
**Objective**: To promote significant reductions in methane and black carbon emissions from the oil and gas sector:

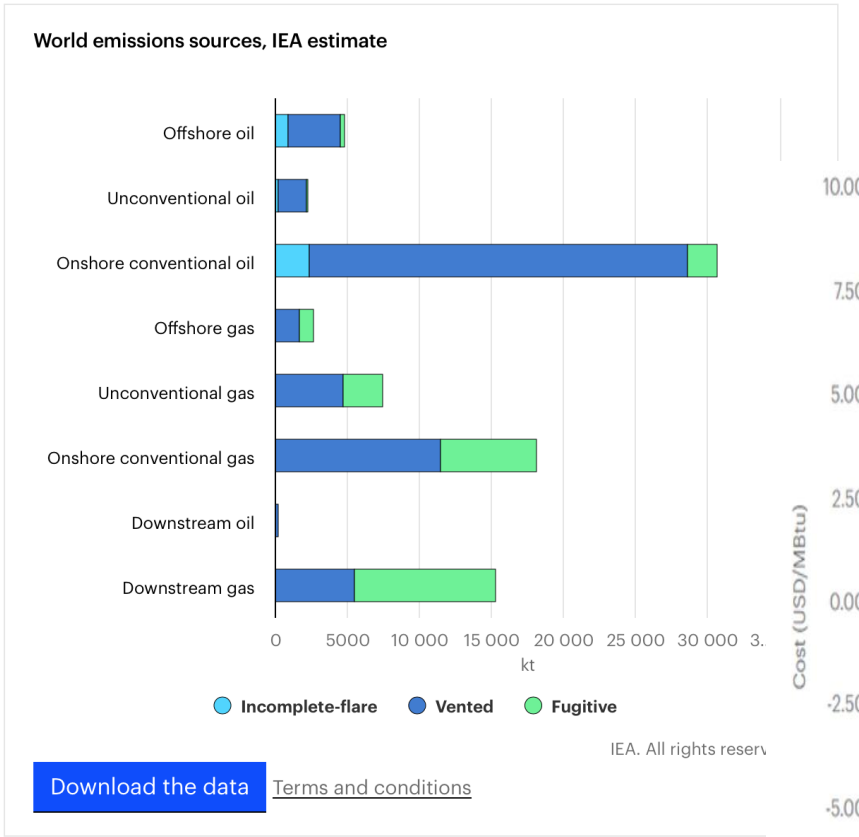
- 45% emissions reductions in methane emissions over estimated 2015 levels by 2025[1]
- 60-75% reductions by 2030[2]

**Partners**:
European Commission (Lead), Netherlands (Lead), Environmental Defense Fund (EDF), Nigeria, UN Environment, Argentina, Center for Clean Air Policy (CCAP), Clean Air Task Force, Colombia, Canada, Mexico, Norway, United Kingdom, United States of America

