Environmental Report

Eesti Energia recognises that transforming energy into a form useable by humans has an impact on the environment. Eesti Energia analyses its activities and works to reduce the damages caused, making the existing solutions more environmentally sustainable and seeking new, less environmentally damaging solutions for the future.

The significant impact that environmental concerns have on the energy industry was demonstrated ever more clearly in the financial year 2007/08. Constantly tightening environmental restrictions have an ever-increasing impact on technological development and future choices. Since the beginning of 2008, the Iru power plant has been obliged to comply with the requirements of the European Union (EU) Large Combustion Plants Directive. The permitted period for use of the old equipment of the Ahtme power plant will lapse at the end of 2010 and considerably stricter SO_2 restrictions will be applied to the energy production units in Narva from 2012.

Climate and CO_2 policies, and the new EU energy package published at the beginning of 2008, seriously affect the energy sector. In the new CO_2 allocation plan period, which started in the EU in 2008 and will last until 2012, Eesti Energia has to make do with only about 50% of the required amount of emission allowances. The balance needs to be purchased, which means the situation is the opposite of that of the previous allocation plan period, when Eesti Energia put its unused allowances up for sale. The ever-tightening CO_2 policy will clearly have a great impact on Eesti Energia's future development choices and investment decisions. As one possible solution to this problem, Eesti Energia has started research into the abatement and storage of CO_2, which is expected to lead to technical innovations. Eesti Energia is also focusing more and more on developing production technologies that are carbon dioxide free or produce a minimal amount of CO_2.

The Estonian energy industry, and therefore also Eesti Energia, is largely based around oil shale. In 2007, the preliminary version of the national development plan for oil shale mining and use was completed, fixing the limits for oil shale mining. The approval of the first version of the development plan means restrictions being placed on mining volumes, which means that the quality of the oil shale that is mined and sold to consumers, such as producers of electricity, shale oil or cement, increases in importance. In the light of possible restrictions on resources, the use of oil shale must become ever more efficient, and in connection with this, Eesti Energia launched a research project last year into oil shale enrichment, and the environmental, economic and technical implications of this. Production of gravel from the waste rock left over from mining is increasing, and more efficient and waste-free use of oil shale would reduce its impact on the environment while also generating economic benefits.

As well as preparing to build new energy production units, Eesti Energia is also making great efforts to ensure that those currently operating units that do not meet environmental restrictions can also be used in the future. In 2007,


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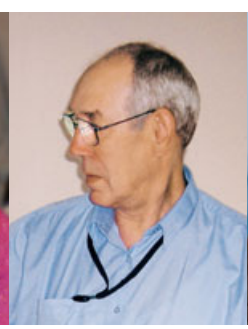
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preparations began for the installation of sulphur abatement equipment on the existing pulverised firing technology based units. Eesti Energia is also looking at ways to reduce nitrogen compounds in emission gases and is making great efforts to develop a technical solution to make ash removal, an important process in the power plants, conform with environmental requirements.

This will not all happen overnight, simply and cheaply. Eesti Energia is working towards making its environmental impact more transparent and comprehensible to interest groups by using various internationally applied measures. What is done is done, but existing knowledge allows us to do things better, both now and in the future.

Environmental Policy

The Eesti Energia Group adheres to the following environmental principles:

1. We have adopted and use an environmental management system that complies with international standards (ISO 14001 and EMAS).
2. We follow all applicable Estonian and international, including EU, environment-related legal acts.
3. We analyse the environmental impact of our operations in advance and reduce the negative impact of power production and transmission by using technological solutions and innovation, and by increasing efficiency, reducing losses and implementing management systems.
4. We apply the best available technology (BAT) and support sustainable development in Estonia through waste prevention, waste recycling and improved efficiency in the power system.
5. We use the BAT to use renewable energy sources as far as is technologically and economically rational.
6. We are open to new solutions and cooperate with scientific research establishments and consultation firms to achieve our environmental goals.
7. Under equal conditions in procurement tenders, we prefer suppliers who have established a certified and verified environmental management system.

The environmental policy of Eesti Energia is public and it is disseminated to employees, suppliers and other interested parties.

Environmental Objectives

1. To bring the oil shale ash hydro-transport at the Narva power plants into conformity with the EU landfill directive and the environmental requirements applicable in Estonia by summer 2009 and to continue to remediate the existing ash storage sites in order to reduce environmental hazards by 2013.
2. To shut down ash field nr 2 of the Balti power plant by the end of 2008 in readiness for the wind park to be erected there, and the Ahtme ash field by 2013 at the latest.
3. To renovate the Ahtme power plant to meet environmental requirements, with the aim of converting it to a co-generation plant using biofuels by 2011.
4. To establish wind parks at Aulepa and on the closed ash field of the Balti power plant, and to develop further renewable energy capacity while also introducing gas turbines to guarantee the reserve capacity for wind energy.
5. To install additional SO2 and NOx removal systems on the pulverised firing technology based energy blocks at Narva power plant by 2012.
6. To cut network power losses in both transmission and distribution.
7. To bring such oil-based facilities as are in violation of the requirements into compliance with legal acts, by 2012 in OÜ Põhivõrk and by 2015 in OÜ Jaotusvõrk.
8. To conduct feasibility and environmental studies into an increase in the diversity of energy sources, the gasification of oil shale, and the use of carbon capture technologies within the next three years.
9. To conduct research into oil shale enrichment from the point of view of mining and consumption by the end of 2008.
10. To certify the management systems of all Eesti Energia subsidiaries using standard ISO 14001 and to verify the EMAS environmental management system covering the whole Group in 2009.

