JSW SA

RESPECT Index

WIG 20

SPÓŁKA NOTOWANA NA GPW

JSW – responsible, innovative, critical

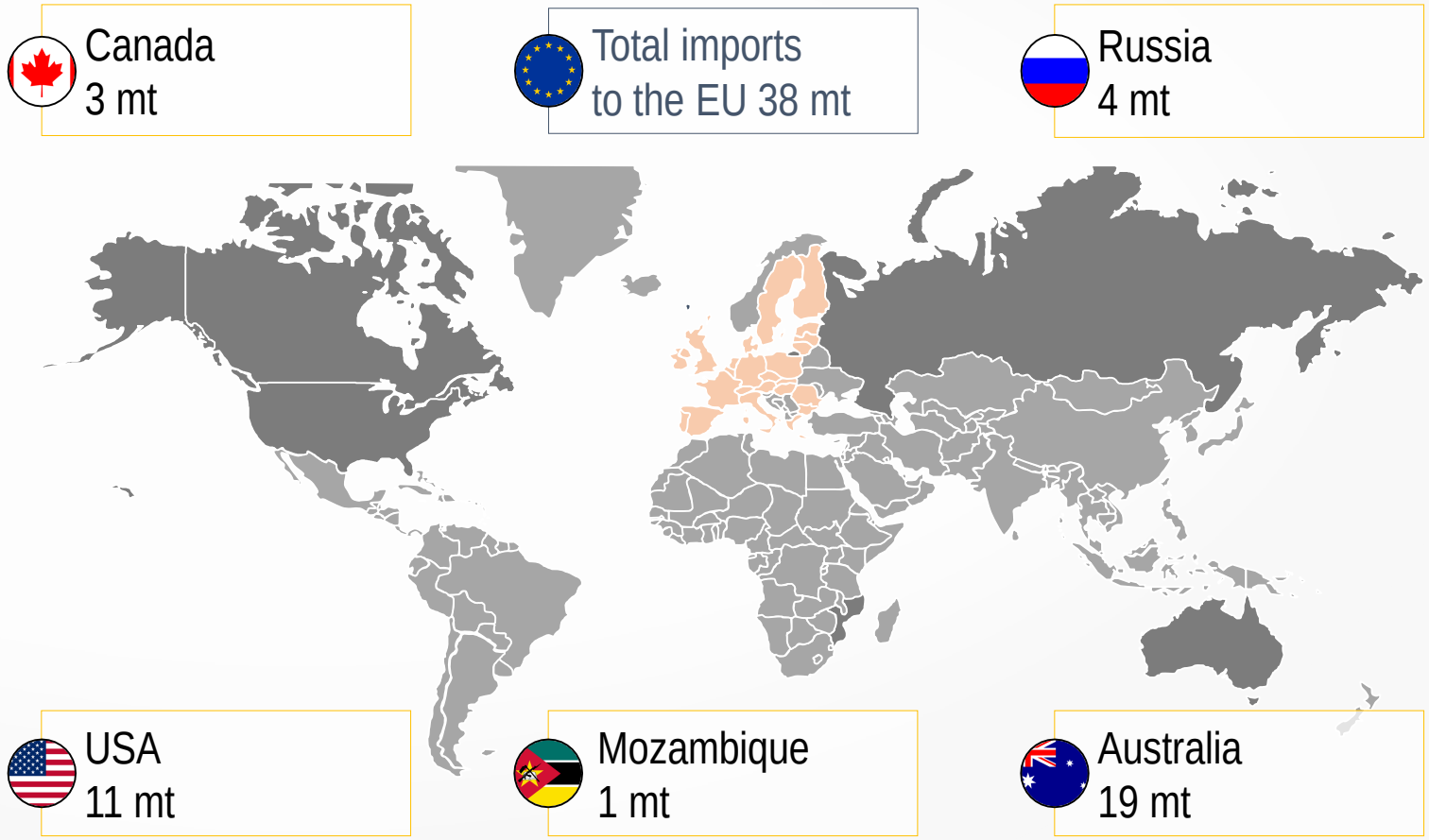
Daniel Ozon

Brussels, 27/06/2018

EU demand for coking coal

- JSW is the largest producer of high quality coking coal and a major merchant coke producer in the European Union
- The level of coking coal imports into the EU points to the significant potential for growing the JSW Group's coking coal sales
- The JSW Group consists of 4 mines (including 7 sections) and 4 coking plants
- The resource base supports a long life of mine

