ENVIRONMENTAL REPORT

Despite the massive efforts by countries and companies to switch to renewable sources of energy, the modern energy industry is still mostly based on fossil fuels as the source of primary energy. The electricity, heat and liquid fuels we consume all impact the environment in many different ways, the main ones being the use of land and resources, the generation of waste, the emissions of pollutants to air and water and certainly the aggregated impact of all this, which is seen in climate change.

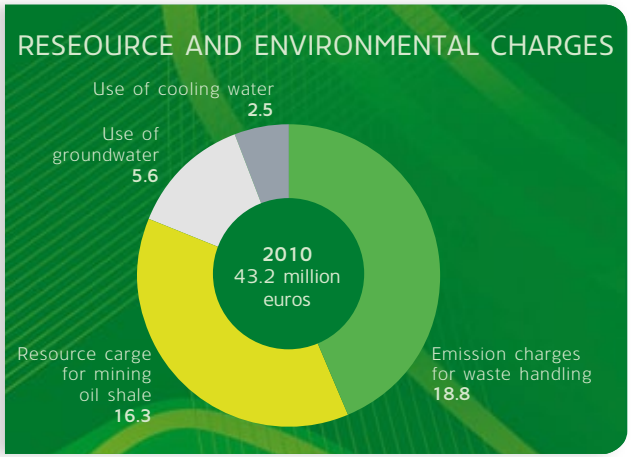
The situation in Estonia is not much different from that in the rest of the world. In order to lower our environmental impact, Eesti Energia takes important and expensive steps every year to increase the use of renewable resources, help to reduce environmental emissions and enable a more efficient use of our natural resources. Making our customers more aware of environmental sustainability is also important to reduce the overall environmental impact.

The basis for Eesti Energia's systematic environmental activities are the common principles laid out in the Group's single environmental policy:

- We use environmental management systems that conform to the international standards ISO 14001 and EMAS.
- We follow all relevant Estonian, European Union and international environment laws, conventions and agreements.
- We analyse the environmental impact of our everyday activities and any new project before starting it, and we look for technically innovative ways to reduce the negative environmental impact and to increase efficiency and the recovery and recycling of materials.
- We are reducing the CO_2 intensity of our produced energy for our clients. To do this we are diversifying our production portfolio and increasing the share of renewable sources of energy, using the best available techniques as far as is technically and economically possible.
- We are open to new solutions. We work with Estonian and international research institutions and consultation firms to achieve our environmental objectives.
- If all other conditions are equal in procurement tenders, we prefer suppliers with certified environmental management systems who use environmentally clean technologies and materials.

No human activity is ever completely without environmental impact. The best we can do to alleviate our impact is to carry out constant and conscious analysis of our activity and choose methods that have the lowest environmental impact possible.

In the past financial year Eesti Energia paid a total of 43.2 million euros in resource and environmental charges. The biggest environmental protection investment last year at 46 million euros was the instalment of DeSOx desulphurisation systems that aim to reduce air pollution in the Narva power plants. Several major investment projects to increase the environmental safety of waste handling and the recovery of waste are in the preparatory stage.



Eesti Energia primarily uses oil shale, a non-renewable fossil fuel source of energy, to produce electricity, heat and liquid fuels. The mining of Estonia's local source of primary energy does offer high security of supply and has a reasonable production cost, but causes specific environmental problems that countries importing primary energy do not have.

The generally widespread consequences of burning fossil fuels are added to mining environmental impact. The domestic environmental impact is felt in the use of resources, air pollution and waste handling, while on a global scale the high emissions of the most widely known greenhouse gas CO_2 and its possible effect on climate change are certainly added to this. We have set ourselves the long-term goal of considerably decreasing our emissions of greenhouse gases from production activities. The aim is to cut the relative importance of CO_2 emissions per MWh of electricity produced by 30% by the year 2015 compared to 2007. In order to achieve this goal we have introduced the oil shale and biomass co-incineration in electricity generation and developed this technology further , broadened the production of wind energy in a sustainable way, increased the importance of combined heat and power (CHP) generation, and taken other steps to diversify our generation portfolio.

In order to supply our customers with the electricity we generate, the total length of our electricity lines is enough to circle the world almost 1.5 times. In order to guarantee the distribution of electricity without failures, limitations of use are placed on the land under the power lines. Trees and shrubs under the power lines cannot grow too high, and every year considerable clearing work is done in order to maintain the land under the electricity lines.

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Electricity distribution uses equipment containing oil. In 2010 we continued rebuilding work of the spill container basins around our oil containing equipment to cut the risk of pollution in the leaks situations. In the past year we also disposed of the last equipment containing environmentally dangerous PCBs and handed it over to a specialised waste handling company. We continue to work to lower the environmental impact of our waste handling and to increase the proportion of our waste that is recycled.

An important role in diversifying Eesti Energia's production portfolio is played by the use of renewable sources of energy. However, even with new renewable sources it is important to be certain that they will not damage the environment. People's attitude towards these projects has changed as interest in the development of renewable energy projects increases, All types

of development have become more complicated due to the progressing NIMBY syndrome by local residents, which limits the range of potential sites and raises the cost of development.

To lower significantly the burden we place on the environment, energy generation and consumption have to work together. Our clients need to understand the environmental consequences of using energy and help maintain sustainable growth for the energy industry through responsible consumption. We have widened our promotion of energy audits and thermal imaging to our clients and we issue energy labels to support energy saving. We are using our successful Green Energy product to encourage the wider use of renewable sources of energy by our clients. In 2010 the number of clients specifically using Green Energy in Estonia rose to 3700, who between them in the year consumed a total of 34 GWh of specially bought renewable energy. To raise awareness of environmental issues we continue to sponsor the Energy Discovery Centre in Tallinn and at the end of 2010 we started to sponsor the work of the Looduse Omnibuss nature conservation organisation.

Land and Resource Use

Eesti Energia uses significant amounts of various resources in its work, just like any other energy company. The main resource we use to generate power and heat and to produce liquid fuel is oil shale. We ensure the diversity of our energy portfolio by constantly increasing the use of other sources of energy, such as wind, biomass and retort gas. Usage of water and land is unavoidable for a company operating across the whole energy chain.

