Model for Developing Fine Scale Spatial and Temporal Methane Emission Estimates for Oil and Gas Basins: Public Project Summary

With support from the Methane Collaboratory, the University of Texas, Colorado State University and SLR International are developing a new community modeling tool for constructing inventories of methane emissions from oil and gas operations. This project responds to needs identified in a recent report by the U.S. National Academies of Science, Engineering and Medicine which recommended that the United States should:

> "…establish and maintain a fine scale, spatially and temporally explicit (e.g. gridded) inventory of U.S. anthropogenic methane emissions that is testable using atmospheric observations and update it on a regular basis."
>
> "…promote a sustainable process for incorporating the latest science into the United States Greenhouse Gas Inventory and regularly review U.S. methane inventory methodologies."
>
> "…establish and maintain a nationwide research effort to improve accuracy, reliability, and applicability of anthropogenic methane emissions estimates at scales ranging from individual facilities to gridded regional/national estimates."

The community modeling tool to be developed by the project team will have the following features:

- *The ability to select custom emission factor and activity factor data, drawn from libraries of quality assured, harmonized data sets, or from data provided by the user.*
- *The ability to assess the potential impact of mitigation technologies.*
- *The ability to generate emission estimates for other light alkanes (ethane, propane, butanes) co-emitted with methane.*
- *The ability to aggregate emissions at multiple spatial and temporal scales.*
- *The ability to estimate uncertainties in the emission estimates.*
- *Community access.*

The model will build on previous modeling and measurement of methane emissions that the project team has performed and applied in the Barnett, Eagle Ford, and Fayetteville oil and gas production regions. This experience will allow the team to focus on model enhancements, including the integration and harmonization of large numbers of data sets, the addition of new information on intermittent emissions, the inclusion of new capabilities for modeling mitigation options, and making the model as versatile as possible. Project deliverables include:

- Open access model code and data libraries. The project will deliver a freely available code that can be made available to a wide range of stakeholders.
- A report describing the model, documenting the approach used in harmonizing past studies, and identifying data gaps.
- A manuscript describing the model will be prepared and submitted for publication in a relevant peer-reviewed scientific journal.

The project team has decades of experience in developing emission inventories and in performing methane emission measurements. The team includes groups that have previously worked separately in collecting activity data, collecting emissions data, developing emissions models, and coupling emission models with atmospheric models to enable comparison of emission models to atmospheric measurements. In combining their efforts, the project team will be focused on creating a state of the science, modular and readily updatable community emission estimation tool that can be used by a wide range of stakeholders.