A performance-based approach to managing methane emissions

Natural Gas STAR Annual Implementation Workshop

Fiji George
November 16, 2015

Who we are

Our Nation's Energy Future Coalition, Inc.

- A 501(c)6 non-profit trade group comprised of leading natural gas companies with operations in one or more of the four principal industry segments.

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The Shale Gas Revolution & the Methane Debate

- Switching from coal to gas averted over a billion tons of CO_2 emissions from 2005-2013.
- Critics have alleged that methane emissions leakage could erode climatic benefits
- Policy Question: How can we prudently develop oil and natural gas that yields a net positive energy, economic and environmental benefit?

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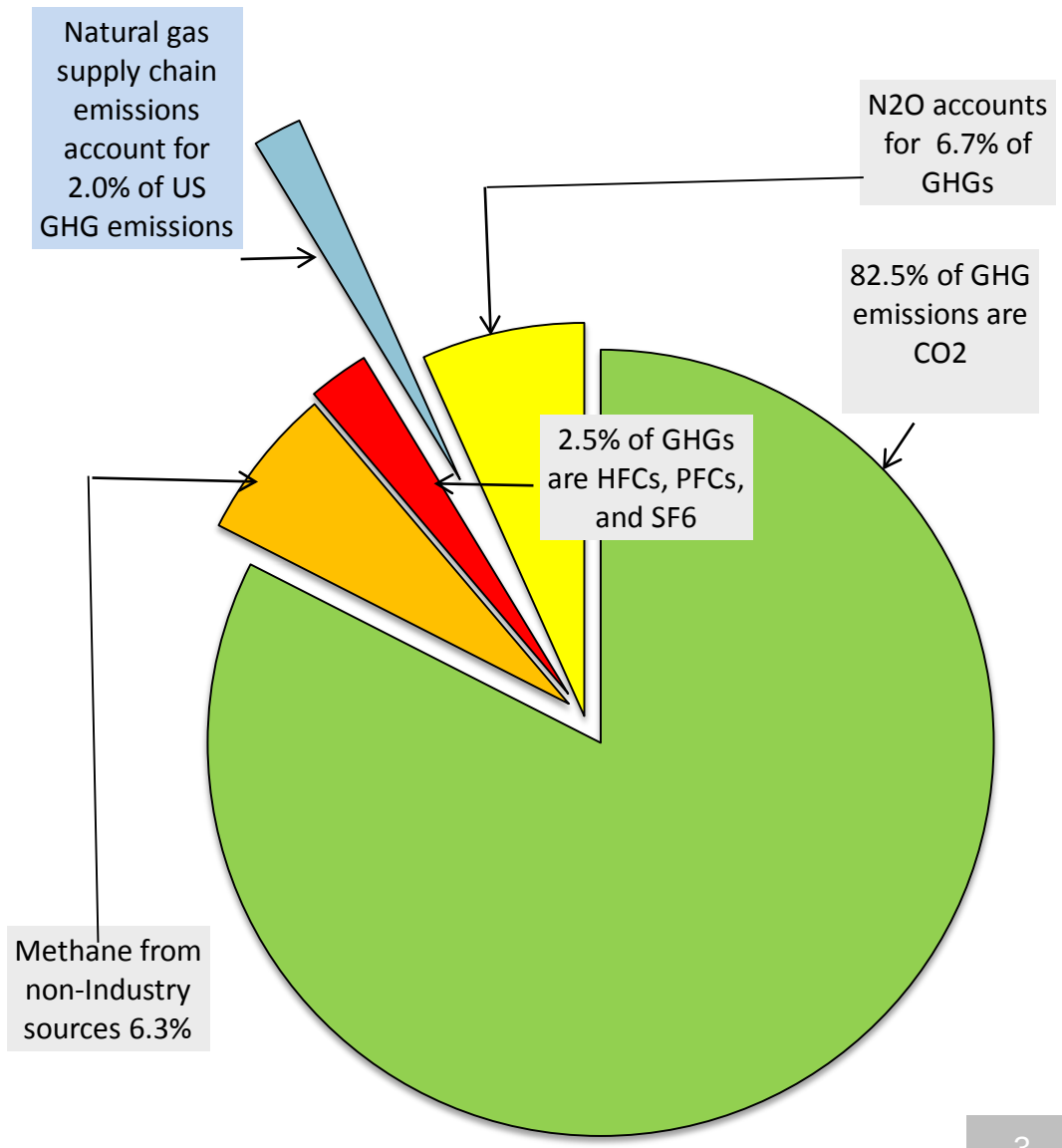
US Methane and other GHG emissions

Natural gas industry accounts for fraction of GHG emissions

- In 2012, the industry collectively emitted approximately 0.36 TCF.
- Methane is our product, so reducing emissions is a core business function.
- **We can do better.** It is incumbent on industry to strive toward continuous improvement.

