VKG
VIRU KEEMIA GRUPP

YEARBOOK

2015

INTRODUCTORY WORD OF THE CHAIRMAN OF THE BOARD

AHTI ASMANN
CHAIRMAN OF THE BOARD OF VIRU KEEMIA GRUPP

The year 2015 will definitely be remembered by the Estonians for the cheapest oil and electricity prices over the last years, however, the lowest world market price of oil over the past 20 years was the key word for the energy producers. If in the mid-year 50 dollars per barrel seemed to be the last limit where the price could drop, the end of the year proved us wrong. Regardless of many internal and external risks the company was able to fulfil one of the most important priorities of the last year – put an end to the construction works and successfully establish the third shale processing plant based on the Petroter technology. This project comprises the greatest investment of private sector in Estonia over the last years. By taking the Petroter plant as an example the company showed once more that the shale sector in Estonia remains competitive, presents high efficiency and environmental friendliness even in the terms of new climate policy.

Last year the company reached a record in producing industrial oil shale. In total, the company produced 3.5 million tons of shale and 506 000 tons of oil shale products, which constitutes 56% of the entire oil shale production in Estonia. The secure and effective work of Petroter plants which operate above the rated output power and Kiviter plant's stable performance enabled the company to hold the second position among the oil shale producers around the world.

The last ten years have brought along expansive development and new routes for the company. In the newly independent Estonia, we now have our first contemporary mine, three new Petroter plants, limestone plant and much more. The rapid development of the VKG over the last decade has been possible due to the open-minded attitude, sustainable development and social responsibility principles. Constant development is the main characterizer of our company and one of the three values. The available technological solutions elaborated by the Estonian engineers allow us to valorize shale more effectively today than ever before.

However, rapidly changing economy and uneasy geopolitical situation make their own adjustments in the company's plans and development paths. Presently, all the market participants are focused on the investable capital and on optimising and reducing daily costs. Regardless of the difficulties, we keep an optimistic view on the future and we are certain that the complex emotional decisions adopted today help us maintain our competitiveness, unique experiences and knowledge in the shale mining, processing and investigating sector.

In difficult times, the smooth partnership between the government and the shale companies is critical. It has become essential to work out in joint collaboration the adequate tax system and legislation based on thorough analyses and research that would consider the global trends and which would support the stable development of the sector in the long run.

The year 2016 is the jubilee year of the shale industry throughout Estonia. Exactly 100 years ago in 1916, Estonia began mining shale and started to investigate its energy potential. Being one of the most substantial natural resources in Estonia, shale mining and the industry ensures employment for tens of thousands of people and gives a significant contribution to the state budget. Therefore I hope that the Estonian shale industry will face several jubilee years in times to come!

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OIL SHALE IN THE WORLD

THE LARGEST OIL SHALE PROCESSING COUNTRIES IN THE WORLD

BRAZIL
2.4 MILLION TONS
PER YEAR

ESTONIA
15 MILLION TONS
PER YEAR

CHINA
14.5 MILLION TONS
PER YEAR

THE LARGEST OIL SHALE PROCESSING COMPANIES IN ESTONIA

Oil shale production in Estonia in 2015

907 000

TONS OF OIL

The share of VKG amounted to

506 000

TONS OF OIL

Or

56%

SUBSIDIARIES OF VKG

PRODUCTION

VKG Oil
Shale oil production

VKG Plokk
production of Roclite building blocks

VKG Kaevandused
extraction of oil shale

VKG Diisel
VKG diesel production project

VKG Energia
production of heat and power

VKG Tsement
VKG cement production project

SERVICES

VKG Transport
railway and vehicle transport services

Viru RMT
assembly, repair and maintenance of industrial equipment

VKG Elektriehitus
construction and repair of electrical systems

VKG Elektrivõrgud
electric power network service and sales

VKG Soojus
heat network service

RECOGNITION

- **Responsible Estonian Business** 2010, 2011, 2012, 2013, 2014, 2015
- **Estonian Culture-Friendly Business** 2012, 2013, 2014
- In October 2012, Viru Keemia Grupp was listed among the three best companies in the category of **Sustainable Growth** of the Swedish Business Award
- On 23 February 2012, Nikolai Petrovitš, a member of the VKG board and the head of the best enterprise in Estonia in 2009, VKG Oil, received an **Order of White Star, IV class** from the President of Estonia Toomas Hendrik Ilves, for supporting the development of the region. According to Nikolai Petrovitš, his order belongs to the entire VKG team.
- **Environmental Enterprise of the Year 2011** in environmental management category
- **Enterprise of the Year** in Ida-Virumaa 2010
- **Best Estonian Enterprise 2009 -** VKG Oil AS

KULTUURI SÕBER 2014

AASTA KESKKONNATEGIJA AUHIND 2011

RESPONSIBLE BUSINESS INDEX 2015 BRONZE LEVEL

GEOGRAPHICAL SALES DISTRIBUTION OF THE PRODUCTS AND SERVICES OF VKG

- Estonia
- Latvia
- Lithuania
- Sweden
- Finland
- Denmark
- Poland
- Belarus
- Ukraine
- Holland
- Germanu
- Malta
- Italy
- Belgium
- Marocco
- India
- Russia
- Japan
- United States of America

MAIN PRODUCTS AND SERVICES OF VKG

- Ship fuels
- Heating oil for local heating boiler plants
- Electrode coke for electrode manufacturers
- Oil shale fine chemical products for perfumery, cosmetics and textile industries
- Oil shale gas for production of heat and power
- Vehicle and railway transport services
- Steam and air conditioning for large-scale industrial companies
- Production, transfer and sale of heat and energy to households and companies
- Repair, assembly and rental services of machinery and equipment
- Consulting services in the field of oil shale processing technology

THE MAJOR ENVIRONMENTAL AND DEVELOPMENT PROJECTS IN 2015/2016

NIKOLAI PETROVITŠ
MEMBER OF THE VKG OIL BOARD,
MEMBER OF THE VKG BOARD

PETROTER III PLANT OPENING

The group launched its third Petroter-technology oil plant on November 11th. The new plant is another completed project in VKG's investment plan that aims to upgrade local resource and use its potential at a maximum. It was one of the group's main annual goals to complete this project successfully despite hard times in the oil shale sector. The project is one of the largest private sector investments to have been made in the last few years. Three Petroter-technology plants are now operating and have proven the investments to be efficient. The energy efficiency of Petroter oil plants is 81% and environmental protection measures make its ecological footprint far less sizeable than those of plants running on previous technology.
Total cost of the investments in the three plants was 220 million euros, of which the Petroter III project cost 84 million euros. The plants also have an important socio-economic role on both regional and state level.

OPENING OF SECOND SULPHUR-TRAPPING UNIT AND CONSTRUCTION OF THE THIRD UNIT

Desulfurization of industrial emissions is a priority in the EU. Reducing the amount of sulphur emissions by three times became possible due to the successfully operating sulphur-trapping units at VKG Energia's territory. VKG Energia is the first in Estonia to use sulphur-trapping units to desulfurize flue gases. The first sulphur-trapping unit has been operating since 2008 and the second unit was launched in 2015. Both units use the Novel Integrated Desulphurisation (NID) technology. The third unit is currently under construction. The unit will be using the Flue-gas Desulfurization (FGD) technology and it will be opened in Autumn 2016. Sulphur-trapping units are an investment in better air quality of the region.

MAIN INDICATORS IN 2015

Number of employees

2101

PEOPLE

Turnover

167

MILLION EURO

Profit

-32

MILLION EURO

Investments into environment
and development

59

MILLION EURO

MAIN EVENTS IN THE REPORTING PERIOD

MARGUS KOTTISE
HEAD OF OJAMAA MINE, MEMBER OF THE VKG BOARD

JANUARY 2015

VKG is among top 50 businesses according to the **Corporate Sustainability and Responsibility Index** . The group was awarded bronze level acknowledgement for the fifth consecutive year. **Mr Hanno Tomberg**, Chairman of the Board of Enterprise Estonia (EAS), presented VKG its quality label diplomas.

