



# **INVESTMENT PROJECT**

## **ORYOL OIL REFINERY PLANT OF FUEL-OIL-PETROCHEMICAL TYPE**

CJSC "ORELNEFT Corporation" in the assistance of the Oryol Region government and in accordance with Instruction of Board N456-P, dated 15.12.2008, is realizing Oil Refinery Plant construction project. Based on the modern technologies, petrochemicals and commercial oil are to be produced in the Oryol Region. The project was included in the region social and economic development plan, proved by the Russian Federation Government resolution.

## Карта российской нефтепереработки



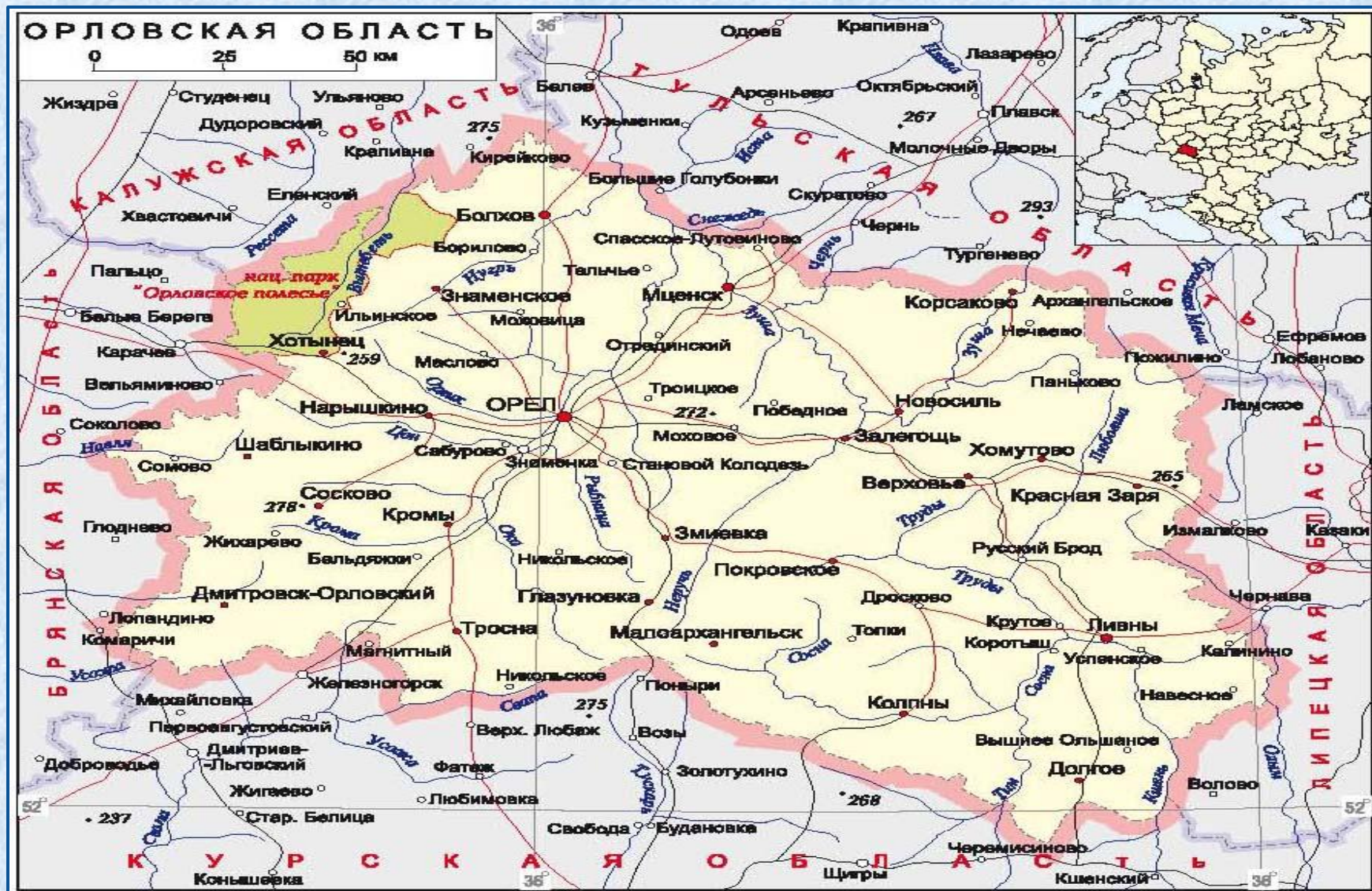
Russian oil refinery map

# THE ORYOL REGION

- The Oryol region is the part of the Central Federal District and Central economic area.
- The region includes Oryol, Tula, Lipetsk, Kursk, Bryansk, Kaluga areas.
- Population - 6 849 010 (2013)
- Area size is 169 009 km<sup>2</sup>.
- Economy is of industrial-agrarian type.
- Basic industry sectors are: machine, food, petrochemical industry, consumer goods manufacturing, wood processing, chemical process and construction materials industries.
- There are the main oil pipeline - Druzhba and gas pipeline -the Urengoy-Pomary-Uzhgorod are running through the region.



# THE ORYOL REGION AND NEIGHBORHOODS



## ORYOL OIL REFINERY PLANT CONSTRUCTION SITE CHARACTERISTICS

Under the land allocation certificate, dated 15.07.2011, the Oryol region Government separated the plot of ground for the oil refinery plant **in area of 598,18 ha**.

The plot of ground is located in **the Verhov'e district of the Oryol region** in the distance of 5 km from district center Verhov'e.

The following factors were considered by the selection:

- Sanitary standards observance for the present category plants (not less, than 1 km from residential buildings, not less, than 200 m from natural reservoirs);
- Railway approach (distance to the union station not more, than 5 km);
- Close proximity to the high-voltage power transmission line suitable for transforming station connection and construction;
- Distance to the distributing pumping unit "Verhov'e" of pipeline "Druzhba"– 1 km.



