SKOLKOVO
Moscow School of Management

# The Future Of Oil Production In Russia: Life Under Sanctions

Energy center SKOLKOVO

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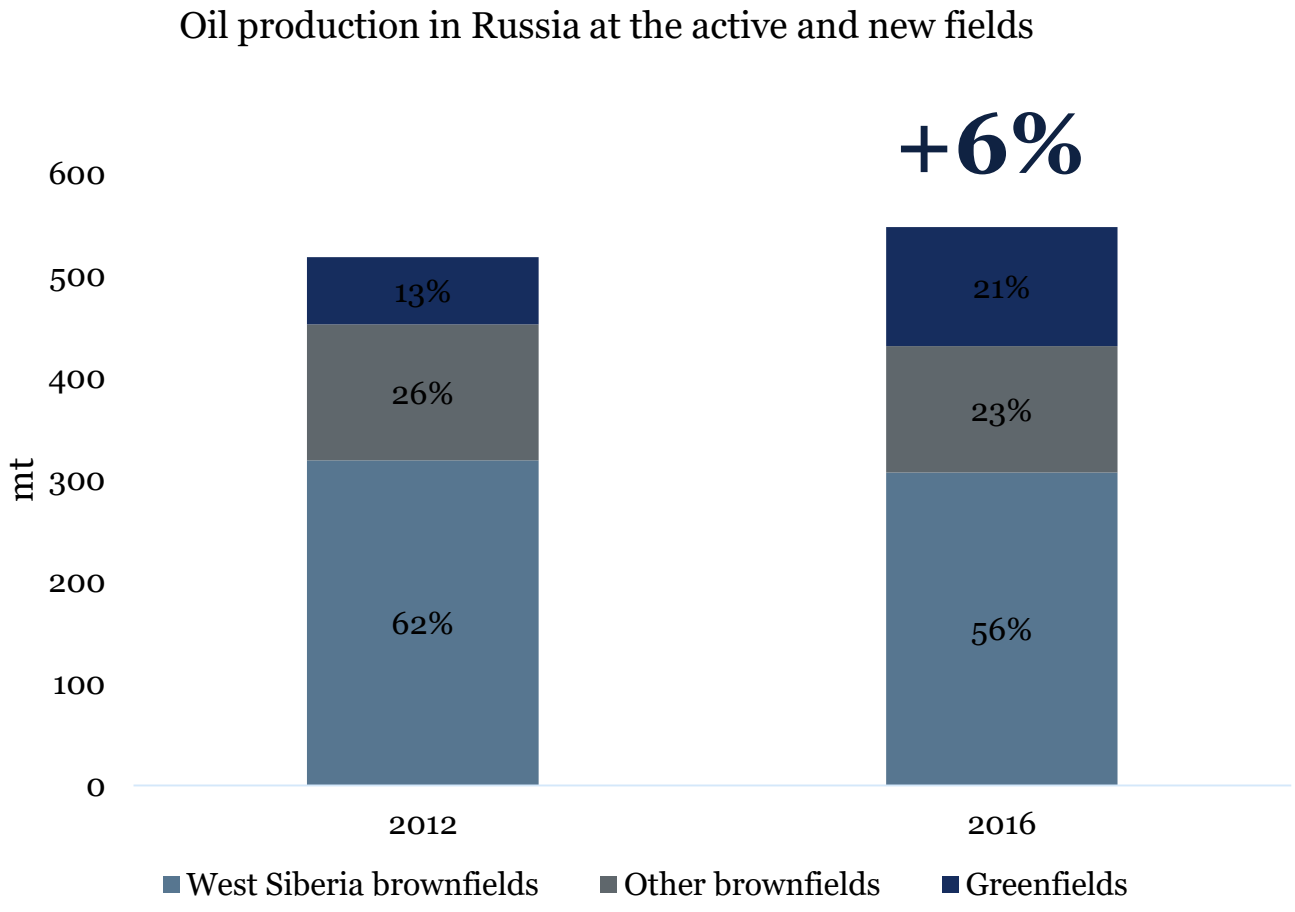
# The main threat of sanctions: vague wording

| | |
|---|---|
| **USA** | |
| Provision of loans and share capital with a maturity over **60 days** | Provision of equipment for oil exploration and production on the shelf, depth over 152 metres, in the Arctic and for shale oil projects |
| Rosneft, NOVATEK, Transneft, Gazprom Neft, pipeline projects | Rosneft, LUKOIL, Gazprom, Surgutneftegaz<br>Subsidiaries with a controlling stake over 33% worldwide |
| **EU** | |
| Provision of loans and share capital with a maturity over **30 days** | Provision of equipment for oil exploration and production on the shelf, depth over 150 m, in the offshore area north of the Arctic circle and production from shale formations by way of hydraulic fracturing |
| Rosneft<br>Transneft<br>Gazprom Neft<br>Subsidiaries with a controlling stake (over 50%) | Rosneft<br>Gazprom Neft<br>Transneft<br>Physical persons or companies with a >50% share of participation in the financial institutions specified in the sanctions list |

