SILICON CLUSTER PROJECT

INVESTMENT TEASER · **precipitated silica for tyres and sodium silicate** · **Kashkadarya region, Yakkabog district**



$110 m
investment
foreign investor 70% + Kvarts JSC 30%

55 kt
output per year
HDS silica 35 + sodium silicate 20

13.1%
IRR
NPV +$23.7 m at 10%

7.2 years
payback
from 2027

330
jobs
permanent

LOCATION

Yakkabog district · 40 ha



Railway	0.1 km
M39 highway	3.1 km
220 kV line	4.3 km
Karabagdarya river	1.7 km
Site area	40 ha

- **Site selected: 40 ha (coordinates on the map)**
- Land: leased once the investment agreement is signed (Decree PF-6243)
- Gas, 220 kV, water: technical conditions at design stage, networks state-funded
- Construction permit and environmental review: 2027, with regional support

WHY YAKKABOG?

≥2 mln t — quartz sand, Ugin deposit: SiO_2 87-99%, ≈30 years

$149 — per 1,000 m³ of gas for industry (China ≈$380)

0.1 km — to the Guzar-Kitab railway

0 — precipitated silica plants in Central Asia

INVESTOR PROPOSAL

$116.8 m
total investment
CAPEX $110 m + initial working capital $6.8 m

$81.7 m · 70%
foreign investor

$35.0 m · 30%
Kvarts JSC

- Shares: foreign investor 70%, Kvarts JSC 30%; no debt financing
- Expected from the investor: HDS technology and licence, EPC management, plant operation, sales to tyre makers
- From the state: external networks (gas, 220 kV, water, rail) under PQ-5233; free economic zone status for the site

PARTNERS AND BUYERS

status as of October 2026

Uzbekistan — **Kvarts JSC** — CO-INVESTOR · 30%

since 1975 · largest glass plant in Central Asia · listed on UZSE (KVTS)

32 mln m² — float glass a year (2 lines: 200 + 400 t/day)
≈380 mln — glass jars and bottles a year
$49 m — revenue 2025 (UZS 593 bn, +14%)
$50 m — assets 2025; equity $21 m (IFRS)
+90% — revenue Q1 2026; net profit UZS 2.4 bn
2,000+ — employees; exports to 5 countries

50 years with quartz sand and glass furnaces

READY TO INVEST

USA — TECHNOLOGY

PQ Corporation

In silicates since 1831; world leader in sodium silicate. Possible role: process licence for sodium silicate and HDS silica.

IN NEGOTIATION

Türkiye — PROPOSED OFFTAKER

Brisa (Bridgestone-Sabancı)

Largest tyre maker in Türkiye: İzmit 11 mln and Aksaray 3.8 mln tyres a year.

POTENTIAL OFFTAKER

STATE SUPPORT

guaranteed by law

40 ha land plot leased to the project (Presidential Decree PF-6243)	IN FORCE
Equipment imports free of customs duty and VAT (Cabinet of Ministers Resolution No. 352)	IN FORCE
External networks - gas, 220 kV, water, rail - funded by the state (Presidential Resolution PQ-5233; Cabinet of Ministers Resolution No. 306)	IN FORCE
The site receives free economic zone status: 0% profit tax for 10 years for investment above $15 m (Tax Code, Article 473)	IN FORCE
Soda ash: long-term contract with Kungrad Soda Plant at export-parity price (≈$303/t)	CONTRACT

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MARKET AND SALES

YAKKABOG SILICON CLUSTER · sales plan by product and country · Türkiye, Russia, Central Asia, Pakistan

GLOBAL TRENDS, 2025

IMARC

$2.6 bn	**silica** +6.4% a year; 54% used in tyres	**$7.8 bn**	**sodium silicate** +3.7% a year

REGIONAL MARKET, 2025

UN Comtrade

≈64 kt	**silica imports, 2025** Türkiye, Russia, Pakistan, Central Asia	**≈35 kt**	**of it tyre-grade (HDS)** estimate: 54% tyre share (IMARC)

SALES DESTINATIONS

from 2031, kt per year



SALES BY COUNTRY AND PRODUCT, kt per year

Country	HDS silica	Sodium silicate	Total	Imports 2025*
Türkiye	15	-	15	27
Russia	12	-	12	24
Kazakhstan	3	10	13	1
Pakistan	3	5	8	12
Uzbekistan	2	5	7	2
Total	35	20	55	≈64

* silica of all grades, UN Comtrade 2025; country values rounded. Kazakhstan: new tyre plant, 3.5 mln tyres a year. Exports: ≈92% of revenue.