## ORYOL OIL REFINERY PLANT CONSTRUCTION SITE



The dash line shows the railway branch that would-be build, adjacent to the factory.

Pumping station of "Druzhba" pipeline is marked by the solid line.

## BASIC DATA OF ORYOL OIL REFINERY PLANT

No	Parameters names	
1	<b>Oryol oil plant capacity by crude oil Urals processing</b>	<b>Total</b> – 8 million tons per year; <b>Phase one</b> - 4 million tons per year; <b>Phase two</b> - 4 million tons per year
2	<b>Main produced petrochemicals assortment:</b>	<b>Motor fuel (Euro 4 and 5 standards):</b> - petrol; - diesel fuel;  <b>Power-generating fuel:</b> turbine and fuel oil; <b>Hydrocarbon oil:</b> lubricating and non-lubricating; <b>Bitumen:</b> (construction and road); <b>Petrochemical feedstock:</b> gas, polypropylene, coke, sulphur and other raw material
3	<b>Oil processing depth</b>	<b>Not less, than 96,5%</b>
4	<b>Crude storage capacity</b>	<b>Crude oil:</b> 250 thousand tons <b>End product (Government reserve):</b> 500 thousand tons <b>Oil refinery plant maintenance:</b> 300 thousand tons
5	<b>Petroleum refining fluent quantity</b>	<b>Double-flow petroleum refining layout</b>

## **PETROCHEMICALS TYPE AND VOLUME PRODUCED BY THE FIRST STAGE OF ORYOL OIL REFINERY PLANT**

<b>Production type</b>	<b>Production volume</b>	<b>Yield, %</b>
<b>Petrol</b>	<b>1300 thousand tons per year</b>	<b>32,5</b>
<b>Diesel fuel</b>	<b>1500 thousand tons per year</b>	<b>37,5</b>
<b>Kerosene</b>	<b>380 thousand tons per year</b>	<b>9,5</b>
<b>Hydrocarbon oil</b>	<b>100 thousand tons per year</b>	<b>2,5</b>
<b>Coke</b>	<b>180 thousand tons per year</b>	<b>4,5</b>
<b>Bitumen</b>	<b>95 thousand tons per year</b>	<b>2,38</b>
<b>Polypropylene</b>	<b>80 thousand tons per year</b>	<b>2,0</b>
<b>Sulphur</b>	<b>25 thousand tons per year</b>	<b>0,62</b>
<b>Liquefied gas</b>	<b>200 thousand tons per year</b>	<b>5,0</b>
<b>Dry gas</b>	<b>120 thousand tons per year</b>	<b>3,0</b>
<b>Outage</b>	<b>20 thousand tons per year</b>	<b>0,5</b>



# The project attraction for the region

Fuels and lubricants materials amount, **required** for the region and neighborhood areas.