# Now sanctions do not have an impact




## Greenfields

**+50 mt**

## Brownfields

**-20 mt**

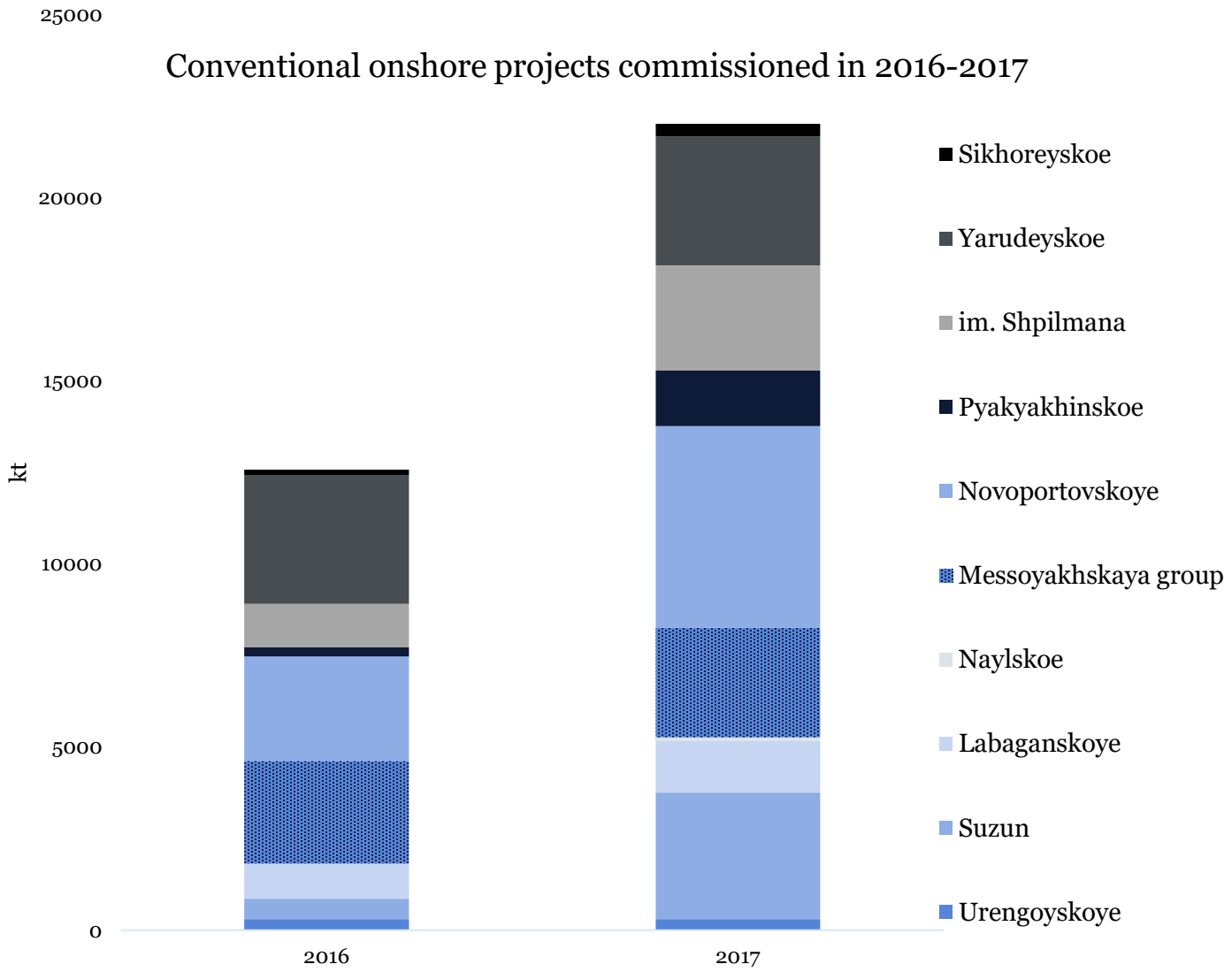
**The decline in production will continue**

