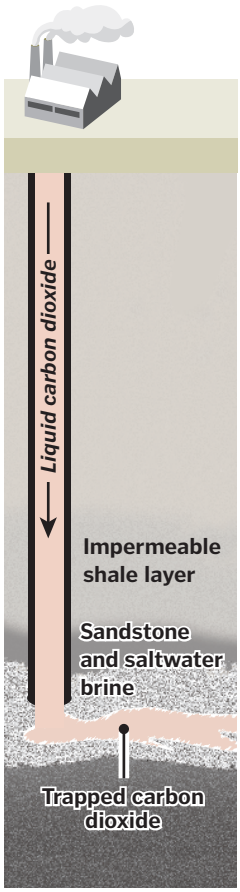
Capturing Carbon Emissions

American Electric Power, the largest consumer of coal in the United States, is retrofitting its Mountaineer coal plant in New Haven, W.Va., to capture carbon emissions and store them underground. Here's how the electric utility plans to use carbon capture and storage (CCS) technology, which will account for 15 percent of its output, and some of the obstacles the industry faces implementing this new technology.

THE PROCESS . . .



1 In the coal-powered plant, an ammonia-based solution absorbs CO_2 from other exhaust gases. The CO_2 gas is then separated from the solvent.

2 The gas is compressed into liquid form and injected more than a mile underground into a porous sedimentary rock.

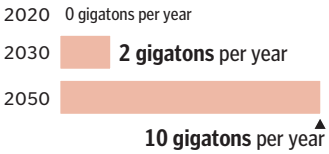
3 A layer of impermeable shale above it prevents the liquid carbon dioxide from migrating upward, trapping it indefinitely.

. . . AND THE OBSTACLES

TIME

To reach the agreed upon target of limiting global warming by two degrees by 2050, CCS efforts worldwide would have to be commerically productive by 2020, an ambitious goal for a largely untested new technology.

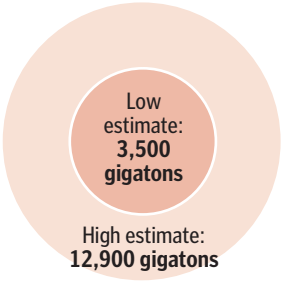
Estimated pace of carbon capture necessary to limit global warming by two degrees.



STORAGE CAPACITY

Viable CO_2 storage space underneath the earth's surface is still being assessed, but maintaining a storage site for over 100 years is a cost energy companies have never faced. They want the consumer to pay for storage fees and not be liable for any accidental release of carbon.

*Estimates of CO_2 storage capacity in the U.S. and Canada**



COST

Separating or "capturing" carbon from exhaust gases is the most expensive part of the CCS process. An estimated CCS cost could be anywhere from $20 to $100 per ton of CO_2, depending on the industry and technology applying it.

*Includes oil and gas reservoirs, unmineable coal seams and deep saline or sandstone formations.

SOURCES: American Electric Power, World Coal Institute, International Energy Agency, and the U.S. Department of Energy's Office of Fossil Energy and National Energy Technology Laboratory; CCS costs compiled from various sources by the Program on Energy and Sustainable Development at Stanford University, JJ Dooley of the Joint Global Change Research Institute, Pacific Northwest National Laboratory.

GRAPHIC BY CRISTINA RIVERO — THE WASHINGTON POST