Total US GHG emissions in 2012



Source: US EPA, 100 year GWP

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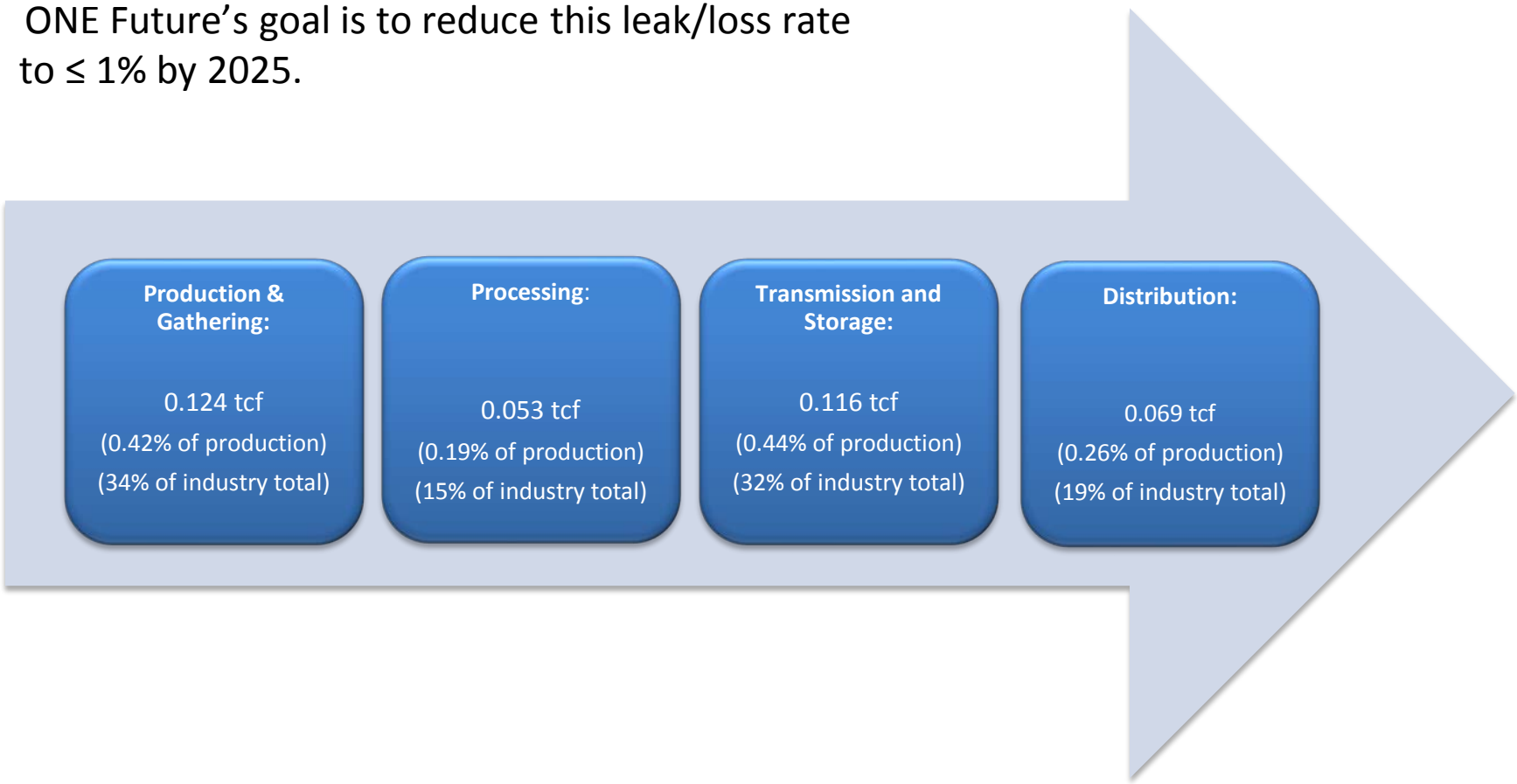
Methane emissions from the natural gas industry *(2012 EPA data)*

EPA data indicates an annual collective industry leak/loss rate equivalent to roughly 1.3% of the natural gas produced (without co-allocation)

- ONE Future's goal is to reduce this leak/loss rate to ≤ 1% by 2025.



