

AZA CARBON PETROLEUM COKE CALCINING PLANT, GEORGIA

Proposal

November 2020

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PETROLEUM COKE AND RELATED PRODUCTS

II

AZA CARBON POTI PETROLEUM COKE CALCINING PLANT

III

INVESTMENT PROPOSAL

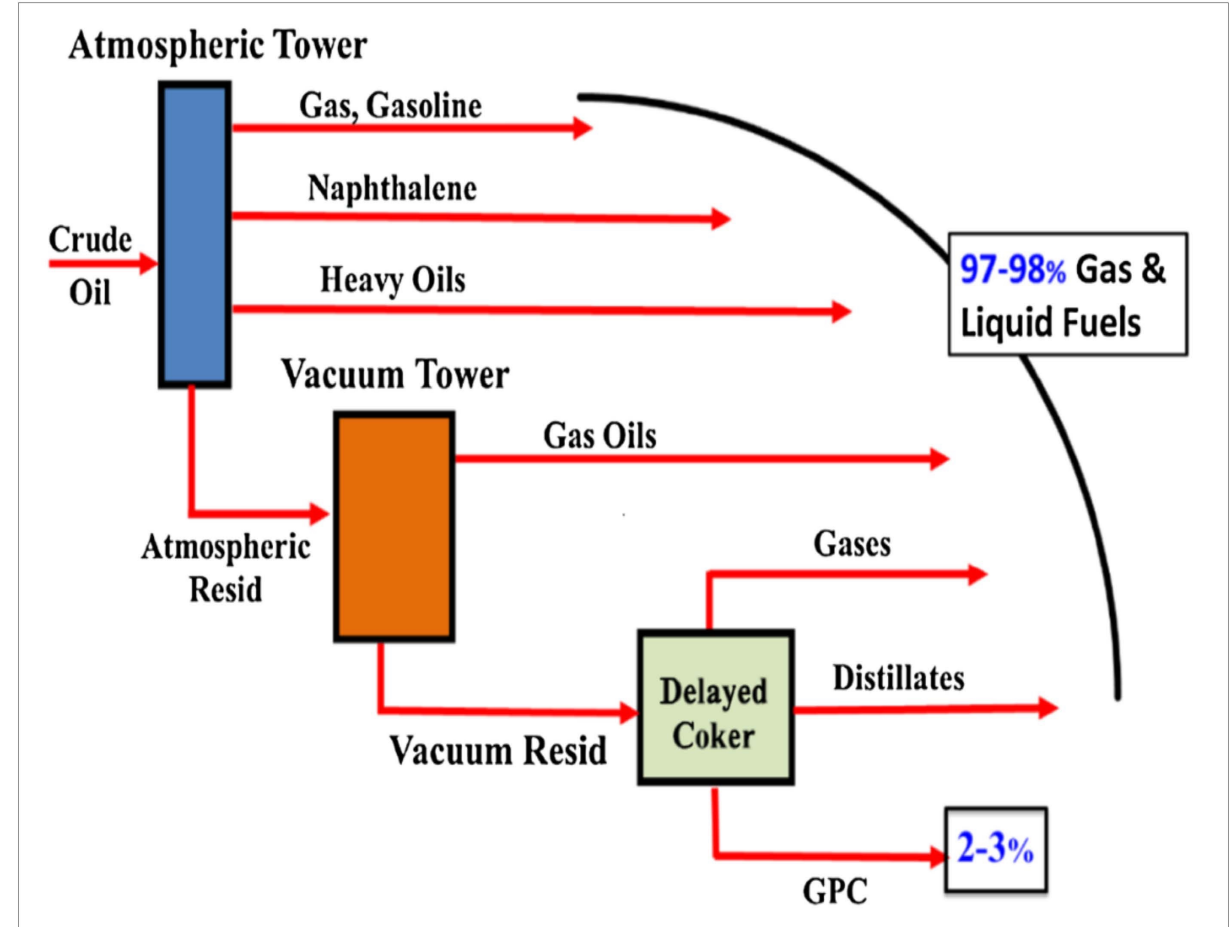
Illustration: Calcining line 2 x 225.000 MTPY (ALBA Bahrain)



MMEC MANNESMANN

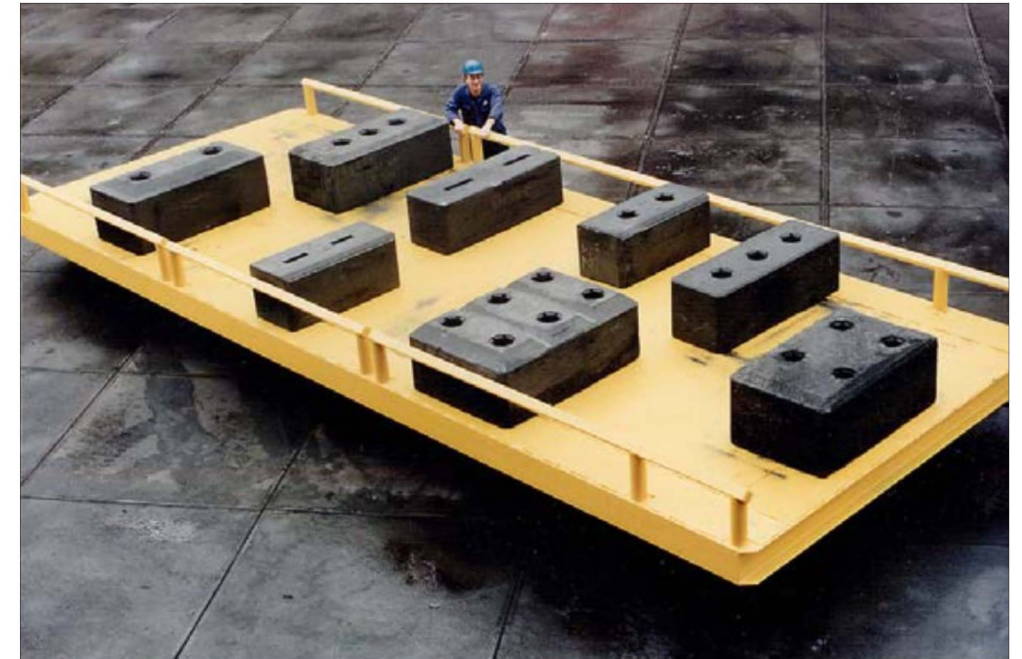
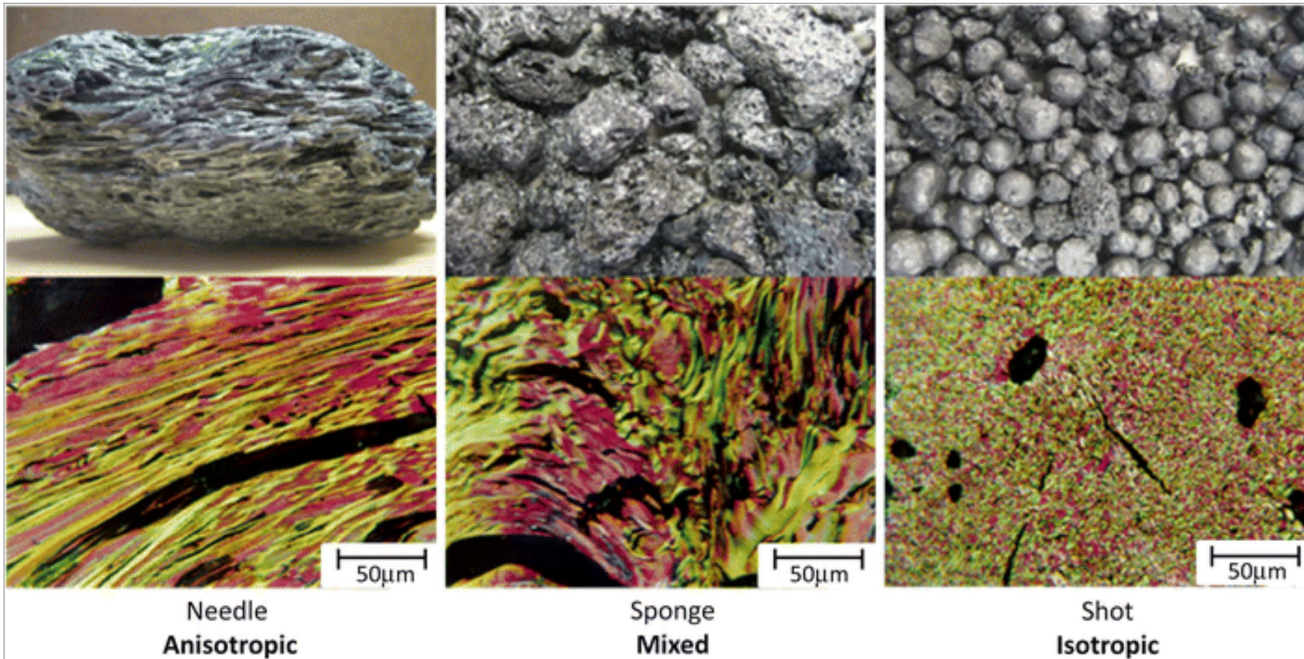


GREEN PETROLEUM COKE (GPC) IS A PRODUCT OF OIL REFINERY



- **Green Petroleum Coke** is a carbon residue that forms as the final product of the condensation process in cracking
- In modern refineries, petroleum coke is produced in Delayed Coking Units, which improve the efficiency of the refinery

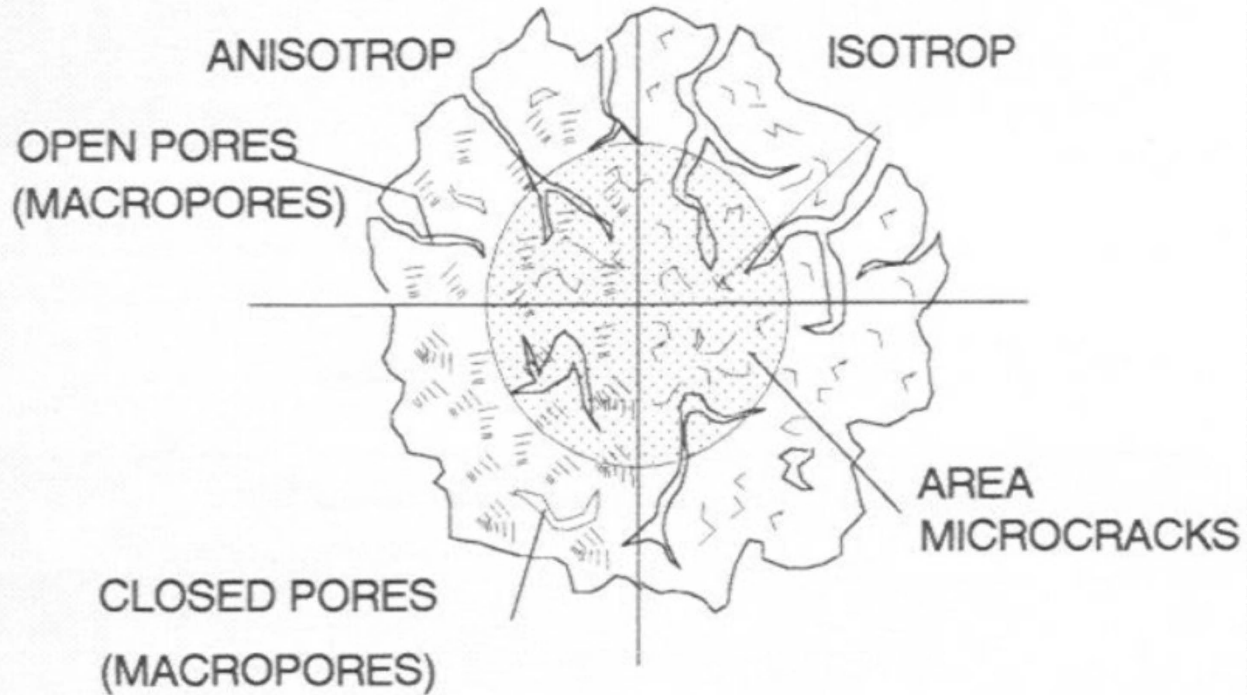
SPONGE GREEN PETROLEUM COKE (GPC) IS RAW MATERIAL FOR ANODE PRODUCTION IN ALUMINIUM INDUSTRY