11. To conduct an environmental audit of between one and three third parties from among Eesti Energia's suppliers and subcontractors by the autumn of 2009.
12. To carry out measures derived from the oil shale electricity life cycle assessment, including the preparation and verification of the oil shale electricity Environment Product Declaration (EPD) in 2008 and the Life Cycle Costing pilot project in 2009.
13. To continue to promote energy saving and an interest in natural sciences among young people.
14. To quadruple the re-utilisation of oil shale ash over the next five years. To conduct research into sequestering CO_2 with oil shale ash and to construct a test facility.
15. To develop a waste treatment accounting system for the whole Eesti Energia Group, and to develop new and existing waste treatment technologies in the next five years.
16. To develop and improve Eesti Energia's environmental information system over the next four years.
17. To construct efficient electricity and heat co-generation equipment fuelled by mixed and ordinary waste at the Iru power plant by 2011.

Environmental Impact of Power Production

In order to get a good overview of all the environmental impacts of power production, it is necessary to look at the entire chain of electricity and heat production. Although different production technologies or fuels are used, the energy production and consumption chain is made up of the following stages:

- preparation of sources of primary energy or the production/ preparation of fuels;
- transformation of sources of primary energy into a form conveniently used by humans through the production of electricity, heat, etc;
- transportation of the transformed energy to the consumer;
- consumption of the energy.

The environmental impacts of each stage differ due to their specific technological features and activities. The form that each environmental impact takes is important and an integral overview is needed to achieve better results in reducing the risks they cause. All the subsidiaries and business units of Eesti Energia work in accordance with the applicable environmental law and the requirements established in the environmental permits they have been issued. Environmental management systems, which meet the ISO 14001 standard and are certified, have been set up in mining, production and network units to reduce systematically Eesti Energia's environmental impact and to improve performance. The majority of the companies use a quality system integrated into the environmental management system and corresponding to the ISO 9001 standard, as well as an occupational health and safety management system corresponding to OHSAS 18001.

In order to keep fully aware of the environmental situation, Eesti Energia performs very extensive environmental monitoring over the areas it influences in all of its activities. In mining, the monitoring covers the quantity and chemical composition of the oil shale mined, the waste rock generated and the water pumped, as well as the effectiveness of re-cultivation in former mining areas and the effect of mining on birds and animals. Stationary monitoring equipment at Narva's power plants is regularly used to measure pollutants, and to monitor the impact of ash fields on groundwater and the Narva River. Compliance with the water regime is monitored at hydro-electric plants. This extensive environmental monitoring is costly, but provides a constant overview of Eesti Energia's environmental impact.

In accordance with the environmental taxation principle applied in Estonia that "the polluter pays", Eesti Energia pays substantial environmental charges for those of its activities that affect the environment. In the financial year 2007/08, the Eesti Energia Group paid a total of 51.2 million euros in environmental charges, with 14.3 million euros for rights to use natural resources and 36.9 million euros in pollution charges. Under Estonian law the environmental charges are used to finance environmental projects, while a part of the charges paid for rights to use natural resources go to the budget of the local government where the company operates.

In order to process better such a large amount of environmental information, the Eesti Energia Group is currently introducing a Group-wide electronic database to ensure the operational availability of Group-based data of a common standard. An Environmental Product Declaration for electricity produced from oil shale using CFB technology, prepared on the principles of life cycle assessment and verified by a third party, will be published in the first half of 2008. In addition to this, the EMAS environmental management system covering the entire Group will be implemented in 2008 and verified at the beginning of 2009 at the latest. The aim of both the preparation of the environment product declaration and the implementation of the EMAS environmental management system is to share Eesti Energia's environmental information with other interested parties in a more efficient manner.

Preparation of Primary Energy Sources

The production of power starts from the existence of primary energy sources, and the main source of primary energy in Estonia today is oil shale. About 95% of Estonia's electricity, and close to 300,000 tonnes of shale oil, are produced from oil shale. Besides oil shale, some electrical energy is also produced from biomass, wind and water. In the future, waste, biogas and solar energy should supplement this list. Natural gas is used in Estonia mainly for the production of heat and not so much for producing electricity. Although the proportion of oil shale in the energy balance will probably start to decrease, it will remain important for a long while yet.

Oil Shale Mining

Mining is an activity requiring special knowledge, special technical equipment and long experience. Oil shale – Estonia's most important mineral resource – is mined by Eesti Energia's subsidiary Eesti Põlevkivi, in two quarries and two underground mines. Mining inevitably impacts the natural environment, but these impacts can be managed, alleviated and minimised by considering the specific features of the site of mining and by applying long-term experience and appropriate technologies. Relying on its long experience and operating consistently, Eesti Põlevkivi has been able to manage the impacts of mining. Consistent environmental investments play an essential role in lessening the impact of mining.

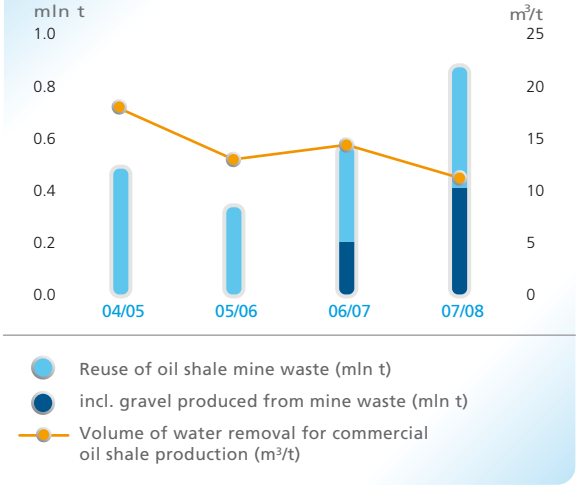
Oil shale is mined in both quarries and underground mines. The choice of mining technology is made on the basis of the depth of the oil shale layer and what lies on the surface. Deposits located up to 30 metres deep are usually quarried in open-pit mines, with losses up to 9%. Room-and-pillar mining is used in underground mines where resources lie deeper in the ground. This method of mining prevents the mining tunnels from collapsing and therefore considerably reduces the impact of mining on the surrounding area, but at the same time the room-and-pillar method creates losses of up to 28%.

