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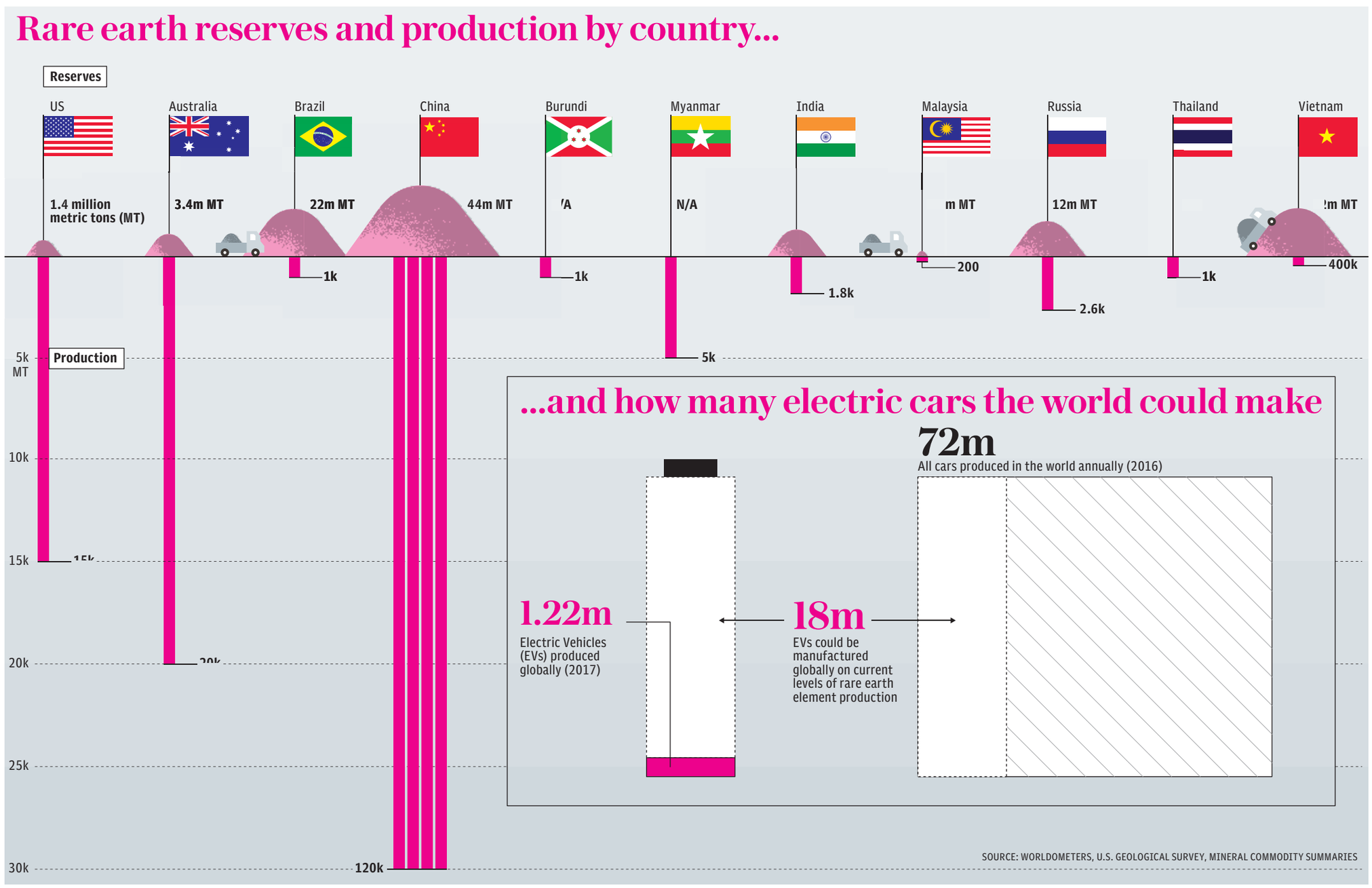
Electric vehicles

Rivals dig deeper in race for rare earth minerals

Electric dreams

A US mine – and a British refinery – aim to end Beijing's grip on the metals powering the e-car revolution, report *Tom Rees, Vinjeru Mkandawire and Olivia Rudgard*



An hour's drive from Las Vegas, surrounded by scrub forest and Joshua trees, lies an open pit that holds the key to the future of the electric car.

Mountain Pass rare-earth mine is a rich source of neodymium and praseodymium, two metals which are used to make the magnets in the powertrain of an electric vehicle.

It is the only rare-earth mine in North America, and one of only a handful of active mines outside China.

The desert-bound mine, which reopened in 2018 after its previous owner went bankrupt, is seeking to challenge the overwhelming dominance of China in rare earth elements – a group of 17 minerals that are embedded in everything from electric cars to consumer gadgets.

The implications of this dominance, says James Litinsky, chief executive of the mine-owner JHL Capital Group, are "pretty powerful".

