



ГОСУДАРСТВЕННАЯ КОРПОРАЦИЯ ПО АТОМНОЙ ЭНЕРГИИ «РОСАТОМ»

Non-nuclear businesses of TVEL Fuel company

Senior vice-president
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Metallurgy

- Special metallurgy
- Special rolled pipes
- Nanometallurgy
- Hydrometallurgy

Engineering

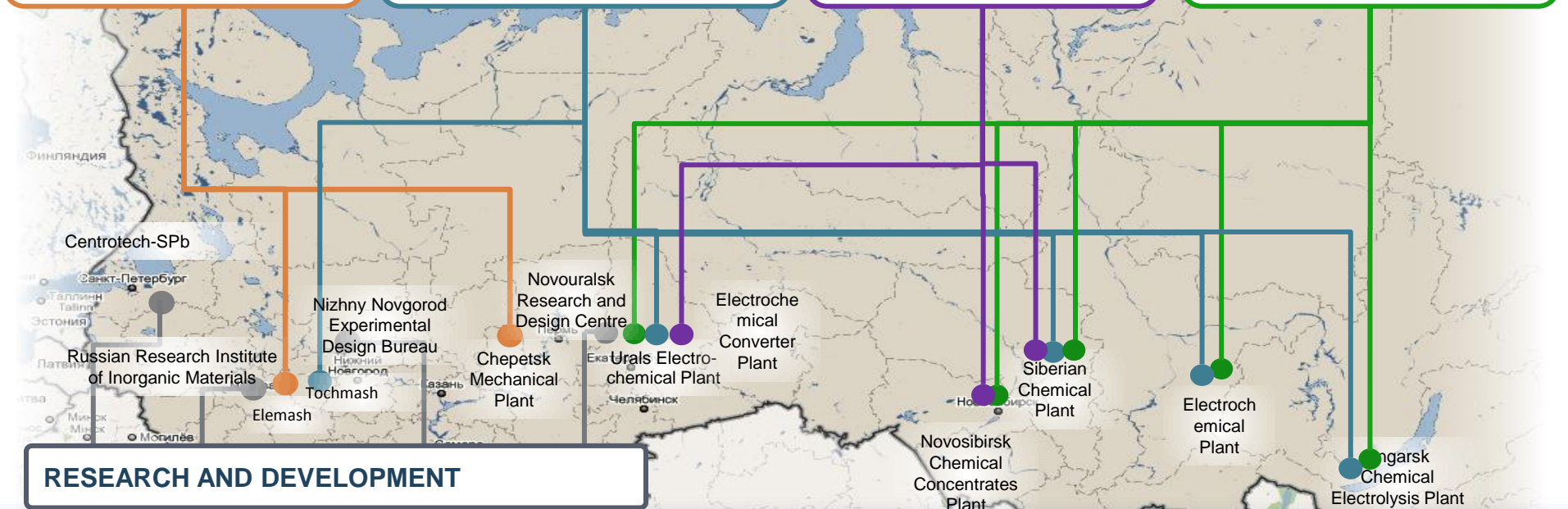
- Special products
- Instrumentation
- Nuclear fuel cycle equipment
- Precision mechanics, etc.

