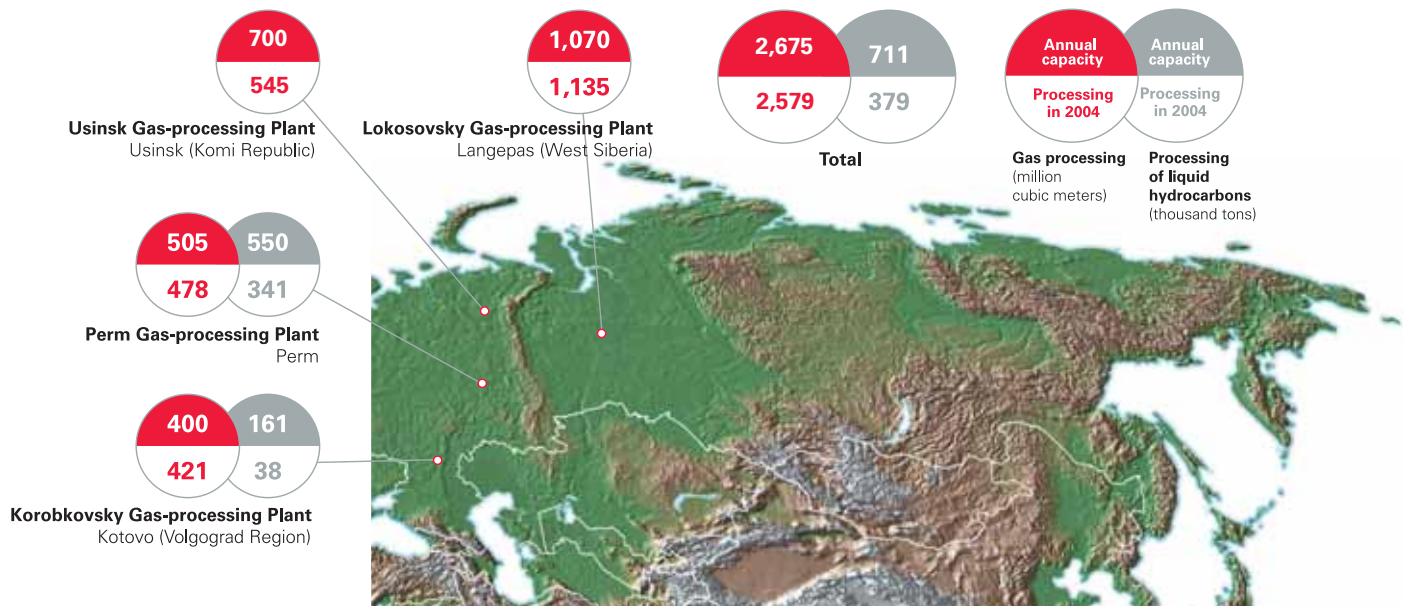


GAS PROCESSING

Gas-processing plants of LUKOIL Group



Korobkovsky Gas-processing Plant

Modernization plans

- Launch of a compression station with annual capacity of 450 mcm per year
- Construction of a gas-drying block using solid adsorbents
- Modernization of air compression and propane cooling units
- Reconstruction of gas fractionation unit

History and description

- Processes gas from oil fields of LUKOIL-Nizhnevolzhskneft and NGL
- Capacity – 400 mcm per year of gas , 161 th. tons per year of NGL
- Saleable products – stripped gas, stable gas naphta and LPG
- Consumers – petrochemical enterprises, foreign marketing units of LUKOIL Group and local consumers
- Put into operation in 1966. **Entered LUKOIL Group in 1996.**
In 2001–2003 external energy supply was overhauled and a steam unit was launched

Processing and production of saleable products at Korobkovsky Gas-processing Plant

	2000	2001	2002	2003	2004
Gas processing, mcm	400	402	390	395	421
NGL processing, th. tons	39	35	33	38	38
<i>Saleable products</i>					
LPG, th. tons	69	75	73	73	72
Stable gas naphta, th. tons	52	48	44	46	44
Stripped gas, mcm	313	310	299	293	337

Perm Gas-processing Plant

Modernization plans

- Launch of equipment for obtaining dioxide sulphide of industrial sodium
- Increase of gas processing capacity to 600 mcm per year, increase of NGL processing capacity to 950 th. tons per year

