacts accompanying extraction activities and monitoring environmental condition, an entrepreneur has to take into account. If environmental impact assessment is carried out in the course of processing an application for a permit, then this in turn will provide the authority issuing the permit with additional information to stipulate environmental conditions in the extraction permit. Till now, in most of the cases no environmental conditions have been imposed on peat extraction enterprises. Unless in the permits environmental conditions have been laid down, supervision over environmental safety of extraction activities is complicated as well. This may cause an irreversible impairment of both the production area as well as neighbouring areas and jeopardize the condition of the ground water and natural watercourses in the surroundings.

3.2. Purpose of use of rehabilitated land and conditions for rehabilitation have not been laid down in permits

Pursuant to the Earth's Crust Act, the holder of an extraction permit has to rehabilitate the production area after completing the extraction activities. To this end, the purpose of use of rehabilitated land has to be set in the extraction permit.[113] Upon issuing a permit the determination of the purpose will help the entrepreneur plan extraction activities, so that the desired rehabilitation project would be technically feasible after completion of the activities (location of ditches and peatstacks, ground relief etc.). Likewise, the entrepreneur can plan its expenses in good time, as the cost of different rehabilitation projects is different.

An entrepreneur will be provided with more specific rehabilitation conditions before starting the drafting of the rehabilitation project, but the conditions may also be set in the extraction permit. In practice the purpose of use of rehabilitated land and environmental as well as other conditions have been indicated in the column "Special conditions and limits".

The purpose of use of rehabilitated land had been indicated only in a quarter of the authorizations for use and extraction permits[114] analyzed (Figure 8).

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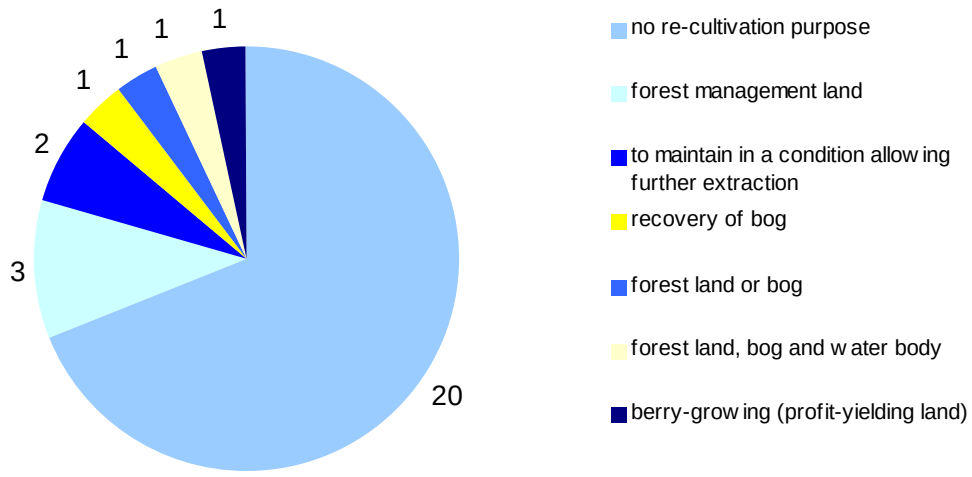
[112] Interview with Mineral Resources and Nature Conservation Specialist of the Environmental Department of Pärnu County on 15 December 2005.
[113] Pursuant to the new Earth's Crust Act, Art. 35, and the old Earth's Crust Act, Art. 30.
[114] Purpose of use and rehabilitation conditions of the land under rehabilitation were reviewed in the same permits of Ida-Viru County, Jõgeva County, Pärnu County, Saare County and Tartu County as environmental conditions.

Rehabilitation conditions had been laid down only in one case - in the permit issued for the production area located in Sangla deposit in Tartu County.

Figure 8. Purpose of use of rehabilitated land



Source: Analysis of authorizations for use and extraction permits made by the SAO in five counties (Ida- Viru, Jõgeva, Pärnu, Saare and Tartu).

Thus, in most cases, while issuing permits the law has not been observed and the purpose of use of rehabilitated land has not been indicated. This may cause a negligent management of areas by extraction enterprises that are unable to take into account the rehabilitation requirements to be set in the future and plan its expenses. In some cases it may cause the insolvency of the entrepreneur after completing extraction activities and deserting the production area.

