Carbon Capture: New Technologies Under Development

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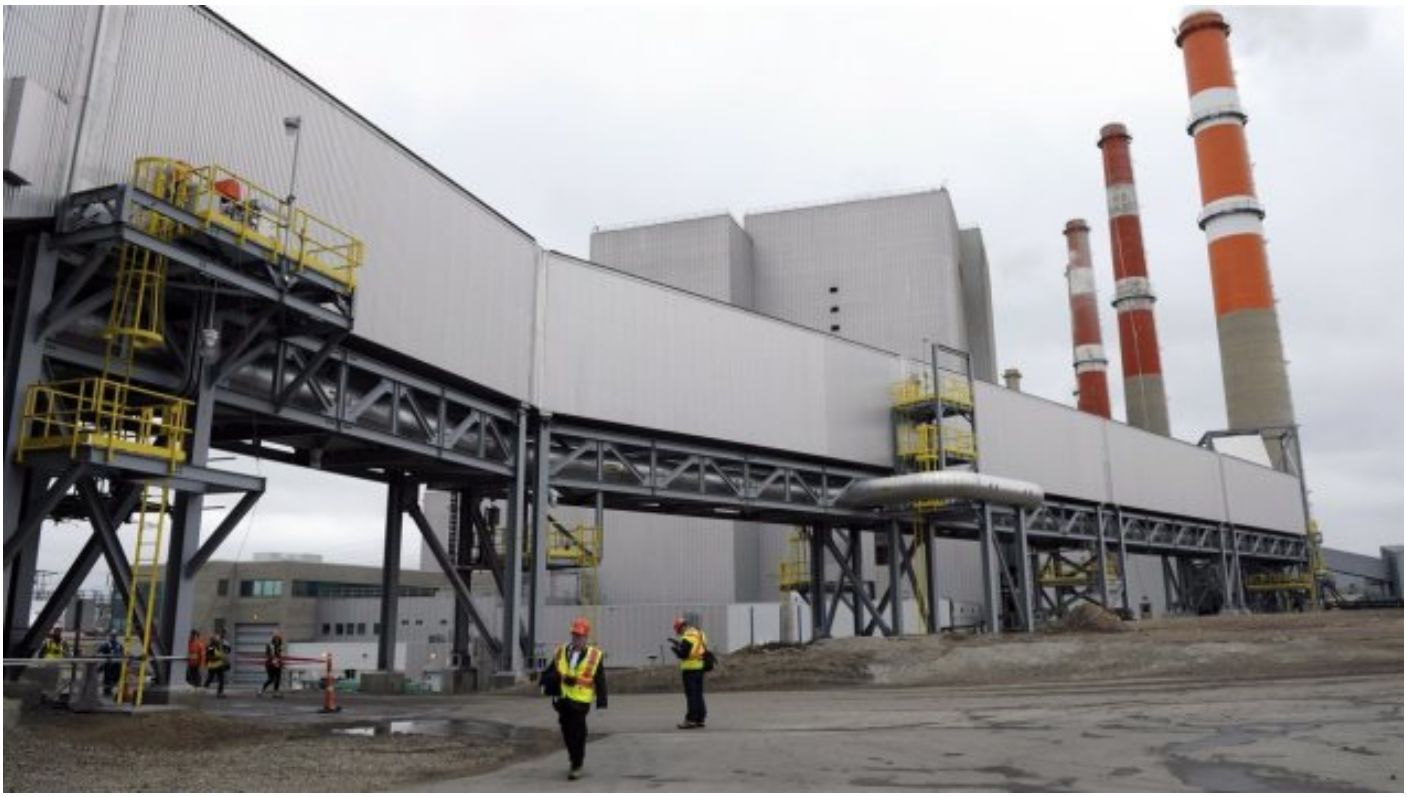

The Boundary Dam Carbon Capture and Storage Plant, near Estevan. Photo: The Canadian Press / Canadian Press / Michael Bell

The amine solution used by SaskPower at its Boundary Dam 3 carbon capture and storage plant is very expensive and leads to cost overruns for the Crown corporation. The pressure of the green shift on coal-fired power plants does not fade nationally, and from coast to coast, companies are developing alternatives to amines to reduce the bill.

A text **Nahila Bendali**

In Quebec, CO2 Solutions wants to develop an alternative to the amine problem. Like SaskPower's privileged technology at its Boundary Dam 3 carbon storage and capture plant, CO2 Solutions captures and separates carbon in a liquid.

The amine solution is a chemical compound that, in carbon capture and storage technology, is used to separate carbon dioxide from the rest of the elements that are captured.

Source: Amr Henni, University of Regina

An enzyme to replace amines

"The solutions to the amine is a bit similar [to our technology], in the sense that the amine is also in a liquid," acknowledges the CEO, Evan Price.

He explains that his company is developing an enzymatic process, which needs less heat than amines to capture and separate CO2, and achieve the same result. "It's a way for us to reduce production costs," he says.

Another advantage, according to Evan Price, is the cleanliness of the liquid, unlike the amines.

