

Yearbook 2012

OPEN - DEVOTED - ASPIRED





VK
VIRU KEEMIA G



VKG
VIRU KEEMIA GRUPP

KG
GRUPP



VI
VIRU KEEMIA



Oil shale is currently the main source of energy in Estonia and it will remain a very important source of energy for us in the foreseeable future. If we learn to value oil shale better and with more versatility than before, also placing emphasis on care for the environment, we are acting wisely. I am very glad that VKG is one of the strong leaders in this field and I hope that we can receive our own Estonian diesel fuel from the Ojamaa oil shale.

Let us recognise the miners and engineers related to the opening of the new mine. Thanks to you, Estonian homes are warm and bright, our e-State is functioning. Thanks to you, Estonia is currently one of the least dependent countries on the import of energy in the European Union. This in turn is an Estonian security and independence matter.



President **Toomas Hendrik Ilves**

Opening of the Ojamaa mine, 31 January 2013

Within the framework of opening the Ojamaa mine on 31 January 2013, VKG dedicated a unique exhibition called “**Miner**” to its miners. This page shows the leading photograph of the exhibition, portraying **Vadim Lavrenko**, an Ojamaa miner. The photograph was awarded 1st prize in the US contest “Wedding and Portrait Photography”. The author of the exhibition is **Kaupo Kikkas**.



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We live in a time of rapid development of the oil shale industry

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There is a saying: what does not kill you only makes you stronger. Our chemical industry went through hardships in the course of its long history and has grown stronger and implemented extensive changes namely by overcoming those hardships.

Establishment of its own oil shale industry was undoubtedly a major development for the group. Starting a very expensive project of mine investment during the biggest financial crisis of the last hundred years, in a difficult economic situation, was a serious challenge. Today we can proudly say that we have the most modern oil shale underground mine. Its modernity encompasses both under- and aboveground logistical and technological solutions. Our own oil shale mine guarantees our stability and security for decades.

Oil shale is a priceless natural resource for Estonia. It has ensured our energy-sphere independence, employment and economic growth over many decades. As the world population increases, more and more attention is given to sustainable usage of power and mineral resources. It is important to apply technologies that are capable of making good use of oil shale with minimal environmental impact and utilising oil shale's entire mineral, power and chemical potential.

The Estonian state can be proud of VKG as we now have the oil shale processing complex with the longest and most intricate value chain in the world. Chemicals and oils made from oil shale are sold all over the world. The heat generated in the course of this processing work is distributed among the local industrial enterprises and the heating networks of three cities. The cogenerated electricity is sold to Estonian consumers. The mineral part of oil shale is used to make construction materials.

A chemical industry is viable only when it is constantly developing towards products with greater added value. The more sophisticated and expensive products we can make from Estonian oil shale, the more people will get higher wages and the more tax and export revenue will go into the national budget. One of the most prominent achievements in the previous year aimed at increasing the added value was selling oil-shale chemicals to Asia and Europe. The complicated and expensive chemicals produced from oil shale are used in the automobile industry and cosmetics.

The Petroter technology developed to expand oil production has already justified itself and we are now simultaneously building two further production facilities. Our goal is extraction of oils from oil shale with their subsequent reprocessing into purer and more expensive motor oils. To achieve this goal, we must first build the additional oil production facilities, Petroter II and III. After that we are to build a modern complex for hydrogen processing.

The Estonian state made the right decision to value oil shale more in the chemical industry and production of liquid fuels while at the same time reducing oil shale usage in energy production. This structural change in oil shale usage requires substantial investments. Developing chemical and fuel industries is a capital-intensive activity. Project cost-effectiveness is subject to a stable economic climate. That is why the state should set long-term resource and taxation policy goals. Only stability will boost rapid development of resource-hungry sectors of the economy.

Priit Rohumaa
Chairman of the Board



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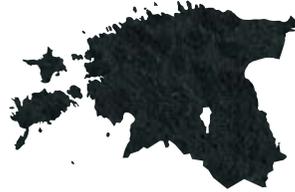
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Introduction

THE LARGEST OIL SHALE PROCESSING COUNTRIES IN THE WORLD



ESTONIA



15

MILLION TONS

Approximately 11 million tons for the production of energy, 4 million tons for the production of oil

CHINA



11.6

MILLION TONS

Very little for the production of energy, majority for the production of oil

BRAZIL



2.5

MILLION TONS

The entire production is used to produce oil

The US and Israel are also developing their oil shale industries.

YEARLY AMOUNT OF SHALE OIL
PRODUCED IN ESTONIA

660 000 TONS



THE SHARE OF VKG IS

370 000 TONS OF OIL

OR

57 %

SUBSIDIARIES OF VKG

Production

VKG KAEVANDUSED

extraction of oil shale

VKG OIL

oil shale processing

VKG ENERGIA

production of heat and power

VKG PLOKK

production of the Roclite building blocks

VKG DIISEL

VKG diesel production project

Services

VKG TRANSPORT

railway and vehicle transport services

VKG SOOJUS

heat network service and other services

VKG ELEKTRIVÕRGUD

electric power network service and sale

VKG ELEKTRIEHITUS

construction and repair of electrical systems

VIRU RMT

assembly, repair and maintenance of industrial equipment

RECOGNITION

- **The Best Estonian Company 2009**, VKG Oil AS
- **The Best Company in Ida-Viru County**, VKG
- **A responsible Estonian Company 2010, 2011, 2012**, VKG
- **“Environmental Award 2011”** in the category of Environmental Management, VKG
- On 23 February 2012, Nikolai Petrovich, Member of the VKG Management Board and head of the Best Estonian Enter-

- prise 2009 VKG Oil was awarded a **Fourth Class Order of the White Star** for participation in the development of the region by Toomas Hendrik Ilves, the President of the Republic of Estonia. According to Nikolai Petrovich, his order belongs to the entire VKG team.
- VKG and its subsidiaries have been recognised over 20 times in the years 2003-2012.



vastutustundlik
ettevõtte 2012

GEOGRAPHICAL DISTRIBUTION OF THE PRODUCTS AND SERVICES OF VKG

17

- 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
- Iran



NAMES OF PRODUCTS AND SERVICES

- Ship fuels
- Heating oil for local heating boiler plants
- Calcined petroleum coke for electrode manufacturers
- Oil shale fine chemical products for perfumery, cosmetics and textile industries
- Oil shale gas for the 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



MARGUS KOTTISE
Member of the VKG Management Board,
Head of Ojamaa mine

MAIN EVENTS IN THE REPORTING PERIOD

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APRIL 2012

opening the long overland conveyor of the Ojamaa mine

MARCH 2012

successful launch of the Ojamaa enrichment factory

AUGUST 2012

the first chamber block started operating at full capacity in the Ojamaa mine

DECEMBER 2012

putting into operation the 18.5-kilometre Kohtla-Järve–Ahtme heat pipeline
VKG mother enterprise acquired ISO 9001 and OHSAS 14001 quality certificates.