History and description

- Processes gas from oil fields of LUKOIL-Perm, wet gas from Perm refinery and NGL from Lokosovsky Gas-processing Plant and other plants
- Capacity – 505 mcm per year of gas, 550 th. tons per year of NGL
- Saleable products – stripped gas, stable gas naphta and LPG

- Consumers – Perm refinery, OOO “Stavrolen”, foreign marketing units of LUKOIL Group and local consumers
- Put into operation in 1969. **Entered LUKOIL Group in 1998.** In 2000 a new desulphurization unit was launched. In 2003 gas fractionation unit was rebuilt to increase NGL processing capacity

Processing and production of saleable products at Perm Gas-processing Plant

	2000	2001	2002	2003	2004
Gas processing, mcm	391	407	412	438	478
NGL, th. tons	192	187	281	322	341
<i>Saleable products</i>					
LPG, th. tons	259	250	327	376	410
Stable gas naphta, th. tons	45	51	83	88	80
Stripped gas, mcm	315	321	290	329	370

Lokosovsky Gas-processing Plant

History and description

- Processes gas from oil fields in Western Siberia
- Saleable products – stripped gas and NGL
- Consumers – Perm Gas-processing Plant and local consumers
- Capacity – 1,070 mcm per year
- Put into operation in 1983. **Entered LUKOIL Group in 2002**

Modernization plans

- Completion of construction of storage tanks and a trestle for lading of NGL
- Completion of construction of a high-stage compression station 1.5 bcm annual capacity

Processing and production of saleable products at Lokosovsky Gas-processing Plant

	2000	2001	2002	2003	2004
Processing, mcm	–	–	896	1,017	1,135
<i>Saleable products</i>					
NGL, th. tons	–	–	293	323	350
Stripped gas, mcm	–	–	704	816	896

Usinsky Gas-processing Plant

History and description

- Processes gas from oilfields of LUKOIL-Komi
- Saleable products – stripped and dry gas
- Consumers – oil producing enterprises of LUKOIL Group and local consumers
- Capacity – 700 mcm per year
- Put into operation in 1980. **Entered LUKOIL Group in 2000.** In 2004 the plant launched a gas preparation and processing block, and a gas input station. This enabled the plant to produce the following products: propane-butane mix, butane, motor propane-butane, stable gas naphta

Modernization plans

- Construction of a new compression station with 300 mcm annual capacity
- Construction of a desulphurization unit with capacity 100 mcm annual capacity

Processing and production of saleable products at Usinsky Gas-processing Plant

	2000	2001	2002	2003	2004
Processing, mcm	414	513	464	419	545
<i>Saleable products</i>					
Stripped and dry gas, mcm	395	495	446	402	526

PETROCHEMICALS

LUKOIL Group petrochemical plants

OOO "Karpatneftekhim"	
Kalush, Ukraine	
Inputs:	Products:
naphta diesel fuel n-butane NGL	vinyl chloride polyethylene ethylene propylene benzene

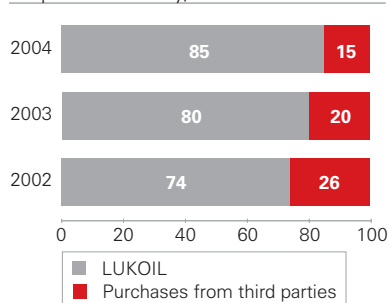
OOO "Saratovorgsintez"	
Saratov, Russia	
Inputs:	Products:
propylene ammonia sulphuric acid benzene oleum methanol	acrylonitrile phenol methyl methacrylate ammonia sulphate synthetic fiber

AO "LUKOIL Neftokhim Burgas"	
(Oil refinery with petrochemical complex) Burgas, Bulgaria	
Inputs:	Products:
naphta propane-butane fraction reformate propylene	polyethylene polypropylene aromatics ethylene oxide ethylene glycols ethanol amines latex synthetic fiber

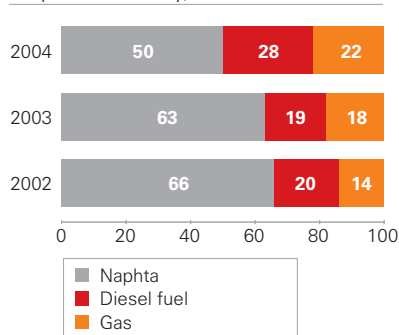
OOO "Stavrolen"	
Budennovsk, Russia	
Inputs:	Products:
naphta propane-butane fraction NGL	polyethylene propylene benzene vinyl acetate



