

Environmental Perspective on Methane Emissions and EDF Research Program Overview

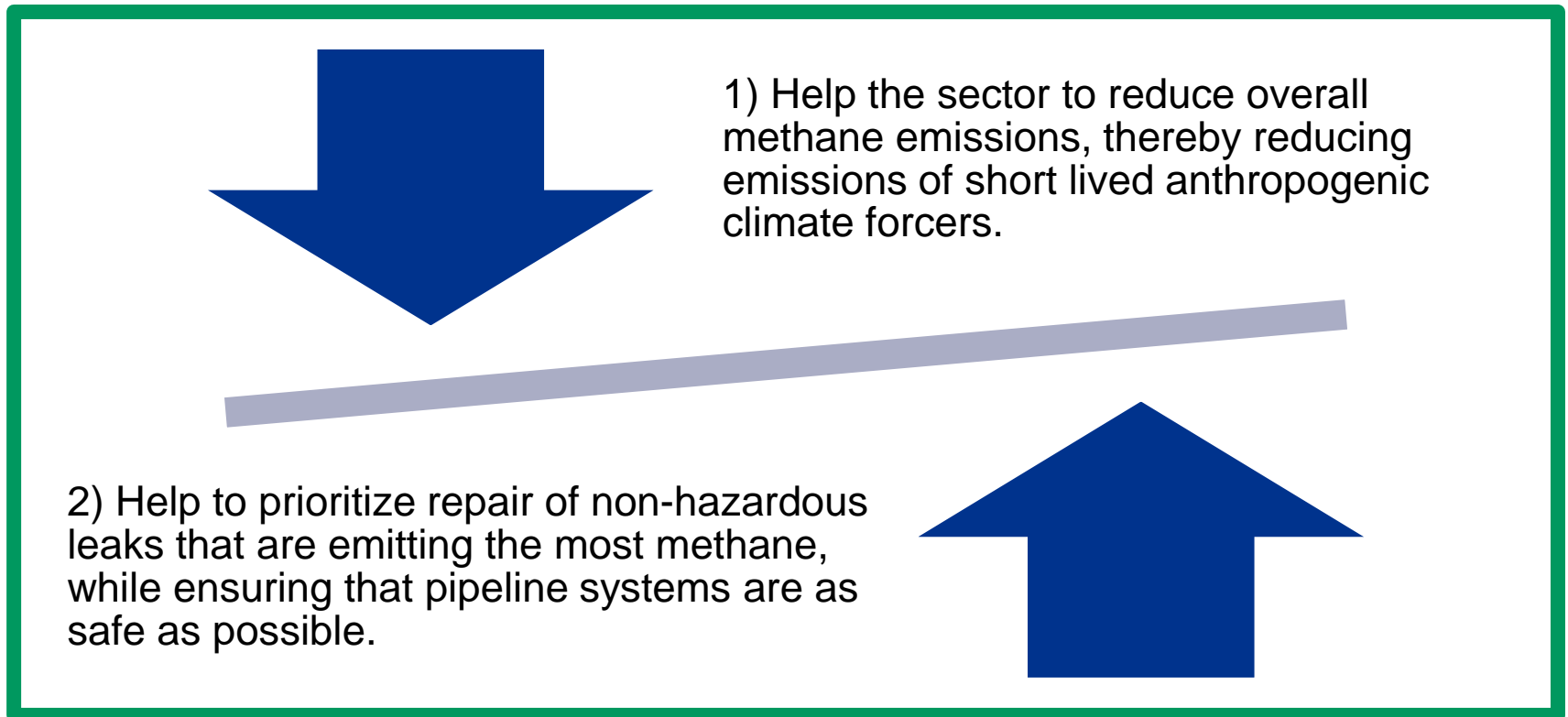
Virginia E. Palacios
Research Associate



Objectives

Standards shall be “designed to meet the need for . . .

- i. gas pipeline safety ...
- ii. protecting the environment.”



