



Production of Maleic Anhydride and Butanediol in Alabuga

2016

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Project Description

- Construction of the first maleic anhydride (MA) plant in Russia, with installed capacity of 25,000 MT per year, using butane as raw material and based on the state-of-the-art technology of CTCE (China)
- Partial conversion of 25,000 MT of MA into 22,000 MT of butanediol (BDO/THF)

Product

- Up to 25,000 MT of high-purity MA (99.85%) a year, in liquid form and in granules
- Up to 22,000 MT of BDO per year
- Expanding the value chain towards products with higher added-value: tetrahydrofuran (THF) and gamma-butyrolactone (GBL)

Project Participants

- Project Initiator: OOO Pa-rus
- Possible participation of Russian investors and financial institutions is currently under discussion

Market

- Europe (60%), Russia (40%)
- Leading chemical trader HELM AG will ensure export sales of BDO

Core Financials

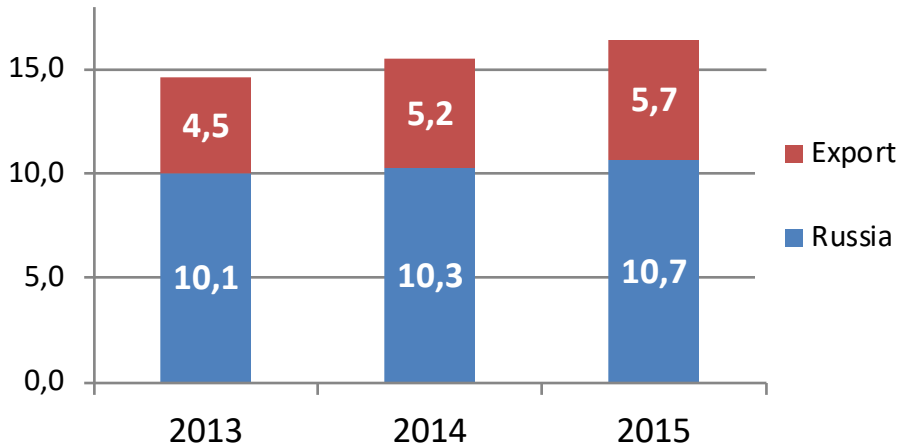
- Total Investments (CapEx+WCAP+Financial cost+Loan Int.) – \$127,5 m
- Financed by the Equity (30%) and a Bank Loan (70%)
- Plant to be commissioned by 2019 and expected to reach the maximum capacity (25,000 MT of MA and 22,000 MT of BDO) by 2020
- Projected Total Gross Sales 2020 – \$63,1 m
- Projected EBITDA in 2020 – \$53,6 m
- Payback Period, after tax and financing – 3,4 years
- Project NPV – \$130,4 m (at 15% discounting rate)
- Equity NPV – \$102,4 m
- Equity IRR – 45%

Project Stages

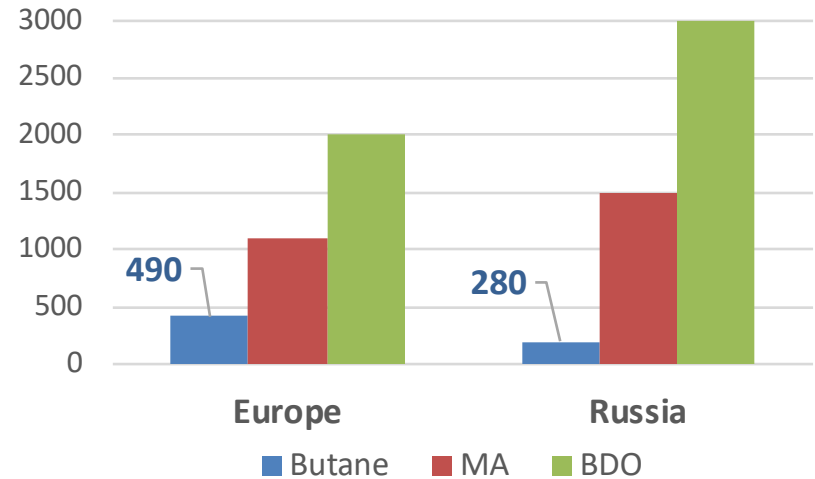
- Preliminary feasibility study completed by Jacobs Consultancy, London
- Purchase of License and Project PDP from CTCE – January 2017
- Development of Project Documentation – October 2017
- Engineering of the commissioning works – May 2019
- 2nd quarter of 2020 – LAUNCH!!!

