



ROSATOM



FUEL COMPANY OF ROSATOM

TVEL



STATE ATOMIC ENERGY CORPORATION ROSATOM

TVEL: 20 years of cooperation

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TVEL FUEL COMPANY: FIRST YEARS AND TODAY



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TVEL in 1998

TVEL today

of countries, to which TVEL fuel is supplied



of NPP units with TVEL fuel

45 units

78 units

TVEL market share (fuel fabrication)

10%

17%

NFC stages

One stage of nuclear fuel cycle – fabrication



3 front-end stages and powerful research unit

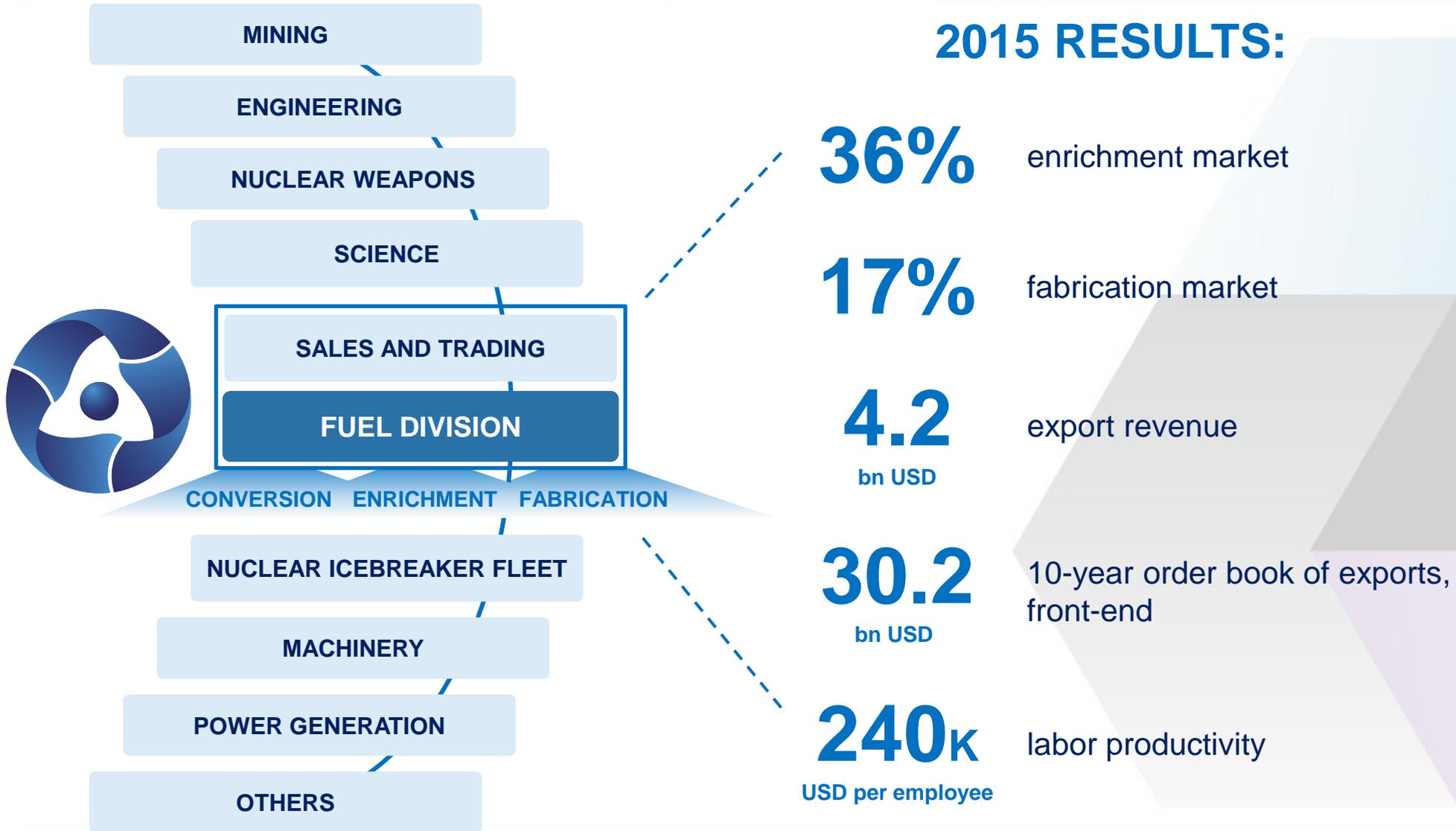


Research and development support

TVEL Fuel Company today:

- ▶ Conditions created for continuous improvements and nuclear fuel upgrade
- ▶ Ability to form innovative and cost-effective proposals to Customers

TVEL IS ONE OF ROSATOM KEY DIVISIONS



Pillars of long-term business continuity and cooperation with Customers:

FUEL SAFETY & RELIABILITY

- Fuel safety is strategic priority for TVEL
- TVEL Fuel Company invests extensively in fuel safety
- Execution of Driving to Zero Failure Program



