



TVEL  
ROSATOM

# SPECIALTY CHEMICALS



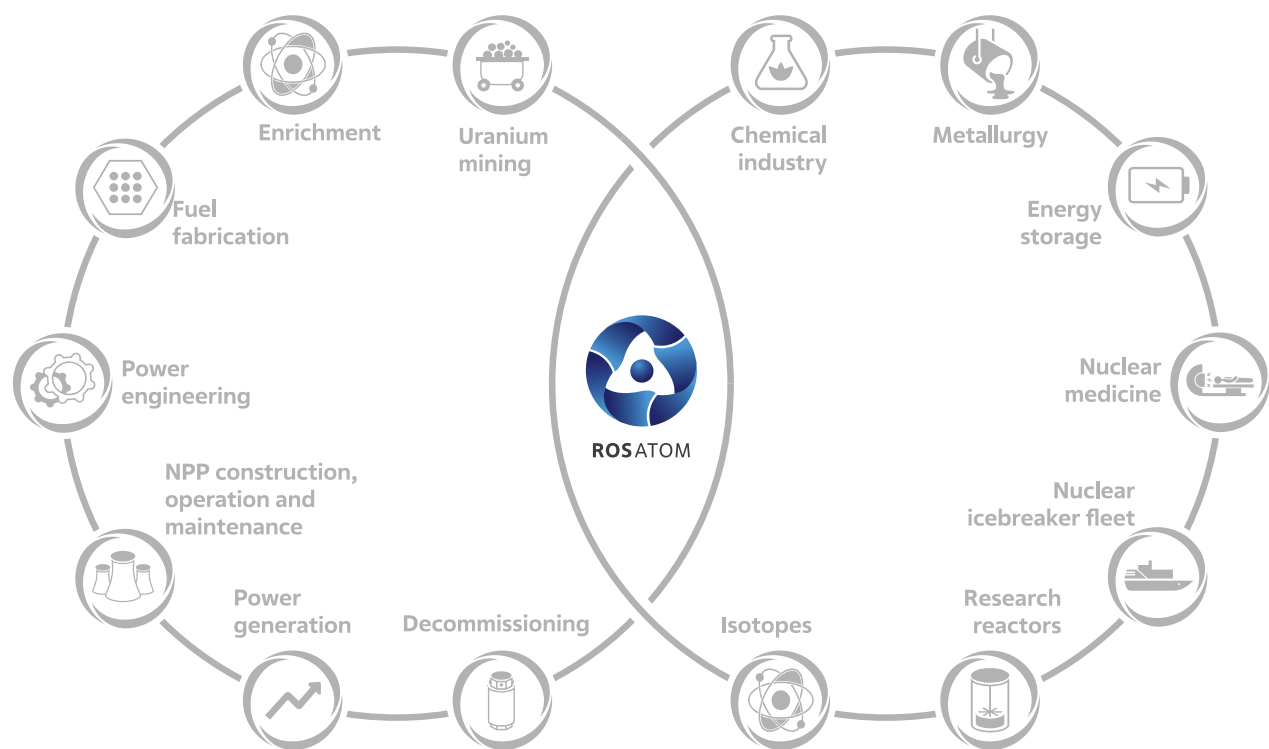


## State Atomic Energy Corporation Rosatom

State Atomic Energy Corporation Rosatom is a vertically integrated holding company involved in all process steps of nuclear power industry, including geological exploration and mining of uranium, uranium conversion and enrichment, nuclear fuel fabrication, mechanical engineering, nuclear power plant (NPP) design and construction, decommissioning, spent fuel and radioactive waste management.

World-class competencies in the nuclear industry enable ROSATOM to diversify into related business segments, such as wind power, nuclear medicine, advanced materials and technologies, digital products, infrastructure solutions, additive technologies and energy storage systems, process control systems and electrical engineering, environmental solutions, etc.

ROSATOM is over 300 enterprises and organizations, including research centers and the world's only nuclear-powered icebreaker fleet. It is the biggest electric power producer in Russia, and one of the world leaders in nuclear technologies (NPP construction, uranium enrichment services, nuclear fuel fabrication, etc.). It constructs and operates many large-scale projects outside of Russia.