JANUARY 2013

festive opening of the Ojamaa mine

I congratulate VKG on successfully finishing the construction of mine and the launching thereof. This is a vigorous step both in terms of reinforcing the future of the company and for the wellbeing of the whole region. I am glad to bear witness to the fact that we are living in another era of rapid development of the oil shale industry and it is only up to us how much benefit we can make of this period for our country and for our people.

Juhan Parts, Minister of Economic Affairs and Communications





On 23 February 2012, **NIKOLAI PETROVICH**, Member of the VKG Management Board and head of the Best Estonian Enterprise 2009 VKG Oil was awarded a Fourth Class Order of the White Star for participation in the development of the region by Toomas Hendrik Ilves, the President of the Republic of Estonia.

According to Nikolai Petrovich, his order belongs to the entire VKG team.

MAIN INDICATORS OF 2012

21

Number of employees

2000

Turnover

214

MILLION EUROS*

Profit

38

MILLION EUROS*

Investments in development
and the environment

66.7

MILLION EUROS*

* Unaudited data

BIGGEST ENVIRONMENTAL AND DEVELOPMENT PROJECTS OF THE YEAR

CONSTRUCTION AND PUTTING INTO OPERATION OF THE KOHTLA-JÄRVE-AHTME HEAT PIPELINE

the 18.5 km long pipeline transports the heat created as a by-product of oil shale processing to a region with over 60,000 inhabitants. This ensures stable and cheap heat supply for the region. Construction of the pipeline commenced in February 2012 and heat was released into the pipes in December.

COMMENCEMENT OF CONSTRUCTION OF THE PETROT- ER II PLANT IN AUGUST 2012

the plant, using the improved Petroter technology, is planned to be completed in 2014.

OJAMAA MINE

in a year, the long overland conveyor unique in Estonia was put into operation; the enrichment/sorting complex was opened along with the first chamber blocks. In January 2013, the mine and its aboveground production complex were fully opened. The mine is planned to reach full capacity in the first half of 2013.

CLOSING OF ASH LANDFILLS

in 2012, closing the old ash landfills was commenced in VKG. The closing work has so far been related to the VKG Soojus ash landfill and the landfill located on the territory of VKG Energia. The works are planned to be finished by the middle of 2013. Big sources of air and water pollution in the region are eliminated thanks to closing the landfills.

By implementing the Petroter I, II and III project, VKG doubles its production volume of 2009. Our first plant is already operating at full capacity, the second is under construction and we will start with the third this year. For construction, we prefer the local companies. Almost all the employees in the new plants are locals, Ida-Viru people.

Nikolai Petrovich, Member of the VKG Management Board



AHTI PUUR
Deputy Chairman of the Management Board,
Chief Financial Officer

PRIORITIES FOR 2013

- Reaching full capacity in the Ojamaa mine in May 2013
- Successful implementation of the Petroter II project
- Successful launch and operation of the Kohtla-Järve – Ahtme heat pipeline, continuing investments in the local heating economy
- Commencement of work with the refining plant and the Petroter III project, commencement of construction in Q3 of 2013
- Continuing with the environmental investments; two new sulphur traps are planned (the volume of the project exceeds 20 million euros)
- Increasing the efficiency of combined heat and power of VKG, commencement of construction of the second new turbine

ESTIMATED NUMBERS FOR 2013

Oil shale processing

2.8 MILLION TONS

Processing capacity of the Petroter I plant

0.9 MILLION TONS

Number of employees

2100

The biggest challenge for VKG in the next few years will be increasing the production volumes and the commencement of production of diesel fuel. In addition to developing the new oil shale processing technology Petroter and opening the Ojamaa mine, it is the next step in ensuring the long-term success of VKG.

Ahti Puur, Deputy Chairman of the Management Board, Chief Financial Officer

Economic indicators

CONSOLIDATED INCOME STATEMENT

(IN THOUSANDS OF EUROS, UNAUDITED DATA)

	2009	2010	2011	2012
Return on Sales	107 480	125 496	183 567	214 814
Targeted Financing	139	188		
Cost of Goods Sold	95 383	102 777	129 231	163 370
GROSS PROFIT	12 236	22 908	54 336	51 444
Marketing Costs	3 261	3 514	3 563	4 971
Administrative Overhead	7 326	7 167	8 974	12 568
Other Revenue	9 481	9 990	6 054	12 541
Other Operating Costs	583	645	12 262	4 743
OPERATING PROFIT	10 547	21 574	35 591	41 702
Financial Income and Costs	-1 348	-2 260	-5 980	-3 154
PROFIT BEFORE INCOME TAX	9 198	19 311	29 610	38 549
Extraordinary Costs				
Income Tax		85	170	436
NET PROFIT FOR THE FISCAL YEAR	9 198	19 227	29 440	38 113

INVESTMENTS INTO DEVELOPMENT ACTIVITIES

(IN MILLIONS OF EUROS)

34	2009
30	2010
44	2011
46	2012

INVESTMENTS INTO ENVIRONMENTAL PROTECTION AND OCCUPATIONAL SAFETY

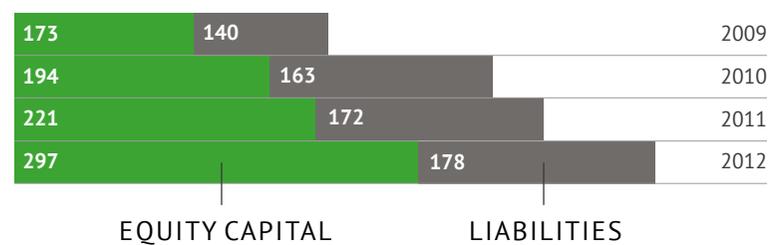
(IN MILLIONS OF EUROS)