New power engineering

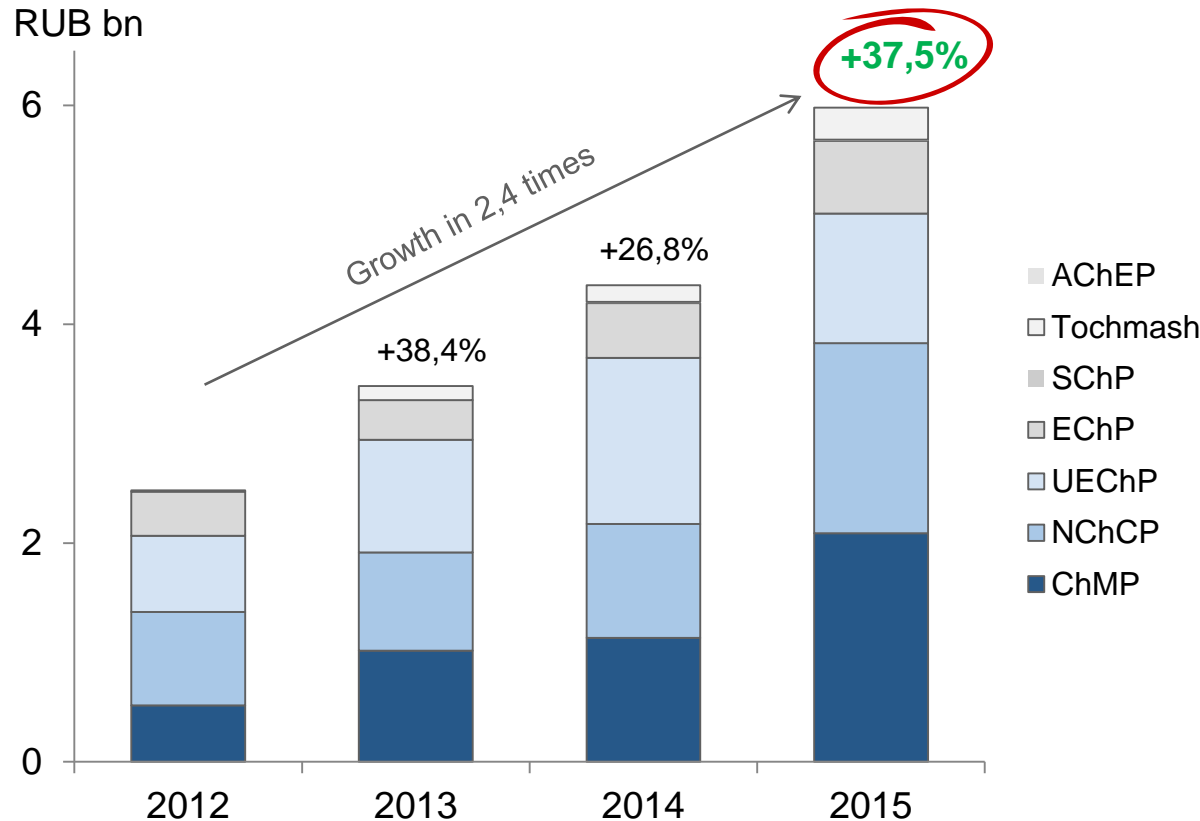
- Lithium-ion batteries, materials and components, LI energy storage systems
- Hydrogen power generation

Chemical engineering

- Fluorine compounds
- Isotopes
- Zeolite catalysts
- Automotive and industrial catalysts