**300**

enterprises and organizations

**275,000**

people employed in the State Corporation

**20%**

share of electricity generated by nuclear power plants in Russia

**\$ 26 bn**

portfolio of new products

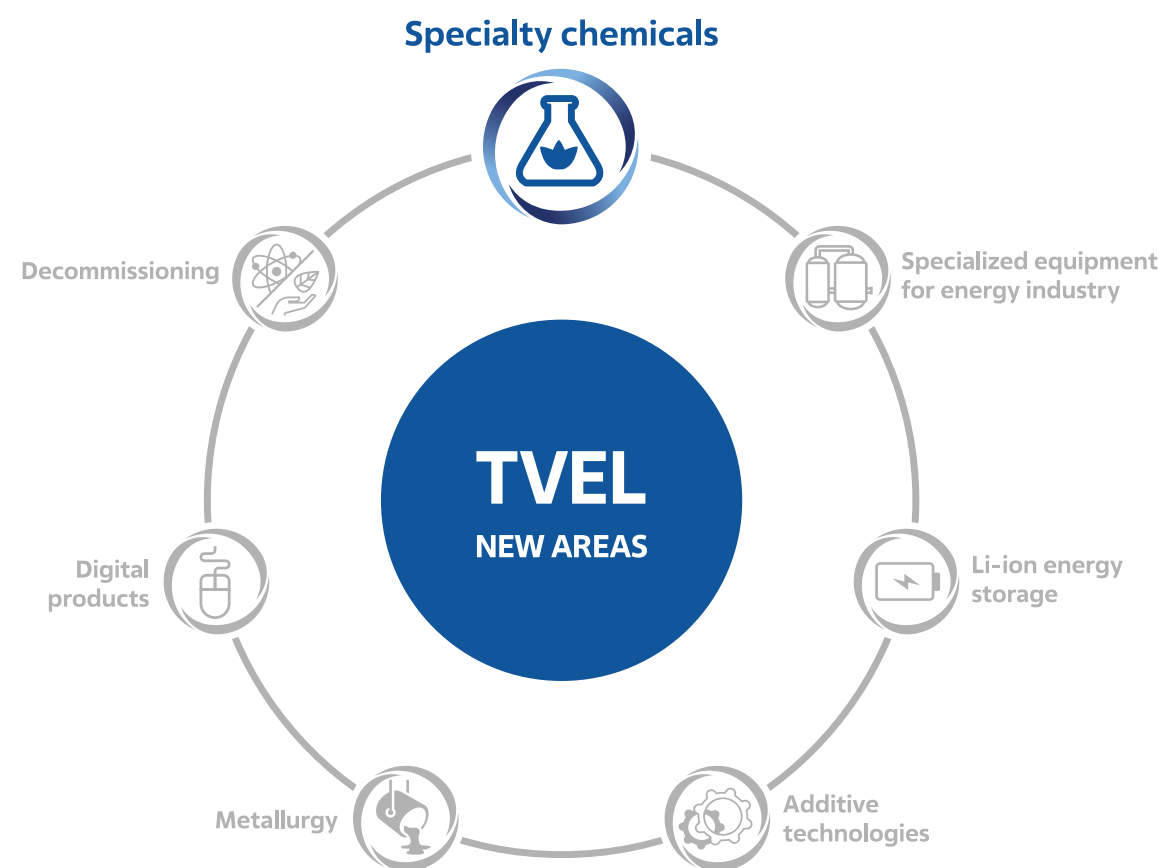


## Fuel Company of Rosatom TVEL

Fuel Company of ROSATOM TVEL is one of the world's largest nuclear fuel producers. The Fuel Company supplies nuclear fuel for all Russian NPPs, as well as marine and research reactors in Russia. It also supplies fuel for NPPs in 15 countries, and every 6th power reactor in the world uses fuel from TVEL.

The Fuel Company manages more than 10 factories specializing in the production of gas centrifuges, uranium enrichment and nuclear fuel fabrication and related materials production and services, and has best-in-class in-house competencies in material science, R&D, design, engineering and construction as it operates several R&D centers.

These core competencies form the basis for the new business segments of the Fuel Company: Specialty Chemicals, Decommissioning of various facilities, Digital Products, Additive Technologies, Metallurgy, Li-ion Energy Storage, Specialized Equipment for the energy industry.



