WINNERS OF THE

Sand Challenge

POWERING COLLABORATION

GE | Statoil

Open Innovation Challenge -

Reduced use of sand in onshore operations

Background

GE and Statoil have launched a new collaboration to accelerate the development of environmentally and economically sustainable energy solutions. This joint technology-focused program is aimed at driving an industrial response to some of the biggest challenges facing global oil and gas development. As part of this, GE Oil & Gas and Statoil are committed to catalyzing broader collaboration within and beyond the industry through open innovation. This includes active use of crowdsourcing as a channel to solicit innovative ideas to reduce the environmental footprint in oil and gas exploration, development and production.

The first Open Innovation Challenge specifically aims to improve the efficiency of proppants used in unconventional operations in order to reduce the impact of trucking on our communities. Sand, one of the most widely used proppants in shale development, plays a critical role in the hydraulic fracturing process and in the ultimate productivity of a given oil or gas well. Sand is transported via water into a formation to "stimulate" or "prop open" the tiny fractures, enabling oil and natural gas to flow freely.

When operators stimulate a well, hundreds of truck trips carrying sand are required to bring this proppant onto the site. Through this open innovation challenge, GE Oil & Gas and Statoil have sought to improve efficiencies within their own operations, as well as encourage the broader industry to pursue solutions to lessen emissions and impacts on local communities and make energy production more efficient.

Tackling the challenge

Reducing trucking during this stage of shale development can largely be addressed by improving the use of current proppants or through the development of new proppants.

New proppants

Develop a replacement for the sand or other proppants used currently that are lighter and/or more compact allowing for more efficient storage and reduced weight. This would reduce the number of truck trips required, thus reducing related emissions, the exposure to moving vehicle hazards, and the wear and tear on roads.

Improved use of current proppants

Develop a new type of fluid or fluid additive that can better suspend the sand or other proppant so that it stays in place in the reservoir rather than settling to the bottom. This approach would increase the efficiency of the proppant and would reduce the amount required to be transported and thereby reduce related emissions, traffic, and road wear.

Awards and opportunities

The winners will each be awarded an initial cash prize of $25,000 USD, and will be eligible to receive additional funding from an available discretionary prize pool of $375,000 USD for potential development or commercialization upon meeting certain additional conditions.

The Powering Collaboration Judges Panel, consisting of both technical experts and management from both companies, evaluated more than 100 submissions from applicants from over 30 countries and across a number of industries. From these, the following five initial cash prize winners were selected:

Bioastra Technologies

Montréal, Quebec (Canada)

Lightweight, expandable polymer proppant

Bioastra Technologies has developed composite particles that swell up to ten times their initial size in liquid. These beads are lightweight and extremely high strength. Much smaller in size than other proppants, they can fit into smaller fissures, and are also somewhat pliable and, to a certain extent, conform to the small cracks in the formation. The particles are also more buoyant, facilitating better suspension in fluid. This material is essentially similar to something first developed for artificial cartilage and occlusion agents for surgery.

Biopolynet

Fredericton, New Brunswick (Canada)

Coiled biopolymer fluid additive

Biopolynet has a product that makes fluid more viscous, thus increasing its ability to support a solid. This would counteract the tendency for proppants to settle, making the proppant potentially more effective. It also makes the proppants slightly 'sticky' helping the particles to adhere to the surface of fissures in the formation. The formula of this can be customized to the mineralogy of a given formation. Currently this product is used as an application on sand dunes to prevent erosion.

Hoowaki

Pendleton, South Carolina (USA)

Alumina ceramic proppant in the shape of an "X"

Today's ceramic proppants particles have a spherical shape. Developed with Shell, the unique X shape 'flutters' as it moves through liquid, creating drag and reducing settling by up to 50% compared to sand. It also wedges better into fractures, which helps keep the fractures open and prevents the proppant from flowing back with the hydrocarbons and produced water. For its apparent density, this product is much stronger than most of the commonly used materials for proppant.

Semplastics

Oviedo, Florida (USA)

Lightweight polymer proppant

Currently proppants are made through the mining of ore, which is then shaped and fired. Semplastics uses a liquid polymer that is cured to a solid state and then fired to make small spherical particles. These particles have half the density of sand; however, they are still able to withstand extreme heat and have high corrosion and crush resistance.

University of North Dakota Energy & Environmental Research Center

Grand Forks, North Dakota (USA)

Lightweight, locally sourced ceramic proppant

Current ceramic proppants are made of high alumina content clays that are sourced in areas that are not located strategically to oil and gas basins. The University of North Dakota has developed a proppant that uses local and widely available, non- premium ore, source rock as the base material. This product is approximately 40% less dense than current ceramic proppants. Because it is lighter it is more buoyant and distributes better through the fractures, meaning less proppant should be required per completion.

Photos: Ole Jørgen Bratland, Tom Payne

More information on the challenge and the winners
can be found at poweringcollaboration.com

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