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Cleaner Coal Coming Down the Pipe

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SYDNEY, Australia -- A hybrid turbine that generates electricity from coal mine waste could help reduce greenhouse gas emissions, perhaps one day making coal nearly as clean a fossil fuel as natural gas, according to Australian scientists.

Coal mining releases methane, a greenhouse gas 21 times more damaging than carbon dioxide. In addition, low-quality coal at many mines -- particularly in Australia -- is often dumped in piles and neglected. There, it can spontaneously combust, releasing carbon dioxide.

Australia's national research organization CSIRO and a private Queensland-based company plan to build a prototype for a 1.2-megawatt power plant that will produce energy by burning both the methane gas and the unused low-quality coal.

Until now, burning methane released by coal mining has been impractical. The cost of generating enough energy to combust the low-concentration gas has exceeded the value of the energy produced from the gas itself.

That's where the stray coal enters the equation. By burning this essentially "free" resource of waste coal, the plant can create enough energy to burn the methane, said Patrick Glynn, the CSIRO researcher spearheading the research project.

"We're not doing anything too novel here, apart from taking existing technologies and putting them together in one application," Glynn said. In fact, he said the main purpose of the demonstration plant will be to test the hybrid under real-world, round-the-clock operating conditions.

Assuming it works, the environmental gains will be twofold, he says. First, the turbine will reduce methane and carbon dioxide emissions by burning both more cleanly. Second, the electricity generated from igniting the methane can either be consumed at the mine or sold on the domestic electricity grid, reducing the need to generate electricity elsewhere.

On a commercial basis, the hybrid turbines are expected to cost about $45 million apiece. Apart from Australia, Japan is seen as a major market for the technology, as are India and China, both large producers and consumers of coal, Glynn said.

Over time, he believes the technology could help close the greenhouse gas emission gap between coal and natural gas -- assuming all emissions from both energy sources are properly taken into account.

"People talk about natural gas emitting four times less greenhouse gases than coal, but that's only when the gas is actually burned for energy," Glynn said. At present, most greenhouse gas calculations don't take into account carbon dioxide emissions that occur when natural gas is pumped from the ground for storage and transmissions.

That may be so. But Keith Tarlo, senior research consultant for the Institute for Sustainable Futures at Sydney's University of Technology, said the stated benefits of hybrid turbine technology are based on misguided research.

"If you're going to put R&D money into new technology, why not put it into making cleaner technologies to begin with?" Tarlo said. "We should be studying ways to transition away from high-carbon fossil fuels altogether, instead of studying ways to make a very dirty fuel slightly cleaner."

Tarlo is also skeptical about how much greenhouse gas savings will result from the technology. That figure, he said, will vary depending upon factors such as the quality of discarded coal and the concentrations of mine methane.

What's more, he added, the technology's greenhouse gains could disappear if it supplanted electricity generated by windmills for the power grid.

"At the very least, it'll be important to show that this will create a real net gain over business as usual," Tarlo said. "The onus will be on them."

Nonetheless, Karl Schultz, spokesman for the Coalbed Methane Outreach Program of the U.S. Environmental Protection Agency, is enthusiastic about the technology -- based on what he's learned so far.

"I am impressed by their ingenuity at stitching it all together to mitigate emissions of coal mine methane and produce energy," Schultz said. "We look forward to learning more about it."