**Environmental improvement due** to supply of consumers by new high-quality motor fuels types, which correspond to the environmental standards severe requirements.

Integration into the project of **the innovative solutions**, made by Russian and foreign technologies and equipment designers.

Region related industry sectors and infrastructure **development.**

Creation more than **10 000 workplaces at the region.**

Annual **tax payments – 18 RUB bn.**

**Investments sponsorship** to the Oryol region.

# TECHNOLOGICAL SOLUTIONS OF ORYOL OIL REFINERY PLANT

## First phase



Oil refinery plant (processing depth is 96,5% with the capacity 4 million tons per year) should be widely involve different technologies, such as: cat cracking, catalytic reforming, hydro treating, hydro-cracking, coking, alkylation, isomerization.

## Second phase



Oil refinery plant with the capacity expansion till 8 million tons per year by the second oil refinery workflow.



# PROJECT TASKS

All the stages of the engineering process shall be realized by following project tasks:

Working processes integration strategy out.

Choosing the low-tonnage certified equipment manufacturers.

Effective layout arrangement search.

Utility and auxiliary facilities refinement.

Industrial and environmental safety observance.

Search of recycling and non-waste technologies (sulphur and solid contamination).



# **ORYOL OIL REFINERY PLANT CONSTRUCTION STAGES**

## **FIRST STAGE**

- plot of ground buying out and it's change to industrial purpose type;
- geological and geodesic exploration;
- holding tender for engineering organizations;
- front and engineering design preparation and agreement;
- definition of technological processing equipment list;
- construction site preparation: fence, surface water supply site protection, temporary roads and communication lines laying, hearty layer mining, temporary accommodation and storage spaces organization etc;
- plant construction zero cycle: staking out and trench work, excavation, fences building-up, staking out of concrete structures and foundations etc.

## **SECOND STAGE**

- general lay-out preparation and generation of oil refinery plant construction with it's approval in appropriate bodies;
- general works performance, connected with foundations, engineering equipment premises and facilities erection, structural units erection etc;
- pipe and tank battery purchase and installation;
- railroad sidetracks sidings and loading/unloading racks installation.

# **ORYOL OIL REFINERY PLANT CONSTRUCTION STAGES**

## **THIRD STAGE**

- complete drafting of oil refinery plant construction;
- project appraisal in the Russian specialized bodies and west engineering companies;
- holding tender for contractor organizations;
- construction facilities building.