CLIMATE & CLEAN AIR COALITION
TO REDUCE SHORT-LIVED CLIMATE POLLUTANTS

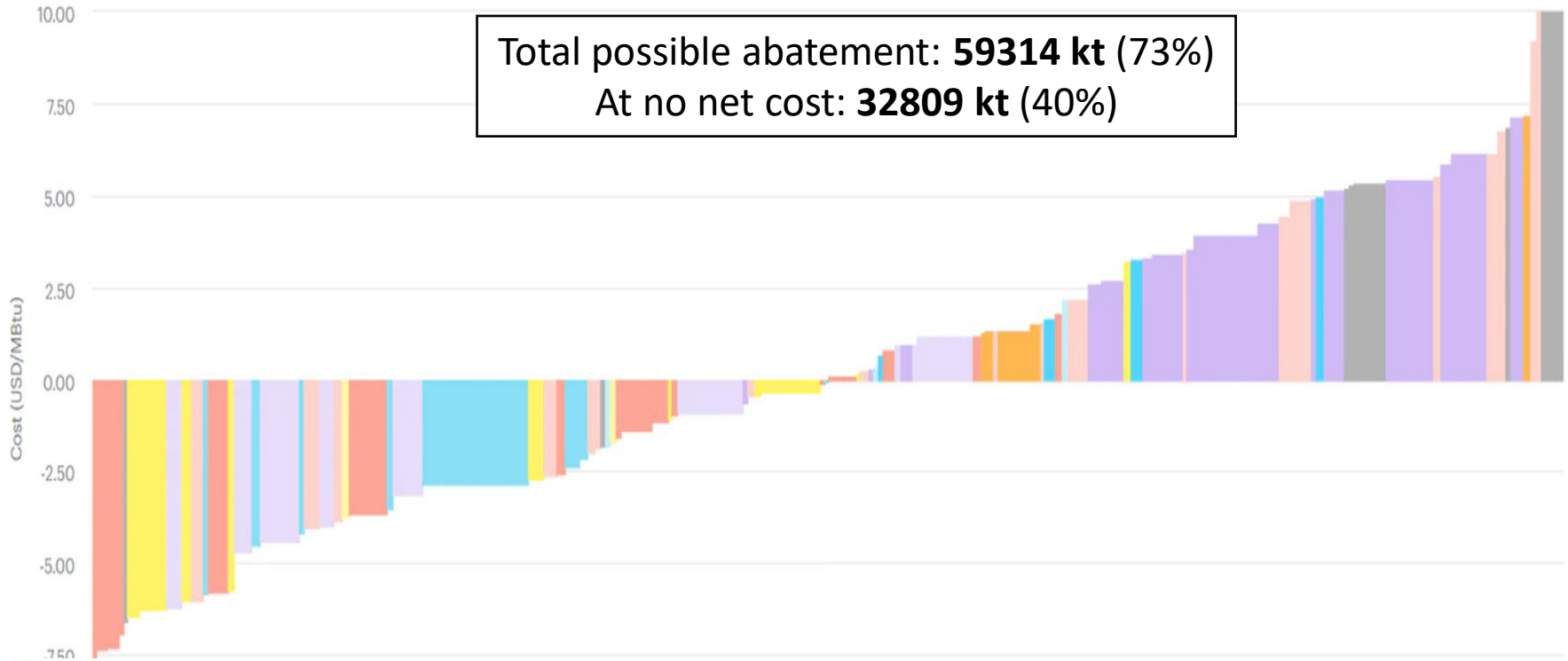
# Oil & Gas






## Marginal abatement cost curve for oil- and gas-related methane emissions by mitigation measure, 2019

Total possible abatement: **59314 kt** (73%)
At no net cost: **32809 kt** (40%)




https://www.iea.org/reports/methane-tracker-2020/interactive-country-and-regional-estimates#abstract

# Ongoing activities

Oil & Gas

## 1. Global Alliance to Significantly Reduce Methane Emissions in the Oil and Gas Sector by 2030

Started in 2019

**Partners**: Clean Air Task Force, Environmental Defense Fund (EDF), UN Environment

## 2. Oil & Gas Methane Partnership

Started in 2015

**Partners:** EDF, European Commission (EC), UN Environment

## 3. Oil and Gas Peer-to-Peer Regulatory Support

Started 2017, Partners:

**Partners**: Argentina, Center for Clean Air Policy (CCAP), Clean Air Task Force, Colombia, Nigeria

## 4. Technology Demonstration: Cost-effective Flaring Mitigation Opportunities

Started 2015

**Partners**: Canada, Colombia, GLOBE Foundation, International Cryosphere Climate Initiative (ICCI), Mexico, Nigeria, Norway, Stockholm Environment Institute (SEI)

Actors: Carbon Limits, Carleton University, Clearstone Engineering, GHGSat, Pembina Institute, Petroleum Technology Alliance Canada (PTAC)

