

# YEARBOOK 2014

# INTRODUCTORY WORD OF THE CHAIRMAN OF THE BOARD



**PRIT ROHUMAA**  
CHAIRMAN OF THE BOARD

The year 2014 was an anniversary year for Viru Keemia Grupp concern. On 24th December 90 years since Shale Oil production has started in Kohtla-Järve were celebrated.

Looking back to these ninety years we can say that Oil Shale production has always been characterized by the excellent technological development during different political times. Oil shale products were produced for the first time in 1924, then during the period between 1950's – 1960's - oil shale gas was mainly produced, which was sold to Tallinn as well as to Leningrad. Today, only a few people can still remember that Raua Street Sauna and Liviko Factory were the first buyers of oil shale gas in Tallinn. After that, when the production of oil shale gas was finished due to its uselessness, our enterprise went back to oil shale production.

During such a long history of our enterprise both a number of rapid development stages and the biggest oil market crises took place. It is worth mentioning that the first 74 years of our important past, the company was a State Enterprise, and only for the last 16 years, after the privatisation process, it has been based on privately owned capital.

At the end of 1997 the state privatised the state enterprise RAS Kiviter stating that the future investor would contribute to technology, the growth of working places and would also solve important environmental problems. Today, in our anniversary year we can state, that VKG has been a good partner for our country. During the last 9 years our concern has created more than 1200 well-paid working places in Ida-Virumaa. The concern employs 2300 people. Within the whole period after the privatisation VKG has invested about 8, 000 000 euro into the production modernisation, such as mining, new oil factories, energetics. In addition, we have been successfully dealing with environmental problems such as water treatment, waste discharge, emissions to the air, which were not solved before the privatisation of the state enterprises.

VKG fast development became a reality thanks to the effective implementations of the open communication as well as the sustainable development and the principles of social responsibility. Our whole massive investment programm is financed by a syndicate of three banks, which has been recently joined the fourth one: the European Bank of Reconstruction and Development (EBRD). Over the last years these banks loaned VKG over 500 million euro. The financial support of EBRD is a kind of a prestigious quality mark, which demonstrates that the activity of VKG in the oil shale industry of Estonia meets all the high standards of the European Union regarding the sustainable development and environmental protection.

VKG has been one of the best partners for people during the process of Põlevkivi conversion. Our value chain, that starts with the newest and most up-to-date mines in Europe - Ojamaa Mine, also consists of three most up-to-date Petroter's type oil factories, two power stations, district heating areas in two cities and electricity distribution network. In addition, we produce fine chemicals and resins from oil shale and also construction materials from the wastes. Taking all this into account, we can confirm that our value chain adds a great deal of value and a high tax contribution to the whole country. The analyses of PWC and EY carried out by the consulting firms show that VKG provides 1% for the Estonian GDP and covers about 1 % of the country's taxation.

The constant development is the main feature of our enterprise and one of our three values. In addition to that, VKG is open to new knowledge, challenges and changes as well as development of the region. The third value, which is also considered as a very important direction of our enterprise, includes dedication to our production, our employees and the region, where we work. Unfortunately, the anniversary year has also brought some sad events. The sudden drop of the world's oil market resulted in closing down 2 Kiviter-type factories and reduction in the number of our employees.

We have been trying to explain to our state, that the oil shale sector is very sensitive to both the prices of the world's oil market and to the relations of CO<sub>2</sub> trade, which have been recently put into effect. We believe that the value chain of oil shale can still grow significantly, if by performing the same amount of digging we can produce more expensive products and more construction materials from mineral wastes. Such a development is, of course, connected with large investments, which VKG is able to carry out with the state's stable resource and tax policy support.

VKG fast development was possible thanks to our workers, who are the best specialists in their sphere and who have definitely deserved gratitude and recognition. Together with personal development we have done very important things and put into effect big investment projects. By keeping our promises and holding to the deadlines together with our technical professionalism we have deserved the respect from our investors. We are very grateful to you for that!

*Priit Rohumaa*

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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**

The entire production is aimed at producing oil.

### ESTONIA

**15 MILLION TONS  
PER YEAR**

Approximately 11 mln tons for production of energy, 4 mln tons for production of oil.

### CHINA

**14.5 MILLION TONS  
PER YEAR**

Very little is used for production of energy, the majority is for production of oil.



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**THE LARGEST OIL SHALE PROCESSING COMPANIES IN ESTONIA**

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Oil shale production in Estonia in 2014

**770 000**  
**TONS OF OIL**

The share of vkg amounted to

**433 000**  
**TONS OF OIL**

Or

**57%**

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## SUBSIDIARIES OF VKG

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### PRODUCTION

#### VKG Oil

oil shale processing

#### VKG Plokk

production of Roclite building blocks

#### VKG Kaevandused

extraction of oil shale

#### VKG Energia

production of heat and power

### SERVICES

#### VKG Transport

railway and vehicle transport services

#### VKG Elektriehitus

construction and repair of electrical systems

#### VKG Soojus

heat network service

#### Viru RMT

assembly, repair and maintenance of industrial equipment

#### VKG Elektrivõrgud

electric power network service and sales

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## RECOGNITION

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- **Responsible Estonian Business** 2010, 2011, 2012, 2013, 2014
- **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





## GEOGRAPHICAL SALES DISTRIBUTION OF THE PRODUCTS AND SERVICES OF VKG

- Estonia
- Latvia
- Lithuania
- Sweden
- Finland
- Norway
- Denmark
- Poland
- Belarus
- Ukraine
- Romania
- United Kingdom
- Netherlands
- Switzerland
- Germany
- Malta
- Austria
- France
- Spain
- Italy
- China
- India
- New Zealand
- Russia
- United Arab Emirates
- Japan
- South 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



**NIKOLAI PETROVIČ**

MEMBER OF THE VKG OIL BOARD, MEMBER OF THE VKG BOARD

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**MAIN INDICATORS IN 2014**


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Number of employees

**2179****PEOPLE**

Profit

**10****MILLION EURO**

Turnover

**194,6****MILLION EURO**

Investments into environment and development

**99****MILLION EURO**


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**THE MAJOR ENVIRONMENTAL AND  
DEVELOPMENT PROJECTS IN 2014/2015**


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**CONSTRUCTION OF THE PETROTER III  
PLANT**

In 2014 the investments into Petroter technology amounted to 66.6 million euro. At present, two shale oil plants are based on Petroter technology. The launching of the third plant is scheduled for autumn 2015. The daily capacity of each plant is 3,000 tons of oil shale. The launching of the third plant (Petroter I was put into operation in June 2010, while Petroter II was launched in September 2014) will more than double the previous production capacity of VKG.