Revenue chart for key non-nuclear products

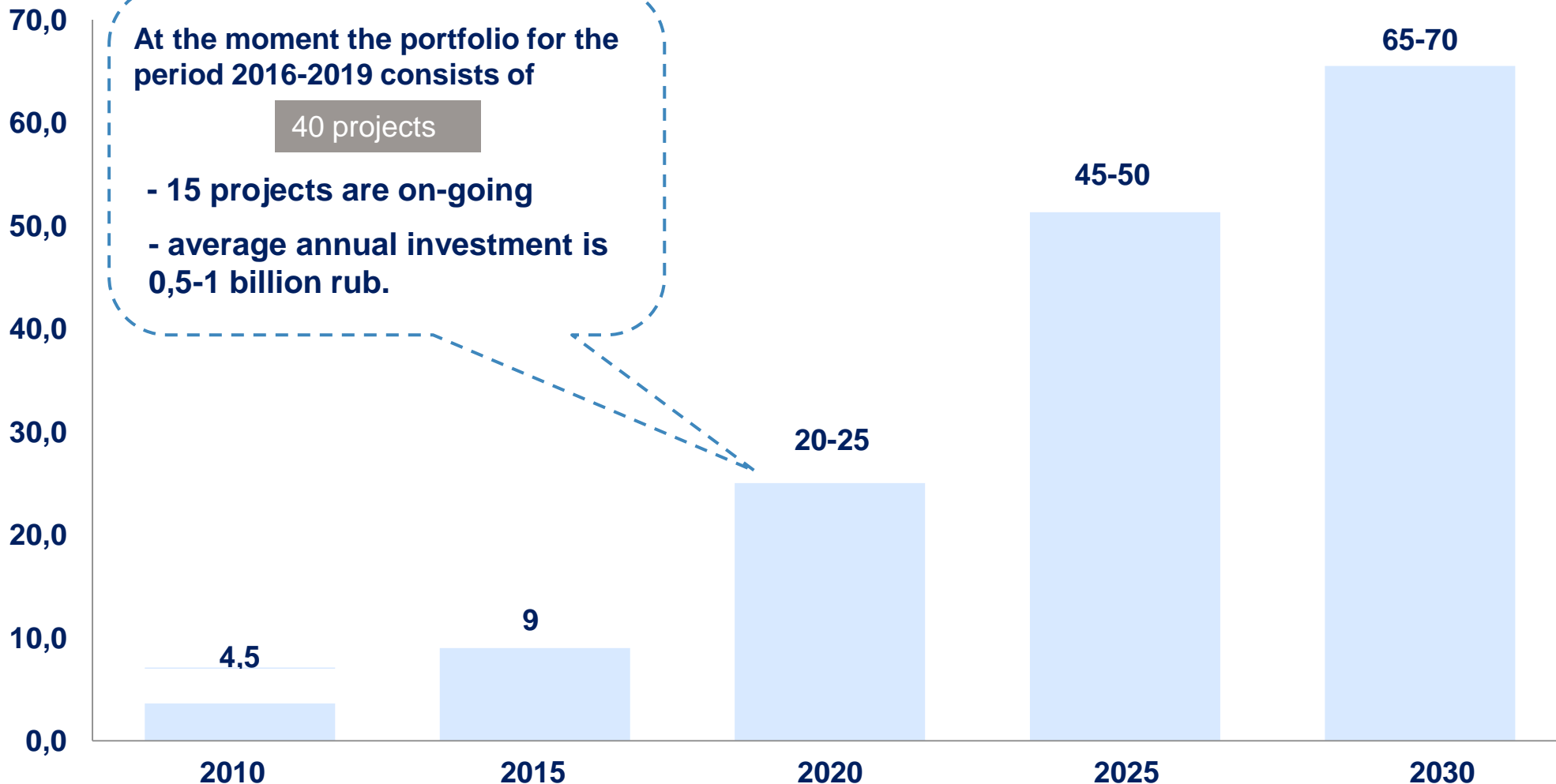


Key non-nuclear products

- Lithium (metal chloride), LiOH-7 (99,5%), LiOH-7 (99,9%)
- Calcium, Calcium wire
- Titanium rolled pipes
- Isotopes
- Automotive catalysts
- Racks and equipment for NPPs, Shipping Packing Sets, equipment for SFSF
- Energy stores based on fuel cells and LIA, cathode materials, LiBF4
- Electro technical products
- Machine-building and mechanical production

- Revenue of key non-nuclear products in 2015 has grown by 37,5% compared with 2014.
- Revenue of key non-nuclear products has grown in period from 2012 to 2015 in 2,4 times.
- Profit created by non-nuclear activities in 2015 was about 1,0 RUB billion.