DEVELOPMENT OF NON-WASTE TECHNOLOGIES & REMEDIATION OF PRODUCTION SITES

- Decommissioning
 - ▶ Nuclear facility of JSC Chemical and Metallurgical Plant brought to greenfield
 - ▶ Building B at JSC VNIINM brought to greenfield
 - ▶ Safe phase-out of conversion plant at JSC AECC
- Tails management at W-facility (~10K tons every year)



HIGH QUALITY

- Manufacturing automation, aiming at minimization of human factor's impact
- Technology excellence of control & measurement operations at plants
- Compliance with international quality management requirements



NON-NUCLEAR BUSINESS DEVELOPMENT

- Improving sustainability of TVEL in cyclical conditions of nuclear business
- Formation of the second stable "financial footing" for TVEL Fuel Company



COMPETITIVE ADVANTAGES OF FUEL DIVISION (2/2)

COST OPTIMIZATION & PRODUCTION SITES MANAGEMENT

- Increasing price competitiveness through cost optimization
- Plant concentration – optimization of duplicate functions, reduction of transaction costs
- Disposal of noncore facilities
- Development of new and non-waste technologies
- Technological development

PACKAGED FUEL SUPPLY

- All stages of fuel production are concentrated in the Fuel Company, providing opportunity for upgrade of fuel characteristics
- Increasing price competitiveness

CONTINUOUS UPGRADE OF FUEL CONSUMER CHARACTERISTICS

- Ensuring load-following operation, possibility to increase power of reactor unit
- Longer fuel campaigns and cycles
- High nuclear fuel burnout

DIFFERENT TYPES OF RAW MATERIALS

- Increasing commercial viability of TVEL fuel
- Reducing the fuel input in the cost of kW/h

FUEL WITH PROVEN TRACK RECORD

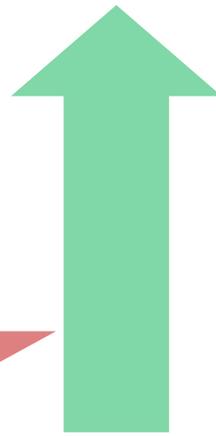
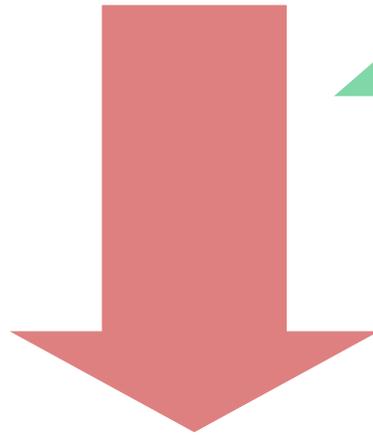
- TVEL offers to the Customers products successfully qualified in Russia

TVEL fuel upgrade is always executed in close cooperation with customers

HIGH QUALITY AND ATTRACTIVE PRICES ARE THE KEY FACTORS OF SUSTAINABLE CUSTOMER SATISFACTION



- Inflation processes in Russia
- Macroeconomic situation in Russia
- Significant capital requirements for modernization



- Optimization of expenses
- Cost cutting
- Optimization of energy consumption



The price of Russian fuel did not increase over the past 5 years



ADDITIONAL INVESTMENT RESOURCES

FUEL SAFETY

REMEDICATION OF
CONTAMINATED
AREAS

QUALITY

RESEARCH &
DEVELOPMENT

TECHNOLOGICAL
DEVELOPMENT



- ▶ ABSOLUTE SAFETY
- ▶ SECURITY OF SUPPLY
- ▶ MAXIMUM CUSTOMER-ORIENTED APPROACH
- ▶ UPGRADE OF FUEL CONSUMER CHARACTERISTICS
- ▶ SCIENTIFIC AND TECHNICAL SUPPORT AND SERVICE
- ▶ FUEL FOR ALL KEY SEGMENTS OF WORLD NPP MARKET
- ▶ PRICE COMPETITIVENESS

KEY WORK AREAS FOR TVEL FUEL COMPANY



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QUALITY



TVEL IMS is certified by TÜV Thüringen e.V. and conforms to ISO 9001, ISO 14001, ISO 50001 and BS OHSAS 18001



Driving to Zero Failure project has been executed since 2012



TVEL production facilities are audited by Customers



IAEA
International Atomic Energy Agency

According to the requirements of the IAEA TVEL has designed policies and programs for development and improvement of safety culture

NEW FUEL DESIGNS

TVSA-12, TVSA-Tmod.2



TVS-2M



TVS-4



TVS-K



- Assemblies loaded, LTA program
- 2nd cycle of irradiation is starting

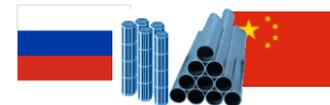


- Consortium has been established
- Powerful partner – GNF
- Available market - ~50% of 17x17 segment in USA

PARTNERING WITH CHINA



The most dynamic market



Extra supplies to Tianwan NPP, including new fuel designs



Fuel fabrication in China, based on the Russian technology

OTHER IMPORTANT DIRECTIONS



Qualified by NRG



Supply to Research reactor "Maria"



Pellets supply for BWR and PHWR



Exchange of excessive Iran EUP to Russian natural uranium

“
One who understands partners is intelligent.
One who understands oneself is wise.
One who overcomes the competition is strong.
One who triumphs over oneself is the greatest.”

following Tao Te Ching