

## Carbon-capture: A pipeline pioneer of a different sort



In addition to reducing carbon-dioxide footprints, Susan Cole has her sights set on a billion barrels of once unrecoverable oil

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Up to now, the crowning moment in Susan Cole's career was being named "Saskatchewan oilman of the year." A decade later, the British-born engineer adds a new title to her résumé – "pipeline pioneer."

She is leading Canada's biggest carbon-capture project so far, a planned \$1-billion pipeline to carry carbon dioxide down the central spine of Alberta. Backers believe it will do for carbon capture what earlier pipes did for oil and gas – unlock massive economic value.

"We have companies today with huge natural gas networks, and now there is potential to do the same with CO<sub>2</sub>," she says.

Her five-year-old firm, Enhance Energy Inc., won't rival TransCanada Pipelines any time soon.

Enhance's Alberta Carbon Trunk Line, when completed in 2012, will run 240 kilometres from the refinery-intensive Heartland region east of Edmonton to Red Deer in central Alberta.

That will reduce carbon footprints for upgraders and refiners that feed into the system. But what happens near Red Deer is key to her broader dreams: The CO<sub>2</sub> will be injected into old reservoirs to extract oil that could not be recovered by conventional water flooding.

"You can increase recovery of that original oil in place by 10 to 15 per cent," Ms. Cole says.

It is a new twist on Canada's obsession with pipelines as the modern versions of 19th-century railways – vast infrastructure along which economic wealth can be transported. For example, the stranded pools of Alberta natural gas were tapped in the 1950s with the building of the Alberta Gas Trunk Line.

Ms. Cole and her investors had that in mind when they conjured up the Alberta Carbon Trunk Line. She has maps of future pipeline webs across the province, carrying carbon dioxide to mature fields with more than a billion barrels of once unrecoverable oil.

"We've got all these old oil reservoirs in the province and they are just waiting for CO<sub>2</sub>," says Ian MacGregor, chairman of North West Upgrading Inc., a major partner and future carbon source for

ACTL. “[Carbon] is a feedstock here, not a disposal problem. There is no other place like that in the world.”

The carbon will be injected into reservoirs after water has already swept through, leaving untapped reserves. CO<sub>2</sub> acts like a paint thinner, a kind of solvent, that strips oil from the rock that can't be flushed out with water.

The pipeline draws on proven technology, used extensively in the United States. And Ms. Cole managed the startup of a similar project in Weyburn, Sask., for which she shared that oilman-of-the-year honour in 2001.

But the Weyburn project, developed by PanCanadian Petroleum Ltd. (later operated by EnCana Corp., and now Cenovus Energy Inc.), uses CO<sub>2</sub> piped from a North Dakota coal plant. ACTL would be the first all-Canadian solution.

It has attracted \$495-million from the Alberta government's \$2-billion carbon capture fund, and another \$63-million from Ottawa. Private backers include Barclays Capital Inc. and North West, whose planned upgrader in the Heartland region will, when completed in 2013, feed its carbon dioxide into the pipeline.

“All crude is getting heavier and this will be the best heavy crude in the world for CO<sub>2</sub> footprint,” Mr. MacGregor argues.

When he and other investors began planning the pipeline, they saw Ms. Cole as a natural to be the operational head. “She's the world expert in enhanced oil recovery through CO<sub>2</sub>,” he says.

Born in England, she immigrated to Canada after high school and got her chemical engineering degree from University of Calgary. She went to work in enhanced oil recovery and ended up in Weyburn. But with EnCana showing no plans to build on that project, she moved to start up Enhance Energy five years ago as president.

The timing was right. “You really need oil to be above \$60 a barrel to break even, and for this project to really make sense,” she says. Also, the development of credits for carbon offsets opened up new streams of potential revenue.

Of course, government funding also helped grease the wheel. But David Keith, director of University of Calgary's Institute for Sustainable Energy, Environment and Economy, questions whether it is government's role to back such a proven process. The carbon pipeline is “not worth public funds,” he says in an e-mail.

In addition to providing the regulatory conditions, government should be using its money to help buy down the cost of brand-new technology, he argues. By contrast, CO<sub>2</sub> pipelines are well understood technology, he says.

Mr. MacGregor says the public money allows the building of a pipeline that, with capacity of 40,000 tonnes a day, is 10 times bigger than the partners could have launched on their own. “We're building the trunk line for what will be needed in the future.”

Construction will start next year, and fertilizer giant Agrium Inc. (AGU-T69.14-0.33-0.48%) and North West are signed up as sources of carbon dioxide. Fairborne Energy Ltd. (FEL-T4.27-0.07-1.61%) will pump the first CO<sub>2</sub> into its reservoirs at Clive, near Red Deer, in late 2012, and recovered oil should start flowing to the surface in a year.

Ms. Cole makes no claims that this is the silver bullet for energy. It is, she says, just part of the solution. But there is a herd mentality in oil and gas, and when people see her project in operation, she is convinced the stampede will start. "We feel we're ahead of the herd."