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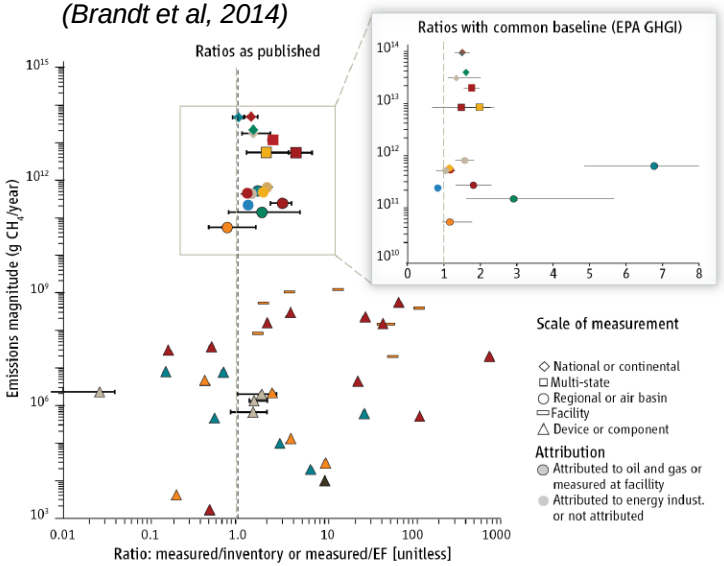
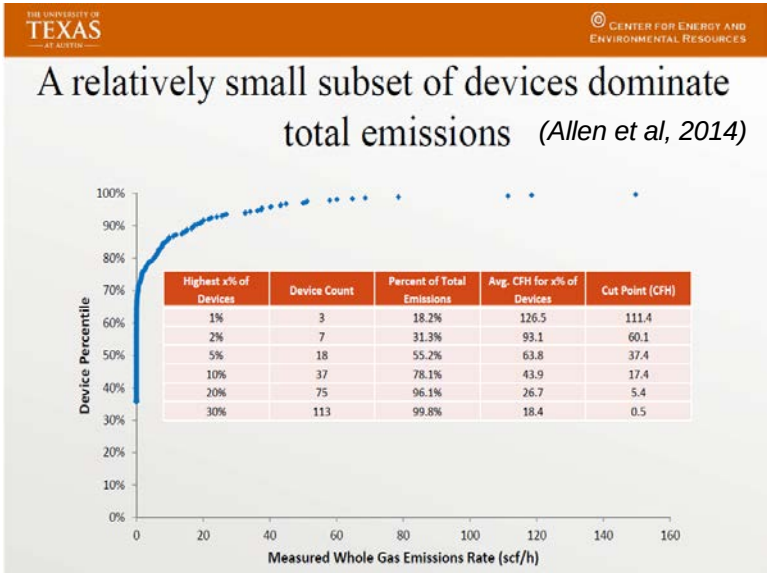
Source: US EPA, EIA, Brandt et al. (2014)

Latest Science on Methane Emissions

"Fat-tails" account for the majority of emissions and "high leakage" rates are unrepresentative of national profile.

(Brandt et al, 2014)





Highest x% of Devices	Device Count	Percent of Total Emissions	Avg. CFH for x% of Devices	Cut Point (CFH)
1%	3	18.2%	126.5	111.4
2%	7	31.3%	93.1	60.1
5%	18	55.2%	63.8	37.4
10%	37	78.1%	43.9	17.4
20%	75	96.1%	26.7	5.4
30%	113	99.8%	18.4	0.5

"Studies suggest that emissions are dominated by a small fraction of 'superemitter' sources at well sites, gas-processing plants, coproduced liquids storage tanks, transmission compressor stations, and distribution systems."*(Brandt et al, 2014)*

"The emissions from these well pads, representing ~1% of the total number of wells, account for 4–30% of the observed regional flux."*(Caulton et al, 2014)*

"…the 9% FER scenario appears unlikely high given previous top-down studies…"*(Schwietzke et al, 2014)*

"…evidence suggests that high leakage rates found in recent studies *are* unlikely to be representative of the entire NG industry…"*(Brandt et al, 2014)*

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White House/EPA Methane Strategy

What's in a 40-45% Reduction?

