



ENERGY INSTITUTE
COLORADO STATE UNIVERSITY

On Trust and the Future of Gas

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Trust



Trust in an Emissions Context

- Do reported emissions reflect actual emissions?
- Do differentiated emissions intensities (regulatory or otherwise) reflect actual differences?
- Do facility or process changes result in predicted changes in emissions – rate or intensity?



Historical Context

1. Complete field measurements
2. Develop emission factors corresponding to some activity factor

N screened connectors, E emissions measured, emission factor $f = \frac{E}{N}$

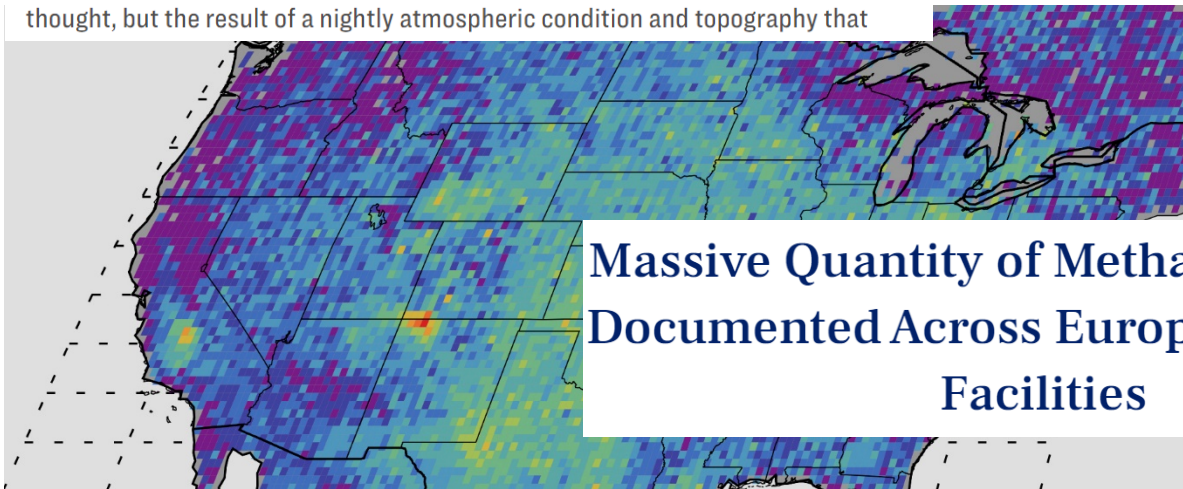
3. Much later and far away ...
 - Track activity (n connectors)
 - Compute emissions: $e = nf$
4. And *never check*



Today ...

US methane "hotspot" is snapshot of local pollution

The giant methane cloud spotted by satellite over the U.S. Southwest that made national headlines in 2014 wasn't a persistent, undiscovered "hotspot" as first thought, but the result of a nightly atmospheric condition and topography that



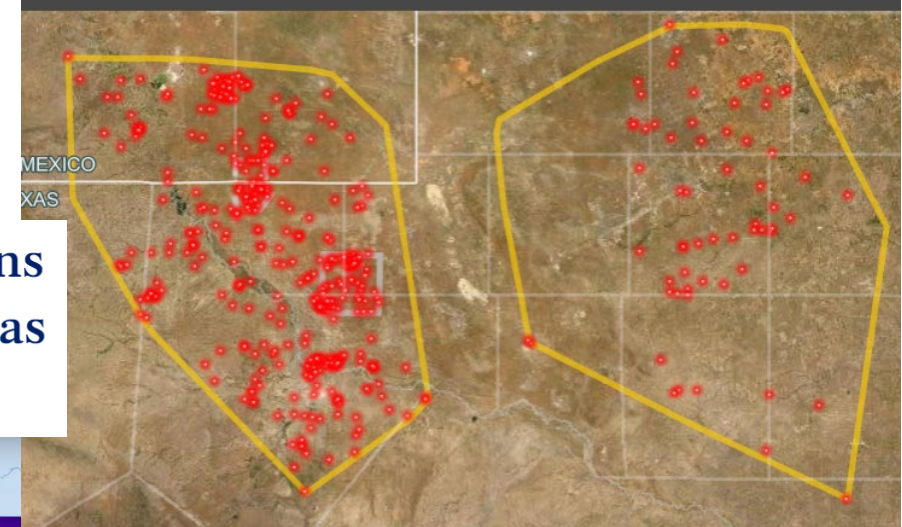
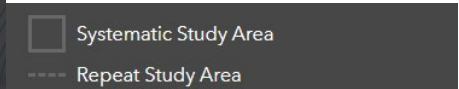
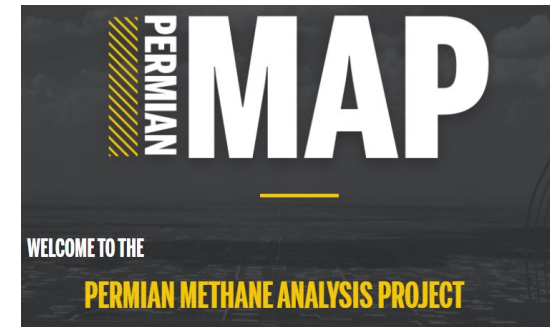
Massive Quantity of Methane Emissions Documented Across Europe at Oil & Gas Facilities



<https://research.noaa.gov/article/ArtMID/587/ArticleID/2691/US-methane-%E2%80%99Hotspot%E2%80%99-is-snapshot-of-local-pollution>

<https://www.permianmap.org/>

<https://cutmethane.eu/>



Multi-tier observations are
Here Now
And
Staying Forever



Today's Momentum

- Data indicates
 - Reporting programs ... *under-report*
 - Under-reporting causes are *clearly visible*
- Many (most?) new programs make yesterday's assumptions:
 - Inventory-based emissions without measurement validation
 - Measurement (or detection) using poorly validated methods
 - Scant attention to lock-out conditions, site configuration, statistical rigor, etc..

~~Trust~~



Challenge ...

The fundamental challenge to

- Regulation ...
- “Responsible” or “differentiated” gas ...
- Voluntary corporate programs
- ...

Is not *whether they can be done ...*

... but whether they can survive robust external audit.

Is *your* program methods & methodology robust enough to stand up to independent measurement?



Thank You



Contact



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