Use of Energy Sources

In the past year Eesti Energia was again the largest energy company in Estonia, and oil shale remained the main source of primary energy in generating electricity, heat and liquid fuel. In this financial year Eesti Energia consumed 14.2 million tonnes of oil shale, 267,652 tonnes of biofuels, 123.6 million m^3 of natural gas and 59.8 million m^3 of retort gas in our business. From these sources we produced a total of 11,823 GWh of electricity, 1676 GWh of heat and 190,448 tonnes of shale oil. In total around 2% of all the fuel consumed was biofuel.

We are pleased to be able to say that despite various changes to rules and subsidy mechanisms, we have kept biomass at the same level within our energy portfolio. We plan to continue this trend as far as is economically rational, and will make the investments necessary for this. In addition to biomass, the renewable resources we use for generating electricity include also wind and, to a small extent, water. By 2013 we will have started the combined

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production of heat and electricity using mixed municipal and industrial waste, that also lessens the environmental impact of Estonian municipal waste management.

Oil Shale

Eesti Energia's primary energy resource is still oil shale. We are mining the oil shale which we need to produce heat, power and liquid fuel in quarries and underground mines. We also sell oil shale to other Estonian producers of liquid fuels and construction materials.

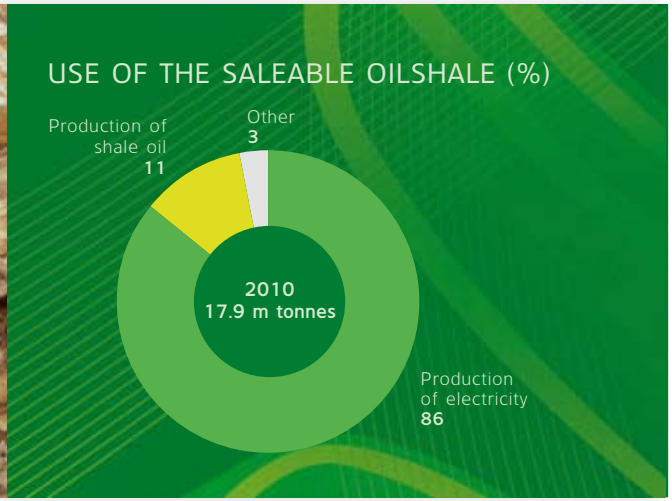
In this financial year we mined a total of 14.0 million tonnes of oil shale geological resource, of which 17.9 tonnes reached consumers after processing. The majority, or 14.2 million tonnes, was used in the power plants in Narva and Ahtme to produce electricity and heat, while 1.7 million tonnes were used in our oil plant to produce liquid fuel. In addition, we sold oil shale to other consumers outside the Group, with 1.8 million tonnes going for liquid fuel production and 88 thousand tonnes to the construction materials industry.

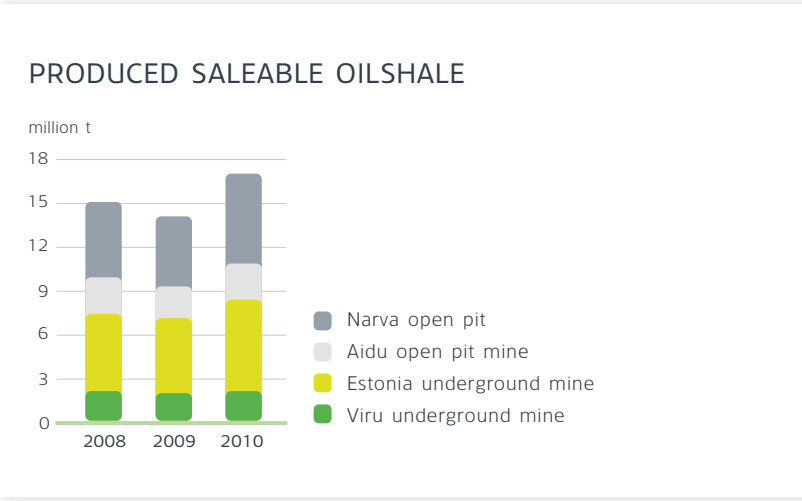
Biomass

Diversifying our production portfolio in order to lower our environmental impact is one of Eesti Energia's key environmental goals. Biomass is one of the best solutions for ensuring the security and availability of supply.

Modern combustion technology is becoming ever more flexible, and it allows different types of fuel to be burned at the same time in one boiler. The Balti and Eesti power plants near Narva use two circulating fluidised bed energy units which have this flexibility and so some of their oil shale fuel can be replaced with biomass. If it is suitably prepared, biomass can also be burned to a lesser extent in furnaces that use pulverised combustion technology.

A consequence of the new renewable energy subsidy system, which came in on 1 July 2010, was that it halved the use of biomass as a fuel being burned together with oil shale during the past financial year. At the start of 2010 we were burning biomass in the circulating fluidised





bed energy units of both the Balti and Eesti power plants and were preparing to switch our pulverised fuel boilers over to a large degree, but from the autumn it was only the Balti plant when working in CHP mode that used biomass. At the same time we have initiated additional investments in the Balti power plant to increase the use of the biomass as a fuel. The new circulating fluidised bed boilers being built in Narva in the near future will also allow for burning biomass alongside other fuel.

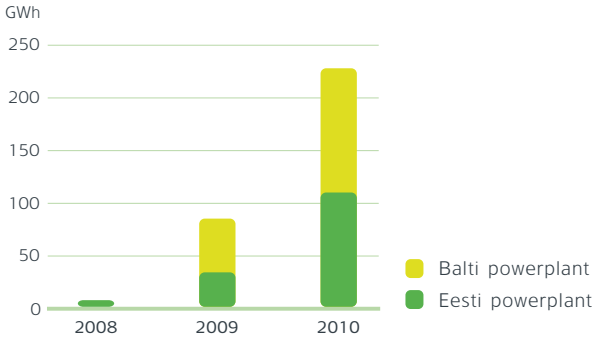
In the past financial year we produced from biomass 110,539 MWh electricity in the Eesti power plant and 118,553 MWh of electricity in the Balti power plant. The biomass we use continues to be primarily wood, as it is economically and technically the most reasonable option, and it needs the fewest technical changes in our system. For biomass to be usable on a large-scale, a good-quality stable supply network needs to be set up. Our largest biomass supplier in the past financial year was the State Forest Management Centre (RMK). Steady supply networks have also been set up with other, smaller suppliers. We have a clear strategy for the next few years to research and develop the potential for using the biomass that is on our own land.