"Our liquid can be sent ... in standard water treatment systems, it is not something polluting [...] it is a very stable product", explains -he. The stability of the product also avoids the problem of degradation, which annoys SaskPower, Price said.

Solids rather than liquids

Although for the time being amine technology is the only technology that is quite developed on the market, some processes that use solids rather than liquid solutions to capture CO2, namely adsorption, are promising, Jamal Chaouki, Professor in the Department of Chemical Engineering at Polytechnique Montréal.

"[With] adsorption already, the energy costs are much lower, so it's a contingency," says Mr. Chaouki. He adds that by adsorption, it is possible to capture CO2 on a smaller surface than in a liquid, where it is necessary to heat a large quantity to achieve the same result.

A company in Burnaby, British Columbia, has taken the challenge of adsorption to reduce the costs of carbon capture.

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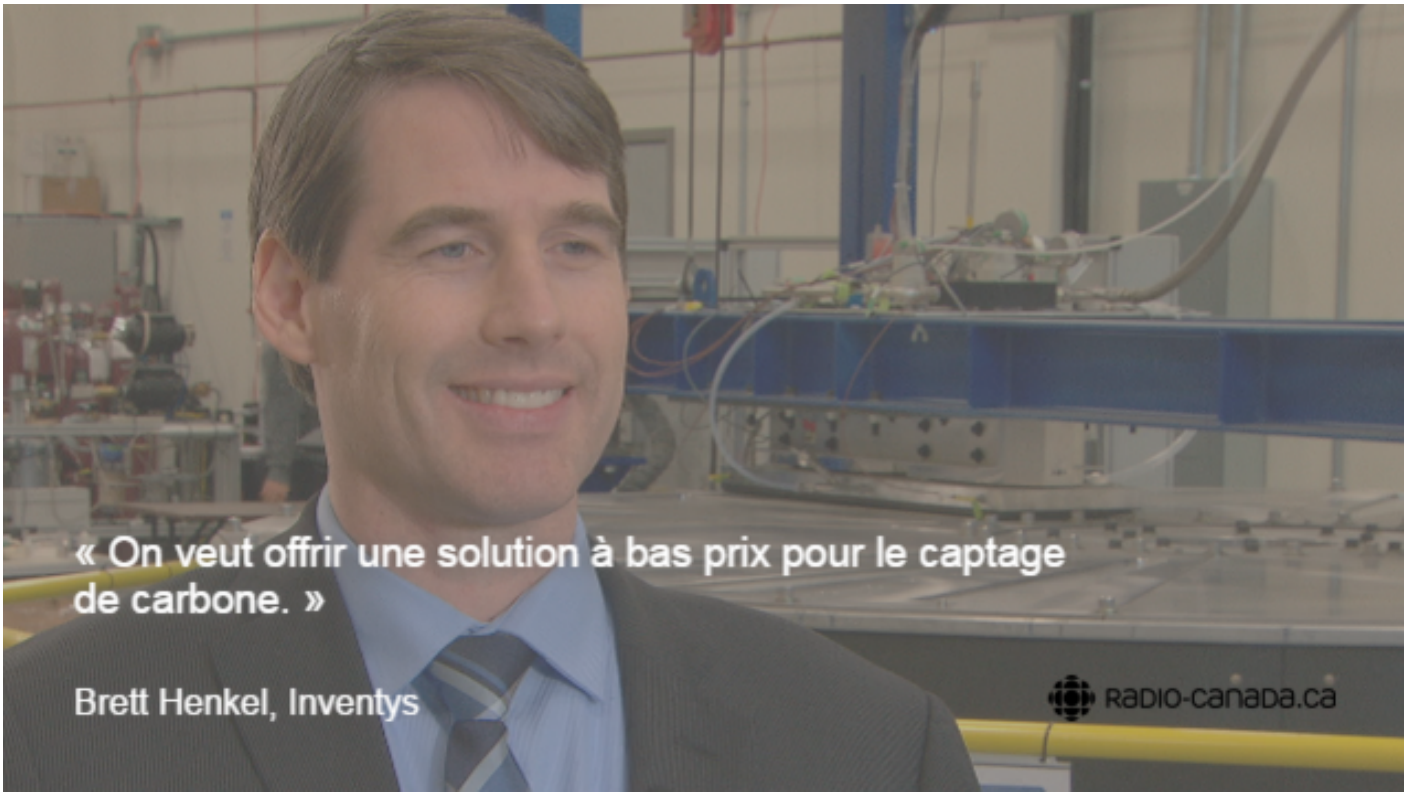
"We believe we have a significant advantage, because our adsorption system allows us to use a compact system," said Brett Henkel, vice president of business development at Inventys.

