

Import Substitution

**SERIAL PRODUCTION OF MEASUREMENT-
WHILE-DRILLING (MWD) SYSTEMS WITH DUAL
(ELECTROMAGNETIC (EM) & MUD-PULSE (MP)) DATA
TRANSMISSION FOR HORIZONTAL WELLS DRILLING
(INCLUDING NAVIGATION AND DRILLING PROCESS
CONTROL EQUIPMENT)**



R&P ENTERPRISE «OPK»

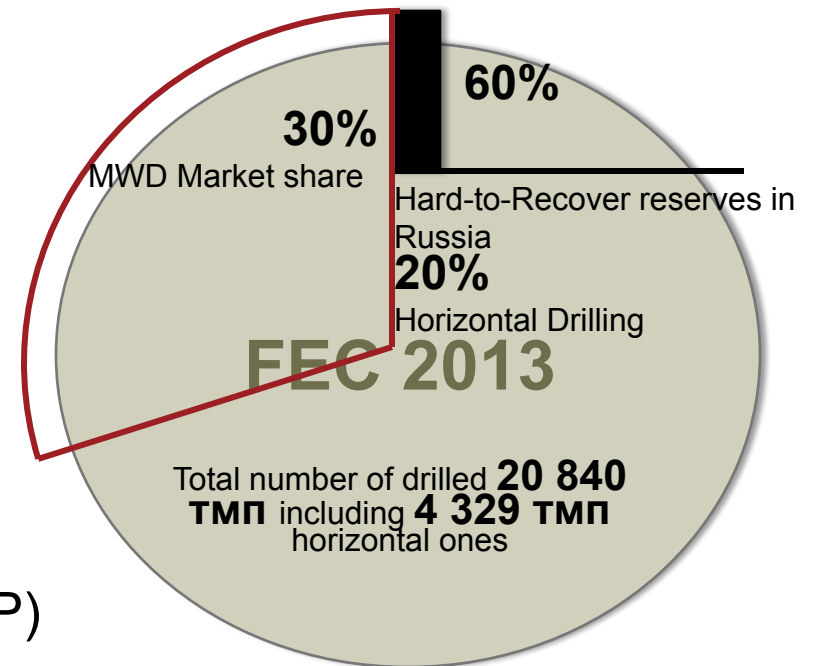
RUSSIA 2017

ABSTRACT

- Σ \$15 million
- T 3 years
- NPV \$45 million
- Profit \$63 million

What's new:

- Dual data transmission (EM and MP)
- Gyro inclinometer
- Drilling process remote control