Our power plants are capable of burning wood chips, wood pellets, wood briquettes, sawdust, wood chippings and other waste wood that is free of hazardous materials together with the oil shale. Other types of biomass could also be used, though no large-scale test burning has yet been carried out into this. It is very important that the quality of the biomass is monitored constantly.

The advantages that biomass offers over oil shale include its higher heating value of 9.98 MJ/kg, compared to around 8.4 MJ/kg for oil shale, and its significantly lower ash content of around 1-2%, compared to 45% for oil shale. Burning biomass also creates substantially lower SO_2 emissions, which is important for the environment.

As biomass is a renewable energy source, it has been agreed that the CO_2 emissions from burning it are not considered. This means that using more biomass to replace oil shale will help lower the CO_2 emissions of our electricity generation.

USE OF BIOMASS
IN ELECTRICITY GENERATION



Other Fuels

As well as oil shale and biomass, Eesti Energia also generates heat and power using natural gas and retort gas, liquid fuels, wind and water. From 2013, mixed municipal and industrial waste will be added to this list as we plan to start using it to generate heat and electricity.

The fossil-fuelled Iru power plant, with lowest environmental impact in the Eesti Energia

Group, generated electricity and heat from 115.5 million m³ of natural gas in the past financial year. Natural gas is also the main fuel of the reserve boilerhouse at the Balti power plant near Narva, which is used to ensure the supply of heat to Narva. The boilers of the Eesti power plant near Narva burned together with oil shale 59.8 million m³ of retort gas, which has a high heating value and is a by-product of the liquid fuel production process.

We mainly use liquid fuels as reserve fuel in electricity generation and for pre-heating the boilers at the power plants. The main fuels are shale oil and fuel oil. In summer, when the demand for heat is low, we use liquid fuel instead of oil shale for generating heat in the Ahtme power plant. In the past financial year we consumed a total of 13,448 tonnes of liquid fuels.

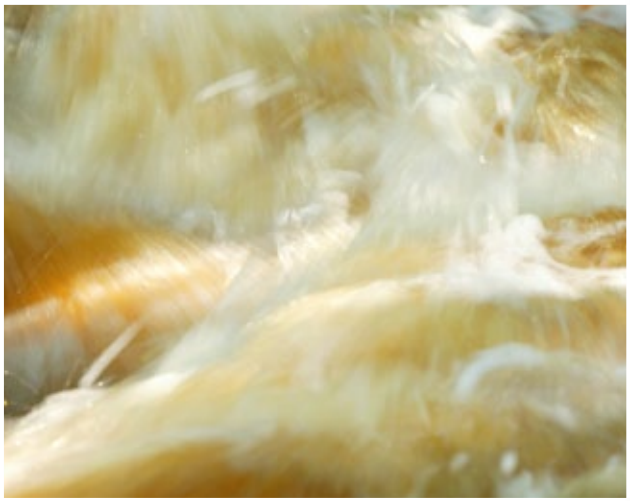
As part of our increasing diversity of sources of energy, we have been looking more and more into using municipal and industrial waste, which has a heating value equal to or even exceeding that of oil shale. It is calculated that about 300 thousand tonnes of municipal waste and some industrial waste still make it into landfills each year, enough to fuel about 50 MW power plant a year. During the recession the amount of waste produced fell, but as the economy recovered last year, so did the amount of waste. Active recycling efforts need to be accompanied by an increase in energy generation from waste to help cut the amount being stored in landfills.

As part of our programme to diversify our energy sources and lower our CO_2 emissions, we plan to build a new energy unit fuelled by unsorted municipal and industrial waste at the Iru power plant, which has so far only operated on natural gas. New unit will be able to produce 17 MW of electricity and 50 MW of heat. We signed the construction contract with the French company Constructions Industrielles de la Méditerranée in March 2010. This will be the first waste to energy unit in Estonia or the Baltic states, and so the preparation time is a little longer than otherwise, and the new generating unit will be completed in 2013.

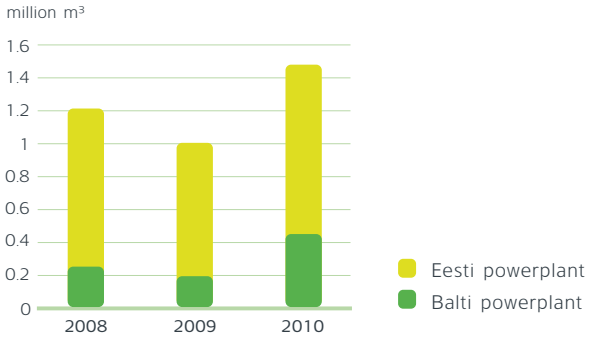
Water Use in Generating Energy

Eesti Energia is Estonia's largest consumer of water. We mainly use water as cooling water in power plants. Also pumping of water during mining is classified as water usage. A smaller volume of water is also used by Eesti Energia's two working hydro-power stations, the 1.2-MW Linnamäe and 365-kW Keila-Joa hydro-plants, and will also be used by the hydro-power station currently being renovated in Põltsamaa.

Water used in power plants for cooling and technical purposes depends directly on production levels. We draw the water for the operation of the Eesti and Balti power plants near Narva from the Narva river; for the Ahtme power



USE OF COOLING WATER IN ELECTRICITY GENERATING



plant from Konsu lake; and for the Iru power plant from the Pirita river. It is possible to lower somewhat the amount of water we take from the environment. At the Iru power plant the cooling water circulates through a cooling tower in order to reduce water consumption in condensation mode. At the Ahtme power plant and the new peak-load boiler plant, we have carried out research into using the water that collects in closed underground mines and is otherwise unused instead of the surface water we currently use.

In the past financial year we used 1.6 million m^3 of cooling water in our power plants and 162,520 m^3 of water for other purposes in generation.

When surface water is used for cooling and technical purposes or as a source of energy in hydro-electric power plants, the question of increasing its volume becomes very important, as does minimising the environmental impact of this and increasing safety in general. The renovation project for the Põltsamaa hydro-electric plant includes the reconstruction of the fish ladders, and this is also important for the Linnamäe hydro plant. In the past financial year the rebuilding project for the Nehatu dam on the Pirita river was made. The dam is needed to protect the water supplies for the Iru power plant, and rebuilding it will make it safer and allow access for fish. The project is being primarily funded by the EU.