Traditional mining takes both oil shale and the surrounding limestone from quarries or from underground mines. The mineral from the mines and the Aidu quarry is enriched in enrichment plants where limestone is removed from the oil shale in order to improve its quality, or calorific value. Narva quarry uses a surface miner to sort oil shale. The limestone, which is removed in enrichment plants, is called waste rock and is cast off onto slag heaps or used in re-cultivating quarries. About 4-5 million tonnes of this waste rock is generated every year and solutions for dealing with it differ across individual production units. At Narva quarry, limestone sediments are cast off onto heaps during the mining process, while at Aidu quarry, waste rock from enrichment is sent back to the quarry heaps. Over the years, a total of over 190 million tonnes of production waste has accumulated in the hills of waste rock that dot the terrain of Ida-Virumaa county. The Environmental Charges Act considers dumped minerals to be waste, and so they are taxed under it.

However, not all enrichment waste makes it to the hills, as Eesti Energia is trying to reduce production waste by using resources more efficiently. An increasing amount of the waste rock from mining is used to produce gravel and filler for use in road construction. Besides slowing down the growth of the Ida-Virumaa hills, the use of waste rock as gravel also has a wider positive effect on the environment, as this partly reduces the mining of limestone for gravel in other regions in Estonia, including in Harju county. Using these resources in Ida-Virumaa may avoid the need to open several of the planned limestone mines that have caused a lot of resentment.

The environmental impacts of mining can also be reduced by measures taken following the end of active mining. The area mined in oil shale quarries is levelled and replanted. Through the re-cultivation of quarries, Eesti Põlevkivi is one of the biggest tree planters in Estonia, reforesting about 180 hectares of former mine areas every year. Besides reforesting, fields have also been created in former mine areas. Small lakes can also

Environmental impacts



be created in mined areas. A total of 12,000 hectares of land have been restored in Eesti Põlevkivi quarries, including a total forested area of 11,800 hectares and 170 hectares of agricultural land. Re-cultivation plans are always agreed with local governments, so that their wishes can also be taken into consideration, and land is made more diverse and varied.

No direct re-cultivation is done in underground mines, as there are practically no changes above ground. In order to make the mines even less noticeable, Eesti Põlevkivi is taking steps to prevent the ground from sinking. Currently, sufficiently large sections of ground are left intact for this purpose when using the room-and-pillar method, but this in turn causes greater losses in underground mining. In order to improve the stability of mining areas, refilling underground mines with an oil shale ash and waste rock mix is being considered. This concrete-like substance would fill the underground chambers and provide an important use for low-quality waste rock and oil shale ash, but at the same time this method of refilling should not have an additional impact on the quality of soil and ground water in the surrounding area. If the refilling project is a success, mining technologies can help reduce losses in the future.

Oil shale lies closer to the surface than, for example, coal and therefore the mining process affects the level of groundwater. In order to ensure dry conditions for excavation, for technical and safety reasons in both quarries and mines, the level of groundwater in these areas needs to be lowered below the level of the oil shale layer, and water collection and pumping systems have been constructed to do this. In 2007, 180 million cubic metres of water was pumped out of the mines and quarries in order to ensure suitable conditions for mining; the water was directed mainly into the Gulf of Finland and partly into Lake Peipsi via ditches and rivers. Eesti Põlevkivi aims to pump out as little water as possible for technical mining reasons, but the amount of water pumped depends largely on the weather conditions and the amount of precipitation. Before being directed into the environment, mine water is cleaned, mainly of suspended matter, in sedimentation tanks. Mines are closed after the resources are exhausted or mining permits lapse; groundwater pumping then stops and the level of groundwater thus rises back to its natural pre-mining level.

A monitoring network has been set up in the mining area, with over 100 drilled holes and groundwater locations under observation, and water samples taken from old mines show a relatively rapid decrease in sulphate concentrations in underground reservoirs. Despite concern about mine water in Europe, treated mine water generated from mining oil shale does not have a significant effect on the environment, as only the proportion of sulphates or the natural hardness is increased. Coal mines have problems with acidic mining waters but that is not the case with oil shale.

Shallower wells in the immediate vicinity of mining works have dried up, so to alleviate this problem Eesti Põlevkivi spends a significant amount of money each year boring deep wells and laying pipelines to restore the water supply for the people living in the area. The construction of wells fed by higher-quality groundwater layers, along with modern pipelines, markedly increases the quality of water available to the people living in the area, and it meets all European norms.

This cannot, however, be done in all mining areas, as it would have a considerable impact on natural biospheres. In the Viivikonna district of Narva quarry, which lies immediately by the Kurtna Nature Reserve, mining work has been conducted within a special project designed to ensure minimal impact on the water regime of the reserve. The primary technical solution, developed in cooperation with the researchers of the Tallinn University of Technology Mining Institute, is a short work face with seepage barriers and infiltration pools, allowing oil shale reserves on the border of the reserve to be exploited.