3	2009
2	2010
2	2011
2	2012

CONSOLIDATED BALANCE SHEET

(IN THOUSANDS OF EUROS, UNAUDITED DATA)

	2009	2010	2011	2012
ASSETS				
Current Assets	21 220	30 719	53 385	74 843
Fixed Assets	292 039	326 328	339 828	400 086
TOTAL ASSETS	313 259	357 047	393 212	474 929
LIABILITIES AND EQUITY CAPITAL				
Short-term Liabilities	50 573	67 069	65 694	87 089
Long-term Liabilities	89 726	95 932	106 214	90 932
Total Liabilities	140 299	163 001	171 908	178 021
EQUITY CAPITAL	172 960	194 046	221 305	296 908
LIABILITIES AND EQUITY CAPITAL TOTAL	313 259	357 047	393 212	474 929

BALANCE SHEET TOTAL (IN MILLIONS OF EUROS)



JAAANUS PURGA
R&D Director,
Member of the Management Board

R&D Activities

The paradigm shift on the global energy resource market and standards regulating fuel quality will also impact and direct the strategic development fields of VKG.

In 2012, the triumph of unconventional shale gas continued on the global energy resource market, and the production of shale oil in the US also increased rapidly in 2011-2012. The production of shale oil does not affect the world market prices of liquid fuels, but the production of such energy resources on the territory of the world's biggest consumer, the United States of America, prepares fuel producers for a paradigm shift – according to forecasts, the United States of America will become an exporter of fuels, rather than an importer of fuels, in 2025. The Peak Oil theory related to the depletion of the oil reserves has been forgotten, and in 2012, the shale gas and shale oil reserves were also officially added to the reckoning of global energy resources.

The reduction of sulphur content to 0.1% in ship fuels that will enter into force in 2015 on the current markets of VKG and the extensive limitation of sulphur content in the fuels used on both land and sea in the period 2010-2020 pose clear challenges to oil shale manufacturers.

As customary for a stable branch of industry, the main strategic directions of VKG will not change rapidly, the earlier plans are purposefully implemented and the period for preplanning is over ten years. The year 2013 will be no exception as the group continues with the earlier planned directions – the gradual extension of oil manufacturing and developing the manufacturing of motor fuels and oil shale chemicals.

MOST ESSENTIAL PROJECTS ONGOING AND TO BE LAUNCHED IN 2013

- Construction of the Petroter II oil plant, commenced 2012, operation 2014
- Commencement of the construction of the post-processing plant for shale oil, operation 2016
- Commencement of the construction of the Petroter III oil plant, planned operation summer 2015
- Construction of a lime plant, operation in the beginning of 2014

MOST IMPORTANT RESEARCH AND DEVELOPMENT FIELDS IN 2013

- Use and processing of oil shale mine waste – road construction and construction materials
- Monitoring the composition of the mineral part of the Tootsa layer in the Ojamaa mine
- Specified research of the composition of oil shale ash
- Use of oil shale ash in concrete mixtures
- Possibilities of extraction without losses and mine refilling
- Manufacturing and use of fine chemicals



MEELIS ELDERMANN
Director for Research,
Board Member

Environmental Activity

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VKG's environmental activity is our company's main economic and development activity providing the bulwark of our social responsibility. Viru Keemia Grupp AS' investments into environmental protection are among the largest in this country and we have invested over 64 million euro already. In 2012–2020 we have planned additional environmental investments of 50 million euro.

In 2013, environmental activities are on-going, with projects started in the past year, in connection with enforcement of the Industrial Waste Directive, the need has arisen to launch new activities. We pay great attention to the quality of ambient air and the possibilities of its improvement. Ongoing are works related to decreasing air pollutants, which will continue until 2014. In 2014 we will also focus on ways of lowering SO₂. We are developing an action plan embracing the entire company which will be implemented in stages until 2016. Due to the Industrial Waste Directive this year's priority is the the composition of the report of environmental related frames of reference of our entire enterprise..

The ash dump organisation works will end in summer 2013, after which the new building of a dump will be handled. Due to the rapid development of our concern, 2013 is also the year when we will comprehensively appraise various environmental impacts and the modelling of possible impacts.

Because this year has been declared the international year of water, VKG also plans to carry out a survey on the opportunities of improving the quality of storm water and sewage of industrial territories. Hence this year can be deemed a year, when a number of fundamental researches are done, the plan of environmental activities for the near future are drawn up and the first environmental investments for the period 2013–2020 are made.

THE MAIN SURVEYS AND PLANS FOR 2013 ARE:

- Energy audit of the concern
- Petroter III plant's building plan
- Completion of Petroter III plant environmental impacts appraisal report
- Completion of VKG Energia OÜ lime production complex environmental-impact appraisal-report
- Completion of shale oil follow-up complex environmental-impact strategic appraisal-report
- Survey of possibilities of increasing SO₂ binding
- VKG industrial territory soil and surface water current situation report
- VKG industrial territory possibilities for storm water and sewage purification survey

THE MAJOR PROJECTS TO DIMINISH THE ENVIRONMENTAL IMPACT

In this year, it is planned to invest in environmental projects ca. 10 million euro:

- Organisation of the old damp ash dump
- Starting to build a new dump, meeting all necessary requirements
- Closing down the old ash dump of VKG Soojus Oü Ahtme SEJ
- Reducing the VKG Kohtla-Järve industrial territory ambient air quality impairing pollutants
- Beginning the building of VKG Energia OÜ second sulphur trapper
- Beginning of VKG Oil AS diphenyl-equipment reconstruction works

Social Responsibility

Social responsibility and sustainable development principles

VKG is one of the most industrious promoters of the social responsibility concept in Estonia. Together with 19 other enterprises in December 2012 VKG founded the network of responsible entrepreneurship in Estonia, aimed at popularising and promoting the concept to Estonian entrepreneurs.

The general priorities within the framework of responsible entrepreneurship are as follows:

ENVIRONMENTAL CONSERVATION

The goal of VKG is to remove the impact of industry or reduce it to a minimum. The amount of environmental investment has been in excess of 64 million euro during the last eight years. Investment for 2012–2020 will be of approximately the same order of magnitude.

VKG WORKERS

In this domain the priorities are primarily concerning occupational safety, the collective agreement of wide additional advantages and preserving the industrial traditions. In the case of the latter, VKG aims to organise large scale events in the industrial regions concerned. During 2012, upon the initiative of VKG was organised the Chemists' Day, the Excavators' Day and the Day of Senior Citizens. Since 2012 VKG has encouraged its workforce to engage in the practice of welfare and voluntary work.