Use of Land

Eesti Energia's distribution network uses a lot of land, but mining and wind parks also have an impact on land use.

Power Lines

Eesti Energia distributes electricity to customers practically everywhere in Estonia. Most of the distribution lines are overhead lines, a total of 47,336 km, while there are also 13,239 km of underground cables. As we prefer using underground cables than overhead lines, the share of underground lines is growing. Overhead lines require wider safety corridor than underground cables, and it varies with the voltage they carry. For example, for 35 kV overhead lines land use is restricted in a corridor of more than 50 metres, while the corridor for underground cables is only two metres wide. Besides their narrower protected zone, underground cables also have the advantage that their operating reliability is better and they don't have any other environmental impact.

The corridors of overhead lines must regularly be cleared of trees and brush. Each year, we do clearing work on land under about 3000 km of lines. The clearing work is coordinated with the land owners and follows all environmental restrictions.

We clear the wood manually with saws and trimmers and with machines such as tractors and mechanical brush-cutters. The felled trees and brush are the property of the land owner, and we cut the timber to the size agreed with each land owner, but the land owner is then responsible for organising further transport. Land owners are becoming more and more interested in collecting the branches, tree crowns and brush left as waste from cutting for use as biomass. If a land owner does not need the brush, we leave it heaped tidily by the edge of the clearance after the work is done.

Quarries

Mining in quarries has a significant impact on the landscape. For this reason we work constantly to recultivate and restore mined areas, as this can even make the restored land notably more valuable than it was before. We plant forests on recultivated quarries and we have also made artificial lakes and even farmland. The Estonian Defence League uses restored quarries as a training area. The planned closure of Aidu quarry is creating a large restored area which will contain a rowing centre, a leisure area, possibly a wind park and other features. It is also important to consider whether the restored and reforested quarry areas can be used as a good site for growing biomass.

The largest Estonian wind parks are currently under development on the mainland but the idea of building wind parks in the sea continues to be discussed.

Wind Parks

The largest Estonian wind parks are currently under development on the mainland but the idea of building wind parks in the sea continues to be discussed. Producing electricity from wind on land generally requires a lot of land, because the wind generators are large machines and they cannot stand too close to each other. Wind parks are mostly built on empty farmland or similar territory, and European experience, for example from Denmark, shows that it is possible to use the territory of former wind parks for agriculture, among other uses. The main limitation on the development of wind parks is their noise and the visual interference they create for people. Eesti Energia's wind parks adhere strictly to all applicable limits.

Making Our Use of Resources More Efficient

Enhancing Oil Shale

- We are analysing more deeply than ever the possibilities for enriching oil shale in the project and development work for new oil shale mines, by ordering work from Estonian research institutions.
- We are trying to put more focus than ever on extracting more value from oil shale by producing liquid fuels. By starting to use the new Enefit-280 technology we will significantly reduce environmental discharges and increase the efficiency of the production process. Producing liquid fuels creates less greenhouse gas emissions per tonne of oil shale than does producing electricity from oil shale, as the majority of the carbon ends up in the liquid fuel and is not released during the production process into the atmosphere as CO_2.

Restoring the Environment

- Each year, we restore just as much former quarry land as we use for mining. We reshape the landscape and restore mine areas as directed by local governments, and we usually reforest the area. After the State Forest Management Centre, we are one of the biggest planters of forests in Estonia.
- We hand reconditioned former mine areas over to the local government. Before the quarries are closed, we already start working together with various interest groups to ensure that the industrial landscape is transformed into a desirable living environment.
- We are preparing to close the Aidu quarry. After mining operations finish, it may become the first rowing centre in Estonia to meet international requirements, or a wind farm, or a shooting range for the Defence League volunteer reserve. The successful recultivation of Aidu shows that there are no permanently spoiled areas as a result of mining.
- Reclaimed former quarries could in future be important sites for producing biomass.

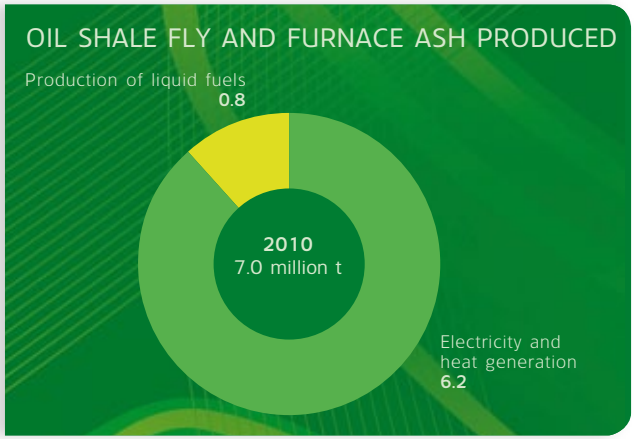
Use of Land Under Power Lines

- The land underneath the power lines used by Eesti Energia has great potential for growing biomass.
- To date the use of land has been slowed by the difficulty of access to the material and the high transport costs for reaching the place where the biomass will be used.
- The increase in the number of small-scale consumers of biomass and the general increase in its consumption will raise the potential of the land under the lines in future.

Waste Handling

Eesti Energia's primary energy source, oil shale, has a high mineral content, which generates a lot of waste when used and also in mining process. We are reducing the environmental impact of our waste handling operations and are looking for new ways to reuse the waste created in the production and generation processes.

Up to half of the mass of the oil shale used to produce energy is mineral rock. When we produce electricity or liquid fuels from oil shale, each tonne of oil shale we process creates up to half a tonne of mineral residue - ash, most of which is currently deposited in ash fields. The Balti and Eesti power plant ash fields near Narva are Estonia's largest waste handling sites and cover a total of 13 km^2. In the past financial year our activities led us to deposit a total of 7.0 million tonnes of oil shale fly and furnace ash. During the work to close the Ahtme power plant ash field, we reused 82,290 tonnes of the oil shale fly and furnace ash produced during electricity and heat production.