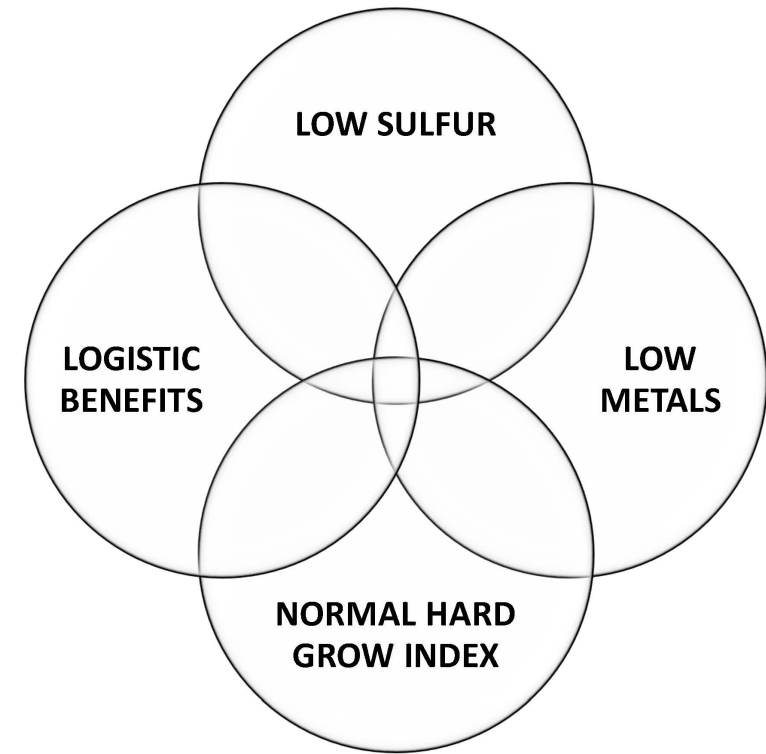
- **GREEN PETROLEUM COKE** is thermally treated, or “calcined”, to provide a higher quality and much more highly priced product for which the main application is as a source of carbon - **CALCINED PETROLEUM COKE**
- The principal use for calcined coke is in the manufacture of carbon anodes for the production of aluminum

OPTIMISATION OF REQUIRED ANODE GRADES GPC BLEND IS A CRUCIAL STAGE IN THE PROJECT

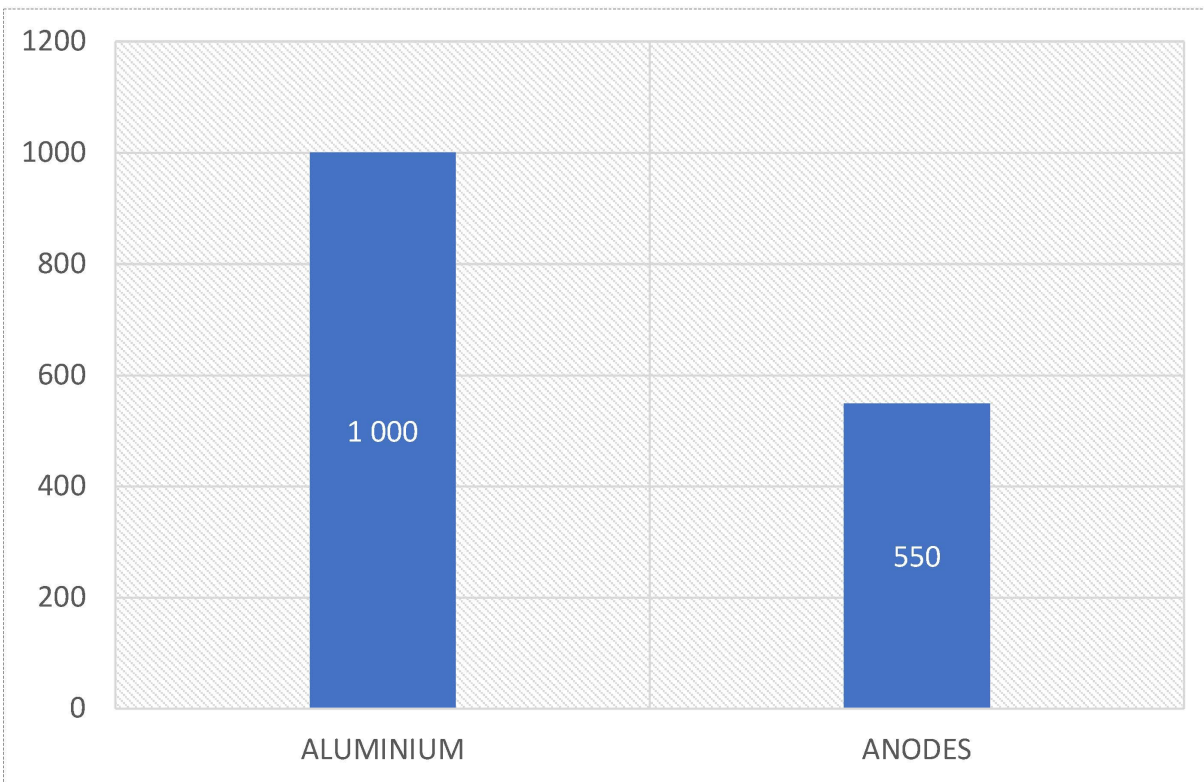
GPC STRUCTURE



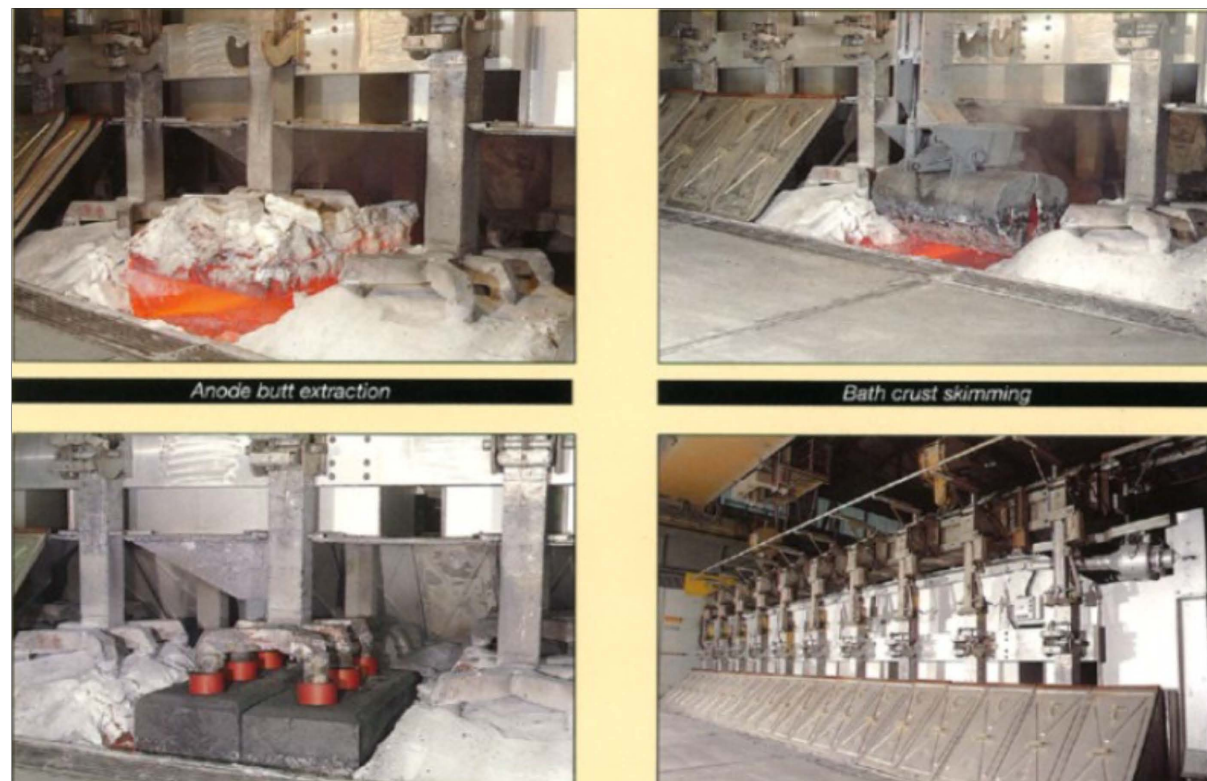
TARGET BLENDING FORMULA



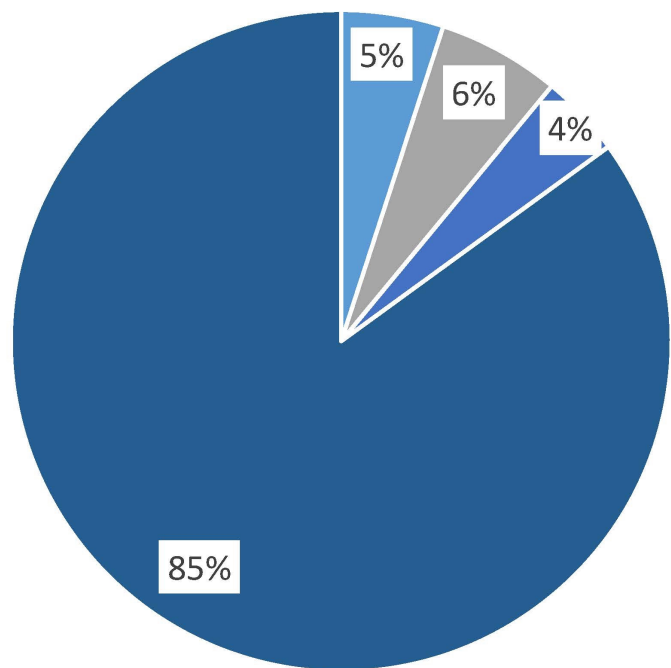
EVERY 1000 KG ALUMINIUM NEEDS 550 KG ANODES



CHANGING ANODE IN ALUMINIUM SMELTER

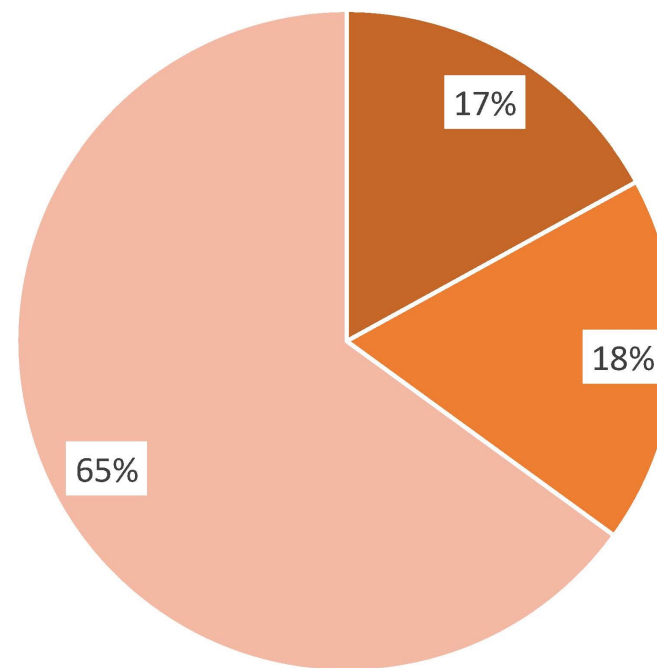


WORLD CALCINED PETROLEUM COKE (CPC) DEMAND



■ Needle ■ Recarb ■ TiO2 ■ Aluminium

ANODE PRODUCTION

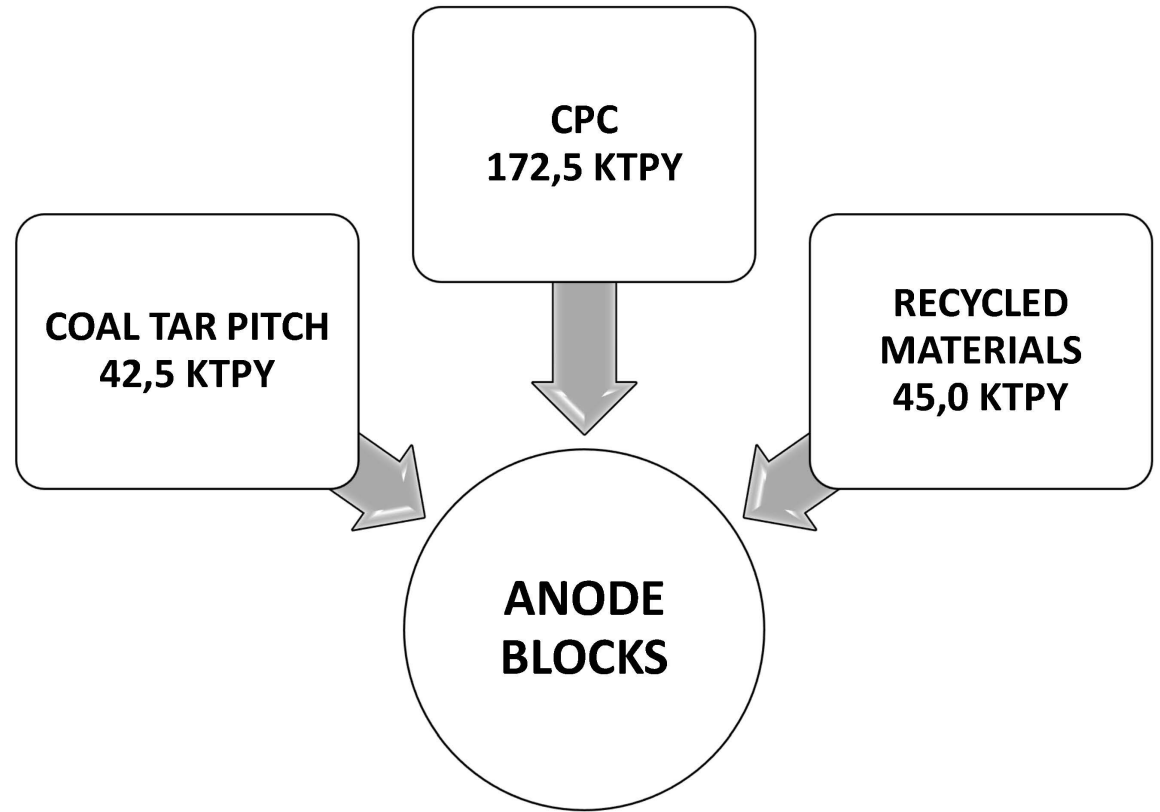


■ Coal tar pitch ■ Anode butts ■ CPC

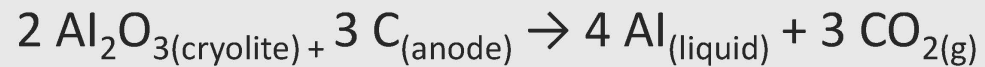


A petroleum coke calcining plant, an anode baking plant and an aluminum smelter are three integrated components in end-to-end aluminum production process