**CONSTRUCTION OF SULPHUR RECOV-  
ERY UNITS AT VKG ENERGIA**

At the beginning of 2015, at the Northern thermal power plant of VKG, the second NID-type sulphur recovery unit was put into operation. Since in addition to SO<sub>2</sub>, the NID-type sulphur trapping technology chosen by VKG also traps SO<sub>2</sub>, it provides a considerable positive effect on the air quality in the area.

**COMPLETION OF THE CONSTRUCTION  
OF THE LIME PLANT AT VKG ENERGIA**

Construction of the lime plant was completed. As a raw material, the limestone remaining from the extraction of oil shale at VKG Ojamaa mine is used, while for lime furnace, the gas generated in the course of shale oil production is used, and the produce of the plant is used for trapping SO<sub>2</sub> from flue gases at VKG Energia power stations, in accordance with the current and future environmental requirements. Such a wise and efficient solution matches the concept of VKG in terms of usage of the by-products of oil shale processing and environmental protection.



**MARGUS KOTTISE**

HEAD OF OJAMAA MINE, MEMBER OF THE VKG BOARD

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**MAIN EVENTS IN THE REPORTING PERIOD**


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**JANUARY 2014**

### HEAVY AND LIGHT OIL PROCESSING EQUIPMENT HAS ATTAINED THE AGE OF 50 YEARS

Heavy and light oil processing equipment is used for removing mechanical sludge, water, and salts from the shale oil obtained at and delivered to the oil plants operating on the basis of Kiviter technology.



**FEBRUARY 2014**

### THE FIRST ROCLITE WALL BLOCKS PRODUCED BY VKG PLOKK WERE USED IN THE CONSTRUCTION PROCESS OF THE AMENITY BUILDING

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.



**MARCH 2014**

### THE SECOND STAGE OF VKG OIL SHALE FEED SYSTEM HAS BEEN LAUNCHED

Due to the launch of the system, the company will be able to reduce the amount of expenses for the transportation of oil shale of the second-rate quality from the enrichment plant at the Ojamaa mine to the final consumer, i.e. the oil plants of VKG Oil. The VKG oil shale feed system has been extended by 700 metres by means of five extra conveyors.



**APRIL 2014**

### LAYING THE CORNER STONE FOR THE PETROTER III PLANT

Petroter is the oil shale technology developed by VKG. The first plant based on this technology was launched in June 2010. In its essence, the new plant is the copy of its „older brothers“ and partly uses the service lines that were laid for the first two plants. The cost of the project has been 80 mln EUR. The plant will be launched in autumn 2015.



**MAY 2014**

### COMPLETION OF THE NEW COMPRESSOR STATION AT VKG ENERGIA

The maximum capacity of the new compressor station is 8,000 m<sup>3</sup> of compressed air per hour. Considering the possible production development perspectives and the relevant increase in the demand for compressed air, the new compressor station has potential for accommodating two more compressors.



**JUNE 2014**

### VKG AND EAS OPENED THE SYNTHETIC RESINS PRODUCTION UNIT

VKG in cooperation with the Enterprise Estonia has opened the synthetic resins production unit on the production territory of VKG in Kohtla-Järve, which produces the raw material for the leading global tire manufacturers. The construction and launching of the equipment have become possible through the support of EAS.

## ARUANDEPERIOODI PEAMISED SÜNDMUSED



AUGUST 2014

### COMPLETION OF VKG ENERGIA LIME PLANT

The lime plant is a perfect example of the industrial environmental investment, which is also economically feasible and is well-integrated with the existing production process at VKG. The plant uses the barren rock produced at VKG Ojamaa mine, and the gas generated as a result of oil shale processing is used as fuel. The produced lime is used for trapping SO<sub>2</sub> in accordance with the environmental requirements. The total cost of the project has been about 6 mln EUR.



SEPTEMBER 2014

### EBRD AND VKG CONCLUDED A LOAN CONTRACT

The purpose of the 35 mln EUR loan contract is to develop the energy production facility of VKG and to improve the environmental protection indicators as well as the efficiency of energy co-generation. The loan provided by the EBRD will be used for financing the construction of two sulphur trapping units and the turbine as well as for the implementation of the lime plant project. Through these investments, the reliability and efficiency of the production facility will be improved, and the amount of emissions of CO<sub>2</sub> and SO<sub>2</sub> will be reduced significantly.



OCTOBER 2014

### GRAND OPENING OF THE PETROTER II PLANT

The plant was launched in August, and it has been operating at full capacity since September. The plant provides the tax revenue to the state in the amount of 14 mln EUR per year. The cost of the entire project has been 65 mln EUR, and together with investments into the development of power engineering, the total sum amounts to over 150 mln EUR. The Prime Minister of Estonia Taavi Rõivas took part in the grand opening of the new plant.



OCTOBER 2014

### COMPLETION OF THE NEW AMENITY FACILITY

One of the largest amenity facilities in Estonia accommodates up to one thousand employees, who can change their clothes, keep personal items, wash and rest there. The investment volume has been over 3 mln EUR.



NOVEMBER 2014

### COMPLETION OF THE SECOND SULPHUR TRAPPING UNIT

NID sulphur trapping unit traps on average up to 2,000 tons of sulphur per year. The cost of the sulphur trapping unit has been about 6.3 mln EUR, and its construction was supported by the Environmental Investment Centre.



DECEMBER 2014

### INSTALLATION OF THE HEAT METER REMOTE READING SYSTEM

VKG Soojus AS has installed the heat meter remote reading system at its facilities in Järve district of Kohtla-Järve, which helps to distribute the heat more accurately, make forecasts concerning its consumption, and spare the customers from the hassle of taking and submitting the meter readings on a monthly basis. Our customers who live in the buildings with heat meters that are read remotely will no longer have to submit meter readings themselves.