Eesti Põlevkivi has, together with Eesti Energia, Narva Elektrijaamad and Tallinn University of Technology started research to implement the technology necessary to enrich oil shale. This would increase the value of oil shale by removing limestone in the enrichment process. Research is focusing on evaluating additional waste flows, and also on an evaluation of a possible increase in energy consumption and the possibility and extent of additional environmental impacts. Eesti Energia holds that increasing the value of the oil shale resource would have a good chance of reducing the future environmental impact of both mining and the further use of oil shale.

Gas and Other Fossil Fuels

Alongside oil shale, Eesti Energia uses gas as a primary source of energy. There are no natural gas deposits in Estonia and therefore all the gas consumed here is imported. Depending on availability, almost all the natural gas is currently imported either directly or from the Inchukalns underground gas storage reserve in Latvia. Natural gas is used at the Iru power plant to produce heat and electricity and at the boiler house of the Balti power plant to produce heat for the city of Narva. The main environmental impact of natural gas transportation is restrictions on the use of the land underneath the pipelines.

Renewable Energy Sources

In addition to non-renewable energy sources, Eesti Energia uses renewable energy sources to produce electricity. The renewable energy sector is a rapidly developing area, due to the significant reduction in CO_2 emission allowances and the EU initiative to markedly increase the use of renewable energy. The

main sources of renewable energy used in Estonia are wind and biomass, with water and biogas used to a lesser degree.

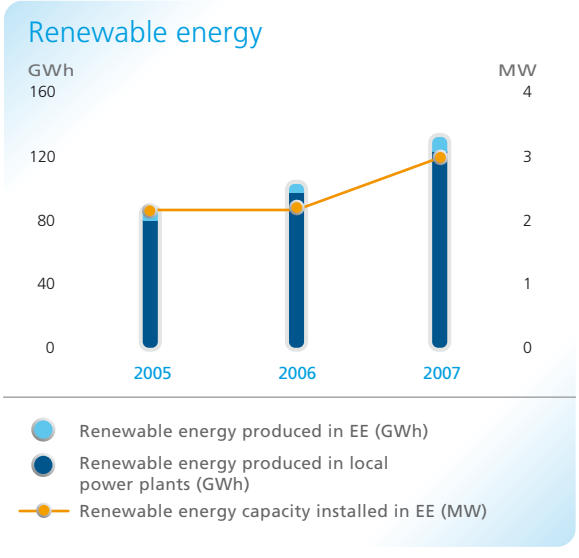
Estonia is a relatively flat country and therefore has very little hydro-energy potential. Our greatest hydro-energy potential of up to 100 MW is on the Narva river at the Estonian border and therefore cannot be used. The estimated maximum hydro-energy potential of rivers within Estonia is 30 MW. Eesti Energia uses hydro-energy at the Keila-Joa and Linnamäe hydroelectric power plants and is considering renovating the Põltsamaa hydroelectric power plant. Use of Estonia's hydro-energy resources is hindered by the scarcity of rivers with slopes suitable for electricity production and problems related to the migration of fish. In total, hydro-energy in Estonia can make only a marginal contribution to satisfying the total energy need. The main reason hydro-energy is still used is the desire to preserve historical traditions. As regards environmental issues, hydro-energy plants must comply with the water level preservation requirements fixed in their licences, while also ensuring passage for fish and taking other measures to alleviate the environmental damage caused by the restoration of catchment ponds. No more catchment ponds are to be built in Estonia, and in restoring the existing historical catchment ponds care must be taken that the environmental impacts, as judged by an impact assessment, are minimal.

Estonia's potential wind energy resources are relatively good for electricity production, particularly on the open sea. At the same time, the use of wind energy is hindered by various environmental and aesthetic problems. The use of wind energy on land restricts the use of the land and causes visual pollution for humans and migratory obstruction for birds. The output of Eesti Energia's wind parks is currently small, but the company is already, in the next few years, planning to put wind energy to use in inland areas where there will be no conflict with the local residents and the environment, and where the impact of development work on the surrounding area is minimal. In addition to this, Eesti Energia is planning the extensive use of open sea wind resources, again causing as small an impact on the environment as possible.

Biomass as a raw material for energy production is currently understood to mean mainly wood and also other plants and shrubs. Given the increasingly intensive use of biomass, consideration must certainly be given to felling restrictions, which ensure sustainable forest management and the reproduction of forests. Excessive felling may cause considerable damage to the reproductive ability and species diversity of forests. Besides ordinary timber, a large part of biomass fuel comes from felling waste, but this must also be used with moderation, as the removal of all the biomass from forests may considerably damage the nutrient content and balance of forests, which are important in ensuring forest sustainability. Besides timber, various energy-rich plants are gaining in popularity, and Estonia has relatively large areas of unused fertile land which could be used to grow such plants. If this is done, account must certainly be taken of the risks and restrictions involved in the spread of monoculture and intensive agriculture.

Household and industrial waste can potentially be considered primary energy sources, and in certain cases it is more expedient not to reuse waste but to transform the energy contained in the waste into heat and electricity, and in the future maybe also into liquid fuel and gas. The energy contained in waste can be used by directly burning it or by using the biogas (landfill gas) that it generates. Eesti Energia is currently developing both of these methods of using the energy potential of waste. Eesti Energia is also planning to use various animal wastes to produce biogas, which could then be transformed into heat or electricity. The solid waste generated in the production of biogas is smaller in bulk than the raw material and has a significantly smaller impact on the environment. Iru power plant intends to use the energy contained in household waste and some industrial waste for the co-generation of heat and electricity. An advantage of using household waste as a source of energy is that the amounts of waste going into landfills and the content of organic substances is reduced and thereby the impact on the climate is diminished, as the emission of landfill gases (mainly methane) into the environment is reduced.