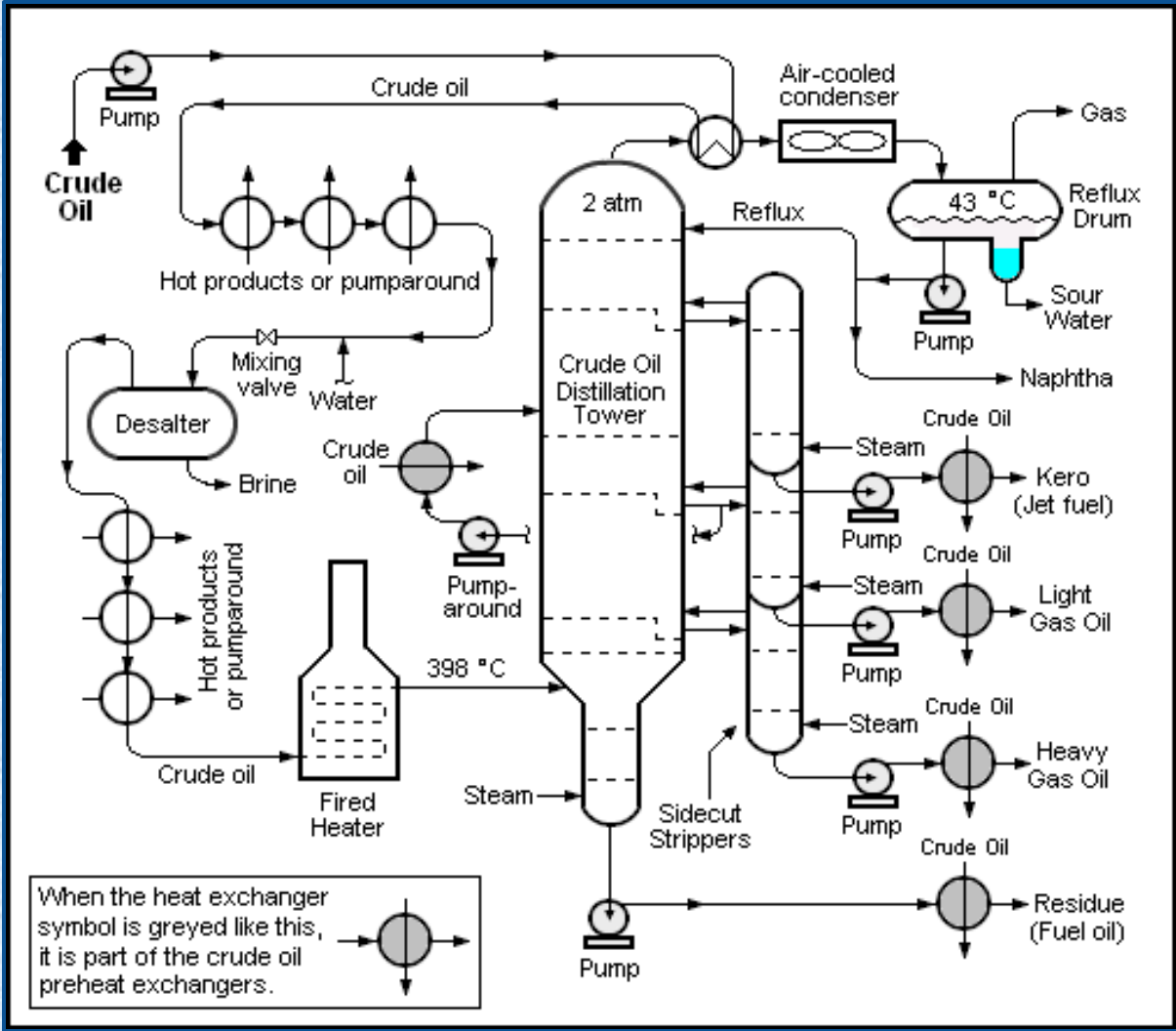
## **FORTH STAGE**

- technological and auxiliary equipment selection, purchase and supply.