**AHTI PUUR**

CHIEF FINANCIAL OFFICER, VICE CHAIRMAN OF THE VKG BOARD

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**PRIORITIES FOR 2015**

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THE SUCCESSFUL COMMISSIONING OF  
THE OIL PLANT **PETROTER III**

**BOOSTING THE ENERGY AND RESOURCE EFFICIENCY**  
WITHIN THE GROUP

IN THE FIELD OF ENVIRONMENTAL PROTECTION, THE  
**COMMISSIONING OF ADDITIONAL SULPHUR TRAPPING**  
**DEVICES AND THE COMMISSIONING OF THE LIMESTONE PLANT**

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**ESTIMATED NUMBERS FOR 2015**

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Number of employees

**2000**  
**PEOPLE**

Oil shale processing volume

**2.9**  
**MILLION TONS**

Oil shale extraction volume

**2.8**  
**MILLION TONS**

VKG's share in the state tax revenues

**1%**  
**OR 45 MILLION EURO**



# ECONOMIC INDICATORS

## CONSOLIDATED INCOME STATEMENT

IN THOUSANDS OF EURO, UNAUDITED DATA

	2011	2012	2013	2014
Return on Sales	183 567	215 754	220 406	194 531
Cost of Goods Sold	129 231	164 599	181 367	172 767
<b>GROSS PROFIT</b>	<b>54 336</b>	<b>51 155</b>	<b>39 039</b>	<b>21 764</b>
Marketing Costs	3 563	4 923	5 802	3 734
Administrative Overhead	8 974	16 137	12 224	13 026
Other Revenue	6 054	15 611	6 915	10 926
Other Operating Costs	12 262	7 171	4 193	2 832
<b>OPERATING PROFIT</b>	<b>35 591</b>	<b>38 533</b>	<b>23 734</b>	<b>13 099</b>
Financial Income and Costs	-5 980	-3 230	-3 974	-3 101
<b>PROFIT BEFORE INCOME TAX</b>	<b>29 610</b>	<b>35 304</b>	<b>19 760</b>	<b>9 998</b>
Extraordinary Expenses				
Income Tax	170	436	315	
<b>NET PROFIT FOR THE FISCAL YEAR</b>	<b>29 440</b>	<b>34 867</b>	<b>19 445</b>	<b>9 998</b>

## INVESTMENTS INTO DEVELOPMENT ACTIVITIES

IN MILLIONS OF EURO

44	2011
46	2012
75	2013
90	2014

## INVESTMENTS INTO ENVIRONMENTAL PROTECTION AND OCCUPATIONAL SAFETY

IN MILLIONS OF EURO

2	2011
2	2012
4	2013
9	2014

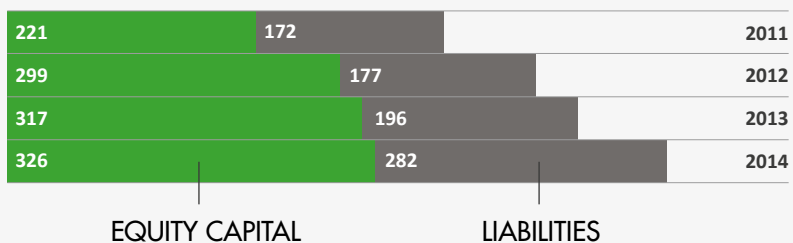
## CONSOLIDATED BALANCE SHEET

IN THOUSANDS OF EURO, UNAUDITED DATA

	2011	2012	2013	2014
<b>ASSETS</b>				
Current Assets	53 385	75 949	85 162	116 117
Fixed Assets	339 828	400 109	428 397	491 701
<b>TOTAL ASSETS</b>	<b>393 212</b>	<b>476 058</b>	<b>513 559</b>	<b>607 818</b>
<b>LIABILITIES AND EQUITY CAPITAL</b>				
Short-Term Liabilities	65 694	88 692	72 028	98 896
Long-Term Liabilities	106 214	88 480	124 124	183 045
<b>Total Liabilities</b>	<b>171 908</b>	<b>177 172</b>	<b>196 152</b>	<b>281 941</b>
<b>Equity Capital</b>	<b>221 305</b>	<b>298 886</b>	<b>317 408</b>	<b>325 877</b>
<b>TOTAL LIABILITIES AND EQUITY CAPITAL</b>	<b>393 212</b>	<b>476 058</b>	<b>513 559</b>	<b>607 818</b>

## BALANCE SHEET TOTAL

IN MILLIONS OF EURO





**JAANUS PURGA**

R&D DIRECTOR, MEMBER OF THE VKG BOARD

# R&D ACTIVITIES

**The research and development activities carried out by VKG in 2014 are characterized by the ongoing work on the existing projects and investments during the year, with a sudden slow-down of R&D activities and their partial suspension in the end of the year due to a sharp fall in oil prices.**

In 2014, the R&D activities involved the following:

- **expansion of production**
- **resource saving**
- **energy saving**
- **sale of know-how**
- **biofuel**

While we have been dealing with the expansion of production as well as resource and energy saving for years, the sale of know-how related to oil shale processing outside of Estonia as well as using biofuel in the shale oil production process took place for the first time in 2014.

## EXPANSION OF PRODUCTION

In 2014, the construction of the oil plant Petroter II and of the limestone plant was completed, while the construction of the oil plant Petroter III continued. Petroter II was commissioned in August, and within three weeks after commissioning the plant reached its full capacity. In September the production capacity of the plant reached 115%. Besides, the overall production volume at the oil plant Petroter II exceeded the expected amounts. Taking into consideration the complexity of technology, such a speed is an incredible achievement on the part of the teams of VKG and VKG Oil.

## RESOURCE AND ENERGY SAVING

As far as liquefying the oil shale gas is concerned, the improvement of the entire oil shale value chain is an extremely promising field of development, which would allow to use the resources more efficiently. In 2014, VKG built the pilot equipment for liquefying the oil shale gas, and a series of successful tests was held. On the basis of the results of the tests, a technological solution was developed for the purposes of industrial application, and the relevant stagewise investment plan for the next few years was prepared.

In August, the limestone plant of VKG Energia also delivered the first batch of produce. At the limestone plant, it is intended to use the VKG oil shale gas as fuel, and the mine waste from the Ojamaa mine will be partially used as a raw material. The produced limestone is mainly used in sulphur trapping devices at VKG Energia, and from 2016, the whole amount of the produce of the plant will be used for that purpose. The limestone plant is, first of all, a project aimed at environmental protection – the by-products of oil shale production and mining are recycled, and the produce is used up completely, which means the reduction of the amount of emissions into the atmosphere.

In 2014, the use of oil shale mine waste in road construction outside of the group extended significantly. Such use of oil shale mine waste is very beneficial for the environment, since it allows to avoid the opening of the new gravel and limestone quarries and the accumulation of mine waste deposits.