- **2012 EPA inventory = 192.4 MM MtCO2e/Y.**
- **40-45% = ~77 and ~86 MM MtCO2e/Y from 2012 levels**
- **Voluntary Measures = 37+ MM MtCO2e/Y**
- **~0.75% leakage rate by 2025**

THE WHITE HOUSE

FOR IMMEDIATE RELEASE
January 14, 2015

ADMINISTRATION TAKES STEPS FORWARD ON CLIMATE ACTION PLAN BY ANNOUNCING ACTIONS TO CUT METHANE EMISSIONS

- *…"a new goal to cut methane emissions from the oil and gas sector by 40 – 45 percent from 2012 levels by 2025"*
- *…"Standards for Methane and Ozone-Forming Emissions from New and Modified Sources"*
- *"Reduce Methane Emissions while Improving Pipeline Safety"*
- *"Drive Technology to Reduce Natural Gas Losses and Improve Emissions Quantification*
- *EPA will work with DOE, DOT, and leading companies, individually and through broader initiatives such as the **One Future Initiative** and the Downstream Initiative, to develop and verify robust commitments to reduce methane emissions.*

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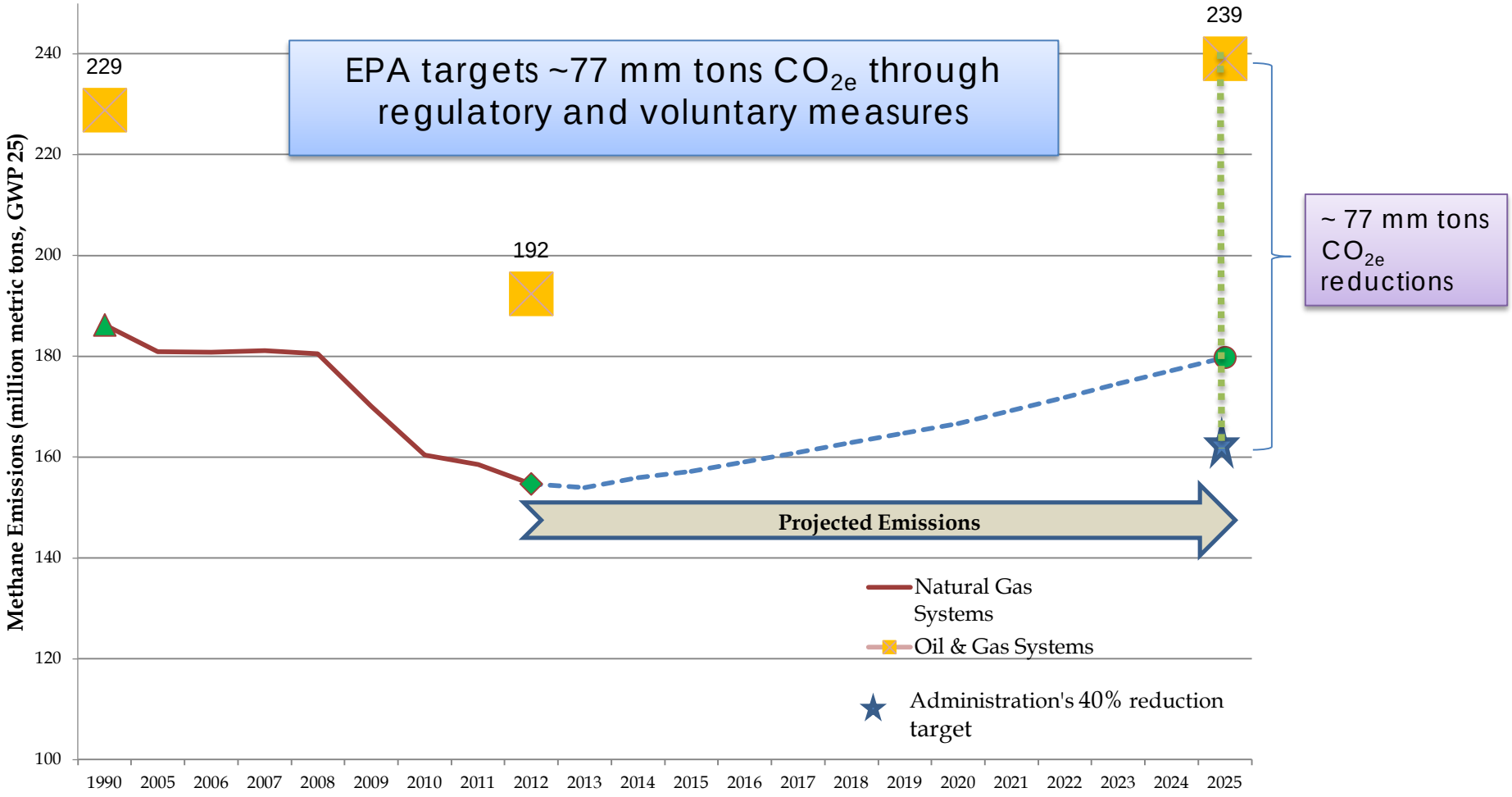
Oil and Gas Methane Emissions – Historical & Projected