Supplies of feedstock for petrochemistry, %



Structure of steam cracking feedstock for petrochemistry, %



LUKOIL is now the leading producer of petrochemicals in Russia, the CIS and Eastern Europe. In particular, LUKOIL is:

- > the **largest** East European producer of olefins (total annual capacity over 1 mln tons)
- > the **largest** East European producer of polyethylene (total annual capacity over 480 th. tons)
- > the **largest** East European producer, only Russian producer and **fourth largest** producer in Europe of acrylonitrile, a raw material for production of synthetic fibers
- > owner of Europe's **largest** vinyl chloride-monomer plant (annual capacity is 370 th. tons)
- > the **only** Russian producer of nitron polyacrylic fibers
- > the **largest** Russian producer of methyl methacrylate

The Company is successfully replacing distillate fractions by gas as a feedstock for pyrolysis since gas is cheaper. The share of gas in 2004 was 22%, up from 18% in 2003. LUKOIL supplied 85% of total inputs to its petrochemical plants in 2004, up from 74% in 2002.

Processing and production of petrochemicals at LUKOIL Group petrochemical plants, th. tons

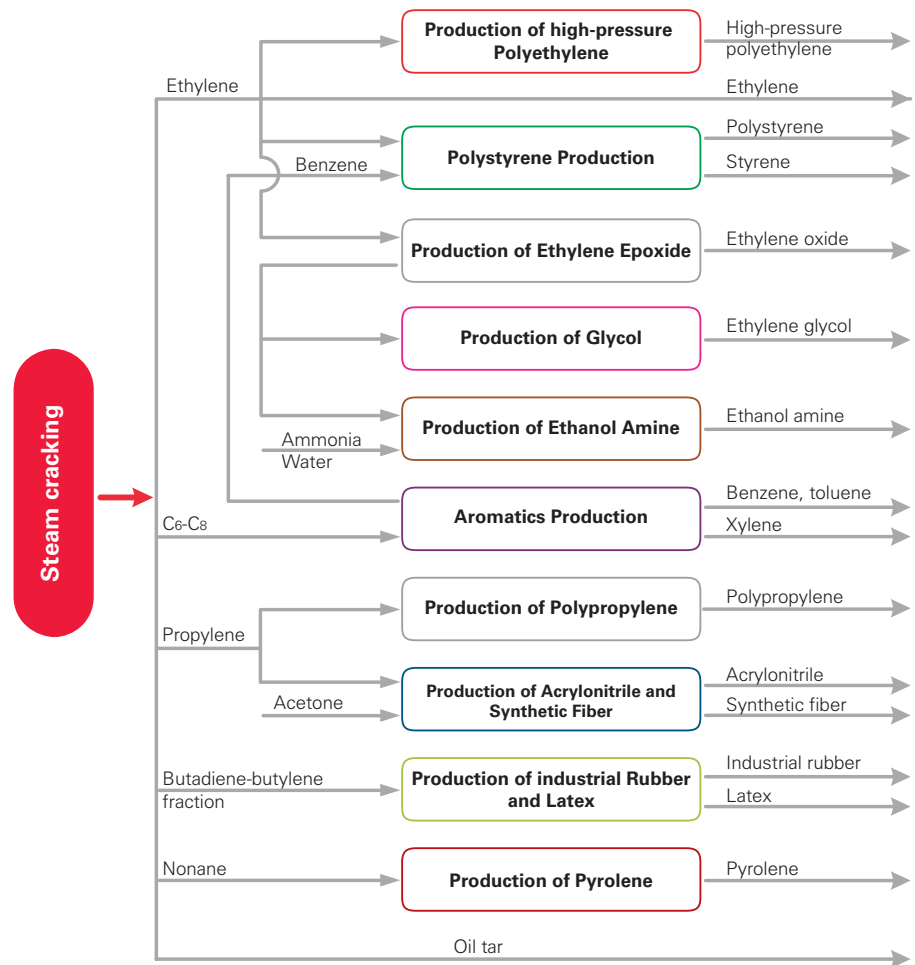
	2000	2001	2002	2003	2004
Processing*	1,141.3	1,605.2	2,138.0	2,262.4	2,442.0
Saleable products, total	1,249.5	1,570.3	1,967.0	2,135.3	2,241.7
<i>Polymers and monomers</i>	458.6	579.2	713.0	795.6	856.5
Polyethylene	323.0	367.0	430.9	427.8	442.7
Polypropylene	53.4	61.6	56.3	64.3	64.8
Synthetic fiber	19.1	23.3	23.1	32.5	31.9
Vinyl acetate	0.0	0.0	30.7	42.5	40.9
Vinyl chloride	9.5	70.7	120.7	173.2	236.0
Styrene	13.0	13.2	12.8	13.8	7.9
Polystyrene	9.5	9.8	8.3	9.3	0.5
Latex	12.7	13.3	12.8	12.2	12.0
Synthetic rubber	18.4	20.3	17.4	20.0	19.8
<i>Products of organic synthesis</i>	366.6	477.8	513.8	547.9	556.6
Benzene	49.1	128.4	157.8	168.8	179.1
Toluene	26.6	28.6	26.0	25.3	20.1
Xylene	16.8	17.8	14.6	14.9	11.8
Phenol, acetone	43.1	39.6	31.1	36.8	41.3
Methyl methacrylate	19.8	20.6	20.7	23.8	26.3
Acrylonitrile	91.5	100.0	139.5	135.7	139.5
Ammonia sulphate	48.9	56.5	50.3	60.7	63.3
Ethylene glycol	59.8	73.4	63.1	69.1	71.3
Ethanol amines	11.0	12.9	10.7	12.8	3.9
<i>Pyrolysis products and fuel fractions</i>	384.4	468.0	650.9	685.1	689.5
Propylene	118.2	161.9	220.7	233.1	238.3
Saleable ethylene	6.0	35.3	50.0	54.9	22.9
Liquid pyrolysis fractions	213.7	184.6	252.9	263.3	255.6
Heavy oil tar	46.5	86.2	127.3	133.8	172.7
<i>Other</i>	39.9	45.3	89.3	106.7	139.1