3.3. Environmental conditions and purpose of use of rehabilitated land are not added to the permits upon re-registration

The process of re-registration of permits that has taken place since 1995 gave a good opportunity to review old authorizations for use and lay down new, modern and more specific conditions in the extraction permits. Several environmental departments stated in interviews that they had intended to do that.

Extraction permits in case of deposits of national importance are re-registered by the Ministry of Environment.

The Ministry also asserted to the SAO that they had intended to specify environmental and rehabilitation conditions in the permits in the course of re-registration.

Although indicating the purpose of use of re-cultivated land in the extraction permit is obligatory by law, this requirement has not been met upon issuing new extraction permits either. Of the 29 permits, analyzed by the SAO, 11 were extraction permits. The purpose of use of rehabilitated land had not been indicated in five permits. All five permits had been issued by the Ministry of Environment. In case of two permits this concerned re-registration of the authorization for use and three were new

permits. Yet on 25 October 2004, the Ministry of Environment granted a re-registered extraction permit for the extracting area of Ulila (AS Sangla Turvas) without adding any environmental and rehabilitation conditions. The purpose of use of rehabilitated land was added neither.

At the time while the audit was carried out both the environmental departments and the Ministry of Environment had not yet re-registered several permits. All existing authorizations for use should have been re-registered by 1 July 2005. Even if the entrepreneurs conclude land lease contracts in the near future, the environmental departments and the Ministry of Environment will be pressed for time when issuing permits and developing of environmental conditions may therefore be omitted. That is why there is a risk that the content of most permits will remain the same even after re-registration and environmental as well as rehabilitation conditions will not be included. By this an opportunity to control and reduce the environmental impact of peat extraction will be missed.

3.4. It is allowed in permits to discontinue extraction without exhausting of peatlands

As peat resources are limited and upon draining of a peatland peat starts to decompose in contact with air (see Chapter 4.2), an open quarry shall be extracted to the bottom in order to avoid wasting of the resource.

The partly decomposed peat that is deposited in the upper layers of a peatland is used in horticulture. The thickness of the layer of this peat ranges from some twenty centimeters to several meters. Under that is the layer of decomposed peat that is used for heating. Entrepreneurs are interested in extracting first of all the partly decomposed peat because it goes to export and the profit made on it is higher.

Taking into account the interests of entrepreneurs such permits have been issued (Sangla, Nurme) that provide with a right to extract only the partly decomposed upper layer of peatland and obligation to leave the quarry in a condition that will enable extraction of decomposed peat (see Figure 8). As an entrepreneur has no obligation to rehabilitate the quarry, the issue of such permits conceals a danger that if another interested enterprise is not found, the area might be left unrehabilitated. This will cause environmental pollution and waste of the resource.

It is not easy to re-exploit areas once deserted. For example, the Environmental Authority of Rapla County has tried to invite tenders to take into use the deserted production areas of Imsi and Hõreda but has failed as entrepreneurs had no interest in half-extracted areas.[115]

Likewise, there is a danger that although an entrepreneur has a right to exhaust the quarry as specified in the extraction permit, this need not be done. The reasons may be that it is difficult to sell decomposed peat or profit received from sale is smaller than in selling partly decomposed peat.

Thus, the sustainable use of a resource has not always been taken into consideration when issuing an extraction permit. The result may be that the drained peatlands after extraction of partly decomposed export peat will be deserted without rehabilitation.

Proposals to the Minister of Environment

- To initiate amendments to the Earth's Crust Act that will provide the authority issuing an extraction permit with a right to change conditions of the permit, i.e. the procedure specified in the Earth's Crust Act that in force until 31 March 2005 will be restored.

A legal basis for changing the conditions of a permit is necessary to be established to lay down environmental conditions in the permits that were issued without environmental impact assessment

[115] Reply of the Environmental Department of Rapla County to the request of the SAO.

and, where appropriate, to adjust conditions of the permit, including environmental conditions and maximum annual production.

- Thereafter to ensure setting environmental conditions and purpose of rehabilitation of the land damaged as a result of extraction activities in all peat extraction permits. To this end:
  - To improve the form of the extraction permit, adding a separate column “Environmental conditions”.
  - To develop uniform guidelines for processing and issuing extraction permits and arrange the relevant training of environmental departments;
  - To review environmental conditions in all valid peat extraction permits, modernizing and, where appropriate, specifying the conditions.

Inclusion of environmental conditions in an extraction permit is necessary to reduce the environmental impact of peat extraction and improve the possibility for supervision.