IDA-VIRUMAA REGION, WHERE THE ENTERPRISE OPERATES

VKG prioritises an ongoing dialogue with local people, educational, cultural and sporting establishments and is supportive of events. VKG has granted memorial stipends at Viru College and also Tallinn University of Technology. For years, several initiatives have been worked on at Concern, aimed at the region's narrower target groups.

CULTURE AND SPORT

Support to culture and sport is manifested primarily as sponsorship activity, which consumes several thousand euros per year. VKG support both nationally important organisations and small scale local events. Besides that, since 2012 we have launched a broad cooperation with Estonia's main art universities, which provide students with new opportunities to expand their artistic activity.



VKG has also started several of our own initiatives for the promotion of local life:

Virumaa first photo competition

“You are beautiful, Virumaa!”

WWW.VKGSOOJUS.EE/KONKURSS

Kaljo Kiisk memorial young filmmaker’s grant

WWW.VKG.EE/KALJOKIISK

children electrical safety campaign

WWW.VKGEV.EE/LASTELE

Involvement of children of Ida-Viru in the historical five-school competition

WWW.VKG.EE/EST/SOTSIAALNE-VASTUTUS/VIIE-KOOLI-VOISTLUS

VKG, EKA and TTÜ initiative for the restoration of the tower of an old oil factory

WWW.VKG.EE/EST/UUDISED/310/UUED-DISAINIIDEED-VANA-OLIVABRIKU-TORNI-TAASELUSTAMISEKS

VKG is the first and only Estonian enterprise which discloses all of its data in conformity with World Social Responsibility report standard GRI. In 2013 our fourth report will be released, with the help of Ernst & Young Estonia.

Additional information on the social initiatives of VKG is available at Facebook and the companies’ websites:

WWW.VKG.EE

WWW.VKGSOOJUS.EE

WWW.VKGEV.EE

WWW.FACEBOOK.COM/VIRUKEEMIAGRUPP

- VKG obtained the title of Estonian Responsible Enterprise for 2010, 2011 and 2012.
- In December 2011 the concern obtained the “Environmental Feat 2011” prize in the category of environmental management.
- Within the last ten years VKG and its subsidiaries have been recognised more than 20 times.

Help and support VKG have provided in 2012:

ORGANISATIONS

Union of Firefighting Sport

Kohtla-Järve Ice Hockey Club Viru Sputnik

Maarja Päikesekodu

Jõhvi Culture- and hobby centre

Kohtla-Järve Järve Gymnasium

Kohtla-Järve Järve Russian Gymnasium

Ahtme Gymnasium

Kohtla-Järve football club FC Lootus

MTÜ Atsalama mixed choir

MTÜ Mäeinstituudi mountain circle

Kohtla-Järve children judo-club “Afina”

Rägavere parish village society “KAI”

Kohtla-Järve kindergarten “Punamütsike”

Kiirderanniku choir

Kiikla children home

Kohtla-Järve childrens home

Kohtla parish kindergarten “Tuvike”

Kohtla-Järve Sports Society “Kalev”

Ahtme Art School

Kohtla-Järve sports-club “nrK”

EVENTS

Uljaste Triibu fishing event

Alutaguse ski marathon

Piret Niglas memorial sports competition

ELO National winter games

Mäetaguse villages’ sports day

Mäetaguse Kalina marathon

Lüganuse parish day

Kohtla-Nõmme popular sports day

Kiikla küla sports day

Maidla parish days

Colorado Oil Shale Symposium

TTÜ Viru College organised “Oil Shale Conference”

Viru Marathon

Five Schools Competition



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 on behalf of VKG over the last 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. My important titles, and the support of Estonian people and supporters have justified this effort and made me eager to hold the Estonian flag up high in the world.

Olympic silver medal winner, **Heiki Nabi**

VKG SUPPORTS

**EESTI KONTSERT (ESTONIAN STATE PHILHARMONICS)**

VKG has been the main sponsor of Eesti Kontsert since 2009. In cooperation with the Jõhvi Concert Hall, VKG has established several initiatives for the promotion of local cultural life: Kaljo Kiisk Grant for young filmmakers, the first Photography Competition in Virumaa, Virumaa forest planting action by the employees of both companies.

**NATIONAL OPERA ESTONIA**

In 2012 Estonian audiences had the chance to enjoy Richard Strauss' opera 'Der Rosenkavalier' and Vincenzo Bellini's opera 'Norma' thanks to VKG's support. The best solists in the world took part in both concert performances.

In May 2012 during the Jõhvi Ballet Festival the best-known and most beloved Estonian composer **Arvo Pärt** met with the world's top ballet dancer and choreographer **Nacho Duato**. The meeting took place in Jõhvi Concert Hall during the V Jõhvi Ballet Festival.

VKG supports the Jõhvi Ballet Festival since 2009.





TARTU KÕRGEM
KUNSTIKOOL



EESTI
KUNSTIAKADEEMIA

ESTONIAN ACADEMY OF ARTS
TARTU ART COLLEGE

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

Depicting our picturesque landscapes needs a new awakening.

We are patriots of Ida-Virumaa and we have valued the art of the unique landscape and industrial area of Ida-Virumaa for a long time.

VKG's art collection contains art from this region that dates back to the 1920s.

Our tradition of collecting art was interrupted at the end of the 1980s, but we feel that it's time to revive this tradition. This is why we invite all young artists to us, so they can use paint, pencils, coal or anything they want to once again secure Virumaa's presence in art history. VKG is pleased to see that the development of Estonian art in Ida-Virumaa is also close to the hearts of our partners.

Priit Rohumaa

Areas of Activities

Our mission is the
valuation of Estonian oil shale.

Our vision is to be flagship of the Estonian
oil shale industry and the leader in the opening
up of oil shale potential.