## **FIFTH STAGE**

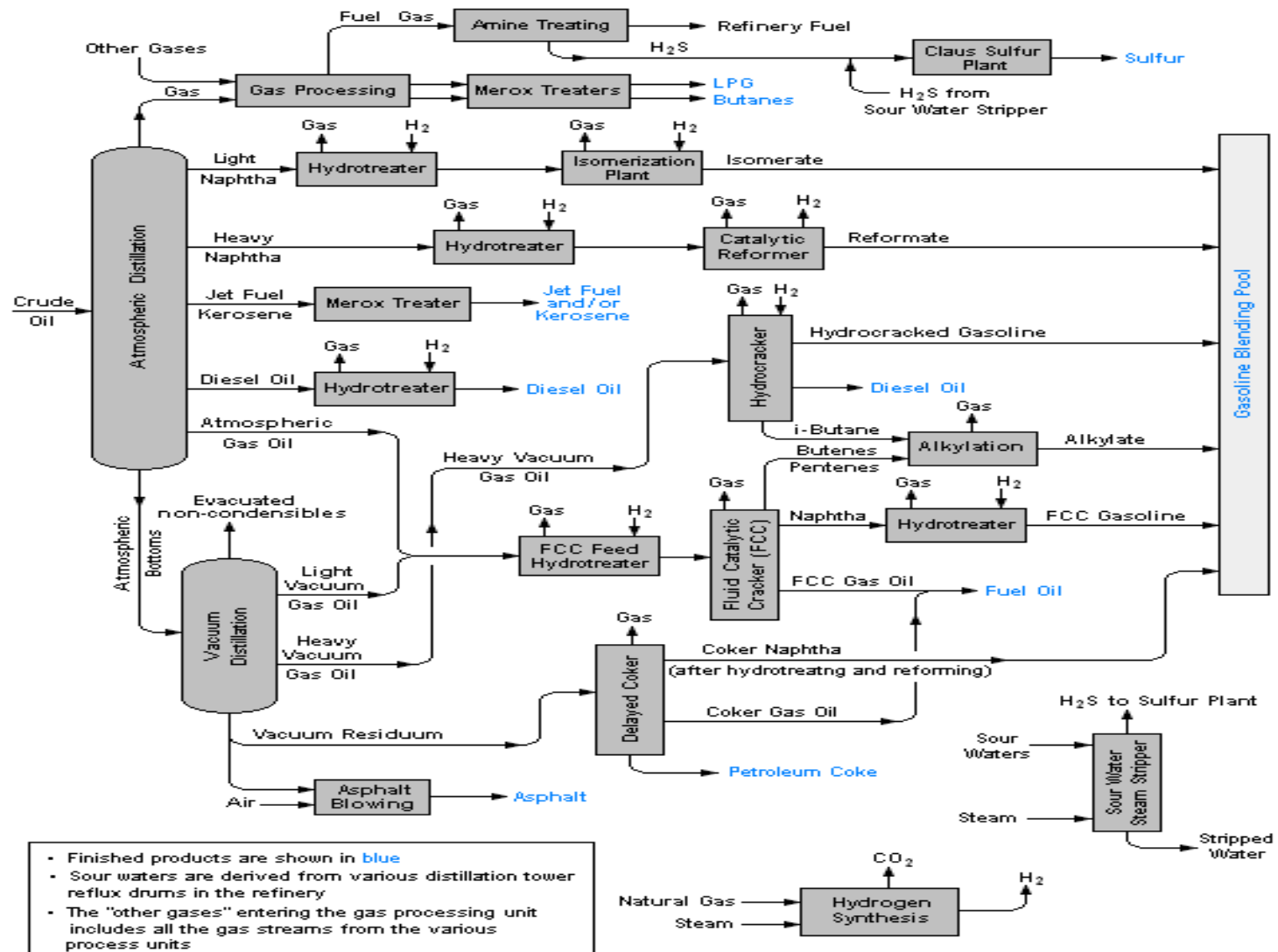
- supervision and mounting of a workshop, commissioning;
- start-up of facility.