## THE SALE OF KNOW-HOW

In the first part of 2014, VKG made an offer about the sale of know-how and entered into a contract for carrying out the technological cost-benefit analysis for Jordan oil shale on the basis of Kiviter technology. It was a very important milestone in the history of both VKG and the entire modern history of oil shale processing in Estonia – the engineering services related to oil shale technology were sold outside of Estonia on the international level for the first time ever.

In the second part of the year, a contract for the sale of the know-how about Petroter technology and engineering services was prepared, and it was signed in January 2015.

## BIOFUEL

The production of liquid fuels made from renewable raw material using pyrolysis, simultaneously with the production of oil shale, is a promising trend in the R&D activities of VKG. Combining biofuel with oil shale fuel will add value to the energy portfolio offered by VKG in the future.

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## THE MOST IMPORTANT ONGOING PROJECTS AND THE PROJECTS TO BE LAUNCHED IN 2014

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- **Construction of the oil plant Petroter II**, start of the production process.
- **Construction of the oil plant Petroter III** (planned start-up in summer 2015).
- **Construction of the limestone plant**, initial start-up, production start-up.
- **Extensive use of oil shale mine waste outside of the group** in the field of road construction.

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## THE MOST IMPORTANT RESEARCH AND DEVELOPMENT ACTIVITIES IN 2014

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- Pilot testing of the **process of liquefying the oil shale gas and the cost-benefit analysis**.
- **Constructing sill mats** on the basis of oil shale ash in the Ojamaa mine.
- Extensive research of the **possibilities of using oil shale ash**, initiation of the certification of ash.
- Developing the concept of the production of **fuel oil on the basis of biomass**.



**MEELIS ELDERMANN**

TECHNICAL DIRECTOR, MEMBER OF THE VKG BOARD

# ENVIRONMENTAL ACTIVITY

**VKG's environmental activity is one of the backbones of the economic and development activities as well as social responsibility of the group. The investments of Viru Keemia Grupp AS into environmental protection are among the largest in the country, and we have already invested over 64 million euro. For 2012–2020 we have planned additional environmental investments of over 50 million euro.**

In 2014 we mainly continued the implementation of environmental activities and the projects that were started in previous years in connection with the enforcement of the Industrial Waste Directive. We paid a lot of attention to the quality of ambient air and the possibilities for its improvement. The works related to decreasing the amount of air pollutants are almost completed, and the relevant activities are going to continue until summer 2015.

The works aimed at the reconstruction of the container park of the oil removal plant at VKG Oil AS were completed. Besides, the monitoring equipment was updated and the new systems for continuous monitoring were purchased, as a result, all of the largest pollution sources (smokestacks) on the territory of the group were equipped with the equipment for continuous monitoring.

In addition to the above-mentioned, the reduction of SO<sub>2</sub> emissions has been one of the priorities both last year and this year. The second sulphur trapping device was installed, and at the moment, the group is getting ready for the construction of the third sulphur trapping device. The report concerning the environment-related frames of reference applied at the enterprises of our group was prepared, on the basis of which the level of pollution of soil and ground waters will be fixed, and monitoring activities will be carried out.

The reconditioning of the ash landfill has reached its final stage, and it will be completed in 2015. In addition to that, the research of the new technology for co-storage of ash and semi-coke, generated in the course of production of shale oil, was completed. This technology will also help to recycle wastewaters and stormwaters without doing any harm to the environment, which in its turn will significantly reduce the load on wastewater purification equipment and different bodies of water.

Since the group is developing very fast, the model of the pollution sources of the ambient air has been updated on a regular basis in order to provide the comprehensive assessment of the environmental impact. The assessment of the environmental impact of the

expansion of the Northern thermal power station of VKG Energia was also completed. Special attention was paid to the quality of ambient air in Kohtla-Järve and the measures for its improvement.

More attention than earlier has been paid to noise. Even although the threshold level of noise has not been exceeded so far, VKG wishes to keep the noise at the same level while expanding the production volume. In order to achieve this goal, all new noise-generating pieces of equipment are now equipped with noise absorption devices or installed in enclosed spaces.

The research of the most effective methods of phenol waters purification was completed. Last year as well as this year the implementation of the project of additional phenol water purification will be continued.

In 2013 WSP Environment & Energy carried out a thorough audit of the environmental impact and the working environment at VKG. According to its results, VKG is operating using the best possible technology (BPT) and in accordance with the environmental requirements and policies established by the European Union. In 2014 the European Bank for Reconstruction and Development (EBRD) provided a loan for the implementation of several important environmental projects of the group.

The fast development of the group, on the one hand, and the requirements in the field of energy policy and energy efficiency on the other hand, set higher requirements for management systems. In connection with the above-mentioned, a new project management method was implemented at VKG group in 2014, which provides a more thorough overview of the key performance indicators (KPI). The Petroter 2 and Petroter 3 oil plants and the expansion of the Northern thermal power station of VKG Energia OÜ are going to offer a great opportunity for boosting energy efficiency within the oil shale value chain. Investments will be made into the construction of boilers and turbines for harnessing the potential of residue gas (semi-coke gas) generated at Petroter plants. The turbines and boilers will allow to produce thermal energy and electricity. Thus, a production chain will be created that will add the maximum value to oil shale.

It is important that the large projects mentioned above are managed on the basis of uniform standards, and the management boards of all of the subsidiaries should monitor the important environmental, resource, and energy efficiency performance indicators closely within the entire period of project implementation.