Source: EPA, Climate Action Report, EIA, SWN

ONE Future Framework

Goal: 99% efficiency rate across the natural gas supply chain

- **Our commitment starts with a scientifically-anchored and ambitious goal**
  - Average annual rate of methane emissions of ≤ 1% of US natural gas production by 2025.
- **Streamlined emissions tracking and reporting standards**
  - Methane Emissions Estimation Protocol relies largely on existing EPA estimation and reporting mechanisms
  - Minimizes the need for additional reporting and internal processes
- **Performance-based deployment of technology & practices**
  - Provides flexibility in allowing individual companies to determine how they can most cost-effectively achieve their emissions reduction goal.
- **Public reporting of Results**
  - Progress will be transparently documented by EPA on their Methane Challenge website.

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How the ONE Future system works

- **A single target for the entire value chain.**
  - Average annual rate of methane emissions of ≤ 1% of US natural gas production by 2025.
  - ***Emissions intensity*** as our metric facilitates benchmarking across industry segments.
  - Interim Goal for 2020

- **Specific goals are set for each industry segment.**
  - Segment emission reduction goals to be roughly proportional to segment's share of total industry emissions and abatement opportunities within each segment

- **Emissions intensity compared with segment goal to determine progress.**
  - Companies compute their emissions relying mostly on existing EPA methods
  - Company emissions intensity defined as US emissions /throughput of all US assets.
  - Report emissions and emissions intensity annually to EPA
  - Companies 5 year weighted emissions intensity should be less than 2020 and 2025 segment intensity targets

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Hypothetical illustration of the One Percent target.

Notional emission goals for each industry segment that would achieve a 1% emissions intensity by 2025.

+ Segment targets will be established based on both proportional emissions and availability of cost-effective abatement opportunities.

Sector	*2012*	2020	2025
Production	*0.42%*	0.39%	0.32%
Gathering & Processing	*0.19%*	0.18%	0.16%
Transmission & Storage	*0.44%*	0.40%	0.32%
Distribution	*0.26%*	0.23%	0.20%
Total Upstream	*1.31%*	1.20%	1.00%

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Creating uniform metrics to benchmark progress

ONE Future has established a protocol for calculating and reporting emissions intensity.

- The Methane Emissions Intensity Estimation Protocol delineates the policies and methodologies that the coalition participants will employ to quantify and report their methane emissions and emission reductions.
- To avoid duplication of effort, the Protocol is largely based on the U.S. EPA's Greenhouse Gas Reporting Program (GHGRP) and Greenhouse Gas Inventory (GHGI).
- The protocol also defines the means by which participating companies will estimate their average emissions intensity and compare it the segment targets and national goal of one percent emission intensity.

ONE Future has commissioned a review of the *Marginal Abatement Costs (MAC)* associated with various technologies and work practices.