RAW MATERIALS FOR CONCEIVABLE ANODE PLANT IN GEORGIA WITH 250,000 TPY CAPACITY



HALL-HEROULT PROCESS



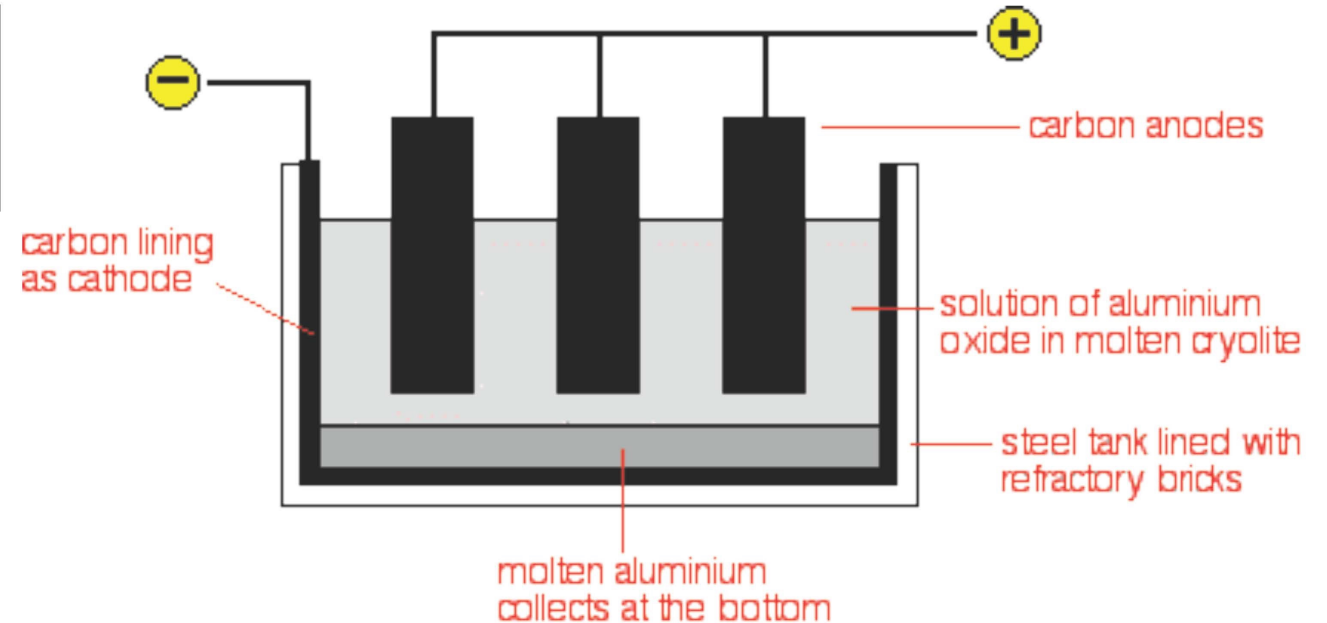
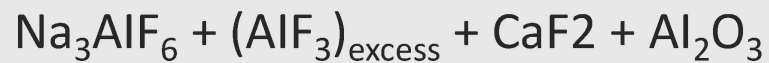
$$T = 960^\circ \text{C}$$

Electrical work needed:

$$I = 200\text{-}400 \text{ kA}$$

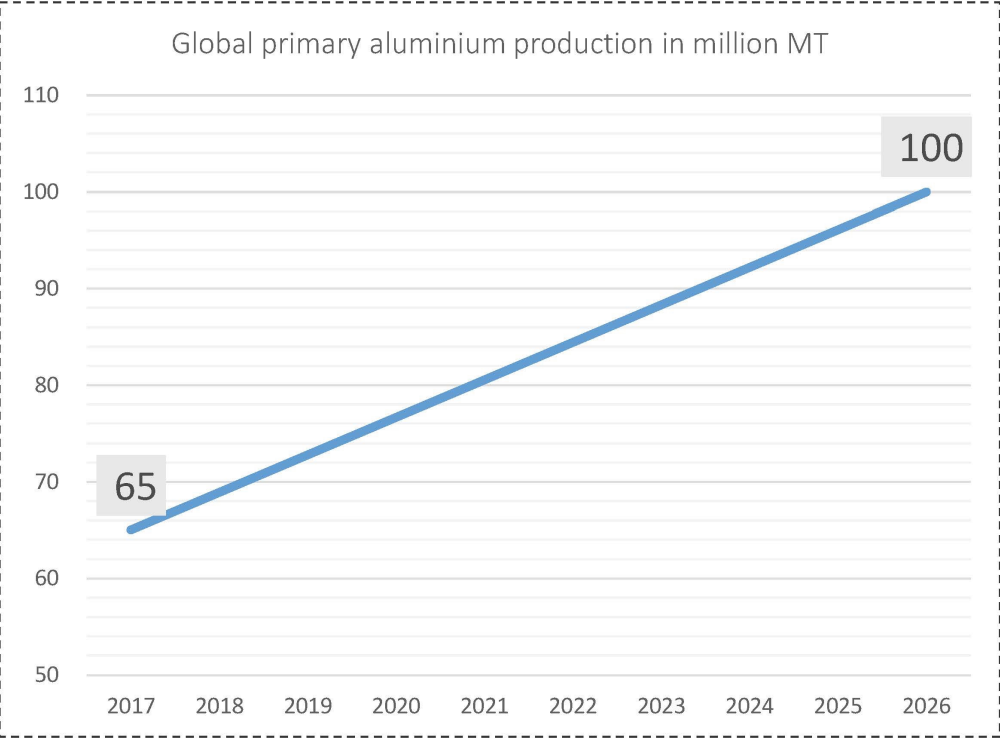
$$E \approx 4 \text{ V}$$

Electrolyte (cryolitic bath)



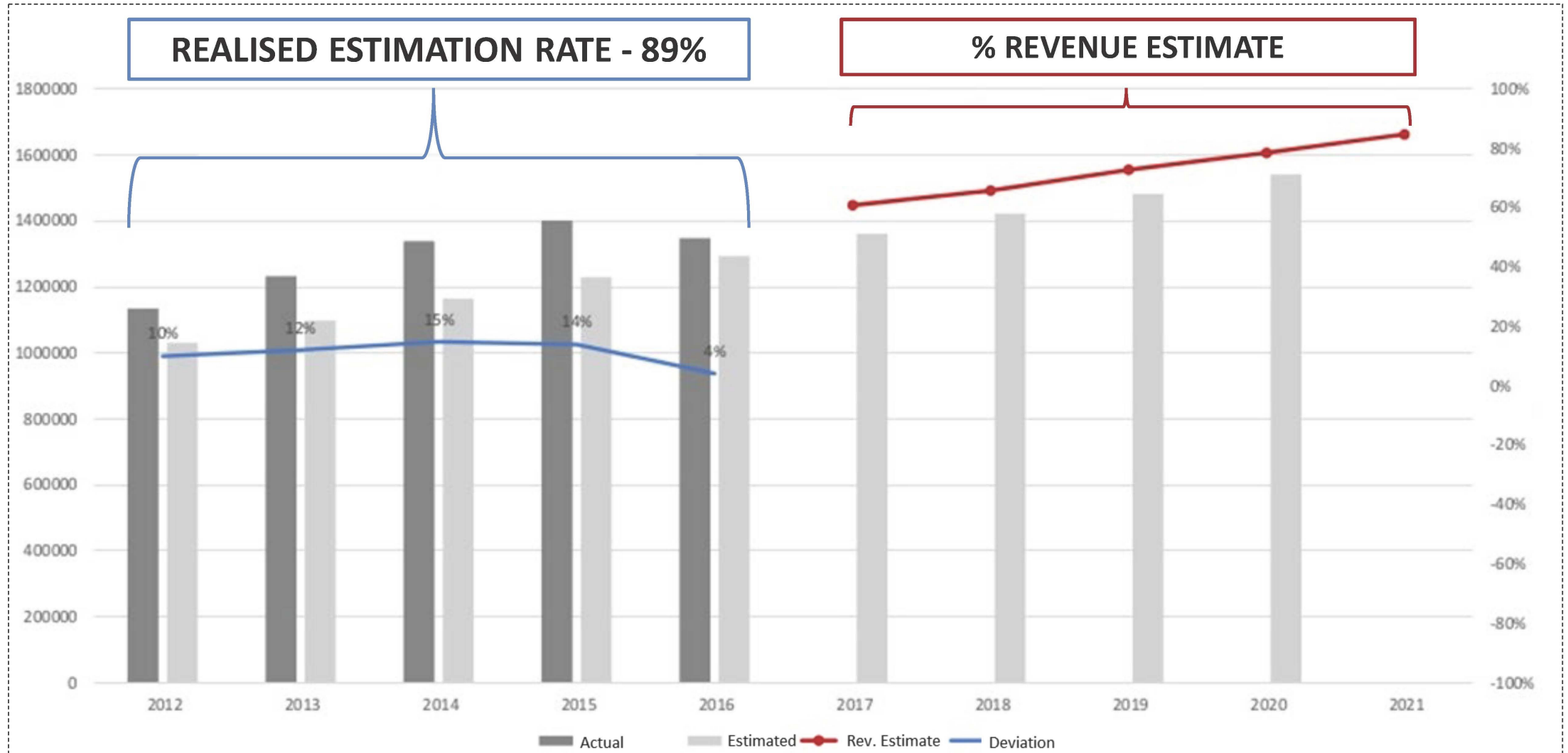
- In the electromechanical process to reduce alumina to aluminum, alumina is dissolved in a molten fluoride solvent called cryolite
- Carbon anodes are integral part of the production process and roughly 55% of aluminum mass is comprised of anode mass

Global aluminum production is expected to grow at CAGR of 5% between 2017 and 2026 reaching aluminum production of 100 million MT per year



ALUMINIUM DEMAND DRIVERS		CAGR
Transportation	Growth in automotive vehicle production content in cars increasing growth in other transport modes, e.g railway	5-6%
Construction	Urbanization, housing market recovery in mature regions, energy neutral buildings	3-4%
Electrical	Urbanization, copper substitution	5-6%
Machinery & Equipment	Improving industrial sentiment in mature regions, manufacturing activity and industrial growth in emerging countries	4-5%

Forecasted growth in industrial consumption of aluminum will result in the subsequent growth in demand for all its production inputs, mainly anode and hence anode grade calcined petroleum coke



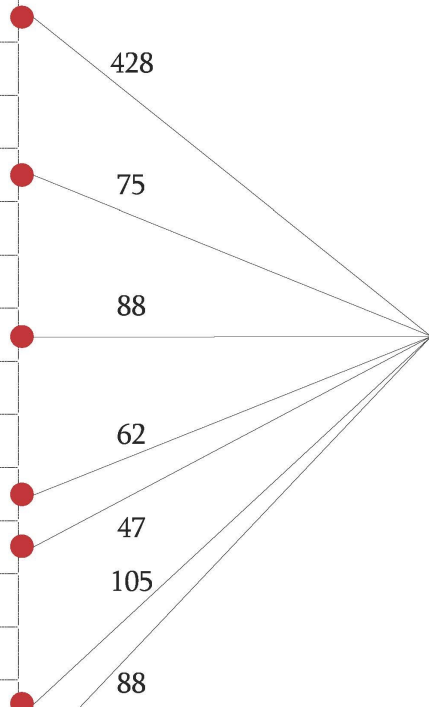
TURKISH ALUMINIUM MARKET PERFORMANCE HAS BEEN STABLY FOLLOWING INDUSTRY ESTIMATIONS AND IS CHARACTERIZED WITH LOW VOLATILITY, THUS MAKING IT ATTRACTIVE TARGET MARKET