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## MAIN RESEARCH PROJECTS AND PLANS COMPLETED OR INITIATED IN 2014

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- the **energy audit report** for the group was prepared
- the assessment of the **environmental impact of Sonda excavation field** was initiated – basic research was completed
- the report on the **pollution level of soil and surface waters** on the industrial territory of VKG was completed
- the **technology for co-storage of ash and semi-coke** at VKG was developed
- the **REACH research** of the marketed products was done, and registration dossiers were updated

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## MAJOR PROJECTS FOR DIMINISHING THE ENVIRONMENTAL IMPACT IN 2015

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**It has been planned to invest ca 20.5 mln EUR into environmental projects this year.**

- **Reconditioning** the old damp ash landfill
- **Building boilers and turbines** necessary for harnessing the energy potential of residual gas generated at Petroter plants
- **Construction of phenol water purification equipment** at Petroter plants of VKG Oil AS
- **Reducing the amount of pollutants** impairing the ambient air quality on the VKG industrial territory in Kohtla-Järve – the final stage of the project
- Getting ready for the construction of the **third sulphur trapping device** at VKG Energia OÜ



# SOCIAL RESPONSIBILITY

VKG'S INTEGRAL POLICY OF SOCIAL RESPONSIBILITY AND SUSTAINABLE DEVELOPMENT WAS FIRST DEVELOPED IN 2009. WE ARE REALLY HAPPY TO BE ONE OF THE LEADING PROMOTERS OF THE SOCIAL RESPONSIBILITY CONCEPT IN ESTONIA AND IN IDA-VIRUMAA IN PARTICULAR. TOGETHER WITH NINETEEN OTHER ENTERPRISES, THE ASSOCIATION OF RESPONSIBLE ENTREPRENEURSHIP IN ESTONIA WAS FOUNDED IN DECEMBER 2012 BY VKG, AIMED AT POPULARIZATION AND PROMOTION OF THIS CONCEPT AMONG THE ESTONIAN ENTREPRENEURS AND ON THE NATIONAL LEVEL.



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



### ENVIRONMENTAL CONSERVATION

The goal of VKG is to eliminate or minimize industrial impact. In our activities, we are pursuing the aim of showing that a large industrial enterprise can also be socially responsible, environmentally-friendly, and use resources efficiently. The group makes the largest investments into environmental protection, which are also one of the most considerable in Estonia in general. We are planning to invest over 60 mln EUR into environmental protection by the year 2020.

### OUR EMPLOYEES

The employees are the most valuable asset of any modern enterprise. The group is really happy to have the employees that are as loyal as ours, who highly value the working environment and the workplace tools provided by the company as well as motivation packages, extra bonuses, and the fact that we are striving to preserve industrial traditions. VKG's commitment to its employees manifests itself through numerous initiatives. Among them we can name the traditional annual events, such as the Miners' and the Chemists' Day, held by VKG. The "Thank You" event, in which we express gratitude to our former employees and other local people who have made their contribution into the development of the life of Kohtla-Järve and the entire region, has also become a tradition. The employees of the group are involved in charity and voluntary work. There is a strong trade union operating at the company, and the collective agreement has been concluded between the group and its employees.

### VIRUMAA REGION WHERE VKG OPERATES

The priority of VKG is to support Virumaa and the social activities beneficial to the organizations that operate here, to its people and local associations. The group pays special attention to the development of the region, keeping in touch with the local authorities and citizens. VKG provides support to important projects contributing to the development of local life. The aim of VKG is to invest a part of the profit it earns back into the region where it operates.

### EDUCATION, CULTURE, AND SPORT

VKG supports both nationally important organizations and small scale local events. Special attention is paid to sports, cultural, and educational initiatives. A number of important cultural projects were implemented in cooperation with Eesti Kontsert (Estonian State Philharmonia), Rahvusoper Estonia (National Opera "Estonia"), the largest Estonian art schools. Every year, in cooperation with Jõhvi Kontserdimaja (Jõhvi Concert Hall), VKG helps to hold one of the largest and the most colorful cultural events in Ida-Virumaa, namely the Jõhvi Ballet Festival, which is becoming increasingly popular outside of Estonia as well.

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

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### VIRUMAA PHOTO COMPETITION "YOU ARE BEAUTIFUL, VIRUMAA!"

[www.vkgsoojus.ee/konkurss](http://www.vkgsoojus.ee/konkurss)

The competition is judged by **Evelin Ilves** and **Kaupo Kikkas**.



### ELECTRICAL SAFETY CAMPAIGN FOR CHILDREN

[www.vkgev.ee/lastele](http://www.vkgev.ee/lastele)

The aim is to teach children at kindergartens and primary schools of Ida-Virumaa the basic rules of using electricity and electrical equipment



### MINERS' DAY

[www.vkg.ee/est/sotsiaalne-vastutus/vkg-regiooni-heaks/traditsioonilised-uritused](http://www.vkg.ee/est/sotsiaalne-vastutus/vkg-regiooni-heaks/traditsioonilised-uritused)

This event is a manifestation of respect and a deep bow to all miners and local people. In cooperation with Eesti Energia.



### CHEMISTS' DAY

[www.vkg.ee/est/sotsiaalne-vastutus/vkg-regiooni-heaks/traditsioonilised-uritused](http://www.vkg.ee/est/sotsiaalne-vastutus/vkg-regiooni-heaks/traditsioonilised-uritused)

Annual public celebration held at the initiative of VKG.



### INVOLVING THE CHILDREN OF IDA-VIRUMAA INTO THE HISTORICAL "FIVESCHOOL" COMPETITION BETWEEN THE BEST ESTONIAN SCHOOLS

[www.vkg.ee/est/sotsiaalne-vastutus/vkg-algatused/viie-kooli-voistlus](http://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

VKG is the first and so far the only Estonian enterprise which discloses all of its data concerning the use of resources and environment in conformity with the World Social Responsibility reporting standard GRI G3. In 2014 our sixth report was released.

VKG communicates with the local people open-mindedly. Meetings with the locals take place regularly, in the course of which the development trends of the group and the environmental issues are discussed.

One of the first Estonian people's initiatives in the field of environmental protection also originates from Ida-Virumaa, namely the **PurFest** festival, the aim of which is to protect the Purtse River. VKG has been supporting and assisting the initiative for years.

Several times a year 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. In 2014 about 500 school pupils visited our production facilities.

Every year, on the last Thursday of May, the traditional **Day of the Environment** is held, which deals with one of the most important problems in the area. The event is visited by the most prominent figures of Virumaa and the whole of Estonia, by the local citizens and the people who are in charge of the environmental issues. In 2014 the main topic was heritage pollution.

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.