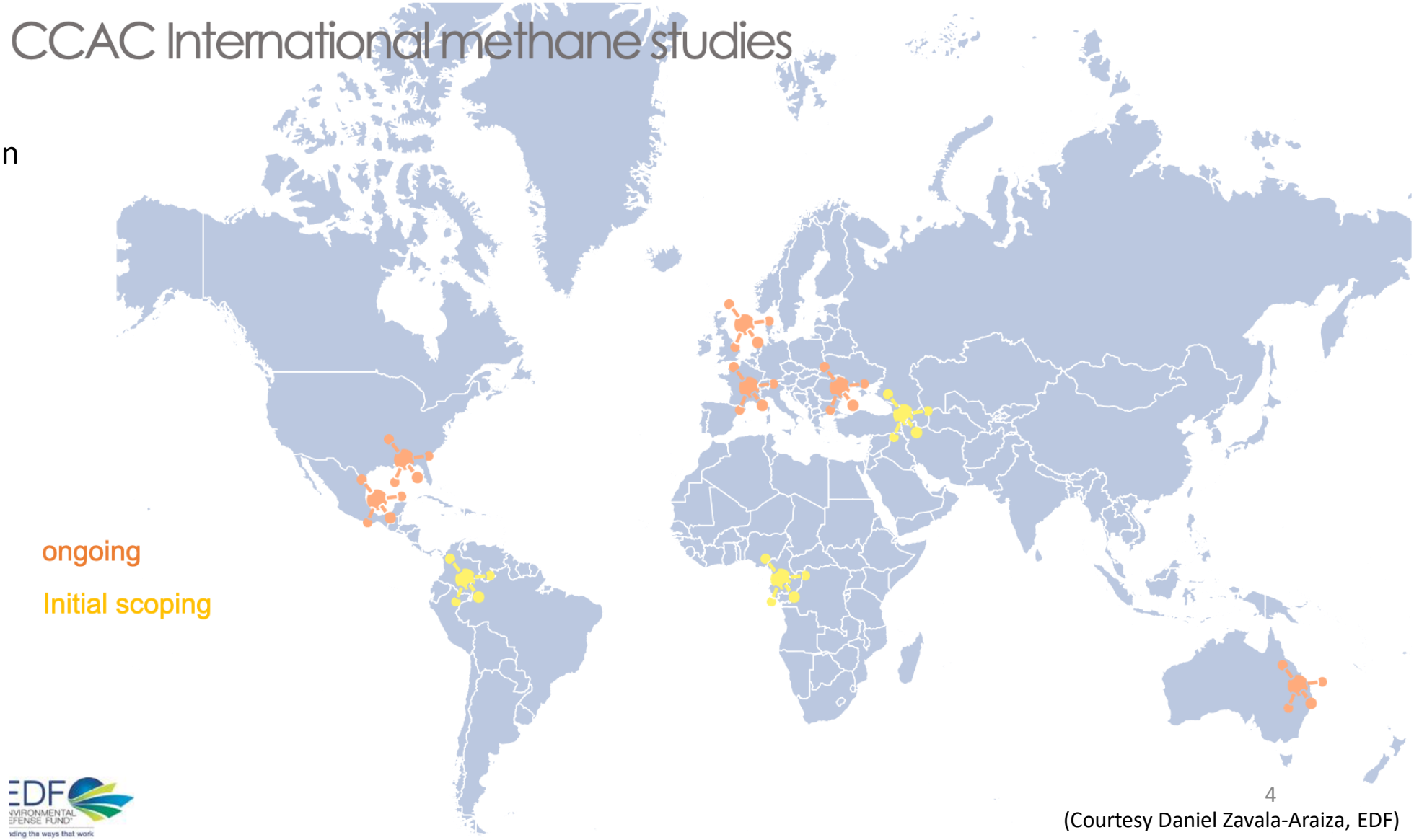
# 5. Oil and Gas Methane Science Studies

Started 2017, **Partners**: EDF, EC and OGCI

**Objective**: *To address a critical lack of global methane measurement data in the oil and gas sector to help prioritise company actions and government policies for addressing this important SLCP emissions source.*

Contact: Christopher Konek

- Partners work together on scientific studies to quantify methane emissions
- Collected data will help companies and governments prioritize mitigation actions and policies to reduce methane emissions.