II. Idea

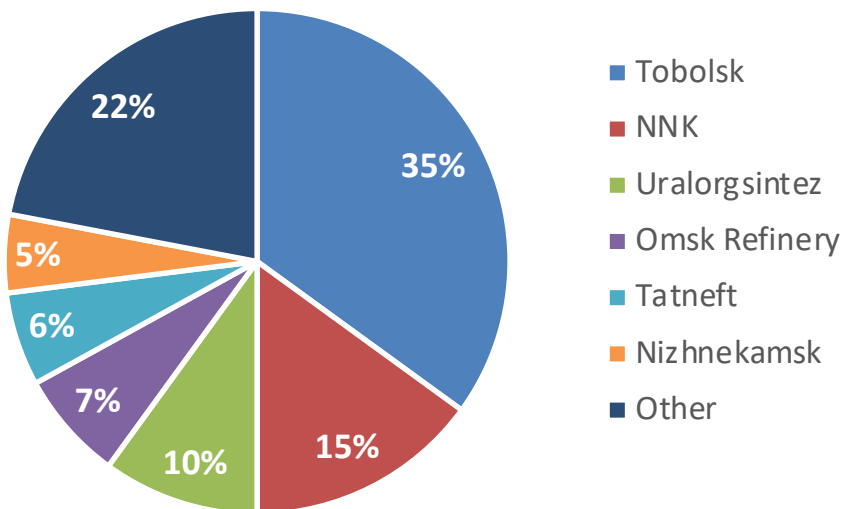
Russian LHG production, million MT:



Average prices in 1Q 2016, EUR/MT:



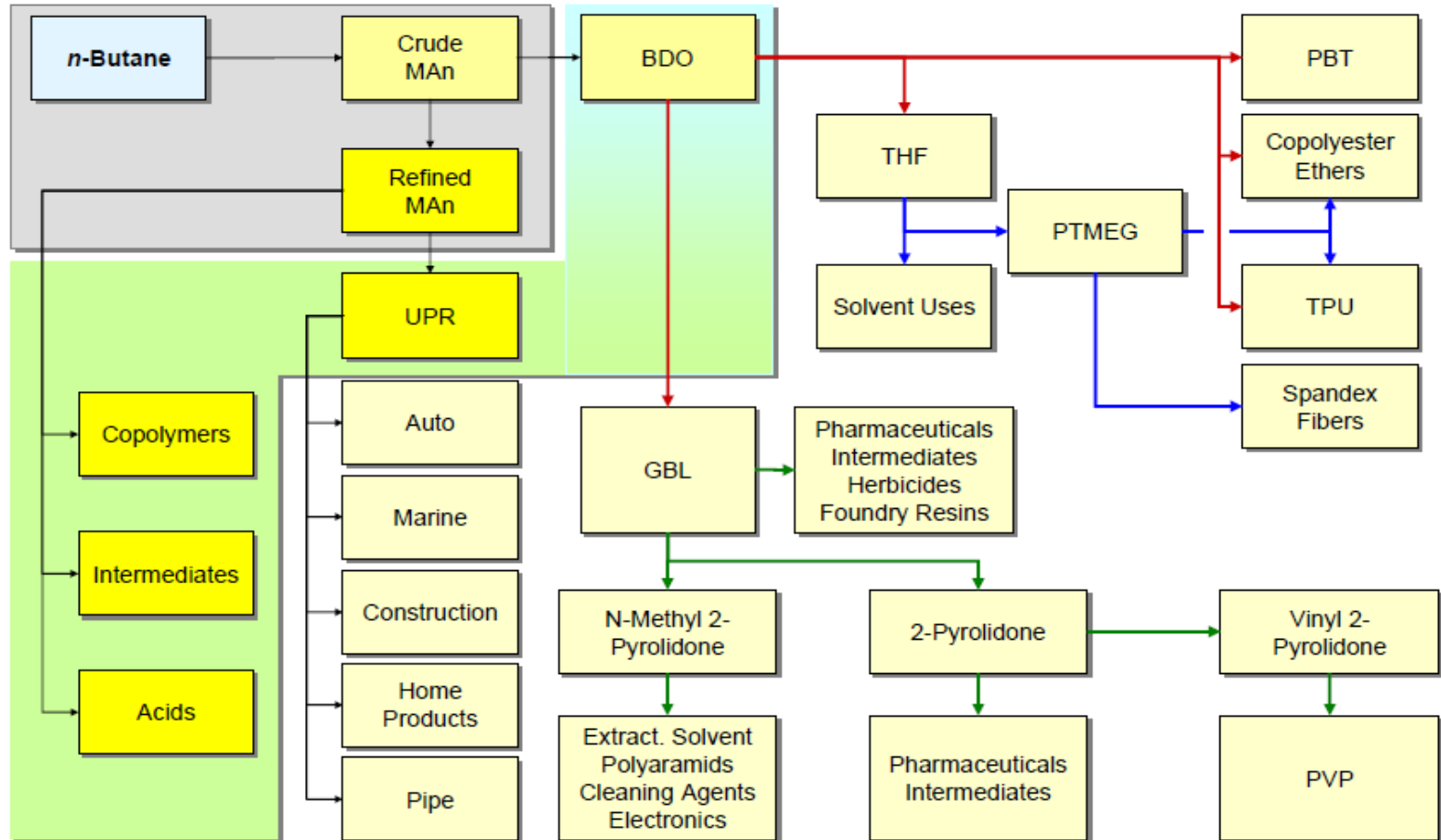
Butane exports, 3Q 2015:



- Large number of butane suppliers
- Low price of raw materials (butane) and high MA/BDO prices in Russia
- THF price in Russia is over €4800 per MT!
- Excessive LHG supply is sold abroad

III. Market

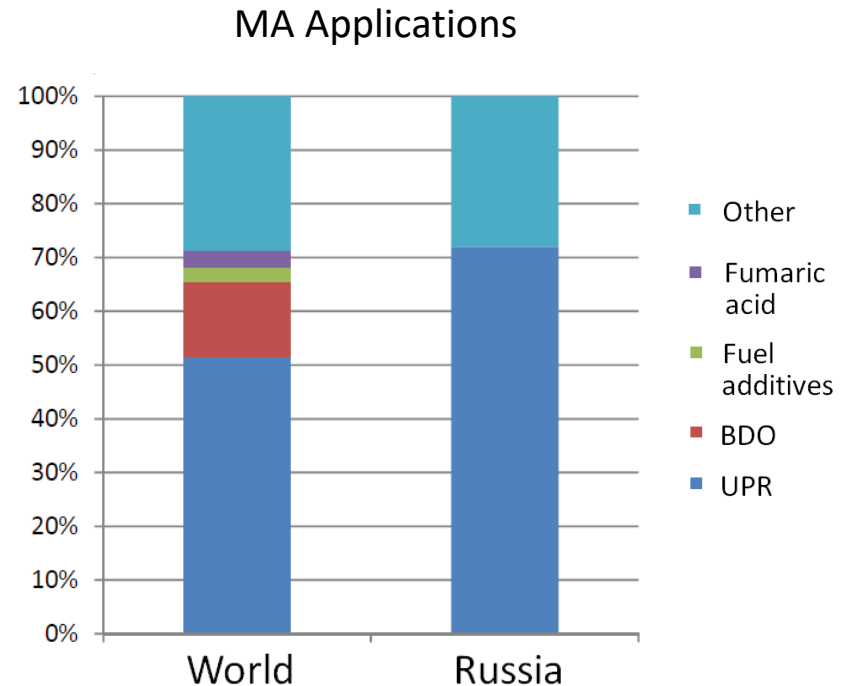
MA and BDO value chain extends to many different products



Source: Huntsman

Main trends on Russian MA and BDO markets:

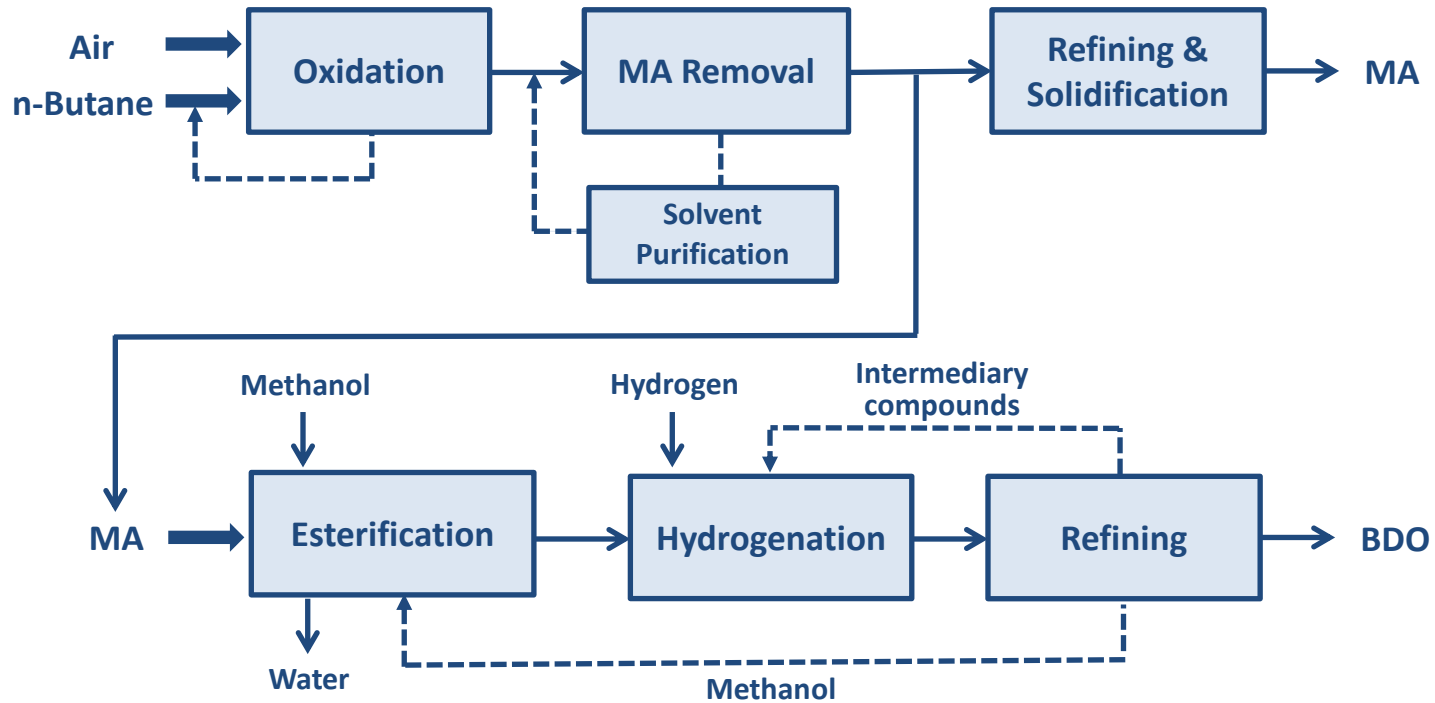
- At present, domestic MA market is relatively small – 8,000 MT per year
- BUT**
- The demand for polyester resins (UPR), BDO and THF is growing
 - Imports of BDO and THF during 2013-2015 have jumped by 50%
 - In 2015, BDO consumption reached 4,000 MT; THF consumption – 1,500 MT
 - By 2020, the combined market for BDO and THF is estimated to reach 10,000 MT



Favourable time for the emergence of a local Russian producer of BDO/THF/GBL

IV. Production

MA production technology is based on the catalytic oxidation of normal butane over vanadium-phosphorus catalyst



BDO production technology is based on the esterification of MA, which converts it into methyl ester, with its subsequent hydrogenation

Providers of MA production technology from n-butane:

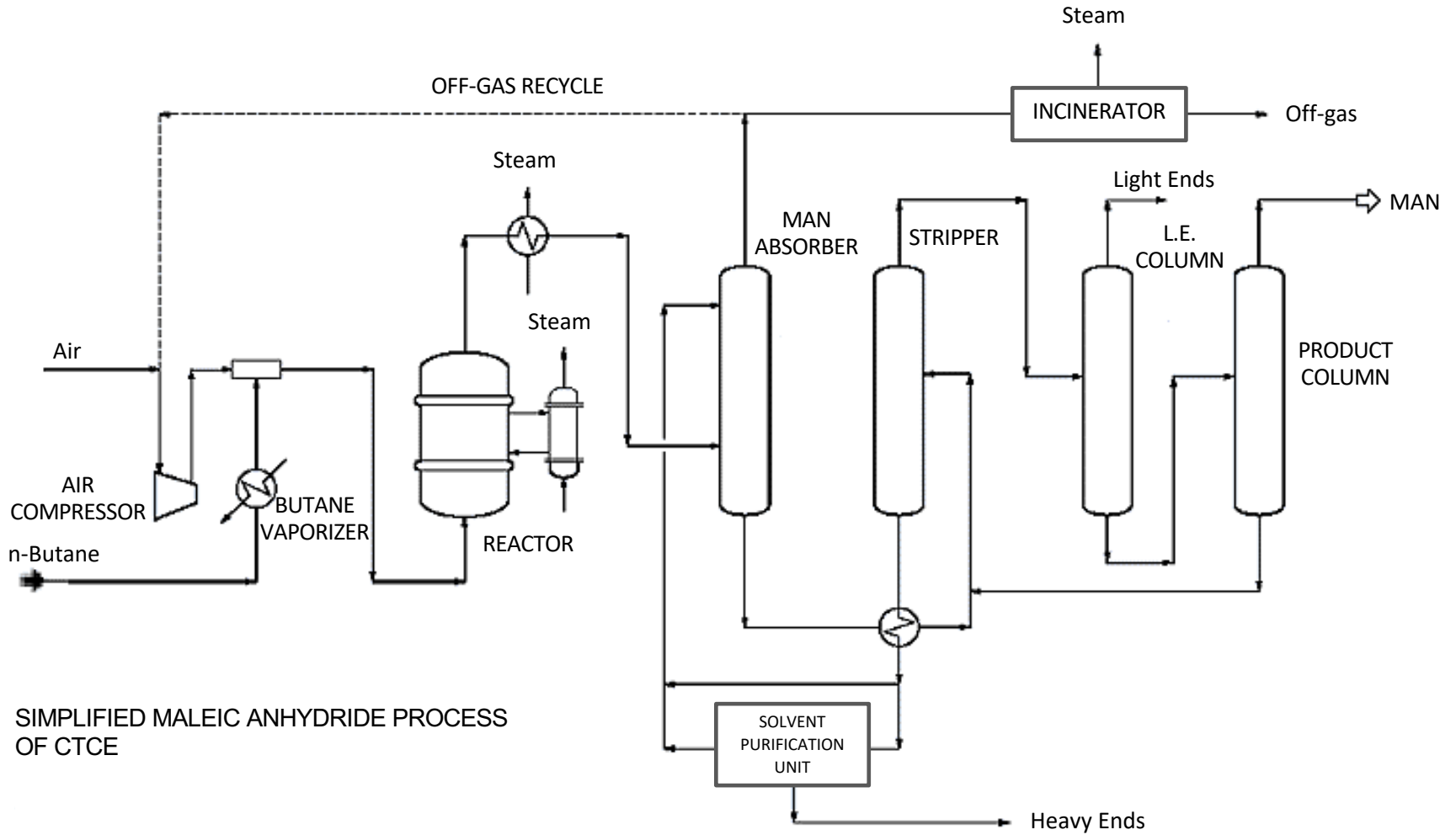
	Reactor Type	Mode of Recovery	Existing Max. Plant Capacity, MT/year
CONSER	Fixed bed	Solvent	115,000
Huntsman	Fixed bed	Solvent	110,000
CTCE	Fixed bed	Solvent/water	100,000
Mitsubishi Chemical	Fluidized bed	Solvent	60,000

Source: Jacobs Consultancy

Comparing CTCE and Huntsman technologies:

	Huntsman	CTCE
Off-Gas Recycle	No	No
Catalyst	Huntsman MARS V	Clariant Syndane 3142 LA
Feedstock Consumption	1.12 MT of n-C ₄ per 1 MT of MA	1,15 MT Of n-C ₄ per 1 MT of MA
MA Purification	Batch vacuum distillation	Continuous vacuum distillation
MA Purity	99.9%	99.8%
Weather Conditions	No existing facilities under severe temperatures	From -30°C to +40°C (China)

