PETROCHEMICAL
TERRITORIAL CLUSTER
REPUBLIC OF BASHKORTOSTAN

CLUSTER DEVELOPMENT OF BASHKORTOSTAN REPUBLIC ENTERPRISES IN THE ENGINEERING FIELD OF FUEL AND ENERGY COMPLEX

UFA-2016

THE PRODUCTION POTENTIAL OF THE BASHKORTOSTAN REPUBLIC

1st place in Russia
for primary crude oil processing, for the production of motor gasoline, diesel fuel

Leadership in oil processing:
- 92% (Bashneft-Ufaneftekhim)
- 90% (Bashneft-Novoil)
- 74% (Bashneft-UNPZ)

(about 70% on average in RF)

Leadership in Nelson Index:
- 9.46 (Bashneft-Novoil)
- 8.97 (Bashneft-Ufaneftekhim)
- 7.41 (Bashneft-UNPZ)

(about 4.22 on average in RF)

Rating :
BBB – "standard" forecast (Standard & Poor's)
Ba2 - "standard" forecast (Moody's)

Processing of raw materials of varying quality from gas condensate to heavy high sulfur crude

More than 120 items
of products of chemical production delivered for export

1st place in Russia
for the production output of baking soda and soda ash

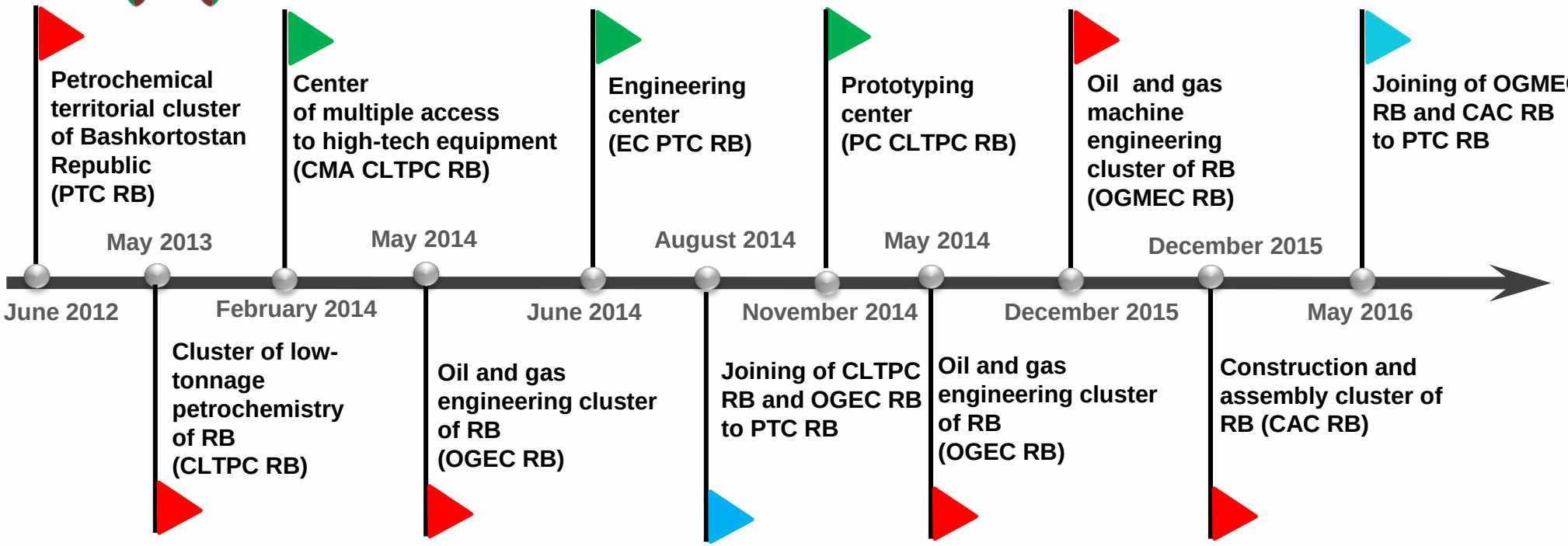
2nd place in Russia
for the production output of synthetic rubber

3d place in Russia
for the production output of caustic soda

PETROCHEMICAL TERRITORIAL CLUSTER OF BASHKORTOSTAN REPUBLIC

Cluster objectives:

- **Creation and development of innovative infrastructure platforms, bringing together the maximum number of competencies in the field of petrochemistry and oil and gas processing.**
- **Growth of international competitiveness of Cluster's members.**
- **Support for small and medium enterprises in the fields of petrochemistry and oil and gas processing**



- Clusters foundation

- Infrastructure objects foundation

BLOCK-SCHEME OF PETROCHEMICAL TERRITORIAL CLUSTER OF BASHKORTOSTAN REPUBLIC

CLUSTER OF LOW-TONNAGE PETROCHEMISTRY OF RB

SUE INKhP RB
SBE RB NITIG AN RB
LLC Bashplast
OJSC NPO Tekhnolog
LLC Innovatsionnyy tsentr Khimtek
LLC Sintez TNP
LLC ZPI Alternativa
CJSC OZNH
LLC HTC UAI
LLC Eksperimentalnyy zavod Neftekhim
LLC NTC Salavatnefteorgsintez
etc.

61 participants

MANUFACTURING COMPANIES

OJSC Sterlitamak petrochemical plant
OJSC Synthez-Kauchuk
OJSC Bashkir soda company
LLC Ishimbay Specialized Chemical Plant of Catalysts etc.

PETROCHEMICAL TERRITORIAL CLUSTER OF RB

ENGINEERING CENTER

OIL AND GAS ENGINEERING CLUSTER OF RB

SUE INKhP RB
PJSC Salavatneftehimproekt
SUE Bashgiproneftekhim
LLC BashNIPIneft
Corporation Uraltechnostroy
FSBEI HPE USPTU
FSBEI HPE BSU
FSBEI HPE USATU
LLC IK OZNA-GazInterAvto
LLC NPO Ufaneftegazmash
SUE BashNIIneftemash
LLC Neftepromavtomatika
etc.

