



A performance-based approach to managing methane emissions

Air and Waste Management Association, Gulf Coast Chapter
Annual Conference

Ed Mongan
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Our Nation's Energy Future Coalition, Inc.

- A 501(c)6 non-profit trade group comprised of leading natural gas companies
- We are committed to seeking cost effective solutions to environmental challenges
- Our operations cut across the four principal industry segments including production, processing, transmission and distribution

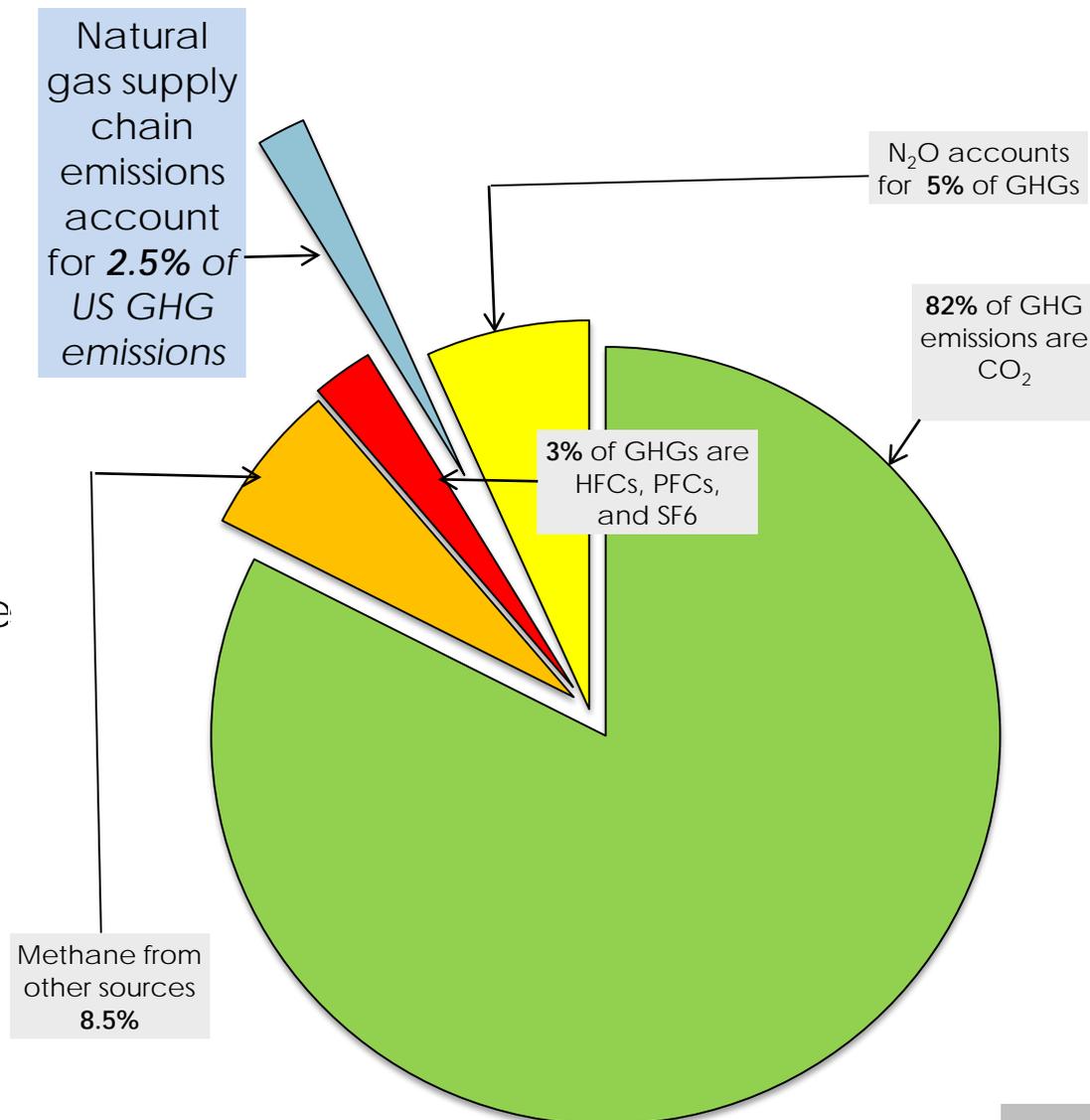


US Methane and other GHG emissions

Natural gas industry accounts for fraction of GHG emissions

- In 2014, the industry collectively emitted approximately 0.37 TCF of methane.
- 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.