"We do not use amines, it's a completely different approach to carbon capture. "



Inventys vice president, Brett Henkel, hopes to reduce the costs of carbon capture through his technology using a solid Photo: Radio-Canada / Paul Préfontaine

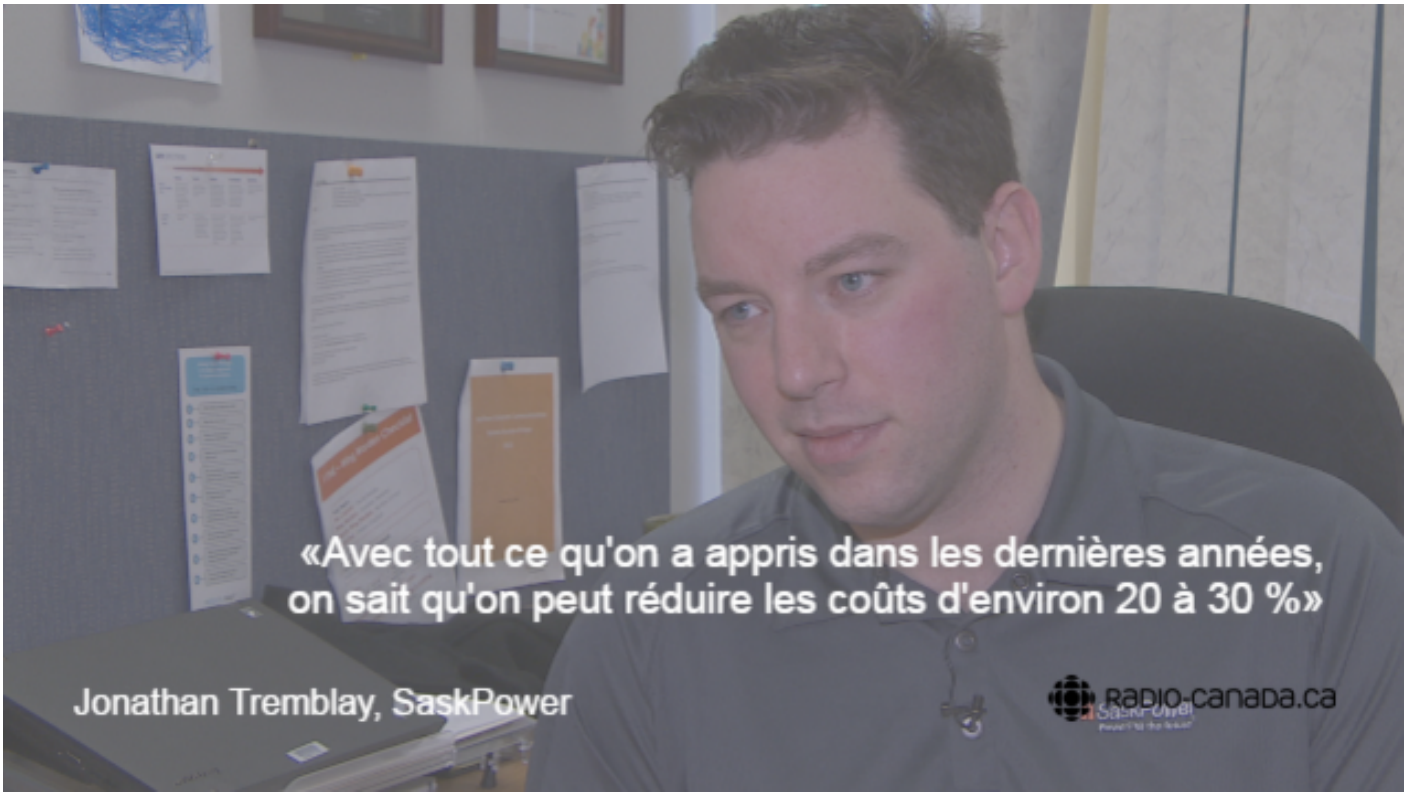
Inventys targets Alberta's oil sands markets, but also targets coal-fired power plants. According to the vice president, its process could be implemented in coal plants of SaskPower when it is developed.

The technology called Veloxotherm is still in development and testing, says Henkel. Inventys tests its system at Husky Energy facilities in Saskatchewan. "We want to market our technology on a larger scale by 2019-2020," he says.

Objective: SaskPower

For now, these technologies are still in the development and demonstration phase.

"Currently, it's the race, there are a lot of labs around the world that race on this technology. There are some in Canada [...], but it is not yet ready, "says Professor Chaouki.



SaskPower spokesman Jonathan Tremblay believes it will be possible to reduce the costs of carbon capture technology Photo: Radio-Canada / Rob Kruk

Current Technology to Perfect

SaskPower is currently dealing with Cansolv, a branch of Shell, for the amines of its Boundary Dam 3 plant. The amine solution used degrades very quickly and must be constantly renewed, which is very expensive.

"Who knows, maybe there are other solutions, other things that exist in the world," said SaskPower spokesperson Jonathan Tremblay.

Both Inventys and CO2 Solutions are hoping to commercialize their large-scale process by the end of the decade. This coincides with the time when SaskPower must comply with federal requirements by closing its coal-fired Boundary 4 and 5 or equipping them with technology to capture and carbon storage, but nothing prevents him to make a decision sooner.

SaskPower is not linked to any company for the future. If it decides to continue with carbon capture and storage technology, there will be a call for tenders, says the spokesman for the Crown corporation, Mr. Tremblay.