Oil shale is not found under the ground clean and isolated, it is mixed together with limestone. The rock that is mined is then enriched, and waste rock is created as up to 40% of the mined material is removed to raise the oil shale to the quality needed. In quarries, the residue from enrichment is transported back to the mining site and used for recultivation. In this case no waste rock is created. In underground mines, the enrichment residue is deposited onto heaps and this is classified as waste depositing. In the past financial year we deposited in enrichment residuals heaps a total of 3.4 million tonnes of waste rock created in the oil shale enrichment process.

As well as oil shale ash and mine waste, our activity also creates other types of waste, both hazardous and non-hazardous. For instance wood pylons impregnated with chemicals have been removed during maintenance and improvements to the distribution grid, and they are processed by licensed waste handling companies. We deposit waste containing asbestos and inert industrial waste created during the maintenance of major production machinery in our own industrial waste landfill, or we use the services of waste handling companies. In the past financial year, we removed a total of 250 tonnes of waste containing asbestos. We always use licensed waste handling services to process the hazardous waste we produce.

We are reducing the environmental impact of our waste handling operations and are looking for new ways to reuse the waste created in the production and generation processes.

Reducing the Environmental Impact of Waste Handling

Eesti Energia is the largest waste generating company in Estonia, and this demands that we

make great efforts to minimise the environmental impact of our waste handling operations. We follow internationally accepted principles for waste handling and are developing two parallel solutions, firstly to recover as much as possible from the waste we produce and secondly to reduce the environmental impact of the technical systems we use for the waste depositing.

It is obvious that the best option for the environment is to ensure that all waste is recovered, as this would remove the need to exploit new natural resources and would help avoid the negative environmental impact of dumping waste in landfills. However, full recovery is not yet realistically feasible, and so we are making sure that the waste handling systems we use have the lowest possible environmental impact by using the technology with the lowest environmental footprint.

Reducing the Environmental Impact of Oil Shale Ash Depositing

At both Narva and Ahtme, we are working to increase the environmental safety of our fly and furnace ash deposits. We are applying for European Union co-financing for the implementation of the two projects.

In the past financial year we finished preparatory work to increase the environmental safety of the oil shale ash storage fields near Narva. We had already found a solution in 2009 that would satisfy everyone, as hydro transport still proved to be the most reliable and economically justifiable solution. In hydro transport, the fly and furnace ash from the power plants are mixed with water and transported as a slurry to the processing zone of the ash field, where the solid material is allowed to settle so that the water can then be re-routed back to the transport system through an intermediate pond. In this process, the water also acts as a coolant and helps to stabilise chemically the material being deposited.

The best way to reduce the environmental impact of ash removal is to isolate the transport system from the environment thoroughly so that the transport water cannot infiltrate to the surrounding environment. To isolate the system, the transport water buffer pool under the ash field and the return water canals around the ash field are surrounded by retaining walls that extend down to the impermeable layer of bedrock. As production levels fall and the amount of ash produced falls, the size of the buffer basin next to the ash field of the Balti plant will be reduced to optimise the quantity of circulating water. As the chemical properties of the circulating water change during the transport process, the water can under no circumstances be directly released into the environment. To maintain stability in the system, the water being released is neutralised before it is diverted into the environment. To minimise the environmental impact of neutralisation, we have replaced a large part of the strong acid that we used previously with CO_2.

The ash depositing site at the Ahtme power plant has not been used since summer 2009. Using material produced in the pre-processing of the ash slurry, we will give the ash field the surface relief needed before its closure and this will be a case of reuse of material, not waste depositing. Current plans expect the Ahtme ash field to be finally closed in summer 2013 and preparatory work for this has already started.

Recycling Instead of Landfill

Eesti Energia's primary goal in waste handling is to increase recycling of waste. The large flows of waste which we currently send into landfills can be a valuable raw material. Making much more use of this resource than we have so far will lessen the negative environmental impact of waste depositing. It will also lessen overall need to develop new quarries for raw materials, which will make our use of irreplaceable resources more efficient and lower its environmental impact.

Waste Rock as a Valuable Raw Material

Oil shale enrichment produces a waste rock that contains limestone, which is widely used

as a resource. In quarries we use the enrichment residue for re-cultivating and landscaping the site, but the waste rock currently deposited in heaps in underground mines can be used as filler or gravel substitute in the construction industry. The largest use of it in the past financial year was the major reconstruction work on the Jõhvi bypass, partly financed by the EU. We sold a total of 389,775 tonnes of oil shale waste rock and 46,493 tonnes of sand removed during mining. As the material was of an appropriate quality for the road, we are hopeful that it can be used in other road construction projects in the future as well.

To increase the recovery of waste rock, the Aidu quarry and the Estonia mine have gravel production units. Together they are capable of producing up to 1.5 million tonnes of gravel, which is of better quality than unprocessed waste rock and widens the ways in which the raw material can be used. We continue to hope that a revival in the construction sector, the exhaustion of limestone deposits in the Tallinn area, and the complexity of opening new mines because of stringent environmental requirements will all combine to restore demand and growth in future.

While we are reusing as much as we can of the waste rock, we are sending the rest that we cannot process to waste rock heaps that can later be used as motor sport centres or other recreational areas. We have started the first of these projects near to the Estonia mine, where waste rock from the mine is being reused to make a motorbike track.

Oil Shale Ash as a Raw Materia

The chemical composition of oil shale ash gives it great potential as a raw material in many ways. The fly ash generated in power plants is already being used in cement production, but only a very small amount of the total produced is used in this way. It is mostly done in Kunda Nordic Tsement's factories, where a special portland cement is produced from our fly ash. Our efforts have also led to a small amount of oil shale ash being exported as a raw material as well.

The main factor that holds back the wider use of oil shale ash is the lack of standards and of experience in its use. To solve this issue, we have started several research and development projects which aim to increase the use of oil shale ash many-fold. For instance, in the past financial year we completed laboratory testing of a mixture of oil shale ash and waste rock that can be used for backfilling underground mines, and we will begin half-scale industrial experiments in our mines soon. The immediate goal of the project is to fill in underground mining chambers and make the ground more stable, but a more distant objective is to develop and deploy a lossfree mining technology that will ensure the stability of the surface of the ground.