40 participants

CENTER OF MULTIPLE ACCESS TO HIGH-TECH EQUIPMENT

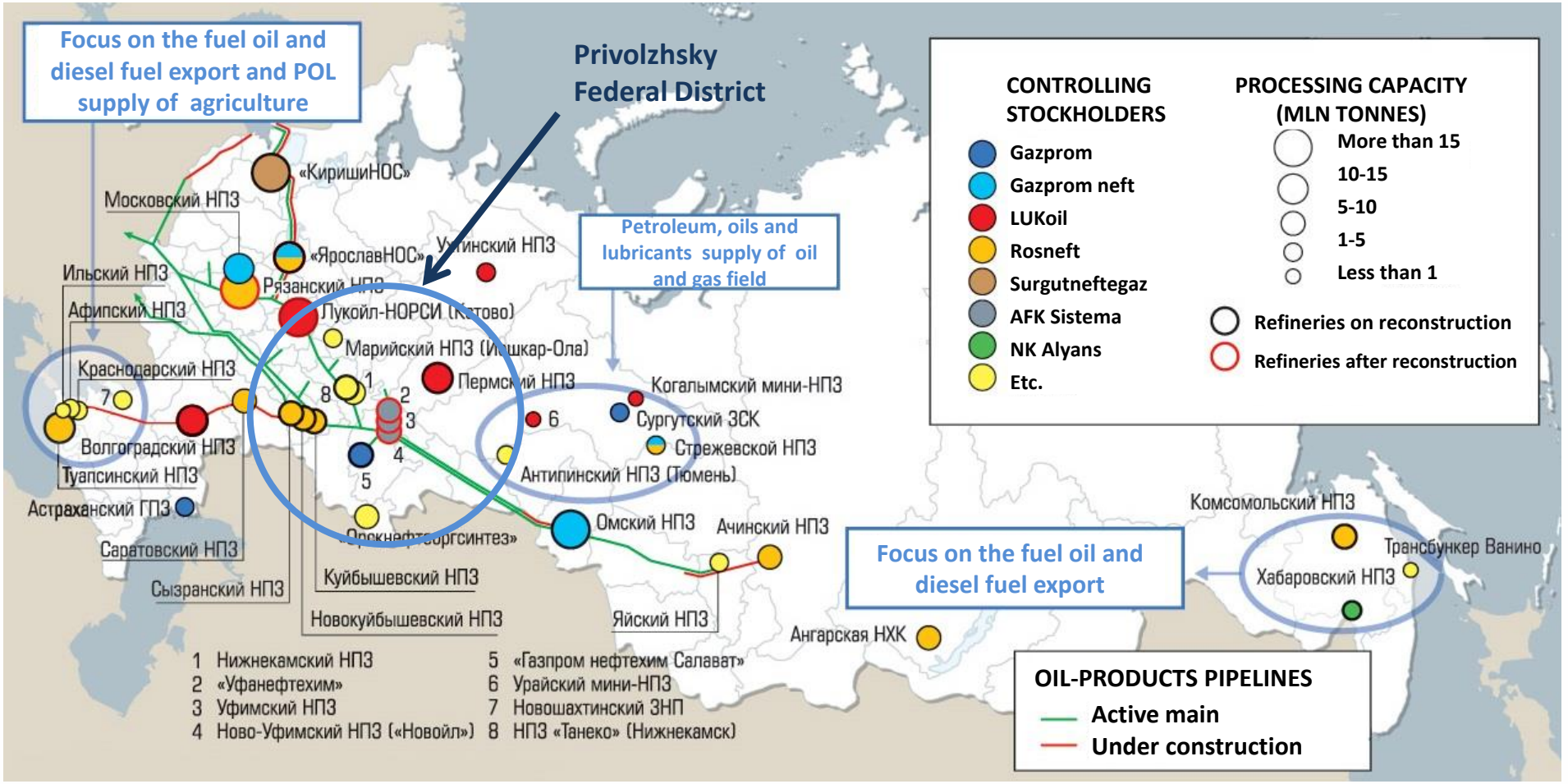
CENTER OF PROTOTYPING IN PETROCHEMISTRY

OIL AND GAS MACHINE ENGINEERING CLUSTER OF RB

CONSTRUCTION AND ASSEMBLY CLUSTER OF RB

THE PROXIMITY OF THE CLUSTER MEMBERS TO THE REFINING CAPACITIES

More than 40% of the oil refining capacities located in Privolzhsky Federal district



Source: "Expert" on the basis of the companies and the Ministry of Energy

THE CENTER OF MULTIPLE ACCESS TO HIGH-TECH EQUIPMENT OF THE LOW-TONNAGE PETROCHEMISTRY CLUSTER OF RB

The center of multiple access to high-tech equipment of the low-tonnage petrochemistry cluster of Bashkortostan Republic (CMA LTPC RB) was established in 2013. The basic company of the center is SUE Institute of Petroleum Refining and Petrochemistry of Bashkortostan Republic.

During the period of 2013 – 2014 more than 70 unique units of scientific-analytical, laboratory and experimental pilot equipment have been delivered

PROTOTYPING STAGES

- INTERPRETATION OF CHEMICAL COMPOSITION
- DISCOVERY OF THE PRINCIPAL "IDEA“ OF THE PRODUCT
- REPRODUCTION IN LABORATORY CONDITIONS (EVIDENTIARY STAGE)
- CREATION OF A PILOT TECHNOLOGY

EXAMPLES OF DEVELOPED PROTOTYPES

The **mastic** prototype is created for rubber bonding to the concrete surface.
Mastic is used for bonding and sealing the rings' seams for construction of underground tunnels, also prevents vibration destruction of preserving the integrity of the surface.

Industrial production at JSC "UZEMIK" is organized.