CHALLENGES FACING THE OIL & GAS INDUSTRY

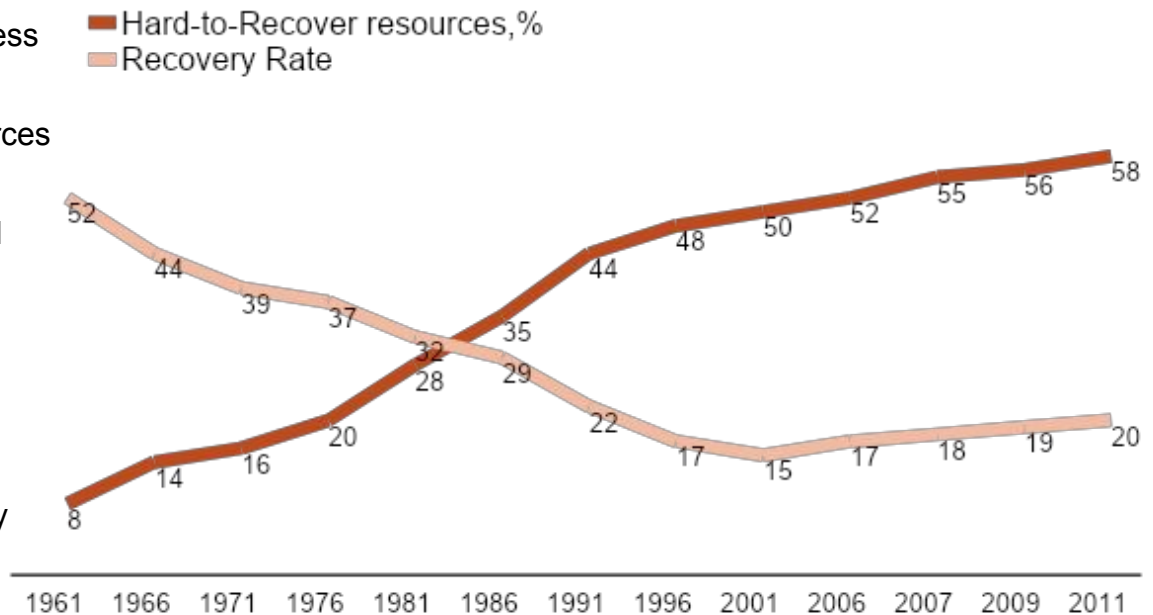
Problems

- Inefficient exploration and production, low recovery rate of hydrocarbon reserves – less than 30%
- A need to develop hard-to-recover resources and marginal fields
- High drilling costs due to complexity of oil production
- Depreciation of drilling equipment

Solutions

- Horizontal drilling will allow to significantly increase production and recovery rate of hydrocarbon reserves
- Hard-to-Recover resources development
- **Import Substitution**

Hard-to-Recover hydrocarbon resources and Recovery Rate in Russia



MARKET POTENTIAL



Horizontal Drilling today:

20% in Russia

vs.

80% Outside of Russia

out of total number of drilling wells

Successful Horizontal wells drilling is not possible without MWD/LWD systems and advanced drilling process control equipment

Market Valuation :

- Market Demand – 1000 sets
- Actual Market of MWD systems in Russia – 450-500 sets/year*
- Sales Target - from 30 sets in 1st quarter of 2018 to 235 sets in 2020