FEBRUARY 2015

VKG was named „**Culture friend 2014**“ for supporting the field of culture. The title was presented by Mrs **Urve Tiidus**, the Minister of Culture.

FEBRUARY 2015

Viru Keemia Grupp’s power distribution company VKG Elektrivõrgud launched a **new power substation at Narva Logistics and Industrial Park**. The capacity of the new substation is 8 MW.

APRIL 2015

Ida-Virumaa’s industrial enterprises Viru Keemia Grupp, Eesti Energia and Eastman Specialities signed an **Agreement of Good Will** at soon to be established Jõhvi state gymnasium, to encourage the youth’s interest in the engineering speciality.

APRIL 2015

VKG Plokk started to offer **porous concrete lintels**, available according to the dimensions of other blocks manufactured by the company. In addition to constructing interior and exterior walls from Roclite blocks, Roclite lintels can be used to bridge openings in load-bearing partition walls and exterior walls of buildings. Therefore VKG Plokk is now offering complete solutions for construction.

MAY 2015

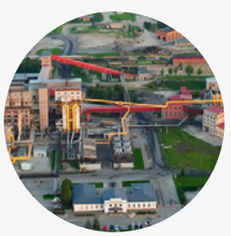
VKG opened the **second sulphur-trapping unit** in Kohtla-Järve, which removes sulphur from flue gases generated in the course of production of heat and power using the **Novel Integrated Desulphurisation** (NID) technology. The unit operates on VKG Energia's territory. The opening ceremony was attended by the Minister of the Environment Mr **Marko Pomerants**.

MAY 2015

VKG supported the publication of a **photo book**. In 2011 Viru Keemia Grupp and Jõhvi Concert Hall invited Estonians to discover Virumaa by holding a photo contest called "**You are beautiful, Virumaa!**". Almost 4000 photos from several hundred different authors were submitted to the contest in 2011, 2012 and 2014. The photo book „You are beautiful, Virumaa!" contains the best photos from all three years that were acknowledged by the grand jury. Many local and nation-wide businesses and establishments took part of the publication process.

JUNE 2015

VKG's Chairman of the Board, Mr **Priit Rohumaa**, decided to step back from the position after six years of work and fifteen years of career at the group.



JULY 2015

Viru Keemia Grupp **restarted a shale oil factory** (1000-ton gas generator) that was removed from operation since December 2014. The restarting was possible due to newly implemented laws that allow mining of previously unused resources.

JULY 2015

Kohtla-Järve city government authorised Viru Keemia Grupp of the **use of third Petroter-technology shale oil plant**. Petroter is a sustainable oil shale reprocessing technology patented by VKG and developed by the group's engineers.

AUGUST 2015

VKG Energia's Northern Thermal Power station, a **high-powered power generation complex** that took three years to expand and includes a new turbine set, substation and refurbished boiler, is ready to start operating. VKG Energia was granted a new ISO certificate for the notable work. **ISO 50001:2011** is a certificate applicable to combined heat and power generation, including steam cogeneration, from retort and generator gas.

AUGUST 2015

The second Petroter shale oil plant that was launched in September 2014 and reached **record high manufacturing parameters** in the first year. Over a million tons of oil shale was reprocessed in a year. This remarkable result means that the plant is working at stable 120% out of its planned full capacity.

SEPTEMBER 2015

Viru Keemia Grupp's oil plant Petroter III is **operating at planned full capacity** which means that 130-135 tons of oil shale are reprocessed per hour. It can be assured that the plant has been launched and it is stable.

SEPTEMBER 2015

Mr **Ahti Asmann** was elected the new Chairman of the Board of Viru Keemia Grupp.

OCTOBER 2015

Oil Shale Competence Center, Eesti Energia, Viru Keemia Grupp and Kiviõli Keemiatööstus published the first **yearbook of Estonian oil shale industry**.

NOVEMBER 2015

Viru Keemia Grupp launched its **third Petroter-technology shale oil plant**. Mr **Kristen Michal**, Minister of Economic Affairs and Infrastructure, was in attendance at the grand opening.

DECEMBER 2015

Viru Keemia Grupp and the Trade Union of Chemists signed a **new collective agreement**.

PRIORITIES FOR 2016

JAANIS SEPP
DIRECTOR OF FINANCE, MEMBER OF THE VKG BOARD

- Adjusting business model and sales strategy to the situation and demand of the market and increasing competitiveness.
- Directing investment strategy towards increasing efficiency, optimizing costs and minimizing the environmental footprint.
- Developing a flexible taxation system in dialogue with the government and establishing legal framework for continuous sustainable upgrading of oil shale.
- Increasing the group's energy and resource efficiency, using smart IT Solutions as one of the measures.
- Constant effort to reduce environmental impact and conducting research to develop new solutions.
- Ensuring continuous research and development.

ESTIMATED NUMBERS FOR 2016

Number of employees

1800

PEOPLE

Oil shale extraction volume

2.4

MILLION TONS

Oil shale processing volume

3.5

MILLION TONS

VKG's share in the state tax revenues

30

MILLION EURO

OIL SHALE INDUSTRY WITH CENTURY-LONG HISTORY

ESTONIA CELEBRATES
100 YEARS OF OIL SHALE MINING
THIS YEAR

The success story of oil shale mining began in 1916 with first extractions near Järve commune centre. The oil shale was sent to St. Petersburg for analysis. Planning and construction of the first oil shale quarry near Pavandu tavern started the same year and the first underground mine was established in Kukruse. November 16th can be considered to be the birthday of oil shale, since it was named kukersite on that date.

During the 100-year long period, oil shale has become one the most valuable and strategically important mineral resources of Estonia, and Estonian engineers the best at upgrading it. Oil shale sector is currently the largest industrial sector that employs tens of thousands of people and makes a remarkable contribution in Estonian economy. Estonia's oil shale upgrading skills are highly appreciated in both Estonia and the whole world.

ECONOMIC INDICATORS

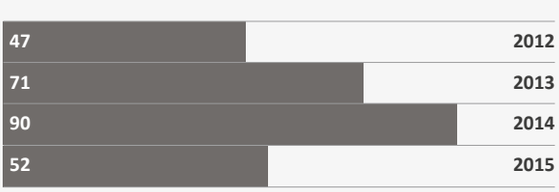
CONSOLIDATED INCOME STATEMENT

IN THOUSANDS OF EURO

	2012	2013	2014	2015
Return on Sales	215 754	220 406	195 216	166 788
Cost of Goods Sold	162 110	174 599	-164 175	-189 159
GROSS PROFIT	**53 644**	**45 807**	**31 041**	**-22 371**
Marketing Costs	4 923	5 802	-3 769	-3 360
Administrative Overhead	16 137	12 224	-12 985	-9 109
Other Revenue	15 611	6 915	11 084	9 973
Other Operating Costs	7 171	4 193	-2 492	-1 745
OPERATING PROFIT	**41 023**	**30 503**	**22 880**	**-26 612**
Financial Income and Costs	-3 230	-3 974	-3 101	-5 269
PROFIT BEFORE INCOME TAX	**37 793**	**26 528**	**19 779**	**-31 881**
Extraordinary Expenses				
Income Tax	436	315		300
NET PROFIT FOR THE FISCAL YEAR	**37 357**	**26 213**	**19 779**	**-32 181**