The development of domestic analogue of the **"soil strengthener"** in the interests of road construction and military-industrial complex of the Russian Federation.
It is used for preparation of the "road cake" on the roads of the highest category as well as for operational (within a day) preparation of ground temporary roads.

ENGINEERING CENTER OF PETROCHEMICAL TERRITORIAL CLUSTER OF BASHKORTOSTAN REPUBLIC

Engineering resources of cluster – more than 7 000 specialists
Profit of cluster members - more than 10 billion rubles per year

Upstream **Midstream** **Downstream**

RANGE OF SERVICES PROVIDED BY ENGINEERING CENTER

Engineering

- Conceptual preliminary study and Master-plan of business development
- Estimating the cost of the project, economic and financial studies
- Feasibility study and examination
- Static and dynamic modeling
- Examination of production facilities
- Process engineering design (PED)
- Providing the own licenses
- Basic engineering design (BED)
- Front-end engineering and design (FEED)
- Design and detailed documentation development

Procurement organization

- Vendor selection, procurement, delivery of equipment and manufacturing inspection
- Procurement management
- Selection of third-party licensors and integration of technologies

Construction

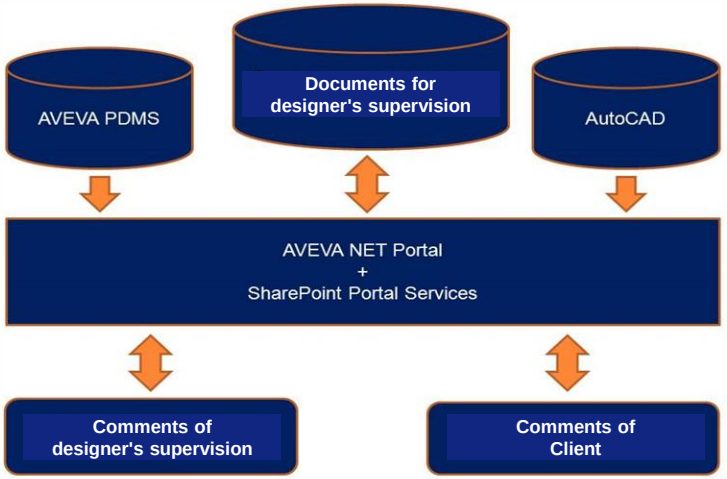
- Installation and construction of the production site
- Construction Project Management
- Supervising installation
- Supervision of start-up works and the commissioning procedure
- Commission and service maintenance

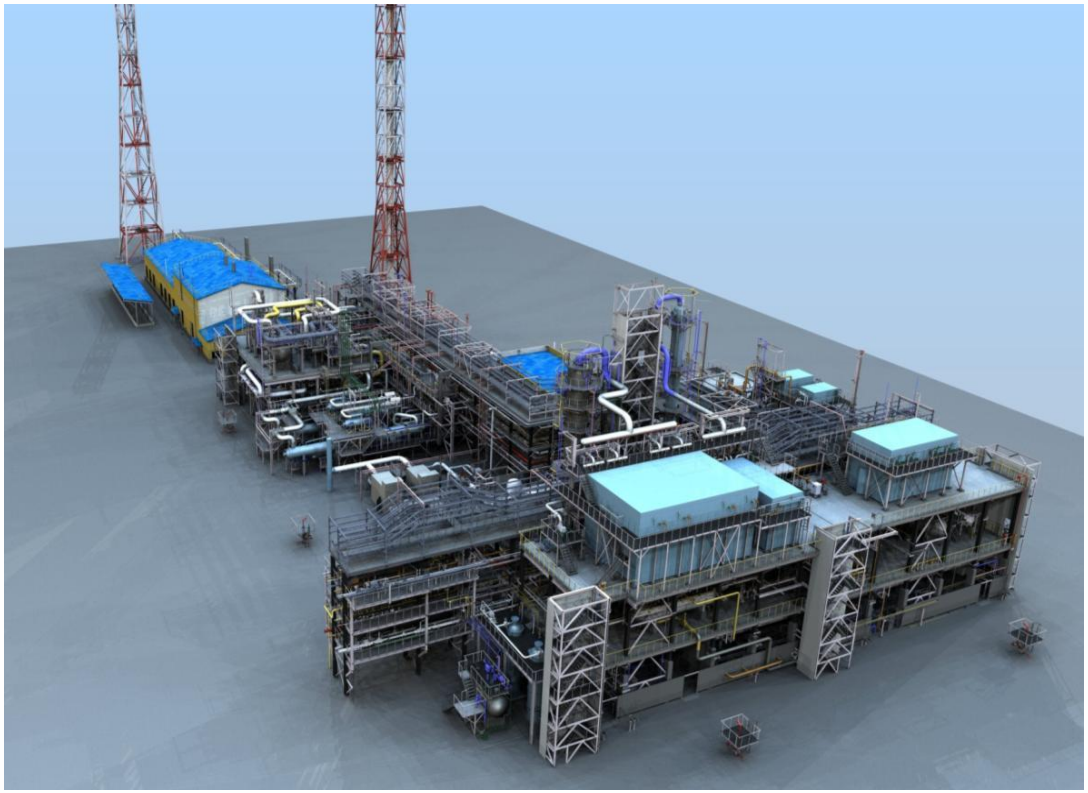
Management

- Project management consultant (PMC) and customer training
- Acting as general contractor

HARDWARE AND SOFTWARE COMPLEX OF ENGINEERING CENTER

AVEVA PLANT





End-to-end solution of layout, architectural, technological, assembly problems by implementing dedicated program complex, which combines the qualities of systems: CAD system, Product Data Management (PDM) and Database Management System (DBMS) by using program products AVEVA PDMS and AVEVA NET Portal.