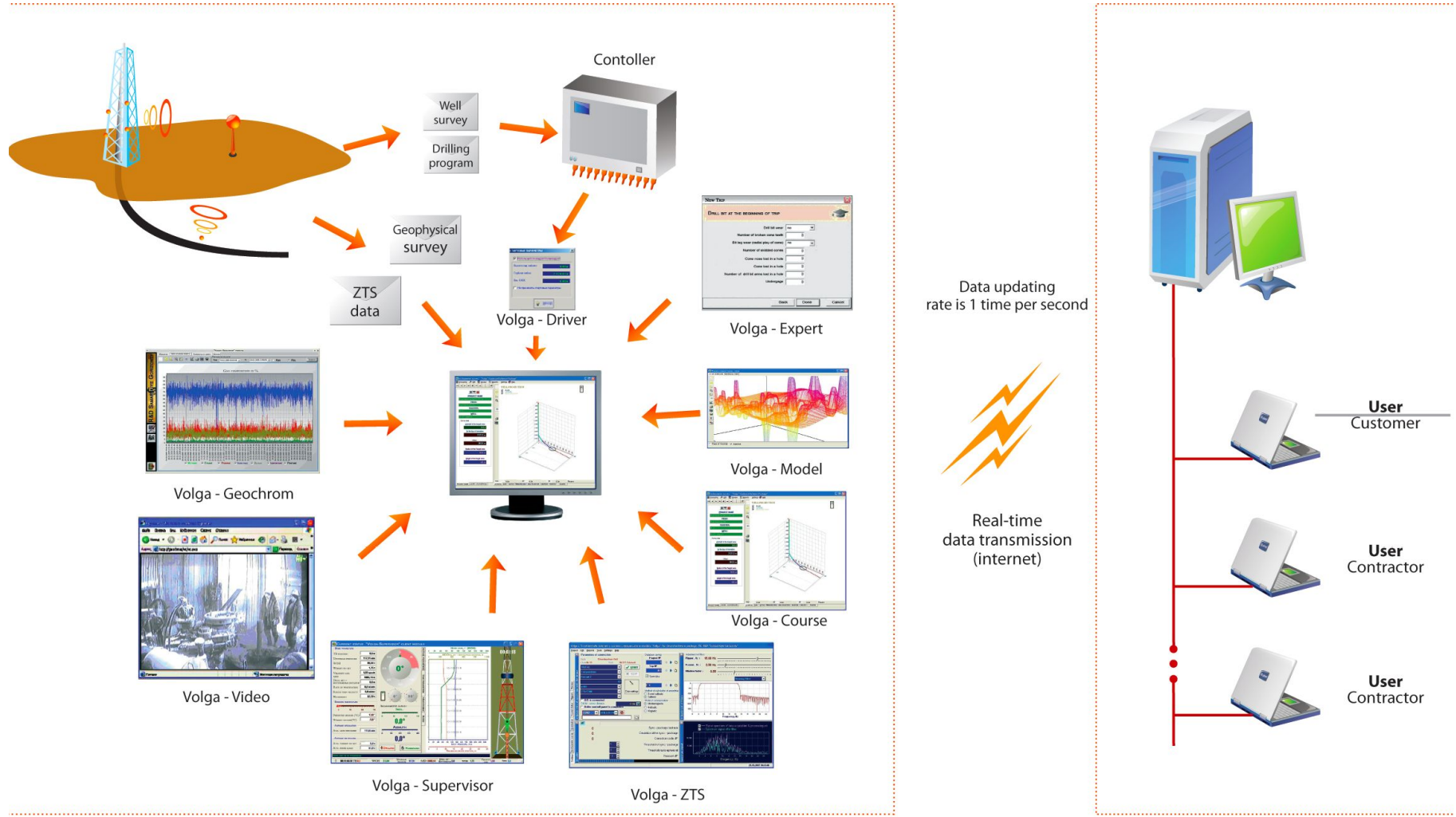
with annual revenue > \$ 49,8 billion

OUR HORIZONTAL DRILLING EQUIPMENT INCLUDES:

- EM & MP MWD (dual data transmission)
- Gyro inclinometer
- Geophysical survey Modules
- Drilling Process Control Complex “Volga” (hardware & software)

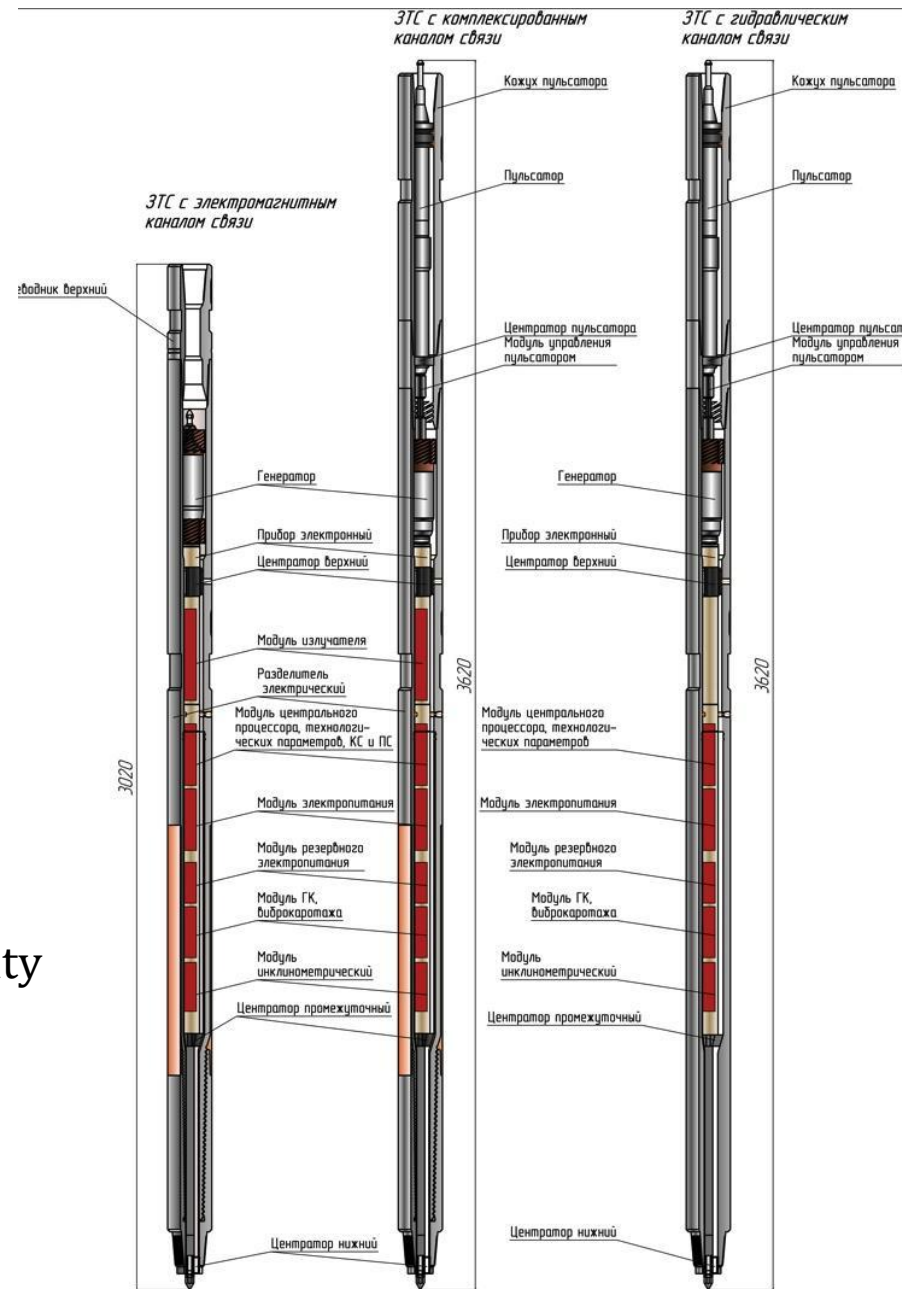
Currently, there are no analogous of MWD systems with dual data transmission