Climate implications of methane

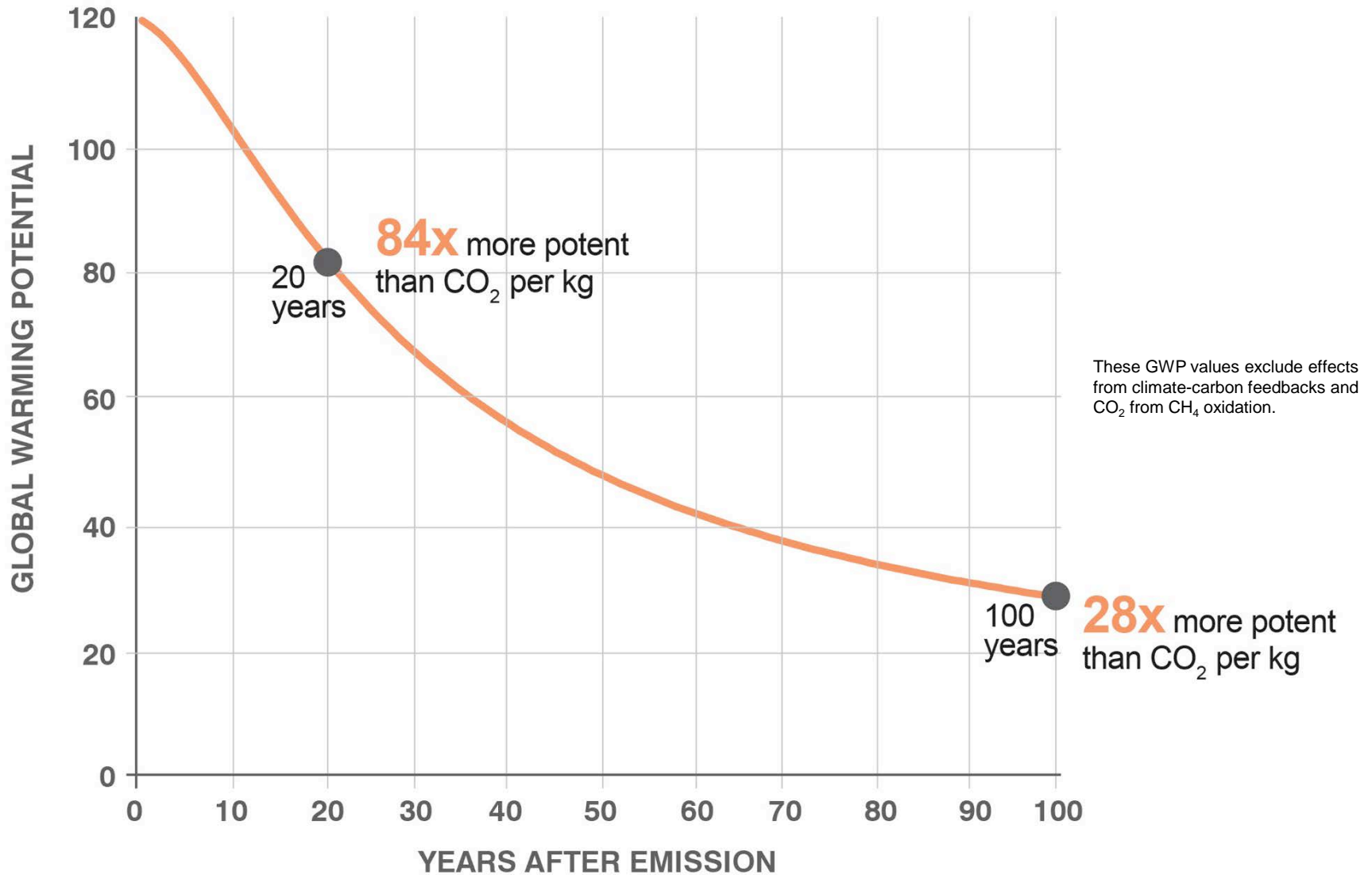
POUND FOR POUND METHANE TRAPS
84x MORE HEAT OVER 20 YEARS

CO₂

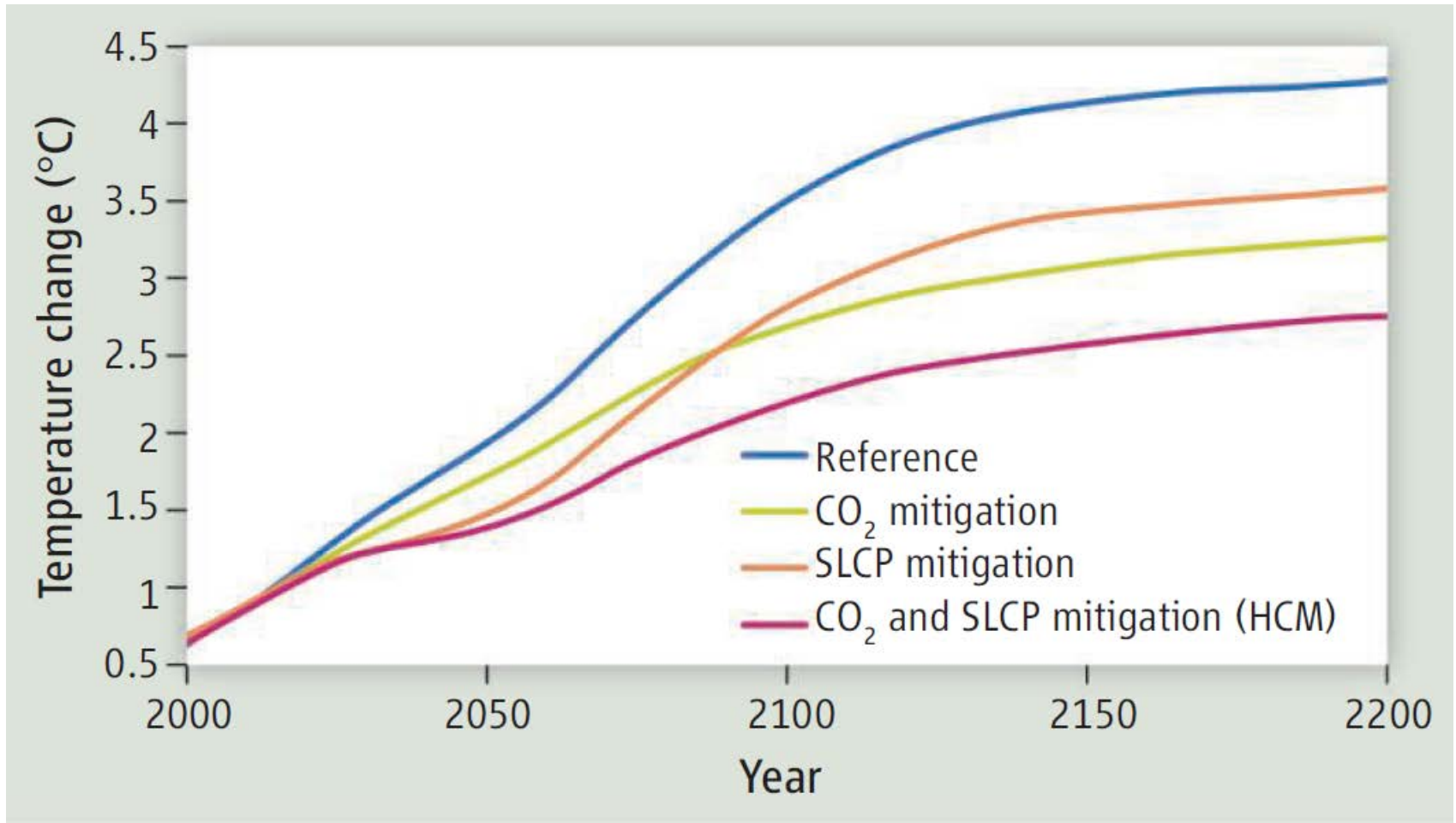
CH₄