*Excluding Burgas refinery.

REFINERY WITH PETROCHEMICAL COMPLEX IN BURGAS

AO "LUKOIL Neftokhim Burgas", Bulgaria

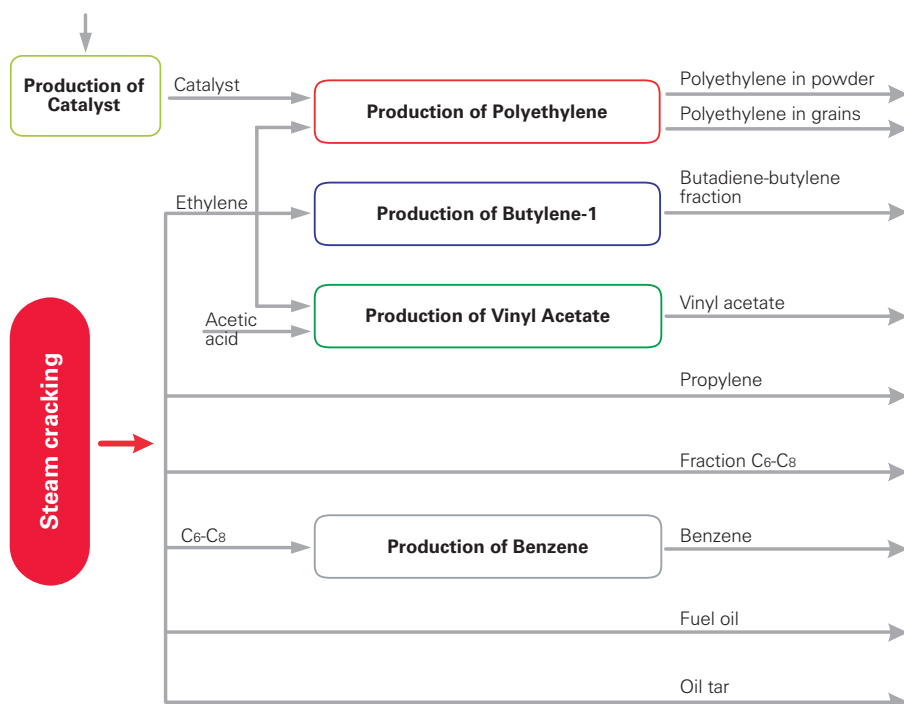
- The petrochemical complex was put into operation in **1968**
- Entered **LUKOIL Group at the end of 1999**
- Complex is supplied by hydrocarbon feedstocks (naphta, reformate, propane-butane fraction, propylene) from the Burgas refining complex
- The petrochemical complex includes production of ethylene, aromatic hydrocarbons, ethylene oxide, ethylene glycols, ethanol amines and phenol
- The complex also produces six types of polymers: polyethylene, polypropylene, styrene and polystyrene, acrylonitrile and polyacrylonitrile, rubber and latex, pyrolene



