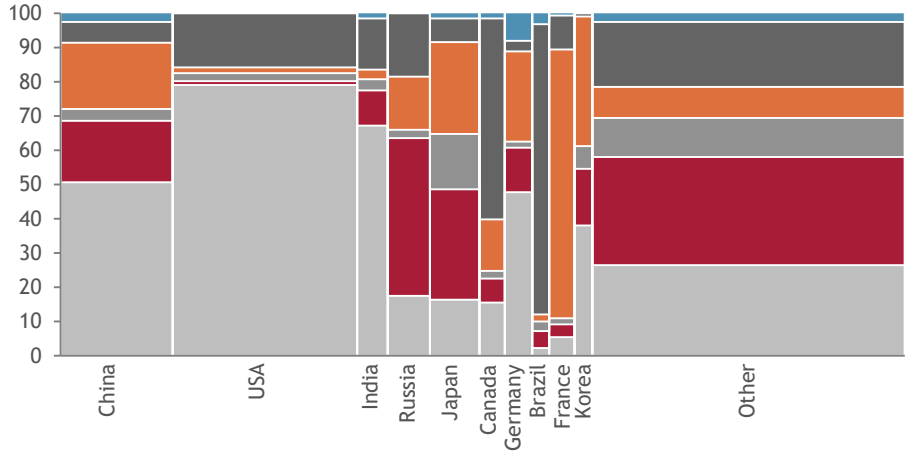
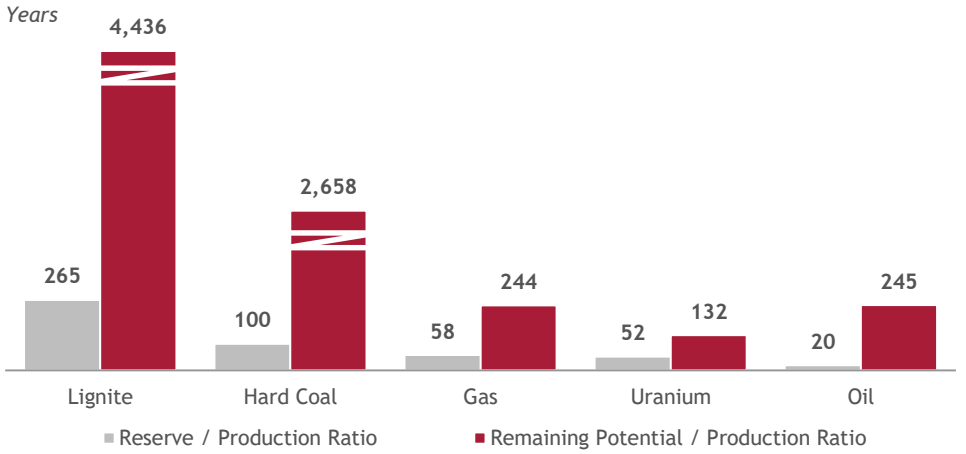

Why Coal Continues to Power the World?
Why PCI Continues to Save the World?
Now on Blockchain?

Why Coal Continues to Power the World?

Coal accounts for 40% of the world power generation, the same share as gas, hydro and petroleum together

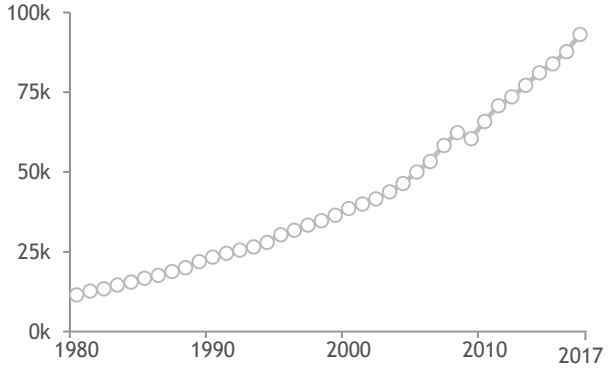


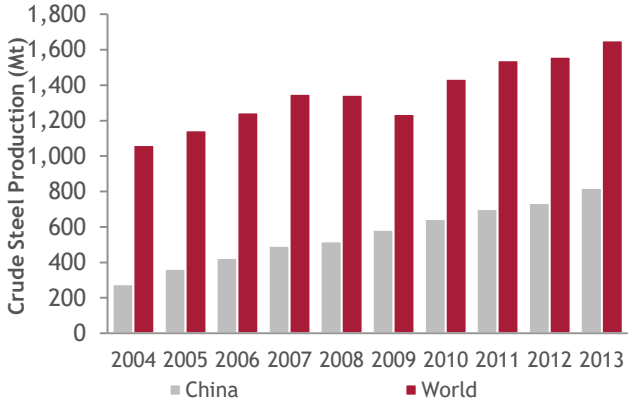
Coal energy potential is huge, the biggest among the fossil fuels