Although it is estimated that the sun radiates hundreds of times more energy than humankind could ever need, the use of this source of energy is still limited. Estonia lies in a climate zone where the intensity of the energy reaching the Earth is not, given existing technical solutions, sufficient for large-scale electricity or heat production. In Estonia, solar energy is currently suitable for individual use as a small additional source of energy, but as technology advances, the large-scale use of this energy source is not inconceivable.



After a period of silence and unpopularity, energy generated from the fission of uranium isotope 235, or nuclear energy, has again come into focus. The main attraction of the generation III reactors with their improved safety features is that they don't discharge any greenhouse gases, and this creates tremendous prospects for their use in electricity production. The world has huge uranium deposits, making nuclear energy an alternative solution long into the future. In contrast to the burning of oil shale, the fission of uranium atoms generates a minimal amount of waste, although the waste it does produce is radioactive and requires long-term special handling and storage. Nuclear energy may also be produced in generation IV reactors, which can use not only uranium but also thorium, of which there are even greater deposits. This would generate even less waste and ensure even better safety, though such reactors are not yet in commercial use. Laboratory testing is also still continuing to create energy from nuclear fusion by imitating the actions of light atomic particles in the Sun. As climate change becomes an ever more important issue, the probability increases that nuclear energy will also be introduced in Estonia.

Environmental Impact of Transforming Sources of Primary Energy

Eesti Energia transforms primary energy into electricity, heat and shale oil liquid fuel by converting oil shale at the Balti and Eesti power plants in Narva and in the Narva oil factory, and by burning gas at the Iru power plant. A smaller but growing proportion of primary energy is transformed in hydroelectric power plants and wind parks. The transformation of primary energy has an environmental impact when both fossil fuels and renewable energy sources are used.

The Balti power plant produces both electricity and heat from oil shale. The advantage of this kind of co-generation regime is that it is the most efficient use of fuel and gains the maximum energy from it, and therefore produces lower emissions per input unit. The gas-fired Iru power plant also produces both electricity and heat, as does the oil shale fired Ahtme power plant. Estonia's main electricity producer, the Eesti power plant, produces electricity only, using a system called the condensation regime. Electricity is produced from water in the hydroelectric power plants at Linnamäe and Keila-Joa and from wind by the windmills at Virtsu and Ruhnu. The island of Ruhnu has a closed electricity system which is not connected to the mainland, and for this reason the island also has diesel generators to ensure a stable electricity supply to local customers. Preparations are being made to establish a waste-fuelled heat and electricity co-generation unit at Iru power plant. Eesti Energia has started building the largest Estonian wind park with a capacity of 39 MW at Aulepa and continues work on the construction of a wind park on the former ash fields.

Eesti Energia produces the majority of its energy, heat and shale oil by burning or processing the local fossil fuel, oil shale. For this reason, Eesti Energia's activities have an impact on air quality through the substances emitted into the atmosphere, as well as having an impact on surface and groundwater through the storage of the solid waste generated from combustion. In addition, the condensation method uses substantial amounts of cooling water to produce electricity, and so the Group's activities have an effect on every part of the environment.

Complete combustion of the fuel generates CO_2 and H_2O, and, depending on the features of the fuel used, combustion may also emit NO_x, SO_2, CO, heavy metals, fly ash and smaller amounts of other compounds. However, the main combustion degradation products make up the majority of the environmental impact.

SO_2 is generated by the oxidation of sulphur when fuels containing sulphur are burnt. NO_x is generated by the oxidation of organically bound nitrogen contained in fuels, and nitrogen contained in the air may also oxidise during high-temperature burning processes. Like SO_2, NO_x gases are acidic and cause acid rain which has a serious impact on the natural environment and causes changes in the communities of species in the surrounding areas. Coniferous forests and certain plants are especially sensitive to acid rain and may be destroyed by it. In addition, nitrogen is an important nutrient in nature and therefore NO_x emissions cause the proliferation of vegetation, or eutrophication in bodies of water. Both gases are mostly local pollutants whose impact is felt within a limited distance from the pollution source (the chimney) and depend on climatic conditions and therefore have no global impact. N_2O is a greenhouse gas with a global effect, but its share in the total volume of NO_x is insignificant.

As the combustion of fossil fuels is based on the oxidisation of carbon, CO_2 is a major product of the degradation of organic matter in the combustion process. CO_2 is a gas that

is produced as a result of life processes – with every breath, all of us release a certain amount of CO_2. It could be said that people use one part of the organic substances they consume to build their bodies and burn the rest for energy. CO_2 is an important element in photosynthesis and the creation of biomass. As a result of human activity considerably more CO_2 is released today than the carbon cycle is able to consume, and therefore the stable carbon circulation process is out of balance. When fossil fuels are burnt in large amounts, the carbon that has so far stayed out of the cycle is introduced into it. According to the best knowledge available today, CO_2 is considered to be one of the causes of global warming, or the greenhouse effect. This claim is based on a rapid rise in atmospheric CO_2 detected in the last decades in conjunction with a rise in temperature on Earth and the melting of glaciers, which are mainly attributed to human activity. Various economic and political measures have been taken to reduce climatic change at both European and global levels. Estonia has ratified the Kyoto Protocol and all four large production units of Eesti Energia are part of the EU greenhouse gas emission trading system.