Source: The Ministry of Energy for the Russian Federation, Energy Centre SKOLKOVO

# Options for maintaining current oil production

1. Development of new conventional deposits
2. In-depth development of existing conventional oil fields using oil production intensification methods (EOR)
3. Development of offshore fields (including on the Arctic shelf)
4. Development of non-conventional oil reserves

# 1. Development of new conventional deposits




Source: SKOLKOVO Energy Centre

## Factors which have substantially supported the economy of projects

### Rouble devaluation

given the prevalence of Rouble costs, significantly cut US Dollar production costs

### Russian tax system

prices fall reduces budget revenues ahead of company revenues

### Numerous tax breaks

adopted for new fields in 2013 (primarily in Eastern Siberia)

# 2. Development of existing conventional oil fields using EOR

**Virtually no projects on EOR application have been implemented since 2014**

High cost of using EOR methods in Russia due to the absence of tax breaks

The tax system is focused primarily on the taxation of high-yield deposits. This category includes deposits that have entered the phase of falling production, for example, in Western Siberia. Most of the profits from these deposits are paid in taxes, and companies cannot direct the cash flow to invest in EOR methods

The system of targeted tax benefits in the industry is aimed at granting MET and export duty preferences solely to new projects

# 3. Development of offshore projects: lack of technology

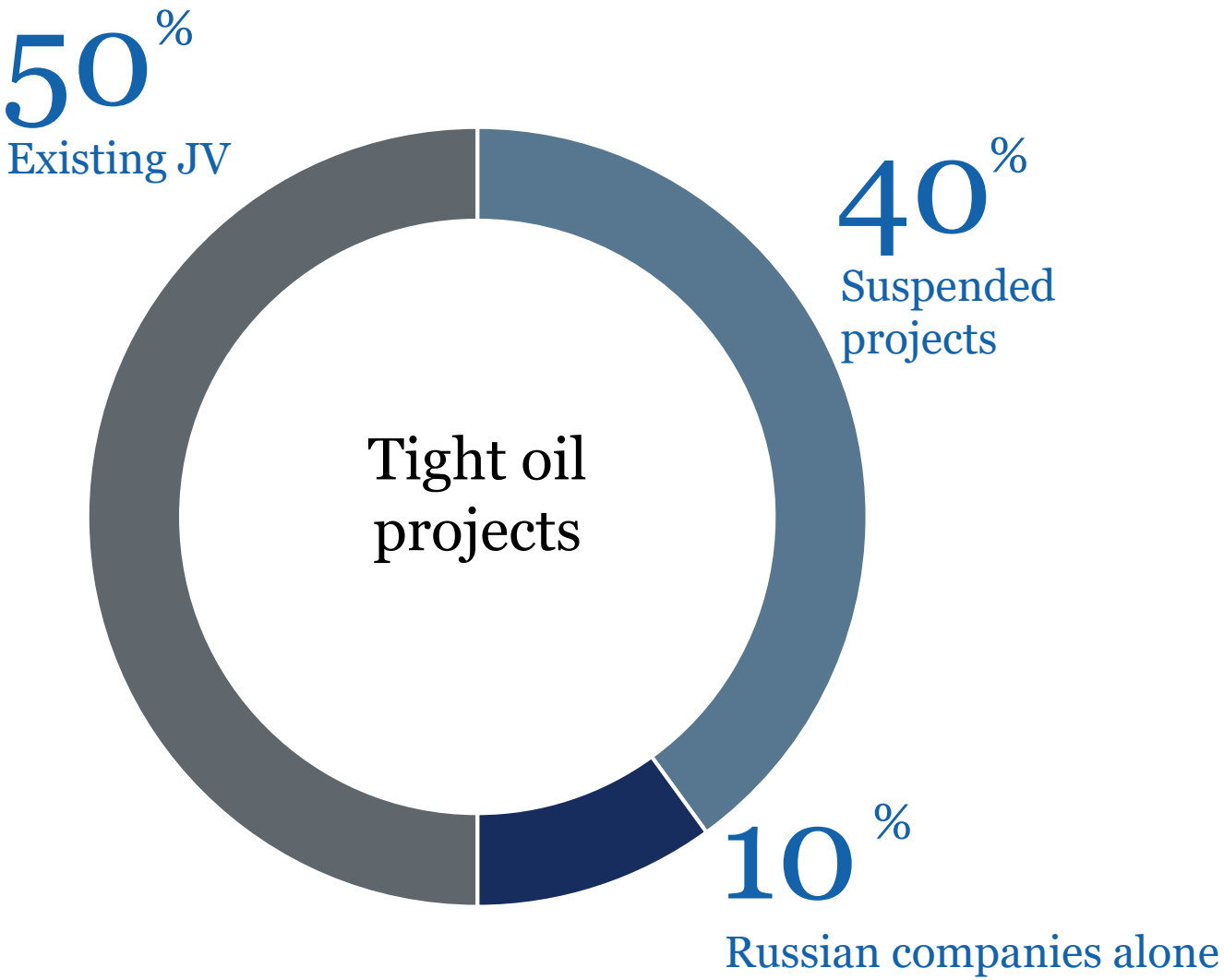
## As of 2016, oil production on the Russian shelf totalled 22 million tonnes