4. Rehabilitation

4.1. No survey of abandoned peat production areas

In previous years peat has been exhausted or production has been finished for some other reason in many quarries, but the areas were not rehabilitated. In general, these abandoned production areas are located on public land. The State should know the surface area of unrehabilitated production areas and their condition as these areas continuously endanger the environment (continuous water pollution, spread of weeds, a high risk of fire, spread of peat dust to the neighboring areas, etc.). One cannot rely on natural rehabilitation. Several drained peat fields where only a thin upper layer of peat has been extracted remain in the same condition for decades (i.e. as peat fields without loose vegetation). For example, in the raised bog of Viru, Lahemaa, where extraction activities were finished some twenty years ago, there is an open black peat field to this day,.

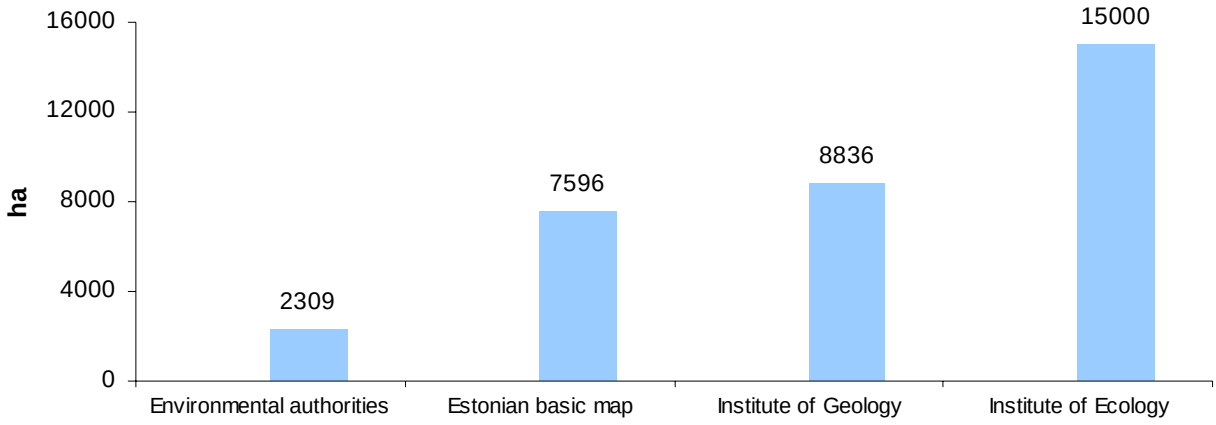
In different times peat production areas have been abandoned unrehabilitated[116]:

- Extraction activities took place in the areas before the 1960s when peat was harvested by hand.
- The area was not rehabilitated after the deposit was exhausted or extraction activities were stopped from 1960 to 1980.
- The area was abandoned at the beginning of the 1990s after the former enterprises were re-organized or finished their activities.
- The entrepreneur neither renewed the authorization for use in the middle of the 1990s nor applied for a new extraction permit and left the area unrehabilitated (e.g. Viirasoo peatland in Pärnu County).
- The entrepreneur did not submit an application to the Ministry of Environment for re-registration of the authorization for use as an extraction permit by April 1998. (e.g. peat extraction areas of Maardu, Kalina, Mõrdama and Ilmatsalu).
- Part of the exhausted production area will be left out in the process of re-registration of the authorization for use. For example, in the production area of Pööravere some extraction fields were considered as having undergone natural rehabilitation and it is intended to transfer them to the State Forest Management Centre.[117]
- The entrepreneur has become insolvent (e.g. Oru peat industry).

The total area of abandoned production areas where peat extraction has been terminated is unknown, and no entrepreneur can be obligated to rehabilitate the areas. The total surface of such areas is estimated at from 2,309 to 15,000 ha (Figure 9).

[116] The SAO analyzed the following data:
a) Notice of permits of I quarter of 1998;
b) List of the Ministry of Environment of the owners of authorizations for use, who submitted an application for re-registration of permits by 3 April 1998;
c) List of the Land Board of the owners of authorizations for use, with whom the Land Board had concluded land lease contracts by 1 April 2005;
d) replies of the environmental departments to the questionnaire of the SAO.
[117] Interview in the Environmental Department of Pärnumaa County on 15 February 2005.

