

## Project Profile

<b>Project Name:</b>	B.C. Top-down Survey and Root Cause Analysis
<b>Project Number:</b>	ER-Meth-2022-02
<b>Proponent:</b>	Carleton University-Bridger Photonics-GreenPath Energy
<b>Funding Envelope:</b>	Environmental Research—Methane
<b>Timeframe:</b>	July 21, 2021, to April 30, 2022

### Project objectives

The objectives of this project are to build on previous methane surveys and provide further information on the prevalent potential causes of methane releases and their magnitude:

- Develop and carry out a field program using a “top down” screening survey to identify and quantify methane emissions at the source level. Follow-up with optical gas imaging (OGI) ground surveys to help identify the methane releases from the “top-down” survey at the source level and attempt to determine the root cause(s) for the releases.
- Develop an inventory of oil and gas sector methane sources in selected areas, by major equipment type—along with the magnitude of each source, the frequency of each release and the proliferation of the major equipment associated with each source. Determine the significance of each source type.
- Determine the root cause(s) of each release.
- Recommend potential solutions to mitigate each source of emissions which can be preventative or post-detection.

### Project approach

Led by Carleton University’s Energy and Emissions Research Lab (EERL), in close collaboration with GreenPath Energy Ltd. and Bridger Photonics Inc., the goals of this proposal are to develop and conduct an aerial top-down methane survey at sites in the Montney region of British Columbia (BC), combined with follow-up optical gas imaging (OGI) surveys and root cause analyses at sites with detected emissions. The combined results of these surveys will be used to identify emissions sources at the major equipment level and their occurrence rates and complete a source-by-source analysis of root causes and potential mitigation options. Finally, leveraging prior analyses, database and statistical tools, and comprehensive uncertainty analysis procedures developed as part of the previous methane survey and inventory work in BC (Johnson et al. 2021; Tyner and Johnson 2021), analyzed results will be used to create an updated upstream oil and gas methane inventory for the Montney region of BC. The project will involve the following phases:

1. Field program—develop scientifically defensible field program identifying the wells and facilities to survey that are representative of oil and gas production in BC.
2. Aerial Surveys—of up to 500 active production sites/facilities in the Montney region.

3. OGI Surveys—as sufficient detection and source location data becomes available, conduct OGI surveys on the ground to confirm, help identify aerial measured sources, and support root cause analysis.
4. Data Analysis—combine multi-pass flight data, aerial imagery, OGI data and site level observations to complete the root cause analysis.
5. Report and discuss findings.

### **Project deliverables**

The deliverables from this project include the following:

1. Final report—containing the following:
  - Top-down methane emissions inventory for defined areas of the Montney region.
  - Root cause(s) of the releases observed in the top-down survey.
  - Possible corrective actions and challenges.
  - Identification of data gaps and recommendations to address.