Production of petrochemicals at Burgas Refinery, th. tons

	2000	2001	2002	2003	2004
<i>Saleable products</i>	385.3	375.4	334.8	371.5	351.6
Ethylene	4.4	2.9	2.5	2.3	3.3
Polyethylene	70.2	68.9	64.4	71.6	70.3
Polypropylene	53.4	61.6	56.3	64.3	64.8
Acrylonitrile	18.8	16.6	17.3	18.0	20.8
Synthetic fiber	9.8	11.7	9.6	11.3	9.6
Styrene	13.0	13.2	12.8	13.8	7.9
Polystyrene	9.5	9.8	8.3	9.3	0.5
Latex	12.7	13.3	12.8	12.2	12.0
Rubber	18.4	20.3	17.4	20.0	19.8
Ethylene glycol	59.8	73.4	63.1	69.1	71.3
Ethanol amine	11.0	12.9	10.7	12.8	3.9
Benzene	28.9	9.7	6.2	10.8	20.0
Toluene	26.6	28.6	26.0	25.3	20.1
Xylene	16.8	17.8	14.6	14.9	11.8
Other	32.0	14.7	12.8	15.8	15.5

OOO "STAVROLEN"



OOO "Stavrolen"

- Put into operation in **1981**
- Entered **LUKOIL Group in 1998**
- Pyrolysis capacity of ethylene production – **330 th. tons per year**
- The enterprise owns one of the largest pyrolysis unit in Russia which uses a wide range of feedstocks – naphta, propane-butane fraction, NGL
- As a result of modernization, the share of gas in total volume of feed stock was raised to 20%. The change in feedstock structure and in construction of furnaces improved efficiency of production and increased basic olefins yield
- At present a propylene unit of **120 th. tons** of annual capacity is under construction (start-up is planned for **2006**) and polyethylene production is being rebuilt

Main products of OOO "Stavrolen"

> Low-pressure polyethylene

Produced by gas-phase polymerization using UNIPOL technology. Stavrolen is currently the largest Russian producer of low-pressure polyethylene. The enterprise produces polyethylene in grains stabilized by a highly efficient antioxydant

> Propylene

Raw material for production of polypropylene, propylene oxide, isopropyl and butyl alcohol, acrylonitrile, etc.

> Butadiene-butylene fraction

Raw material for production of synthetic rubber

> Benzene

Raw material for production of caprolactam, phenol, nitrobenzene, isopropyl benzene

> Vinyl acetate

Raw material for production of water-based emulsion paints, paints for the car industry, various adhesives, polyvinyl acetate, polyvinyl spirit, copolymers with vinyl chloride, ethylene, etc.

