Reach for the sky
Whether by foot, truck, drone, robot or satellite, Dr. David Risk (above) and his Flux Lab team are on a mission to help Canada’s energy sector reduce its methane emissions

For this story, you need to take a trip on Google Earth to the picturesque town of Antigonish, the highland heart of Nova Scotia. Here, in this home of the oldest continuous Highland games outside of Scotland, you’ll find the venerable St. Francis Xavier University. You probably know it as St. FX.

Zoom in a bit closer, to one of the newest facilities on campus. You’re looking for the Physical Sciences Complex (building number 30 on the campus map). Now zoom in even closer, until you find 2066. It’s a space that’s hard to label. Part industrial workshop and part computer science centre, this is the home of Flux Lab—now in its 13th year of operation, it’s one of the largest earth sciences labs in Canada. It’s here that Dr. David Risk and his research team—16 in total, all of them young, more than half of whom are women—are developing new ways to measure and reduce greenhouse gases. And they’re doing it in partnership with some of the country’s biggest gas emitters.

Let’s reset that focus. Zoom out, as it were, to see how we—more specifically, Dr. Risk—got here.

A soil scientist by training, Risk has spent a lot of time using gas to measure the rate of biological processes. He has worked in the Arctic and Antarctic regions, monitoring soil and plant dynamics.
And he has co-authored a number of seminal works, including “First year-round record of Antarctic dry valley soil CO2 flux”. Not to mention the page-turning “Using subsurface CO2 concentrations and isotopologues to identify CO2 seepage from CCS/CO2–EOR sites: a signal-to-noise based analysis.” Of course, there’s also the must-read “Bulk and isotopic characterization of biogenic CO2 sources and variability in the Weyburn injection area.”

Are we being facetious? Just a little. Not to belabour the point, but Risk is a respected academic authority. He could have easily continued to spend his life applying for and securing research grants. That research, however, was disheartening: Risk was finding continuous evidence of increasing permafrost decay and greenhouse gas emissions. Frozen polar lands are thawing at alarming rates and as they thaw, they release previously trapped gases. “I felt powerless,” he says of his observer/recorder role.

With big, getting ever bigger, climate change on the horizon, Risk was determined to do something about it. That something is the Flux Lab. There, he and his team are building advanced monitoring tools that identify methane emitters. In identifying them, they create the opportunity for those leaks to be plugged.

On January 1, 2020, Flux Lab’s work moved from “nice to know” to “must have” information.

If Flux Lab can help Canada’s oil and gas industry hit Canada’s new methane reduction targets, that will be the equivalent of taking 5.7 million cars off the road.

National methane regulations that took effect this year are specifically designed to curb methane emissions by 40 to 45 per cent. According to the Government of Canada’s online information about Methane Regulations for the Upstream Oil and Gas Industry, methane has a global warming potential more than 70 times greater than carbon dioxide. This same source also says that “oil and gas facilities are the largest industrial emitters of methane in Canada. They release 44 per cent of total methane emissions.”

When oil and gas are extracted and processed on land, natural gas can leak accidentally or be released intentionally into the environment. These emissions contribute significantly to global warming and climate change and also cause smog and other negative impacts on air quality. (According to Risk, offshore projects, by the nature of their subsea location and extraction methods, aren’t as prone to methane risks as their onshore counterparts.)

Flux Lab’s work is sponsored by a diverse portfolio of stakeholders that includes regulators, NGOs—and the private sector. Once contracted for a project, members of their team conduct tests related to methane emissions. Thinking in terms of a pipeline that stretches over hundreds of kilometres, and the equipment needed to detect large plumes of escaping gas (such as drones, vehicles and satellites), you can appreciate why these assessments require

Neither rain nor sleet nor snow can stop Dr. David Risk and the Flux Lab team. The nature of their research demands extensive field work, often in remote areas, assessing oil and gas developments for greenhouse gas emissions. (Submitted photos)
This region’s economic prosperity and quality of life includes access to reliable, competitively priced energy and increasing the availability of renewable energy for domestic and industrial use.

The Atlantica Centre for Energy encourages informed decision making for strategic energy development.