Climate implications of methane



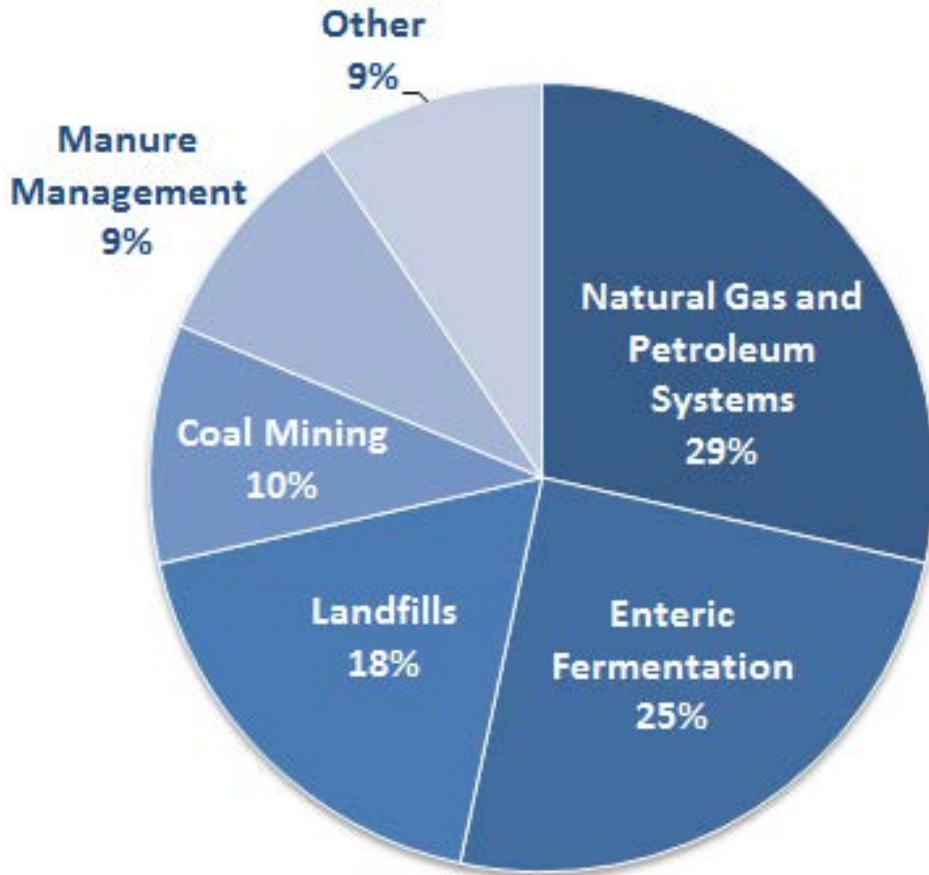
Need to reduce both CO₂ AND CH₄



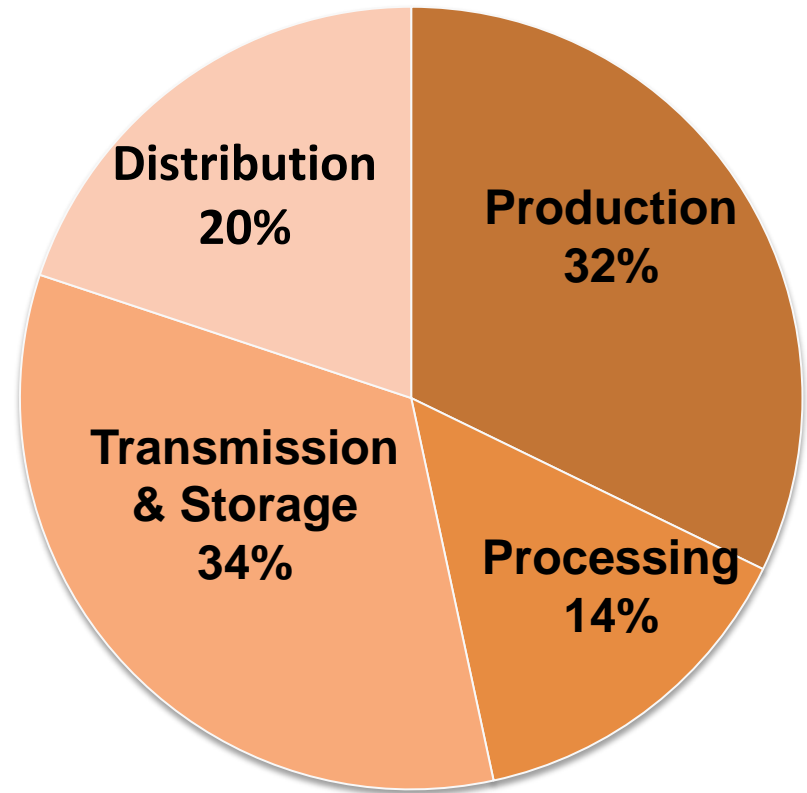
Source: Shoemaker, J. K., Schrag, D. P., Molina, M. J., & Ramanathan, V. (2013). What Role for Short-Lived Climate Pollutants in Mitigation Policy? *Science*, 342(13 December 2013), 1323–1324. doi:10.1126/science.1240162