## IN ADDITION TO THAT, IN 2014 VKG ALSO SUPPORTED THE FOLLOWING EVENTS AND ORGANIZATIONS

### ORGANISATIONS

Ahtme Art School  
 Lügänuuse John the Baptist congregation  
 Ida-Virumaa Sports Association  
 Jõhvi Culture and Hobby Centre  
 Kiikla Children's Home  
 Kirderanniku Choir  
 Kohtla Mining Park and Museum SA  
 Kohtla-Järve Järve Gymnasium  
 Kohtla-Järve Järve Russian Gymnasium  
 Kohtla-Järve Cultural Centre  
 Kohtla-Järve Children's Home  
 Kohtla-Järve Maleva Secondary School  
 Non-Profit Association "Alutaguse Ski Club"  
 Non-Profit Association "HTG Graduates Club"  
 Non-Profit Association "Külaselts KAI"

Non-Profit Association "Punnvõrr"  
 Non-Profit Association "Purtse River Development Center"  
 Non-Profit Association "Vajangu Firefighters society"  
 Non-Profit Association "Tumemaine tuli"  
 Non-Profit Association "Vaba kunst"  
 Non-Profit Association "Virumaa Kultuurisõbrad", Kukruse polar manor  
 Mäetaguse Kindergarten "Tõruke"  
 Porkuni School  
 National Opera "Estonia"  
 RSK "Jõhvikas"  
 Foundation of Ida-Viru Enterprise Center  
 Sports Centre "EVS Nimfeja"  
 Tae Kwon Do Club "Tekken"

Dance Group "Virulane"  
 Mining Institute of the Tallinn University of Technology

### EVENTS

Alutaguse ski marathon  
 Avo Talpas memorial competition  
 ELO winter games  
 Kiikla village sports day  
 Concert "Mõisatuled" at Maidla manor  
 Maidla Manor Days  
 Rescue camp for children  
 Eurovision song contest of the students of the Tallinn University of Technology  
 Competition between five schools

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

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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 on behalf of VKG over the past eight years. VKG's support of the sport's development in the country will continue for at least the next four years.

Priit Piilmann was elected president of the Wrestling Federation in 2012.



"All sporting achievements are built on total commitment and pushing yourself to the limit tens and hundreds of times. My important titles and the support of Estonian people and fans have justified this effort and made me eager to hold the Estonian flag up high in the world."

**HEIKI NABI**

OLYMPIC SILVER MEDALLIST, 2012 LONDON SUMMER OLYMPICS

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**VKG SUPPORTS**


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### EESTI KONTSEERT (ESTONIAN STATE PHILHARMONIA)

VKG has been sponsoring Eesti Kontsert since 2009. In cooperation with the Jõhvi Concert Hall, VKG has established several initiatives for the promotion of local cultural life: Jõhvi Ballet Festival, Virumaa Photography Competition, Kaljo Kiisk Grant for young filmmakers. We have also held the Virumaa forest planting event together with the employees of both companies.



### NATIONAL OPERA "ESTONIA"

In September 2013, Viru Keemia Grupp became the main sponsor of the National Opera "Estonia". Owing to VKG's support, in November 2014, the Rimsky-Korsakov's opera "The Snow Maiden" (Snegurochka) was brought to Estonia for the first time. The best leading opera singers in the world took part in the performance.



### ESTONIAN ACADEMY OF ARTS. TARTU ART COLLEGE

In spring 2012, VKG signed cooperation agreements with the two largest art universities in Estonia. The purpose of this cooperation is to create opportunities for students, which support the organization of studies as well as summer practice.



### ART MUSEUM OF ESTONIA

The cooperation between VKG and Art Museum of Estonia started in the beginning of 2014. The first project supported by VKG will be the fashion exhibition "A Moveable Feast. Art Deco Fashion Design from Alexandre Vassiliev's Collection" (10.10.2014—February 2015) in Kumu Art Museum. By coincidence, it perfectly appeals to the period in which the oil shale industry itself originated.



# 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

A full-page photograph of a male worker in a dark underground setting. He is wearing a yellow hard hat with a headlamp, a blue high-visibility jacket with reflective stripes, blue overalls, and green rubber boots. He is standing next to a yellow excavator, with his right hand resting on its large, treaded tire. The excavator has 'ST7' written on its side. The background is a dark, rocky tunnel.

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.

## THE PROJECT WHICH IS WORTH 90 YEARS OF THE INDUSTRY DEVELOPMENT



The enriched oil shale is produced as output in the result of oil shale mining and enrichment activities, and as a by-product, the crushed limestone is obtained from certified mine waste. The Ojamaa mine produces about 1.5 million tons of crushed limestone a year, which is used as construction material in road construction, landscape design, as the filling material, etc. The architectural bureau “Kadarik Tüür Arhitektid” in cooperation with the team working at the Ojamaa mine have developed the innovative way of recycling of barren rock, namely it will be used for the construction of the pyramid park.

The architects were inspired by the pyramids located in different parts of the world, and they decided to join them in a single project. This is how the idea was born about how to use the artificial landscape in order to make the area more attractive.

While in real life one can enjoy the pyramids only from the outside, and as a rule, it is quite difficult and dangerous to climb

on top of them, the pyramids in the Aidu pyramid park will be equipped with ramps which will be quite easy to use. According to the plan, the largest pyramid in the world, which will be 154 metres high, will also be built in Aidu, and the visitors will be able to climb on top of it using the ramps without any danger to their lives or health. The first pyramid may be completed by 2020, and the visitors will be able to witness how the history is made right from its top. Important sights will be created within the frames of this project, and the structures will even be visible from space. Undoubtedly, this will be something much more exciting than just another hill of barren rock.

At the same time, it should definitely be mentioned that the project also needs assistance from the Ministry of the Environment. Relevant changes must be introduced into waste regulations, to make it possible to create a real culturally valuable object from the mining waste. However, we hope that this bright idea will find its way through various legal acts and regulations.

An aerial photograph of a lush green forested valley. A railway line with several tracks runs diagonally across the scene. A long, elevated conveyor bridge with a metal truss structure spans across the valley, crossing over the railway tracks. The surrounding area is densely wooded with tall trees. The text "OIL SHALE PROCESSING" is overlaid in the center of the image.

# OIL SHALE PROCESSING

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. No dust or emission gases are generated in the course of oil shale supply. The conveyor does not do any damage to the roads, and it is virtually noiseless.

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.

The processing of oil shale takes place on the basis of two processing technologies: Kiviter on the basis of crushed stone, which is used at four oil shale processing factories built in 1940-1990\*, and Petroter on the basis of fine stone, which is an environmentally-friendly oil shale processing technology improved by the engineers of the group. The final product generated by the equipment, operating on the basis of both technologies, are fuel oils for boiler rooms and marine fuel additives. The heaviest oil fraction is, among other fields of application, also used for producing electrode coke. In 2014 the volume of oil shale processing at the company was 2.8

mln tons of oil shale, while the volume of the end product amounted to 433,000 tons of crude oil.