**Flow diagram of typical crude oil distillation unit.**





# Flow diagram of a typical petroleum refinery.



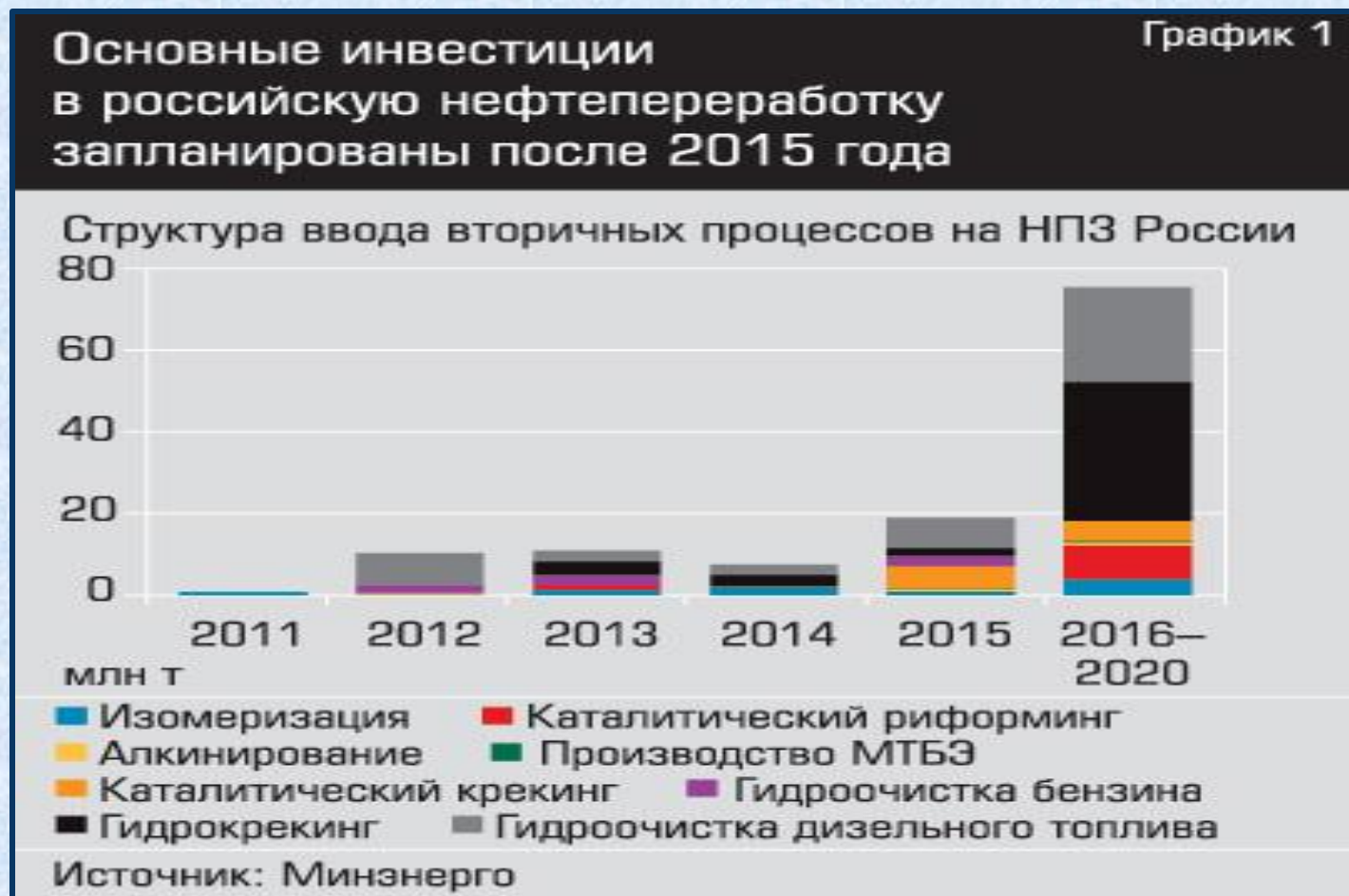
## ACTUALITY OF ORYOL OIL REFINERY PLANT CONSTRUCTION

Russian petroleum refining industry sector performance review and development trend allow to confirm, **that period 2013-2014 is an optimal time for oil refinery plant construction** beginning, for:

Price for motor petrol and diesel fuel of "Euro-4" and "Euro-5" standards will be kept at a high level. Such situation will not be change till 2015, when the government is going to make residual fuel export duties of the same level, as crude oil.

Residual fuel export duties will essentially decrease oil refinery plant attraction, if primary crude oil processing takes place only, without qualitative finished motor gasoline and diesel fuel production. Only frontal investments into oil refining sector will briefly cut residual fuel yield and increase motor fuels yield, in case investments are made by one and all market players, including "Gaspromneft", "Bashneft", "Surgutneftegas" and "Tatneft". Plant technical re-equipping will require serious cost and time expenditures.

## Indicated conclusions are based on the diagrams, given below.



**Figure 1 Main investments into oil refining sector of Russia are planned after 2015**

Secondary processes introduction scheme at the oil refinery plants of Russia

Million tons

Isomerizing; catalytic reforming; alkylation; MTBE production; cat cracking; gasoline hydrotreatment; hydro-cracking; diesel fuel hydrotreater