2014 EPA GHG Inventory

U.S. CH₄ Emissions from Human Activities



2012 Natural Gas Sector CH₄ Emissions



Climate & Economic Impact

1.2 %
Leak
Rate

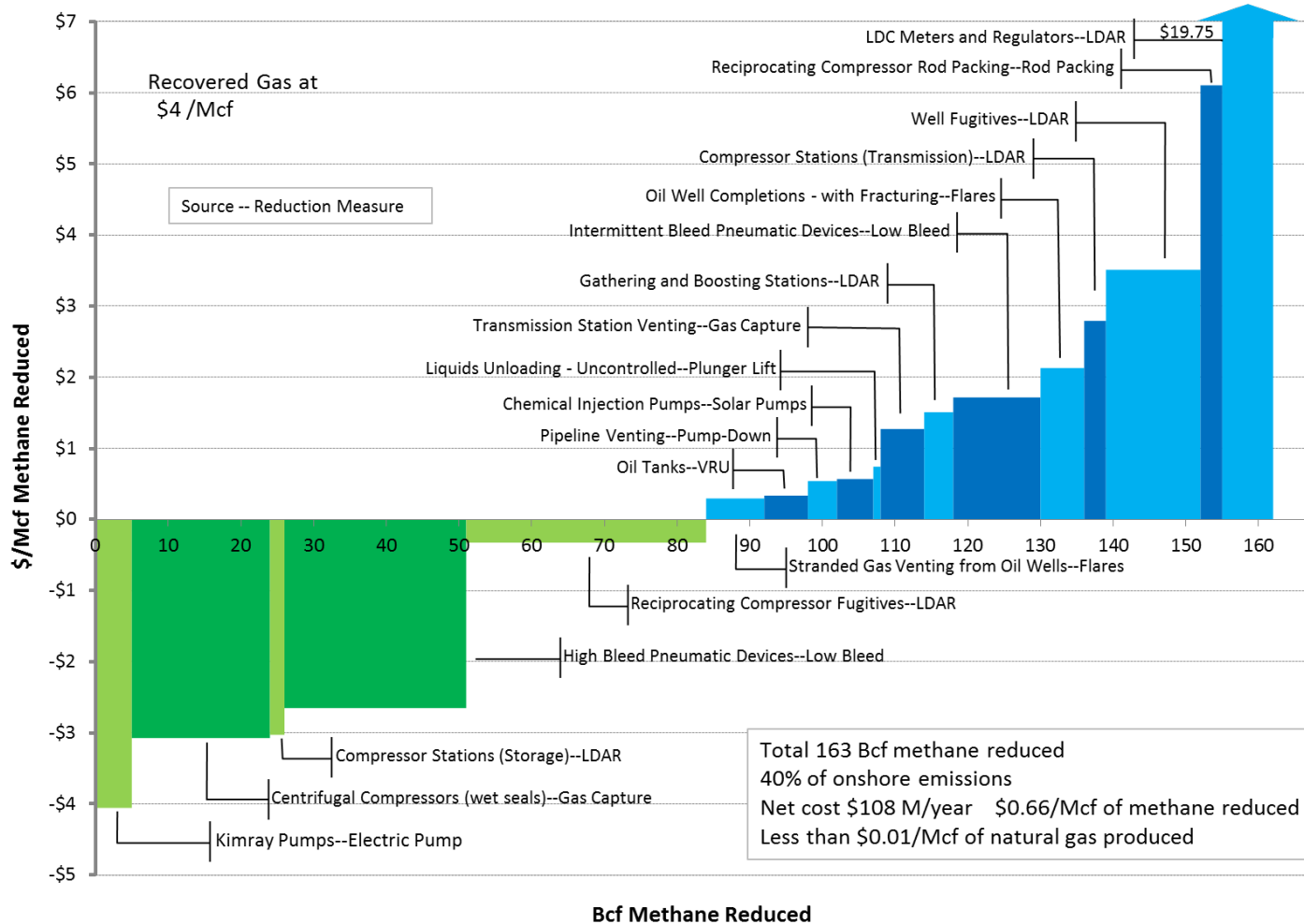
\$1.36 - \$5.15 billion lost revenue

Annual GHG emissions from:

- 112 Million Cars OR
- 140 Coal Plants

Gas carried by 119 LNG tankers

Methane Reductions are Cost-Effective



EDF Methane Work (2012-2014)

16 Studies w/ roughly 100 collaborators

Studies embody 5 principles:

- Led by academic scientists
- Employ multiple methodologies, where possible;
- Input from independent scientific experts;
- Make all data public to ensure transparency; and
- Publish results in a peer reviewed journal

We expect all studies to be submitted by end of 2014.