In the past financial year we worked with our partners to develop a project for enhancing oil shale ash recycling with 1.1 million euros of funding from the EU LIFE+ programme. The project tested various mixtures of oil shale ash for use in road building, and we developed standards to control and describe the process. As part of the SMOCS project for countries from around the Baltic sea we are looking into the use of oil shale ash to stabilise the environmentally hazardous sediments that are removed during the dredging of ports, as this could be a major use for ash as cement replacement. We are working with Estonian scientists on using oil shale ash to neutralise acidic soils in agriculture and adding microelements to soil and on several other promising projects.

Our long-term goal for this is to increase tenfold the amount of ash recycled compared to today's levels. As well as researching all these possibilities we want to increase our capacity to remove ash without using water and to store and process it in dry form before sending it for reuse.

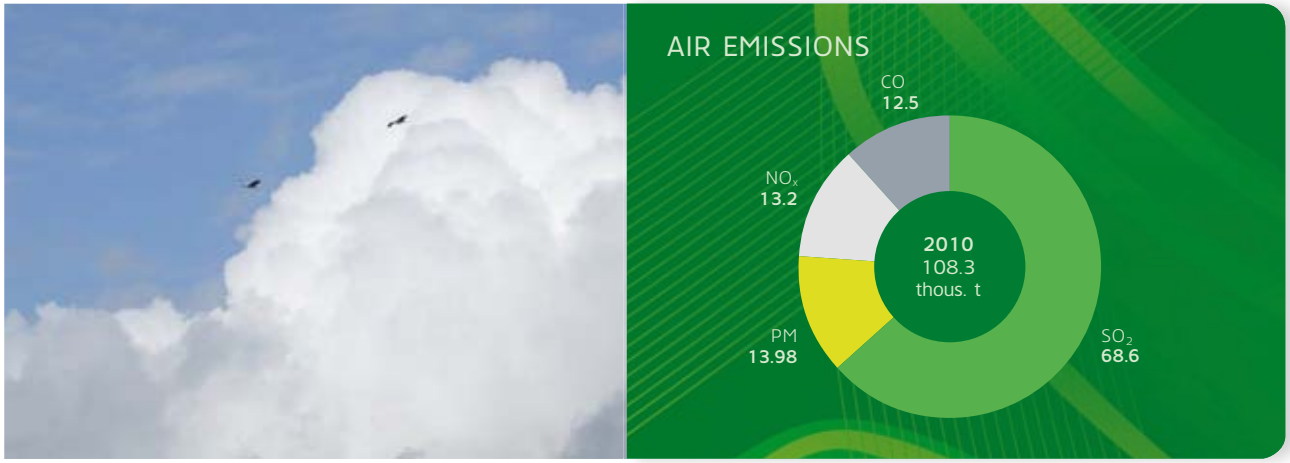
Air Pollution

Eesti Energia impacts air quality primarily by burning fuel during the process of generating electricity and producing liquid fuels. The main pollutants released are SO_2, NO_X, solid particulates and CO_2. Air pollution is also caused by heavy metals, CO and the volatile organic compounds that are released both in the production of electricity and liquid fuels from oil shale. To a lesser degree there is also air pollution from the explosives involved in mining and emissions from vehicles, but this is small-scale local pollution.

Reducing Air Pollution

People want a clean environment for living, and so environmental requirements for emissions of fluegases into the atmosphere have grown more stringent. The greatest task facing Eesti Energia in the next few years will be to reduce significantly the air pollution from each unit of electricity, heat and liquid fuel produced. Enhanced methods and investments will allow us to keep our electricity and heat production capacity at or close to its current level while reducing the emissions.

The first serious limits will come in in 2012 when restrictions are tightened so that our production plants will not be allowed to discharge annually more than 25,000 tonnes of SO_2. This means that emissions will have to be cut by half at least from today's levels.



From 2016, our production plants will have to conform to the environmental requirements of the EU directive for Industrial Emissions, which restricts the emissions of SO_2, NO_X and solid particles and which will oblige us to reduce our current emission levels significantly.

Narva Power Plants

Reducing SO_2 emissions

In order to cut significantly our SO_2 emissions while maintaining our production output at Narva's Eesti power plant, we will install desulphurisation ($DeSO_X$) systems on four 200 MW energy units. The cleaning technology will allow us to reduce the concentration of SO_2 in the exhaust gases of those units to as little as one-sixth of its present level. It will also help us reduce the solid particulate content in gases, and increase the amount of time the energy generation units are in operation.

Given the design of the power station buildings and the way that oil shale is burned, we decided to use the Alstom semi-dry NID (Novel Integrated Desulphurisation) technology, which uses the fly ash in the gas itself and does not require any additional compounds to bind the SO_2. The equipment design and installation

process ensures that the desulphurisation equipment will be able to operate at the required levels of efficiency and reliability for the next 15 years. By the end of the financial year the desulphurisation equipment was ready on the first energy units and testing had begun. All four of the planned sets of equipment should be ready by 2012 at the latest.

In addition to NID desulphurisation equipment, we are also looking for other economically rational ways of reducing the levels of SO_2 discharged in the exhaust gases of the other energy units and thus of extending the working life of the units.

Reducing NO_X Emissions

In 2016, the temporary derogations from EU environmental directives that Estonia was granted when it joined the EU will expire, and more stringent restrictions on the NO_X content in the exhaust gases at Eesti Energia's Narva plants will come into effect.

We have tested and analysed a number of solutions that can chemically reduce NO_X content in exhaust gases either with or without a catalyst. It is also possible, by optimising the combustion process in the boiler plants, to reduce the formation of NO_X compounds at high temperatures.

All of the technologies tested so far can cut NO_X emissions to the permitted level. In making our final choice, we will look at the reliability and cost of the equipment, and we will install it by the end of 2015.

The Ahtme Power Plant

From 2011, the Ahtme power plant must conform to all of the environmental requirements of the European Union for large combustion plants. If the old plant cannot fulfil the requirements, it can spend only a limited time in operation.

At the end of the past financial year a new 100-MW natural gas and liquid fuel-fired reserve and peak boiler plant was completed in Ahtme, and it conforms to all European Union requirements. Once final testing is completed the local residents will be able to get heat with a low environmental cost. To ensure supplies of heat at a stable price for consumers, we are using the Ahtme plant only partially from 2011 up to a maximum of 50 MW. The technical solutions for lower production levels were put in place during the financial year and will also help improve the local air quality by significantly reducing local air pollution. In March 2011 Eesti Energia signed a sales agreement under which it sold its share of Kohtla-Järve Soojus to Viru Keemia Grupp, which became the sole owner of the heating company. As a consequence Viru Keemia Grupp will be responsible for further development of the Ahtme power plant from March 2011.