Figure 9. Area of abandoned peat quarries according to the different sources



Sources: Replies of environmental departments to the questionnaire of the SAO, Estonian Environmental Information Centre, Geological Survey of Estonia[118] and "Peat increment in Estonian peatlands" [119]

A questionnaire to environmental departments focusing on arrangement of the environmental impact assessment of peat extraction and rehabilitation of peat production areas.

The SAO sent a questionnaire to all environmental departments asking information about the number, area and condition of abandoned peat production areas. One third of the environmental departments had no information available about abandoned areas. At the same time, according to the Geological Survey of Estonia[120], such areas exist in all counties. According to the Geological Survey of Estonia, none of the environmental departments had information about all areas that had been previously under extraction.

According to the Estonian Environmental Information Centre, 7,596 ha of abandoned peat areas have been carried on the Estonian Basic Map[121]. This is approximately 1,200 ha less than the area of deposits included in the register of mineral deposits of the Geological Survey of Estonia.

The area of abandoned peat production areas is the biggest according to the estimates of the Institute of Ecology of Tallinn University. The total area of abandoned peat production areas is 15,000 ha according to the Institute.[122] This figure is considerably higher than that of the Geological Survey of Estonia. This is first of all due to that the Institute has included data relating to the extraction activities in the period about which data are missing in the National Register of Earth Deposits (i.e. before 1952).

The state of abandoned peat production areas is very different, from open and "black" peat fields to partly recovered peatlands. In most cases the environmental departments are not able to assess the

[118] Turbaalade jätkusuutlik kasutamine ja kaitse. [Sustainable use and protection of peatlands.] Final report to the project of Environmental Investment Centre. Compiled by Orru, M. and Orru, H. Geological Survey of Estonia, 2005. (In Estonian)
[119] Turba juurdekasv Eesti soodes. [Peat increment in Estonian peatlands.] Final report on an applied research project of the Environmental Investment Centre. Drafted by M. Ilomets. Institute of Ecology, Tallinn University, 2005. (In Estonian)
[120] The Geological Survey of Estonia holds the the National Register of Earth Deposits, which contains data on peat deposits and resources from 1952.
[121] An integral digital topographic database in scale 1:10 000 covering the whole Estonia, administered by Estonian Land Board.
[122] Turba juurdekasv Eesti soodes. [Peat increment in Estonian peatlands.] Final report on an applied research project of the Environmental Investment Centre. Drafted by M. Ilomets. Institute of Ecology, Tallinn University, 2005. (In Estonian)

condition of abandoned quarries in their own counties. Sometimes the SAO was responded that the area was as before an open peat area, covered with weeds or bushes. In some answers the area was considered to have undergone natural rehabilitation. On inquiry it appeared that single trees that had begun to grow in former peat production areas were considered natural rehabilitation. According to Mati Ilomets[123], a specialist in peatlands, the growing of trees in peatlands is sooner harmful from the point of view of recovery of the peatland, because by increasing evaporation the trees make the area drier, thus hindering the growth of bog plants. Consequently, there is no single understanding of how a rehabilitated peat quarry has to look like and when the quarry can be deemed to have been naturally rehabilitated. For example, in the production area of Pööravere, part of the exhausted extraction area was deemed to have been rehabilitated without expert opinion.

No institution has collected or systematized data about abandoned peat quarries. The State does not have a survey of the exact number and condition of unrehabilitated peat quarries, the size of the residual reserves of peat, the scope of environmental damages and the need for rehabilitation.

Likewise, nothing has been done to rehabilitate these areas or exhaust the residual reserves of peat. The type and size of the resources necessary for rehabilitation of areas have been estimated neither.

4.2. Peat resources perish in abandoned peat production areas

According to the principles of sustainable development, natural resources necessary for economic development have to be used in a sustainable way, without substantially damaging the natural environment and by avoiding losses.

Peat is accumulated and preserved best in peatlands. After draining of a peatland, peat starts to mineralize in contact with the air. During the first ten years after draining, the speed of decomposition of peat is 15 to 20 tons per ha.[124] Henceforth the process is slowed down, but does not end up before all the peat has been mineralized. According to different data[125] 2.5 to 6 million tons of peat is mineralized annually in total in all drained areas in Estonia. It is at least two times as much as was extracted, e.g. in 2002, which is a remarkable waste of peat reserve.