ALUMINUM EXPORTERS

Country	2013	2014	Diff.
Russia	3335	2830	-15%
Canada	2630	2481	-6%
Netherlands	2074	2237	8%
UAE	1790	2063	15%
Australia	1545	1471	-5%
Norway	1254	1327	6%
Qatar	1129	1264	12%
Iceland	788	699	-11%
China	572	667	17%
India	440	589	34%
S. Africa	620	554	-11%
Malaysia	399	522	31%
USA	515	517	0%
KSA	N/A	N/A	N/A
Tajikistan	N/A	N/A	N/A

ALUMINUM IMPORTERS

Country	2013	2014	Diff.
USA	2897	3056	5%
Japan	2480	2824	14%
Germany	2390	2555	7%
Netherlands	2062	2503	21%
S. Korea	1430	1491	4%
Italy	993	1114	12%
Turkey	990	1095	11%
Mexico	615	692	13%
Taiwan	592	662	12%
France	473	562	19%
Thailand	558	520	-7%
UAE	340	504	48%
Belgium	536	469	-13%

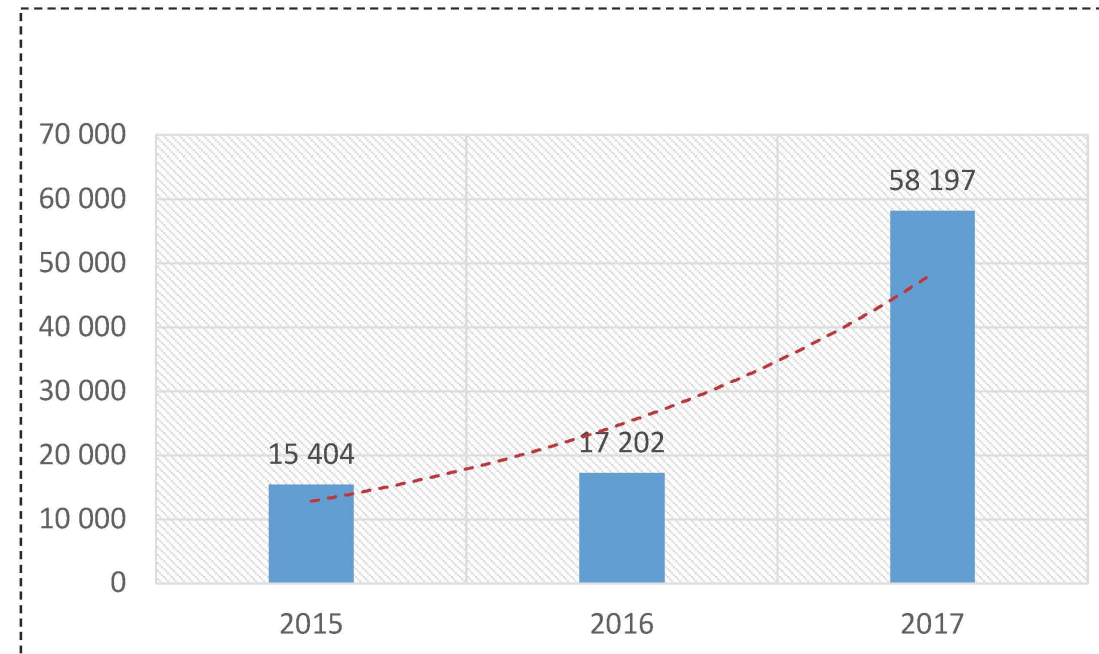


TURKEY IS MAJOR IMPORTER OF ALUMINIUM PRODUCTS AND GEOGRAPHICALLY AND LOGISTICALLY WILL REPRESENT MAJOR TARGET MARKET FOR POTENTIAL VERTICAL INTEGRATION OF AZACARBON

IMPORTED CPC BY ETI ALUMINYUM A.S. BETWEEN 2015-2018

No	DATE	FROM	QUANTITY, T
1	DEC 2015	BRAZIL	15,069
2	OCT 2016	BRAZIL	15,017
3	JAN 2017	BRAZIL	15,127
4	NOV 2017	IRAQ	23,942
5	NOV 2017	IRAN	17,174
6	SEP 2018	ARGENTINA	15,233

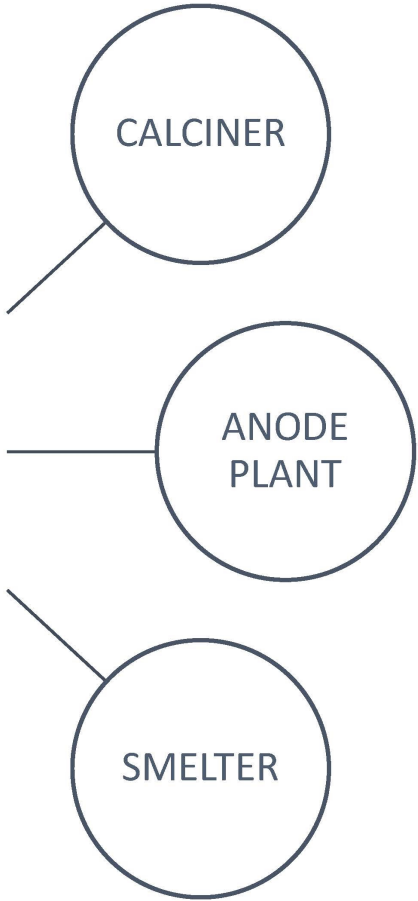
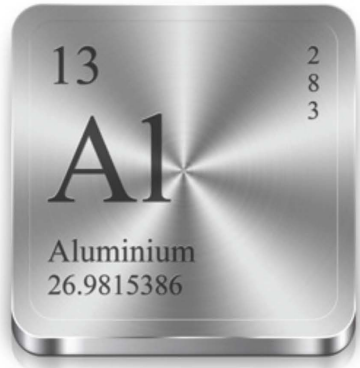
IMPORT CALCINED PETCOKE IN TURKEY (TONS/YEAR)



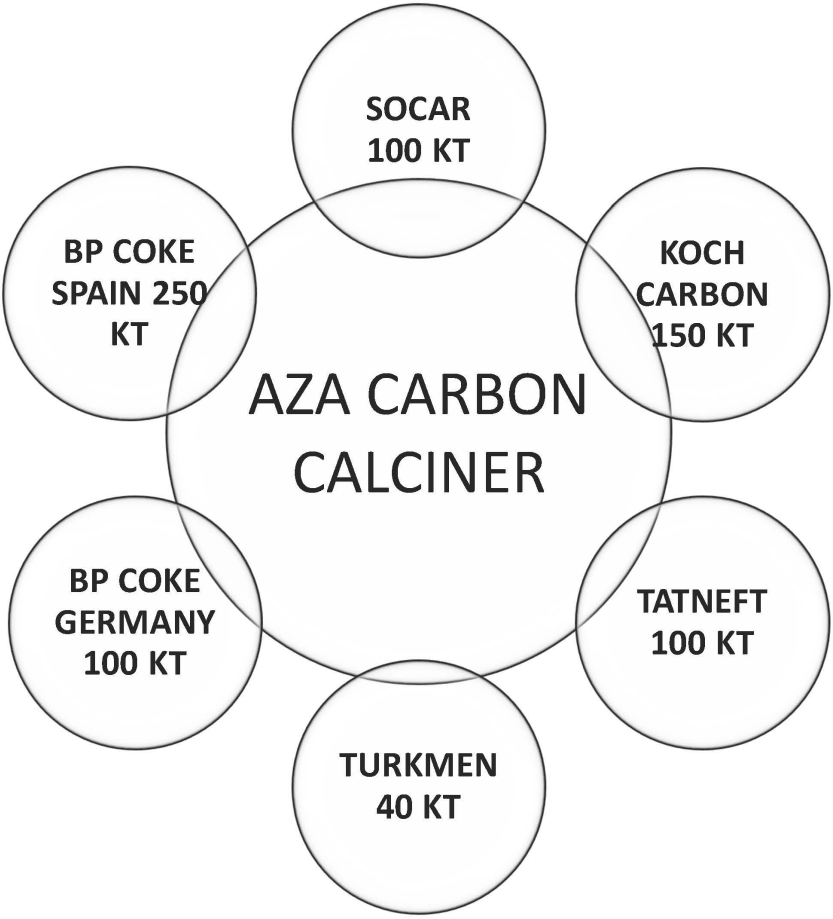
TURKEY IS VITAL DESTINATION FOR CALCINED COKE PRODUCT EXPORTER. TOTAL IMPORTED VOLUMES TRIPLED BETWEEN YEARS 2015-2017

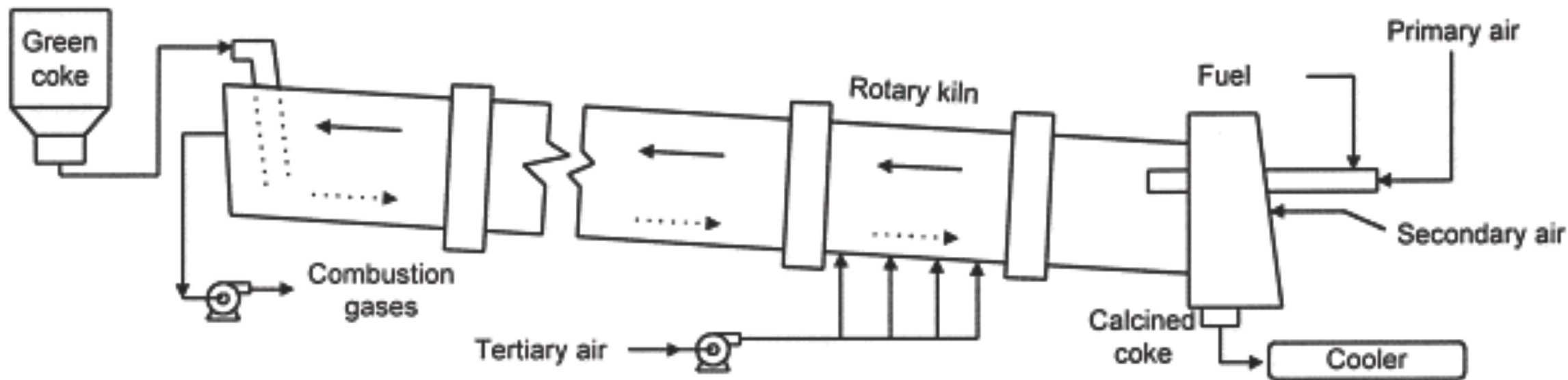


CONTENTS OF ALUMINUM INDUSTRY

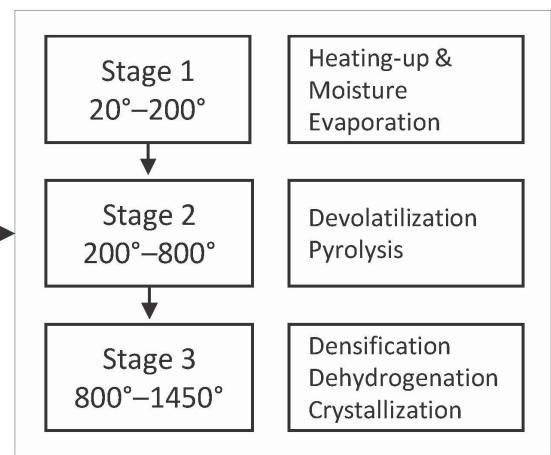


**740 KTPY GPC FOR 500 KTPY CPC
IN AZA CARBON PETROLEUM COKE CALCINER**





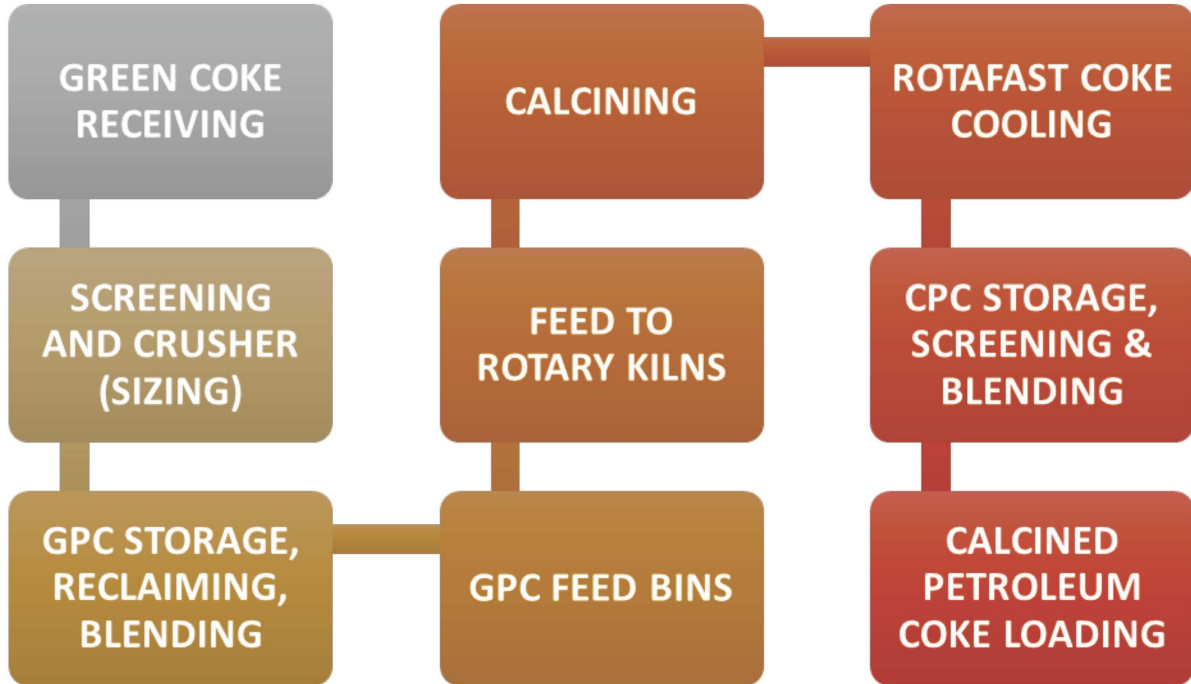
- The thermal treatment of coke is carried out in a **ROTARY KILN**
- The kiln is slightly sloped and the coke descends to the discharge end
- Heat is transferred to the coke bed by the hot brick and the hot combustion gases which flow in counter current to the coke: THERMAL TREATMENT IN THREE STAGES
- **CALCINING PROCESS IS A TIME-TEMPERATURE FUNCTION**