CUSTOMERS

- OAO NK Rosneft (OJSC)
- PAO ANK Bashneft (PJSC)
- PAO Gazprom (PJSC)
- OAO Gazprom neft (OJSC)
- OAO Surgutneftegaz (OJSC)
- PAO Tatneft (PJSC)
- PAO SIBUR Holding (PJSC)
- OAO Novatek (OJSC)
- PAO LUKOIL (PJSC)
- AO Antipinskiy NPZ (JSC)
- OOO Ilskiy NPZ (LLC)
- OOO Izhevskiy NPZ (LLC)
- ПАО Nizhnekamskneftekhim (PJSC)
- OOO Mariskiy NPZ (LLC)
- AO NNK Khabarovskiy NPZ (JSC)
- OAO Slavneft-YANOS (OJSC)

REFERENCE-LIST OF CLUSTER'S MEMBERS

	Description	Feasibility study and estimate	Licenses/ basic projects	Construction project	Reconstruction project
Primary processes, residue conversion	Oil, gas condensate and their fractions rectification	9	27	40	13
	Delayed coking and coke burning		8	15	9
	Visbreaking and thermal cracking	2	11	10	17
	Bitumen production	7	11	41	11
	Deasphalting		4	2	4
Secondary processes, gas treatment	Isomerization and alkylation	1		3	2
	Reforming			1	6
	Oil production	3	8	7	1
	Elemental sulfur production		5	7	3
	Diesel fuel, vacuum gasoil hydro treatment		2	4	12
	Hydro cracking			2	6

REFERENCE-LIST OF CLUSTER'S MEMBERS

	Description	Feasibility study and estimate	Licenses/ basic projects	Construction project	Reconstruction project
Offsites' objects and infrastructure	Airport fuel complex		1	3	3
	Fuel station			3	2
	Offsites' objects	2	3	9	4
	Waste water treatment, Oil sludge utilization	4	8	10	9
Petrochemical processes	Monomers production	1		3	13
	Aromatic hydrocarbons production				3
	Polymers production			4	1
Storage and transport	Refinery tank farm		2	2	9
	Discharge rack	2		11	18
	Main pipelines		3	1	7

PETROCHEMICAL TERRITORIAL CLUSTER OF BASHKORTOSTAN REPUBLIC

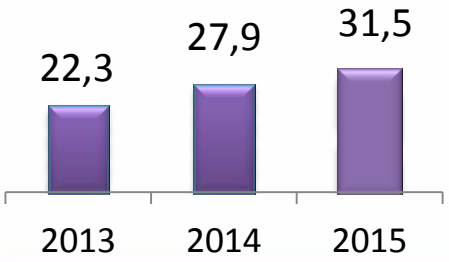
Key participants	Specialization	Foreign partners
OJSC Bashkir soda company	Chemistry, petrochemistry	AVEVA, APS Designing Energy
OJSC Sterlitamak petrochemical plant	Chemistry, petrochemistry	
OJSC Synthez-Kauchuk	Chemistry, petrochemistry	KELLER AND HECKMAN LLP
ГУП «Институт нефтехимпереработки Республики Башкортостан»	Oil and gas chemistry, petroleum refining, engineering	FUJITSU, Petrochemical Holding GmbH

> **30** joint projects in research, development and design, modernization of existing and creation of new industries

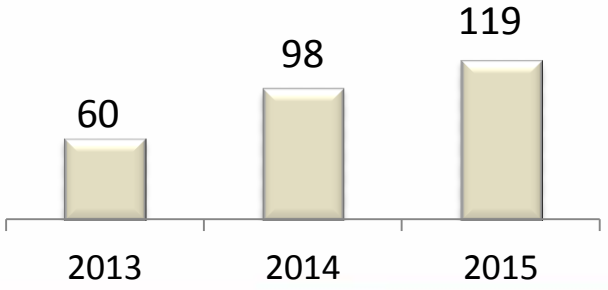
The center of multiple access to high-technological equipment and the prototyping center in petrochemistry are created

High-tech software and hardware for the automated design and modeling are purchased

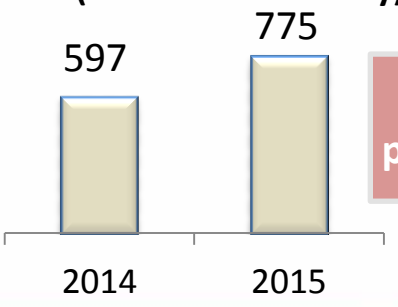
The volume of shipped goods, works and services (billion rubles annually)



The number of SME participants, which use the equipment of the center of multiple access