Coking coal imports to the EU in 2017



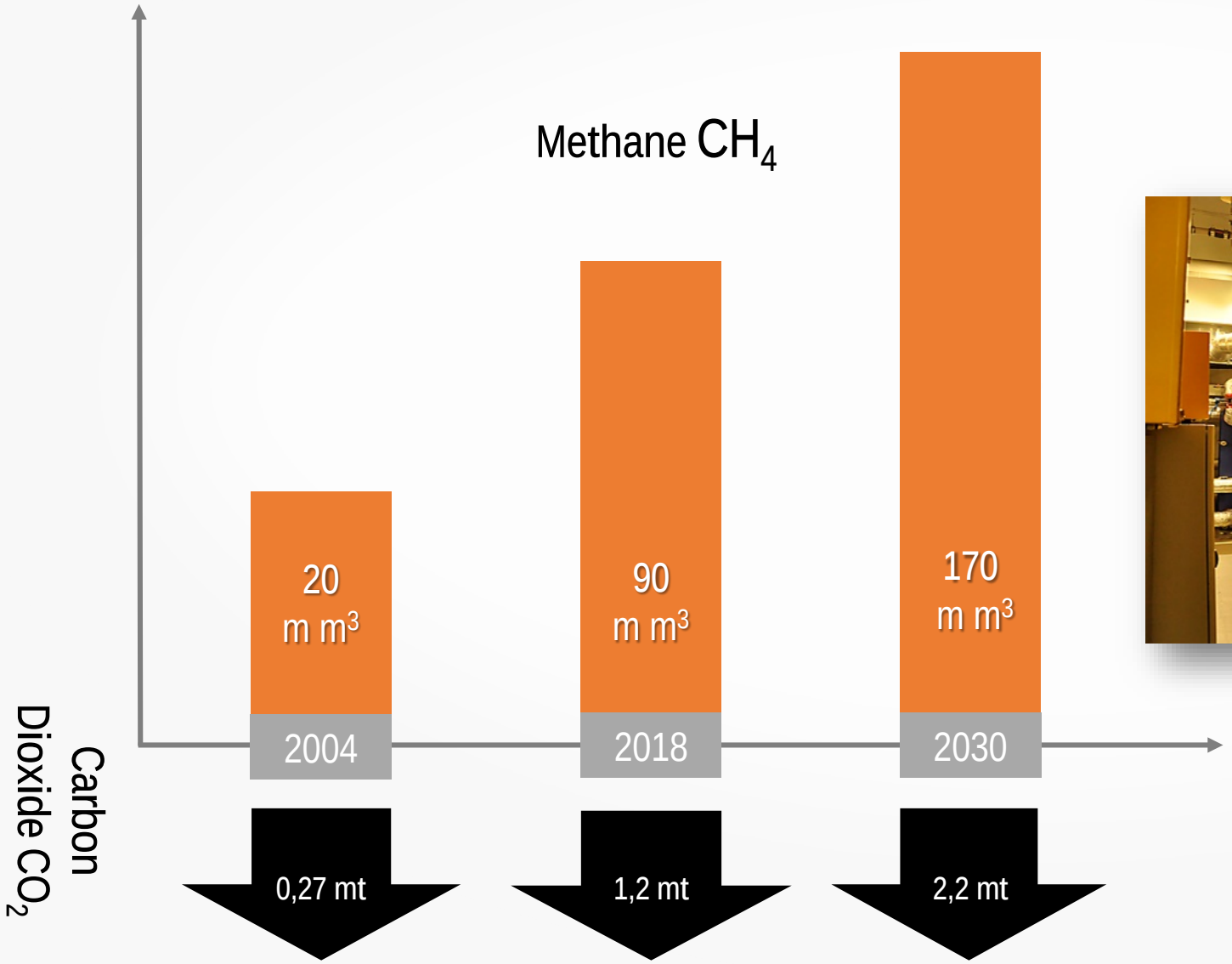
Coking coal on the list of critical raw materials

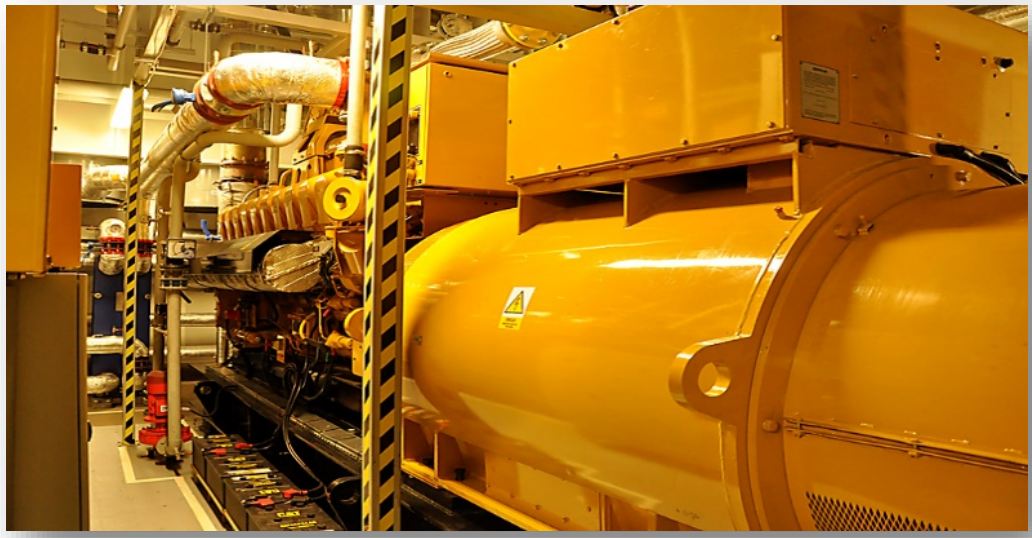
List of the EU's Critical Raw Materials – coking coal is one of the 27 raw materials entered on the list of critical raw materials

