



AMUR GAS CHEMICAL COMPLEX: NEW HORIZONS, TECHNOLOGICAL AND ENVIRONMENTAL SOLUTIONS FOR THE DEVELOPMENT OF NATURAL GAS CONVERSION

D.Y. BORISOVA

Managing director for

Development and Innovations of SIBUR LLC

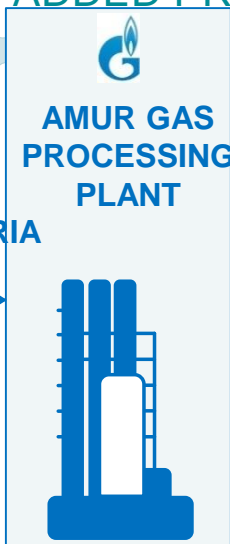


AMUR GAS CHEMICAL COMPLEX: A WORLD-CLASS PROJECT TO CONVERT HYDROCARBON FEEDSTOCK INTO VALUE-ADDED PRODUCTS



**POWER OF SIBERIA
NATURAL GAS**

42 bn m³



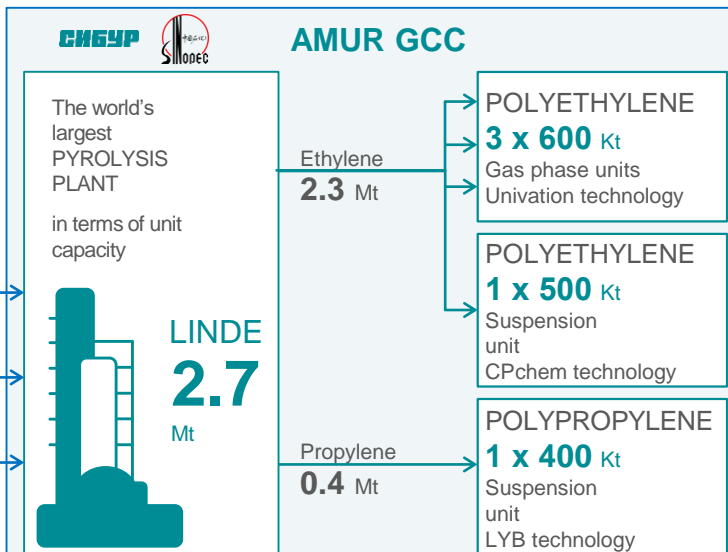
CHINA

Methane
38 bn m³

Ethane
2.35 Mtpa

Propane
0.74 Mtpa

Butane
0.36 Mtpa



COMMERCIAL PRODUCTS

POLYMERS

2.7 Mtpa

AMUR GPP MILESTONES

Start of site preparation

Placement of first purchase orders

Start of basic construction and installation work (1st pile)

Oversize equipment delivery

1st navigation window 2nd navigation window

Mechanical completion.
Plant startup.
Commencement of operation

3Q 2019

4Q 2019







3Q 2020

2-3Q 2021

2-3Q 2022

2024-2025

MAJOR CONSTRUCTION PROJECT

DISCIPLINE	MEASUR.U NIT	ZSNK	AGCC			
Piles	<i>thous.ea</i>	98.0	130.1			
Cast-in-place concrete	<i>thou. m³</i>	420.0	668.2	CONCRETE 668.2 thou. m ³	or	 1.7 CRIMEAN BRIDGES (400 thou. m ³ of concrete) 
Pipeline installation	<i>Kt</i>	56.0	52.4			
Structural steel installation	<i>Kt</i>	146.0	187.3	STEEL 239.7 Kt	or	 33 EIFFEL TOWERS (7.3 Kt of steel) 
Electrical cable installation	<i>thou. km</i>	8.5	9.3			
Instrument cable installation	<i>thou. km</i>	7.2	9.6	CABLE 18,9 thou. km	or	 2.5 ROAD TRIPS (7.7 thou. km)  MOSCOW SVOBODNY

