

Oil and Gas

Call for open path optical gas sensing solutions



CONTEXT

The photo shows a few hundred of the ~2 million oil and gas wells in North America. Airborne surveys show such production operations can be a substantial source of methane emissions. Typically, a large proportion of the total emissions are due to just a few sources: but how to find them?

We seek a radically new, 24/7 monitoring solution that can automatically identify methane sources and report their mass emission rates. This will prompt earlier and better remedial action.

Central to this approach is the need for mass-produced, robust, ultra-low-cost, open-path methane sensors that can transmit data to the cloud for remote analysis. Until now this has only been possible using advanced open-path gas sensors with beams steered across the area of interest.



WHAT WE ARE LOOKING FOR

We seek optical source and detector technologies suited to the large-scale manufacture of simple, low-cost, open-path optical sensors for methane. The goal is a sensor whose deployment cost per well pad is less than or close to the [ARPA-E Monitor programme's](#) goal of ~3000\$ per well pad per year.

We seek a step change in the performance/cost of short open-path optical methane sensors, through the use of advanced infra-red sources and detector technologies. We have already demonstrated we can remotely detect, locate and quantify gas emission rates from such data. We now seek simpler, cheaper, more robust sensors to enable measurements and monitoring at small, remote, production facilities.

1. Our first goal is to model the spectroscopic and optical performance of candidate sources/detectors in the "minimal optics" mode of operation we envisage.
2. Our second goal is to make a "zeroth order" physical prototype to evaluate the performance achievable by such an approach.

IN SCOPE

- Mass produce-able open path optical gas sensing systems.
- Minimal optics and alignment requirements -no moving parts.
- High power LED or other solid-state sources for 1.6, 2.3, 3.4 μm and uncooled detectors.
- Phase-coded beam length measurement techniques.
- Advanced signal processing at the sensor.
- Low power electrical design/telemetry: ideally solar panel/battery compatible

OUT OF SCOPE

- Any commercially available open path gas detection system.
- Proposals involving: telescopes, mechanical scanning heads, precision optical alignment.
- Manual alignment or set up and calibration/maintenance.
- DIAL systems, Solar occultation methods, FTIR systems.
- Point sensors of any description; including mobile point sources.
- Fibre optic based systems.
- Gas imaging cameras.
- Drones, acoustic detection, electrochemical cells.

HOW TO SUBMIT YOUR PROPOSAL

- Visit the [GameChanger submission form](#).
- In the "One-line description (max 100 characters)" field, label your proposal as "Open path optical gas sensing solutions".
- Submit your proposal by: May 17th, 2019
- For questions contact GameChanger-Solutions@shell.com

WE APPLY THE FOLLOWING CRITERIA FOR CONSIDERATION:

1. Novel – Is the idea fundamentally different and unproven?
2. Valuable – Could the idea create substantial new value if it works?
3. Doable – Is there a plan to prove the concept quickly and affordably?
4. Relevant – Is the idea relevant to the future of energy?

Any information submitted as part of the process will be considered by Shell as NON-CONFIDENTIAL data and information at this stage and will be treated as such. The funding opportunity will be in the range USD 150,000 – 300,000 to progress a "proof of concept" in a phased approach over a period of no more than 12 months. There is a possibility of further support by Shell depending on the overall outcome of the initial award.