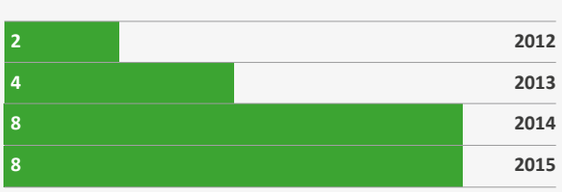
IINVESTMENTS INTO DEVELOPMENT ACTIVITIES

IN MILLIONS OF EURO



INVESTMENTS INTO ENVIRONMENTAL PROTECTION AND OCCUPATIONAL SAFETY

IN MILLIONS OF EURO



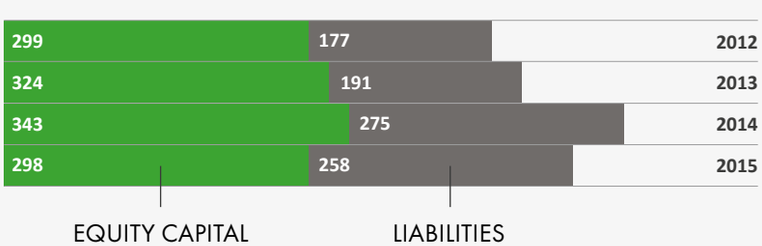
CONSOLIDATED BALANCE SHEET

IN THOUSANDS OF EURO

	2012	2013	2014	2015
ASSETS				
Current Assets	75 949	76 556	115 403	71 086
Fixed Assets	400 109	438 161	501 848	485 513
TOTAL ASSETS	**476 058**	**514 717**	**617 251**	**556 599**
LIABILITIES AND EQUITY CAPITAL				
Short-Term Liabilities	88 692	67 114	91 368	75 383
Long-Term Liabilities	88 480	123 388	183 261	182 724
Total Liabilities	**177 172**	**190 503**	**274 629**	**258 107**
Equity Capital	**298 886**	**324 214**	**342 622**	**298 493**
TOTAL LIABILITIES AND EQUITY CAPITAL	**476 058**	**514 717**	**617 251**	**556 599**

BALANCE SHEET TOTAL

IN MILLIONS OF EURO



DEVELOPMENT ACTIVITY

SOME OF THE MAJOR MILESTONES OF THE DEVELOPMENT ACTIVITY OF VKG IN 2015 WERE ENDING INVESTMENTS IN THE PETROTER 3 UNIT AND DEPLOYING THE NEW PETROTER ASH HANDLING TECHNOLOGY. DUE TO THE CONTINUING LOW OIL PRICES ON THE WORLD MARKET, THE PRIMARY FOCUS OF THE DEVELOPMENT ACTIVITY IS ON INCREASING THE EFFICIENCY OF THE PROCESSES AND THE EXISTING VALUE CHAIN.

EXPANSION OF PRODUCTION

In September 2015 the Petroter 3 oil plant was established at full power within one week. This completed one important development phase in the history of the group, which began in July 2009 with the mine construction of VKG. In addition to the Petroter 3 oil plant, VKG also has sufficient power for reprocessing fine shale produced in Ojamaa mine. Such rapid establishing of the Petroter 3 plant and achieving that stable and efficient operation wouldn't have been possible without numerous innovations conducted by the project team compared to the Petroter 1 and Petroter 2 plants.

INCREASING THE EFFICIENCY OF THE VALUE CHAIN OF OIL SHALE

Within the framework of the project of regenerating gasoline fractions from retort gas, specifying the developed technical solution and profitability calculations took place. In case of realization of the project and favorable oil prices in the world market, regenerating gasoline fractions from gas allows to increase the energy efficiency of oil-shale production and the additional value created in the value chain of valorising oil-shale.

Since the oil shale industry is a so-called weight-losing industry and oil-shale is the raw material of relatively low calorific value, optimizing the logistics of oil-shale, by-products and waste is one of the important opportunities for improving the cost efficiency in the value chain. In 2015 a 1500 m tube conveyor for transporting shale ash from Petroter plants to landfills was set up, which in addition to the cost efficiency of the value chain also significantly reduces the burden on the environment.

INCREASING THE EFFICIENCY OF PROCESSES

In 2015 VKG continued the introducing of the asset management system in the group. In collaboration with research institutions we started compiling and reviewing the mathematical models and optimization algorithms for better solving of the optimization tasks of production in a dynamic environment. Along with introducing the business monitoring software it creates prerequisites for making managerial decisions in order to increase the effectiveness of the necessary information process and the information quality.

MAJOR RESEARCH AND DEVELOPMENT AREAS IN 2016

- Project of regenerating gasoline fractions from retort gas - modelling and specifying the profitability analysis
- Increasing the reliability of Petroter equipment
- Increasing the reprocessing ability of Petroter equipment and the yield of net oil
- Introducing the asset management
- Mathematical model, improving the production optimization algorithms
- Impact analysis of changing of the marine fuel quality requirements of MARPOL, adaptation strategy

ENVIRONMENTAL ACTIVITY

MEELIS ELDERMANN
TECHNICAL DIRECTOR,
VICE CHAIRMAN OF THE VKG BOARD

THE ENVIRONMENTAL ACTIVITY OF VIRU KEEMIA GRUPP IS ONE OF THE KEY PILLARS OF THE ECONOMIC AND DEVELOPMENT ACTIVITIES, AS WELL AS OF THE SOCIAL RESPONSIBILITY OF THE GROUP.

In 2016 legislation arising from Industrial Emission Directive was adopted and the European Union's tightened environmental requirements became effective. The environmental investments which have been made over the years were successfully completed and the companies of the group comply with the applicable requirements. VKG investments in environmental protection have always been some of the most substantial ones in the country, constituting an amount of nearly 100 million euros within ten years.

The strategic goal of VKG is to maximally valorize oil-shale in processing to exploit the chemical, physical and energetic potential of it. Product design, development, energy efficiency and maximum deployment of by-products and production residues are the kind of activities which enable to enhance the use of resources and reduce the environmental impact of the oil-shale industry and footprint. In 2014 and 2015, two new Petroter oil plants with the energy efficiency of 81% were established, retort gas boiler and steam turbine in VKG Energia was reconstructed, a new electrical substation was built and the desulphurisation installation and Petroter sewage treatment plant was set up. Total investments in energy efficiency and environmental projects in 2015 were 26 million euros.

New technologies raise production efficiency and enable to obtain maximum amount of products and by-products from oil-shale. As a result of the cooperation between our engineers and subcontractors, new factories based on Petroter-technology were established, which is the best available technology in shale oil production with the energy efficiency of 81%. In 2015 Petroter II reprocessed more than 1 million tons of oil-shale, which allowed to produce over 50% of shale oil, 20% of semi-coke gas and 11% of heat energy from its primary energy. The shale oil plant Petroter III which was completed in September, achieved the planned production capacity in October. Among the operating factories in Estonia the energy efficiency of the Petroter appliances is the highest and the level of produced emissions and waste is the lowest. The cogeneration of energy in VKG Energia allows to use all of the residual heat and retort gas of the technological process, and to lower the footprint of CO_2. It is important that these large projects are managed on the basis of uniform standards and that the employees observe and make management decisions by following the essential result indicators, trends and goals reflecting the environmental, resource and energy efficiency.

The rapid development, energy policy and energy efficiency of the group set higher requirements on the management systems. In 2015 VKG Energia implemented the certified energy management system ISO 50001 in addition to the existing management system.

One of the environmental priorities of the group is to improve the ambient air quality of the industrial sites. The ambient air modelling that was started some years ago has given inputs for the project of reducing air pollution sources, under which all containers were equipped with cleaning installations in 2015. Also the oil-removal device of VKG Oil container park has been reconstructed, and the monitoring equipment and continuous monitoring systems have been renewed. In addition to the above, one of the priorities of the last and the given year is still to reduce the SO_2 emission. The largest environmental investment in 2015 was the third desulphurisation device in VKG Energia with the value of 18.7 million euros.

Some of the more substantial activities in 2015 were promoting recycling economy. The researches were performed and the technology was developed that allows to deposit moistened shale ash in accordance with environmental standards, ensuring the necessary conditions for the establishment of the landfill. This in turn significantly reduces the burden on sewage treatment plants and bodies of water, while saving clean water during deposit action. The new deposit methodology is planned to be implemented in 2016.In addition to that, a new landfill is planned to be built this year which is about to cost 6.1 million euros. In 2015 the former ash landfill of the Põhja thermal power plant of VKG Energia was repaired.

