

# Steelmaking coal

## Properties, facts, uses and production

# BHP

# BMA

BHP Mitsubishi Alliance

BHP Mitsubishi Alliance (BMA) is a 50:50 joint venture between BHP Group Limited and Mitsubishi Development Pty Ltd that was formed in 2001.

## What is steelmaking coal?

Steelmaking coal (also known as metallurgical/met coal or coking coal) is a naturally occurring mineral found within the Earth's crust.

Categories of steelmaking coal include hard coking coal, semi-hard coking-coal, semi-soft coking coal and pulverised coal for injection (PCI). These apply to the different quality grades of coal, all of which are used to make steel. BHP Mitsubishi Alliance (BMA) produces primarily higher-quality hard coking coal.

Steelmaking coal is a very different type of coal to thermal coal (which is burnt for electricity generation and also known as energy coal). Steelmaking coal typically contains more carbon, less ash and less moisture than thermal coal, and contains metallurgical properties that enable it to melt and fuse into coke for use in steelmaking.

## How is steelmaking coal used?

Steelmaking coal is a primary ingredient in the conventional blast furnace steelmaking process. It takes around 750 kilograms of coal to make one tonne of steel.

The majority of steel is used in:

- ☒ Construction
- ☒ Industrial mining, plant and equipment
- ☒ Transport
- ☒ Household appliances

## Facts about steelmaking coal



**Coal is formed from prehistoric vegetation** that has been heated and compressed over millions of years.



The energy we get from **coal today comes from the sunlight that was absorbed by plants** that were alive millions of years ago.



The equipment used to mine coal is huge! Excavators can weigh up to

**800 tonnes**



Haul trucks can carry in excess of

**300 tonnes**

of material per load.



Coal was first used to make steel in **China in the 11th Century**.



**~750 kilograms** of coal are required to make the steel for a typical mid-sized car.

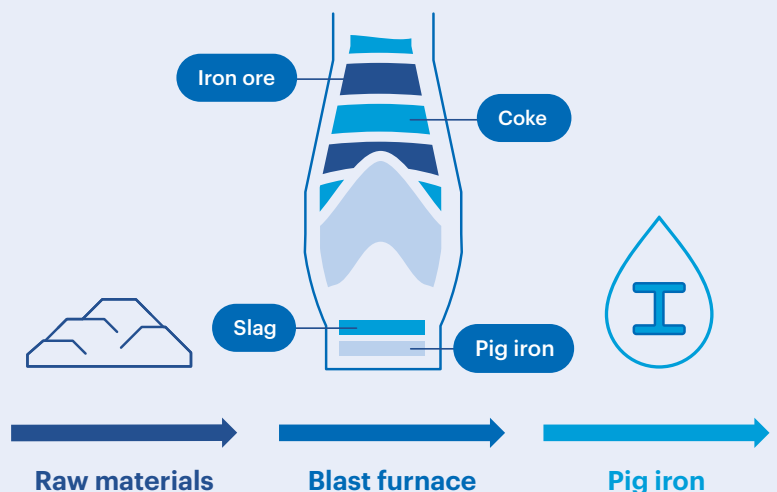


An offshore wind turbine requires

**1050 tonnes of steel or 790 tonnes of steelmaking coal**

## How is steel made?\*\*

- Coal is heated above 1,000°C in a coking oven to create coke—a hard, porous lump.
- The coke is then added to a blast furnace with iron ore. Hot air and PCI are introduced, creating a flame temperature over 2000°C.
- Coke is porous and allows gases to permeate up through the blast furnace while structurally supporting the weight of the ferrous burden. Coke also plays a chemical role by reducing the iron ore to 'pig iron' in the blast furnace.
- This molten 'pig iron' is transported to a steel shop, where impurities are removed and alloys are added to make steel.



\*\*Via the conventional blast furnace process route.

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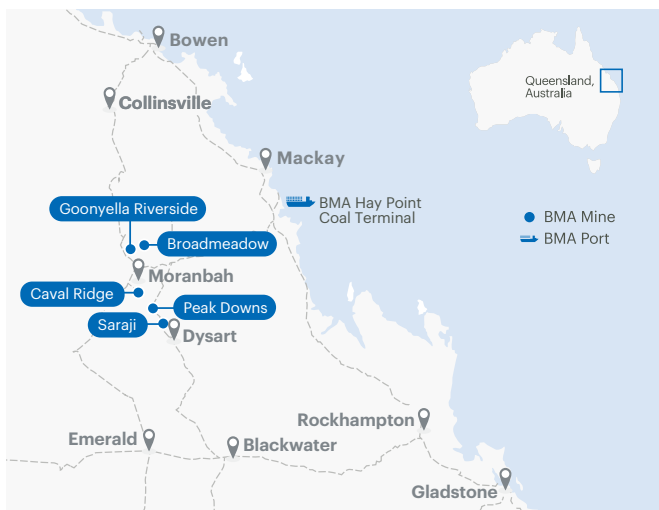
## Why do we mine coal?

Steel is one of the most widely used building materials on earth, and we expect the higher-quality coal we mine to continue to play an important role in steel production for decades to come.

Roughly, 40% of global steelmaking coal export comes from Queensland. Our challenge is to continue producing the coal required to support future construction, infrastructure and the energy transition, while reducing the greenhouse gas (GHG) emissions footprint of our operations. The steel sector is GHG emission intensive and hard-to-abate, so we must also support industry to develop technologies and pathways capable of reducing the emission intensity of steelmaking.

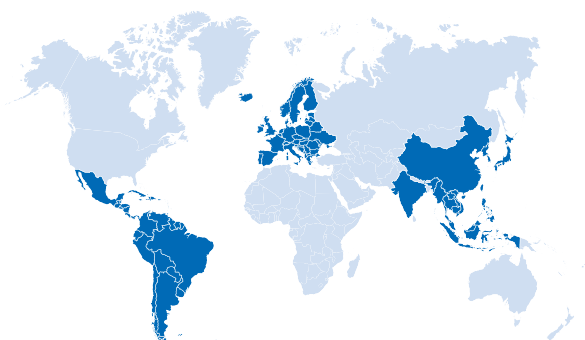
## Where do we mine coal?

BHP operates five steelmaking coal mines in the Bowen Basin area of Central Queensland in Australia. It also owns and operates the Hay Point Coal Terminal near Mackay to export coal to ports around the world.



## Where do we export coal?

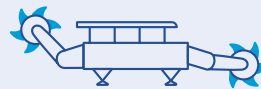
Our steelmaking coal is shipped to steel mills in India, Japan, Southeast Asia, South Korea, Europe, Latin America and China.



## How is coal mined?

Mining methods differ depending on how far the coal is located below the earth's surface.

### Underground

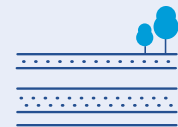


At our Broadmeadow mine, coal is mined by a longwall shearer deep underground.



The coal is then transported to the surface on a conveyor belt.

### Open Cut



At our open cut mines, we extract coal from seams that are relatively close to the surface.



We blast and remove the surface layers of soil and rock to expose the coal, which we then mine using excavators, draglines, shovels and trucks.



The coal is then transported to stockpiles.



Impurities are removed through washing and treatment at a coal handling and preparation plant.



The coal is then transported by train to port, loaded onto ships and exported to our customers.