**Prirazlomnoye - current projects**

Dolginsky - delayed projects not because of sanctions

South Chukchi - long-term projects (licensed areas), with the participation of foreign companies. Deferred or frozen for an indefinite period

# 4. Sanctions and tight oil: joint projects suspended




**Current production levels were not affected**

**Oil output at the Bazhenov Formation totaled over 10 mt**

**Companies planned significant production volumes only after 2020-2025**

Source: Energy Centre SKOLKOVO, based on company data

# Analysis of the implementation of the import replacement program

| Ministry of energy 2015 | Plan | Fact |
|---|---|---|
| Hydraulic fracturing fleets | 15 pcs / year | 0 |
| High pressure pumps | 48 pcs / year | |
| Rotor-driven systems | 150 pcs / year | |
| Shelf drilling rigs | 30 pcs by 2030 | |

**Russian companies make efforts to create their own technologies and equipment**

# Two scenarios of Russian oil production

## Baseline scenario

The price of oil to 2025 in the range of 50-60 $/barrel

There is no further strengthening of sanctions. Access to fracturing technology is deteriorating

New projects planned for commissioning before 2025 are introduced according to the plans of the companies

## Intensified sanctions

The price of oil before 2025 fluctuates around 40 $/barrel

Prohibition of transactions with debts for 30 days by all countries

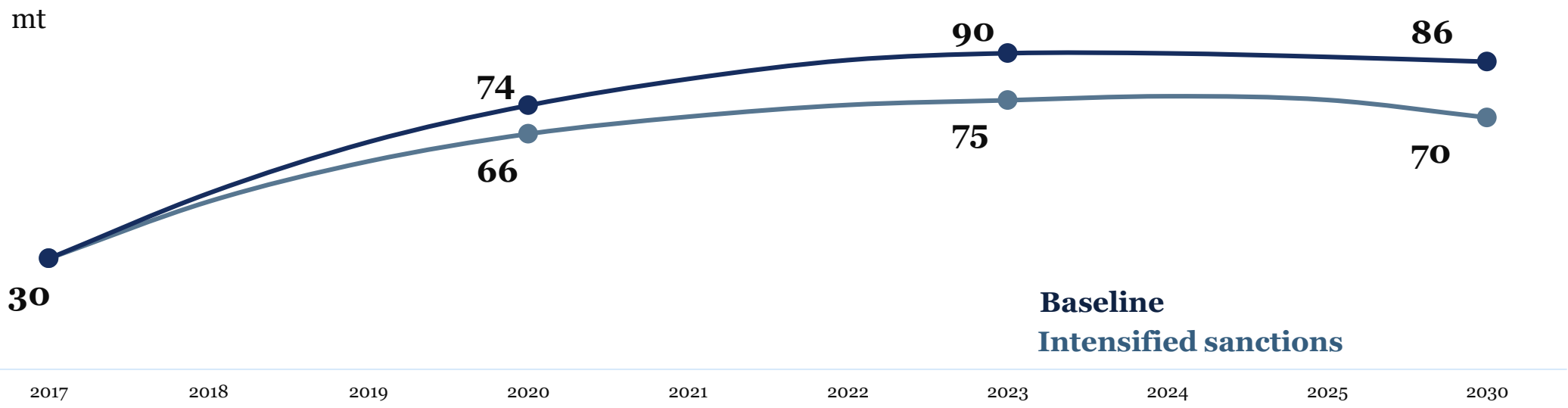
New projects planned for commissioning before 2025 and falling under sanctions are canceled

A ban is imposed on the supply of equipment and services for all projects in Russia