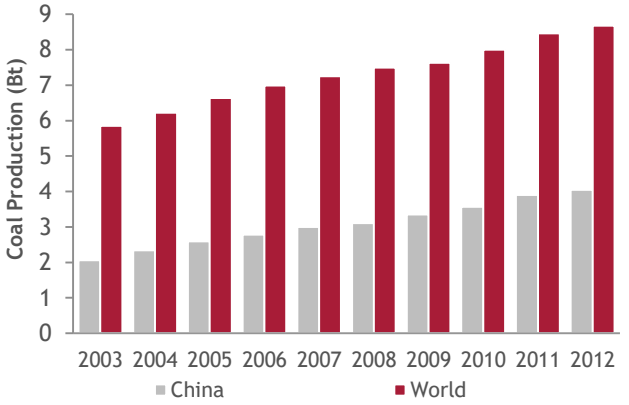


Growing World GDP fuels the growth of consumption and infrastructure investments, where power and metals plays the key role. Production of 1 ton of crude iron requires ~0,7 ton of coke (≈1,1 ton HCC). Expected 2018 GDP growth: +3.1%, coal production: +0.5%

World GDP
Billion US dollars in current prices







Traditional Ironmaking Process is Harmful for Environment

Traditional ironmaking process is source consuming and environmental unfriendly

Production of 1 ton of coke requires 1.5 ton of coking coal to be processed via highly environmental polluting carbonization technology

Iron ore

Electricity

Gas

Oxygen

Coke

Cast iron

Air pollution

Water pollution

Soil pollution

Can PCI Really Save the World?

40%	*40% of coke can be replaced with PCI*
-33%	*Harm from coal extraction works*
-40%	*Electricity consumption*
-50%	*Oxygen consumption and CO2 emission*
-60%	*Sulphur-containing wastes*
-80%	*Gas consumption*

PCI can be injected into the furnace directly, no need in special preparation

PCI coal is by 20-50% cheaper than HCC

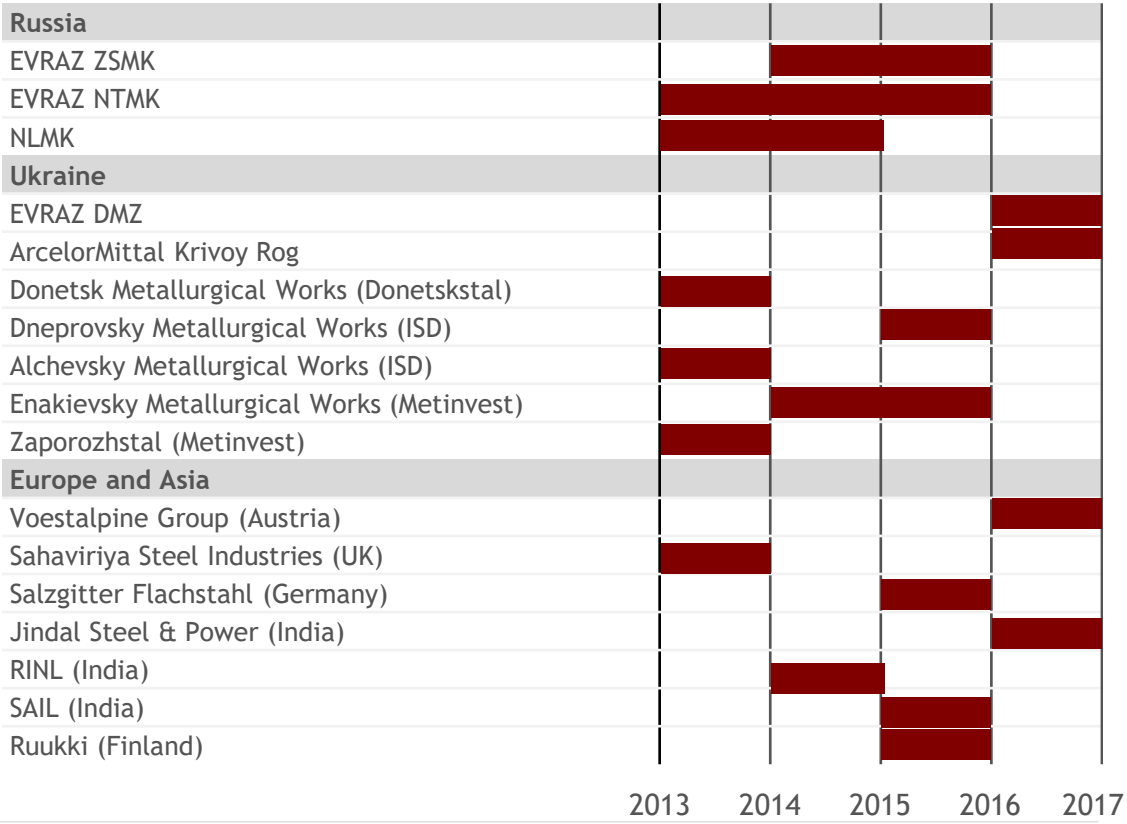
The Use of PCI make significant impact on the environment and ecology