The utilization of by-products and waste of oil-shale mining and oil production increases the resource usage of oil-shale. One of the by-products of oil-shale mining in Ojamaa is gravel. Semi-coke and shale ash which was produced during shale oil production, can be used or re-used as building material. In 2015 VKG reused more than 800 thousand tons of semi-coke and ash, and all the gravel produced from mining in road construction and backfilling. Within the framework of VKG development, researches are performed to increase the use of shale ash for backfilling mining tunnels, for producing building blocks in VKG Plokk and for road construction.

Oil shale mining and shale oil production and power generation from retort gas has become considerably cleaner and more efficient over the years. The state of the environment is improved and the footprint of oil-shale sector is reduced. We have invested in new technologies and large-scale environmental projects. As of today, the challenge is to further increase the production efficiency, recycle waste and reduce air emissions.

MAJOR PROJECTS IN 2016 TO REDUCE ENVIRONMENTAL IMPACT

We plan to invest about **13.7 million euros** in environmental projects this year.

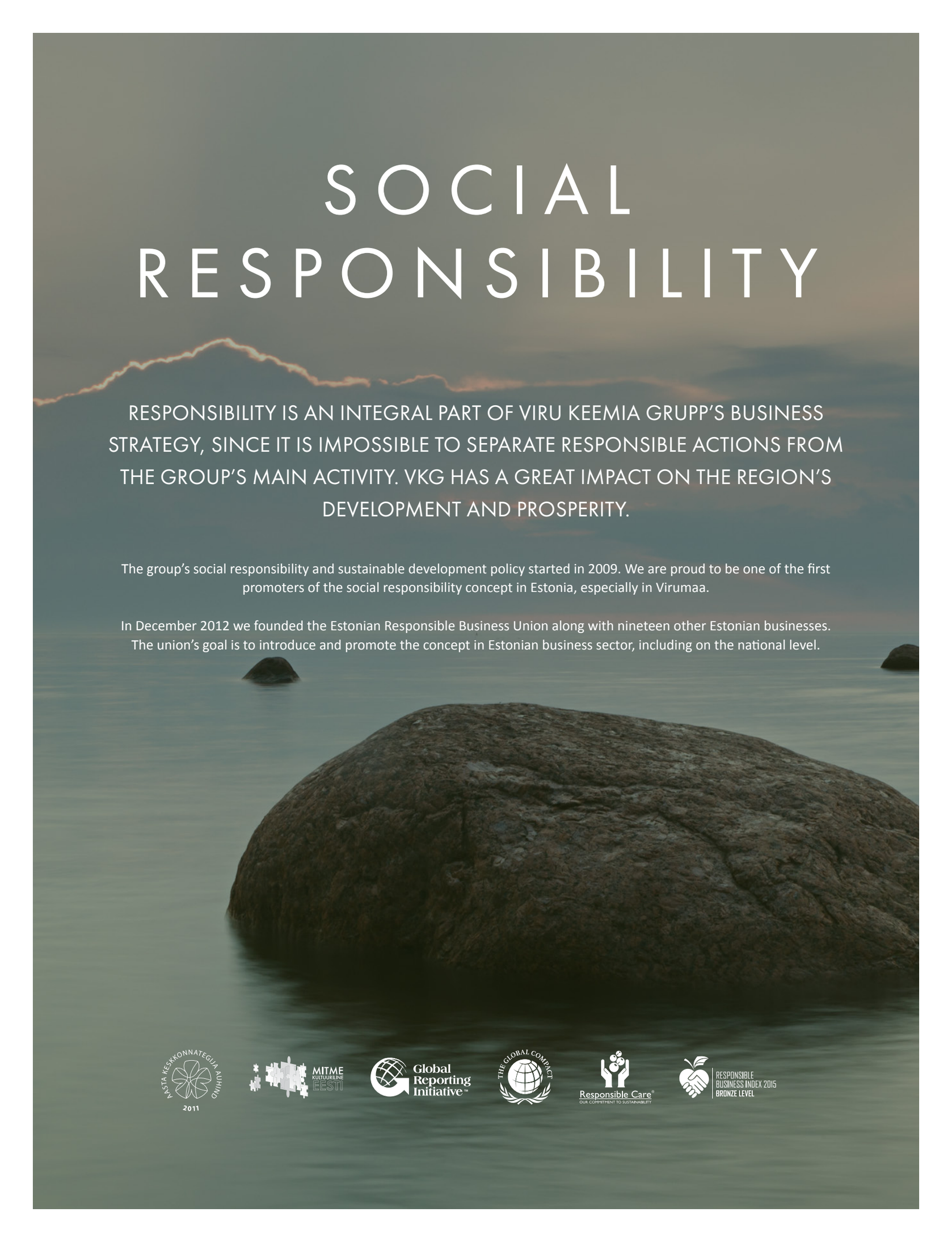
→ Construction works of the third desulphurisation device of VKG Energia.

SOCIAL RESPONSIBILITY

RESPONSIBILITY IS AN INTEGRAL PART OF VIRU KEEMIA GRUPP'S BUSINESS STRATEGY, SINCE IT IS IMPOSSIBLE TO SEPARATE RESPONSIBLE ACTIONS FROM THE GROUP'S MAIN ACTIVITY. VKG HAS A GREAT IMPACT ON THE REGION'S DEVELOPMENT AND PROSPERITY.

The group's social responsibility and sustainable development policy started in 2009. We are proud to be one of the first promoters of the social responsibility concept in Estonia, especially in Virumaa.

In December 2012 we founded the Estonian Responsible Business Union along with nineteen other Estonian businesses. The union's goal is to introduce and promote the concept in Estonian business sector, including on the national level.



THE GENERAL PRIORITIES OF THE GROUP WITHIN THE FRAMEWORK OF RESPONSIBLE ENTREPRENEURSHIP

OUR SUCCESS FACTORS ARE CONTRIBUTIONS TO SOLVING COMMUNITY PROBLEMS AND CONSCIOUSLY MINIMIZING THE ENVIRONMENTAL FOOTPRINT OF OUR ACTIVITIES.

ENVIRONMENTAL PROTECTION

VKG's priority is to reduce and minimize the environmental impact of industry. The aim of our operations is to show that corporations can be responsible, sustainable and use resources at their maximum potential. The group's largest investments have been directed to environmental functions, making VKG one of the largest environmental investors in the country. VKG has invested around 100 million euros in environmental projects over the years.

OUR EMPLOYEES

People are the most valuable asset of any business. As the region's largest employer our purpose is to offer modern working conditions, pleasant working environment and development opportunities for our employees. We are grateful to our employees who are loyal and value the group as their employer. Employees of the group are engaged in charity and voluntary work. There is a trade union at the group and collective agreements have been signed.

OUR PLACE OF OPERATION – VIRUMAA

VKG's priority is to support Virumaa and the activities of local organizations, people and societies that benefit the community. The group pays attention to the region's development, keeping close touch with local authorities and citizens. VKG supports sports, culture and education initiatives.

VKG HAS ALSO STARTED SEVERAL OF OUR OWN INITIATIVES TO PROMOTE LOCAL LIFE

PHOTO CONTEST "YOU ARE BEAUTIFUL, VIRUMAA!"

Photo book "**You are beautiful, Virumaa!**" was published in 2015. The book contains some of the best contest photos from previous years. Pages of the book also display quotations on beautiful Virumaa by politicians, entrepreneurs and cultural figures. This is the first photo book of the region.

ENGAGING STUDENTS INTO THE HISTORICAL BATTLE OF FIVE SCHOOLS

www.vkg.ee/est/sotsiaalne-vastutus/vkg-algatused/viie-kooli-voistlus

In cooperation with Hugo Treffner, Miina Härma, Nõo and Tartu Tamme gymnasiums and Jakobson school.

COMMUNICATION BETWEEN THE LARGE INDUSTRY AND THE LOCAL PEOPLE

ONE OF THE VALUES OF THE GROUP IS OPENNESS. OPENNESS TO NEW KNOWLEDGE, TO THE REGION AND IT'S PROBLEMS, TASKS AND CHANGES.

With that principle in mind we have been making the use of our resources and environmental information public for the last six years according to the Global Reporting Initiative's guideline GRI G3.