PRODUCTION INPUT
GPC - 740.000 TPY

PRODUCTION OUTPUT
CPC - 500.000 TPY



STACK EMISSIONS

The environmental design conditions for the calciner plant shall be in accordance with the contract as the following:

	Upper Limits	Unit	Remarks
Dust / Powder	30	mg / Nm ³	At source of emission
SO ₂	350	mg / Nm ³	*
No _x	350	mg / Nm ³	*
CO	100	mg / Nm ³	*

* Measured for dry flue gas with 3 Vol.-% O₂ at the main stack during normal plant operation only. In case of by-pass operation mode, hot flue gases from the calciner plant will be released untreated to the atmosphere at a temperature of approx. 1,200°C

I

PETROLEUM COKE AND RELATED PRODUCTS

II

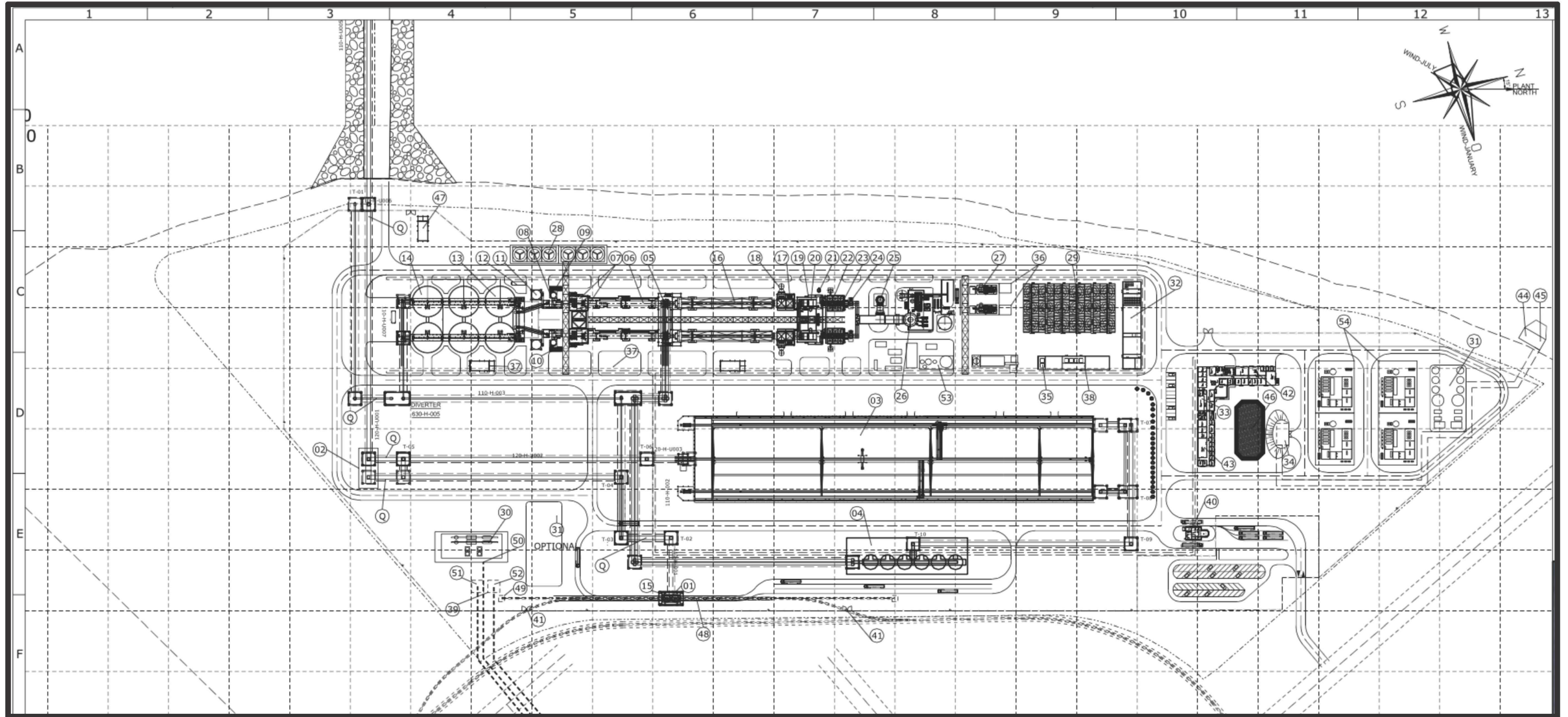
AZA CARBON POTI PETROLEUM COKE CALCINING PLANT

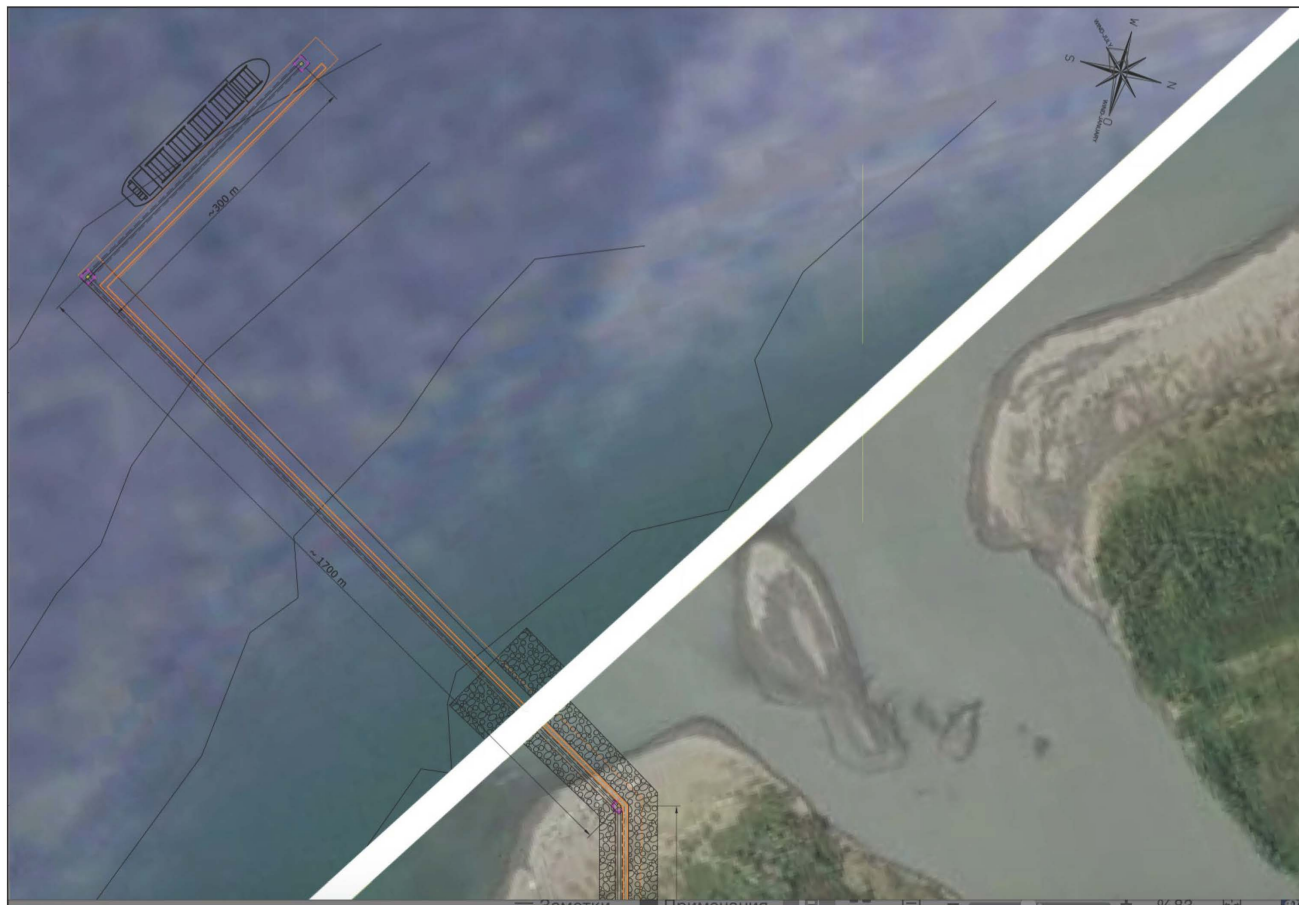
III

INVESTMENT PROPOSAL



AZA CARBON POTI PETROLEUM COKE CALCINING PLANT PLOT PLAN





- DEVELOPMENT OF OWN PIER/JETTY IS SIGNIFICANT VALUE ADDED INITIATIVE THAT WILL ALLOW AZACARBON NOT ONLY TO DECREASE PROCUREMENT COSTS BUT ALSO WILL ENABLE ADDITIONAL REVENUE STREAMS
- PIER/JETTY INITIATIVE IS CAPITAL INTENSIVE PROJECT THUS COULD BE IMPLEMENTED IN POST-COMMISSION STAGE



Existing Plant 

Under Construction 

Planned 

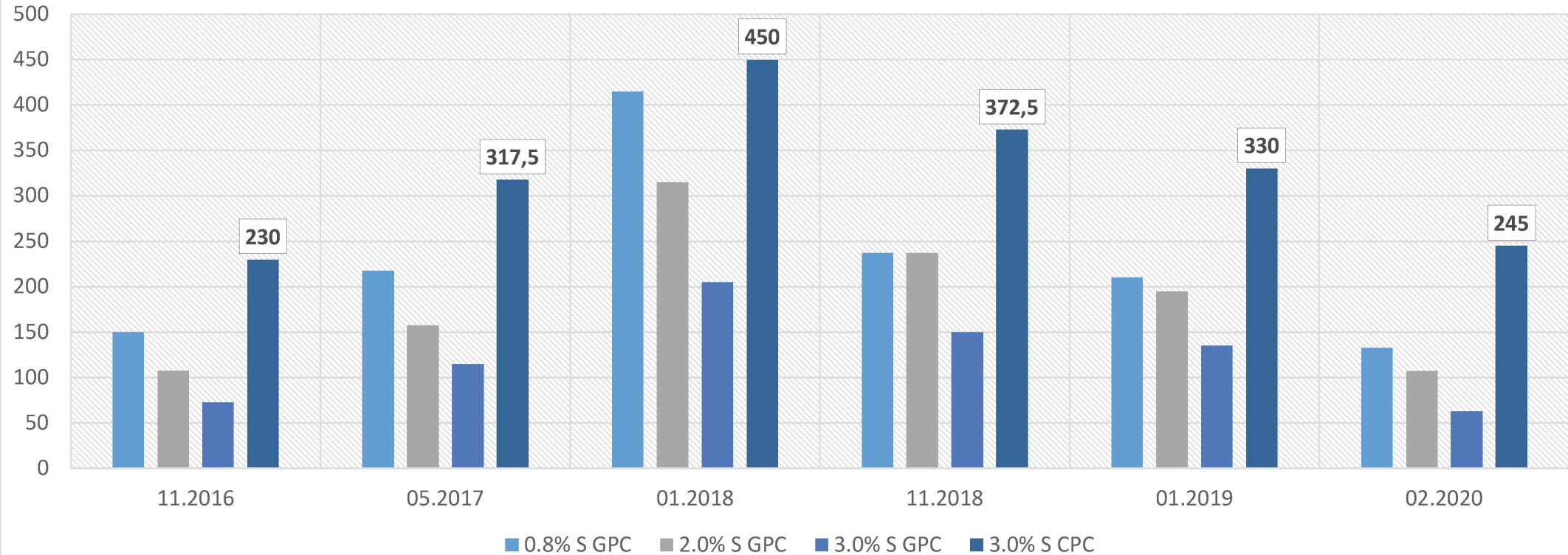
- Two dominant suppliers of anode coke to global smelters are the United States and China
- Brazil, Venezuela and Russia do have the potential to play a more important role in the market.
- New calciner capacity installed recently by ADNOC at the Ruwais Refinery in the UAE
- Georgia is located at the strategic crossroads for the aluminum industry