- The MAC analysis will provide a comprehensive listing of known emission abatement technologies and deployment costs.
- The MAC data will also inform the reductions specified by the Segment Goals, by indicating where the most cost-effective opportunities for abatement are across the supply chain.

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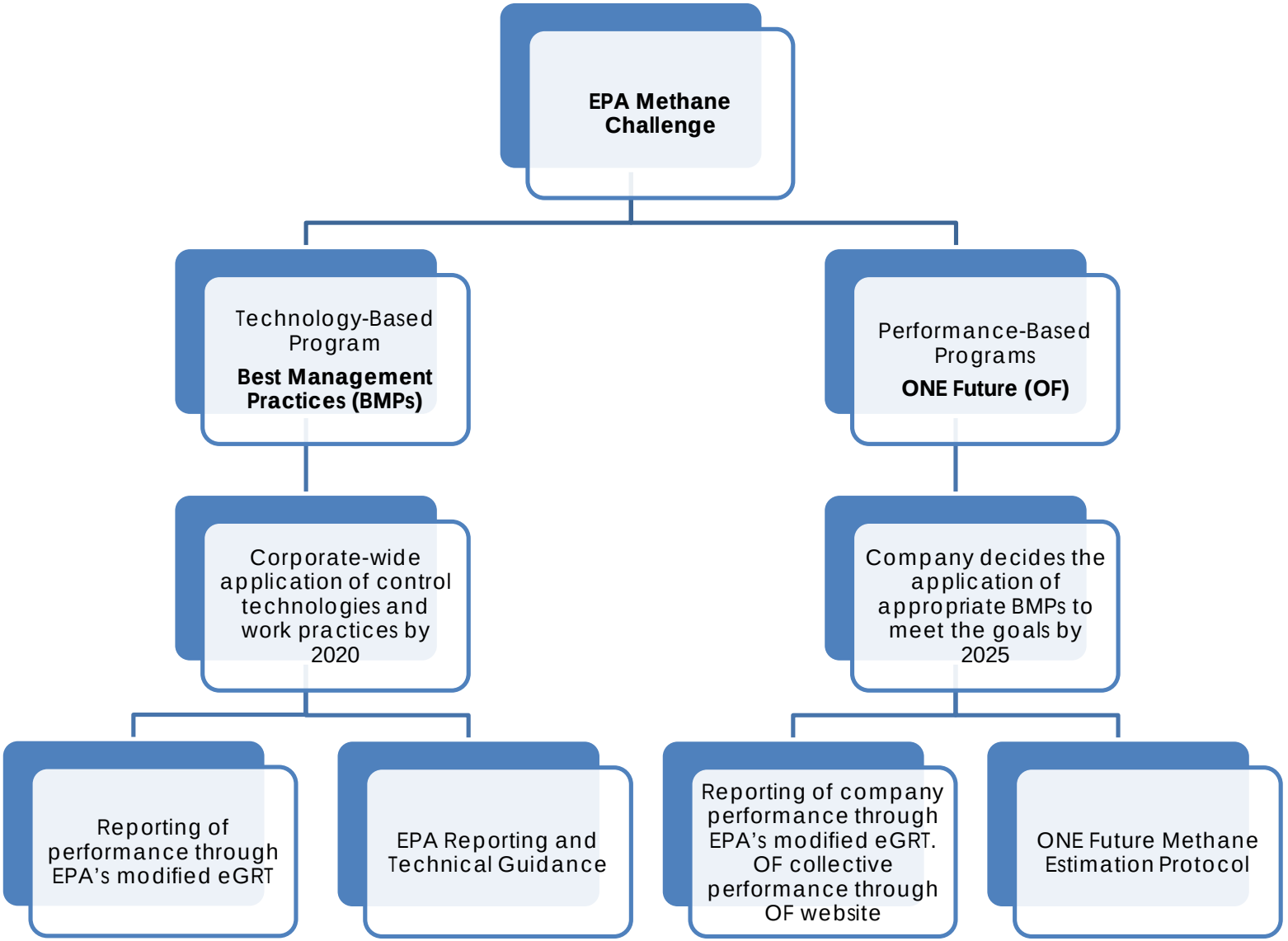
ONE Future and EPA's Methane Challenge program



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