REGIONAL IMPORTS: HDS SHARE

kt per year

Regional silica imports, 2025 (Türkiye, Russia, Pakistan, Central Asia), all grades — 64

of which tyre-grade HDS, 2025 (estimate) — ≈35

Regional HDS demand in 2031 at +6.4% a year — ≈51

Project HDS sales from 2031, all markets (Uzbekistan 2 kt) — 35

HS 2811.22 does not separate HDS, so the tyre share is the global 54% (IMARC). Uzbekistan's own imports: 2 kt (2025). In 2031 the project would cover ≈70% of regional HDS demand, so supply contracts are needed (table below).

POTENTIAL BUYERS

target volumes, kt/yr

Company, country	Product	kt/yr	Basis	Status
Brisa (Bridgestone-Sabancı), Türkiye	HDS	5	14.8 mln tyres a year	samples: 2027-28
Türk Pirelli, Türkiye	HDS	4	tyre plant in İzmit	samples: 2027-28
Goodyear, Türkiye	HDS	3	plants in Adapazarı and İzmit	samples: 2027-28
Petlas, Türkiye	HDS	3	tyre plant in Kırşehir	samples: 2027-28
General Tyre; Service Long March, Pakistan	HDS	3	plants in Karachi and Nooriabad	samples: 2027-28
Tyre and rubber makers: Russia, Kazakhstan, Uzbekistan	HDS	17	12 + 3 + 2; to be selected	potential buyer
Detergent, foundry, construction-chemicals makers	silicate	20	Kazakhstan 10, Pakistan 5, Uzbekistan 5	potential buyer

PRICE COMPARISON, SAME TERMS

$/t, delivered to Türkiye

Supplier and product	Price at plant	Delivery	Delivered	vs. project
Yakkabog · HDS, CTAB ≈160 m²/g	**1,300**	**165-195**	**1,465-1,495**	-
Germany · precipitated silica (Ultrasil 7000 GR class)	1,350	100-130*	**1,450-1,480**	-1%
China · precipitated silica, general grade (not HDS)	1,050	120-160*	**1,170-1,210**	-20%
Türkiye · average import price, 2025 (CIF)	-	included	**1,850**	+25%

Prices: IMARC, June 2026 (average of all grades); UN Comtrade 2025. * freight estimate; duties and VAT excluded. From Yakkabog: rail via the Middle Corridor.

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TECHNOLOGY, PARTNERSHIP AND BY-PRODUCTS

YAKKABOG SILICON CLUSTER · HDS for tyres, partnership structure, by-products · phase 1

PHASE 1: TECHNOLOGY AND INVESTMENT

CAPEX $110 m

1. **Quartz sand** — Ugin deposit, 66 kt · SiO_2 87-99%
2. **Beneficiation** — to SiO_2 ≥99.0%, Fe_2O_3 ≤0.015% · $3.4 m
3. **Sodium silicate** — 68 kt · $31 m
4. **HDS silica** — 35 kt, for tyres · $53 m
5. **Closed water loop** — zero liquid discharge · $12 m

External networks: state-funded

gas, 220 kV, water and rail siding (Presidential Resolution PQ-5233; Cabinet of Ministers Resolution No. 306); not part of CAPEX

RAW MATERIALS AND UTILITIES: 100% LOCAL

per year · quality · source

66 kt	**29 kt**	**22 kt**	**30 mln m³**	**17 GWh**
quartz sand, Ugin deposit	soda ash, Kungrad Soda Plant	sulphuric acid, Almalyk MMC	natural gas	electricity
raw SiO_2 87.2-98.7%; after beneficiation ≥99.0%, Fe_2O_3 ≤0.015%	Na_2CO_3 ≥99.0% (technical grade)	H_2SO_4 ≥92.5% (technical grade)	$149 per 1,000 m³ excl. VAT (Cabinet Resolution No. 243)	$82 per MWh excl. VAT (Cabinet Resolution No. 243)
reserves: several mln t; 30-year need 2.0 mln t	plant output 200 kt/yr; our need ≈15%	AGMK output 690 kt (2025); our need ≈3%	external connection funded by the state	220 kV line 4.3 km from the site

PRODUCT AND MARKET ENTRY

tyre grade

CTAB ≈160 m²/g — Zeosil 1165MP / Ultrasil 7000 GR class · moisture 5-7% · pH 6-7 · low-dust micropearls

Approval by tyre makers: 12-18 months

- **2027-28** — samples and letters of intent
- **2029** — first batches from Yakkabog
- **2029-30** — test tyres
- **2030** — approval and supply contracts

Until approval: sodium silicate and non-tyre silica grades. If approval is one year late: IRR 11.6%.

PARTNERSHIP STRUCTURE

no debt, 100% equity

Foreign investor	Kvarts JSC
70% · $81.7 m	30% · $35.0 m
HDS technology and licence	runs the sodium-silicate furnace (50 years of experience)
EPC and construction management	quartz sand, beneficiation and lab control
plant management and quality	local staff and training
HDS sales to tyre makers	buyer of sodium sulphate (glass batch)

Supervisory board by shares; reserved matters need both partners

SODIUM SILICATE: 68 kt, DRY BASIS

48 kt	20 kt
to the HDS line, as liquid	sold as solid

All tonnages are dry (anhydrous) product. The 20 kt sold is solid at $350/t; as 37% liquid it would be ≈54 kt.