EDF SERIES OF METHANE STUDIES

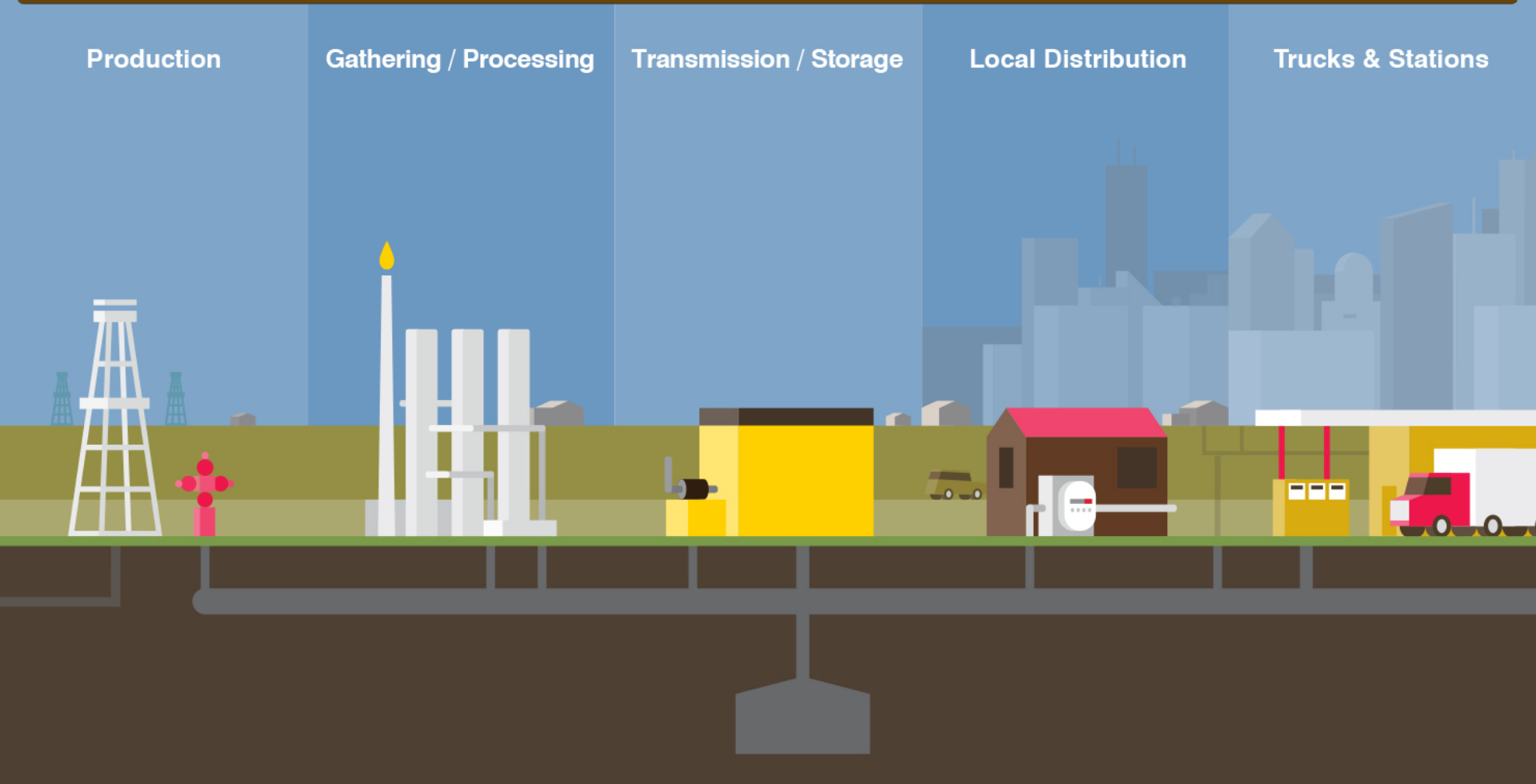
Production

Gathering / Processing

Transmission / Storage

Local Distribution

Trucks & Stations



Four-page summary:

