Current Project Overview

The Quantification, Monitoring, Reporting and Verification (QMRV) Project aims to produce an accurate representation of greenhouse gas emissions in the supply chain of a liquified natural gas (LNG) company. The goal of this project is to improve emissions transparency, verify accuracy of reported emissions, and achieve emissions reductions. There are three phases of the project: A Baseline Phase, Enhanced Monitoring Phase, and a Verification Phase. The Baseline Phase will measure the total facility emissions using Top-Down (aerial and drone) and Bottom-Up (ground) technologies to compare against the Operator Estimated Inventory (OEI). The Enhanced Monitoring Phase the Operator will observe and estimate the emissions of the facility each month for 6-months. A measurement technology will come once a month to measure the site emissions. This will show how the emissions at the facilities are changing month to month. The Verification Phase will be a Top-Down verification measurement of the total facility emissions at the end of the project. A Low Emissions Gas standard was established by the Operator to assess if the enrolled facilities are achieving this standard during each phase of the project.

There are 15 different enrolled facilities in the midstream sector dispersed mostly in the NE and Southern regions of the US. CSU is part of the Scientific Measurement Team – our role is to analyze and verify the data and to compute the results. We look at each facility to produce a Measurement Informed Inventory (MII) which is an estimate of emissions by combining all available sources of information.

Research Progress

The project is currently in the Baseline Phase. We are writing reports for each facility, providing the data and results that occurred during the Baseline measurement day. To create the MII, top-down and bottom-up measurement methods are analyzed. The goal is to make each method a comparable full facility, estimate of emissions. No measurement technology is perfect, so this means augmenting top-down measurements with emissions that were not detected. The bottom-up measurement method is not considered a whole site estimate and therefore is only used to count fugitive leaks. The figure below represents a facility level emissions estimates compared to the OEI.
The Top-Down Measurement 1 and 2 were augmented with fugitive leaks, methane slip from compressors and non-compressor exhaust to get an adjusted total emission estimate. The third Top-Down Measurement was determined to be a full-facility estimate. To create the MII the average of the three top-down measurements is taken and compared to the OEI. The OEI is typically much lower than the three measurement methods. The MII and OEI is then compared to Low Emission Gas (LEG) standard. These calculations will be done again each month until the End-of-Project verification phase.

Research Plans

1. Finish Baseline Reports – process data and produce results for remaining sites.
2. Start Enhanced Monitoring Phase
   a. Analyze monthly OEI and measurement data
   b. Process the monthly data and produce results
   c. Compare the results to the LEG standard
   d. Present results to companies each month
3. End of Project Verification Phase
   a. Get Top-Down measurement and OEI data
   b. Compare the results to the LEG standard
   c. Look at overall emissions of the sites
4. Start research paper on the findings of the project

Literature cited