The work in Russia of foreign service companies is limited

**In both scenarios Russian companies will not develop their own technologies. This allows us to see the "net" results of such a stress test**

# Until 2020, the difference in production at the largest new fields is small, but it grows stronger over time ...

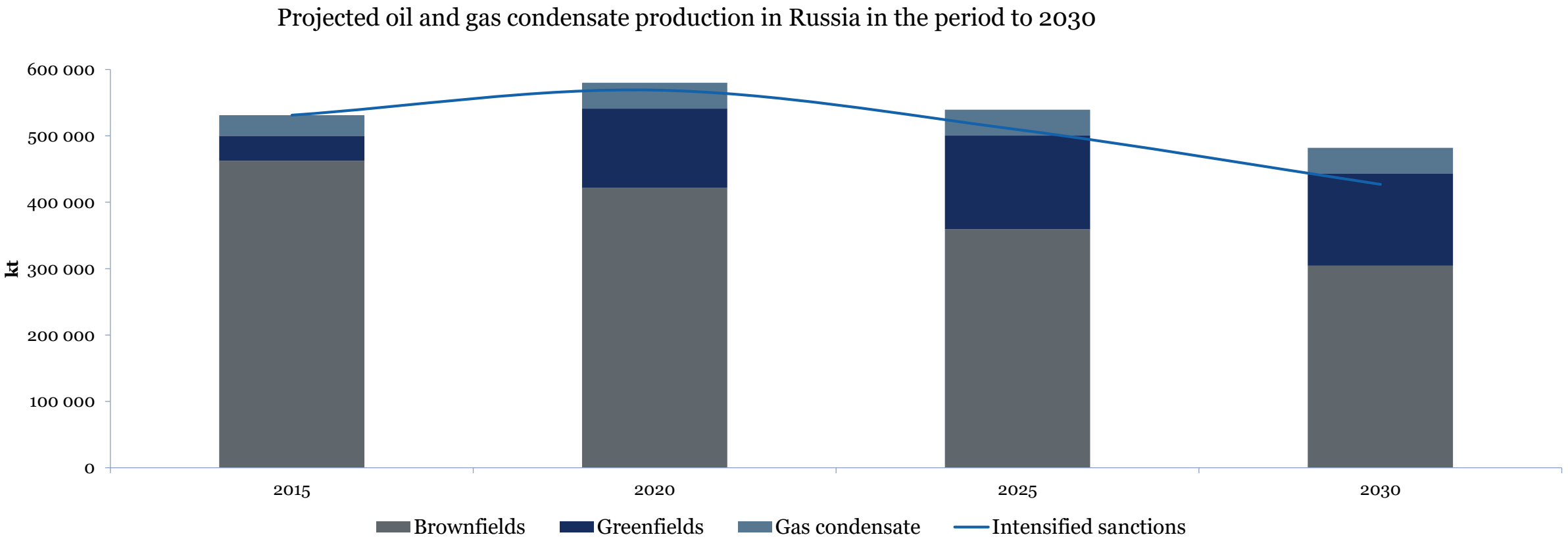



Source: Energy Centre SKOLKOVO

## The reasons for the small difference are:

1. The implemented projects have already been financed and can work efficiently at a price of $ 40 per barrel.
2. Relate to the tax preferential regime

# ... and by 2030 the difference in production volumes between the scenarios reaches already 50 mt (10% of the current production)




Source: Energy Centre SKOLKOVO

# The main reason for production decline:

## lack of opportunities to intensify production at existing fields

# Over time, lack of access to new equipment will have a greater impact on production

## 2025

45% of the 30 million tonnes of falling production is attributed to faster decline in production at the brownfields