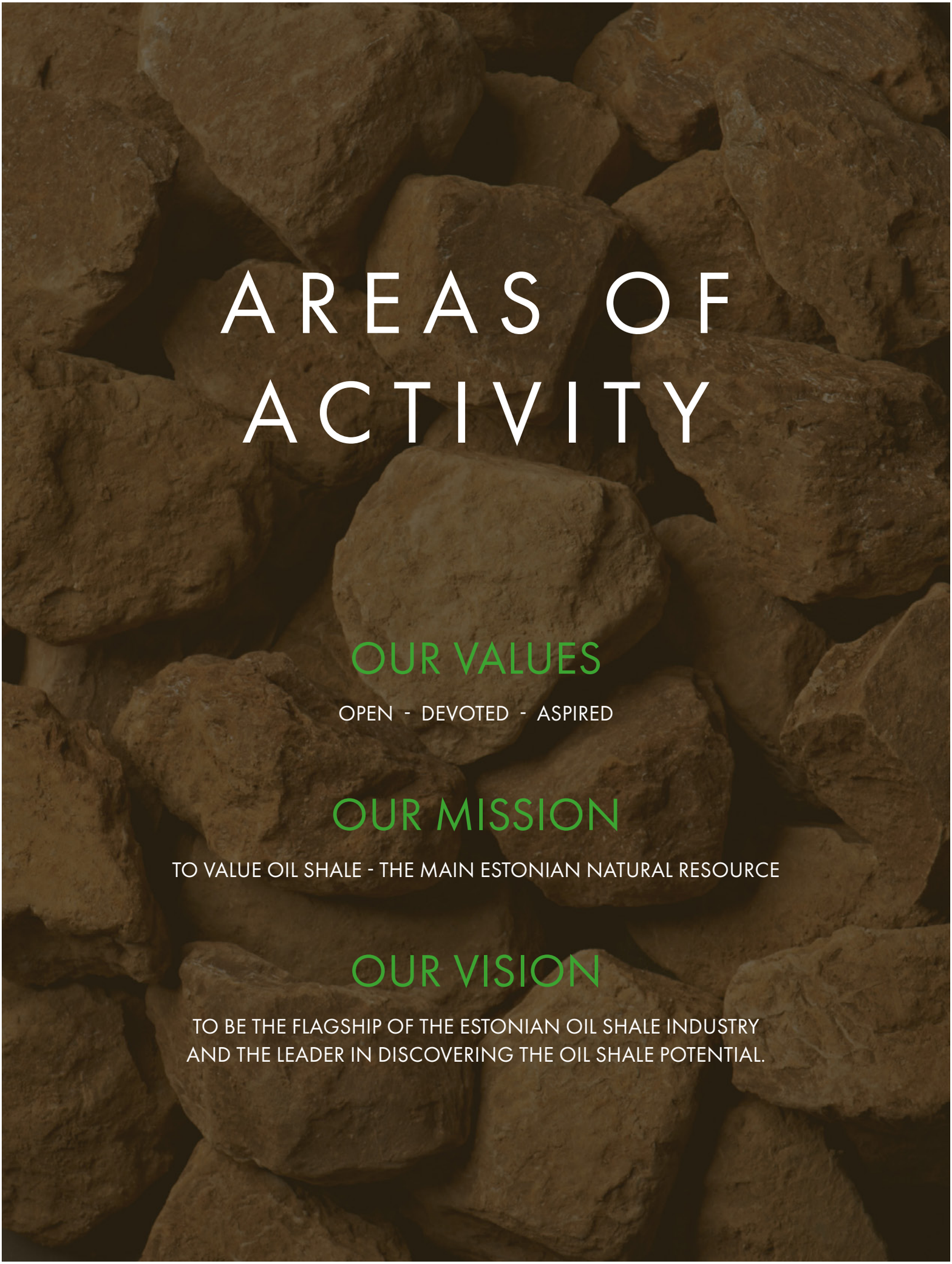
VKG is an important employer and partner in the region VKG's production territory is located in the vicinity of Kohtla-Järve city. We pay great attention to communication with the locals and keeping them informed of the happenings at the group. To ensure communication, meetings with representatives of the community are held on a regular basis. The group's future development plans and environmental matters are discussed at the meetings. On a regular basis the group holds the so-called Open Doors Day, during which everyone can visit the production territory of VKG and to see with their own eyes how the modern industrial processes are running. We also offer an opportunity to arrange visits and excursions to our facilities to the students from comprehensive schools.

The employees of the group take active part in charity and volunteer work. The group holds topic-based donation campaigns, tree-planting events and workshops, and supports orphanages in the district.

VKG HAS BEEN THE MAIN SPONSOR OF THE ESTONIAN WRESTLING FEDERATION SINCE 2005

VKG'S SHAREHOLDERS PRIIT PIILMANN AND ELAR SARAPUU HAVE CONSISTENTLY SUPPORTED THE ESTONIAN WRESTLING FEDERATION AND THE ESTONIAN WRESTLING TEAM'S PREPARATIONS FOR THE CHAMPIONSHIPS AND OLYMPIC GAMES.

Priit Piilmann is the president of the Wrestling Federation since 2012.