(Courtesy Daniel Zavala-Araiza, EDF)

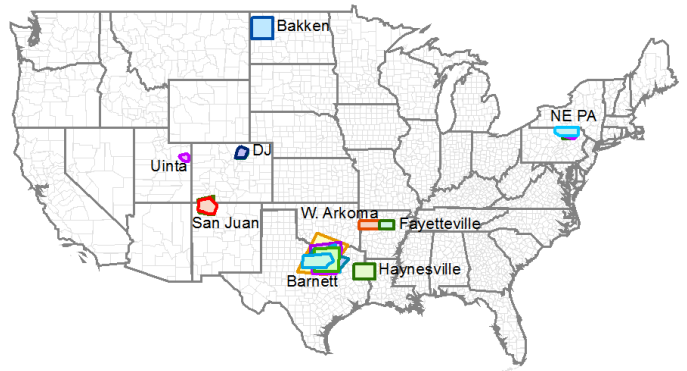
**Assessment of methane emissions from the U.S. oil and gas supply chain**

Ramón A. Alvarez, Daniel Zavala-Araiza, David R. Lyon, David T. Allen, Zachary R. Barkley, Adam R. Brandt, Kenneth J. Davis, Scott C. Herndon, Daniel J. Jacob, Anna Karion, Eric A. Kort, Brian K. Lamb, Thomas Lauvaux, Joannes D. Maasakkers, Anthony J. Marchese, Mark Omara, Stephen W. Pacala, Jeff Peischl, Allen L. Robinson, Paul B. Shepson, Colm Sweeney, Amy Townsend-Small, Steven C. Wofsy, Steven P. Hamburg. Science 361, 186–188 (2018) 13 July 2018

**Table 1. Summary of this work's bottom-up estimates of $CH_4$ emissions from the U.S. oil and natural gas (O/NG) supply chain (95% confidence interval) and comparison to the EPA Greenhouse Gas Inventory (GHGI).**

| Industry segment | 2015 $CH_4$ emissions (Tg/year) | |
|---|---|---|
| | This work (bottom-up) | EPA GHGI (17) |
| Production | 7.6 (+1.9/−1.6) | 3.5 |
| Gathering | 2.6 (+0.59/−0.18) | 2.3 |
| Processing | 0.72 (+0.20/−0.071) | 0.44 |
| Transmission and storage | 1.8 (+0.35/−0.22) | 1.4 |
| Local distribution* | 0.44 (+0.51/−0.22) | 0.44 |
| Oil refining and transportation* | 0.034 (+0.050/−0.008) | 0.034 |
| U.S. O/NG total | 13 (+2.1/−1.7) | 8.1 (+2.1/−1.4)† |

*This work's emission estimates for these sources are taken directly from the GHGI. The local distribution estimate is expected to be a lower bound on actual emissions and does not include losses downstream of customer meters due to leaks or incomplete combustion (materials and methods, section S15).
†The GHGI only reports industry-wide uncertainties.