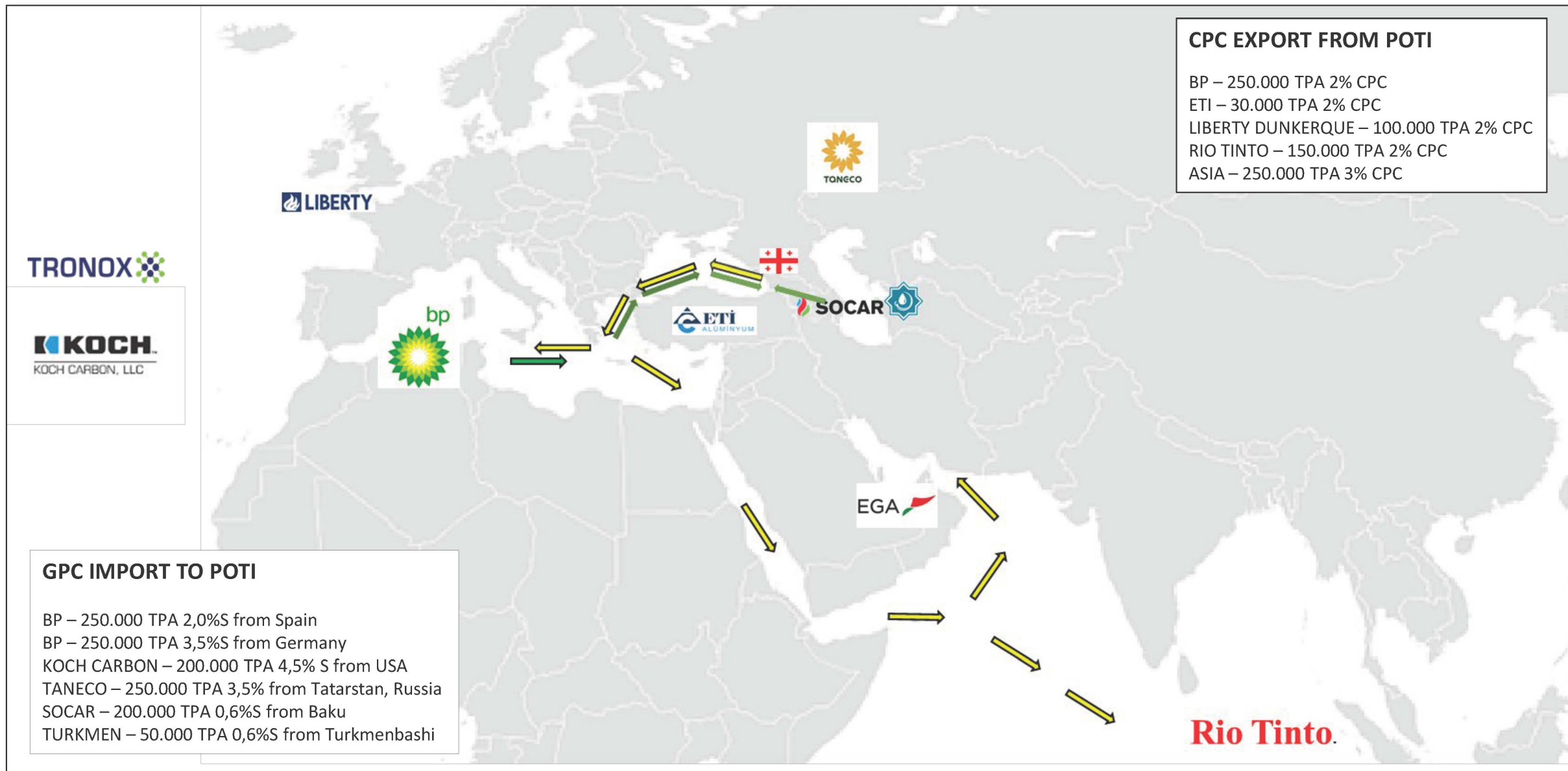
Prices \$/MT	Sulphur	Mar-2020			Jun-2020		
		Low	High	Mid	Low	High	Mid
Green							
CIF US Gulf @0.8%	0.8%	115	150	132.5	160	175	167.5
CIF US Gulf @2.0%	2.0%	94	120	107	120	140	130
CIF US Gulf @3.0%	3.0%	48	78	63	58	78	68
CIF US Gulf @5.0%	5.0%	42	56	49	42	56	49
FOB China @2.0%	2.0%	110	190	150	145	185	165
FOB China @3.0%	3.0%	95	185	140	125	175	150
FOB Mideast Gulf	4.0%	100	125	112.5	112	125	118.5
Calcined							
FOB US Gulf	3.0%	230	260	245	230	250	240
FOB China	3.0%	215	300	257.5	220	250	235
CIF Europe	1.5%	230	255	242.5	230	260	245
CIF Mideast Gulf	3.0%	260	290	275	270	290	280

- We can observe that prices on green petroleum coke increased between March-June 2020 across all supply channels
- Prices on calcined coke market have experienced mixed dynamics
- Products with higher Sulphur level have significantly lower prices
- Chinese green coke price significantly exceeds US prices

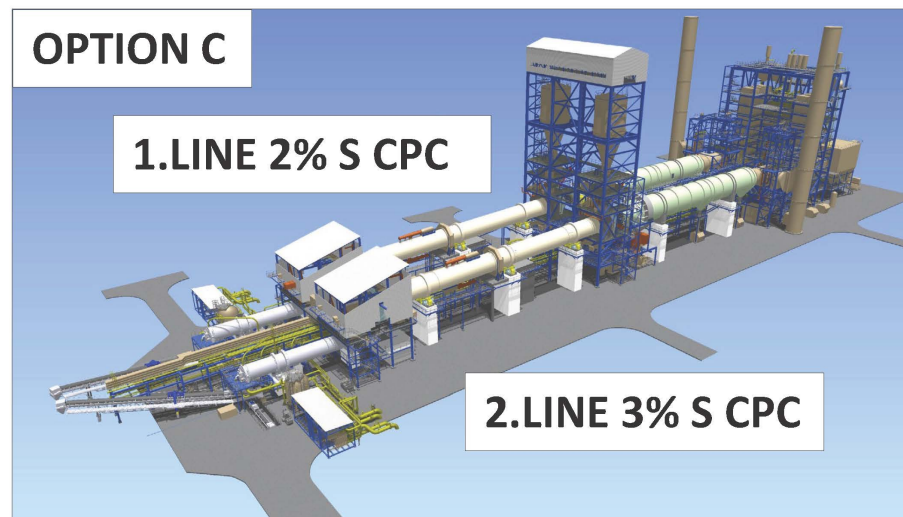
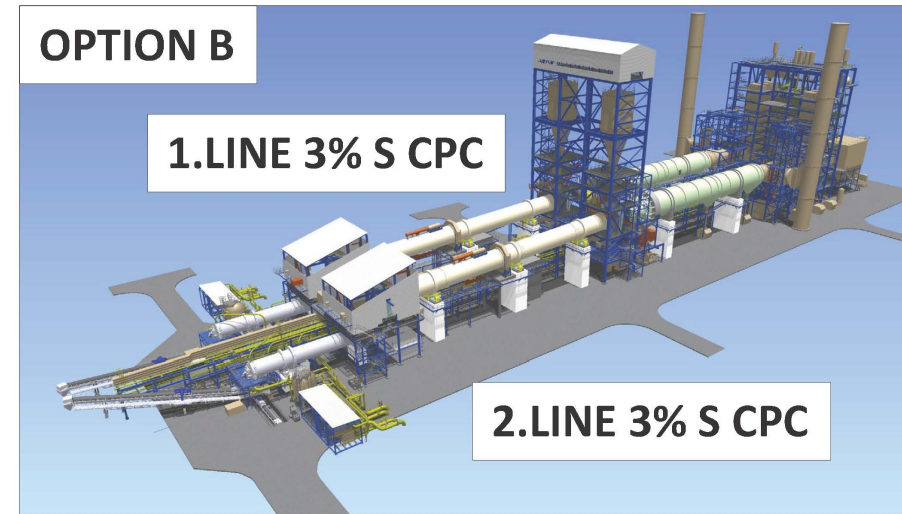
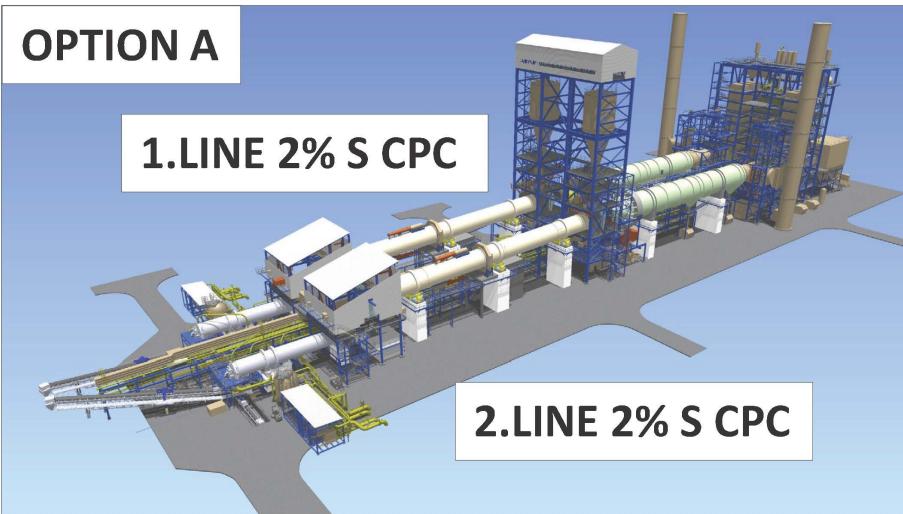
CIF US GULF ANODE GRADE PETCOKE PRICES