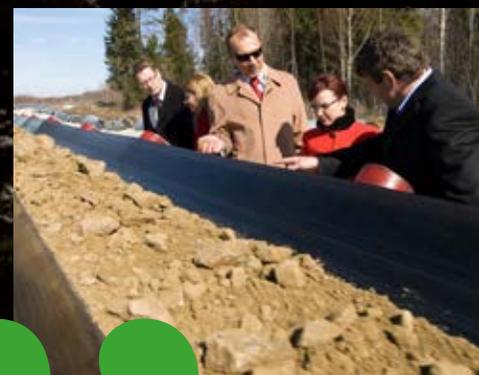


ALEKSEI FEDJAJEV

Underground Drifter, Ojamaa mine

“ We are happy to recognise that with the initiation of a plant that is unique in Estonia environmental matters have been kept in mind. A large-scale production enterprise has chosen the most ecologically beneficial way for the delivery of its raw material, if it is about overland or rail transport. The new conveyor is a good example for an innovative way of thinking which is useful for the local community as well as for the environment and the company itself.

Minister of the Environment, **Keit Pentus**



Excavation of Oil Shale

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VKG operates the whole chain of oil shale processing, starting from oil shale excavation and ending with the marketing of chemicals. Oil shale excavation is however the newest direction in activity, because for many years VKG received our oil shale needed for production from Eesti Energia Kaevandused AS. Since 2012 Eesti Energia Kaevandused no longer covers the entire needs for the necessary raw materials of VKG and in 2013 VKG must be able to provide, by itself, a large part of the raw materials needed for its production.

VKG obtained mining permits for Ojamaa mine in 2004. Preparatory works for the opening of the mine began in 2007 and in July 2009 work on the object was launched. The mine was

opened ceremoniously on 31 January 2013 and is projected to reach full capacity in the second half of the year.

In the process of cross-put works, starting from August 2010 the Ojamaa mine started to deliver fine oil shale for consumption in the Petroter I plant. In 2011, the fine oil shale delivered by Ojamaa became the only raw material of the new plant.

Ojamaa will cover VKG's raw material needs for approximately the next 15–17 years (in 2013 we plan to enhance the mine's maximum capacity to 3.8 M tons per year). For that it is strategically important to guarantee the oil shale resource for the more distant future, through our new Kiviõli or Sonda mining field.

Facts

- In Estonia VKG has a mining permit for **75 MILLION TONS OF OIL SHALE** (Ojamaa and Sompma mine).
- The Ojamaa mine must be able to guarantee both VKG fine oil shale to Petroter technology and to lump rock for Kiviter technology.
- Ojamaa mine resource is nearly **60 M TONS** and the local oil shale suits the needs of VKG very well.
- At full capacity Ojamaa mine shall yield **4.3 M TONS** of oil shale per year.
- Ojamaa mine's building total investment reaches **120 MILLION EUROS** (incl. 2013). Project's main investors are Consortium Pohjola and Scandinavia's largest banks Nordea and SEB
- In 2012 Ojamaa yielded over **800 000 TONS OF FINE OIL SHALE** to the VKG Petroter I plant (2011 the volume of the fine oil shale delivery reached 670 000 tons).
- At the end 2010, Estonia witnessed the building of **A UNIQUE CONVEYOR, OVER 12 KM LONG**. In January 2012 the work launching the conveyor started. The ceremonial opening of the conveyor, with Minister of the Environment Keit Pentus attending, took place in April 2012. The Estonian unique snake-conveyor connects the VKG production complex and the Ojamaa mine.
- At the Ojamaa mine building project VKG's is the main partner for one of Europe's largest machine building concerns.
- During building of the mine the company is **CONSTANTLY COMMUNICATING** with the local population and local government.
- A new mine locally creates more than **400 NEW WELL PAID JOBS**.
- VKG is **ONE OF THE LARGEST SUPPORTERS** of Mäetaguse parish' culture and sports, cultivating a healthy way of living.

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Oil Shale Processing

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Oil shale excavated in mines and quarries is carried away with the new snake-conveyor of VKG in Kohtla-Järve, where it ends up in the VKG Oil AS oil factories. VKG Oil is the companies largest subsidiary, whose main area is the production of oil shale oil and chemicals.

VKG Oil can extract oil shale oil and gas ca. 80% oil shale energy potential, which is an excellent ratio of industrial deployment. Kiviter technology' based devices can extract from one ton of oil shale ca. 170 l crude oil and ca. 500 m³ oil shale gas with the calorific value 800–900 kcal. The Petroter I factory, whose raw material is of lower calorific value than fine oil shale, obtains from one oil shale ton 120 l crude oil and 500 m³ gas, whose calorific value is 8000–10 000 kcal. The end product is a boiler room heating oil and admixtures to ship oil, oil coke for the electrode industry and oil shale bitumen for road cover.

VKG Oil is strongly developing its production capacity. In 2005 four new Kiviter technology gas generators were built. In December 2009 the Petroter I plant was launched. In August 2012 the building of Petroter II plant was started. In the third quarter of 2013, building of Petroter III plant will begin. By starting the oil follow-up complex, VKG Oil will become by 2016 the first diesel fuel manufacturer in Estonia.

In January 2013 the management team of the enterprise was expanded. Besides the long time head of VKG Oil Nikolai Petrovitš, a new member of the board Priit Pärn was appointed. The area of responsibility of the new manager is the planning of sales and marketing activities. The new EU requirements effective from 1 January 2015 on the sulphur content of fuel oil and also VKG diesel oil production plans are challenging.

Facts

- In 2012 VKG Oil processed ca. **2.4 M TONS OIL SHALE**, yielding 365 000 tons oil and ca. 21 tons of fine chemicals.
- VKG Oil main partners are globally known enterprises.
- The enterprise uses **TWO OIL SHALE PROCESSING TECHNOLOGIES**: lump rock using Kiviter, on the basis of which there work four oil shale processing factories, built in 1940–1990, and fine oil shale using Petroter, employing environmentally sustainable oil shale processing technology renovated by engineers of our enterprise.
- The Petroter I plant opened in December 2009 and achieved full capacity within less than a year of opening. In 2010 the new plant processed 260 000 tons of oil shale, in 2011 **OVER 670 000 TONS OF OIL SHALE**. Presently the plant is at full capacity.
- In 2012, building of VKG's **PETROTER II PLANT STARTED**. The building of Petroter III starts in August 2013.
- The enterprise works effectively in the Baltic countries, where ca. **20% OF PRODUCTION** is delivered.
- In 2009 VKG Oil obtained the title of **BEST ESTONIAN ENTERPRISE**.
- With more than 600 workers, VKG Oil is **A MAJOR EMPLOYER OF THE REGION**, with salaries averaging above average in the county and in Estonia.
- Our valid **COLLECTIVE AGREEMENT** for enterprise guarantees broad benefits and impressive bonuses to workers.