The Iru Power Plant

The Iru CHP plant on the outskirts of Tallinn, which mainly burns natural gas, should by now comply with all the European Union environmental requirements. The Iru CHP plant is able to use liquid fuels as well as natural gas in emergencies, and it is now the cleanest fossil-fuel fired power plant operated by Eesti Energia.

To get NO_X emissions down to the required level we have replaced the low NO_X burners in the second energy unit at the Iru power plant. We also replaced the automation equipment controlling the generation system and the new continuous emissions monitoring equipment. By installing the new burners, we reduced the NO_X content in the fluegases by more than one-third and made the operation of the power plant more efficient. The first energy unit of the Iru power plant is now used for only limited amounts of time and is mainly used if there is a shortage of capacity.

Production of Liquid Fuels from Oil Shale

Eesti Energia has a long and unique expe-rience of producing liquid fuels from oil shale. Continuous development has let us expand the production volumes and stability of our Enefit-140 machinery. It is important for the environment that while we have increased production volumes we have equally managed to lower environmental emissions.

The new Enefit-280, which will be completed in 2012, is twice as powerful in comparison Enefit-140 and it uses the new circulating fluidised bed technology. Further development of it will allow SO_2 and NO_X emissions to be reduced even further and some of the pollu-tants from the exhaust gases to be eliminated completely. This new technology will allow us to increase liquid fuel production volumes sig-nificantly without harming the local air quality.

To make more effective use of the oil shale and to increase the mechanical efficiency of the production process, maximum use is made of the heat released by the new system; it will be used both to produce oil and to produce elect-ricity in a 35 MW steam turbine.

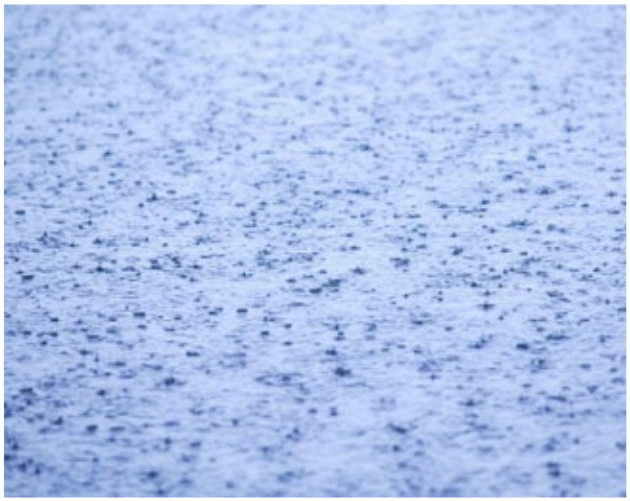
We emphasise significantly the reduction of environmental impacts from storing, loading and transportation of liquid fuels produced with different technical solutions.

Impact on the Aquatic Environment

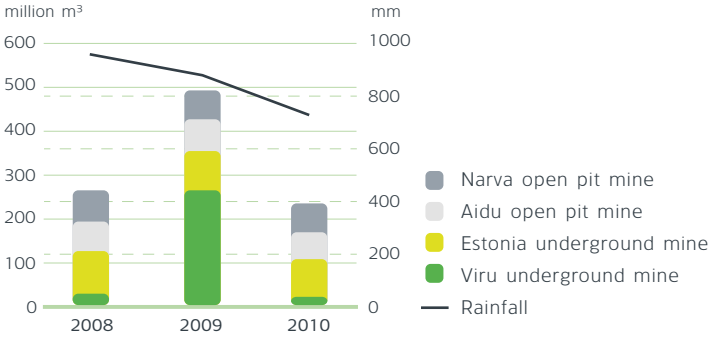
Eesti Energia's production requires a good deal of water, as already noted. Our large-scale water use always has the potential to impact water quality and the condition of the environ-ment. We are working hard to avoid problems by reducing the current and future impact of our activities.

Pumping of Water in Mining

Water is pumped out of mines and quarries to lower the water table and to create dry condi-tions for mining. The amount of water that is pumped out depends on the depth of the oil shale layers and how they lie. This is primarily dewatering work and during it, the water comes into contact with the oil shale and this changes its composition. The water pumped out of quar-ries and mines has higher than normal levels of sulphates and suspended particles. The oil shale's high limestone content and the neut-ral environment it creates mean that Estonia's



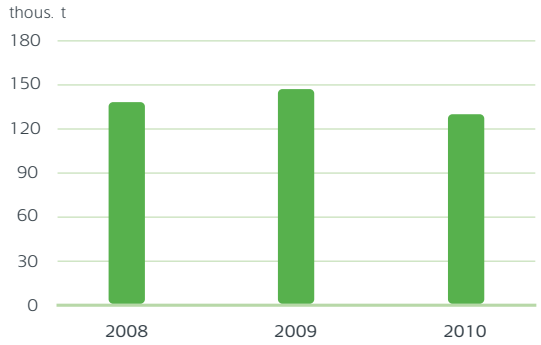
OUTPUMPED WATER VOLUMES AND RAINFALL



mines do not produce acidic waste water with high concentrations of heavy metals. We direct the water pumped out of mining areas back into the environment through ditches and rivers. Most of the water reaches the Gulf of Finland and a smaller amount flows into Lake Peipsi. There is little we can do to decide the amounts of water being pumped out, as these amounts are affected above all by weather conditions, particularly the amount of precipitation, the depth of snow and the temperature, and how frozen the ground is. In the past financial year we pumped a total of 232 million m^3 of water out of our mines and quarries.

The chemical content of Estonia's mining water is not hazardous to humans or the environment, as is shown by the fact that rainbow trout have been farmed successfully in the water pumped out of mines, even though the fish is very sensitive to its environment. A study we commissioned found that mining water, at the right temperature and with enough oxygen content, created a favourable environment for the fish and that the overall health of the fish was good.