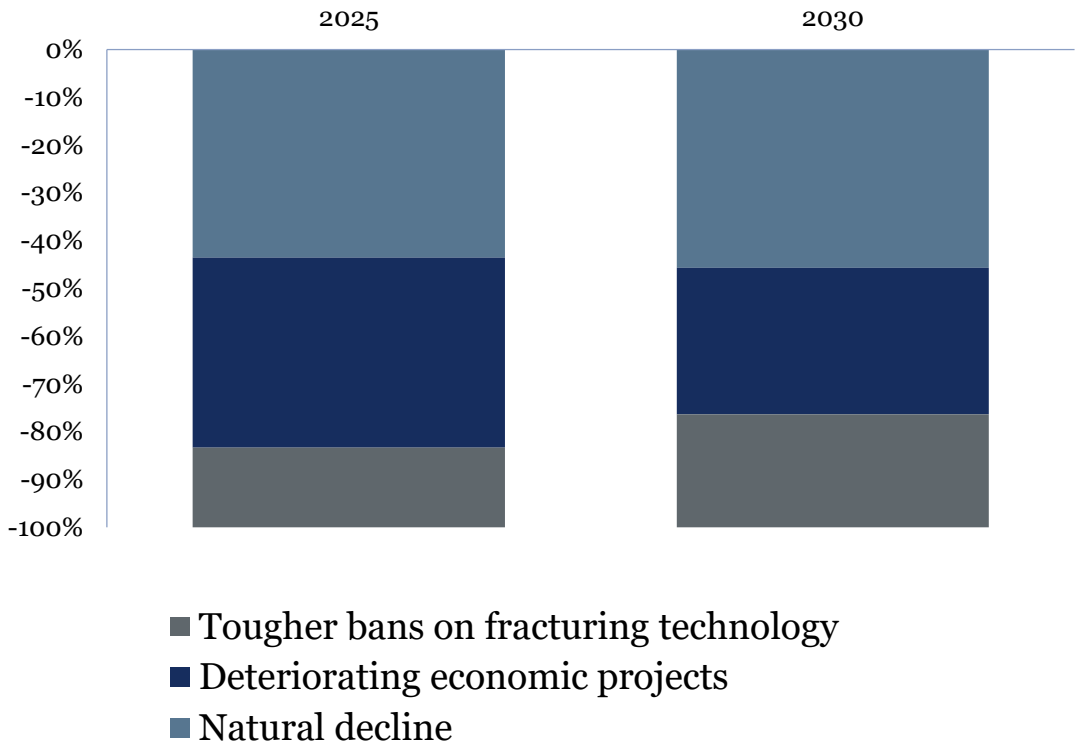
40% of the drop in production is due to the fact that, given low price conditions

15% of the drop in production is due to tougher bans on the use of foreign fracturing technologies

## 2030

**up to 25%** of production falling due to tighter bans on the application of foreign hydraulic fracturing technologies

The structure of the loss of oil production in 2025 and 2030. in the scenario “Intensified Sanctions" in comparison with the "Baseline Scenario"




Source: Energy Centre SKOLKOVO

# Recommendations

1

Sanctions require active efforts to support and develop technologies in oil production. The investment cycle takes 5-7 years, and in order to keep production from falling after 2025, it is necessary to invest in the most important technologies today.

2

**Critical technology for maintaining production volumes – hydraulic fracturing.** It is able to maintain production at existing fields, and increase production at unconventional deposits.

3

The regulators should provide transparent and preferential regimes for this segment

Oil companies and service companies should train their own specialists who will be able to manage this equipment, probably in cooperation with international and Russian educational centers. In the future, training should also be carried out in Russia.

# Conclusions

- Russian oil companies have completely adapted to the new conditions. Oil production has been growing in the past five years
- Vague wording of sanctions creating a possibility for wide interpretation and application depending on the circumstances and the degree of political confrontation
- In the period to 2020 there is potential for further production growth by using the greenfields which have already been prepared
- Until 2025, in the case of tight constraints and a low oil price, the difference between the scenarios is 30 million tons
- After 2025 maintaining level of oil production is becoming an increasingly difficult task, primarily due to the reserves quality reduction.
- The deceptively small immediate impact of the sanctions can be misleading. Sanctions always have a compound interest rate" effect