http://www.edf.org/sites/default/files/methane_studies_fact_sheet.pdf

EDF SERIES OF METHANE STUDIES

Production

UT Phase 1 ★
UT Phase 2
EPA/HARC

Gathering / Processing

CSU

Transmission / Storage

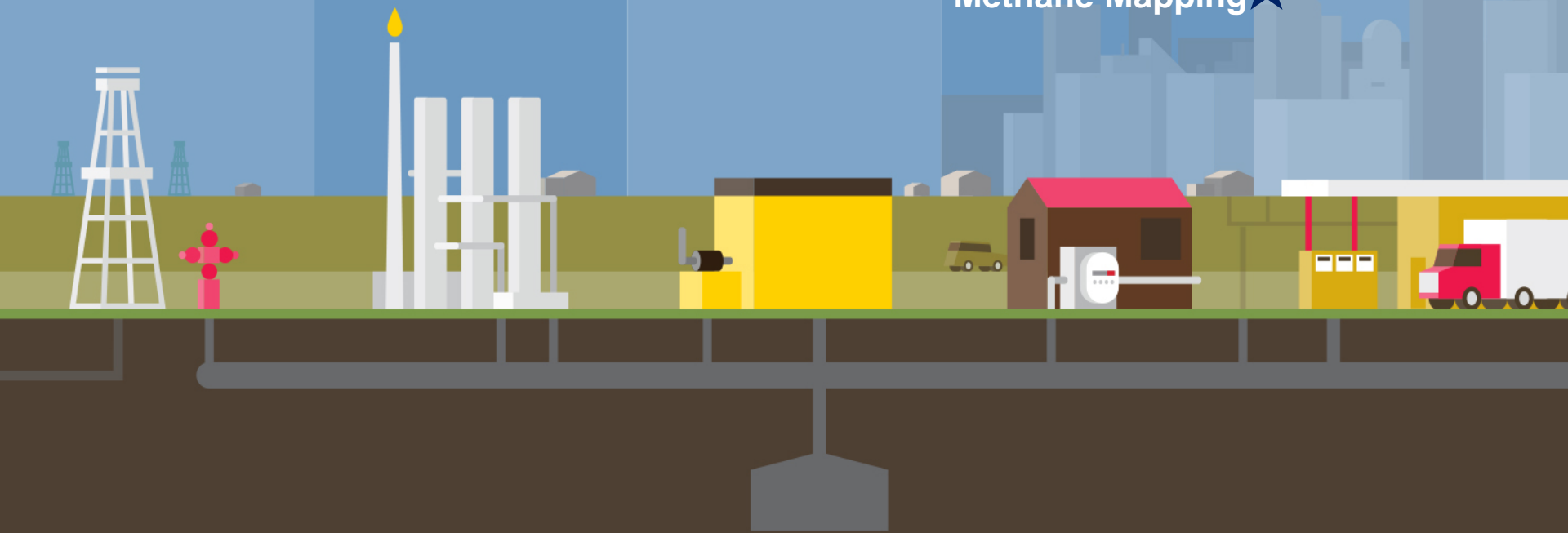
CSU

Local Distribution

WSU Multi-City
Boston
Indianapolis
Methane Mapping ★

Trucks & Stations

WVU



★ = already publically available

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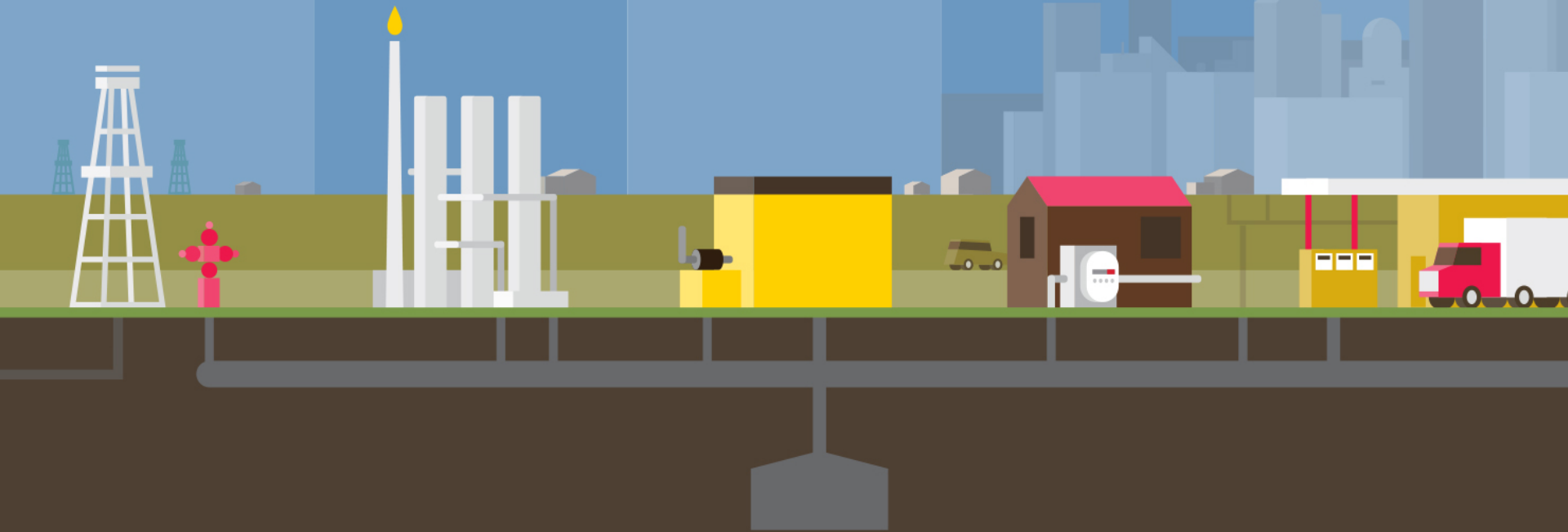
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Denver-Julesburg★ and Barnett Fly-Overs; Barnett Coordinated Campaign