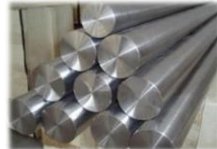
Revenue, RUB bn



Products made of titanium alloys



ingots



rods



forgings

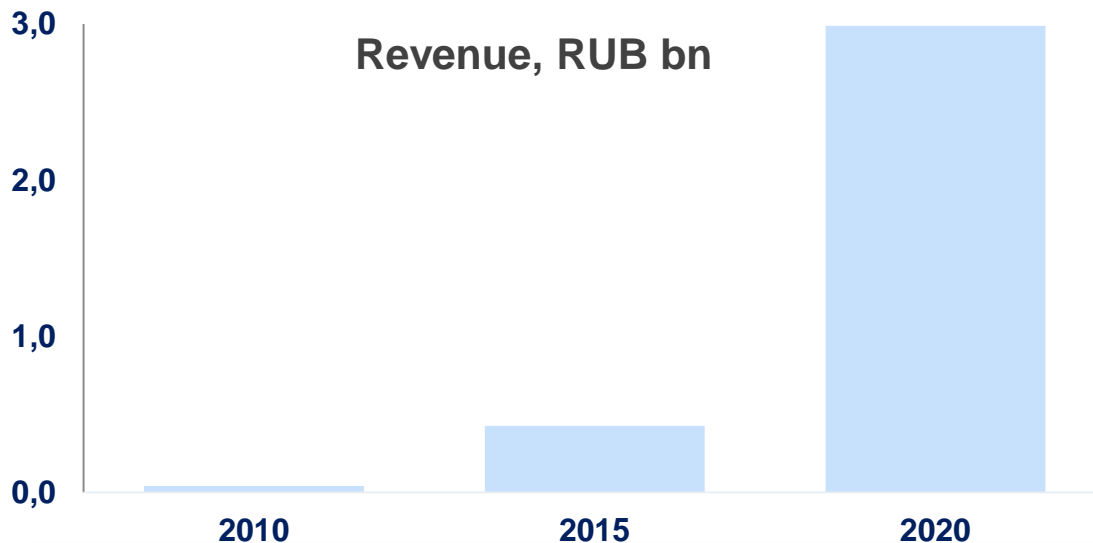


tubes



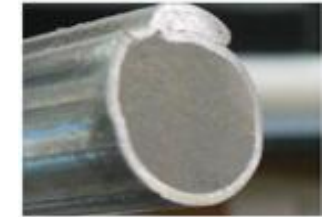
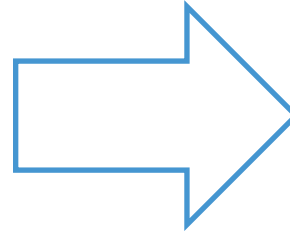
wire

The purpose of the project is to create a production of titanium products based on the competence in zirconium for nuclear sphere



Progress:

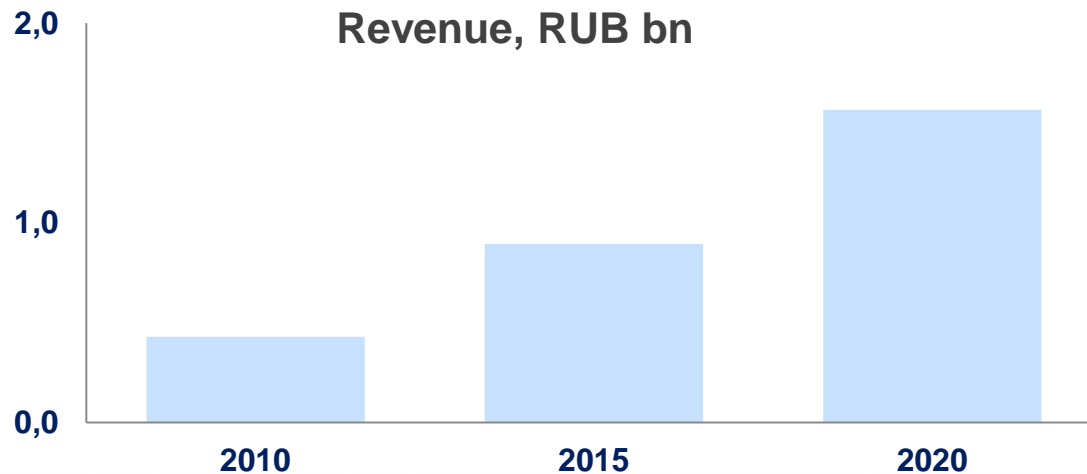
- **Growth of revenue from titanium products by 10 times since 2010.**
- More than 100 new nomenclatures of titanium alloys were mastered
- Production of new intermetallic alloys for perspective gas-turbine engines was mastered in 2015.



"Traditional calcium" - traditional calcium products (calcium ingots, grains 2-7 mm, pieces of 50-160 mm).

Calcium injection wire is used for furnace processing of metallurgical melts at metallurgical plants.

The purpose is to keep calcium metal production in the Russian Federation as well as to development a more profitable product - calcium injection wire



Progress:

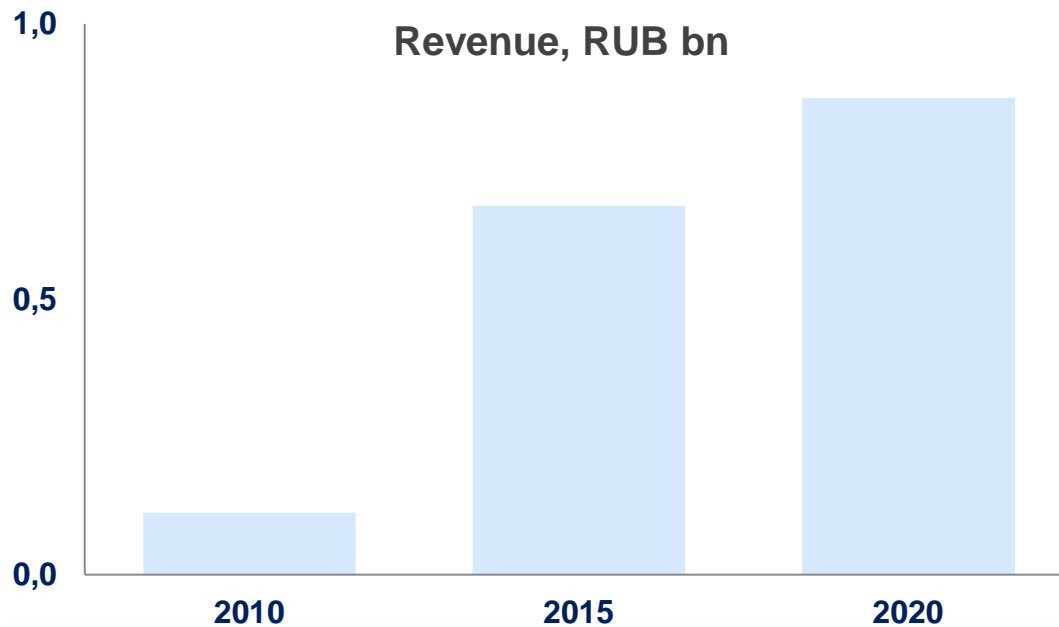
- **Production of calcium injection wire was started**
- Multiple growth of revenue since 2010



Lithium-7 is an irreplaceable reagent for the western PWR reactors and a perspective isotope for application in thorium reactors and medicine.

PJSC «NPCC» produces lithium-7 enriched from 99.95 to 99.995% in the form of hydroxide monohydrate.

The purpose is to keep and increase TVEL world leadership in lithium isotopes market



Progress:

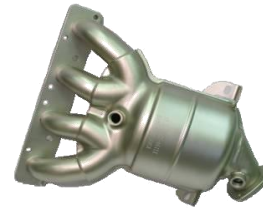
- Growth of revenue from lithium-7 in 6 times since 2010
- Production of high-pure isotope of 99,995% was developed

Products

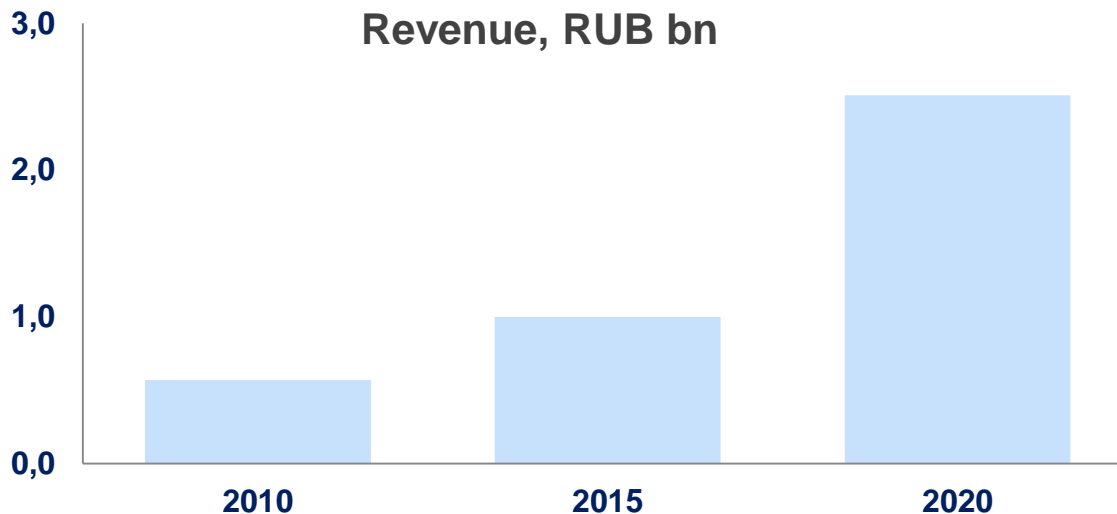
The catalytic Euro-3/4/ 5/5+ blocks for motor transport.



