

Bury greenhouse gases, report urges

Canadian technology traps carbon dioxide by collecting it and injecting it deep in ground

BY MARGARET MUNRO

Canada could help bury its image as one of the world's worst polluters by pumping millions of tonnes of carbon dioxide underground, says a new federal report.

The report calls for immedi-

ate action on carbon capture and storage using pipelines to collect the carbon dioxide spewing from factories and energy plants and inject it deep into underground disposal sites.

Ten to 100 million tonnes a year — as much as a quarter of the carbon dioxide emitted by

Canada's 700 most-polluting factories, refineries and electricity plants — could eventually be buried, says the report, which notes the sedimentary basin under the Prairies is ideal for soaking up CO₂.

The report has input from players in the country's energy sector and Alberta's energy research community.

"Picture a sponge," says co-author Bill Reynen, a science and technology director at Natural Resources Canada. A sponge, he adds, kilometres thick and hundreds of kilometres across that could sop up emissions for at least 100 years.

The report, titled Canada's CO₂ Capture and Storage Technology Roadmap, was drawn up over the past three years.

Natural Resources, a federal government department, published the 89-page report this month, but it does not reflect government policy, Mr. Reynen says. He describes it as a "guidance or reference" document — one that's emphatic about the need for action.

"The time to invest in CCS (carbon capture and storage) is now," the report states. The report says almost 3.4 million tonnes a year could be economically captured in the Western Canadian Sedimentary Basin "today" with "many more megatonnes available if appropriate policies emerge for dealing with CO₂ emissions."

The report was commissioned by the Liberal government, but appears to offer the federal Conservatives a guide for reducing pollution from large industries without offending Alberta's energy sector. Environment Minister Rona Ambrose has indicated carbon capture will be a prominent part of the government's "made-in-Canada" plan expected this fall.

A Canadian carbon storage project — an EnCana operation in Weyburn, Sask., — has drawn worldwide attention and is held up internationally as evidence that carbon sequestration can work.

The federal report suggests carbon sequestration would allow Alberta's energy companies to bury one of their biggest environmental problems — carbon dioxide — and keep on expanding. Injecting carbon could also enhance energy recovery by flushing more gas and

Tomorrow: An in-depth look at EnCana's \$1.5-billion Weyburn operation, where an elaborate maze of pipes and drill holes 1.5 kilometres underground has turned southeast Saskatchewan into a mecca for people searching for solutions to global warming. "You name a country and they've been here," EnCana's Dave Craigen says of the operation, which is home to the largest carbon storage project on the planet.

Thursday: University of British Columbia geologist Gregory Dipple sees big potential for mines to be part of the global warming solution.

oil out of underground reservoirs.

Alberta is "uniquely situated" to take advantage of carbon capture, Mr. Reynen says. Alberta emitted 224 million tonnes of CO₂ into the atmosphere in 2005, more than any other province in the country and almost one-third of Canada's total annual emissions of 750 million tonnes. As it happens, Alberta's biggest polluters sit on top of or near geological formations with the potential to soak up vast amounts of CO₂.

Central Canada does not have "suitable geological media" close by, he says. But pipelines could gather carbon from big emitters in Central Canada and carry it to U.S. or Prairie storage sites. The Atlantic provinces could stash some of their CO₂ in the region's coal beds.

But the report says the "world-class" geological basin under northern B.C., Alberta, Saskatchewan and Manitoba is the most logical place to start.

"A number of underutilized small diameter pipelines (five- to 10-cm lines) already criss-cross Alberta and Saskatchewan, and could be used to transport CO₂ from emissions sources," it says. These lines could become "the ribs" connecting to a larger "backbone.

The most likely prospects for CO₂ collection are emitters in the oilsands, and fertilizer, ethanol and ethylene oxide industries, which produce exit gases that are almost pure CO₂. Rather than sending the gas into the atmosphere, it could be diverted into pipelines and injected one to two kilometres underground.

Researchers both internationally and at Alberta Research Council have been advocating underground carbon storage for years, and there are plans to capture carbon from the oilsands in north-eastern Alberta and pipe it south for underground storage. Another proposal calls for "clean" coal-fired power plants in Saskatchewan that would capture and bury the CO₂ that would otherwise end up in the air.

The roll-out of technology, expertise and know-how for capturing CO₂ is "the prize to be won," says the report: "Canada could become an example of how to tackle the issue of climate change while continuing to increase the value of its fossil fuel resource base, all the while developing and commercializing technology for the world to use." The report pegs the cost at \$3 to \$80 for every tonne of CO₂ captured, depending on the source of the gas and how far it needs to travel.

A recent report from the Alberta Research Council, which laid out an ambitious Canadian carbon capture plan, pegs "ballpark" federal and provincial government investments at \$3.5 billion between 2008 and 2012.

The Pembina Institute, an Alberta think-tank, recently released a report saying carbon capture and storage could play a "significant role" as long as safeguards are put in place. Co-author Mary Griffiths, a senior policy adviser at the institute, stresses monitoring and strong regulations will be essential to ensure carbon dioxide doesn't slowly seep out of storage areas through abandoned wells and rock fractures.