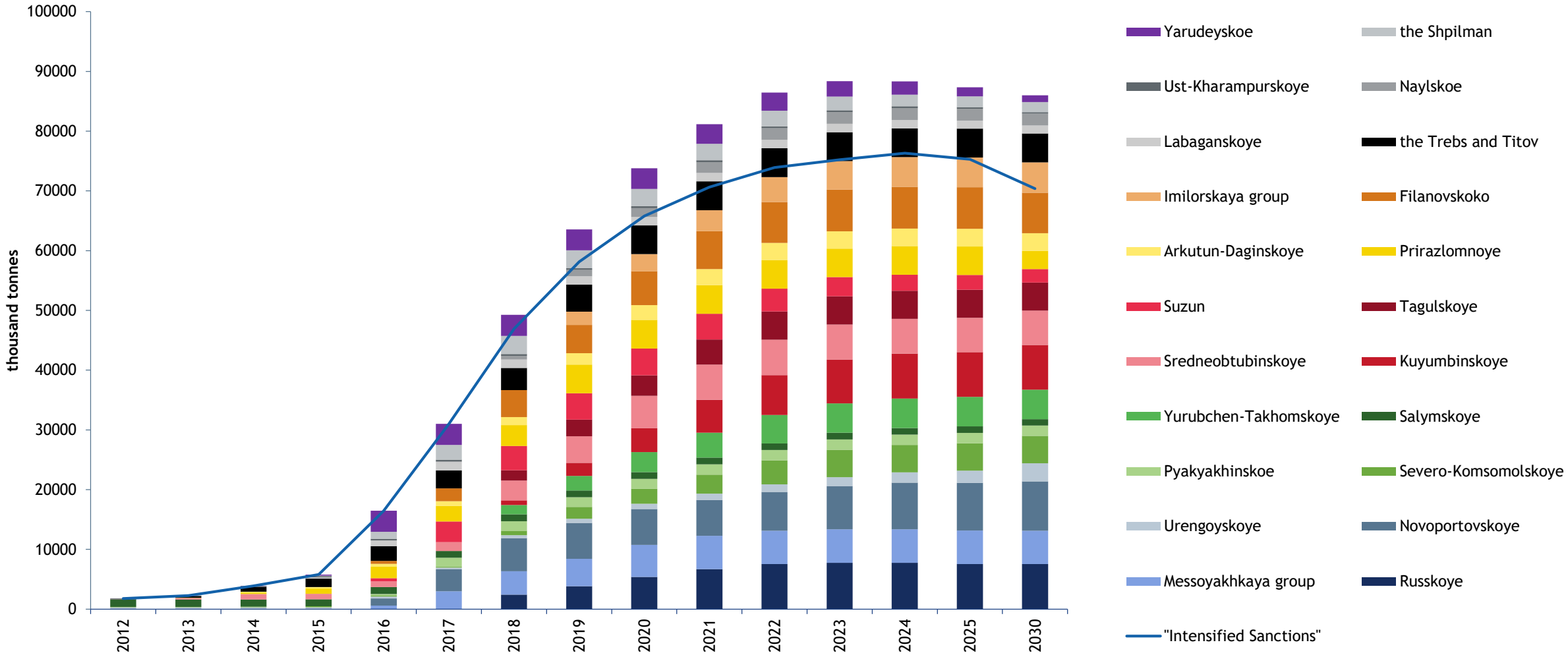
# Back Up

# Joint non-conventional oil projects, involving foreign companies, which suffered from the sanctions

| Project | Participants | Deferred | Current status |
|---|---|---|---|
| **Bazhenov and Achimov Formation in Western Siberia** | JV Trizneft Pilot SARL between PJSC Rosneft 51% and ExxonMobil 49% | PJSC Rosneft and ExxonMobil signed an agreement on pilot development. They planned to do joint work to assess potential commercial production of hard to reach oil resources of the Bazhenov and Achimov Formation in Western Siberia. ExxonMobil was to invest 300 million US Dollars in the project. | Deferred |
| **Development of Domanic deposits in the Orenburg region** | JV between PJSC Rosneft 51% and BP 49% | It was planned that BP would cover Rosneft's past costs associated with work at the Domanic deposits, as well as provide carry financing of up to $300 млн. Pilot programme was to take place in 2 phases. | Deferred |
| **Development of the Bazhenov shale oil formation in the Khanty-Mansiysk region** | JV between PJSC LUKOIL and Total | The companies were planning joint exploration at three shale oil formations in the Khanty-Mansiysk Region – East Kovenskoye, Tashinskoye and Lyaminskoye in the Khanty-Mansiysk Region, with estimated costs of 120-150 million US Dollars. | Total transferred its stake in the project to PJSC LUKOIL |
| **Development of the Bazhenov formation in the Khanty-Mansiysk region** | JV «Khanty – Mansiysk Oil and Gas Union between Shell 50% and PJSC Gazprom Neft 50% | The JV received the licence for geological exploration of the Yuilsky04, Yuilsky-5 and Yuzhno-Lungorsky-1 in the Khanty-Mansiysk Autonomous Region. | Shell stopped work on the project |