The decomposition or mineralization of peat causes the pollution of air. As a result of mineralization, a high amount of carbon dioxide (CO_2) a greenhouse gas that causes global warming, will be released into the atmosphere. According to estimates, 11 million tons of CO_2[126] is emitted into the atmosphere annually, while in 1999, for example, 1.2 million tons of CO2 emitted into the atmosphere from motor traffic.[127] The emission of carbon as a component of CO_2 exceeds ten times the quantity of the bound carbon formed in the course of photosynthesis in natural peatlands during one year.[128]

At the same time while peat reserves perish in abandoned areas, new peatlands are opened for extraction. Re-exploitation of former production areas is hindered by a low interest of entrepreneurs because: the quantity of low-decomposed peat suitable for export is insignificant; the upper layer of peat may have been contaminated with weed seeds; the areas may be located far from harbours; etc. The reason for an inadequate interest on the side of entrepreneurs may also be that it is relatively easy

[123] Presentation on the seminar on rehabilitation of peatlands the Ministry of Environment on 2 March 2005.
[124] Tomberg, Uno. Turba vajumine soode kuivendamisel. [Reduction of peat after drainage of peatlands.] Saku: AS Rebellis, 1992. (In Estonian)
[125] Long-term Public Fuel and Energy Sector Development Plan until 2015. Passed by the Riigikogu on 15 December 2004; Peat increment in Estonian peatlands. Final report on applied research project of Environmental Investment Centre. Drafted by Ilomets, M. Institute of Ecology of the Tallinn University, 2005, p. 48.
[126] Turba juurdekasv Eesti soodes. [Peat increment in Estonian peatlands.] Final report on an applied research project of the Environmental Investment Centre. Drafted by M. Ilomets. Institute of Ecology, Tallinn University, 2005. (In Estonian)
[127] Estonia's third national communication. The Ministry of Environment. 2001.
[128] Turba juurdekasv Eesti soodes. [Peat increment in Estonian peatlands.] Final report on an applied research project of the Environmental Investment Centre. Drafted by M. Ilomets. Institute of Ecology, Tallinn University, 2005. (In Estonian)

to apply for a permit in order to open a new deposit. It is known by now that only the production area of Leinasoo in Viljandi County will re-exploited.[129]

The re-exploitation of abandoned areas is also hindered by the fact that the quantity of preserved peat in these areas is not known. The National Register of Earth Deposits contains data about peat reserves at the moment of termination of extraction activities, but taking into account the mineralization of peat that has taken place afterwards, these data are not reliable. In most cases the size of peat reserves preserved has not been estimated. The size of reserves has been estimated in the course of a supplementary geological exploration only in a few cases when entrepreneurs have been interested in starting extraction activities in an abandoned area (e.g. in Leinasoo).

As peat decomposes in abandoned and drained peat production areas, the peat reserves suitable for extraction will be exhausted sooner than one may suppose today when comparing total reserves of peat and its extraction volumes.

4.3. Neither experience nor money for rehabilitation of peat production areas

Pursuant to the Earth's Crust Act[130], the holder of the extraction permit has to rehabilitate the area damaged as a result of extraction activities on the basis of the rehabilitation project before the extraction permit expires. Abandoned peat fields must not be left unrehabilitated because they represent a great danger to the environment and a risk of fire. The owner of the land has to rehabilitate these peat production areas where extraction activities were terminated before the entry into force of the Earth's Crust Act in 1994. As most abandoned areas are located on public land, the State must be responsible for r-cultivating them.

There are many ways of rehabilitating the land damaged as a result of extraction activities: afforestation, establishment of a watercourse, recovery of the peatland, establishment of berry farming, etc. (see Chapter 3.2). Rehabilitation expenses may be very different, depending on the volume of necessary explorations and the purpose of use of the rehabilitated land.

Only very few rehabilitation projects have been launched in connection with abandoned peat production areas and none of them have been finished yet. At the moment, financed within the LIFE-Nature programme of the European Union rehabilitation is in progress in the raised bog of Tolkuse-Maasika of the conservation area of Rannametsa-Soometsa, Pärnu County where the enterprise left the production area unrehabilitated. A rehabilitation project has also been drafted for another abandoned area, i.e. Oru peat production area in Ida-Viru County, which will be re-cultivated by the State Forest Management Centre.