AREAS OF ACTIVITY

OUR VALUES

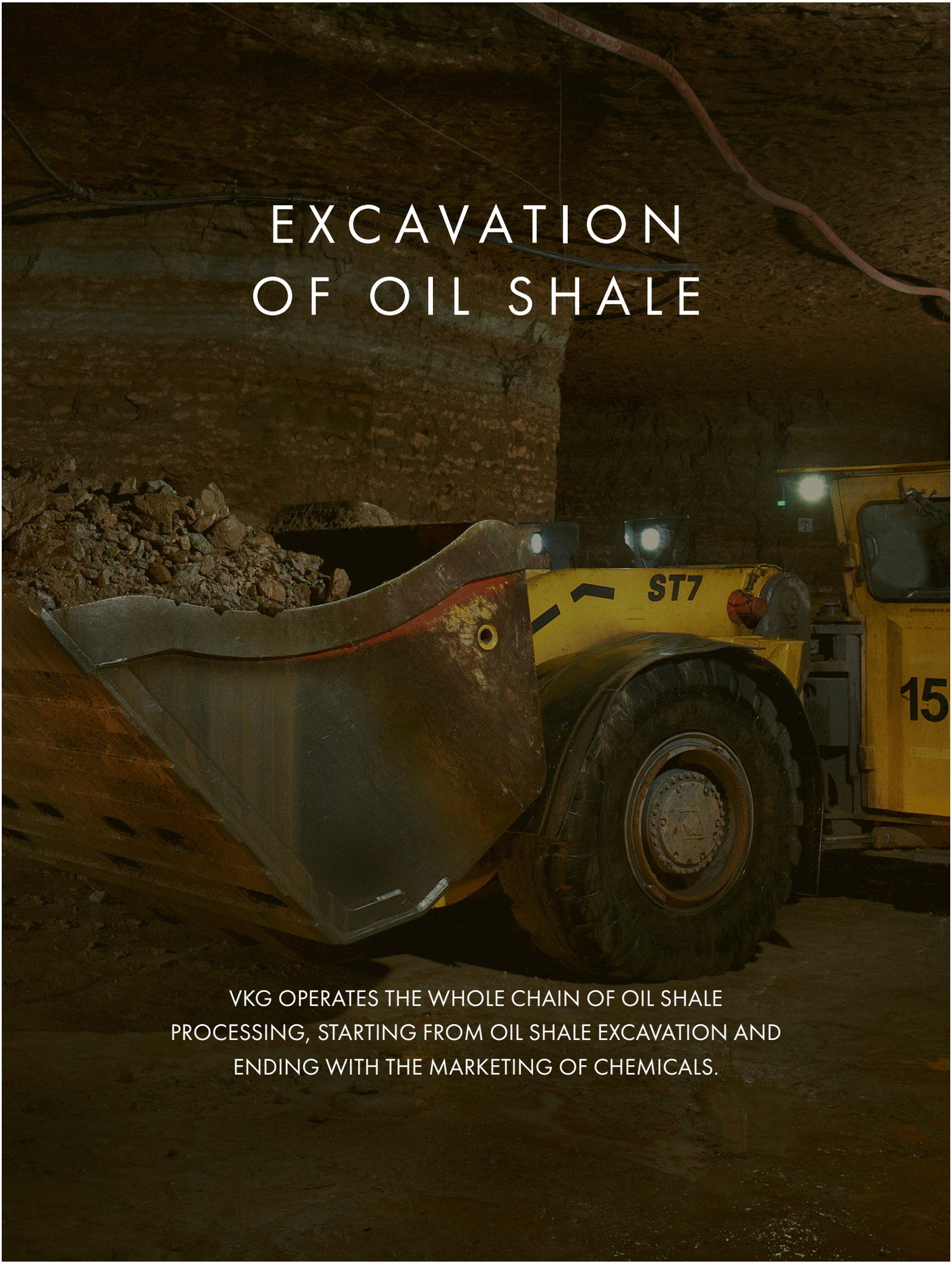
OPEN - DEVOTED - ASPIRED

OUR MISSION

TO VALUE OIL SHALE - THE MAIN ESTONIAN NATURAL RESOURCE

OUR VISION

TO BE THE FLAGSHIP OF THE ESTONIAN OIL SHALE INDUSTRY
AND THE LEADER IN DISCOVERING THE OIL SHALE POTENTIAL.



EXCAVATION OF OIL SHALE

VKG OPERATES THE WHOLE CHAIN OF OIL SHALE PROCESSING, STARTING FROM OIL SHALE EXCAVATION AND ENDING WITH THE MARKETING OF CHEMICALS.

For many years VKG received the oil shale needed for production from Eesti Energia Kaevandused. Since 2012 Eesti Energia Kaevandused no longer covers the entire demand for raw materials of VKG, and the lion's share of oil shale is supplied by the company's own Ojamaa mine, which holds 60 mln tons of oil shale. By opening the mine, we have provided over four hundred well-paid jobs.

VKG obtained the mining permits for the Ojamaa mine in 2004. Preparatory works for the opening of the mine began in 2007 and in July 2009 work on the facility was launched. The grand opening of the mine was on 31 January 2013, and it reached its full capacity in the second half of the year.

As the most recently opened in Estonia and one of the most up-to-date oil shale solutions globally, the underground excavation is applied for producing oil shale, which is used when the layer of oil shale is deeper than 30 metres under ground. Only the most up-to-date technologies and the best possible equipment are used in the technological process. The volume of investments into the Ojamaa mine has amounted to 120 mln euro.

During the cross-put works, from August 2010, the Ojamaa mine started to supply fine oil shale for satisfying the needs of the plant Petroter I. In 2011, the fine oil shale supplied by Ojamaa became the only raw material used at the new plant. The Ojamaa mine can supply raw material to three plants simultaneously using the Petroter technology.

Ojamaa will cover the demand of VKG for the raw material needs for approximately the next 16 years. So that the mine would be able to supply both fine stone and crushed stone to the three Petroter plants and four factories operating on the basis of the Kiviter technology, its capacity must be increased up to 3.8 mln tons per year. The relevant application has already been submitted to the Ministry of the Environment. The production capacity of the mine corresponds to the amount limited by excavation permits (which amounts to 2.772 million tons per year at present), but within a very short time it will be possible to increase the capacity for covering the increased needs of oil plants.

The increase in capacity has been largely discussed at the top level of the state government recently. At the beginning of 2015 the Riigikogu Mining Group submitted a proposal for making amendments in the Earth Deposits Act, which would make the excavation rate period-based. This change will allow VKG to excavate the oil shale which has remained unexcavated in the first years of the Ojamaa mine operation.

Of course, this will be a temporary measure, but this solution will still allow VKG to relieve a stressful situation, which has occurred as the result of the distribution of oil shale resources.
It is strategically important for the group to guarantee the oil shale resource for the more distant future. It has been planned to do that by building a common mine for Sonda oil shale mines mining claims, which would have a common opening, technology, and transportation system. The Ministry of the Environment has approved the environmental impact assessment programme. The group is planning to develop this project in cooperation with Kiviõli Keemiatööstus.


SHALE OIL
PRODUCTION

The oil shale extracted at the Ojamaa mine is delivered to the production territory of VKG by a unique overhead conveyor, which has been in use since 2012. The conveyor consists of one belt. The length of the structure is 12.4 kilometres and its width is 4 metres. Conveyor is a great example of an environment friendly manufacturing solution. The conveyor produces no emissions and dust and there is no additional load for local roads and no noise. The local community as well as specialists in the field of environmental protection were involved in the process of planning the route of oil shale supply. The habitats and habits of local animals and birds were taken into consideration. Throughout the entire length of the route, special tunnels and bridges for animals have been built, so that the tenants of the wood could cross the conveyor safely.

On the production territory, the raw material is distributed by a powerful distribution system that is located ten metres above the ground. VKG Oil, the flagman of the group, is responsible for oil shale processing. VKG OIL, which includes 3 Petroter-technology plants and 4 Kiviter-technology factories, is responsible for oil shale reprocessing in the group Kiviter factories operate on oil shale rocks, while Petroter plants use fine-grain shale.The final products of both type of technologies are fuel oils for and marine fuel. Heavier shale oil fraction is also used as the raw material in electrode coke production. Oil Shale reprocessing capacity of the company was 3 million tons of oil shale in 2015, of which 506 000 tons of crude oil was produced.

THERE IS A GOOD REASON TO BE PROUD

OPENING OF
PETROTER III OIL PLANT,
NOVEMBER 2014

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The new Petroter III oil shale plant is a step ahead in the direction of the modernization of the oil shale sector in Estonia. Using oil shale for the production of oil, we are going to increase the share of energy that is obtained from oil shale. The Estonian oil shale sector will be capable of being successful in the conditions of the European climatic and energy policy, reducing the environmental effect and boosting efficiency. The innovation implemented by the Estonian companies and engineers in the name of the new Petroter III plant will help to achieve this aim.

KRISTEN MICHAL

THE MINISTER OF ECONOMIC AFFAIRS AND INFRASTRUCTURE

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We are very pleased and proud to open the third Petroter plant. The successful implementation of the project, in spite of the difficult times in the oil shale sector, has been one of the main targets of the Group in the year 2015. It has been the largest investment into the private sector within recent years in Estonia. The plants that are based on Petroter technology have proved the efficiency of investments in practical terms and the appropriateness of the choices that VKG made some time ago. The energy efficiency of Petroter oil plant is over 82%, and, owing to some environmental measures, the ecological footprint of the Group, compared with the technologies that have been used earlier, will reduce by several times.

AHTI ASMANN

CHAIRMAN OF THE BOARD OF VIRU KEEMIA GRUPP

OIL SHALE CHEMISTRY

THE MOST VALUABLE PART OF ESTONIAN OIL SHALE IS CALLED ALKYLRESORCINOLS.

The most valuable part of Estonian oil shale is called alkylresorcinols: 5-Methylresorcinol, 2-Methylresorcinol, 5-Methylresorcinol Monohydrate and 2,4-Dimethylresorcinol, all fine chemicals with high reactivity and of high purity.

Oil shale chemicals can be used in a variety of products. Chemicals from Estonian oil shale can be found in dyed textiles, tanned furs, also hair dyes by L'Oréal, Wella ja Schwarzkopf, skincare and sunscreens. They are also used in the manufacturing of Samsung TV screens, also Lexus and Toyota car parts.

Honeyol and rezol, oil shale phenols fractions, are used as adhesive resins in tire, plywood and petroleum industry and as a base in manufacturing dyes and varnishes. The product from the new resin production unit that was opened in 2012 is called „red resin" and it is used in the manufacturing of tires by the best tire manufacturers in the world - Lexus, Goodyear, Pirelli and Bridgestone.