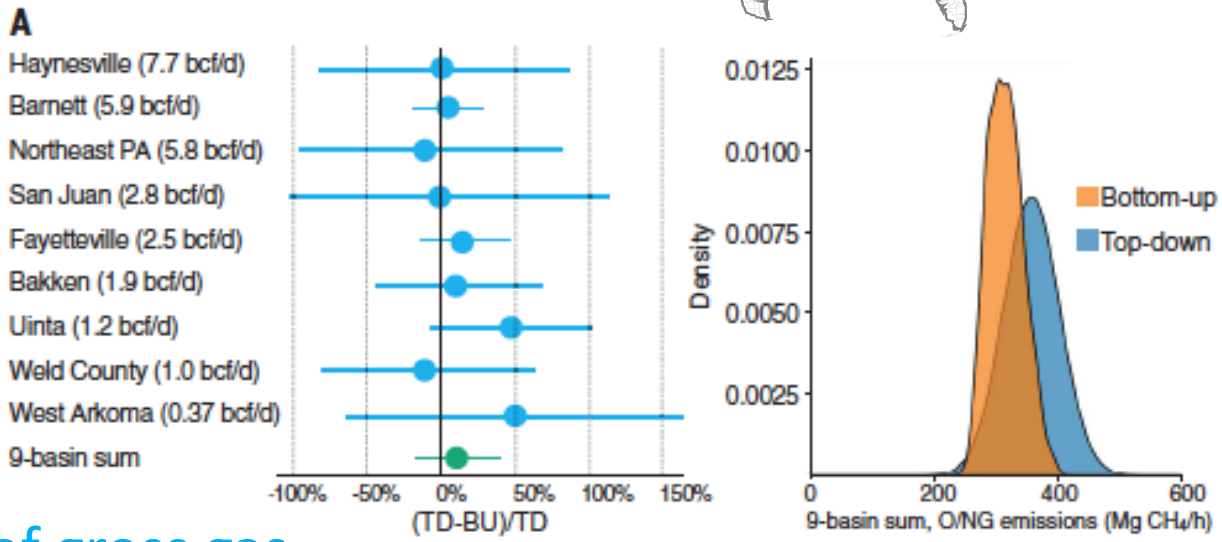



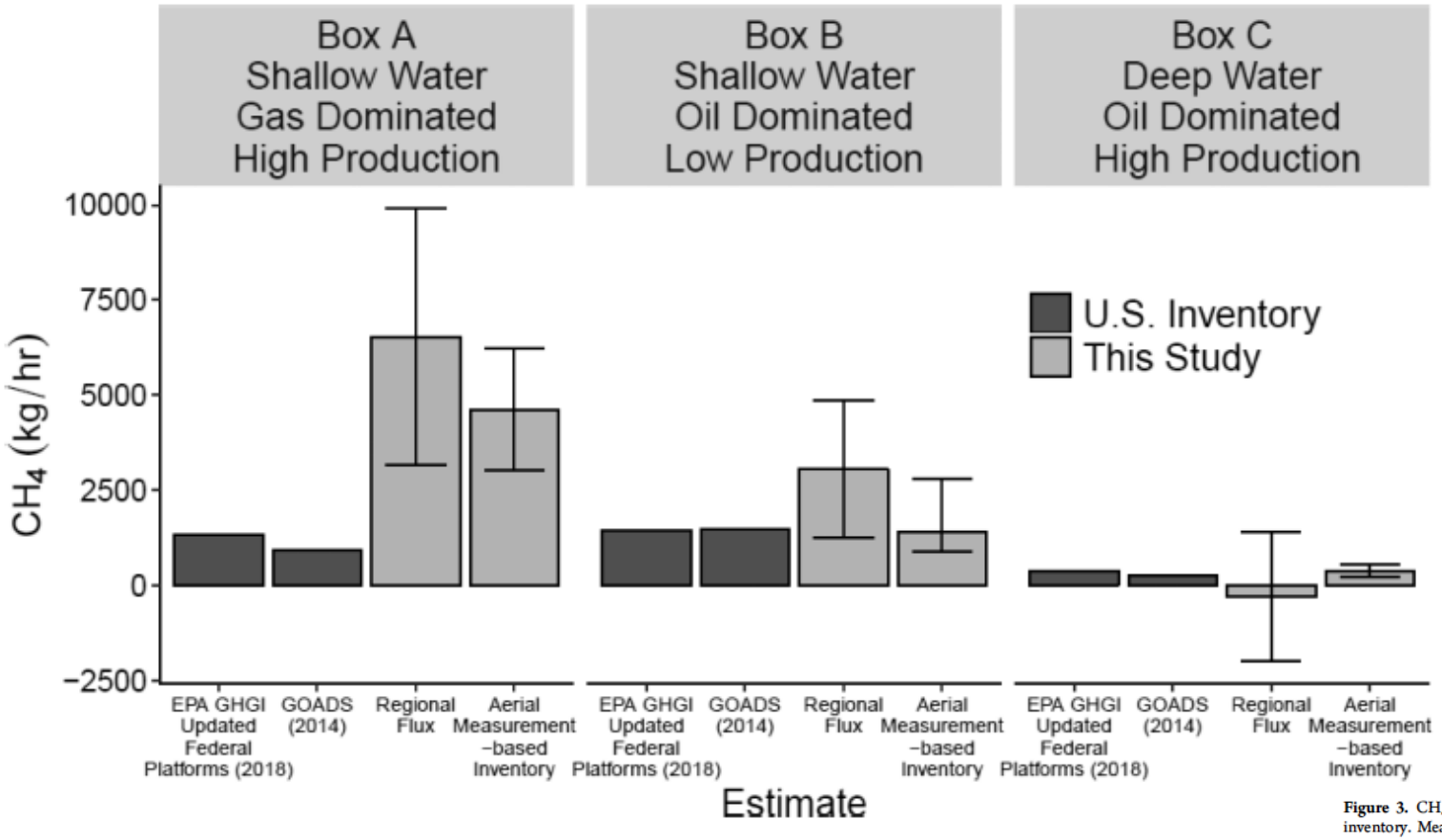

**Fig. 1. Comparison of this work's bottom-up (BU) estimates of methane emissions from oil and natural gas (O/NG) sources to top-down (TD) estimates in nine U.S. O/NG production areas.** (**A**) Relative differences of the TD and BU mean emissions, normalized by the TD value, rank ordered by natural gas production in billion cubic feet per day (bcf/d, where 1 bcf = $2.8 \times 10^7$ $m^3$). Error bars represent 95% confidence intervals. (**B**) Distributions of the nine-basin sum of TD and BU mean estimates (blue and orange probability density, respectively). Neither the ensemble of TD-BU pairs (A) nor the nine-basin sum of means (B) are statistically different [$p = 0.13$ by a randomization test, and mean difference of 11% (95% confidence interval of −17 to 41%)].

- Supply-chain emissions of 13 Tg per year, 2.3% of gross gas production, scaled-up to US-wide
- Methane emissions are 60% higher than US-EPA estimates

Airborne Assessment of Methane Emissions from Offshore Platforms in the U.S. Gulf of Mexico

Alan M. Gorchov Negron,* Eric A. Kort,* Stephen A. Conley, and Mackenzie L. Smith

Environ. Sci. Technol. 2020, 54, 5112−5120. https://dx.doi.org/10.1021/acs.est.0c00179