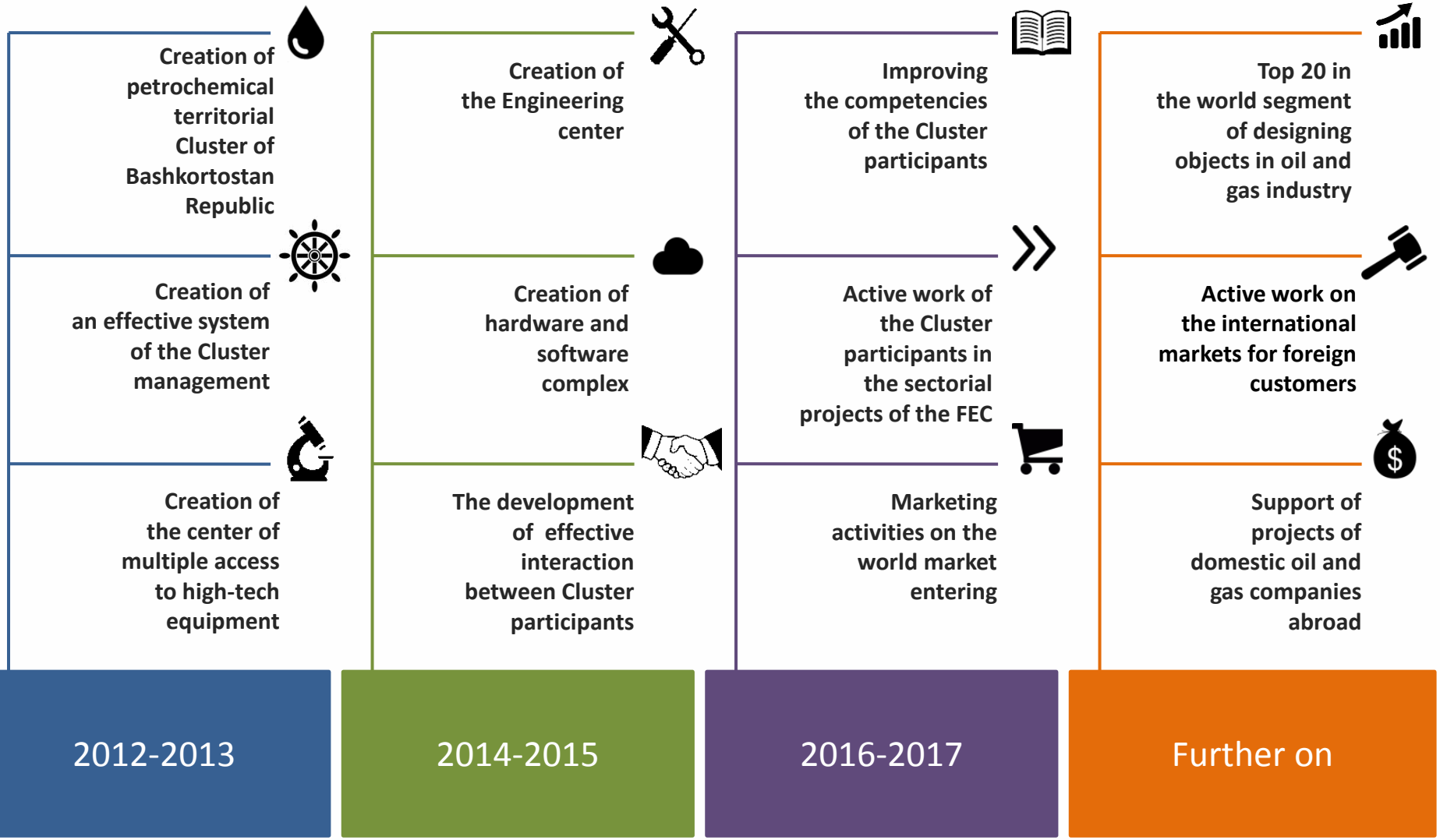


The volume of projects realization in the Engineering center (mln rubles annually)



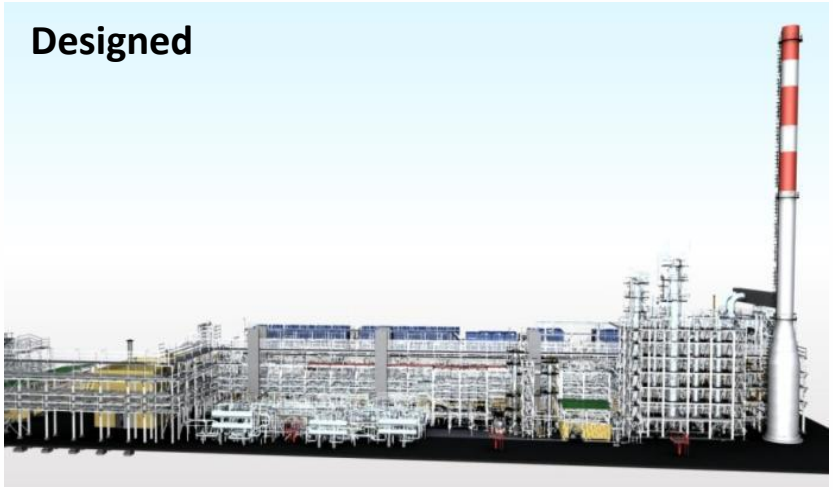
∑32 projects

DEVELOPMENT STRATEGY OF PETROCHEMICAL TERRITORIAL CLUSTER OF BASHKORTOSTAN REPUBLIC



VISBREAKING UNIT AT OJSC «TANECO»

Designed



Built

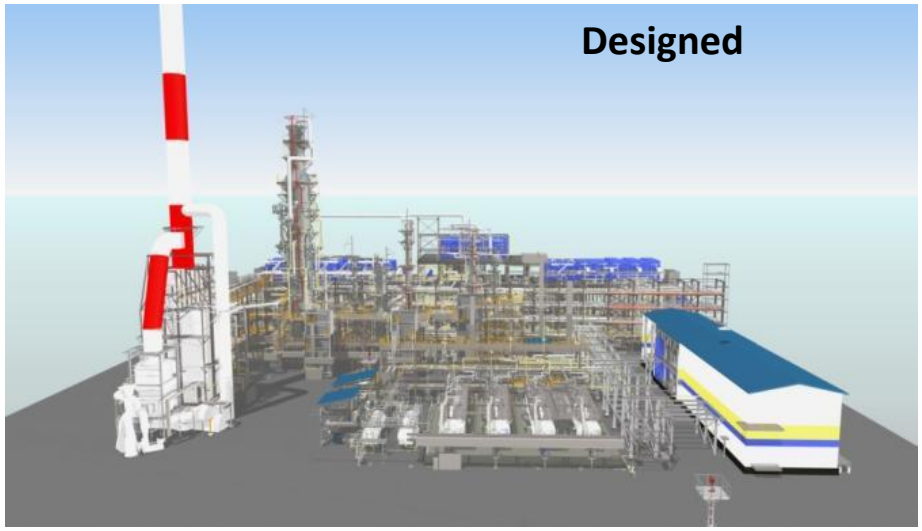
Capacity- 2,4 mln.t/y

License, basic design, design, exploitation documentation, main technological equipment procurement, supervision

– GUP INKhP RB

200 positions of equipment
1200 positions of instrumentations and controls
7000 positions of fittings
50 km extent of pipelines