There is only little experience in rehabilitating peat quarries and therefore those concerned do not know which works need to be done and how in order to succeed in rehabilitation. So far, rehabilitation of part of the production area of Määrastu, Põlva County, has been finished only. This area had not been abandoned and the entrepreneur financed rehabilitation. Although so far rehabilitation of peatland has been tried out in single areas only, it is possible to start to develop methods of rehabilitation on the basis of the available results and the experiences of other countries.

Money is needed to rehab ilitate abandoned State-owned peat production areas, but so far no sums have been planned for this purpose.

The obligation to rehabilitate shall be imposed on the State also in case the enterprise is unable to fulfill its obligation (e.g. in case of insolvency). From the entry into force of the Earth's Crust Act in 1995 till 31 March 2005 a requirement that the holder of an extraction permit either pays a deposit

[129] Reply of the Environmental Department of Viljandi County to the questionnaire of the SAO.
[130] The old Earth's Crust Act, Art. 39, The new Earth's Crust Act, Art. 48.

before starting with the work or provides a financial guaranty for rehabilitation in any other way was in force.[131] Determining the size of the financial security and establishing procedure for payment was the task of the local government.

The state guarantee fund was not applied in any of the local governments. One of the reasons was that local governments were not interested in arranging rehabilitation of peat-extraction damaged areas that were located on public land, and this is not their task. Another reason why such a state guarantee fund was not applied was the modest capability of local governments to establish and administer such funds. The new Earth's Crust Act does not foresee establishing such a guarantee fund.

In many countries the state pays much attention to the arrangement of rehabilitation. For example, in Sweden the obligation to rehabilitate is connected with the issue of a permit to extract peat, i.e. an enterprise planning peat production has to include rehabilitation costs in its overhead costs already in the beginning.. To get an extraction permit Swedish enterprises have to produce a letter of guarantee issued by a bank to this effect that they have the needed finances to cover future rehabilitation costs.[132] In the United Sates of America rehabilitation of peat quarries began after establishment of the corresponding fund.[133]

The participants in the focus group meeting organized by the SAO found that establishment of a separate fund in Estonia was not expedient as costs of administration of the fund would be high and preservation of money would not be guaranteed. The focus group considered setting up of a state guarantee fund or a sub-fund under some financial institution, e.g. the Environmental Investment Centre, to be a better solution.[134]

As at present the enterprise has no obligation to pay deposit for arrangement of rehabilitation, then one cannot be assured that the enterprise is able to cover costs of rehabilitation of the damaged land after termination of extraction activities (e.g. enterprises may become insolvent). The arrangement of rehabilitation of previously abandoned areas has not been solved either.

Proposals to the Ministry of Environment

- To initiate rehabilitation of degraded State-owned peatlands, where it is inexpedient to restart extraction. To this end
  - to arrange necessary exploration in order to estimate the number, area, condition and preserved peat reserves of abandoned peat quarries;
  - thereafter that to decide which areas have to be rehabilitated and in which areas it is expedient to continue with economic activities (e.g. restarting with extraction or establishing berry farming);
  - to issue an order to develop methods for rehabilitation of the land damaged as a result of extraction activities;
  - to issue an order to develop a plan of investments for rehabilitation of abandoned peat production areas.

Rehabilitation of abandoned peat production areas will stop the environmental pollution originating from the abandoned areas and avoid the risk of fire.

- In order to direct peat extraction to abandoned, non-exhausted production areas, to suspend, until 2025, the issuing of new extraction permits concerning peatlands and parts of peatlands, which

[131] The old Earth's Crust Act, Art. 39.
[132] Expert opinion, appendix 4.
[133] Meeting of the focus group on 15 March 2005.
[134] Same.

have not been extract, according to the objectives set in the Long-term Public Fuel and Energy Sector Development Plan. To initiate necessary amendments to the legislation, including the Earth's Crust Act, in order to achieve the objectives of the development plan.

Termination of the issue of permits concerning peatlands or parts of peatlands that have not been extracted will provide a sustainable use of peat reserves and preservation of valuable peatlands. Likewise, re-exploitation of areas with a residual supply of peat will stop misuse of peat resources and offer an opportunity to rehabilitate the fields after termination of extraction activities.

- To develop a financing scheme to cover costs of rehabilitation in case an enterprise becomes insolvent, e.g. establishing to this end a state guarantee fund or a sub-fund under some financial institution or requiring a deposit for reclaiming from the enterprise before issuing the extraction permit.

Developing such a financing scheme will reduce costs of the State that may arise in case of a possible insolvency of a peat production enterprise.