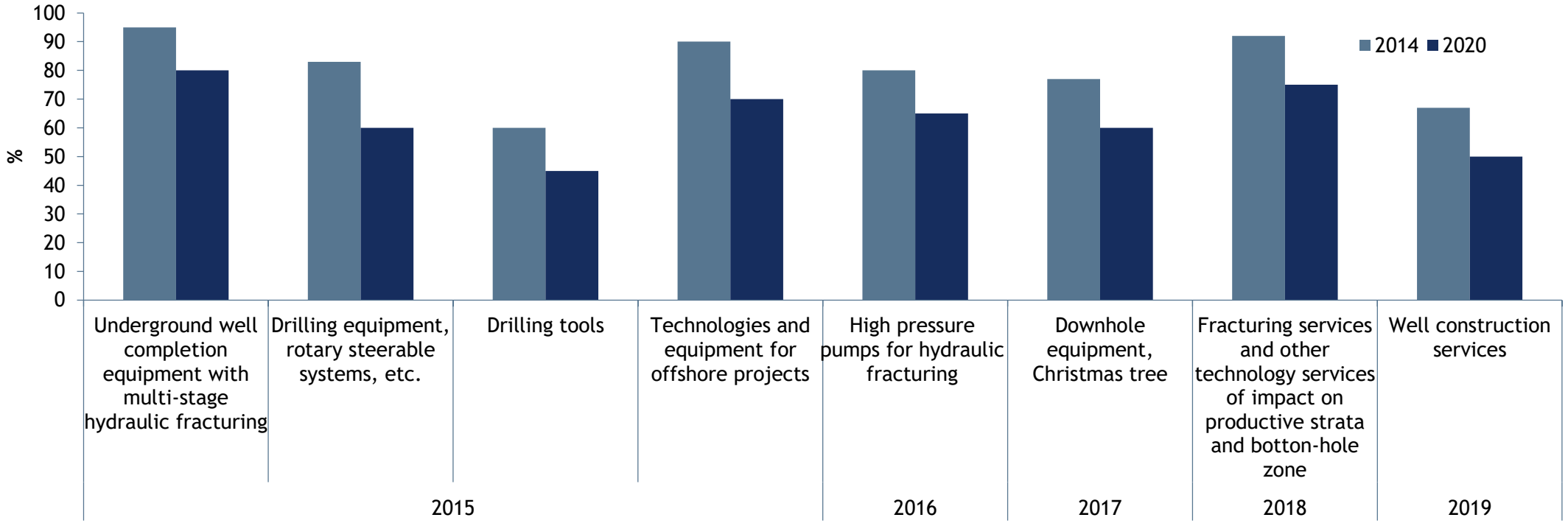
Source: SKOLKOVO Energy Centre, based on company data

# Projected oil and gas condensate production at the largest new fields in the Baseline Scenario and in the "Intensified sanctions" scenario for the period up to 2030




Source: SKOLKOVO Energy Centre

# Plans for import replacement in the oil and gas industry (dates on X axis show the start of the programme, blue – the situation in 2014 and cian – target performance)




Source: Planned measures to replace import in the oil and gas manufacturing segment, oil refining and the petrochemical segment of Russia's oil and gas industry

# Russian companies make efforts to create their own technologies and equipment

Directions of development of domestic production technologies

| | |
|---|---|
| Zvezda shipbuilding complex | The project includes the construction of ice class tankers jointly with Dutch Damen, the construction of drilling platforms jointly with Singaporean Keppel, and drilling equipment with American GE |
| PJSC "Surgutneftegas" | More than 1000 prospecting and exploration wells have been drilled at this formation. The company is operating 10 fields in the Khanty-Mansyisk region and their number is expected to increase to 13 by 2018 |
| PJSC Lukoil | • uses the methods of thermal gas treatment and water-alternated gas injection<br>• successfully used multistage hydraulic fracturing technology. The technology creates an artificial collector to increase reservoir recovery rate. Tests have allowed to increase debits at the wells by over 30% |
| PJSC Gazprom Neft | • construction of horizontal wells with multistage fracturing technologies (MGRP) optimized for mining and geological conditions of the Bazhenov formation,<br>• methods of including light oil reserves from the rocks of the shale formation in the development, thanks to thermochemical methods |
| consortium led by the Ministry of Energy and the Ministry of Trade | • simulator of hydraulic fracturing equipment – Cyber hydraulic fracturing equipment |
| PJSC "RussNeft | Company has developed an innovative technology — "hybrid" hydraulic fracturing using slickwater technology |
| JV SPD | Launched ASP mixing unit at the Salym group of fields (an innovative technology capable of significantly increasing oil recovery in the developed fields of Western Siberia |
| JSC "Zarubezhneft" | Started using thermal gas treatment and injection of ion-modified water at the Vis field |