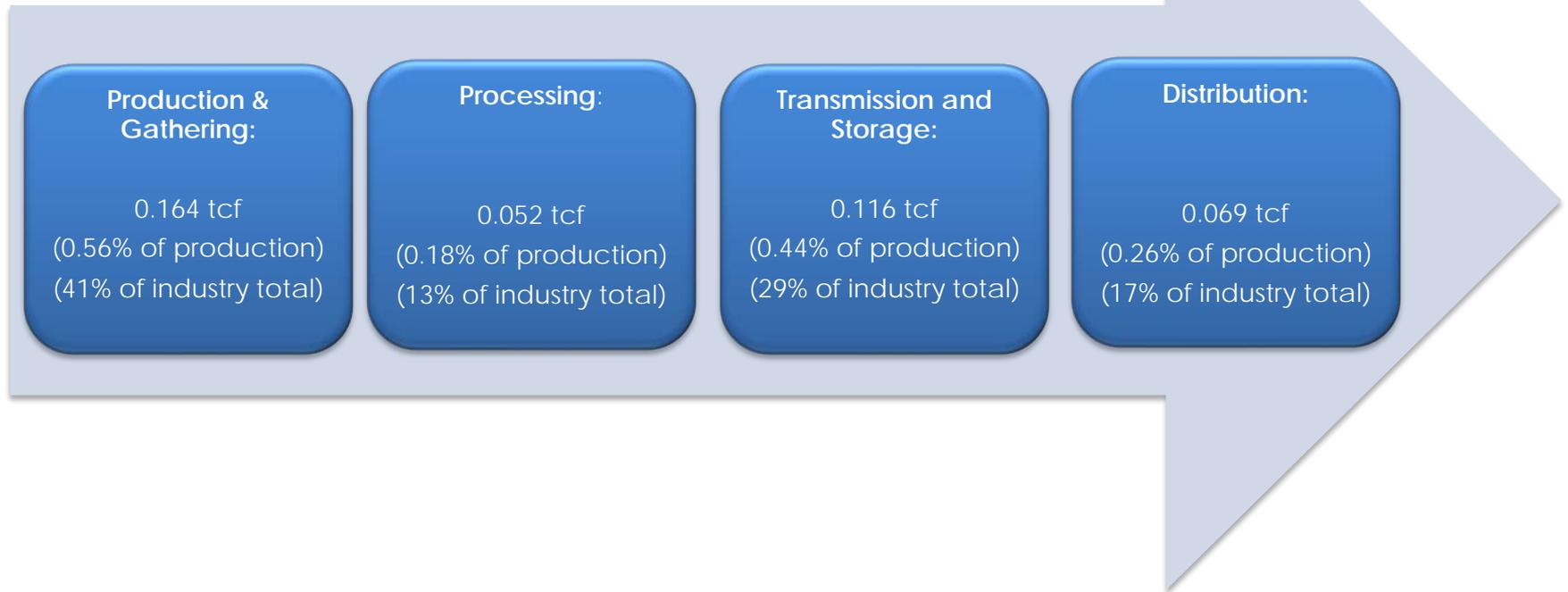
Total US GHG emissions in 2014



Source: US EPA, 100 year GWP

EPA data indicates an annual collective industry leak/loss rate equivalent to roughly 1.44% of the natural gas produced (without co-allocation)

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



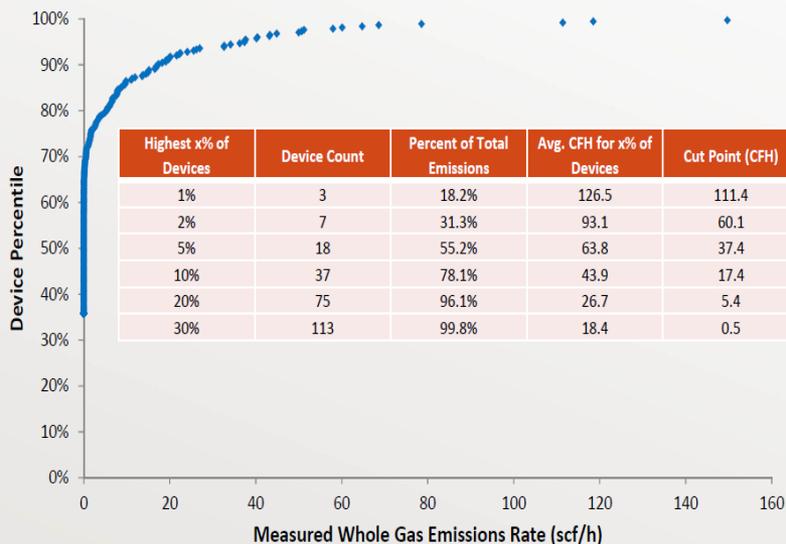
Latest Science on Methane Emissions

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

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A relatively small subset of devices dominate total emissions *(Allen et al, 2014)*



“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)*

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

ONE Future Framework

We aim to sustain a 99% efficiency rate across the natural gas supply chain by implementing a flexible, cost-effective and transparent approach to reducing methane emissions.