SALTS FROM WATER TREATMENT

- **Sodium sulphate ≈26 kt a year, crystallised in the closed water loop (cost within the $12 m)**
- Buyers: Kvarts JSC (glass batch) and other glass makers, detergent makers; China FOB $71/t, India CIF $162/t (Aug 2026)
- Included in the model at $100/t ex-works: $2.6 m a year (Chinese sulphate delivered ≈$140/t)

FINANCING AND ECONOMICS

YAKKABOG SILICON CLUSTER · investment $116.8 m: 70% foreign investor + 30% Kvarts JSC · 15-year model, USD

FINANCING SOURCES

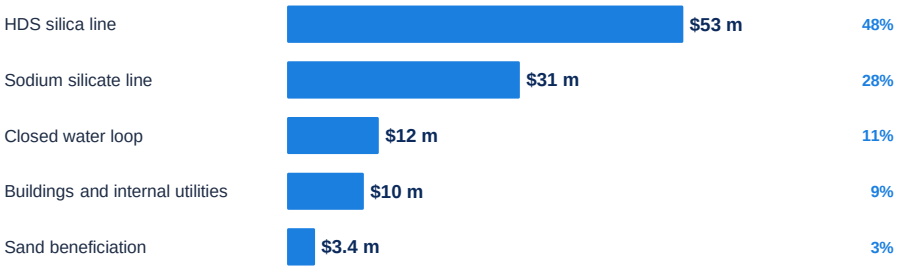
total $116.8 m

Source	$ m	Share	Contribution	Form
Foreign investor	81.7	70%	HDS technology and licence, EPC management, plant operation, HDS sales	equity
Kvarts JSC	35.0	30%	silicate furnace, quartz sand, staff; buyer of sodium sulphate	equity
Total	116.8	100%	CAPEX $110.0 m + initial working capital $6.8 m	

No debt financing. Included: 15% contingency in the equipment lines (≈$13 m); working capital $6.8 m at start, $9.5 m at full capacity. External networks (gas, 220 kV, water, rail siding) are funded by the state and are not part of CAPEX.

USE OF FUNDS: CAPEX $110 m

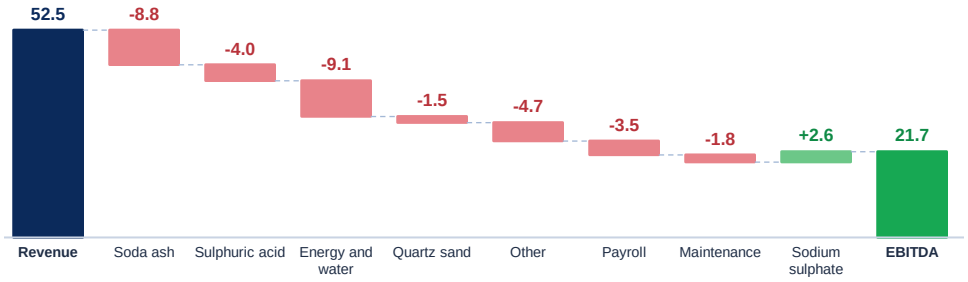
share



Equipment lines include 15% contingency; external networks are not part of CAPEX

FROM REVENUE TO EBITDA

full capacity, $ m per year



Unit cost, $/t

	Cash cost	Full cost*	Price
HDS silica	735	940	1,300
Sodium silicate	252	293	350

Revenue = HDS 35 kt × $1,300 + silicate 20 kt × $350; plus sodium sulphate 26 kt × $100. EBITDA = $21.7 m (39%). Energy and water: gas, power, water, zero-discharge loop. Other: packaging, insurance, sales, licence royalty (2%), land and subsoil tax. * Full cost adds depreciation ($7.3 m a year, 15 years) and property tax.

WHAT THE IRR MEANS

after tax, 15 years

13.1%

IRR

on the total investment of $116.8 m, after tax, no debt

NPV at 10%: +$23.7 m

7.2 years

PAYBACK

from 2027; same terms for both shareholders

IRR is 13.1% for both the investor and Kvarts

No debt: both shareholders receive cash flow pro rata to their shares. External networks are state-funded and are not in the investors' cash flows.

SENSITIVITY

IRR, after tax

	Base case	Prices -10%	Prices +10%	Costs +10%	Capex +10%	Approval 1 year late
IRR	13.1%	8.7%	17.1%	10.6%	11.6%	11.6%

NPV stays positive down to an HDS price of $1,200/t - 35% below Türkiye's import price ($1,850/t)

POINT OF CONTACT

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