Active PCI Technology Implementation Across the World

- 60% of blast furnaces in the world are equipped with the PCI technology
- The technology is being currently implemented on the rest of the furnaces since steelmakers are forced to make savings on expensive hard coking coal in the low steel price environment and PCI technology is fully paid off in 2-3 years
- Although older PCI installations replaced 10% of hard coking coal, the new ones are capable to replace up to 40% i.e. the blast furnaces operating the new PCI installations will consume 4 time more PCI coals
- **Once the PCI technology is introduced on all the blast furnaces, PCI demand will increase by 3,7 times (not by 1,7 times)**

PCI Implementation Across Steel Works

- EVRAZ NTMK implemented the PCI technology in 2013 with EVRAZ ZSMK completed two more PCI implementations in 2014
- NLMK is also planning more PCI implementations in the nearest future
- Ukrainian steel works have also actively implemented the PCI technology
- The PCI technology implementations are widespread in Europe where potential for this technology remains very high
- Major PCI consumers in Asia are China, India, Japan, Korea and Taiwan
- Demand for metallurgical coal (including PCI) from India is steadily growing and the amount of new implementations is constantly increasing



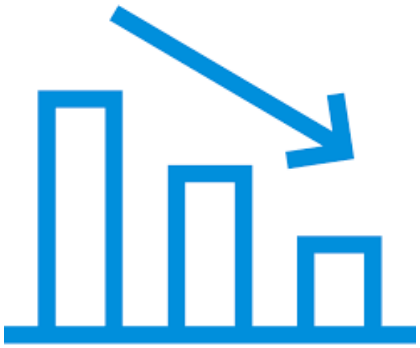
Source: Steelmakers

Economical Efficiency of PCI

The use of PCI leads the improvement of metal quality and the common production efficiency

EVRAZ Case Study

- **Key raw materials consumption decrease** (per tonne of metallic iron):
  - Coke by 20%: 423 kg vs. 358 kg
  - Gas by 2 times: 72 m3 vs. 34 m3
- **Cost savings**: $6 per tonne of steel, i.e. at least $70 mm based on 11.7 mmt crude steel output in 2014 from its ZSMK and NTMK mills
- **Return analysis:** NPV of $680 mm with over 30% IRR; capex - $372 mm



CAPEX Reduction

- A typical coke furnace is repaired periodically since coke furnaces are being destroyed by high heating and chemical impact in the course of usual operations
- PCI installation costs 3-4 times cheaper compared with construction of a new coke furnace and 2 times cheaper compared with the costs of reconstruction of the old one to be repaired

Now On Blockchain?

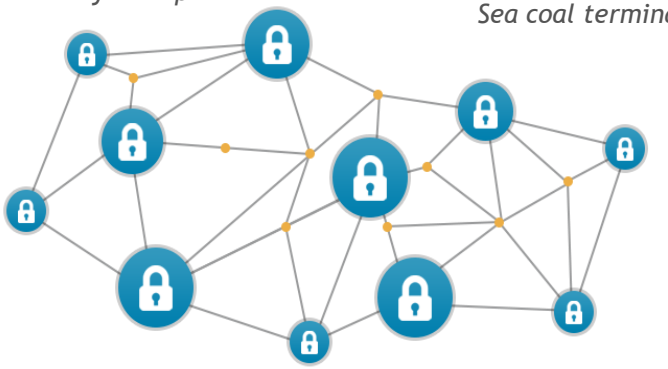
What if one of car makers seeks to market a ‘really green’ model with all its metals directly sourced from and traceable and ecologically-rated mines on the planet?