Source: CAC



Source: CTCE

The provider of BDO production technology will be chosen between CONSER и Davy

KAMATEX



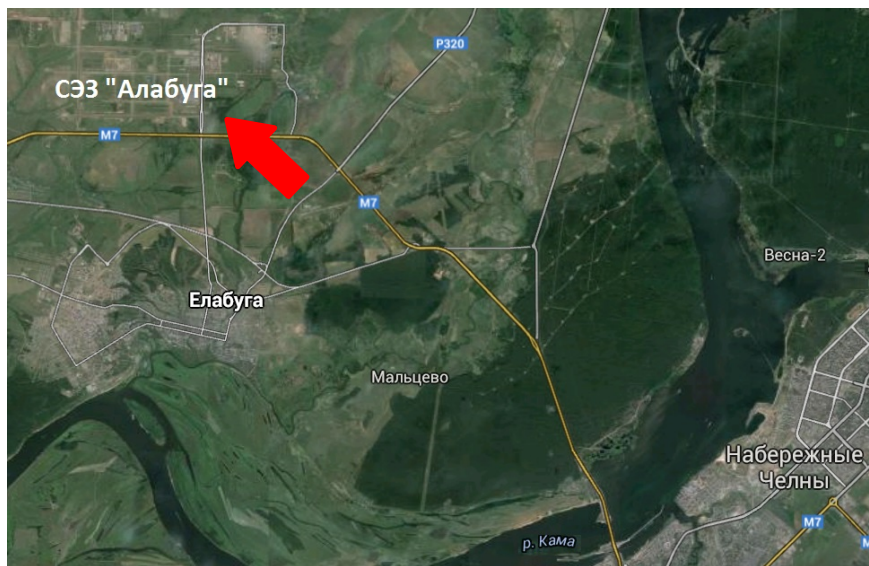
- CONSER and Davy Process Technology are the two world's main technology providers for making BDO
- CONSER's and Davy's technologies are very close to each other in many respects
- Making BDO from MA provides for the lowest production costs and lower capital intensity among all existing production technologies

Project KAMATEX is located in Alabuga SEZ (special economic zone), Republic of Tatarstan

KAMATEX

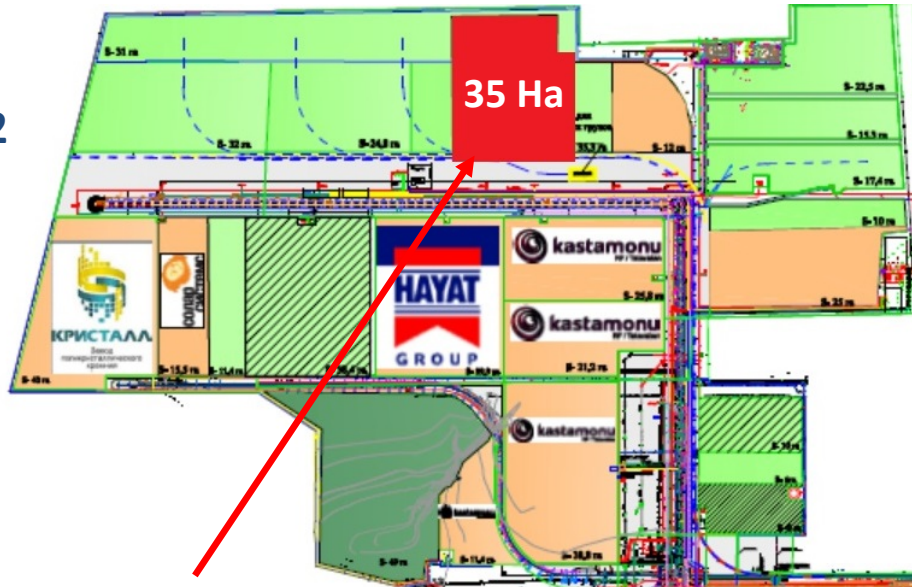


- One of the most economically developed regions of Russia
- The best region for business in Russia according to Forbes (2011)
- The best region in Russia for conditions for business according to Ernst & Young (2011)



- Zero VAT rate applied for imported machinery and equipment
- No property tax, no land and transport tax during the first 10 years
- Income tax benefits (2% – first 5 years, 7% – next 5 years, 15.5% – till 2055)
- No charge for connecting to the existing electricity grid
- Low price for land (10 RUB per sq. m.)

