

GRAPHITE: FROM LEAD PENCIL TO MARKET LEADER

PAST



CARBON

naturally occurs in two forms:



GRAPHITE



DIAMONDS

GRAPHITE occurs in three forms



FLAKE



AMORPHOUS



LUMP/VEIN

GRAPHITE FACTS



- Excellent conductor of heat and electricity
- Highest natural strength/stiffness of any material
- Lightest weight of all reinforcing agents
- High natural lubricity
- Resistant to heat and chemical attack



Most commonly known for:



Lead in Pencils



Lubricant

LUMP/VEIN

Vein graphite is the rarest, most valuable and highest quality form of natural graphite



15th

most abundant element in the Earth's crust

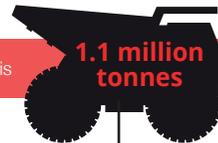


PRESENT



SRI LANKA is famed for being the only major producer of crystalline vein graphite (lump or Ceylon graphite) in the world

The world production of graphite is **1.1 million tonnes** per year



(That's more than 50 times the size of the lithium or rare earth markets.)

STEEL INDUSTRY

Demand for graphite today is largely tied to the steel industry

- As a liner for ladles and crucibles
- As a component in bricks which line furnaces
- As an agent to increase the strength of steel
- Assist in melting scrap metal



52% of graphite demand can be attributed to the **steel industry**.

ELECTRIC VEHICLES

There are **25-50kgs of graphite** in an electric vehicle



LITHIUM ION BATTERIES

Lithium ion batteries are used for:



There is over **10x** more graphite than lithium in a lithium ion battery.



NUCLEAR REACTORS

Graphite is ideal for use in nuclear reactors due to its chemical stability, conductivity and thermal stability. It is used in reactors to slow down neutrons in order to produce a more efficient fission.



CARBON FIBER REINFORCED PLASTICS

Key material for ultra lightweight carbon fiber reinforced plastics (CFRPs). These plastics aid to reduce fuel consumption and lower CO2 emissions in cars.



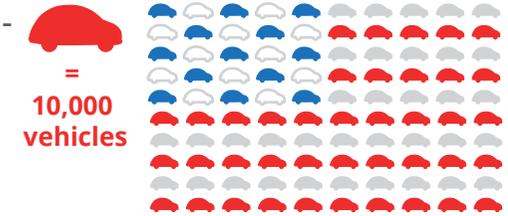
FUTURE



GREEN TECHNOLOGY

Demand for graphite is expected to significantly grow as a result of green technology initiatives.

Obama's plan is to have **one million** electric vehicles on the road by 2015 in the US alone.



= **10,000** vehicles



ELECTRIC VEHICLES

The evolution of electric vehicles has seen a rapidly growing demand for lithium ion batteries



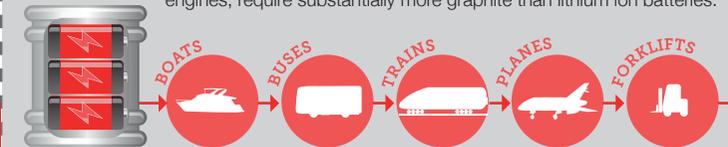
LITHIUM ION BATTERIES

2008 (**44,000 tonnes**)

2020 (**286,000 tonnes**)

FUEL CELLS

Fuel cells, which are predicted to replace traditional combustion engines, require substantially more graphite than lithium ion batteries.



SUPPLY CRITICAL



The US and EU have named graphite as a **supply critical material**



MRL Corporation Limited holds **63km²** of Exclusive Exploration Licenses in Sri Lanka



WHAT NOW?

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