EMISSIONS OF THE SULPHATES WITH MINING WATER



In the past financial year, close to 1557 tonnes of sulphates and 129,702 thousand tonnes of suspended particles were released into the environment as a result of mining. To avoid large concentrations of suspended particles being released into the environment we remove excess particles from mining water before it is discharged, in accordance with our published standards. We do not use chemicals to do this, but rather we use settling pools where the rate of flow of the water is slowed and the solid particles settle as gravity acts on them. There is no need to remove sulphates from the water, as water quality monitoring has shown that the quality of water that collects in closed mines improves by itself over a few years and the content of the sulphates lower quickly.

The water table cannot be lowered by ordinary pumping in mines near to nature reserves as this could endanger wetlands or water bodies. The Viivikonna branch of the Narva quarry lies next to the Kurtna protected landscape area, and so a special project has had to be set up for water pumping so that the impact on the nearby nature reserve would be minimal. The technical solutions employed are a short mining face and a filtration barrier with infiltration pools, allowing the oil shale reserves to be mined on the edge of the reserve without affecting the groundwater level.

We are working with our partners to carry out research to develop possible approaches and technical solutions for mining oil shale from underneath wetlands without impacting the environment. This will become a more salient topic in the near future, as the mines will soon reach the edges of the wetlands. It is also clear that we can only work in such areas if we do not damage the natural wetlands or change the water balance around them.

The Environmental Impact of Cooling Water

Using water for cooling in power plants does not change the water's chemical content, and nor are any pollutants introduced into the water during the cooling process under normal circumstances. However, the water re-routed into the environment is an average of seven or eight degrees warmer than when it is first abstracted.

Due to the high volumetric flow of the River Narva, the impact of the heat pollution from the local power plants is of local and limited nature, and is restricted to the area in which

the water is released. No negative environmental impact has been noted in the cooling water drainage channels under normal circumstances, and sturgeon, a thermophilic species of fish, have even been farmed successfully in the Eesti power plant cooling water canal. Problems may only arise if exceptional weather conditions give rise to a general and significant temperature rise in all groundwater.

Deposits of Fly Ash and Furnace Ash

We use stable hydro transport to deposit oil shale fly ash and furnace ash. This process changes the chemical properties of the water circulating in the system; the pH of the transport water can climb as high as 13 due to the high calcium oxide content in ash. The water circulating in the ash transport system also contains various chemical compounds (K, Na, SO_4^{2-},Cl-), which are not hazardous to the environment as the high pH prevents the precipitation of heavy metals from the solution.

The ash transport and depositing system is closed, which means that the transport water circulates within it without escaping into the environment. Changes in production levels and the amount of precipitation mean that excess transport water must sometimes be removed from the system in order to maintain stability in the system, but this water cannot be released directly into the environment. Before the water is released, it is brought to a pH of 9 or less, which is a level that is suitable for natural environments. We have replaced with CO_2 the strong acid that was previously used to neutralise the transport water and lessen its environmental impact. This prevents excessively low pH levels from being reached and the carbonates formed from the neutralisation have less impact on the environment than do the salts formed from the use of hydrochloric acid, and this all makes the whole process safer.

Countering Climate Change

Modern energy generation still involves burning large amounts of fossil fuels, and current thinking believes this has changed the earth's climate. Eesti Energia's work also leads to the discharge of a large amount of the greenhouse gas CO_2, 12.5 million tonnes in the past financial year.

In order to lessen the impact of the climate changes brought on by greenhouse gases, the European Union has set a target of reducing CO_2 emissions by 20% by 2020. This policy and the pan-European cap and trade system are having an impact on our activities. To preserve our long-term competitiveness against energy companies in other areas, we have set ourselves the target of a reduction in CO_2 emissions per MWh generated of 30% from the current level by 2015 and of 70% by 2025. There is no one single simple solution for how to achieve this target, and we will have to meet it by combining various solutions.

One answer is to burn biomass together with oil shale. Wider use of biomass needs technical work and development of sources of biomass. We are currently working on both these approaches, with consideration for financial arguments and the current subsidy system.

Another way is to reduce the furnace temperature by modifying the combustion process or using circulating fluidised bed technology. Lowering the furnace temperature lessens the

release of limestone from the oil shale and the creation of CO_2. Raising the efficiency of the operations is also an important way of producing more electricity from the same amount of fuel and with the same CO_2 emissions.

To reduce our own emissions we have started studies into partial CO_2 capture using ash and ash transport water. We can use technology to increase significantly the amount of CO_2 captured in ash fields and buffer basins, and this would reduce the need for additional CO_2 storage in special facilities. This method is not as efficient as other CO_2 capture and storage technologies being actively developed around the world, but it does provide a significant way of reducing the CO_2 output of power generation.

Diversifying our energy portfolio with CO_2-neutral production methods and solutions will also help significantly reduce our greenhouse gas emissions. We are doing this firstly by investing in various forms of renewable energy, using wind energy, biomass and waste as sources, and secondly by exploring clean and environmentally safe nuclear energy.

Promoting Energy Conservation

As well as aiming to cut CO_2 emissions, the European Union has set the target of a reduction in energy consumption of 20% by 2020. This is an ambitious goal and affects power generation, distribution and consumption. It is equally the best solution for the environment, because the environmentally cleanest energy is that which is not consumed. Estonia has great potential for saving energy, because it is estimated that it would be economically profitable for Estonia to conserve at least 20-30% of current energy consumption.

Eesti Energia has proposed three routes to follow to energy conservation:

- We conserve energy ourselves, for instance we have mapped the energy use of our buildings and are helping our employees to conserve energy in our offices, and we are developing energy-saving transport.
- We organise energy conservation information campaigns aimed at our customers, such as the energy conservation portal kokkuhoid.energia.ee and national advertising campaigns and other forms of communication.
- We are developing services for customers that generate value added and save money, for example energy audits, assessment of thermal losses and energy labels.

The passive house development project run by the University of Tartu's Energy Efficient Building Core Laboratory within the Future Energy Foundation, and supported by Eesti Energia, finished in the past financial year. The project designed a passive house suitable for Estonia, and produced information on low-energy-use buildings and other energy solutions. We will be able to distribute this information in future to our customers as important advice for planning and designing building work. The general aim of the project was to present the concept of the passive house to architects and other people involved in designing buildings. We hope that this information will help to prevent energy-inefficient buildings from being built in Estonia in the future.