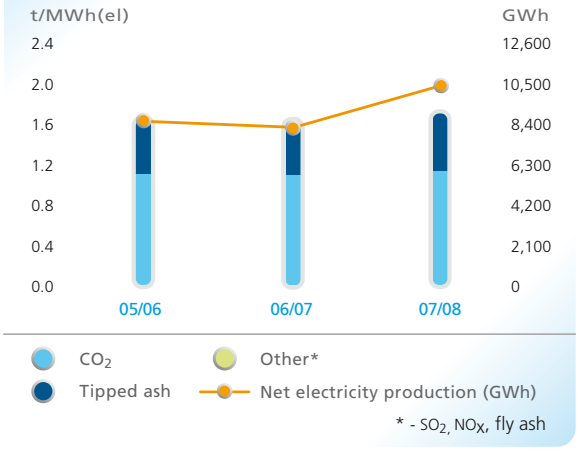
Fly ash is mainly generated by burning solid fuels and is the only atmospheric pollutant that can be seen with the naked eye. Heavy metals are also mainly released into the environment through fly ash. According to the latest studies, the emission of the finest particles with a diameter of 2.5 micrometers or less is the most hazardous for humans. The fly ash released into the air causes respiratory disorders and pulmonary diseases, and these have made it necessary to limit solid particles or fly ash concentration in the layer of air closest to the ground. Fly ash generated by burning oil shale is alkaline and the oil shale fly ash released into the environment reduces the acidity of the environment and thus alleviates the environmental impact of acid rain. The discharge of alkaline fly ash may be one explanation as to why there is no acid rain in Ida-Virumaa. This claim is also supported by environmental studies performed in the area of influence of the Narva power plants.

In the financial year 2007/08, Eesti Energia power plants released a total of 70,342 tonnes of SO_2, 12,191 tonnes of NO_x and 12,530 tonnes of fly ash. All these absolute quantities are higher than in the previous financial year, but given that production volumes have also increased considerably, the emissions have actually decreased per energy unit produced.

The majority of the total emissions are from the Eesti and Balti power plants, which also have the highest production volumes. The main reason for the drop in atmospheric emissions, especially for CO_2, is the two new Circulating Fluidised Bed (CFB) based boilers at the Narva power plants, while the quantities of fly ash released into the atmosphere have been successfully reduced by the use of more efficient filters. Besides using more efficient filters, the level of emissions per production unit can be reduced by increasing production efficiency, with the resulting lower fuel consumption allowing more energy to be produced from the same amount of fuel. The fluidised bed boilers are more efficient than the earlier pulverised firing technology based boilers and use less fuel to produce the same amount of energy. Electricity produced from oil shale has been made less CO_2 intensive through increased efficiency, and the lower combustion temperature used in the fluidised bed boilers and the resulting lower degradation level of the carbonates (limestone) contained in oil shale. In addition to the existing energy blocks, a new and modern natural gas based peak load reserve boiler has been established at the Balti power plant in order to guarantee the stable provision of heat to residents of Narva. In order to ensure the constant monitoring of all emissions and a satisfactory level of response to them, an emission monitoring system was set up at the Narva power plants.

Iru power plant, which was also originally intended to use liquid fuel, is currently running 100% on natural gas, which is a non-renewable fossil fuel but is also the least environmentally harmful and most efficient non-renewable fuel. As the production volumes and total installed capacity are smaller than those of the Balti and Eesti power plants, the absolute amounts of exhaust gases (mostly NO_x) emitted by the Iru plant are smaller. Despite the use of natural gas, the atmospheric emission values of the Iru power plant did not meet EU requirements and therefore major investments have been and will be made to ensure compliance with all EU environmental requirements. In the financial year 2007/08, the gas burners of one energy production unit were replaced by lower environmental impact burners, which ensure lower NO_x levels. It is also planned to replace the automated control

EE Group's special emissions and net production



equipment of the energy unit in the near future, which should ensure the more efficient use of the unit. The new equipment coming online will significantly reduce the levels of harmful emissions discharged during the production of heat and electricity, increase the efficiency of energy production and ensure that activities conform with EU environmental requirements.

Like the Narva power plants, the Ahtme power plant uses oil shale as fuel, but is considerably older. Due to the non-conformity with the EU environmental requirements of the old boilers currently in service, and the unreasonable economic cost of renovating them, the Ahtme power plant will be shut down at the end of 2010. However, in order to ensure electricity production and the continued provision of heat to the residents of the area, preparations are currently being made to construct a new biomass and peat based production unit that would meet all the environmental requirements. The emission gases and pollutants discharged from the current Ahtme plant are similar to those generated in Narva, but the quantities are considerably smaller as the production capacity is smaller.

Treatment of Solid Waste

Analysis of the amount and type of emissions generated in the Eesti Energia production process shows that the treatment of solid waste plays a major role. In addition to gas, a greater or lesser amount of mineral waste or ash is formed whenever any fuel is burned. A peculiarity of oil shale is its high mineral content, meaning that around 45–50% of the original mass is left after combustion. The ash created at the Narva and Ahtme power plants is deposited in ash fields next to the power plants, and only a small proportion is re-used. Hydro-transport is used to convey large quantities of ash, that is, ash is mixed with water and pumped to the place of storage. Experience has shown that this transport system offers the highest reliability.

As a result of the thermal degradation of carbonates, oil shale ash contains a high concentration of calcium oxide (CaO), or quicklime, which reacts with the transport water in a process known as slaking and renders it strongly alkaline, and for this reason oil shale ash is classified as hazardous. Today, ash is transported in closed systems, where the transport water circulates several times and does not come into contact with the environment. However, the balance of the transport water system is affected by precipitation. Surpluses of water created by precipitation are neutralised and processed as required, then rerouted to the environment in accordance with the terms and conditions specified in the environmental permits. Although the system is closed, the large quantities of strongly alkaline water (with pH up to 13) circulating in the ash transport system pose a risk of environmental pollution, especially if water were to be released into the environment as a result of an accident or technical problem. Both the transport system and the safety of storage areas have been improved in order to reduce this risk.