Oil Shale Chemistry

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Besides energy carriers, oil shale oil and gas, VKG Oil also produces shale chemicals. Estonia's oil shale most valuable part is the fine chemicals of high reaction capacity – alkyl - resorcin, extensively used in perfumery, pharmacy, cosmetics products, the machine and tyre industry and in many other areas of industry. VKG Oil produces fine chemicals of high purity (over 99%) in tens and also in hundreds of tons (2-methyl-resorcin, 5-methyl-resorcin). In the future it is planned to increase capacity – in 2010 the designing of a new fine chemicals production device was started, in 2011 it was built and in 2012 it was launched. Our products are in use in the demanding market of Japan, as well as in India and China.

Together with increasing the production capacity, the enterprise bears witness to successful development work also in the production of other phenol compounds. In 2010, an opportunity opened to extract from local oil shale 2,4-dimethyl resorcin, which is used in UV-filter production, and 2,5-dimethyl resorcin. Development works continued also in 2012, so that new compounds could be produced in industrial volume.

The second largest area of use for oil shale chemicals is resin. For instance, in 2012 a new resin production device was launched, whose raw material, a resin titled B-30-WS (so-called red resin) goes to the best armaments manufacturers. Building of the device was supported by Enterprise Estonia Foundation. Presently the device works at full capacity.

Facts

- In 2012 the enterprise produced **OVER 20 TONS OF FINE CHEMICALS**.
- Price per kg of fine chemical of over 99% purity may exceed **800 USA DOLLARS**.
- Alkyl resorcines are found only in Estonian oil shale, their extraction technology is an invention, covered by a **PATENT OF VKG OIL ENGINEERS**.
- VKG Oil produced fine chemicals are in use in **LEXUS CARS**.
- The work on a new fine chemistry-production complex started in 2012 and **INCREASES THE ENTERPRISE'S CAPACITY UP TO 50%** and enables the doubling of the production choice of chemicals than before.
- VKG actively supports with memorial stipends the studies and training of local students. In 2012 the enterprise had **IN TRAINING CA. 90 STUDENTS** from local College and Mainor Higher School and Narva Professional Training Centre. For good work the students on probation earn very decent wages.



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VIRU K...

100%

Oil Shale Energy

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While oil shale oil gives energy in VKG clients' boilers and machines, oil shale gas creates value within the organisation. The VKG Oil produced oil shale gas is used by us for the production of heat and electricity of energy producer VKG Energia. VKG Energia has two power stations of thermal total capacity 700 Mw. The enterprise's electricity production capacity is 47 Mw, since September 2011 it reached 80 Mwn (in autumn VKG Energia launched a new turbine). Building of the new turbine, over 30 Mw, enables the more effective organised cogeneration of heat and electricity. At the beginning 2013 launched the project to build another new turbine, in order to enhance the cogeneration of heat and electricity.

Since March 2011 VKG also holds 100% of the local heat generator and supply enterprise Kohtla-Järve Soojus AS. Since 1 January 2013 Ahtme oil shale station started its work, supplying heat to the Ahtme and Jõhvi region of over 50 000 residents. Providing a heat supply to the region was assumed by VKG, building in 2012 an 18.5-km thermal main from VKG

production territory to VKG Soojus AS. Used for heating is residual heat generated with the processing of oil shale. Preparing reorganisation of the heat supply, VKG Soojus AS took care of the whole customer service in the Jõhvi and Kohtla-Järve region. Due to that VKG Energia became a purely energy production enterprise, with the main goal of providing the region's heat supply and to produce electricity for VKG and neighbouring enterprises.

VKG Energia produced heat is sufficient to cover the need for heat of the whole VKG concern and neighbouring facilities. VKG's two energy enterprise heat pipeline project, the goal of which is delivery of oil shale gas based heat also to other Ida-Virumaa towns, reaches 2006 per year, when the enterprise acquired 42% of share capital of AS Kohtla-Järve Soojus. The heat pipeline project was completed in mid-2010. The pipeline went into use in January 2013. VKG Soojus retained a natural gas based reserve and top load boiler house, guaranteeing reliable heat supply in all situations.

Facts

- In 2012 VKG Energia sold over **335 GWH HEAT** and ca. **1 210 GWH ELECTRICAL ENERGY**. VKG Soojus produced ca. 230 Gwh thermal energy.
- VKG Energia owns thermal power stations, which can operate on **OIL SHALE AND OIL SHALE GAS**.
- In 2011 and 2012 VKG Energia received the whole Petroter plants produced high calorific value generator gas.
- In recent years, the investments made into the plants have made the enterprise an energy producer and distributor of large potential.
- VKG Energia is the **SECOND BY SIZE, ELECTRICITY PRODUCTION AND DISTRIBUTION ENTERPRISE IN ESTONIA**.
- The produced thermal energy is used in the form of steam for the surrounding industrial enterprises: Viru Keemia Grupp subsidiaries and mineral fertilisers producer AS Nitrofert and benzoic acid producer Eastman.
- When designing the VKG Soojus mains, taken into account was the desire of Kohtla-Järve to organise cheap heat delivery also to small settlements, which they will receive, thanks to VKG's initiative, **HEAT UP THREE TIMES CHEAPER**.
- VKG Energia is the **FIRST ENTERPRISE IN ESTONIA, TO EMPLOY A DEVICE PURIFYING SMOKE GASES OF SULPHUR** (cost of device is ca. 10 M EURO). In the following years there are plans to build two more sulphur trappers.
- Works are being continued, in order to bind part of the sulphur compounds contained in generator gas at the so-burning of generator gas and oil shale already in the boiler and thus decrease emissions.
- Coming into use in the autumn of 2011 the new turbine helped us to **MORE ECONOMICALLY USE ENERGY** and more efficiently organise the cogeneration of electricity and thermal energy.



Electrical Energy Distribution

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In terms of sales volumes, VKG Elektrivõrgud is the second largest electrical energy supplier company following Elektrilevi OÜ which belongs to Eesti Energia.

The main field of activity of VKG Elektrivõrgud is the forwarding of electricity through the network and the sales of distribution services and of services related to the operational management of the electrical system of the company. In addition, the company also provides design, construction, repair, usage, control and maintenance services for electrical installations. The lines of VKG Elektrivõrgud supply an area of about 100,000 inhabitants with electricity. VKG Elektrivõrgud has: 4 high voltage 110 kV substations, 8 average voltage 35 kV substations, 333 low voltage 6-10 kV substations, 387 km of overhead lines and 435 km of cable lines.