> Fractions C₅-C₉ and C₆-C₈

Raw material for production of motor fuels, solvents and aromatic hydrocarbons

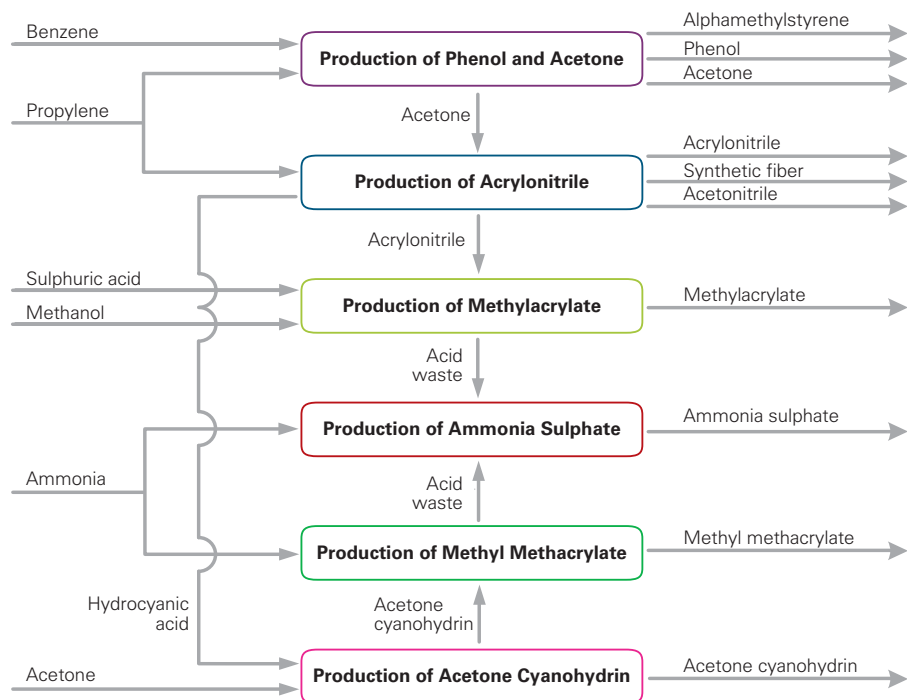
Processing and production of petrochemicals at OOO "Stavrolen", th. tons

	2000	2001	2002	2003	2004
Processing	826.4	788.5	889.8	914.4	906.5
Saleable products	634.5	581.0	671.2	686.6	692.4
Propylene	115.2	109.8	128.7	129	128.9
Polyethylene	252.6	245.8	267.8	263.9	274.3
Benzene	19.0	70.4	75.9	78.2	78.2
Vinyl acetate	0.0	0.0	30.7	42.5	40.9
Heavy liquid fuel	38.3	35.5	32.7	33.9	36.5
Liquid pyrolysis fractions	209.4	119.5	135.4	139.1	133.6

OOO "SARATOVORGSINTEZ"

OOO "Saratovorgsintez"

- Put into operation in **1957**
- Entered **LUKOIL Group in 1999**
- The plant has three huge productions:
 - hydrocyanic acid and acrylonitrile (capacity – **125 th. tons**)
 - synthetic fiber (capacity – **25 th. tons**)
 - organic synthesis (capacity – **110 th. tons**)
- Main feedstock is polypropylene from OOO "Stavrolen"
- From 2000 the Company has been rebuilding main production units. The plant is installing production of sodium cyanide (start-up is planned for 2007) to recycle wastes from production of hydrocyanic acid



Main products of OOO "Saratovorgsintez"

› Acrylonitrile

One of the most important monomers for production of acrylic fiber, butadiene-nitrile rubbers, alkyl- and polyamides

› Ammonia sulphate

Nitrogenous fertilizer widely used in agriculture

› Acrylic fiber

Raw material for the knitwear industry

› Phenol

Used in production of phenolformaldehyde resins, caprolactam, diphenylpropane, lubricants and lubricant

additives, pigments, pesticides, pharmaceuticals, thermoplastics

› Acetone

Used in the paint and varnish, food and pharmaceutical industries, and also in production of cellulose acetate, and nitrocellulose, cinema film, plexiglass, etc.