VKG is currently the only company in Estonia to extract valuable fine chemicals from shale oil. The company is capable of producing hundreds of tons of fine chemicals of high purity (over 99%) per year. Price of the fine chemicals can go up to hundreds of euros per kilogram. The largest consumers of Estonian shale oil chemicals are well-known businesses from the EU, Japan and India. Fine chemicals produced in Kohtla-Järve have also been used in Iran and Latin America.

New web page for fine chemicals is located at www.finechem.eu


OIL SHALE
ENERGY

VKG Soojus offers heat distribution and sales services. Residual heat generated in the process of processing oil shale is used for heating the service areas. The areas of Kohtla-Järve and Jõhvi are heated through a main heating system which is over 18.5 kilometres long. It was built in 2012. The heating main starts at the VKG Energia production area in Kohtla-Järve and runs through several rural municipalities up to the point of connection to the distribution network at VKG Soojus AS.

VKG Energia is the industrial electricity-generating enterprise with the main goal of providing heat to the nearby districts and producing electricity for VKG and neighbouring enterprises, using the total amount of oil shale gas produced at VKG Oil for that purpose. VKG Energia has got two power stations: the Northern and the Southern stations. Total thermal capacity is 320 MW. After the first turbo generator set was commissioned in August 2015 the electric production capacity has risen to more than 98 MW.

In August of 2015 the expansion of VKG Energia's Northern Thermal Power Station's powerful power generation complex was finished. A new turbine with 27 MW capacity, generator, cooling system, 40 MWA nominal capacity and 110 kV voltage substation were constructed and a boiler with 75 tons of steam per hour nominal capacity was refurbished as a part of the project. Total cost of the complex was 28 million euros.

Together with expanding VKG's production capacity and starting the third Petroter-technology shale oil plant, the new complex is of significant importance. In addition to the shale oil produced at oil plants, other products such as retort gas, steam and heated water is being sent to the power station, producing power, supplying heat for the citys in the area and steam for industrial consumers. The power and heat cogeneration implemented in VKG is tremendously more efficient than direct combustion of the oil shale and its environmental footprint is also much smaller. The project helps to increase energy efficiency and sustainable use of resources in the oil shale industry.

Another remarkable project was the completion of the second sulphur-trapping unit's construction and the unit's opening on 2015. The sulphur-trapping unit removes sulphur from flue gases generated in the course of production of heat and power using the Novel Integrated Desulphurization (NID) technology. In Autumn 2015 the construction of the third unit began on VKG's production territory. The project is planned to be completed by the end of 2016. VKG Energia is the first in Estonia to use a sulphur-trapping unit.

VKG ELEKTRIVÕRGUD OÜ

VKG Elektrivõrgud is the second largest power distribution company after Eesti Energia's Elektrilevi. The main areas of activity of the VKG's electricity distribution enterprise located in Narva are transferring the electricity through the network and the sale of distribution services and the services connected with the operational management of the electric system of the company.

VKG Elektrivõrgud is the only electricity distribution enterprise in its service area. The region of 100 000 residents is being supplied with electricity through the lines of VKG Elektrivõrgud. The company has 4 substations with 110 kV voltage, 8 substations with 35 kV voltage, 358 substations with 6 kV and 10 kV voltages, 413 km of overhead electrical lines and 501 km of electrical cable lines. In addition, the company also provides the service of designing, building, repairing, using, checking and maintaining electrical installations.

Starting from 2012 the company has been offering different electricity price packages to its customers. Every year VKG Elektrivõrgud invests considerable amounts of money into the maintenance of the lines, substations and other equipment, which is why the reliability of the network is improving, while the share of electricity losses is diminishing considerably. In 2015 608 thousand euro were invested into developing the network and boosting its reliability. In addition to satisfying the needs of private consumers and smaller companies, the enterprise accomplishes an important mission of supplying large industries located in Narva and Sillamäe with electricity.

- In 2015, **technical and commercial losses** of VKG Elektrivõrgud (the difference between the amount of energy entering and leaving the network) amounted to 7.3 %.
- The System Average Interruption Frequency Index (SAIFI) was 1.233 in 2013, 0.641 in 2014 and 2015.aastal 0.477.
- The company is planning to make all meters available for remote reading by 2017. As of the end of 2015, **84% of meters** were available for **remote reading**.
- The management system corresponding to the standards **ISO 9001:2008** and **OHSAS 18001:2007** is implemented in the company
- In 2015, the turnover amounted to **12.1 million euro**
- In 2015 **60 employees** worked in the company. VKG Elektrivõrgud is recognized as one of the **region's best employers**.
- The company pays a lot of attention to electrical safety and holds **information campaigns for children**
- To fulfill the needs of the customers and to provide a better service, a new and more up-to-date self-service office was opened.

PRODUCTION OF CONSTRUCTION MATERIALS

BUILDING BLOCKS MADE OF OIL SHALE DUST

Building blocks are produced under the Roclite brand, which is a subsidiary of VKG. Roclite building blocks are produced by autoclave treatment at a high temperature from the mixture of sand, oil shale dust, and water. Roclite is an environmentally friendly material, which does not pollute the environment, saves energy, and provides quality for years to come. The blocks from porous concrete are environmentally friendly and do not emit harmful substances into the environment. In the production process we are following a waste-free principle: we send oil shale dust for recycling. The blocks are sold both in Estonia and for export.

Additional information can be found on the webpage: www.roclite.eu.

LIME PRODUCTION

Semi-coke gas and generator gas derived from shale oil production are being used as the energy necessary for decarbonization. A modern mixing unit has been constructed to mix and dispense the gases.

The next step for VKG lime plant to reach its planned full capacity was taken last year. In 2015 the lime plant manufactured approximately 11 000 tons of lime that all used in the process of binding sulphur compounds in flue gases. Some of the desulfurization residue was used in agriculture. The Agricultural Board confirmed that the product is in compliance with the quality requirements of the Fertilisers Act and the company holds an according certificate.

In the project stage the lime plant was supposed to be an unit that would supply the entire desulfurization complex with lime, including the SDA (Spray Dry Absorbtion) unit which will launch in 2016. The experience from this and previous year has indicated that the lime plant is able to produce good quality lime in such volumes, it will cover the current and future demands of VKG and will present an opportunity to market the lime outside of the group as well. The entire project (sulphur-trapping units and lime plant) follows VKG's manufacturing logic and its goal to upgrade Estonian oil shale at use its organic and mineral potential at the maximum and to preserve other natural resources such as limestone.

USE OF OIL SHALE RESIDUES IN ROAD CONSTRUCTION

The use of the mining residues and processing of oil shale in road construction is still one of the focus projects, into which a lot of time and money resources are being invested. Recently we have carried out a number of tests and some research, and we found the best possible field of application for the two kinds of the most abundant production residues generated in the process of oil shale mining and processing. In road construction, the ash generated in the course of oil shale production as well as the crushed rock obtained in the proccess of mining can be used instead of some concrete elements. VKG is absolutely sure that the use of mine waste in road construction together with the oil shale ash generated at the Ojamaa mine is an environmentally-friendly solution, which is also economically feasible.

THE COMPANIES SUPPORTING THE MAIN PRODUCTION AREAS OF VKG

VKG TRANSPORT

VKG TRANSPORT AS IS ONE OF THE LARGEST TRANSPORTATION COMPANIES IN ESTONIA, AND IT PROVIDES INTERNATIONAL ROAD AND RAILWAY TRANSPORT LOGISTIC SERVICES.