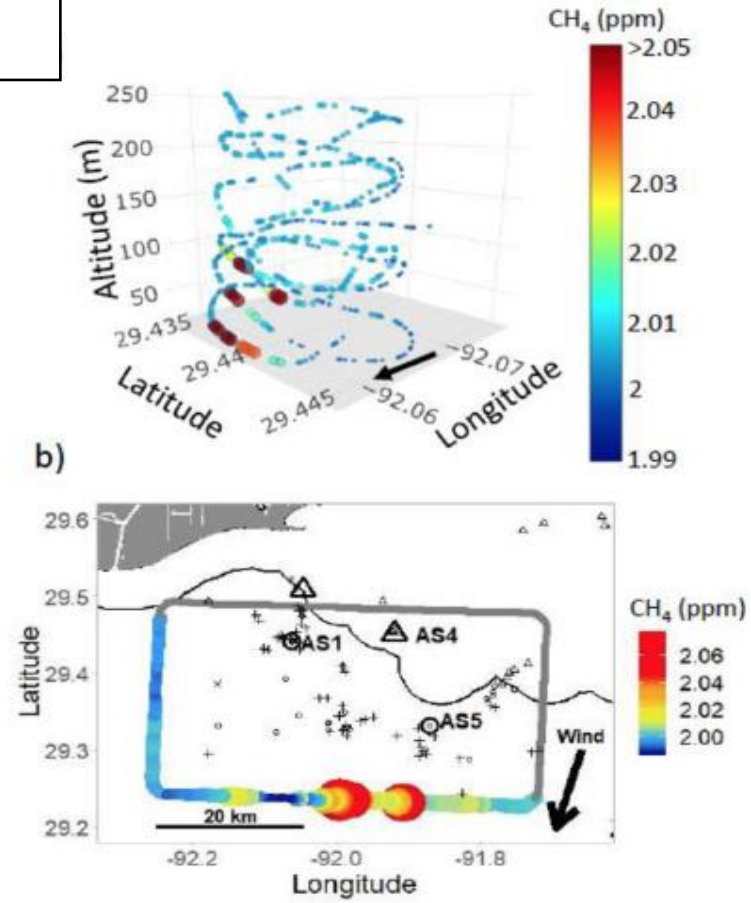




**Figure 3.** $CH_4$ emissions reported for Box A, Box B, and Box C by existing inventories, the regional flux, and the aerial measurement-based inventory. Mean and 95% confidence intervals (error bars) are shown.

- Offshore platforms are emitting twice as much methane than previously estimated
- Methane emissions (0.5 Tg per year) correspond to a loss ~ 2.9% of produced gas.

Methane Emissions from Offshore Oil and Gas Platforms in the Gulf of Mexico

Tara I. Yacovitch,* Conner Daube, and Scott C. Herndon

*Environmental Science & Technology* **2020** *54* (6), 3530-3538
https://dx.doi.org/10.1021/acs.est.9b07148

