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$8.4 Billion Cache of Rare Earth Elements Discovered in America

By Bill Pierce
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Image Credit: Shutterstock

By Andre Nalin

In a surprising twist on the old “trash to treasure” saying, scientists have uncovered an enormous cache of rare earth elements worth an estimated $8.4 billion—hidden in plain sight across the U.S. in coal ash.

A team of researchers from the University of Texas at Austin recently found that coal ash, the powdery residue left behind after burning coal for power, contains massive amounts of rare earth elements (REEs)—the very materials critical to building everything from smartphones to wind turbines and the batteries used in electric vehicles. The results were published in the *International Journal of Coal Science & Technology*, not usually one of our favorite publications.

A Hidden Domestic Resource

According to the new study, America may be sitting on 11 million tons of rare earth elements buried in landfills, ponds, and storage sites. That's nearly eight times the current domestic reserves. For a country that relies on imports for 100% of its REE needs—75% of which come from China—this discovery could change the game.

"This really exemplifies the 'trash to treasure' mantra," said Dr. Bridget Scanlon, research professor at UT's Bureau of Economic Geology. "We're recovering valuable resources from waste while reducing environmental impacts."

Why Rare Earths Matter

Rare earth elements—17 in total—are essential components in modern EV tech and clean energy. But the global supply chain is tightly controlled and vulnerable to political tension. Domestic production, even from unconventional sources like coal ash, could offer much-needed security.

Coal ash isn't new—it's been piling up for decades as a byproduct of burning coal. But this is the first comprehensive study to tally up how much rare earth material it holds. Researchers analyzed ash from different coal-producing regions and found notable variations in both quantity and extractability:

Appalachian Basin coal ash contains the highest levels of REEs (431 mg/kg), but only 30% is recoverable.

Powder River Basin ash holds less REE content (264 mg/kg) but is more extractable, with about 70% potentially recoverable.

"There's huge volumes of this stuff all over the country," said Davin Bagdonas, a co-author and research scientist at the University of Wyoming. "And the upfront work is already done—the ash is already here."

Pilot Projects and the Road Ahead

The U.S. Department of Energy (DOE) has already started applying the study's methods for its own nationwide assessment. Meanwhile, pilot projects are underway to make REE extraction from coal ash economically viable.

One such project is being led by Bagdonas at the National Energy Technology Lab, focusing on ash from the Powder River Basin. Elsewhere, companies like Element USA are taking the next step—building the workforce and infrastructure needed to turn these ideas into action.

"It's a common-sense approach," said Chris Young, chief strategy officer at Element USA. "The challenge is turning that into an economic approach."

To accelerate the effort, Element USA is moving its lab and pilot operations to Austin, tapping into UT's deep bench of mineral expertise and offering students hands-on experience in the emerging field of critical mineral extraction.

Our Take

This is FANTASTIC news. Coal ash is an environmental headache. Now, it might just be the key to strengthening America's independence in the global race for critical materials. As the world races toward clean energy, innovations like these show that the path to a sustainable future could be built from the dirty remnants of our fossil fuel powered past.

We congratulate Element USA, researchers from the University of Texas at Austin, and US DOE. We hope DOE will take a stronger stance to promote electric vehicles and clean energy, as both are not only eco-friendly and cost-effective, but also provide massive job creation and economic growth in America.

Climate change action is important. Sadly, the federal government has fallen short. Climate Mayors is a community of mayors across America supporting climate leadership in our communities. EVinfo.net urges that you support forward-thinking organizations such as this, to see more great environmental advances such as the extraction of REEs from coal ash.

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