Specific abbreviations for the materials covered

Agr	Aggregates	Mn	Manganese
Al	Aluminium	Mo	Molybdenum
Sb	Antimony	NC	Natural cork
Brt	Baryte	Gr	Natural graphite
Bx	Bauxite	Nr	Natural Rubber
Bn	Bentonite	Nt	Natural Teak wood
Be	Beryllium	Nd	Neodymium
Bi	Bismuth	Ni	Nickel
Bo	Borate	Nb	Niobium
Ce	Cerium	Pd	Palladium
Cr	Chromium	Pe	Perlite
Co	Cobalt	P	Phosphorus
Cc	Coking coal	Phs	Phosphate rock
Cu	Copper	Pl	Platinum
Di	Diatomite	Po	Potash
Dy	Dysprosium	Pr	Praseodymium
Er	Erbium	Re	Rhenium
Eu	Europium	Rh	Rhodium

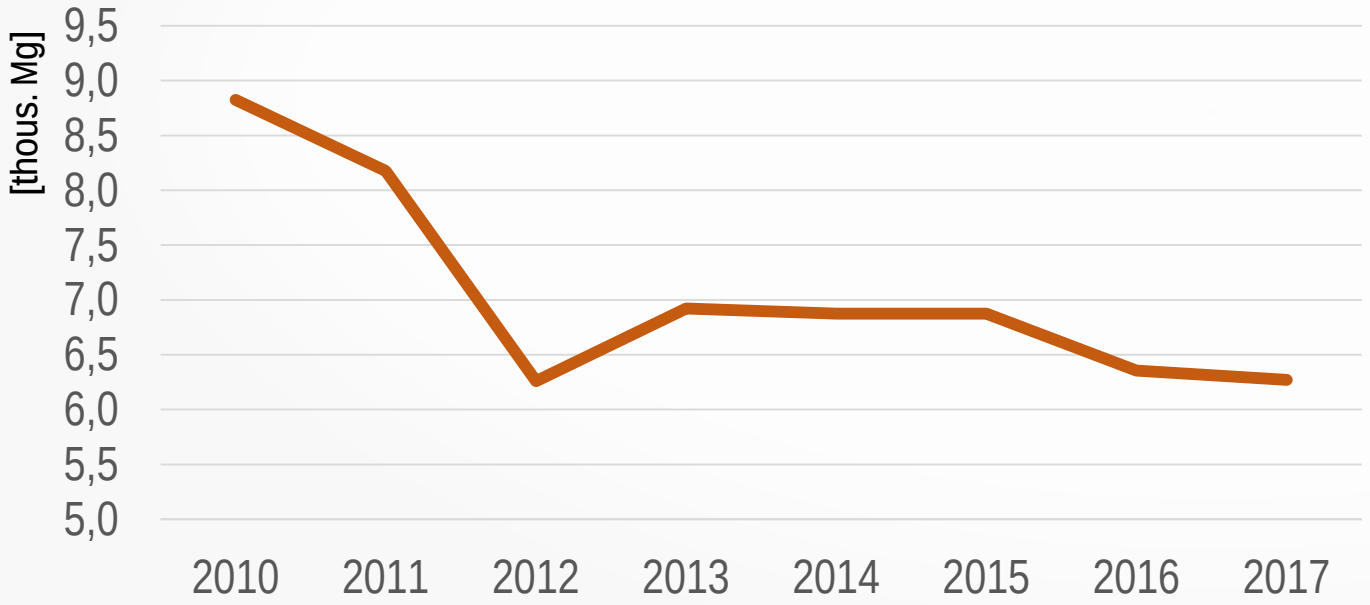
Methane capture and utilisation





Emission reductions

Total dust – gas emissions between years 2010-2017 in JSW KOKS S.A. coking plant installations