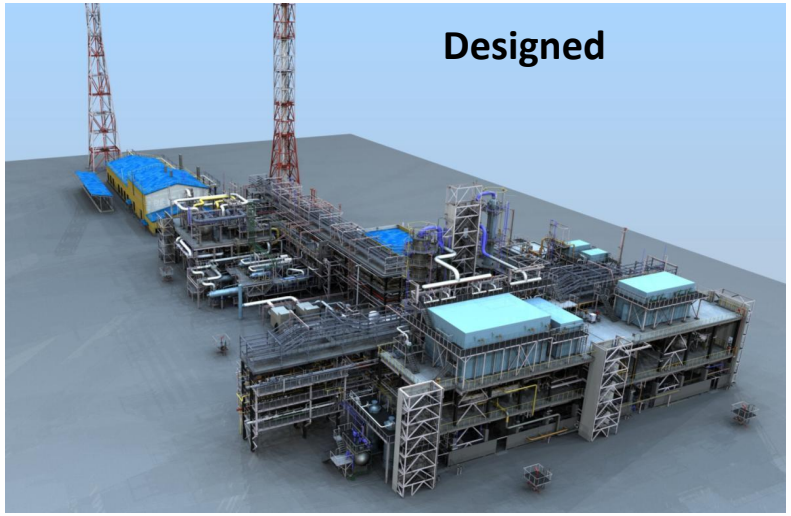
IIId STAGE OF CONSTRUCTION OF CJSC «ANTIPINSKY REFINERY»



CDU -3
Capacity - 5 mln.t/y
Basic design - GUP INKhP RB
Design:
- GUP INKhP RB

119 positions of equipment
1200 positions of instrumentations and controls
3400 positions of fittings
39 km extent of pipelines

IIId STAGE OF CONSTRUCTION OF CJSC «ANTIPINSKY REFINERY»



Elemental sulfur production unit
Capacity - 30 thous. t/y
Licensor - GUP INKhP RB
Design:
- **GUP INKhP RB**
- **«NefteKhimInzhiniring» LLC**

220 positions of equipment
1025 positions of instrumentations and controls
4300 positions of fittings
29 km extent of pipelines

Processing of natural and associated gas into synthetic liquid and solid hydrocarbons

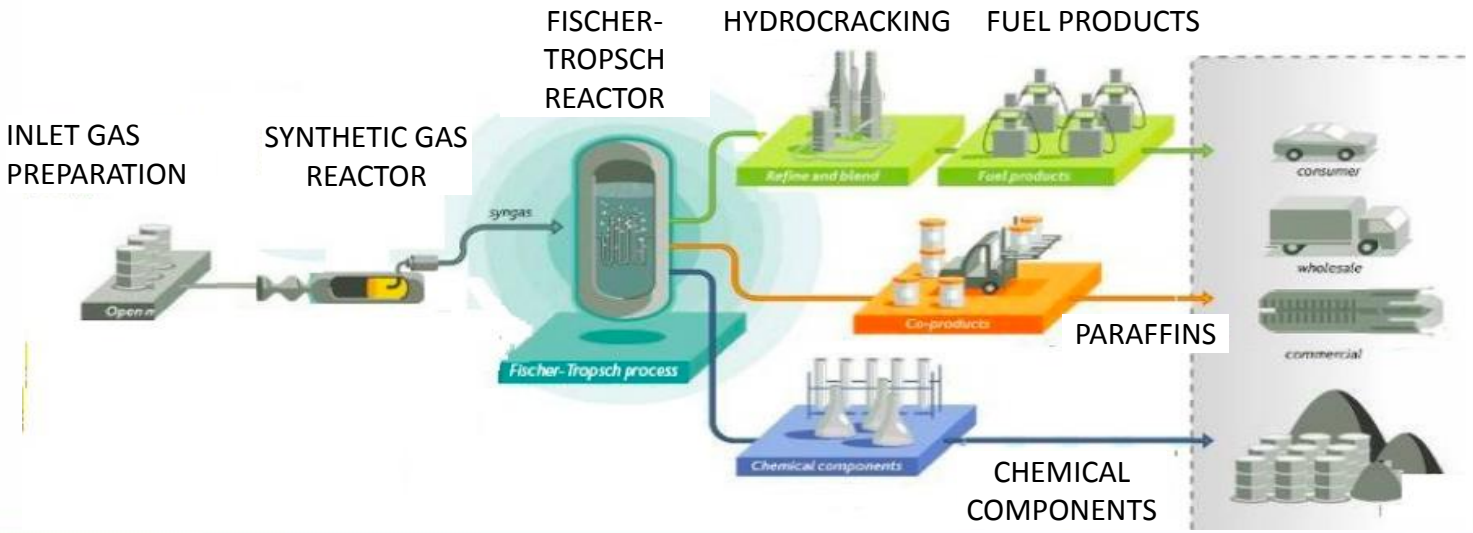
Purpose - use of associated petroleum gas fields

Location of implementation– JSC "Novokuybyshevsky Oil Refinery"

Status of the project:

- the initial data for designing is developed (author -"RN-CIR" LLC)
- engineering surveys are performed ("EnergoProektStroyIzyskaniya" LLC)
- design documentation is developed (GUP INKhP RB)
- the sanitary protection zone project is being developed (GUP INKhP RB)
- documentation package for passing the state examination is being prepared

ASSOCIATED GAS PLANT SCHEME



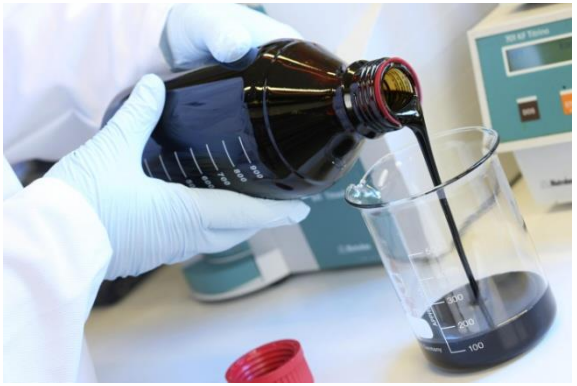
HEAT TREATMENT OF THE SUPER-VISCOUS OIL (SVO)

Purpose of the process :
Production of synthetic oil with a viscosity of no more than 100 cSt.