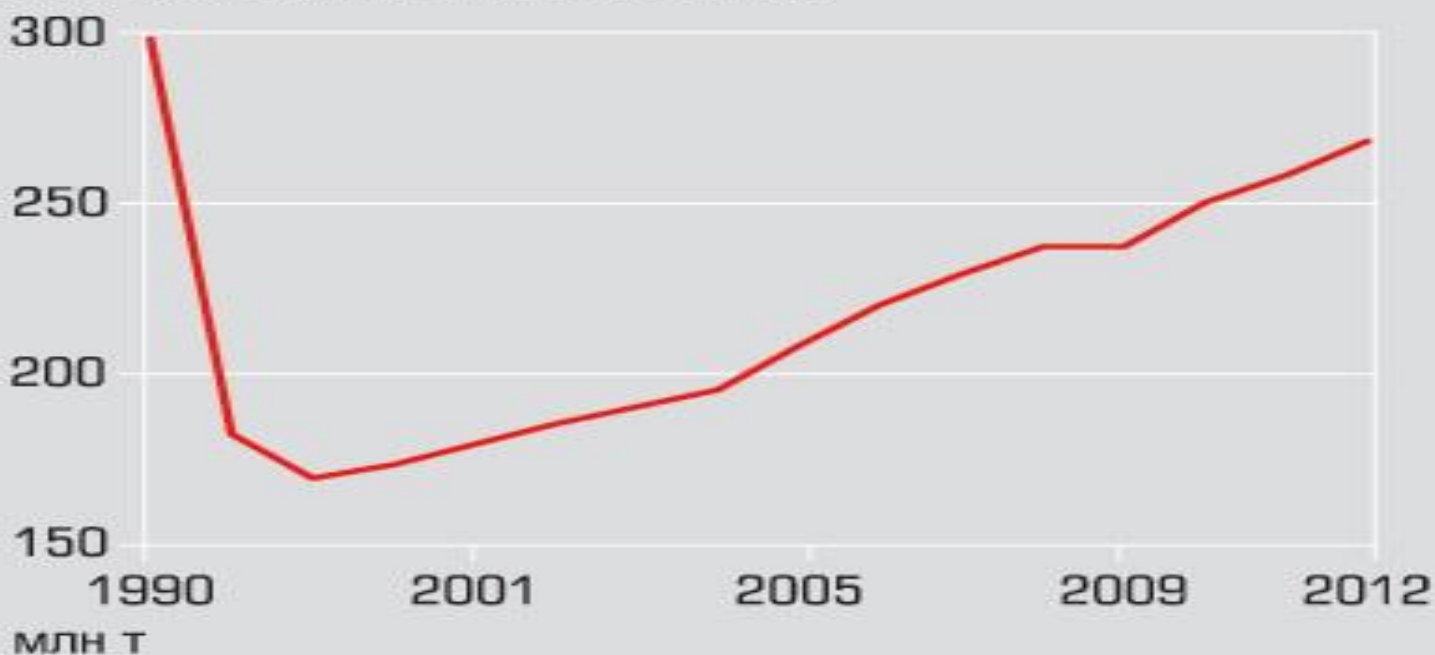
Vein: RF Ministry of Energy



## Динамика переработки нефти в России

График 2

Нефть, поступившая на переработку  
(первичная переработка нефти)



Источник: Росстат

**Figure 2 Oil refining dynamics in Russia**

Ingress of oil to the refinery (primary crude oil processing)  
Million tons

Vein: Federal State Statistics Service

# По внедрению сложных процессов российские НПЗ все еще значительно отстают от большинства развитых стран мира

График 3

Индекс Нельсона в 2012 г.



Источник: «Альянс-Аналитика»

**Figure 3 Russian oil refinery plants still remain short of the world developed nations majority in complicated processes introduction**

Nelson Index in 2012

USA

North America

EU

World;

Central America;

Asian-Pacific Region;

South America;

CIS;

Middle East;

Russia;

Africa

Points

### 2001-2011 oil refinery capacities introduction scheme

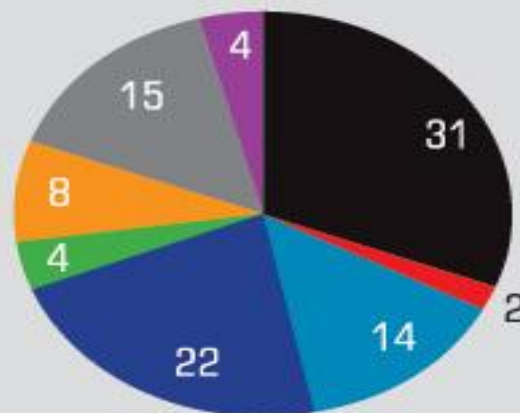
- primary crude oil processing
- cat cracking
- hydro-cracking
- visbreaking
- delayed coking
- catalytic reforming
- diesel fuel hydrotreater
- Isomerizing