Converters for cars (from small-capacity to heavy-load) using petrol and diesel engines.



The purpose is to develop production of the catalytic blocks and converters for cars using petrol and diesel engines and meeting the requirements of Euro-3/4/ 5/5+



Progress:

- Revenues from automobile catalysts and converters sales were increased by 31,8% in 2015 despite a difficult situation in the Russian automobile market (car sales were reduced by 33%)
- New products were developed and involved in production: catalytic blocks for Euro-5/5+ requirements and new car models (including Vesta и X-RAY)



Isotope products

Isotopically enriched Ge and Si for fundamental research & microelectronics

Ir-191 for radiation sources & metallography

Depleted zinc in Zn-64 for russian NPP

C-13 for medical diagnostics

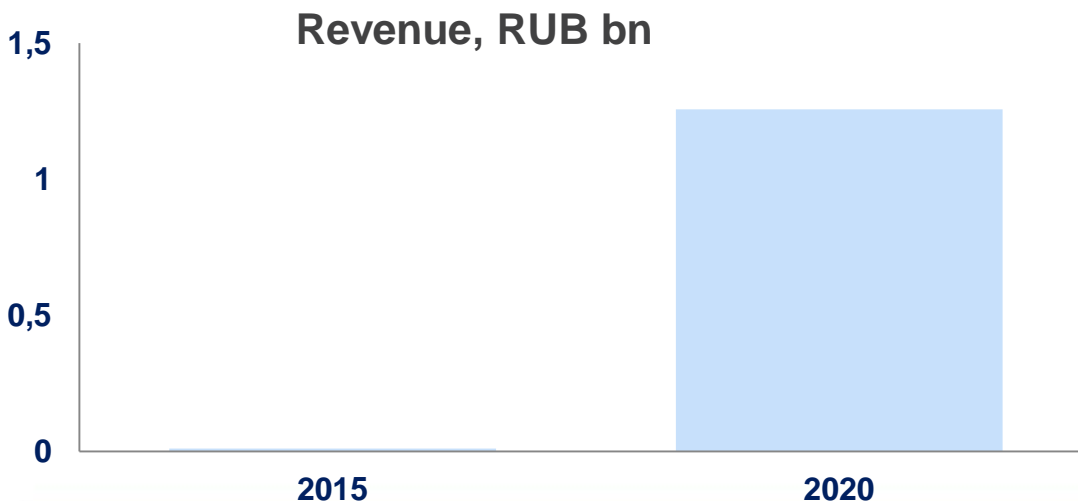


Mo-100, 98 precursor isotopes for nuclear medicine

Nd-150 for fundamental research in astrophysics

Yb-168,176 precursor isotopes for nuclear medicine

Project aims at the development and implementation of technology and high-efficient facilities for stable isotope separation in gas centrifuges, thus ensuring to increase production capability and extend the list of produced isotopes



Progress:

- **Long-term contracts for supply of Mo and Si isotopes to the international scientific collaborations were signed**
- Centrifuge cascading technology was elaborated, and pilot cascade was set up for the separation of rare element isotopes; Nd-150 sample has been obtained
- The base for start of a number of new isotope elements production was created (technologies, design documentation on the equipment were developed)

SCREW PUMP



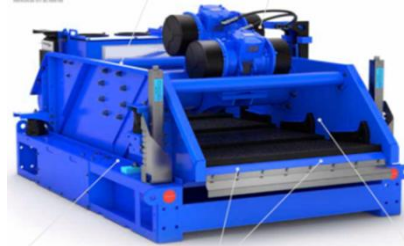
Screw feeding pump is intended for drilling mud fluid supply

drilling mud DEGASSER



Degasser is applied for gas removal from drilling mud fluid

VIBRATING screen



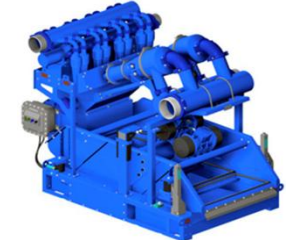
The vibrating screen is designed for separation of the sludge by filtering the solution through a vibrating meshes