**10**

production sites

**22,400**

people employed in TVEL

**17%**

of global nuclear fuel fabrication market

**\$ 340 m**

revenue in new areas

# Specialty chemicals

## Lithium products



Fuel Company TVEL is the largest in Russia producer of lithium metal, lithium chloride and lithium hydride, as well as lithium-7 hydroxide monohydrate.

Lithium metal and its compounds are essential for primary and secondary batteries production. Lithium alloys and compounds are also used as reagent-catalysts in organic synthesis, in aircraft alloys, lubricants, as well in many other industries, primarily in nuclear engineering, pharmaceuticals and metallurgy.

## Fluorine products



Fuel Company TVEL is a leading manufacturer of fluorine products in Russia. Hydrogen fluoride and hydrofluoric acid are used in the aluminum industry, for treatment of stainless steel alloys and for glass etching as well as in the petroleum, chemical and nuclear industries.

Lithium fluoride salts play a key role in the lithium-ion batteries as the electrolyte components. Lithium fluoride is also used in optics, silicate production and as an additive for alloys to aluminum electrolysis in welding and soldering.

## Automotive catalysts



Fuel Company TVEL is the leading Russian manufacturer of automotive catalysts with a market share more than 35%.

Key features of automotive catalysts by Fuel Company TVEL:

- Strict adherence to the European emission standards up to EURO-5, EURO-5+, EURO-6b, EURO-6c, EURO-6d;
- Certified and procured by numerous Russian and international car producers: Auto-VAZ, RENAULT-NISSAN, SOLLERS and others;
- Selected for the AURUS cars for the top public officials.

## Titanium dioxide and promising products



Fuel Company TVEL has developed the unique fluoride - based technology for production of titanium dioxide. Its advantages are zero waste, environmental safety and energy efficiency. Industrial production is scheduled to start in 2024.

Titanium dioxide is the most common white pigment used in the production of paint, paper, plastics, food and cosmetics.

Lithium metal  
CAS №: 7439-93-2

Lithium chloride  
CAS №: 7447-41-8

Hydrofluoric acid  
CAS №: 7664-39-3

Trifluoromethanesulfonic acid anhydride (CF<sub>3</sub>SO<sub>2</sub>)<sub>2</sub>O  
CAS №: 358-23-6