Compared to the original plans, production volumes have diminished considerably at Balti power plant and therefore the plant no longer needs two ash fields for storing oil shale ash. Balti power plant's ash field No 2, which has not been used since the end of the last century, will be closed with EU financing in order to manage environmental risks. A wind park with a capacity of about 35 MW will be erected on the area of the closed ash field in a safe manner. In the existing operating ash fields we are working hard to bring ash removal and storage into compliance with the Best Available Technology (BAT) which would also ensure compliance with EU requirements regarding waste depositing. Compliance must be achieved by the summer of 2009 at the latest, when Estonia's transition period will end. Over several years, various technologies have been tested and the superiority and high reliability of the chosen technology has been proven. In order to become the BAT, the security and environmental safety of the ash storage fields and the systems for processing and re-circulating transport water to the power plants need to be improved. Not only has the system been tightened against leaks, but CO_2 has been used instead of the formerly used strong acids to neutralise the surplus water drained out of the system, and this provides much more environmentally sustainable results. We monitor the safety of the ash fields constantly. The environmental impact of the ash fields is monitored through the groundwater monitoring bore well network and the monitoring is performed by an independent third party, the Geological Survey of Estonia.

Oil shale ash may be used as a raw material in various ways, and not only deposited in storage sites. The Narva power plants are keenly investigating economically reasonable ways to use it, aiming to increase the recycling rate of ash. Currently about 2-3% of oil shale ash is used in the production of cement and building blocks, but oil shale ash has also been used for neutralising acidic soils. Ways are being explored of using oil shale ash as a road embankment stabiliser in road construction, a filler material in underground oil shale mines, and a cement substitute in projects for stabilising contaminated soil and immobilising pollution.

In contrast to the decomposition of carbonates taking place in combustion processes, it is, in principle, possible to bind a certain amount of CO_2 to the oil shale ash contained in smoke. Binding CaO, a hazardous substance found in oil shale ash, with CO_2 in stable carbonates will stop the creation of strongly alkaline contact water, and make the ash inert. A material with such properties can be used in re-cultivating mines or quarries or in other construction projects, and thus

the amount of oil shale ash recycled can be significantly increased. At the same time, CO_2 which is otherwise emitted into the environment can be bound into a minerally stable compound, and this represents the removal of CO_2 from the emissions. No pilot testing unit is complete as yet, but preliminary research is being carried out and Eesti Energia thinks this solution is interesting and has great potential.

Water and Renewable Energy

Water is used as a cooling liquid in power plants working in condensation mode and as a heat-carrier in co-generation power plants. In addition, Eesti Energia's production companies also use water for transporting ash (see above).

Natural surface water from nearby water bodies is generally used in all power plants. If cooling water resources are limited, semi-closed cooling systems are used, which need less water than through-flow cooling systems because of their water circulation. When cooling water is used, the environmental effects include a rise in the temperature of surface water as a result of the re-routing of the cooling water back into the environment. The cooling water used by the Narva power plants raises the temperature of surface water by an average of up to 7 degrees a year. The new CFB technology will also reduce the amount of water necessary for cooling. When water is used as a heat carrier, it has to be chemically treated first, and this may have an environmental impact if chemicals leak into the environment should treatment fail to follow the requirements.

The main environmental impacts of transforming flowing water into energy at hydroelectric power plants include the obstruction of water flow and the natural movement of water fauna; restrictions and problems related to the use of land; and hindrance to the movement of fish, especially rare species, to their spawning areas. Eesti Energia has only restored existing old hydro plants, always performing a thorough environmental impact analysis. No new dams and catchment ponds have been built and the existing ones have been renovated in line with all requirements with a minimum of disruption to the environment. Any disruption in the course of construction work has been compensated for by corrective environmental action to the rivers affected, such as releasing young fish and other similar measures.

Other Environmental Impacts

One of the most common environmental impacts of wind energy is the danger of wind turbines to birds and bats if the wind turbines have been installed on their flight paths. Wind turbines also have an aesthetic effect as such installations may not suit every landscape. When locations for wind turbines are chosen the danger of ripple and screen effects and of noise (low frequency noise) and vibration has to be taken into account. In order to avoid these problems, a thorough environmental impact assessment is carried out before the construction of a wind park, identifying the potential risks and measures to alleviate them. The wind turbines used by Eesti Energia today and in the future conform to all current and known future environmental and health protection legislation.

Environmental Impact of Electricity Transmission

After the primary energy has been transformed into a more suitable form, the transmission of the transformed energy, i.e. the transport of energy to consumers via high and low voltage lines or heating pipes, also has an environmental impact. The environmental effects of electricity transmission relate to land use issues and the physical properties of electricity transmission. For heat the issues generally relate to the presence of physical pipelines in the human environment.

Jaotusvõrk has a total of about 59,000 km of transmission lines, of which about 49,600 km are overhead lines, and about 19,000 substations. Põhivõrk has about 5,300 km of high voltage overhead lines and about 140 substations. Kohtla-Järve Soojus and Narva Soojusvõrgud have a total of 350 km of heating networks.

One of the largest groups of effects are the restrictions on the use of land underneath the electricity transmission and distribution lines, as this land has to be properly maintained. It is necessary to establish sufficient protection zones free of trees around the lines to ensure their safety and reliability. In addition to usage restrictions, overhead lines and substations are visually unappealing and it is often necessary to cut down forest or carry out excavation work in order to build them, which reshapes the natural setting significantly.