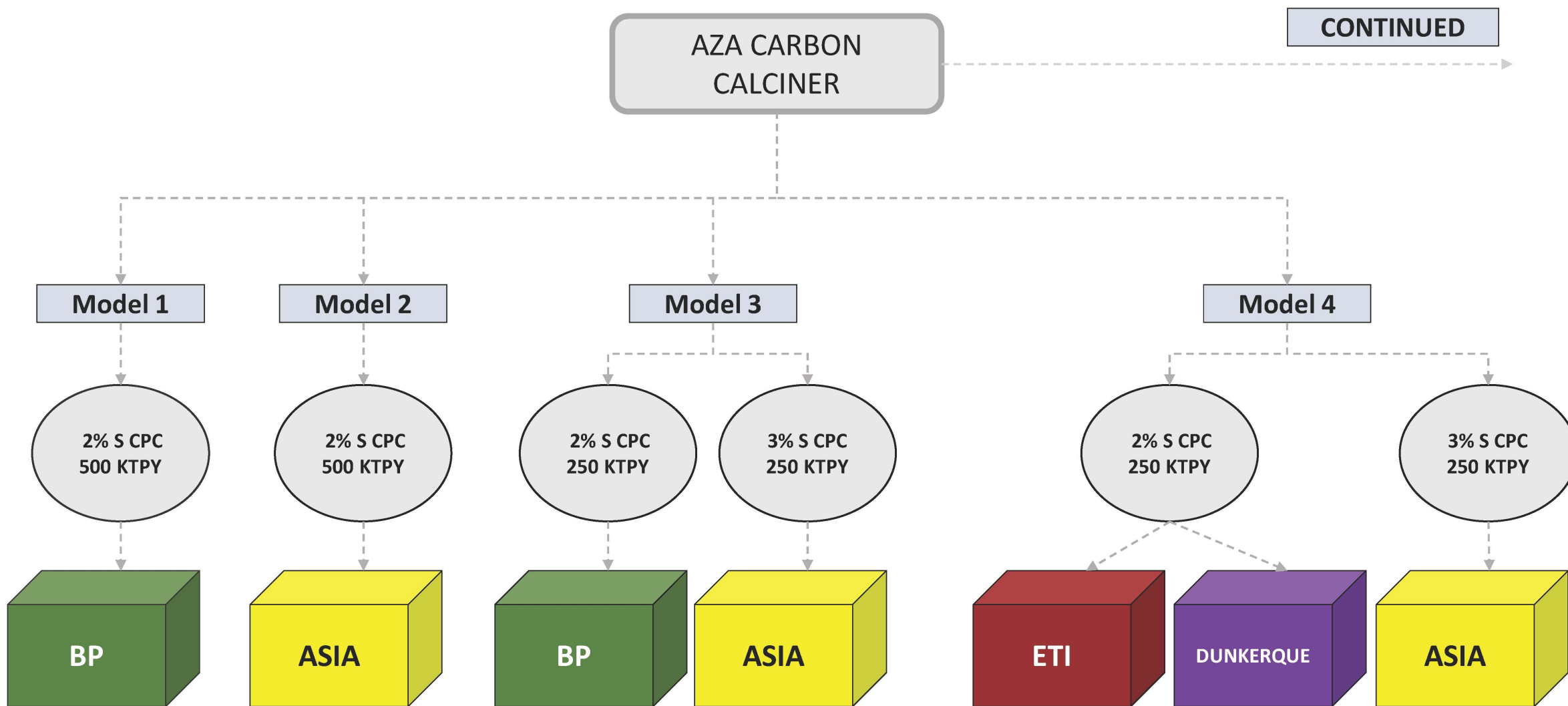


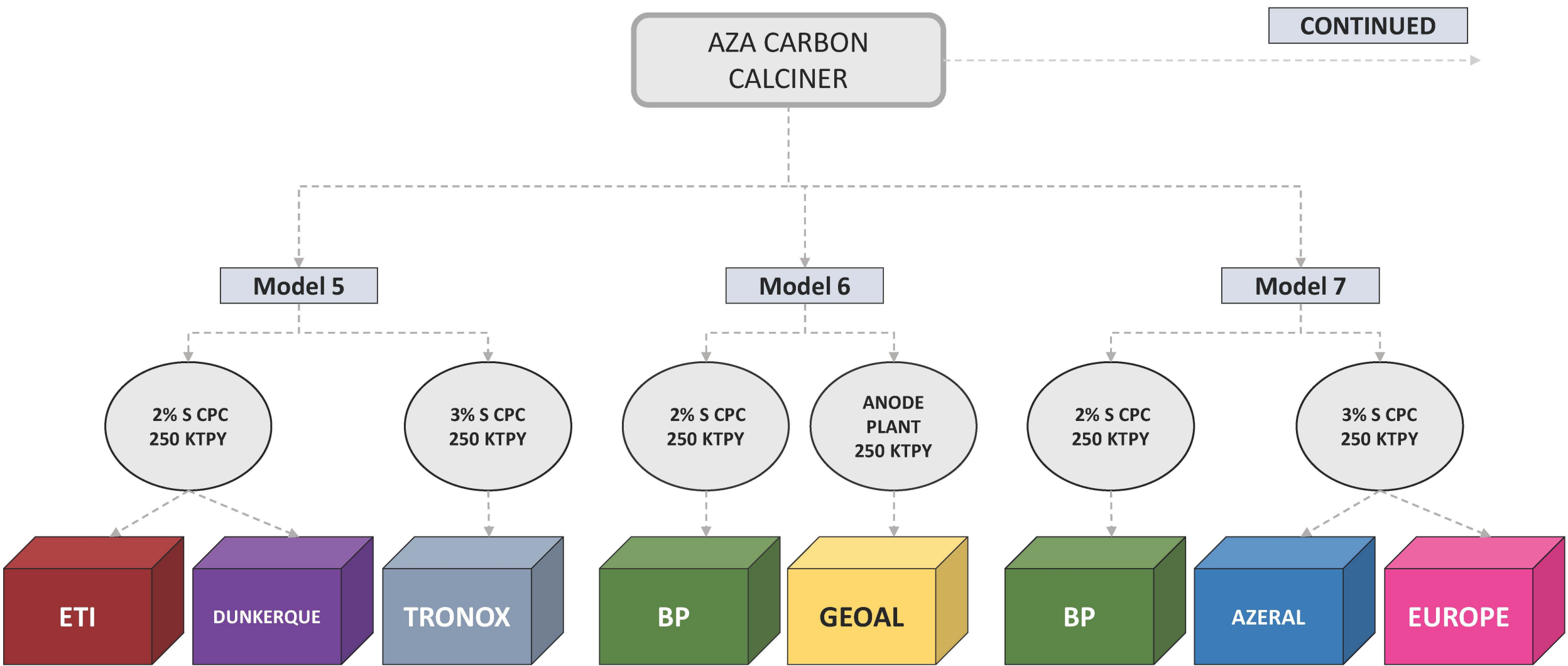
- SUPLHUR LEVEL IS KEY DETERMINANT IN QUALITY AND PRICING OF GREEN PETROLEUM COKE
- PRICES FOR ANODE GRADE PETCOKE FLUCTUATE FROM TIME TO TIME
- CURRENTLY SELLING PRICES ARE CLOSE TO THE RECORD MINIMUM AND ARE SUBJECT TO FURTHER APPRECIATION