THE COMPANY´S MAIN AREAS OF ACTIVITY ARE

- **organisation of international and domestic railway and road transportation of goods**
- **provision of forwarding services**
- **international and domestic shipping of dangerous goods, i.e. ADR shipping, by road tankers**
- **Motor transport special services**
- **railway construction, maintenance and repair services**
- **weighing of railway wagons**
- **transportation of hazardous waste**

- VKG Transport has been operating **since 1999**
- In 2015 **159 employees** worked in the company
- In 2015, the turnover amounted to **14.7 million euro**, while the profit was **0.9 million euro**
- About 74% of the turnover of the company is made of the services **provided inside the group**, which are mainly connected with the processing of oil shale.
- The amount of investments in 2015 was **27.9 thousand euro**.
- VKG Transport AS also owns tankers suitable for transportation of chemicals, which operate on all European highways. All vehicles conform to the terms and conditions concerning transportation of dangerous goods (ADR). All of the employees who deal with the transportation of hazardous substances have completed relevant training courses.
- In 2015 the company started **LNG** (Liquefied Natural Gas) **road transportation**.
- The company holds all licences and activity permits required for the provision of the services listed above and it follows all environmental, quality management, occupational health and safety, and management systems, such as **ISO 9001:2008**, **ISO 14001:2004** and **OHSAS 18001:2007**.

VIRU RMT

VIRU RMT WAS CREATED FROM THE FORMER REPAIR AND ASSEMBLY DEPARTMENT OF THE OIL SHALE CHEMICAL PLANT, WHICH MEANS THAT IT HAS EXTENSIVE EXPERIENCE IN THE FIELD OF PROVISION OF REPAIR AND ASSEMBLY SERVICES.

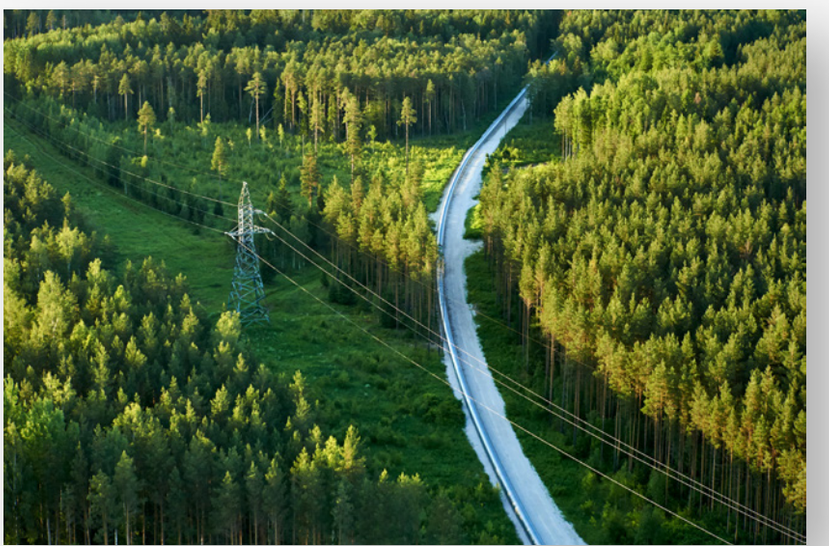
THE COMPANY'S MAIN AREAS OF ACTIVITY ARE

- **production, installation, maintenance, and repair of metal structures;**
- **maintenance, repair, design, production and installation of technical equipment;**
- **automatic management systems design, software development and installation,**
- **installation and repair of control and measuring instruments;**
- **repairs and calibration of inspection measuring instruments;**
- **maintenance and repairs of lifting equipment, lifting operations;**
- **implementation of turnkey technical solutions.**

- In 2015, **321 people** were employed at the company.
- In 2015 the company took active part in the **construction of the oil plant Petroter III**. The following works have been carried out:
  - Production and installation of the electric filter;
  - Design, production and installation of the internal fuel feed system;
  - Automation of Petroter III.
- The Viru RMT customer portfolio includes the companies primarily **within the VKG group**, who jointly provide almost three fourths of the sales turnover of the company, which is about **12.5 million euro**.
- The company holds the certificate **ISO 9001:2000** (TÜV) and the Occupational Health and Safety Management Certificate **OHSAS 18001** as well as **EN 1090-1**, **EN 3834-2** and **EVS-EN ISO/IEC 17025:2006** certificate.

VKG ELEKTRIEHITUS

VKG ELEKTRIEHITUS AS IS THE COMPANY DEALING WITH DESIGN, CONSTRUCTION AND REPAIRS OF ELECTRICITY MAINS AT VKG GROUP.



The company was born out of the Department of Electrical Construction at Narva Elektrivõrgud AS, that is why VKG Elektrivõrgud is still the biggest customer of the company. The largest share of the turnover of VKG Elektriehitus is still derived from Ida-Virumaa, where the task of the company is to maintain the most eastern mains electricity of Estonia (from Narva to Sillamäe and Vaivara rural municipality) and to support the developments of the VKG group in Kohtla-Järve by providing the know-how. This is why the company has two departments, one in Narva and another one in Kohtla-Järve.

- In 2015, **38 people** were employed at the company.
- The largest customers of the company are the companies of **VKG** and **Eesti Energia groups**, as well as **local governments**.
- The partners of the company are **ABB, Harju Elekter, KEK Ehitus, ENERGEL Estonia, Onninen, SLO Eesti**.
- In 2015 VKG Elektriehitus finished the biggest project in its history – the planning and **construction of VKG Energia's Northern Thermal Power Station's 110/6 kV substation**. Total cost of the project was 3.2 million euros.
- In 2015, the turnover of the company was **4.5 million euro**.
- Since 2002, VKG Elektriehitus has been a member of the **Estonian Association of Electrical Enterprises**.
- In its activities, it proceeds from the requirements of the **ISO 9001** standards.

CONTACTS

VIRU KEEMIA GRUPP AS

Ahti Asmann, Chairman of the Board
Meelis Eldermann, Vice Chairman of the Board

Registration number 10490531
Järveküla tee 14
30328 Kohtla-Järve

Phone: +372 334 2700
Fax: +372 337 5044
E-mail: info@vkg.ee
www.vkg.ee

VKG KAEVANDUSED OÜ

Margus Kottise,
Member of the Board

Järveküla tee 14
30328 Kohtla-Järve

Phone: +372 334 2782
Fax: +372 337 5044
E-mail: vkgkaevandused@vkg.ee

VKG OIL AS

Nikolai Petrovitš, **Priit Pärn**,
Members of the Board

Järveküla tee 14
30328 Kohtla-Järve

Phone: +372 334 2727
Fax: +372 334 2717
E-mail: vkgoil@vkg.ee

VKG TRANSPORT AS

Ervin Küttis,
Member of the Board

Järveküla tee 14
30328 Kohtla-Järve

Phone: +372 334 2535
Fax: +372 334 2719
E-mail: transport@vkg.ee

VKG ENERGIA OÜ

Marek Tull, **Sergei Kulikov**,
Members of the Board

Järveküla tee 14
30328 Kohtla-Järve

Phone: +372 334 2852
Fax: +372 332 7620
E-mail: vkgenergia@vkg.ee

VKG ELEKTRIVÕRGUD OÜ

Tarmo Tiits,
Member of the Board

Paul Kerese 11
20309 Narva

Phone: +372 716 6601
Fax: +372 716 6600
E-mail: vkgev@vkg.ee
www.vkgev.ee

VIRU RMT OÜ

Andry Pärnpuu, **Peeter Ilves**,
Members of the Board

Järveküla tee 14
30328 Kohtla-Järve

Phone: +372 334 2573
Fax: +372 334 2545
E-mail: viru.rmt@vkg.ee
www.virurmt.com

VKG ELEKTRIEHITUS AS

Andry Pärnpuu,
Member of the Board

Paul Kerese 11
20309 Narva

Phone: +372 716 6622
Fax: +372 716 6600
E-mail: elektriehitus@vkg.ee

VKG SOOJUS AS

Aleksandr Šablinski,
Member of the Board

Ritsika 1
31027 Kohtla-Järve

Phone: +372 715 6444
Fax: +372 715 6400
E-mail: vkgsoojus@vkg.ee
www.vkgsoojus.ee

VIRU PLOKK OÜ

Jaak Saar,
Member of the Board

Ahtme mnt 145
31027 Kohtla-Järve

Phone: +372 334 2408
Fax: +372 334 2416
E-mail: vkgplokk@vkg.ee
www.roclite.eu

PHOTOS

Kaupo Kikkas
Janek Laanemäe

GRAPHIC DESIGN

2ood / Oliver Oberg