In 2012 VKG Elektrivõrgud went public with its own flat rates for electricity. As of January 2013 the company has had the lowest price for general service in Estonia.

VKG Elektrivõrgud is the only electrical energy distribution company in its service area, which is why uninterrupted functioning is very important for the local people. The service area of the company includes the cities of Narva, Narva-Jõesuu and Sillamäe, the parish of Vaivara, and the Viivikonna district in Kohtla-Järve. The main goals of the company are to increase the level of network service quality and to continually reduce the number of blackouts and the amount of electric losses.

Every year VKG Elektrivõrgud makes enormous investments into the maintenance of the lines, substations and other equipment, and from year to year it has significantly decreased the share of electric losses, and improved the reliability of the network. In addition to existing customers, every year new consumers start using the company's services, and this intensifies the work of VKG Elektrivõrgud even more. Alongside with the satisfaction of the needs of private consumers and small companies, VKG Elektrivõrgud plays a crucial role in supplying electricity to large industrial companies located in Narva and Sillamäe.

Facts

- In 2012 the sales revenue exceeded **12.7 MLN EUROS**. The sales of network services made up to **220.04 GWH** in 2012. In comparison to 2011 the sales of network services increased by 7.1%, the sales of electricity amounted to 155.6 Gwh.
- The investments made into the development of the network made up 1.75 mln euros. The **ANNUAL GROWTH OF INVESTMENTS WAS 38%**, of which the greater part was made up by new registrations.
- The company has had a System Average Interruption frequency Index (SAIFI) of 0,608 in 2010, of 0.382 in 2011 and of 0.360 in 2012 – exclusive of exterior effects.
- In the last quarter of the year VKG Elektrivõrgud started with the sales of electricity on the deregulated market. In the months of November and December of 2012, contracts were concluded with close to **8 000 POWER CUSTOMERS**.
- By 2017, the company is planning on making the entire meter system **REMOTELY READABLE**. As of the end of 2012, 60% of meters are remotely legible. In 2012 the transition to the collection of measuring data based on the hour was made, since it is a requirement for the participation on the deregulated market.
- In 2011-2012, the quality management system applied at the company was updated, as a result of which the company now uses the quality management system that conforms to ISO 9001:2008 and OHSAS 18001:2007 standards.
- VKG Elektrivõrgud is fully in favour of supporting third sector organisations and of single individuals and provides sponsorship, while particularly appreciating activities directed towards children and youngsters and their achievements. In its sponsorship policy, VKG Elektrivõrgud concentrates mainly on sports and cultural events in the area.
- The company deals with the raising of electricity safety awareness in the community. In 2011, an electricity safety campaign was started, during which a particular character to introduce electricity safety emerged – a bear called Miša. Wearing a costume which was finished in 2012, this bear, together with workers of the company and with the assistance of the local theatre company „Ilmarine“, visited tens of facilities for children, civic institutions and events where he introduced electricity-related hazards and requirements.



Construction Materials Made of Oil Shale

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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, however the mineral part of it, i.e. the residues left from its processing, on the contrary, require thorough development work and the courage of making investments.

CONSTRUCTION BLOCKS MADE OF OIL SHALE ASHES

In February of 2012 the VKG team restarted the updated production line for construction blocks made of oil shale ashes, which is located at the Ahtme district of Kohtla-Järve and which the company had acquired as a bankruptcy asset a year earlier in April. In the same year, i.e. in 2011, another subsidiary company of VKG, called VKG Plokk, was founded and the new construction block brand of Rocklite was worked out. These construction blocks, which are made of porous concrete, provide an environmentally friendly and ecologically clean inorganic material for building walls. Its building features are good and the main goal of this young enterprise for 2013 is to conquer a market share for its products.

USE OF OIL SHALE RESIDUES IN ROAD CONSTRUCTION

On October 5 of 2012, on the territory of the VKG Ojamaa mine, VKG and the Estonian Road Administration undersigned an agreement of cooperation with the purpose of the use of the residues of oil shale mining and processing in road construction. In the construction of a road which started in October of 2012, for the first time, instead of the use of the ingredients of concrete, it was gravel made from the ashes that result from the processing of oil shale and from residues which result from oil shale mining that was used for road construction. As a result of this, the optimal application of the two production residues resulting from oil shale mining and processing with the highest volume has been found. VKG is convinced that the use of residue materials and oil shale ashes in road construction is reasonable from the viewpoint of ecology as well as of the economy.

OIL SHALE CEMENT

In 2008 VKG went public with the development of the production of cement based on the residues resulting from the processing of oil shale. In 2008 – 2009, a corresponding subsidiary company was founded and the technological process was worked out. The establishment of a modern cement plant on the Kohtla-Järve production territory is still one of the priorities of VKG's developmental work, which will be performed after the building of the oil shale post-treatment complex has been completed.

LIME PRODUCTION

In the first half of 2013 VKG will start with the building of its own small lime production plant. The production of the plant is meant for the use in a sulphur trapping device already in use and for supplying future trapping devices with raw material. The raw material used for the production of lime consists of the residues resulting from the Ojamaa mine. The product of the whole plant – ground caustic lime – is used up completely for the elimination of sulphur dioxide resulting from the exhaust fumes produced by the power plant of VKG Energia Põhja elektrijaam.

The logo for Rocklite, featuring the word "ROCLITE" in a bold, blue, sans-serif font. The letter "O" is stylized with a white circle inside, and the letter "L" has a white vertical bar on its right side.

50 Subsidiaries of VKG

When all previous manufacturing areas of the group are directly related to oil shale processing, then the following subsidiaries demonstrate the development trends of the group's strategic area of work.