Implementation of Blockchain based

Railway transport

Sea coal terminal

PCI coal producer



Shipment

Steel producer

Quality control expertise

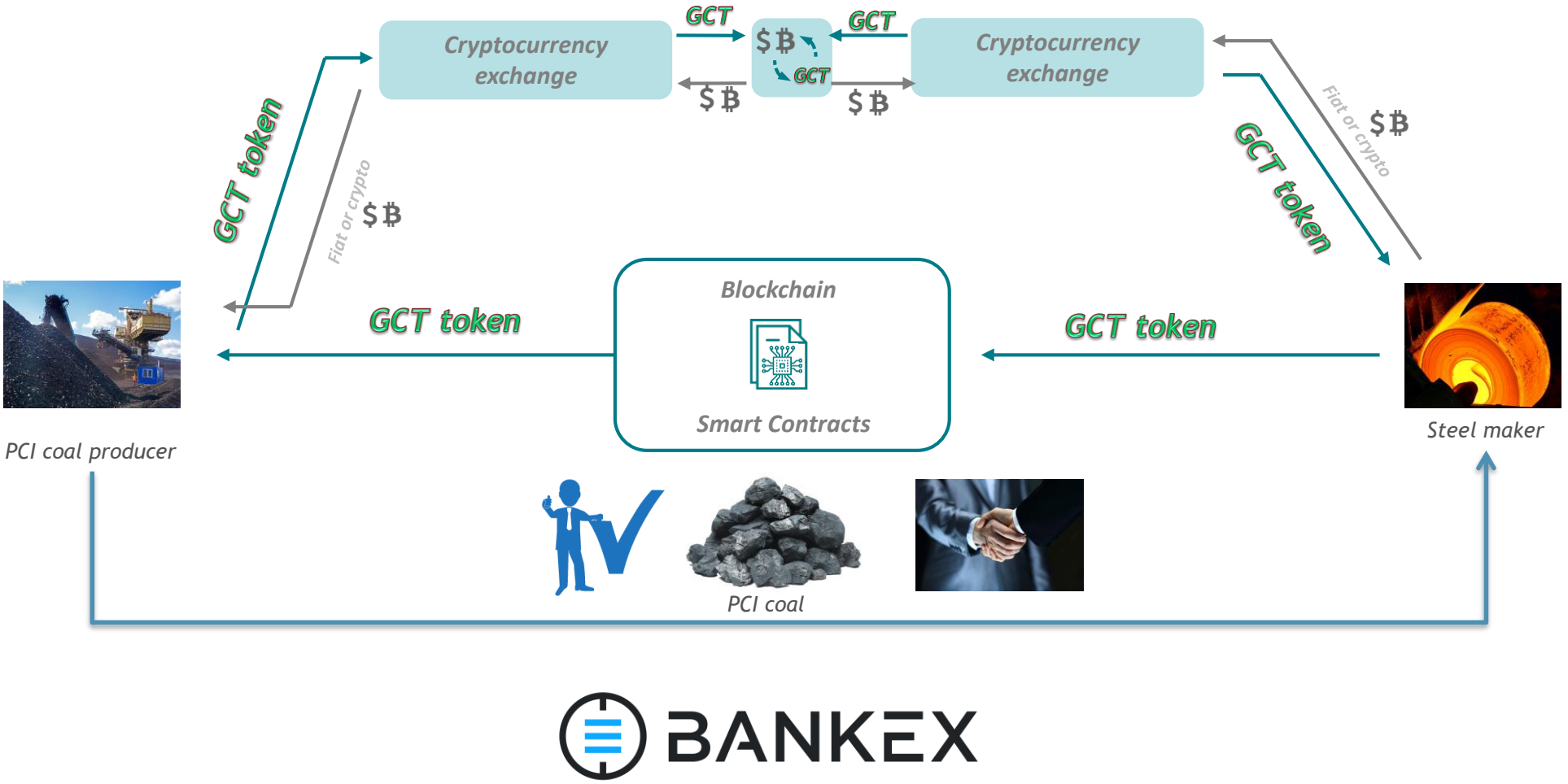
Compliance control

Green Coal Token

makes it realistic, as:

1) GCT is backed by 1 ton of PCI coal;
2) GCT contains all information about the PCI coal used in the metal production;
3) Information of GCT cannot be changed;
4) Metal producer can be sure that the PCI coal he bought has proper quality, compliant with all regulations and ethically clean.