Lithium-7 hydroxide monohydrate  
CAS №: 76576-68-6

Lithium hydroxide  
CAS №: 1310-65-2

Anhydrous hydrogen fluoride  
CAS №: 7664-39-3

**Under development:**  
Fluoropolymers

Lithium hydride  
CAS №: 7580-67-8

Lithium tetrafluoroborate LiBF<sub>4</sub>  
CAS №: 14283-07-9

Potassium bifluoride  
CAS №: 7789-29-9

Lithium fluoride compounds  
CAS №: 7789-24-4

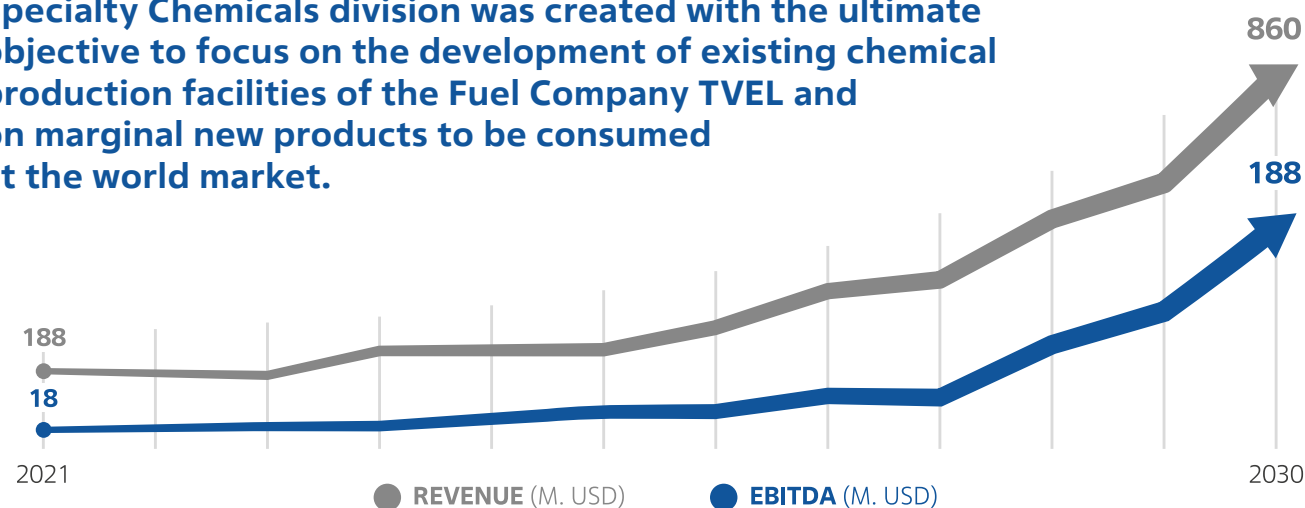
Catalytic blocks  
Neutralizers

Titanium dioxide  
CAS №: 13463-67-7

**Under development:**  
Polyanionic cellulose (PAC)  
CAS №: 9004-32-4  
Iron-oxide pigment  
CAS №: 51274-00-1

Fuel Company TVEL is actively developing various chemical technologies and products.

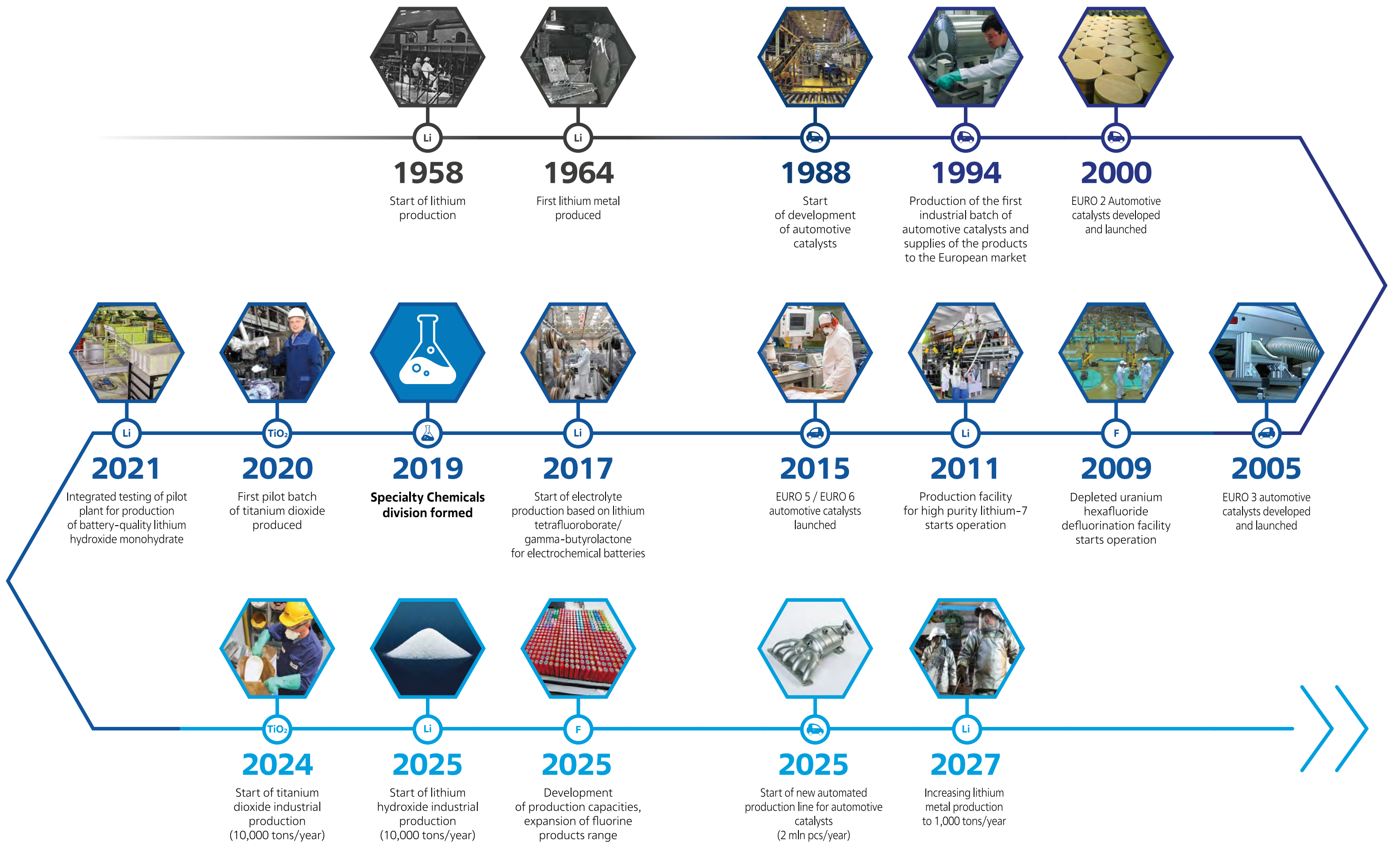
Specialty Chemicals division was created with the ultimate objective to focus on the development of existing chemical production facilities of the Fuel Company TVEL and on marginal new products to be consumed at the world market.