Underground cables may also be used for transmission lines, reducing the problems of strict line zones and visual pollution, but there are still restrictions around the cable lines. Today, line protection zones are made exactly as wide as required to ensure safety and reliability, avoiding the unnecessary felling of trees. In addition, new and more efficient line zone maintenance technologies are being tested and the use of the biomass produced in line zone maintenance for energy generation is being considered.

Apart from lines, substations are important components in the transmission process. Equipment in substations produces noise in the surrounding area, which can be reduced by construction and technical solutions. In addition to this, transformer oils are used as an insulator in substations. If there is a leak or accident, there is a danger that the oil may disperse into the environment and contaminate surface and groundwater. Transformer oils are often associated with environmentally harmful substances such as the PCBs and PCTs used in the past. Both Põhivõrk and Jaotusvõrk keep records of all the equipment containing PCB or PCT and all of this equipment will be disposed of in accordance with requirements by 2010. Eesti Energia has also performed soil and groundwater analyses at substations using PCB and PCT equipment. Soil contamination was discovered at only one substation, where it has been eliminated in accordance with requirements.

Transmission substations also use a small number of gas switches, which are generally less environmentally harmful than oil switches, although special requirements apply to the handling of gas switches, as they contain gases that cause climate change.

As they are in other electrical processes, electromagnetic fields, which may have various effects on living organisms, are created in the immediate definable vicinity of high-voltage transmission lines and substations. Many studies have been conducted into their effects, but no conclusive answer has been established as to the precise effect that the electromagnetic fields created around substations or high-voltage lines have on living creatures. To reduce the possible effects of electromagnetic fields on humans, restrictions have been established on development in the possible danger zone or in the maintenance zone. Underground cables also produce an electromagnetic field, but a smaller one.

In order to prolong the useful life of the pylons used in the transmission process, they are treated with special impregnation agents, as a result of which old pylons become hazardous waste. Eesti Energia has taken measures to dispose of this waste in accordance with requirements, and has, among other things, reached an agreement with the line repair company that collects the old pylons. Pylons are impregnated in accordance with EU environmental requirements and Eesti Energia has started increasing the use of impregnation agents that are less harmful to the environment. Eesti Energia and its subsidiaries do not impregnate the pylons themselves, but purchase them from suppliers with the required marking and consignment documents.

Constant systematic work is being carried out to alleviate all of the environmental effects of transmission. A more stringent and thorough set of rules for maintaining lines and clearing forest has been adopted and in order to improve the quality of line maintenance, the company works with the State Forest Management Centre (Riigimetsa Majandamise Keskus - RMK). For private forests, negotiations are held with various interest groups in order to find and implement solutions that satisfy

all parties. More and more overhead lines are being replaced with cable lines, especially in cities and towns, thus avoiding visual pollution problems, but certain restrictions on land use still remain. When substations are built, the use of more compact and quieter equipment is favoured, reducing the size of substations.

With oil based equipment a shift is also being made to environmentally safer solutions, and if this is not possible, the appropriate security systems are built in the form of safety pools, oil separators and collectors. In the financial year 2007/08, over 0.1 million euros was invested in the safety of oil based equipment.

Environmental Impact of Sales and Consumption of Electricity

An important role in the chain of power production is also played by the consumption of electricity, or how customers use the energy transmitted to them. The potential for energy saving in Estonia is high and it is considered an important way to solve the energy supply problems arising from growing consumption. It is estimated that Estonian consumers could use at least 20-30% less energy by consuming more economically and reasonably. In addition to reducing the amount of pollution caused by production, energy saving also helps in planning production processes more efficiently.

Those who are interested may find information about ways of saving energy and related technologies and measures from Eesti Energia's extensive internet portal at kokkuhoid.energia.ee. The portal offers useful information for corporate and residential customers and major consumers who are interested in saving money and the environment through more efficient use of energy. The page also contains articles about insulation, lighting, heating systems, more efficient electrical equipment and the development of pricing components. Eesti Energia plans to supplement the energy saving portal even more and make it more user friendly in the near future.

In the financial year 2007/08, Eesti Energia carried out several energy saving awareness projects for the general public. In cooperation with Estonian daily newspapers, special supplements were published on energy saving and an awareness raising project for young people was run in cooperation with MTV. Materials on energy saving were distributed to customers both in customer service offices and via the internet. Eesti Energia also gave various presentations on this subject at seminars and conferences. Through the Future Energy Foundation, Eesti Energia supports the development project of Tartu University Institute of Technology to systematise the wider distribution of information about the construction of passive houses. The project should produce a variety of study materials as well as one publicly used building applying passive house principles.

Eesti Energia's customers can still buy Green Energy, which is electrical energy produced from 100% renewable energy sources. Green Energy is produced in compliance with all environmental requirements, and by buying it customers support research into the development of renewable energy in Estonia.

Following the introduction of the renewable energy charge imposed by the state from 1 May 2007, the earlier system based on consumption amounts needs to be reviewed and adjusted to the new circumstances. The aim assumed in the adjustment process is to make Green Energy a subsidy based project, distributing the amounts collected to future generation projects and to making the current production process more modern and environmentally sustainable. The plan is to make the option of joining Green Energy available to those companies and private persons who are not directly Eesti Energia's electricity consumers, but still wish to support environmentally based principles and activities. In the longer term, Eesti Energia wants to offer consumers the option of starting to use energy produced entirely from renewable energy sources in their households and businesses. In addition, the law already motivates companies that produce electricity from renewable sources to seek direct relationships with consumers. All this should prepare us for the opening of the electricity market in 2013 and help educate consumers about environmental issues.