Location of implementation :
PJSC TATNEFT
Ashalchinskoye SVO field.
Unit of SVO preparation «Chumachka»

Ecological solutions :

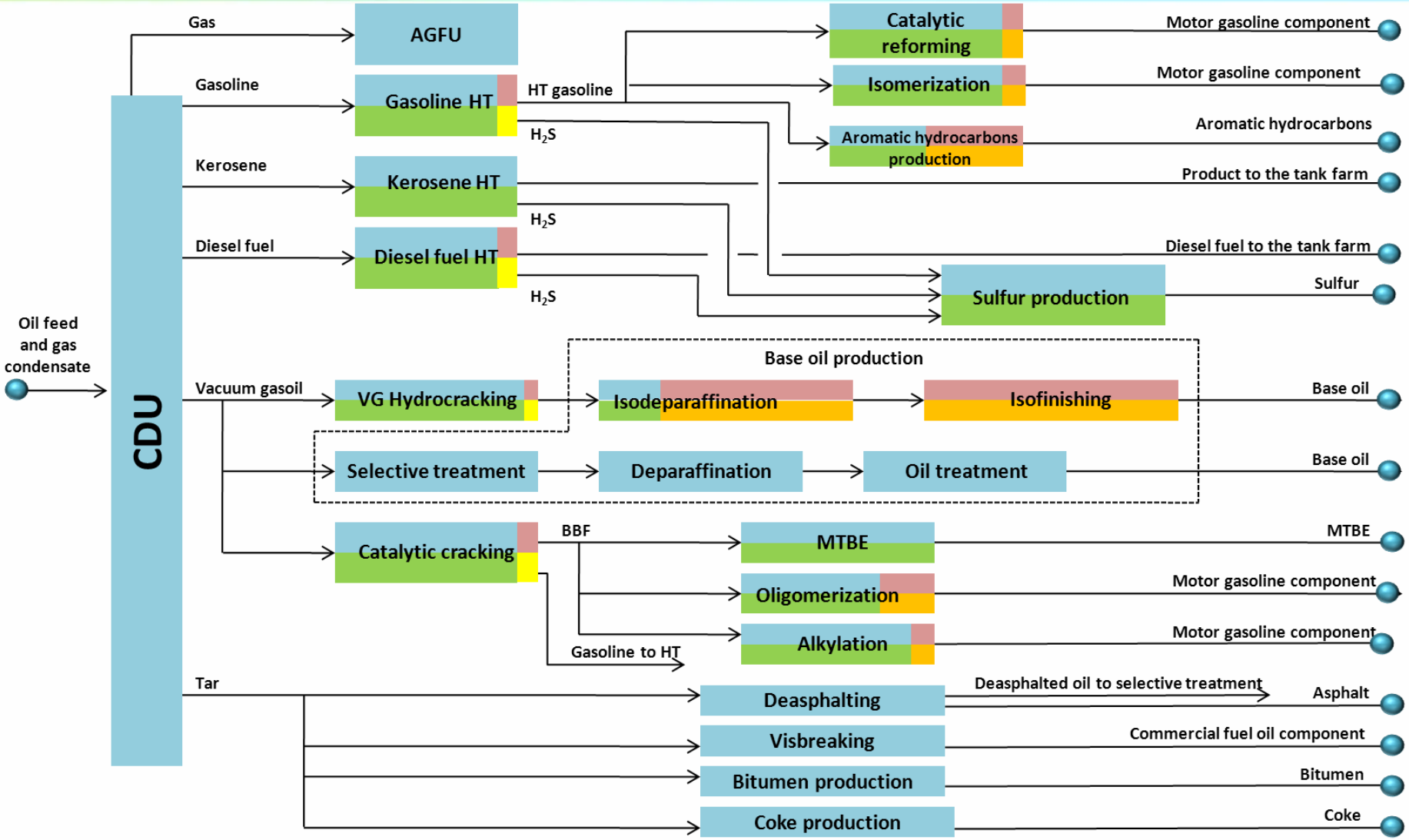
- **conversion of the process resulting hydrogen sulfide into elemental sulfur;**
- **the complete recovery of hydrocarbon gases.**