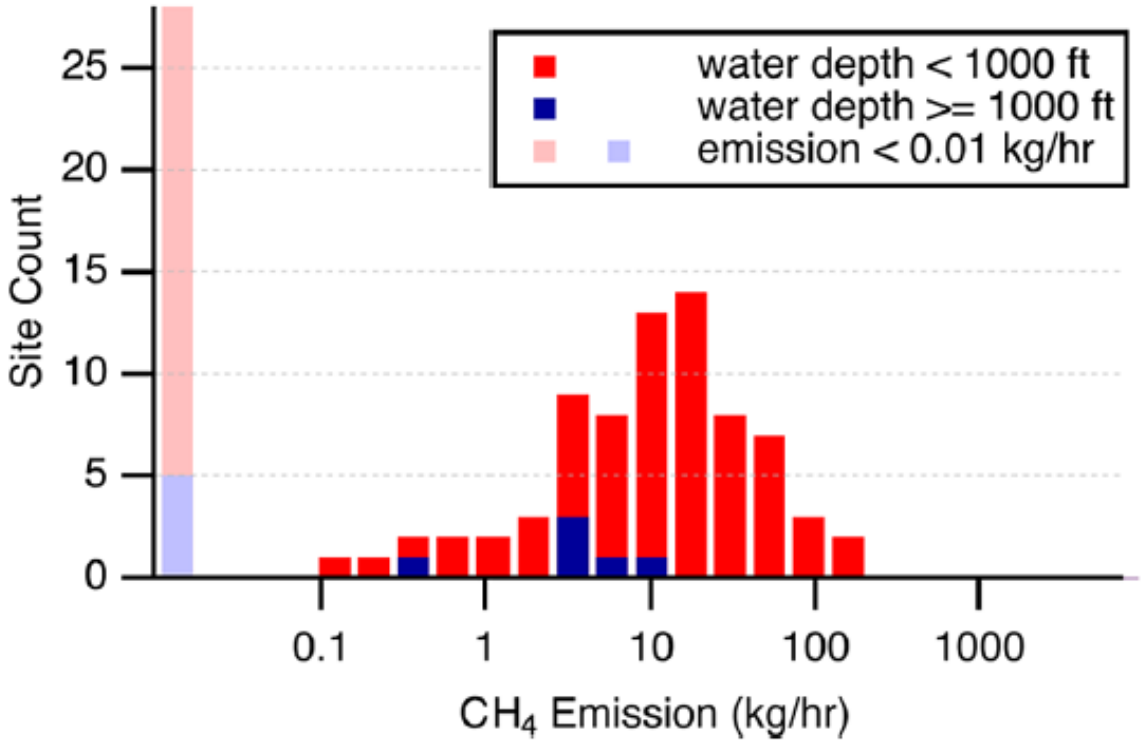



**Figure 3.** Estimated methane emission rates in kg/h for offshore sites.

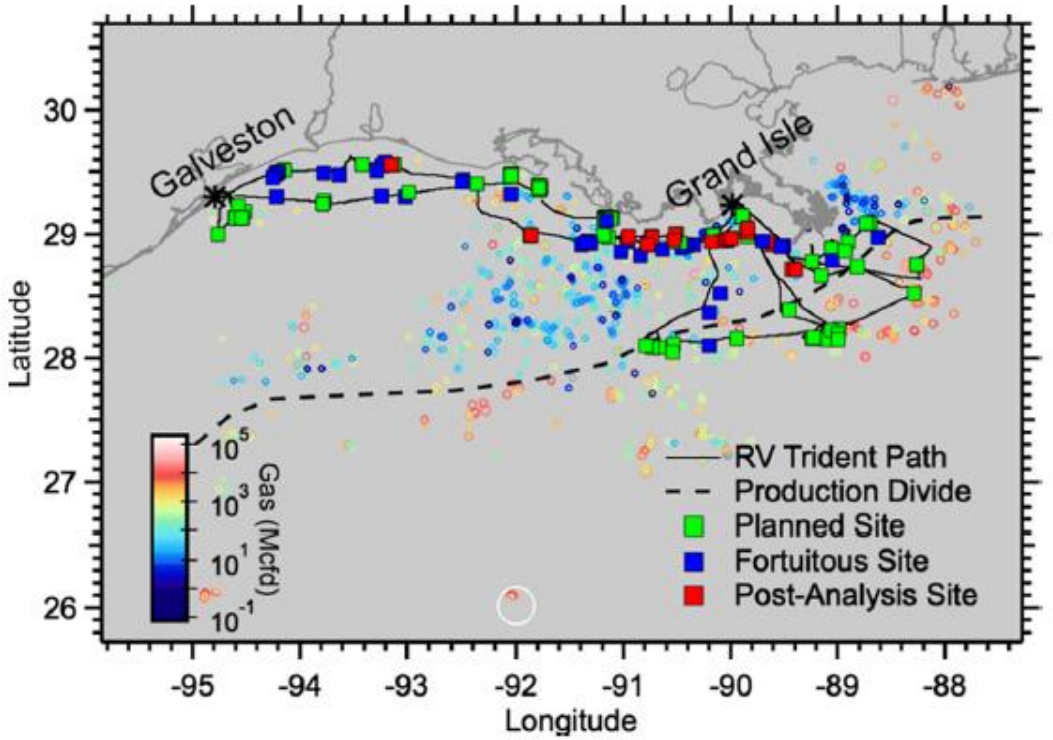



**Figure 1.** Vessel path (solid black line) over the course of the campaign, showing measured sites (squares) colored by site choice type. Offshore well daily gas production (circles) for the period June–February 2017[23] is plotted in thousand cubic feet per day (Mcfd). A dividing line between lower and higher production magnitudes is shown (dashed line). The shoreline map was obtained from NOAA.[25]

- Shallow-water platforms much larger sources than deep-water facilities
- High emitters: Top 2 located in shallow water account for 20% of emissions, with rates up to 190 kg/hr

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# Thank you for your attention


Graciela B. Raga

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