

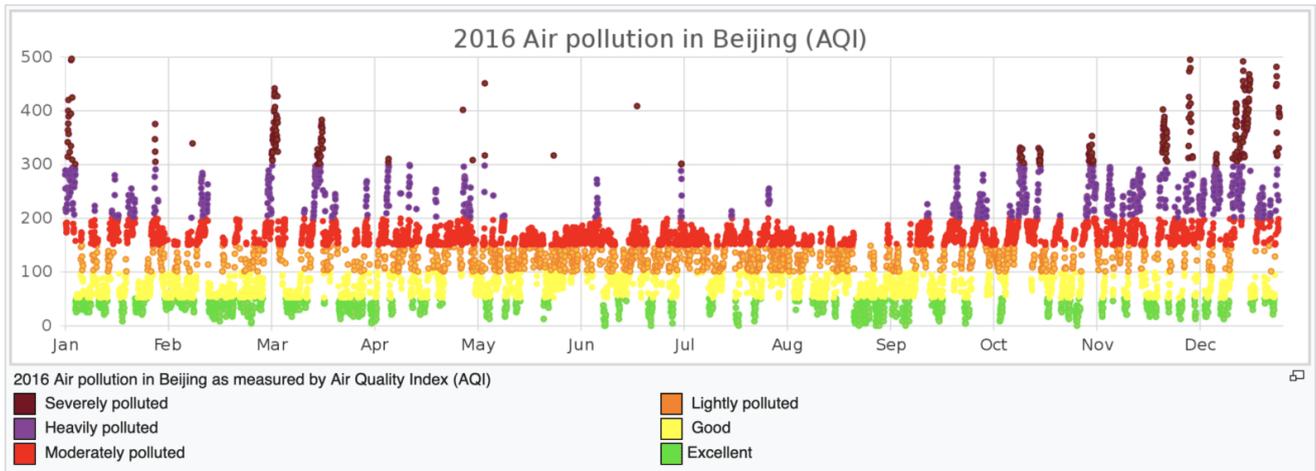
Disregarding ESG standards is key to China's rare earths dominance

Everyone knows – or, those who care about such things know – that China produces approximately 80% of current rare earths supply for essential “green” materials such as permanent magnets used in electric vehicles and offshore wind turbines. US and European governments repeatedly have stated publicly that this degree of market dominance poses a clear and present danger to their national security and economic development interests, and are providing a variety of incentives to hasten rare earth processing within their respective national boundaries while respecting ESG (environmental, social and governance) concerns.

It is worth examining how China attained its controlling market position. It is not because China has all the rare earth deposits, although they do have significant amounts. Rather, the answer lies in a variety of factors, including but not limited to: relatively low demand, until recently, for most rare earth elements, which meant that private mining companies were not incentivized into this segment of the mining market; relatively low geological exploration outside China until relatively recently, and China's willingness to disregard ESG (Environmental, Social and Governance) principles which would have constrained its rapid production growth.

Not so long ago, the world was startled by images from major Chinese cities, including Beijing, of air pollution so bad that visibility was limited to feet, citizens masked up to try to breathe (some even resorting to gas masks) and birds fell dead from the sky, choked to death. These amazing images were reminiscent of the Great London Smogs written of in the 1800s,

or of the pollution in Mexico City in the mid-to-late 1980s. In other words, not today's normal.



2016 air pollution in Beijing as measured by Air Quality Index (AQI) defined by the EPA. Source: WikipediaCommons – Phoenix7777

But the willingness to forego or disregard ESG standards is fundamental to China's rare earths dominance. The majority of known deposits coexist with highly radioactive thorium and uranium, making both mining and production dangerous and expensive. Storing thorium (which currently has few non-medical uses) is costly. So too is storing uranium, although processed uranium is useful for nuclear energy and certain other uses (mostly military). This poses a particular hurdle for US companies potentially interested in the rare earth space. Appropriate secure storage and/or construction and maintenance of impoundment ponds are subject to special licensing and impose significant additional project costs as well as heightened uncertainty that a project even could be permitted, as the Nuclear Regulatory Commission would then become party to the already lengthy permitting process (averaging 10 years in the US if no significant opposition to the project arises).

Recent discussions and increasing interest in building new nuclear power plants – particularly experimental mini-plants – could offer a new offtake solution for uranium but this

remains years away. Similar and sometimes more restrictive regulations in the EU also have affected production there. All these measures, however, reflect the responsibility felt by Western governments to safeguard their populations and uphold environmental standards – in other words, balancing ESG and national/economic security interests.

The Chinese government has allowed no such qualms to hinder its aspirations, which is how it became the world's leading producer of rare earth metals materials, but new, cleaner separation technologies being developed in the US offer hope of breaking China's grasp.



Heavy smog hangs over the Shanghai skyline.

Research underway at the Critical Materials Institute, a U.S. DOE Energy Innovation Hub, Lawrence Livermore Laboratories (with DOD financial support) and various University labs focus on trying to develop “green separation” methodologies using amoebas, bacteria, proteins etc. This strand of research is

best suited to rare earth deposits with little to no radioactivity, such as those of junior exploration/development company American Rare Earths Limited (ASX: ARR | OTCQB: ARRNF), which is providing feedstock to the above-cited labs from its La Paz and Halleck Creek sites. Other companies, such as MP Materials Corp. (NYSE: MP), the sole US-based rare earth miner, are working on setting up production facilities in the US. Initiatives such as these illustrate that it is possible to realize the goals of shortening and securing supply chains for vital rare earth processed materials while developing a “green economy” in the US based on sound ESG principles.