Stage 2



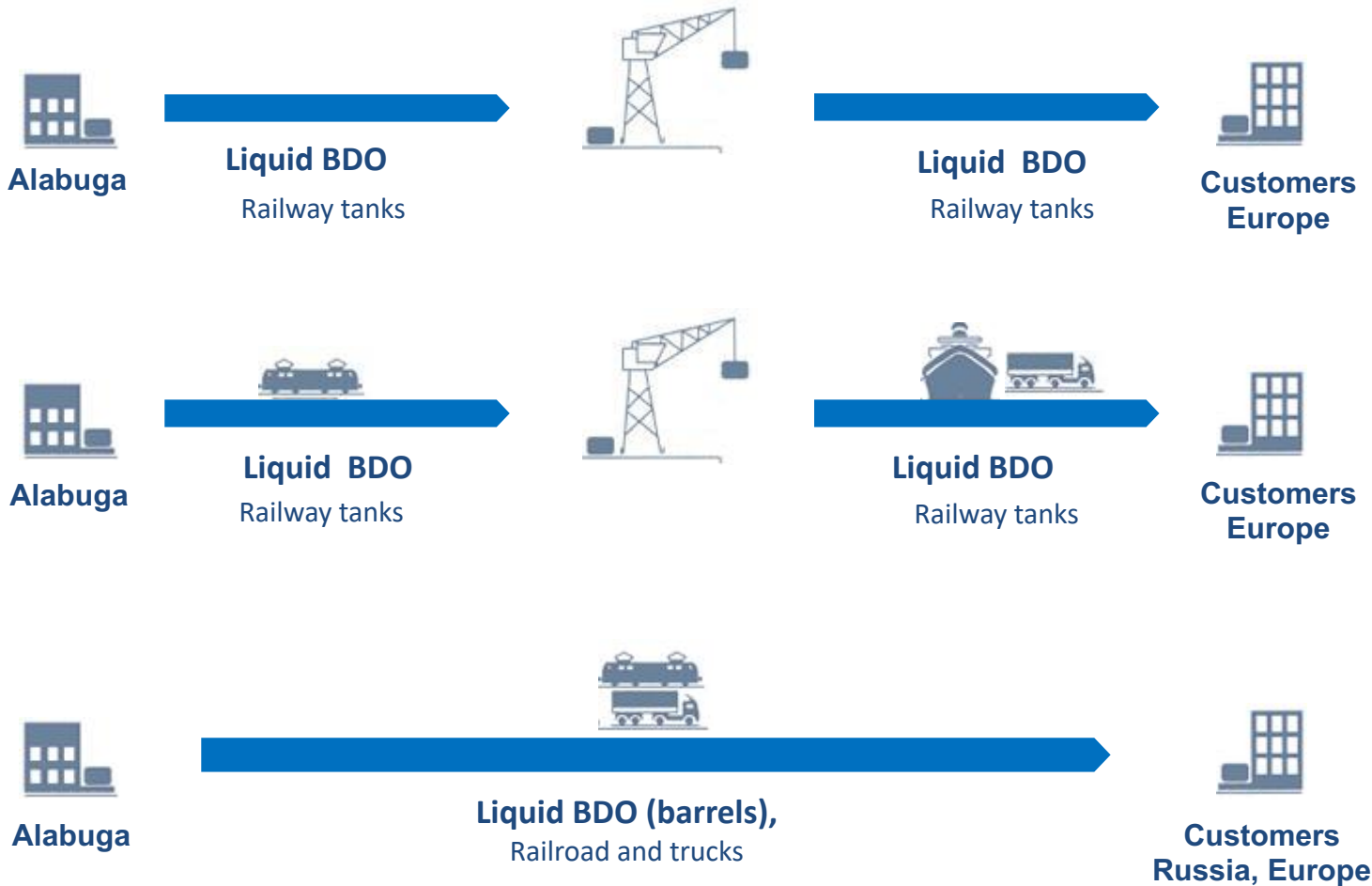
KAMATEX

All access points for natural gas, water and electricity supply are located within 300-500 m distance from the KAMATEX site



Stage 1

We can deliver BDO by a variety of means to our customers in Russia and abroad



V. Finance

	m \$	
Investments in ISBL (МА+БДО)	61,4	Equity \$38,2m
Investments in OSBL	7,5	
Project ownership costs	1,5	
License (BDO + MA), engineering and technical services	7,0	
CAPEX escalation	6	Bank Loan \$89,3m
Contingency reserve	4	
Capital Budget excluding VAT	87,4	
Value-added tax (VAT)	15,7	
Capital Budget including VAT	103,2	
Investments in WCAP	9,1	
Financial costs (12% p. a.)	15,3	
TOTAL BUDGET	127,5	

Process-Related Risks	
Project Implementation Risks	
Integration-Related and Third Party Risks	
Operating Risks	
Logistic Risks	
Market Risks	
Risks Related to Setting up a New Production in Russia	

Low risk level, minor effect on the project

Medium risk level, major effect on the project

High risk level, major effect on the project

Thank you!

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