CENTRIFUGE



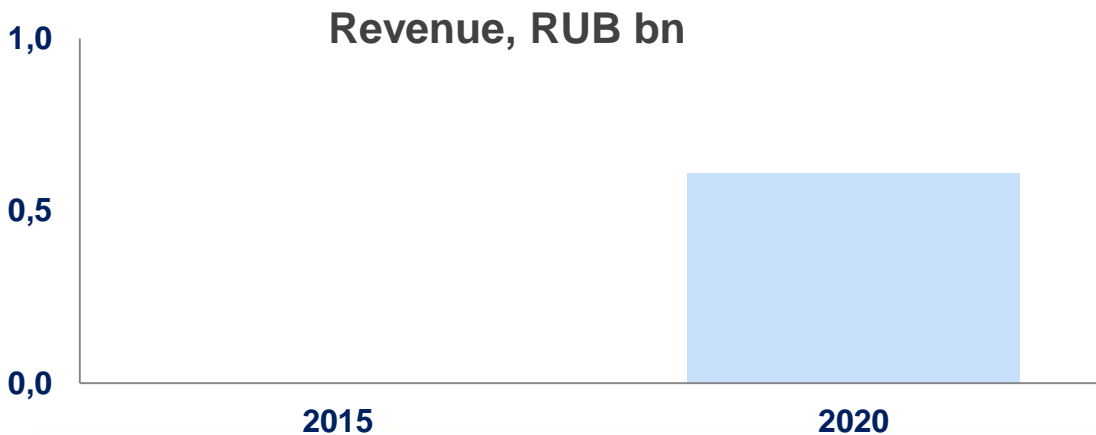
Centrifugal separator is designed for separating solid phase from the liquid one

CYTOGERONTOLOGY INSTALLATION



Cytogerontology unit is designed for efficient removal and dewatering of sludge

The purpose is to organize and develop industrial production of the equipment for systems of drilling mud fluid purification



Progress:

- Prototypes were made, testing procedures have been started.
- Design documentation was developed.

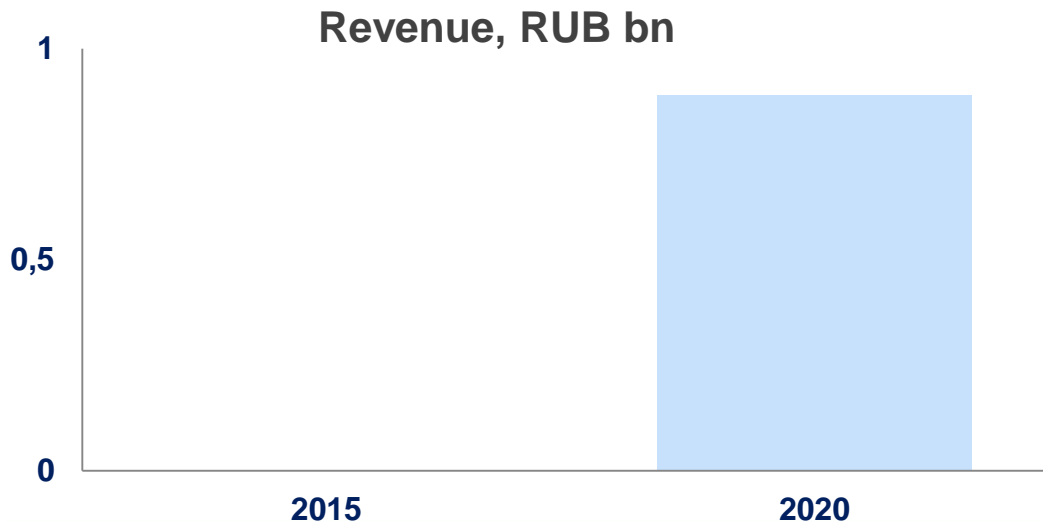


3D printer

The project is provided for the needs of nuclear, aviation, space and other high-tech industries of the Russian Federation.

Project is implemented by the leading scientific institutes of the Russian Federation (including companies of Rosatom State Corporation) with involvement of the enterprises of the Novouralsk cluster. The aim is to develop multilaser automated complex of layer-by-layer synthesis from polymetal powder compositions which exceeds existing foreign analogs.

The purpose is to create hi-tech production of metal 3D printers.