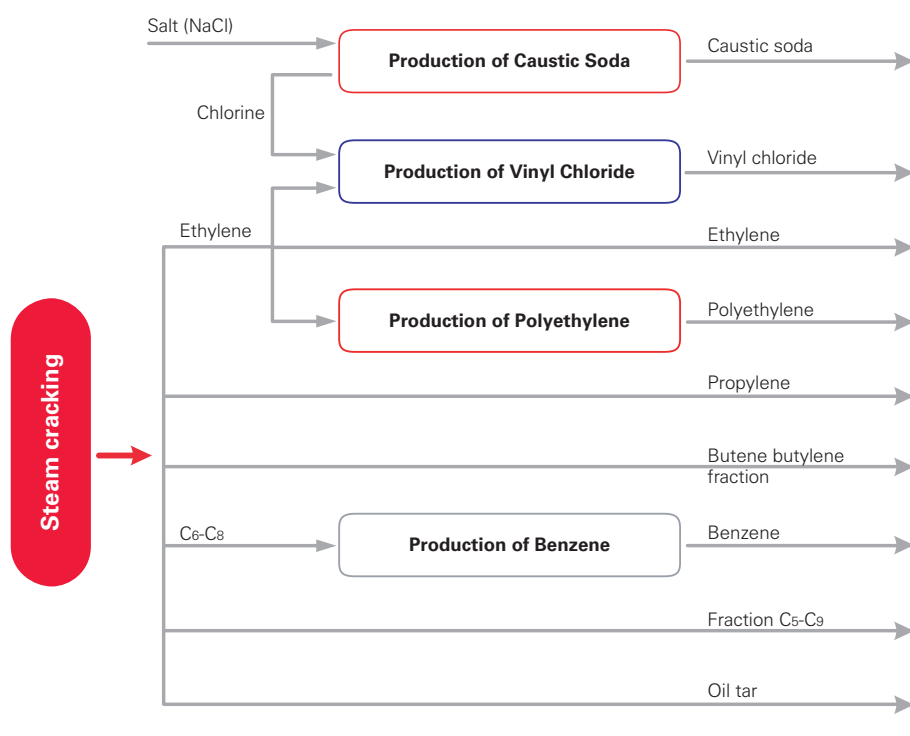
› Methyl methacrylate

Used in production of plexiglass, synthetic resins, latex, emulsions, ash-free additives to petroleum and lubricating oils, impact strength modifiers, paints and varnishes

Processing and production of petrochemical products at OOO "Saratovorgsintez", th. tons

	2000	2001	2002	2003	2004
Processing	278.8	305.2	373.2	401.6	415.2
Saleable products	201.7	218.0	244.0	269.5	279.6
Phenol	35.6	33.3	28.4	33.3	37.5
Acetone	7.5	6.3	2.7	3.5	3.8
Acrylonitrile	72.7	83.4	122.2	117.7	118.7
Synthetic fiber	9.3	11.6	13.5	21.2	22.3
Acetone cyanhydride	3.2	2.6	0.5	2.8	1.0
Methyl methacrylate	19.8	20.6	20.7	23.8	26.3
Sulphate of ammonia	48.9	56.5	50.3	60.7	63.3
Other	4.7	3.7	5.7	6.5	6.7

OOO "KARPATNEFTEKHIM"



OOO "Karpatneftekhim" (previously ZAO "LUKOR"), Ukraine

- Put into operation in the early **1970s**
- A joint venture established in **2000** between LUKOIL and the company "Oriana"
- Pyrolysis capacity of ethylene production – **250 th. tons per year**
- Main feedstocks – diesel fuel, supplied from Nizhny Novgorod refinery, and sodium chloride
- In **2001–2003** the capacities for production of olefins and polyethylene were rebuilt and modernized

Main products of OOO "Karpatneftekhim"

> Vinyl chloride

Raw material for production of polyvinylchloride, which is widely used in the construction industry, manufacture of cables and artificial leather, as well as in agriculture, packaging production, and various consumer products

> Polyethylene

Production is based on gas-phase technology developed by the US firm, Union Carbide, which is the world leader in polyolefins

The olefin production unit makes ethylene, propylene, C₄ fraction, C₅-C₉ fraction, benzene and pyrolysis resin

> Caustic soda

One of the strongest alkalis. More than 95% of produced soda is used in industry for production of synthetic fibers, hydrogen nitride, caprolactam and basic chemicals. Also used in electroenergy, the cellulose industry, food industry and in production of pharmaceuticals

Processing and production of petrochemicals at OOO "Karpatneftekhim", th. tons

	2000	2001	2002	2003	2004
Processing	36.1	511.5	875.0	946.4	1,120.3
Saleable products	28.0	395.9	717.0	807.7	918.1
Ethylene	1.6	32.4	47.5	52.6	19.6
Propylene	3.0	52.1	92.0	104.1	109.4
Benzene	1.2	48.3	75.7	79.8	80.9
Polyethylene	0.2	52.3	98.7	92.3	98.1
Vinyl chloride	9.5	70.7	120.7	173.2	236.0
Liquid pyrolysis fractions	4.3	65.1	117.5	124.2	122.0
Oil tar	8.2	50.7	94.6	99.9	136.2
Other	0.0	24.3	70.3	81.6	115.9