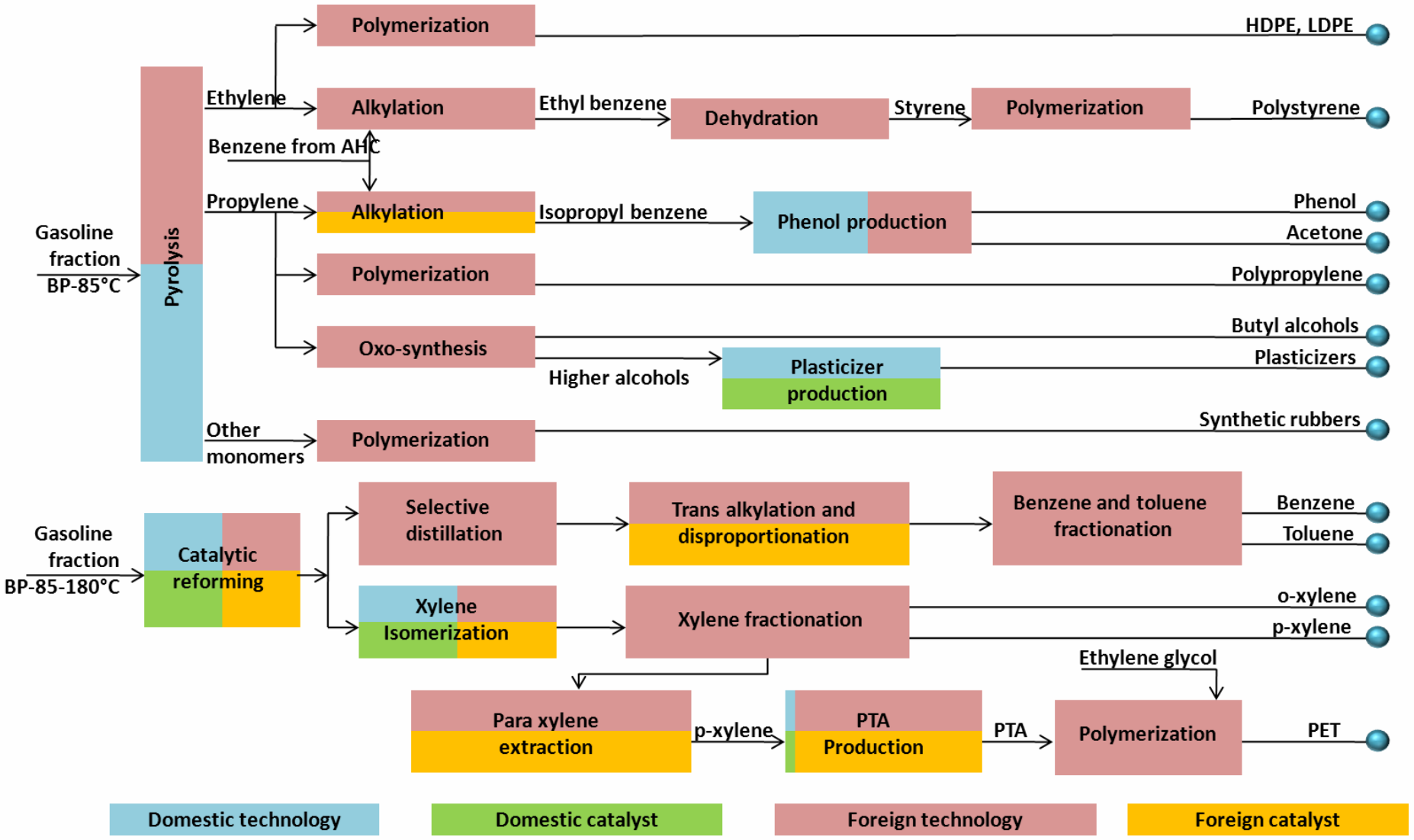
Status of the project :

1. **Basic design of technology is completed.**
2. **The basic design solutions regarding technology, equipment selection, layout and design solutions are developed.**
3. **The project is on hold until market conditions improve.**

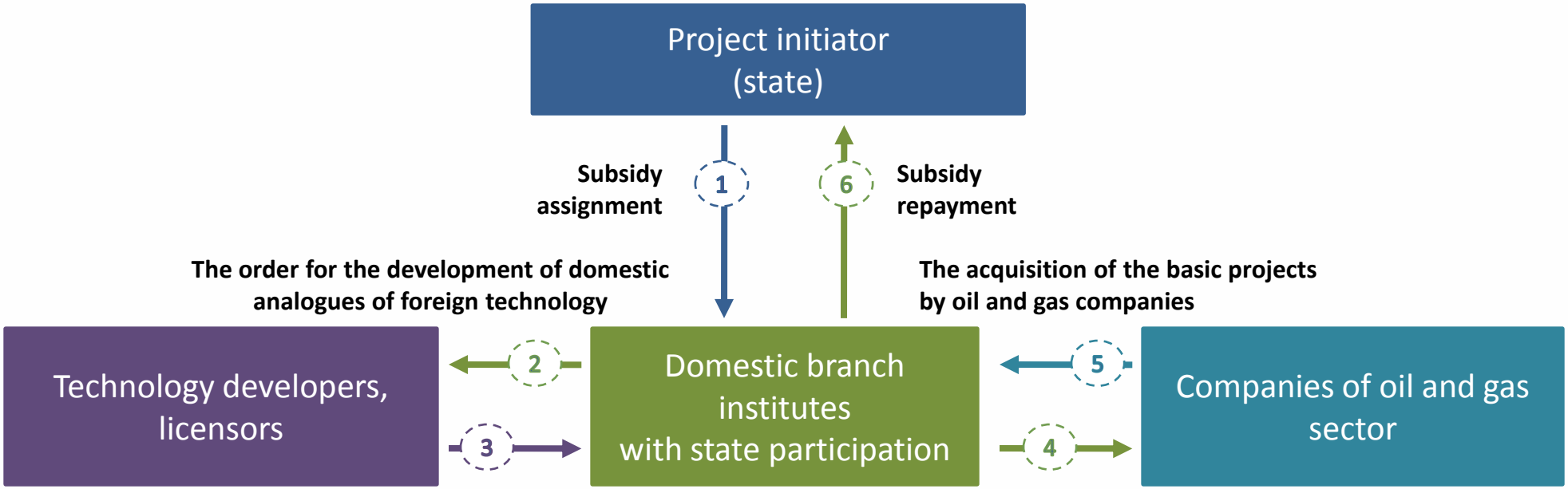
TECHNOLOGIES AND CATALYSTS PETROLEUM REFINING OF BASHKORTOSTAN REPUBLIC



TECHNOLOGIES AND CATALYSTS PETROCHEMISTRY OF BASHKORTOSTAN REPUBLIC



PROPOSALS ON MECHANISMS TO SUPPORT DOMESTIC CONTRACTORS IN THE OIL AND GAS SECTOR (2016-2018)



Development and transfer of basic projects of technology, including using, if necessary, the import catalysts with their subsequent replacement on the Russian analog as soon as ready

The introduction of technology on the projects of oil and gas companies, support facilities' lifecycle

Reference:

In 2011, 18 four-way agreements between oil companies are signed. The FAS, Rostechnadzor and Rosstandart, which provides 34 units to reconstruct and 99 process units to build.
According to the Ministry of Energy, 1,9 trillion rubles in 2014 prices are planned by oil companies for 133 units.
By the beginning of 2016 the plan is made up of 50%, at the same time 90% of the used technologies are foreign.