› Current issue
› Archive
› NS Full Access

NewScientist.com

› Man with tiny brain shocks doctors
› Taking the fossil out of fossil fuel
› Space station crew to dump trash overboard

NewScientistTech

› Orbit data speeds up cellphone navigation
› Checkers 'solved' after years of number crunching
› Creeping oil might propel synthetic life

NewScientistSpace

› Space station crew to dump trash overboard
› Stars play tug-of-war with dusty disc
› Black holes trigger stars to self-destruct

Taking the fossil out of fossil fuel

Print Send Feeds

20 July 2007
NewScientist.com news service
Phil Mckenna New York State

Tools
digg MY YAHOO! Google Reader
reddit newsvine citeulike

In the rolling farm country of central New York state, the cicadas buzz, the barn swallows swoop and the natural gas hisses. Covered from head to toe in a baggy blue safety suit, Jennifer McIntosh, a geochemist from the University of Arizona in Tucson, leans over a rusty wellhead as she extracts a sample. A moment later the hissing stops and a small silver canister, now full of gas, is unfastened and packed away, ready for the lab.

Over 1.5 billion cubic metres of natural gas were extracted in New York state last year, yet there remains a certain element of mystery about the stuff's origins. Conventional natural gas deposits are thermogenic, meaning they formed under intense heat and pressure hundreds of millions of years ago. McIntosh (pictured at work, below) is looking to see if the gas at this location is "biogenic", created during the past 18,000 years by methane-making microbes, or methanogens.

"Ultimately, the goal is to understand how microbes make methane and how to speed up that process," says McIntosh. "Biogenic gas is a huge energy resource that could potentially be renewable on a human timescale."

Biogenic gas is a familiar by-product of methanogens that break down organic material in wetlands, landfills and the human digestive system, among other places. What McIntosh is looking for is natural gas that made by methanogens devouring carbon locked in deposits of black shale. Normally, the briny groundwater often associated with this type of shale would inhibit methanogens. However, studies suggest the vast release of fresh water at the end of last ice age may have diluted the groundwater in some deposits enough for methanogens to gain a foothold.

In 1993, researchers with the United States Geological Survey (USGS) reported pockets of biogenic gas across the US and predicted that 20 per cent of all known natural gas deposits worldwide were formed by microbes. Outside the US, deposits are now being tapped in Siberia, Australia, India and China, with additional accumulations believed to blanket continental shelves worldwide. "The distribution occurs from polar regions to the tropics, from sedimentary basins on land to offshore," says Peter Warwick, a USGS researcher.

This summer, McIntosh is sampling gas and water from wells across New York, Pennsylvania, Ohio, Kentucky and the Canadian province of Ontario to learn the full extent of biogenic gas deposits in these areas. This in turn will provide a better sense of what environments methanogens can live in and aid the search for new gas deposits, as well as for potential sites where carbon dioxide can be sequestered after natural gas has been extracted. McIntosh also hopes to learn how the methanogens reach the shale in the first place, and whether they can be deliberately introduced into deposits that are not currently producing gas.

> "Methane-producing bacteria could be deliberately introduced into deposits that aren't currently producing gas"

"In the future we might be able to use large beds of coal and shale as nurseries for biogenic gas," says Warwick.

LUCA Technologies, based in Golden, Colorado, is already working on this idea and has close to a dozen related patents pending. Researchers at LUCA are currently testing ways to speed up methane production both in the laboratory and in naturally occurring "geobioreactors" deep underground. They are also developing strains of microbes to inject into shale, or spent coal and oil deposits to produce clean-burning natural gas.

"We're talking about gas formation over weeks or months instead of hundreds or thousands of years," says Mark Finkelstein, vice-president of biosciences at the company.

The idea has obvious appeal. Compared with burning coal, natural gas produces 44 per cent less carbon dioxide per unit of heat generated and far fewer toxic pollutants. Despite this, McIntosh acknowledges that the consumption of natural gas is a significant source of greenhouse emissions. "We need to be looking to alternative energy, but it's not going to happen overnight," she says. "It's still important to explore the potential of renewable natural gas."

From issue 2613 of New Scientist magazine, 20 July 2007, page 17

Related Articles	Web Links
Gas taps its natural flare	Jennifer McIntosh
Rising prices could end wasteful gas flaring	LUCA Technologies

Print
Send
Feeds

Latest News

› Deadly fish virus spreads further
› Taking the fossil out of fossil fuel
› Melting glaciers will dominate sea-level rise
› 'Hidden' species may be surprisingly common
› Meat is murder on the environment

More Stories