METHOD



COMPETITIVE ADVANTAGE

- **High reliability data transmission and 2 times more data** (thanks to dual data transmission, EM+MP)
- **Unified design** of MWD system enables to operate in all range of diameters from 3 ½ in. to 9 ½ in., displacing body frames
- **Gyro inclinometer** excludes the impact of magnetic masses of drilling tool, casing (during sidetracking), neighboring cased borehole on the measurement of azimuth that increases drilling accuracy
- **Small length and structural flexibility** enables drilling with high deviation intensity (to 1°/m) and prevents sticking of bottomhole assembly
- **Drilling process control complex with self-learning element** allows to optimize well construction



COMPETITION ANALYSIS

Foreign manufactures:

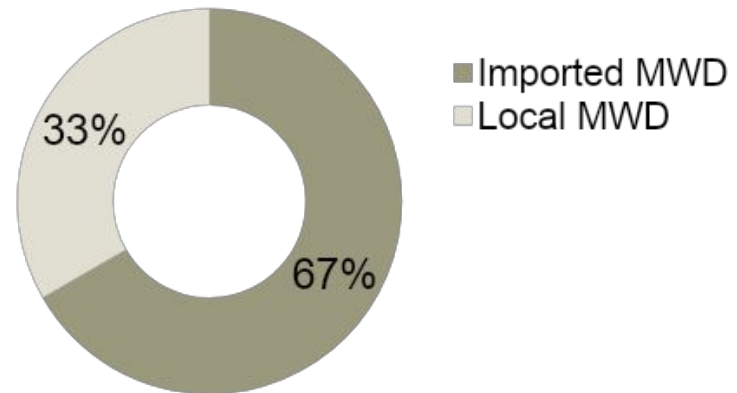
- Schlumberger
- Baker Hughes
- Weatherford International
- Halliburton

- ✓ Mud-Pulse MWD
- ✓ Price \$1-5 million (MWD - LWD)

R&P SAGOR

- ✓ Dual data transmission (EM + MP)
- ✓ Price < 1,5-2 times, than imported ones
\$1-5 million (MWD – LWD)

Number of MWD systems in operation in Russia, %



PROJECT EXECUTION STAGE

TODAY:

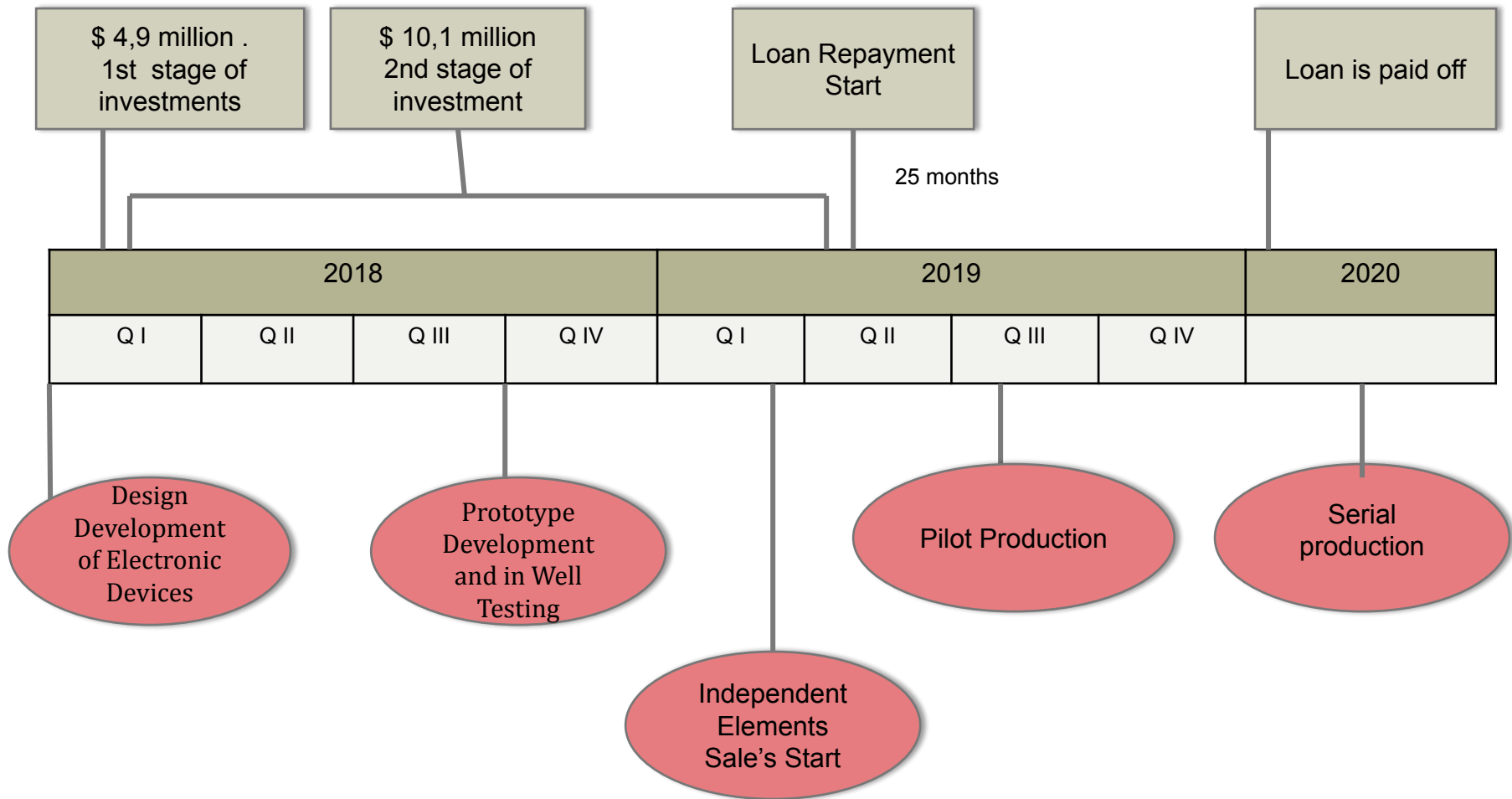
- R&D of Dual MWD (EM+MP) key units has been carried out. Design Documentation of EM MWD (downhole section) has been developed.
- R&D of “Volga” complex (hardware) has been carried out and adjusted to work with MWD; 60% of the software has been completed

More than 100 patents on design, key elements and software has been obtained

The following projects have been realized and bring profit:

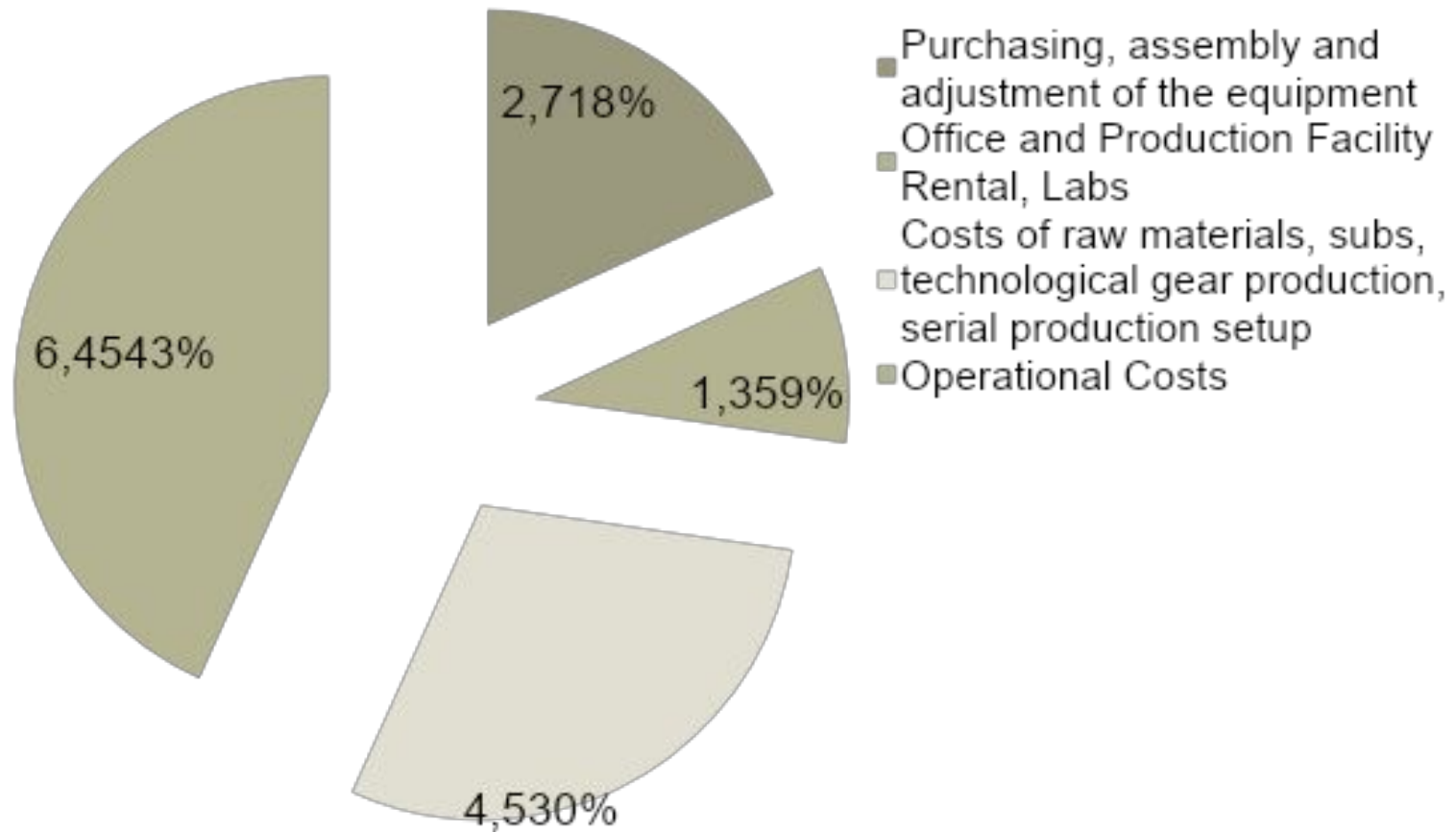
- MWD with EM data transmission
- Drilling process control complex “Volga”
- Well Sand Screens

FUNDING AND IMPLEMENTATION



INVESTMENTS STRUCTURE

Investments structure



Total investments \$15 million



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DROMASH800@MAIL.RU

+7(831) 295-50-61, 295-50-60