EFFECT FOR THE ECONOMIES OF RUSSIA AND AMUR REGION

+2.4

RUB TRLN
GROSS REGIONAL PRODUCT

+4.6

RUB TRLN
NON-COMMODITY EXPORTS

+227

RUB BN
TAX REVENUES TO
BUDGETS AT ALL LEVELS

+3.6

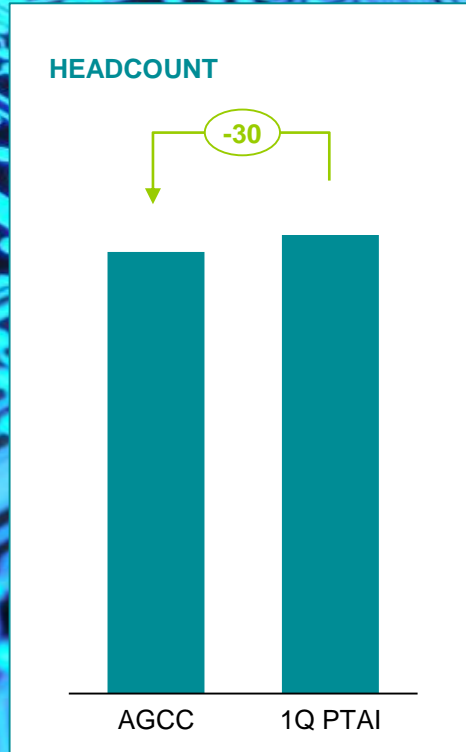
RUB BN/YEAR
EFFECT OF NEW JOBS IN THE
REGION DURING THE
CONSTRUCTION PHASE

BUSINESS DEVELOPMENT

IN THE REGION TO ENSURE
CONSTRUCTION PROGRESS AND
SUBSEQUENT OPERATION

DIGITAL CHEMISTRY: SAFETY, EFFICIENCY, TRANSPARENCY

Proven efficiency in the 1st quartile among European manufacturers due to implementation of appropriate solutions in three areas:



ORGANIZATION

- Remote control and monitoring center in Tobolsk
- Multitasking of console and field operators, repair services
- Round-the-clock shift personnel perform qualified operations only, ensuring safety and reliability
- SIBURINTECH-based personnel training program



AUTOMATION

- Automation of furnaces, rotating equipment, dosing of chemicals
- Autopilot for technological process (APC)
- Modular procedural automation
- Minimization of equipment inspections through continuous monitoring (vibration, temperature, pressure)
- Intelligent video surveillance for automatic emergency detection (black screen system)
- Online flow control analyzers to generate datasheets based on flow analysis data



RELIABILITY

- Mechanical completion of equipment is 97.4%, on a par with the world leaders, according to Solomon research
- Equipment requiring minimal maintenance (extended service interval)
- Predictive diagnostics (failure prediction using machine learning)
- Risk-based approach to reliability management (FMEA, RCM, RBI)



FORMING THE PLANT'S PRODUCTION TEAM OF THE FUTURE ALREADY TODAY

SIBUR has been systematically training engineers and technicians for the Amur Gas Chemical Complex by creating a platform for education quality improvement in a number of disciplines: chemistry, physics, computer science, and mathematics:

- SIBUR is a strategic partner of innovative educational platforms in the Far East
- The company participates in the development of general and supplementary engineering and technological educational programs
- The company holds annual science festivals and educational sessions for schoolchildren and their parents
- The company implements engineering and chemistry grant programs for high school students
- SIBUR supports Russian nation-wide and international engineering and technical competitions held in the Amur Region
- The company cooperates with a number of universities in the regions of operation
- The company implements a contract-based program of training students in a number of disciplines
- The company promotes a system of internships at its enterprises for students, university graduates and young professionals in various disciplines

SUSTAINABLE DEVELOPMENT



CUTTING-EDGE TECHNOLOGY

- Specific greenhouse gas emissions at AGCC are **40%** lower than SIBUR's total for 2019 in the Petrochemical segments. Reduction effect of the total specific indicator in the Petrochemicals segment is **17%** together with AGCC (in 2019).
- Use of a closed-loop water recycling system
- Installation of smokeless flares
- Minimization of waste disposal



ENVIRONMENTAL CONTROL SYSTEM

- Air quality, noise level
- Quality of water supply and wastewater disposal
- Installation of observation stations, including online monitoring
- At the points of ambient air sampling on the border of the buffer zone



MONITORING VEGETATION AND WILDLIFE IN ADJACENT NATURAL AREAS



USE OF RENEWABLE ENERGY SOURCES

- Including the use of regional hydropower potential