VKG Oil is actively developing its production capacity. In December 2009 the plant Petroter I was launched and it has been operating at full capacity for several years now. In August 2012, construction of the Petroter II plant was started, and in October 2013, construction of the Petroter III plant commenced.

In August 2014, the Petroter II plant was launched successfully at VKG, which reached its full capacity less than within a month. Petroter-type plants are based on the technology which has been developed by VKG itself. The launching of Petroter III is scheduled for autumn 2015.

The engineers at VKG have developed a project, the implementation of which will allow to produce diesel fuel oil with the Euro V quality from local crude oil. The follow-up oil processing facility is the next large project for VKG after the successful launch of the plant Petroter III.

\* Due to the situation at the global petroleum market and the national tax and resource policy, VKG was forced to stack two Kiviter oil plants. The plants have been idle since December 2014.

## THERE IS A GOOD REASON TO BE PROUD



### OPENING OF PETROTER II OIL PLANT

OCTOBER 2014

**The grand opening of the second new-generation Petroter II oil plant at VKG took place in October 2014.**

“A private investment in the amount of 70 mln EUR is very unusual for Estonia, and we should be proud of it. It helped to create new workplaces in Ida-Virumaa and to bring the annual tax revenue to the state which equals, for example, the volume of the budget of the town of Rakvere. This is really important”, said Taavi Rõivas, the Prime Minister of Estonia, who took part in the opening ceremony. He credited VKG with the ability to squeeze out the maximum of every single bit of oil shale.

While a whole year passed from the moment when the Petroter I

plant had been completed in autumn 2009 until it reached its full capacity, the second plant reached its nominal-rated capacity within a month after being launched.

A fast and successful launching of the new plant is a huge success for the whole group. Once again, it proves that VKG has once made the right decisions, since both the team and the equipment are functioning flawlessly.

The plant is operating at full capacity and provides jobs both directly and indirectly to almost five hundred people and brings tax revenue to the state in the amount of 14 mln EUR per year.

A woman with long blonde hair and bangs, wearing a blue lab coat over a white t-shirt, is shown in profile. She is holding a small, clear vial with a blue cap in her right hand, looking at it intently. The background is a blurred laboratory setting with shelves and equipment. The text "OIL SHALE CHEMISTRY" is overlaid in the center of the image.

OIL SHALE  
CHEMISTRY

The most valuable part of the Estonian oil shale are fine chemicals with a significant reaction capacity generated from the oil shale - alkylresorcinols. They are used in pharmaceutical and cosmetics industries as well as in machinery and tyre manufacturing industries.

VKG is the only company in Estonia that is capable of extracting those expensive substances from oil shale, using the oil by-products at the factories operating on the basis of the Kiviter technology. Smart modern technologies, equipment, and professional staff are used in the production process.

The engineers at VKG Oil are able to produce fine chemicals with the high level of purity (over 99%) in tens and even hundreds of tons. Fine chemicals are quite expensive, and their price can exceed several hundreds of euros per one kilogram.

In the future it is planned to increase this capacity. The largest customers are well-known companies in the European Union, Japan, and India. The enterprise is also continuously carrying out successful development work in the production of other phenol compounds. In 2010 it became possible to extract some new fine chemicals from the local oil shale. Development works continued in 2012 and 2013.

Fine chemicals are also used in electronics, for example, in the production of Samsung TV screens.

At the same time, the group launched a separate webpage for marketing the new compounds: [www.finechem.eu](http://www.finechem.eu)

The second largest area of application of oil shale chemicals are resins. For instance, in 2012 a new resin production device was launched, whose raw material, the so-called red resin, is purchased by the largest tyre manufacturers in the world. The construction of the device was supported by the Enterprise Estonia Foundation (EAS). The device is currently operating at full capacity.

Besides, alkylresorcinols are also used in the production of rubber and automobile industry products for such globally well-known brands as Lexus and Toyota.



# OIL SHALE ENERGY

WHILE OIL SHALE OIL SUPPLIES ENERGY TO THE BOILERS  
AND MACHINES OF THE CUSTOMERS OF VKG, THE OIL  
SHALE GAS CREATES VALUE WITHIN THE ORGANIZATION.

Two companies are dealing with the production of energy in the group - VKG Soojus and VKG Energia.

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 400 MW. Electric production capacity is 68 MW, and after the first turbo generator set is commissioned (August 2015), the electric production capacity will reach 95 MW. The construction of the new 27 MW turbine will allow to generate electricity in condensation mode more efficiently.

The use of the turbine with the capacity of over 25 MW allows to co-generate heat and electricity more efficiently. At the beginning of 2013, the project was launched to build another turbine, which is going to be completed in August 2015.

The launching of the plants Petroter II and III will be accompanied by a significant increase in electricity-generating and heat-production capacities of VKG Energia. The increase in capacity has been planned for the years 2015 and 2016, but the next renovation stage at the energy-generating facility has already started, in the course of which the whole energy production process will be taken to a new level. The main changes will affect the water and combustion gases purification process as well as the production of heat and electricity. At the beginning of 2015, the construction of the second sulphur trapping device was completed, and up to two additional sulphur trapping devices are expected to be built in the following years. VKG Energia is the first enterprise in Estonia that started using sulphur trappers in its production process.

In 2014 the first stage of construction of the plant for purification of demineralized water was completed. The operation of this piece of equipment is closely connected with Petroter II and Petroter III plants, since the feedwater with very high level of purification is used in the boilers at those plants. Besides, the use of demineralized water in different processes allows to boost the reliability of the equipment.

## REMOTE READING SYSTEM AT VKG SOOJUS

VKG Soojus is installing the remote reading system for heat meters. The successful implementation of this project will allow to distribute heat more accurately, make forecasts concerning its consumption, and make it easier for the customers to take and submit the readings.

The additional aim of this project is to reduce the amount of losses, including the losses which occur through the inaccurate

submission of meter readings, and to keep under strict supervision those parts of the heating main which need closer attention due to being in need of repair or replacement. At the same time, the remote reading system will spare the customers from the hassle of submitting the readings monthly and allow to monitor heat consumption through the self-service customer program.



A worker in a red hard hat and high-visibility jacket is using a circular saw to cut a metal pipe in an industrial setting. The worker is wearing safety glasses and gloves. The background shows a factory environment with metal railings and pipes. The text "PRODUCTION OF CONSTRUCTION MATERIALS" is overlaid on the image.