## Geography of deliveries







# Geography of production facilities

 Saint-Petersburg

 Moscow

 Novorossiysk

Novouralsk




Seversk

Zelenogorsk  
Novosibirsk




Angarsk

 Vladivostok




## • Ecoalliance, Ltd

-  Novouralsk,
-  Founded in 1994
-  Key products: auto catalysts; neutralizers




## • JSC Siberian Chemical Combine (JSC «ECP»)

-  Seversk
-  Founded in 1949
-  Key products: TFBL electrolyte (lithium tetrafluoroborate LiBF<sub>4</sub>); Titanium dioxide




## • Electrochemical Plant JSC (JSC «ECP»)

-  Zelenogorsk,
-  Founded in 1955
-  Key products: hydrofluoric acid; anhydrous hydrogen fluoride

## • Novosibirsk Chemical Concentrates Plant (PJSC «NCCP»)

-  Novosibirsk,
-  Founded in 1948
-  Key products: metal lithium; lithium-7 hydroxide monohydrate, lithium hydride and chloride

## • JSC Angarsk Electrolysis Chemical Combine (JSC «AECC»)

-  Angarsk
-  Founded in 1954
-  Key products: lithium hydroxide; potassium bifluoride; polyanionic cellulose (PAC)





# Quality Management System

The fundamental principles of Fuel Company TVEL are impeccable quality and continuous improvement. Fuel Company TVEL and its subsidiaries are certified and comply with the following international standards:

- ISO 9001:2015
- ISO 14001:2015
- BS OHSAS
- ISO 50001:2011
- QS-9000
- ISO/TS 16949 and special automotive standards QSB, ASES

The company is registered with the European Chemical Agency in accordance with Registration, Evaluation, Authorization and Restriction of Chemicals (REACH).



# Environmental Policy



**All business activities of the Fuel Company aim to preserve the environment for future generations.**

Fuel Company of ROSATOM TVEL builds up its production activities on the basis of the integrated economic, social and environmental development of enterprises and the regions of their locations. Environmental protection is considered by the Fuel Company as the most important business principle.

The priority areas in environmental protection are reduction of emissions, recycling of resources and energy saving. In its activity, Fuel Company TVEL takes reasonable precaution through anticipating and evaluating environmental risks, thus preventing, reducing or controlling any kind of contaminating emissions or discharges and therefore eliminating or minimizing the possible adverse impact operations may have on the environment, personnel, and the populations of the regions of the Fuel Company TVEL presence.

**The high commitment to ensuring environmental safety of the Fuel Company TVEL enterprises is confirmed by the certificate for compliance with the requirements of environmental management standard ISO 14001:2015.**



State-of-the-art resources-saving production technologies



Reduction of environmental impact from enterprises



Continuous environmental monitoring



# Advantages



Unique chemical production facilities that enable the obtaining of highly purified metals and materials and complex chemical compounds used in a variety of industries



Full technological cycle for the development of automotive catalysts and serial production of exhaust gas catalytic converters



Application of high technologies and use of advanced scientific developments



Over 80 years of successful business operations



Flexibility of technological and commercial cooperation conditions



Certified quality management system



Modern and environmentally friendly production



Conduct of business in accordance with the UN principles in the area of sustainable development







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