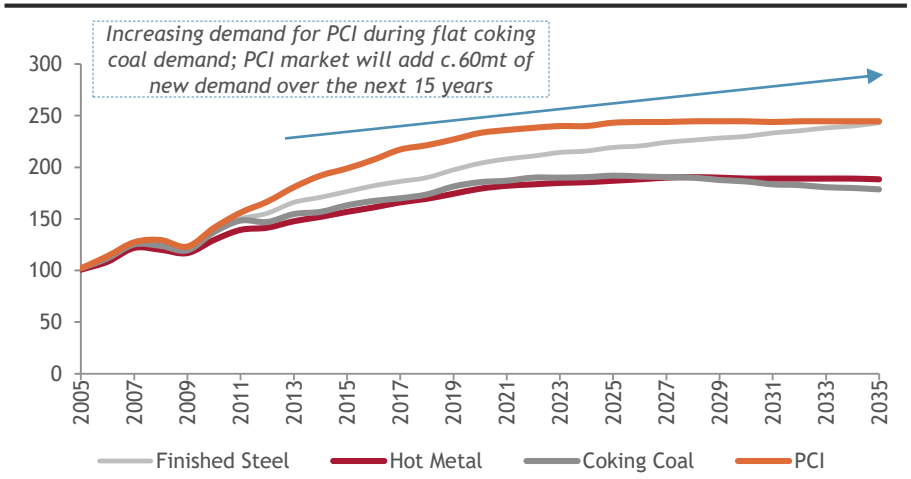
GCT Exchange Turnover



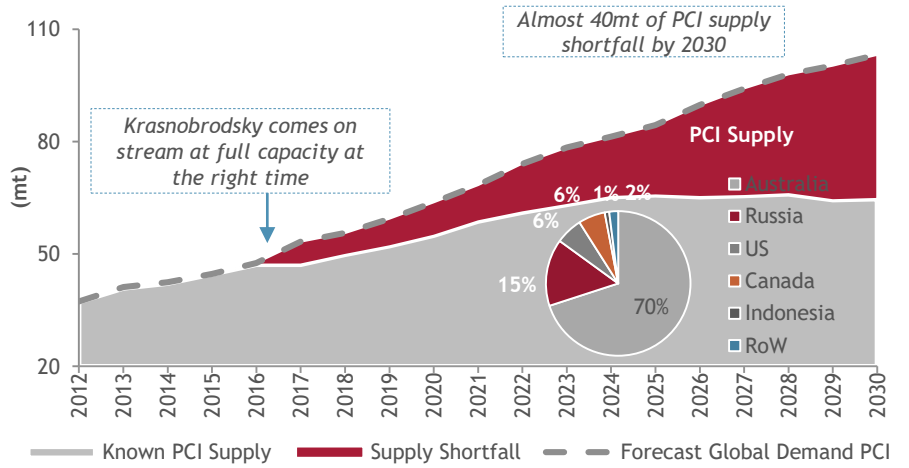
BANKEX

PCI Coal – Unique Positioning Within the Coal Market
GCT Tokens has High Growth Potential and Investment Attractiveness

Key demand – side metrics, index 2005=100



PCI market supply and Demand



- **PCI is uniquely positioned as a niche market which will benefit both from the demand and supply sides – this will grow the PCI market share within the broader metallurgical coal market:**
  - Coking coal and PCI coal are expected to perform differently since PCI injection rates will continue to rise enabling the coke rates to ease due to cost savings
  - Developing markets will naturally be the driving force behind PCI demand, as new steel capacities will seldom be installed without injection capability
  - Furthermore, existing steel plants will continue to push injection rates towards technical limits
- Those companies that supply **good quality PCI** are likely to see consistently strong demand for their products
- Asia will be a key growth market
- In longer term supply shortfall will also be attributed to the scarcity of world's PCI resources – 2 billion tonnes PCI resources vs. over 300 billion tonnes of coking coal resources
- We believe, based on the fact that 1 ton of PCI coal saves 1 ton of coke (i.e. 1.5 tons of coking coal) and reduce gas/electricity consumption and improve the performance of furnaces, PCI could be more expensive than coking coal in the nearest future

Source: Brokers