# PRODUCTION OF CONSTRUCTION MATERIALS

IT IS THE MISSION OF VKG TO VALUE ESTONIAN OIL SHALE BY WAY OF OPENING ITS COMPLETE POTENTIAL. THE ORGANIC SIDE OF OIL SHALE DOES NOT PROVIDE MUCH OF A PROBLEM IN THAT RESPECT, BUT THE MINERAL PART OF IT, I.E. THE RESIDUES LEFT FROM ITS PROCESSING, ON THE CONTRARY, REQUIRE THOROUGH DEVELOPMENT WORK AND THE COURAGE TO MAKE INVESTMENTS.

## 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](http://www.roclite.eu).

## LIME PRODUCTION

In summer 2014 the lime plant was completed at VKG, which uses lime produced at the Ojamaa mine as raw material and also produces lime used by sulphur trapping equipment. In Estonia Viru Keemia Grupp has developed a unique solution which makes it possible to produce lime from the low grade marginal lime obtained in the course of the production process at the Ojamaa mine, which is extracted to the surface together with oil shale.

Consequently, within the framework of the present project, on the one hand, the sulphur trapping equipment was commissioned. On the other hand, the lime plant was built, which produces the sorbent material required for the proper functioning of the NID-system from the material obtained while mining oil shale.

The entire project (sulphur trapping equipment and the lime plant) follows the production logic of VKG as well as the aim of adding the maximum value to both the organic and mineral potential of the Estonian oil shale and saving other natural resources, such as lime.

The amount of investments into the designing and construction of the lime plant has amounted to about 6,000,000 EUR. The cost of the recently completed sulphur trapping equipment NID II has been ca 6,300,000 EUR (the estimated sulphur trapping efficiency is 92%).

The construction of the VKG Energia OÜ sulphur trapping system has been supported by the Environmental Investment Centre in the amount of 411,564 EUR. Besides, both projects have been financed by one of the most environmentally friendly European banks, i.e. EBRD, which provided a loan and has regarded this solution as unique and worth proper financing.

## 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 process 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.

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## OUR VISION

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The most important aim and motivation of VKG is to use up the energetic, chemical and mineral potential of oil shale completely and to achieve the largest possible added value. According to the vision of VKG, by 2025, diesel fuel oil and fine chemicals will be produced, while the oil shale mineral waste will be used for the production of cement and ash blocks. Luga-nuse rural munic-

ipality is planning to use the barren rock being the by-product of the excavation operations at the Ojamaa mine for the construction of the pyramid higher than the Egyptian pyramids. At the same time, the research is being carried out about how to use the local barren rock in road construction instead of the crushed stone that is imported from abroad.

THE COMPANIES  
SUPPORTING THE  
MAIN PRODUCTION  
AREAS OF VKG



## VKG ELEKTRIVÖRGUD

**In terms of the sales volume, VKG Elektrivõrgud is the second largest electricity distribution enterprise in Estonia after Elektrilevi, which belongs to Eesti Energia.**

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 area with the population of about 100,000 people is supplied with electricity through the lines of VKG Elektrivõrgud. VKG Elektrivõrgud has four high voltage substations (110 kV), eight medium voltage substations (35 kV), 355 medium voltage substations with the voltage of 6 kV and 10 kV, 409 km of overhead lines and 501 km of cable lines.

The following services are also provided: electrical equipment, design, construction, repair, application, inspection and maintenance.

Starting from 2012 the company has been offering different electricity price packages to its customers. In 2014 the company had on average the cheapest price for common power supply service in Estonia.

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 2014 2,862,000 EUR 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 2014, technical and commercial losses of VKG Elektrivõrgud (the difference between the amount of energy entering and leaving the network) amounted to 6.8%.
- The System Average Interruption Frequency Index (SAIFI) was 1.233 in 2013 and 0.641 in 2014.
- The company is planning to make all meters available for remote reading by 2017. As of the end of 2014, 77% 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.
- VKG Elektrivõrgud is one of the best employers in the area.
- 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.

## 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.

- 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, Elektroskandia Baltics, SLO Eesti, Esvika Elekter, Onninen.
- In 2014 VKG Elektriehitus started the implementation of the largest project in its history, in the course of which the 110 kV substation of the Northern thermal power station of VKG Energia OÜ will be designed and built. The cost of the project is 3.2 mln EUR.
- In 2014, the turnover of the company exceeded 4.2 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, ISO14001 and OHSAS 18001 standards.



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## VKG TRANSPORT

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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 AREAS OF ACTIVITY INCLUDE:

- 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 > services related to special road transport
- Motor transport special services
- railway construction, maintenance and repair services
- weighing of railway wagons
- domestic container transportation
- transportation of hazardous waste
- services of a safety advisor working on road transportation

### FACTS

- VKG Transport has been operating since 1999
- In 2014 159 employees worked in the company.
- In 2014, the turnover amounted to 18 mln euro, while the profit was 2 mln euro
- About 70% 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.
- VKG Transport is the largest transportation enterprise dealing with transporting hazardous chemicals in the Baltic region.
- The amount of investments in 2012 reached 0.6 mln 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.
- 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.



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## VIRU RMT

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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 and repair of technical equipment;
- design, production, repair and installation of technical equipment;
- construction and general construction contracting, including construction and repair of water supply, sewerage, and engineering systems;
- automatic management systems design, software development and installation, installation and repair of control and measuring instruments;
- implementation of turnkey technical solutions;
- maintenance and repair of lifting equipment as well as lifting operations;
- project management

### FACTS

- In 2014, 324 people were employed at the company.
- In 2014 the company took active part in the construction of the oil plant Petroter II. The following works have been carried out:
  - Production and installation of the electric filter;
  - Design, production and installation of the internal fuel feed system;
  - Design, production and installation of the stormwater and sewage systems;
  - Automation of Petroter II.
- In 2014 the NID II sulphur trapping device was installed at VKG Energia
- In 2014 the construction of communication lines between different workshops at Petroter II and III started.
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- At the end of 2014, the construction of Petroter III started. The volume of construction works is larger than the volume of construction works for the Petroter II plant.
- 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 12.8 mln EUR.
- The company holds the certificate ISO 9001:2000 (TÜV) and the Occupational Health and Safety Management Certificate OHSAS 18001 as well as EN 3834-2 certificate. The process of certification and implementation of the EN 1090-1 standard is going on at the moment.



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