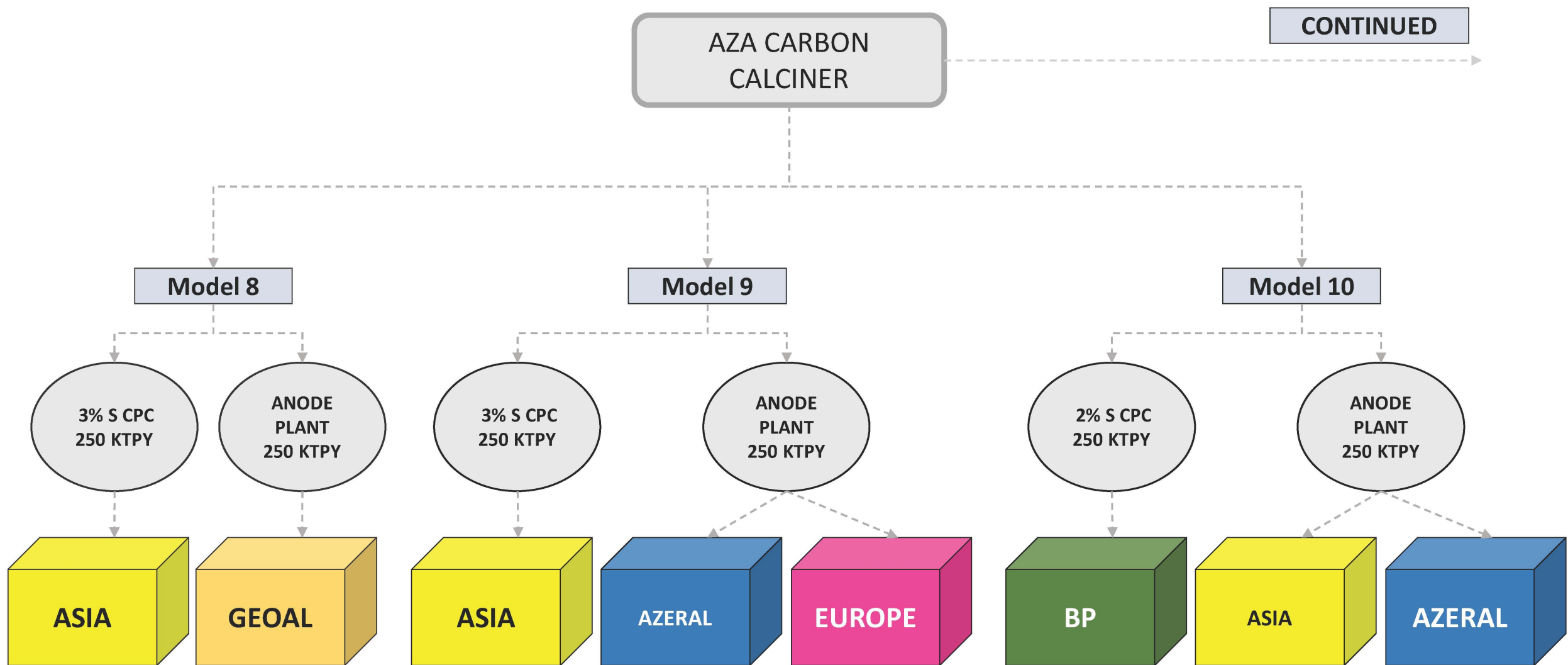


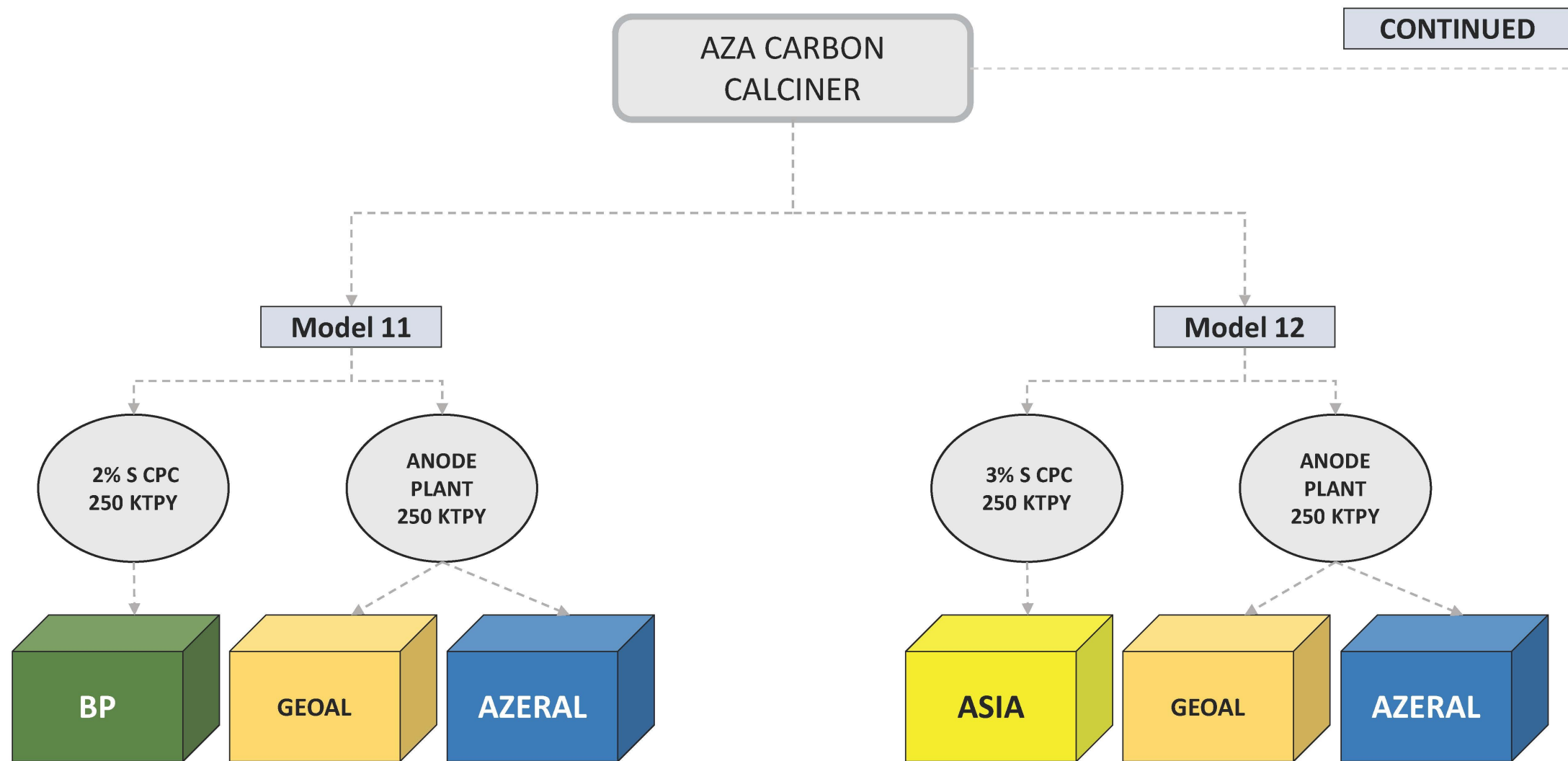


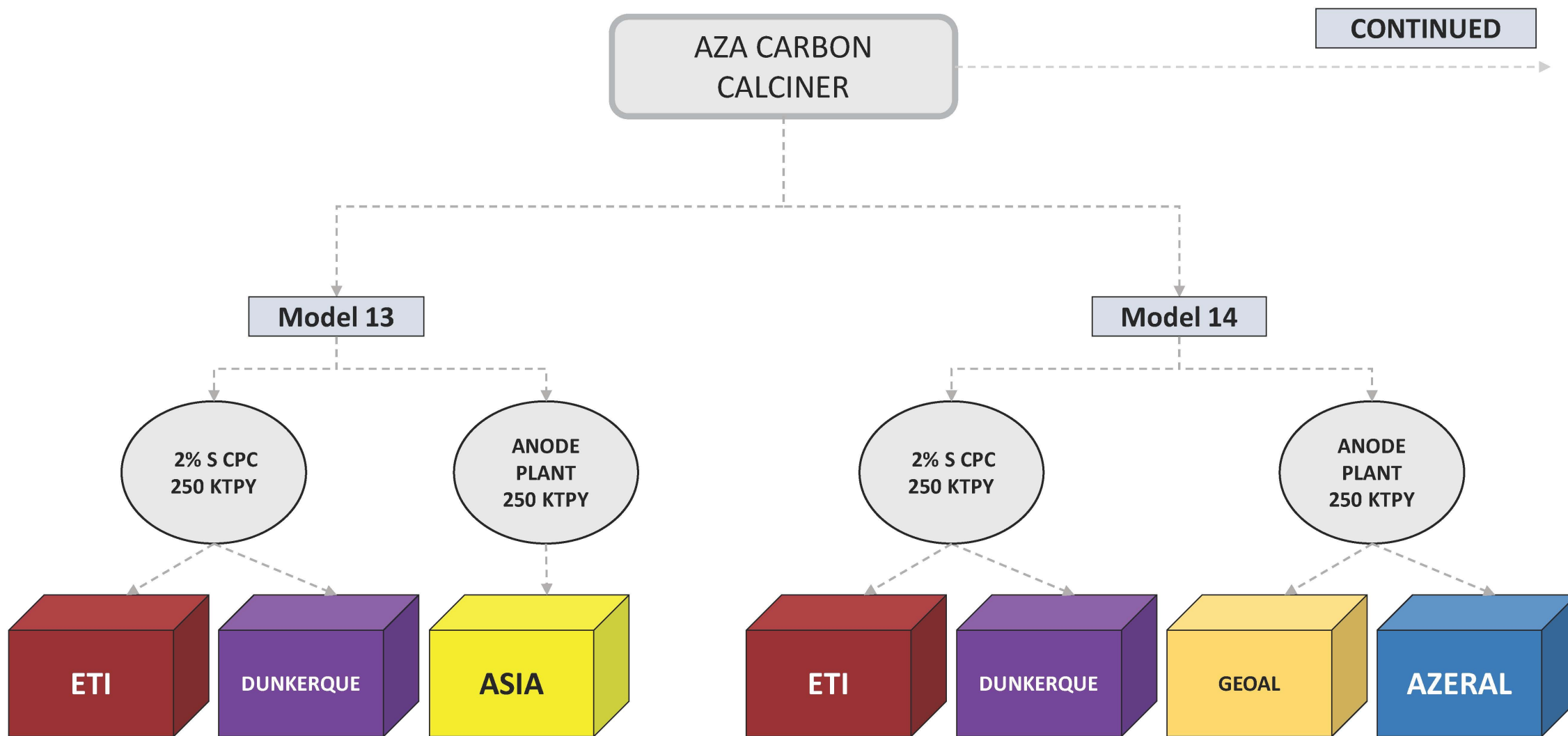














AZA CARBON
CALCINER

Model 15

Model 16

2% S CPC
250 KTPY

ANODE
PLANT
250 KTPY

2% S CPC
250 KTPY

ANODE
PLANT
250 KTPY

ETI

DUNKERQUE

GEOAL

AZERAL

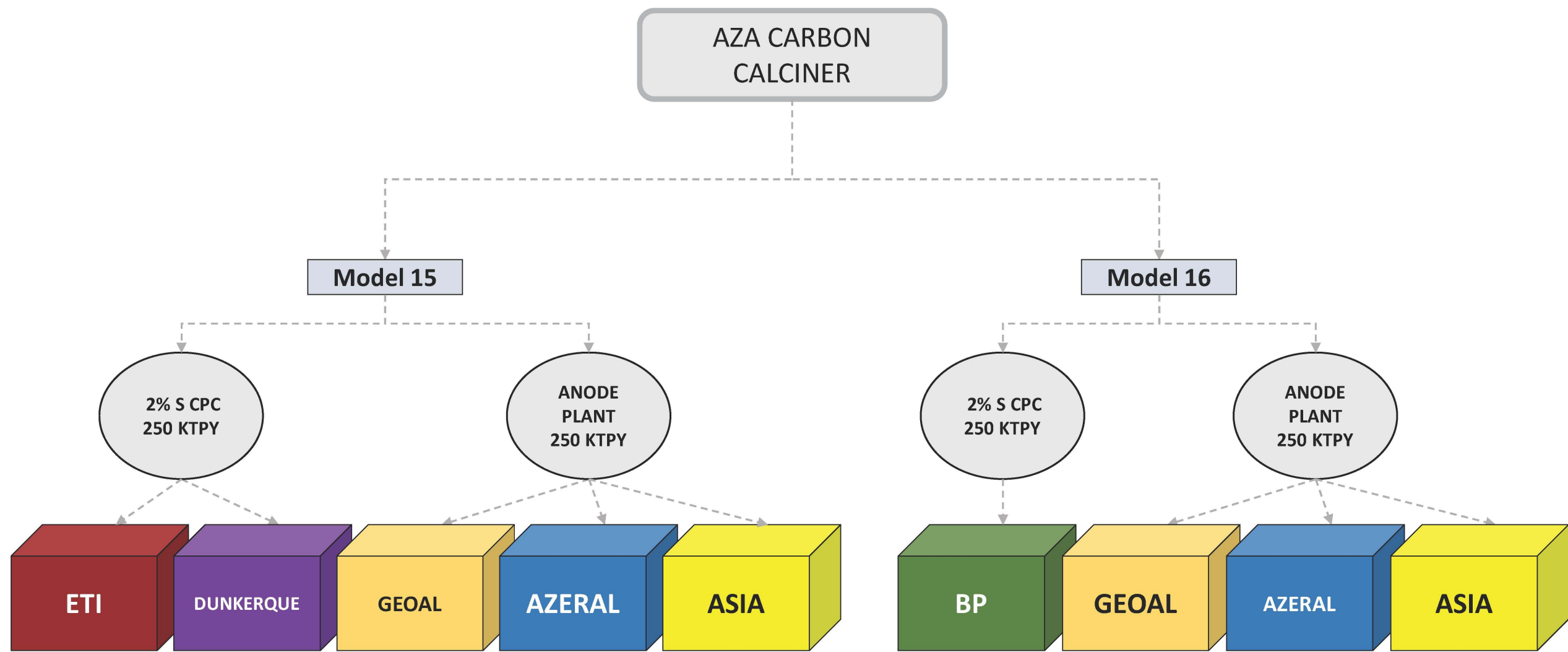
ASIA

BP

GEOAL

AZERAL

ASIA



I

PETROLEUM COKE AND RELATED PRODUCTS

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AZACARBON POTI COKE CALCINER PLANT

III

INVESTMENT PROPOSAL



FIGURES DO NOT REPRESENT BEST CASE SCENARIO



THERE IS ROOM FOR IMPROVEMENT THROUGH

Capital Structure Optimisation

Further negotiations with Banks

Additional Price reduction from suppliers



WE PRESENT REAL FIGURES IN ORDER TO SUSTAIN OUR PARTNERSHIP



OTHER UPCOMING PROJECTS: YOU MAY BE INTERESTED

Scenario A	Probability	50%
	NPV	247.05
	IRR	14%
Scenario B	Probability	25%
	NPV	464.00
	IRR	18%
Scenario C	Probability	25%
	NPV	615.62
	IRR	21%

Probability weighted project value, USD **393 M**

IRR = 14.2

Annual EBIT ≥ 50 M USD

Payback Period = 11 Years

- The **worldwide market** for Calcined Petroleum Coke is expected to **grow at least at a CAGR of 4.4%** over the next five years
- Project IRR is expected to reach **21%** in scenario C

МЫ ПРЕДНАМЕРЕННО ИСКЛЮЧИЛИ
ВСЕ ЭКОНОМИЧЕСКИЕ СОСТАВЛЯЮЩИЕ И ДОЛЕВЫЕ
ВКЛАДЫ УЧАСТНИКОВ ПРОЕКТА.





Poti City

Area – 69 sq.km
Population – 41 500



Poti Free Industrial Zone
Total area - 304 ha

Customs :

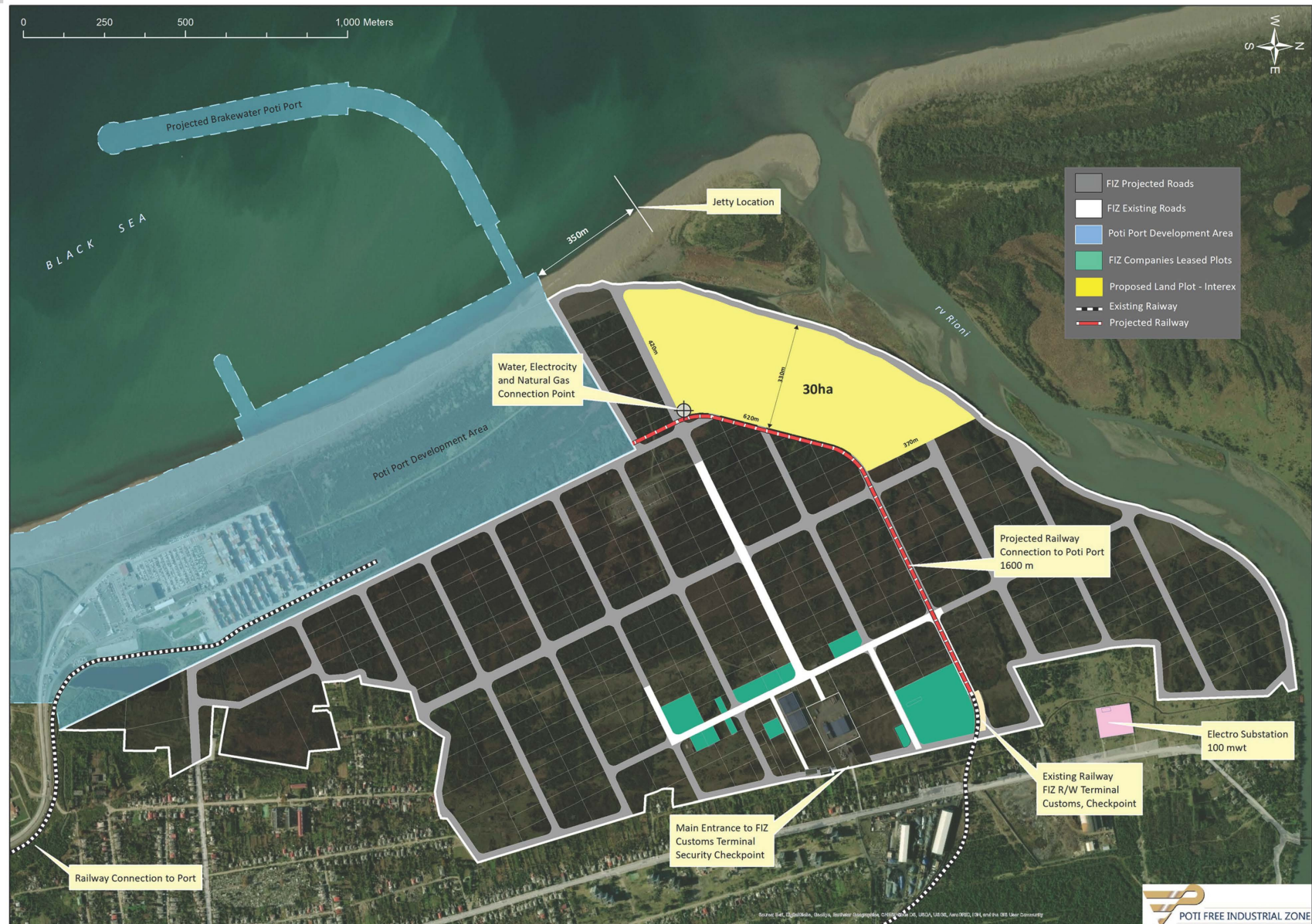
- Area - 16 800 sq.m
- Buildings - 2 700 sq.m
- Truck weighbridge
- Cargo & transport inspection scanners
- Temporary warehouse
- Video surveillance
- Security Checkpoints

Railway terminal :

- Area – 3000 sq.m
- Weighbridge
- Open shed
- Custom checkpoint
- Video surveillance
- Security checkpoint

FIZ Infrastructure:

- Warehouses – 6946 sq.m
- Video surveillance
- Security Checkpoints
- Fence – 5700 m
- Roads – 3208 m
- Water pipeline – 2600 m
- High voltage line – 2980 m
- Transformers – 2x1600 kva, 1000 kva, 250 kva





AZA CARBON

THE WARRANTY OF YOUR
SUCCESS

[ops@azacarbon.
ge](mailto:ops@azacarbon.ge)