"Although rare earths is a few billion dollar industry, the ramifications for the global economy are quite large, with trillions in GDP and tens of millions of jobs," he says.

The mine has been affected by the US trade war with China, with Beijing putting a 25pc tariff on the rare earths sent into the country for refining into magnets.

To overcome this the mine is due to begin processing its own materials with the goal of eventually bringing magnet manufacturing to the US.

But even without trade tensions, China's dominance in something so crucial to the future of EVs is a problem, says Litinsky.

"The world has one country that is a single point of failure in the automotive supply chain of the future," he warns.

"Our goal is to continue to move downstream over time, and help to have some of that supply chain back here domestically."

Despite its name, the 17 rare earth elements are abundant around the world and are often the by-product from other mining projects.

What is rarer is a supply that is economically viable, particularly outside of China. Australian miner Lynas – the world's biggest non-Chinese producer of rare earth minerals – earned a full year profit for the first time last year.

"The truth is there are plenty of rare earth materials to go around," says Tim Worstall of the Adam Smith Institute. "The real reason very few people mine them directly, or extract them from their own mine wastes, is that they're not worth much at the moment – maybe $1 per kg (77p) or $1,000 for each ton."

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17

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For now, the market is only worth about $4bn globally. However, rising demand for rare earths could soon inflate that figure.

Ratings agency Moody's expects consumption of the metals used in electric car batteries to increase up to sixfold by the mid-2020s.

"The world is wondering where sufficient rare earths are going to come from to feed the new electric vehicle revolution," says John Meyer, a mining analyst at broker SP Angel.

"There are plenty of rare earths in the world but the problem is there aren't many rare earth deposits that are potentially economic.

"There are very few rare earth projects being planned in the Western world at the moment."

The West has allowed China to develop a tight grip on the market. China produces around 80pc of the global supply of rare earths, has around 35pc of total reserves and dominates refining the elements.

"This is something the UK, EU and the US need to look at very seriously to ensure there are one or more Western refineries," warns Meyer.

Around four fifths of rare earth elements being imported into the US are from China and Beijing threatens to capitalise on this overreliance.

China has hinted that it could take advantage of this stranglehold on US supply. In May, Xi Jinping stoked tensions by making a high-profile visit to a rare earth metals production plant.

Meyer says China has "weaponised rare earth supply".

"Basically, if you want access to significant quantities of rare earth for many years, you need to build a factory in China in order to be sure you're going to get those raw materials," he says.

It has been claimed that this hunt for rare earth metals could have persuaded Donald Trump to seek talks with North Korea and inquire about buying Greenland, two areas thought to have abundant supplies.

The Pentagon's scramble for the niche minerals also prompted secret discussions with London-listed rare earth miners earlier this year.

US officials reportedly met executives at Rainbow Rare Earths. The Pentagon also held meetings with Mkango Resources, whose goal to build a mine and processing plant in Malawi is still several years away.

However, the US is not the only country stepping up efforts to break China's dominance of the critical minerals.

This year, Australia put out a list of 15 projects to develop vital metals, including rare earths.

Australia also signed a deal with Washington in 2018 to extract, process and develop rare earths. The agreement includes a pledge to support joint research between the two economic powers.

Industry experts agree that the race to secure a stable supply of rare earth metals presents a clear opportunity. Eugene Gholz of the University of Notre Dame says that future demand will push the market outside China to expand its production at all levels of the supply chain. "Australia, the US, Canada, France, Japan, and other countries are all involved at various stages of rare earth development," he says. "If China tries to leverage their high market share to achieve political goals, that will expand the market potential for non-Chinese suppliers."

There are a number of fully permitted mining projects ready to expand when market conditions warrant the investment, particularly in Australia, he explains. In addition to mining, efforts are already under way to improve rare earth processing capacity.

"New non-Chinese rare-earth supply could be available in a matter of months," Gholz adds.

'You've got a lot of people there that have skill sets we need to build a rare earth plant'

The Mountain Pass rare earth mine about an hour from Las Vegas

One such project that could help the West wean itself off Chinese supply is being developed in the UK.

Rare earths could help renew Teesside just a few years after the collapse of its huge steelworks left deep scars on this post-industrial coastal region.

Australia-based Peak Resources chose Teesside for a refinery that will process rare earth elements mined in Tanzania.

Rocky Smith, its chief executive, says there is a "certain amount of angst with the US-China trade discussions", which highlights the need for operations elsewhere.

The UK pipped Vietnam and several other countries to the refinery, which is expected to be in full operation in 2023.

"You've got a lot of people there that have skill sets we need to build a rare earth plant," he says, adding that the company was also lured by low land costs.

"The thing we have been waiting for, and we are getting very close to getting, is a special mining permit from the Tanzanians, which we are hoping to have by the end of the year."

Even if trade tensions blow over, demand for rare earth elements will inevitably explode in the coming decades and the West will need to wean itself off Chinese supply.

Teesside could become the unlikely location for the booming electric vehicle market to charge up its batteries.