ALEKSANDR LOBANOV
Mechanic, Ojamaa mine

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 FIELDS OF ACTIVITY ARE:

- lease of railway tanks, cement wagons and open wagons
- 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 tanks vehicles
- services related to specialty road transport
- railway construction, maintenance and repair services
- weighing of railway wagons
- domestic container transportation
- transportation of hazardous wastes
- service of a safety advisor working on road transportation

Facts

- VKG Transport AS has been operating **SINCE 1999**.
- There are **135 EMPLOYEES**.
- In 2012 the turnover amounted to **21.7 MLN EUROS**.
- About 30% of the turnover of the company is made up of services provided inside the group, which are mainly associated with oil shale processing.
- In 2012 VKG Transport AS Eesti achieved an honourable **FIFTH PLACE** in terms of profitability among transportation and logistics enterprises in the List of Competitive Companies and it is also among Estonia's Successful Businesses, having a **CREDIT RATING OF AAA**.
- VKG Transport is the **BALTIC REGION'S BIGGEST** transportation enterprise dealing with hazardous chemicals portage.
- The amount of investments in 2012 reached **1.8 MLN EUROS**.
- The employees of VKG Transport AS are members of the trade union, and **COLLECTIVE AGREEMENTS** are concluded between the employees and the company, which provide employees with extra benefits.
- Together with other group subsidiaries, VKG Transport supports the traditions of Kohtla-Järve as an industrial city. Besides, the company pays considerable attention to the improvement of the internal working atmosphere and to keeping the employees highly motivated through internal events.
- The wagon fleet of the company consists of about **1,500 RAILWAY WAGONS** (tanks for the transportation of light and dark oil products, open wagons for the transportation of bulk products and tanks for chemicals). The majority of wagons belonging to the company run on the territory of the Russian Federation and make domestic shipping operations.
- In addition to railway vehicles, VKG Transport AS also owns tank vehicles suitable for the transportation of chemicals, which operate on all European highways. All vehicles conform to the terms and conditions concerning transportation of dangerous goods (ADR). The company guarantees that the transportation units are in good condition and periodically undergo technical inspection. Also all staff which deals with the transportation of dangerous goods has undergone special training.
- The company holds all licences and activity permits required for the provision of the services listed above and it follows all environment, quality management, occupational health and safety management systems. In 2012, the company renewed the ISO 9001:2008, ISO 14001:2004 and OHSAS 18001:2007 certificates.

Viru RMT OÜ has developed from the former repair and assembly department of the oil shale chemical plant, and it has extensive experience in the field of provision of repair and assembly services.

THE COMPANY'S FIELDS OF ACTIVITY ARE:

- **repair and maintenance of technical equipment;**
- **designing, production, repair and installation of metal structures;**
- **engineering of complete automatic systems;**
- **construction of and digging work for sewage, water supply and long-distance heat pipelines**

The company's customer portfolio includes companies primarily within the VKG group, which altogether provide close to 70% of the companies turnover. The company holds the certificate **ISO 9001:2000** (TÜV) and the occupational health and safety management system certificate **OHSAS 18001**. In 2012 there were 294 employees working for the company.

Recently, the major tasks in terms of the realisation of ready-for-use technical solutions were related to the set-up of the Ojamaa mine, underground as well as overland. We participated in the construction of one of the longest conveyors in Europe, of an enrichment plant and numerous underground conveyors. A major contribution to making the underground work of miners more safe is a modern and, in Estonia, a unique solution for transport connection. As a result of the work of the engineers at Viru RMT, fully automatic control systems for the majority of the VKG oil shale plants as well as for the production equipment at the power plant have been developed.

In 2013, the company will take an active part in the construction of the Petroter II plant to be built.

Facts

- In 2012, the number of employees went **BEYOND 300**.
- During the construction of the Petroter I plant, Viru RMT was one of the four contractors at the site, whose main duty was to design and build all automatic systems at the plant, as well as the oil shale feeding system.
- The Viru RMT customer portfolio includes companies primarily within the VKG group.
- From the middle of 2009, Viru RMT has been involved in the construction of the Ojamaa mine; the company is responsible for the assembly of the long overland conveyor.
- The company holds the certificate **ISO 9001:2000** (TÜV) and the occupational health and safety management system certificate **OHSAS 18001**.
- Viru RMT is one of the few companies in Estonia which maintains lifting equipment and self-propelled cranes with a lifting capacity of 140 tons and a lifting height of up to 80 metres.

VKG ELEKTRIEHITUS AS

VKG Elektriehitus AS is the company belonging to the VKG group that deals with industrial energy and the provision of electrical construction services.

The company has developed from the electrical construction department of Narva Elektrivõrgud AS, which is why VKG Elektrivõrgud is still the largest customer of the company. In spite of the fact that a large share of the turnover of VKG Elektriehitus still comes from the county of Eastern Virumaa, where the company's duty is the maintenance of the most eastern electrical networks of Estonia (from Narva to Sillamäe and the parish of Vaivara), the company's strategic interests are first and foremost directed to outside of Eastern Virumaa.

The company has two production facilities: one in Narva and one in Kohtla-Järve. It provides construction services all over Estonia.

In addition to providing construction services outside of the group, the company also plays a crucial role in VKG's large projects. Since 2009, VKG Elektriehitus has performed all electrical works for the underground area as well as for the overland area of the Ojamaa mine. In 2010 the most important touchstone was the electrical work related to the construction of the new turbine at VKG Energia OÜ, with a capacity of 30 MW. This project was completed in August of 2011, and it was the largest of industrial and energy projects in Estonia (the new turbine allows to set up the combined production of thermal and electrical energy at the VKG Energia power stations much more effectively than before).

Facts

- The largest customers of the company are the companies of the VKG group, Eesti Energia Jaotusvõrk, state institutions and local governments both in Northern and in Southern Estonia.
- The partners of the company are ABB, Harju Elekter Grupp, Elektroscandia Baltics, SLO Eesti, Tameo MT, Esvika Elekter and Onninen.
- In 2012, the largest projects that VKG Elektriehitus started were the installation works for the Ahtme 110kV substation and the Baltic 330kV section, the electrical works for the Jõhvi traffic junction (overcrossing) and the construction of the Kiikla - Ojamaa 6kV cable line.
- The company's turnover in 2012 exceeded **3 MLN EUROS**.
- In 2008, the company received the **TITLE OF BEST EMPLOYER** for the fastest increase in salary at Narva companies.
- A strong trade union is operating at the company. **COLLECTIVE AGREEMENTS** are concluded between the management board and the employees, providing extra benefits to the employees.
- Since 2002, VKG Elektriehitus has been a member of the **ESTONIAN ASSOCIATION OF ELECTRICAL ENTERPRISES** (EETEL).
- The company is updating the **ISO 9001** and **ISO 14001** certificates and implementing the **OHSAS 18001** certificate.

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