Progress:

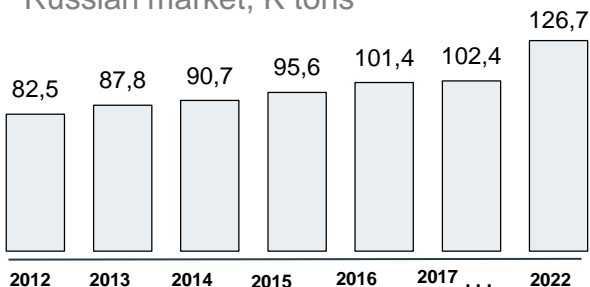
- **Project is supported by the Ministry of Education and Science of the Russian Federation.**
- Unique technologies obtained by enterprises from nuclear sphere are applied for 3D printer development



Titanium dioxide

JSC «SCHP»

Russian market, K tons



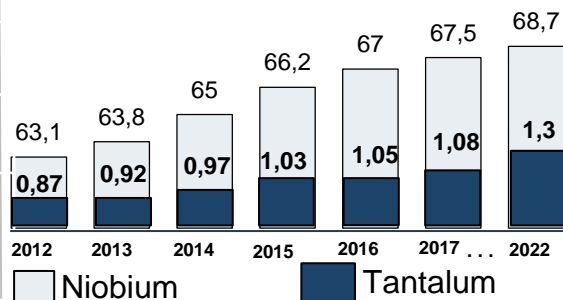
Project budget	800 RUB million
Target revenue	2,5 RUB billion in 2022 r.
Production capacity	10 K tons
Status	Market confirmation
Key event in 2015	Test lots of product were made



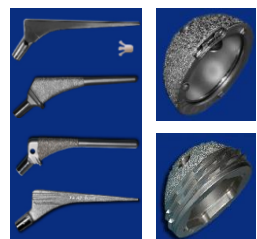
Niobium-tantalum

JSC «AEChP»

World market, K tons



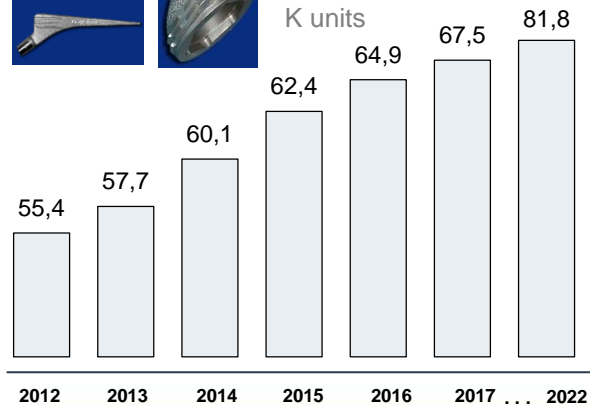
Project budget	280 RUB million
Target revenue	1,1 RUB billion in 2019
Production capacity	70 tons of tantalum oxide 120 tons of niobium oxide
Status	Documents for joint venture creation are under preparation
Key event in 2015	Technical capabilities of project implementation were confirmed



Endoprosthesis

JSC «RRIIM»,
JSC «ChMP», PJSC «NChCP»

Russian market, K units



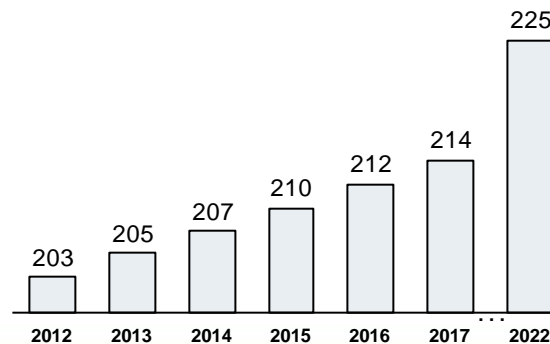
Project budget	160 RUB million
Target revenue	700 RUB million in 2021
Production capacity	Up to 80 K units different types of endoprosthesis per year
Status	RRIIM started production. Documents for production extension are under preparation. Creation of production at ChMP and NChCP are planned.
Key event in 2015	Design and installation of production site at RRIIM was completed.



Medications

JSC «MPP»

Russian market, kg



Project budget	4 RUB billion
Target revenue	8,2 RUB billion in 2021
Production capacity	56 kg of final medical product
Status	Documents for project initiation are under preparation.
Key event in 2015	The concept of project implementation was prepared.

Thank you for the attention!