# Calgary Herald

## Game theory helps forecasters think ahead; Modelling method lets oil producers anticipate change

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Illustrations: Colour Photo: Ted Rhodes, Calgary Herald / Dick Cooper, left, and Brant Sangster, of Deloitte Consulting, do battle with The Winner, a chess sculpture by J. Seward Johnson in Century Park. The men are among the authors of Producer's Dilemma, a study applying game theory to oilsands development.

A groundbreaking study utilizing game theory could help oilsands players make better decisions about their multibillion-dollar ventures.

The results of the study completed earlier this year by the Canadian arm of the energy and resources group of Deloitte Consulting also suggest some of its conclusions are already coming true, in particular the decision by the Alberta government to make material changes to the province's royalty regime for the oilsands.

The exercise has specific application to what may be the world's largest development play, the $100-billion development by 27 firms and interests of 53 different oilsands projects over the next decade.

"We wanted to understand where all of this was going to go, would things continue on as they are," says Dick Cooper, who heads Deloitte's Canadian energy and resources consulting practice from Calgary.

"What we're focussed on is the challenges that they're facing and helping them overcome some of those challenges," Cooper says in an interview.

Using game theory and modelling experts Priva Consulting Corp., the study modelled publicly available input from the oilsands' largest players, government, unions and pipeline firms. Deloitte was then able to narrow the likely future of Alberta's frenzied oilsands development down to two probable outcomes.

One of the two outcomes -- essentially that the current degree of development continues and even accelerates -- predicted that the government might step in as the pace approaches unsustainability.

The intricate modelling -- which was centred on whether oilsands firms would proceed with their plans or delay investment; and whether they would upgrade inside Alberta or outside -- actually produced 33 million outcomes, but the bulk of those were considered unlikely, undesirable or both.

"As overall levels of activity within the industry move towards a state that is potentially unsustainable, the simulation forecasts that a certain degree of external control -- i.e., government regulation or royalty/taxation rate changes -- could guide the industry back to an evolved position of balance," says the report.

"The first outcome, which was the fast pace of the oilsands continues, is actually what we see unfolding as we speak in that the government increased royalties," Cooper noted.

"We're waiting to see how that unfolds in terms of the impact on the pace of development."

Industry experts say the game theory approach has some precedent or near-precedent in the world of conventional oil, but not the non-conventional world of oilsands projects and production.

And it can be insightful, they suggest.

"The idea is really quite valid," says Canadian Association of Petroleum Producers vice-president Greg Stringham, "although there's so many variables out there I'm not sure you can model it."

Stringham notes that probability and risks have been modeled for years in conventional production -- and possibly, to a lesser degree, non-conventional projects -- using analyses called "risked economics." However, "when you get into the oilsands, it's not just a plain hit or miss risk, it's not an exploration risk, it becomes more game-theory-like, a policy simulation as well," said Stringham.

Cooper and his team are now monitoring the situation to see if a shift is underway toward the second likely scenario, a situation where some projects are slowed or delayed, but which is expected to lead to an increase of upgrading and refining activity in Alberta.

That scenario two also suggests that both federal and provincial governments, under pressure due to labour force pressures, environmental concerns and other strains, "would have to provide incentives and, at the same time, encourage industry to slow the rate of development."

Among those on the Deloitte team is Brant Sangster, a former Petro-Canada senior vice-president in charge of the energy giant's oilsands projects, who helped to guide the oilsands game theory project.

"We're very curious to know whether we will get to scenario two," says Sangster."Outcome two is an interesting place to contemplate, for example, whether there there is another shoe to drop."

For now, it's unclear whether a shift is taking place, although both Cooper and Sangster hope to develop a

further stage of the game theory exercise to try to measure how the new royalty regime affects decision-making by oilsands participants.

"Even in the face of the royalty increases, we've (seen) how certain of the players have declared that they are still moving ahead. The jury may be out whether there will be a delay in the pace of development because of what the government has elected to do up to this point." says Sangster.

Stringham believes the game theory initiative can be a useful addition to a suite of decision-aiding tools during what he describes as a decidedly uncertain time for oilsands developers.

"A lot of them are looking into this murky crystal ball of the future. Other than the ones that are under construction, most of them are having a hard time putting all of the moving pieces in line to be able to make a firm decision on a go/no-go basis."

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