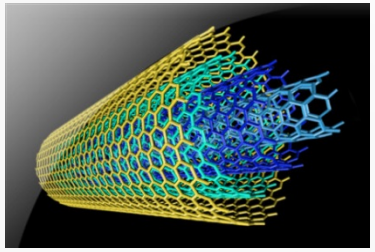


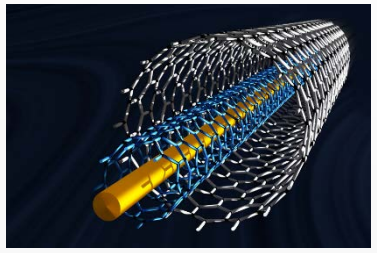
Tar processing

Production of high value added products from coal tars – by products of coke production ie. carbon fiber, graphite electrodes, and nanostructures

Coke production → Coal tar → Carbon nanostructures / Carbon fibers

- Carbon nanostructures → Graphite electrodes; Light constructions; Electronic devices
- Carbon fibers → Composite materials



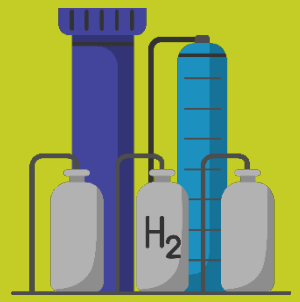


- Carbon nanostructures are used in automotive industry, chemistry and electronics, mainly thus their weight-strength ratio
- Compounds made from carbon fibers have the best potential for light weight constructions
- Graphite electrodes contain about 1-3% of carbon nanostructures for lit-ion batteries
- Carbon fibers will take about 45% of future composite applications

Hydrogen separation

Coking Coal Mine

Coking Plant



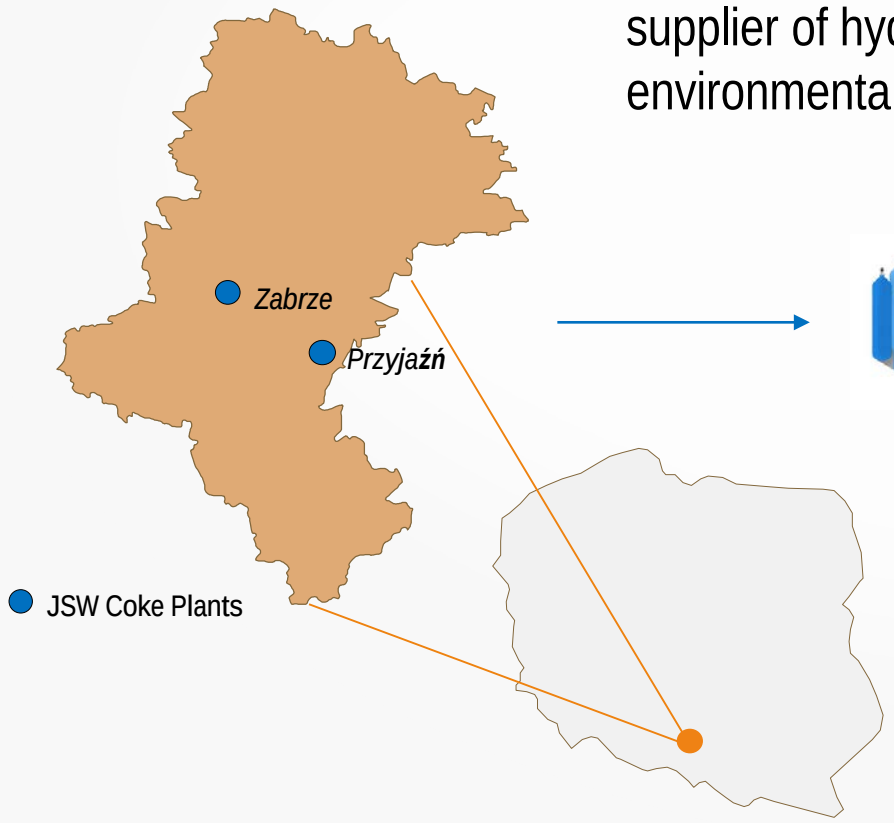
Hydrogen

Fuel Cell Transport

Hydrogen for Silesia

The Metropolis of Upper Silesia is one of the most densely populated areas in Poland with over 2,5M citizens. In the upcoming years, the Metropolis plans a modernisation of the existing bus fleet with 600 new zero-emission vehicles. Whereas JSW could become the main supplier of hydrogen and in this way could contribute to achieve the objectives of the environmental policy in Silesia.

Upper Silesia



300 km/day

8 kg H_2/100km

24 kg H_2/day

8760 kg/year

End of the cycle - revitalisation

Thank You!

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