

# Daily Oil Bulletin

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## GE Announces Global Winners Of Innovation Challenge Tackling GHG Emissions From SAGD

BY [CARTER HAYDU \(/AUTHOR/CARTER-HAYDU/\)](#) – FEB. 4, 2015 – [VIEW ISSUE \(/HEADLINES/2015-02-04\)](#)

While the interactions between temperature, density and acoustic wave pressure variations have been observed for centuries, **Kees de Blok** hopes to harness thermoacoustics for a rather unique application — potentially offsetting the need for fossil fuel consumption in oilsands operations.

“It is quite new — it is a novel technology and I am one of the founders of the technology in a modern implementation,” said de Blok, an engineer with **Aster Thermoacoustics** of the Netherlands.

His plan is to use the low-grade heat temperature changes from steam assisted gravity drainage (SAGD) to produce acoustic waves in order to run a thermoacoustic engine and generate power.

“We have to do some R&D, but we are not starting from scratch,” he told the *Bulletin*. “I expect to bring this to application in the oilsands within three to four years.”

On Tuesday, de Blok was one of four recipients of a \$25,000 cash prize and an offer for another \$100,000 in co-development funding as part of the first phase of **General Electric’s** two-phase Ecomagination Innovation Challenge, with winning submissions addressing alternative uses for waste heat from SAGD, ultimately reducing greenhouse gas (GHG) emissions.

“What really is the exciting part is pulling together an industry looking for a solution with potential solution providers, and then collaborating to bring the whole thing back home,” **Brian Gregg**, manager of GE Global Research Canada, told the *DOB* following an award ceremony at his company’s Calgary Customer Innovation Centre.

Strategic advisors for the GE challenge include **Alberta Innovates – Energy and Environment Solutions** and **Canada’s Oil Sands Innovation Alliance** (COSIA).

“This will also accelerate our ability to find unique ways to reduce the greenhouse gas impact from some of these SAGD operations in the areas [COSIA members] think is most important,” he said.

Along with naming the first phase winners, GE announced it would start accepting applications for the second phase of its global Innovation Challenge, which will focus on finding technologies proven in other industries to enhance steam generator system efficiency in the oilsands, thereby lowering both emissions and operating costs.

According to Gregg, both phases of the challenge attempt to improve SAGD energy efficiency. While industry is working to resolve other efficiency issues in the oilsands, such as finding a way to reduce or eliminate the need for water or steam, GE’s Ecomagination hopes to find a near-term solution that could be implemented on an existing oilsands project.

“Instead of going out and finding a silver bullet that would replace SAGD entirely, we are asking how we can make the existing SAGD approach less impactful quickly,” he said.



Naren Chidambaram (left), Kees de Blok and Stefano Consonni are among three of the four winners from the first phase of the General Electric GHG Ecomagination Innovation Challenge, awarded at the GE Calgary Customer Innovation Centre on Feb. 3, 2015.

For the winners of the oilsands Innovation Challenge, Gregg said, the next step is to figure out how to use the \$100,000 development grants. “Is \$100,000 enough? Should we be bringing in other sources of funding? It all starts with a discussion of what is the scope of work we need to take with each unique technology to prepare or test it to see if it truly will be a good fit for this application in SAGD.”

Italy's **Stefano Consonni**, president of **Consorzio LEAP**, won Phase 1 of the challenge on behalf of his team's 'Opti-Up' closed-cycle heat pump, which upgrades low-grade heat to higher temperatures for application in steam production or power generation. Based on a reverse-Rankine cycle, the system uses water and ammonia as working fluid, and electrically-driven compressors upgrade low-grade heat to a higher, more useful level.

"Basically, it works as a refrigerator," Consonni told the *DOB*. "With a refrigerator you take the heat from the inside and discharge it into the kitchen. Instead, with our case it does the same thing, but picks up the heat at a low temperature and releases it at a higher temperature. "This could increase the efficiency of a SAGD plant, because it reduces the amount of fuel that is needed to generate the steam."

Companies are either applying or planning to apply to other industries all four technologies that received first-phase Ecomagination funding, Gregg noted. For example, de Blok's solution will probably first cool solar panels in the Middle East before it finds a potential application for recovering low-grade heat for a SAGD facility.

He said: "We are looking at what are the technical risks, the market risks, and where we should be spending money, and who should be partnering in order to figure out how to eliminate some of the risks and see where the technology is going to be a good fit.

"It is all about project planning now, and developing the relations we need in order to work with each of them."

According to Consonni, while similar closed cycle heat pump systems already exist, his company's technology is unique in its range of application, which includes development of the oilsands. Further, he said, his innovation uses a novel formulation for the working fluid of its refrigeration system.

"We have produced preliminary estimates of the configuration of the system, the performance and the cost. However, before going to the field there are two further steps we think are strictly necessary. One is refining the configuration, the performance and cost estimates. The second is to build the prototype."

Consonni said that winning the Innovation Challenge was both satisfying and a motivation for him to advance his technology to the next phase of its development.

India's **Naren Chidambaram**, managing partner at **Guha Industries**, won for his ammonia water heat pump, in which upgraded heat is applied using adsorption refrigeration with a working fluid of both ammonia and water.

"Once we have a pilot plant drive, we are ready to go into the field," Chidambaram said, adding that the system's use of ammonia must still be tested for oilsands application.

"The main thing is safety. We have to ensure this does not interfere with existing operations. Once we make sure of that, then it is ready to go into the field."

The process generates liquid ammonia, as well as a lean ammonia solution, which when pumped to high pressures and recombined will generate heat at higher temperatures — performing as a heat pump. Low-grade SAGD heat returned after heat extraction would drive the heat pump.

Chidambaram told the *DOB* that receiving the Innovation Challenge funding is a good indication that Guha Industries is doing a good job with the development of its technology. "That is a great incentive to keep going."

The United Kingdom's **Ron Driver**, an engineer with **Technical Services Ltd.**, was unavailable to attend Tuesday's presentation, but he won for a technology consisting of two cylinders each with an orbiting piston. A heat exchanger captures low-grade heat and supplies it to the 'hot' piston, driving the flow of air from the 'cold' piston to the exchanger, and the pressure changes move the pistons.

**Dan Wicklum**, president and chief executive officer at COSIA, said that through the Innovation Challenge his organization's 13 member companies — ranging from global supermajors to more local producers — are partnering with one of the most sophisticated technology organizations in the world. GE in turn is partnering with smaller companies led by hardcore superstar entrepreneurs, all to tackle a specific challenge.

"In a very real way, I think that what we are witnessing here today is the future," he told the awards ceremony. "We are living the future right here today in how large and small companies and organizations partner together quickly, efficiently and with discipline to solve specific challenges."

Wicklum noted: "This is a great way to tap into a world of expertise and fresh perspectives. The potential environmental benefits from implementing today's winning technologies, as well as future submissions, is very exciting."

“We needed this type of innovation to continue moving the bar forward to deliver the operating efficiencies and fine tuning we know producers and the market needs, but at the same time ensuring we are always delivering on environmental performance,” added **Elyse Allan**, president and CEO of **GE Canada**.

“We always felt that we could have our cake and eat it too. You can deliver on the operating side, and you can deliver on environmental performance. We can win on both. It takes innovation, technology and discipline to work through the challenges.”

The deadline for submissions to Phase 2 of the GHG Ecomagination Innovation Challenge is April 9. More information is available on the Ecomagination [website](https://ninesights.ninesigma.com/web/ecomaginationinnovation/) (<https://ninesights.ninesigma.com/web/ecomaginationinnovation/>).

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