



Atmospheric flux

- **Strengths of CMS stakeholder engagement efforts**
 - What is working well? What have you learned from stakeholders/scientists?
 - Interacting with governmental agencies that are developing bottom up inventories
 - Working with NGOs and industry to generate actionable data
 - Good progress making connections at the state level (Maryland, New York, California)
 - Huge change regarding energy/emissions is on the horizon, so very important to augment CMS data studies/production, including the need for continuous monitoring using top down approaches
 - On the CH₄ point source front, sharing plume imagery and source locations is facilitated with web portals like Methane Source Finder (transferred to Carbon Mapper and CARB for operational decision support)
- **Gaps in CMS Stakeholder membership**
 - Major stakeholders:
 - Public: NYSERDA, CGIAR (CCAFS), and others
 - Private: Unilever, GHGSat, Oil&gas companies, gas utilities, landfill operators, and many others
 - Regulatory: California Air Resources Board (CARB), U.S. State/National agencies, and others
 - Missing stakeholders?/Who should we focus on engaging with in the next phase?:
 - International stakeholders
- **Challenges and barriers for effective stakeholder engagement**
 - There is not a unified strategy for communicating data and results with stakeholders (i.e. U.S. State Department, etc.)
 - Need to address data gaps with stakeholders (i.e. needing consistent, annual data, regular updates)
 - Stakeholders confused with uncertainties with data products (i.e. why can't we see methane emissions with TROPOMI from a given landfill or major metropolitan area of NYC)
 - For methane retrievals, we need to provide fluxes and uncertainties in addition to concentrations
 - Inconsistencies on accounting front (i.e. scientists versus EPA) and challenges in comparing inverse CO₂ fluxes with EPA inventory
 - Inventories often not produced in a way that allow for direct comparison of top down measurements
 - Lack of required bio/fossil priors and covariances for methane and carbon dioxide for improving flux inversions (EPA is not mandated to produce the required inventories)
 - Challenges attributing top down emission to sectors
 - **Recommendation:** Use CMS working groups to develop best practices for engaging with stakeholders that can be communicated to new CMS projects