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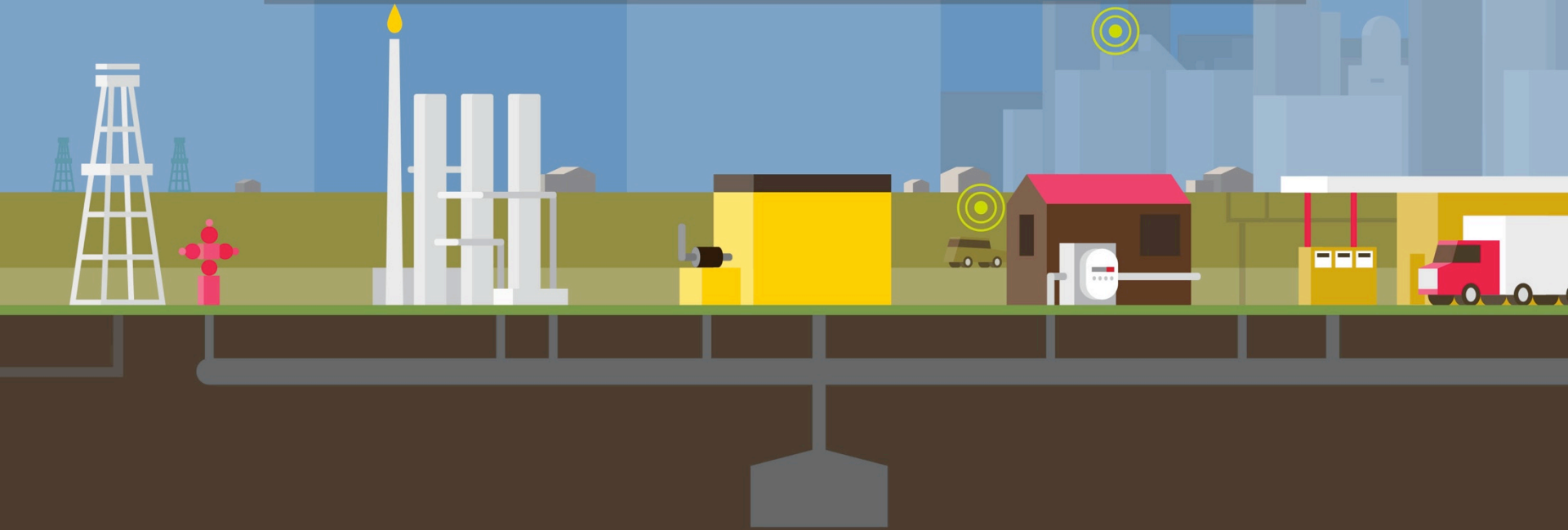
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EDF SYNTHESIS PAPER

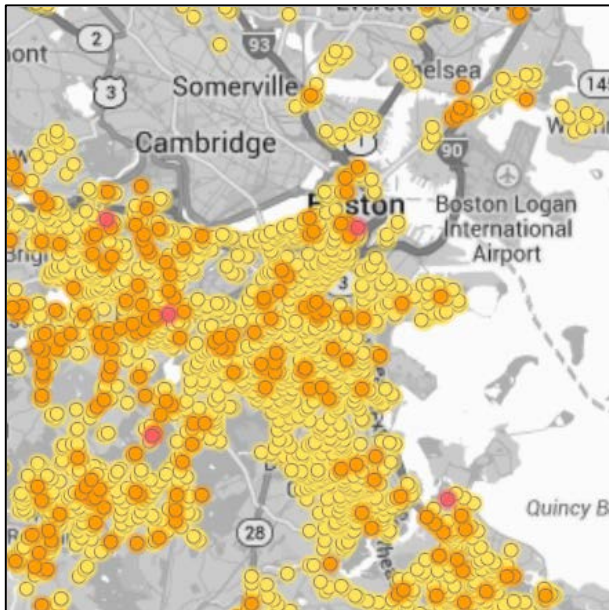


Four-page summary:

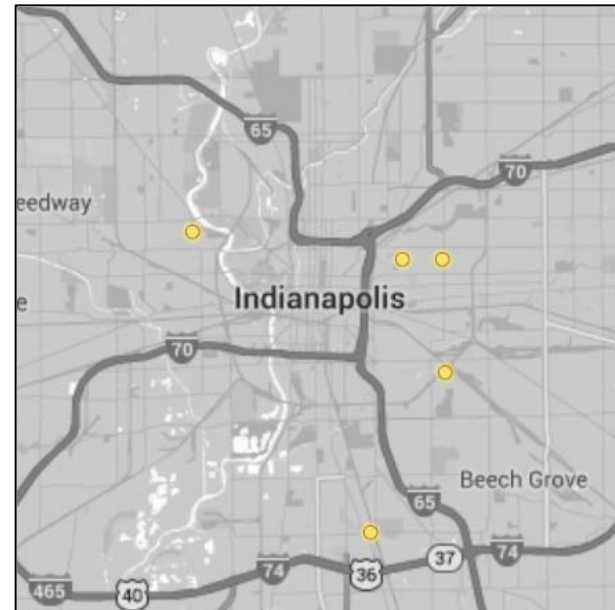
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Local Distribution Methane Mapping

Boston



Indianapolis



One approach, but there may be others, with potential to widely deploy mobile mapping technology with methane sensors to efficiently locate leaks and determine their magnitude.

Research recommendations

Find & prioritize non-hazardous leaks

Refine methane measurement technologies

- Flux rate
- Source attribution
- Locations on pipelines
- Inexpensive, precise methane sensors

Gather the “low-hanging fruit”

- Blow-downs, maintenance and best practices
- Leak Detection and Repair (LDAR) programs

Compare/contrast cost recovery programs

- Accelerated repair and replacement
- Reduced rate of leakage
- Greater emission reductions at lower cost

Questions?

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84x MORE HEAT OVER 20 YEARS

CO₂



CH₄



2012 Natural Gas Sector CH₄
Emissions