Vein: "Expert" on RF Ministry of Energy basis

### Структура вводимых нефтеперерабатывающих мощностей в 2001–2011 годах

График 4

%



- Первичная переработка нефти
- Каталитический крекинг
- Гидрокрекинг
- Висбрекинг
- Замедленное коксование
- Каталитический риформинг
- Гидроочистка дизельного топлива
- Изомеризация

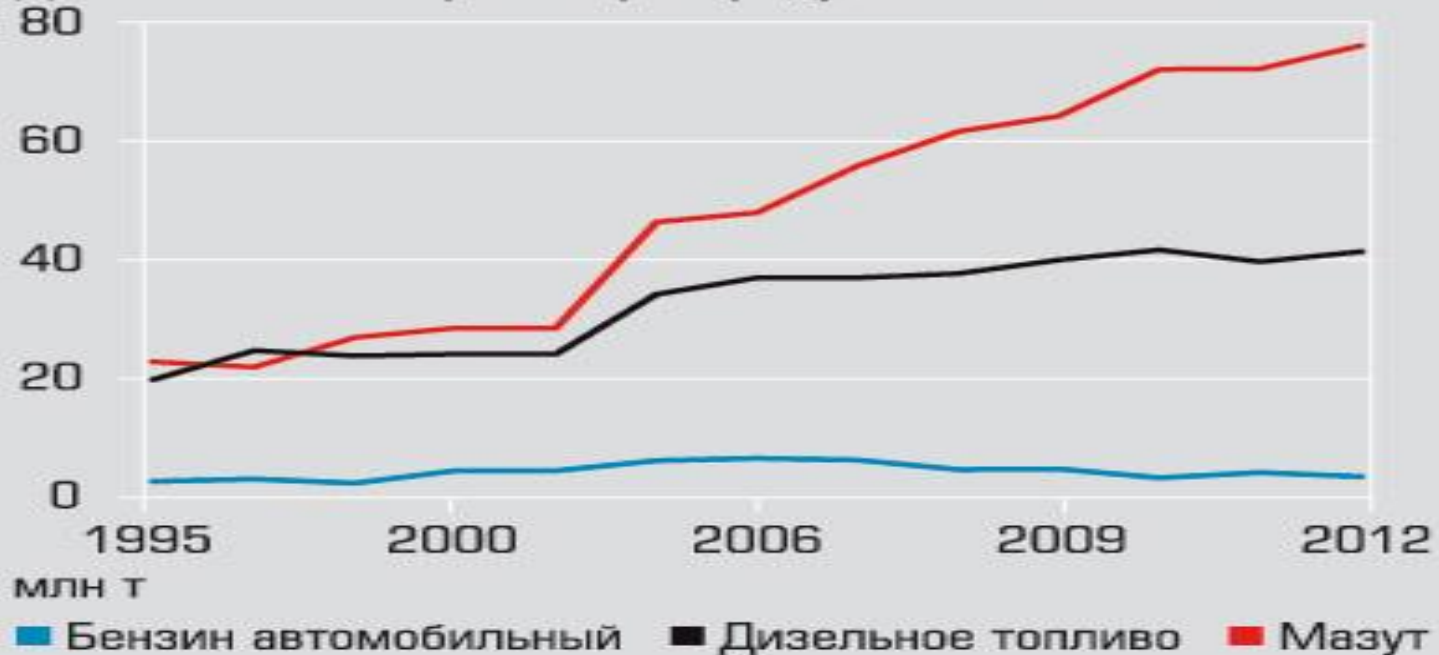
Источник: «Эксперт» на основе данных Минэнерго



## Низкие экспортные пошлины сделали мазут основным продуктом российской нефтепереработки

График 6

Динамика экспорта нефтепродуктов из России



Источник: Росстат

### Low export duties made residual fuel the main Russian oil refinery product

Petroleum products export dynamics from Russia

Million tons

Automobile gasoline

diesel fuel

residual fuel

Vein: Federal State Statistics Service

**THANK YOU FOR YOUR  
ATTENTION**