Our commitment starts with a scientifically-anchored and ambitious goal.

- By 2025, ONE Future companies aim to achieve an annual rate of methane emissions across their collective operations equal to or less than one percent of natural gas production.

Supported via streamlined emissions tracking and reporting standards

Achieved with performance-based deployment of technology & practices.

How the ONE Future system works

A single, national target for the entire value chain in 2025.

- We will establish an interim goal for 2020 to benchmark progress.

Segment-specific goals are set for each industry segment.

- Proportional to segment's share of total industry emissions and abatement opportunities within each segment

Companies compare their emissions intensity 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.

Annual results reported publicly to US EPA Methane Challenge Program

- Using a streamlined reporting system to be developed by EPA

Illustration of the One Percent target.

Notional emission goals for each industry segment that would achieve a collective 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	0.56%	0.46%	0.36%
Gathering & Processing	0.18%	0.15%	0.11%
Transmission & Storage	0.44%	0.37%	0.30%
Distribution	0.26%	0.24%	0.22%
Total Upstream	1.44%	1.22%	1.00%

Creating uniform metrics to benchmark progress

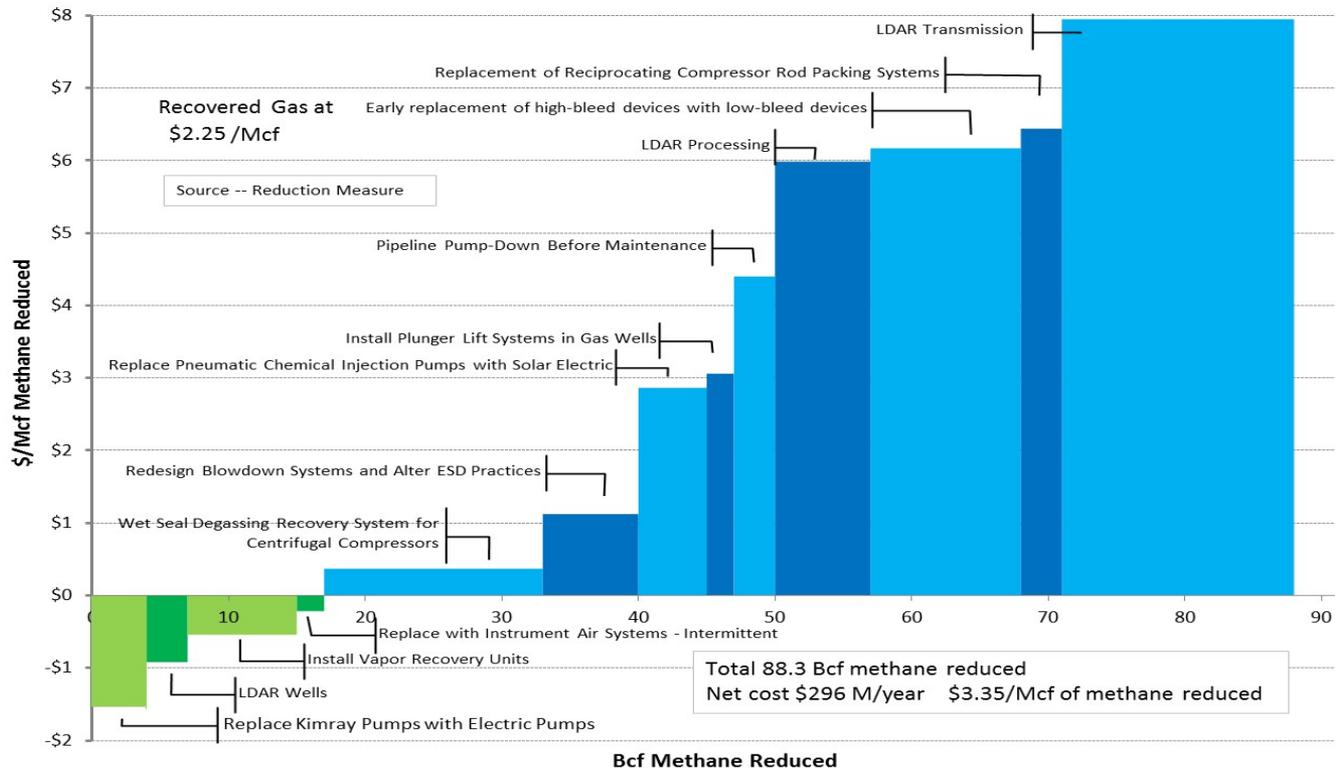
ONE Future has established a Methane Emissions Intensity Protocol

- The Protocol describes the methods the One Future participants will use to quantify and report their methane emissions and emission reductions.
- 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 for comparison with One Future targets.
- The Protocol is available on the One Future coalition's website:
<http://www.onefuture.us/methane-challenge-documents/>

Understanding costs to establish segment targets

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

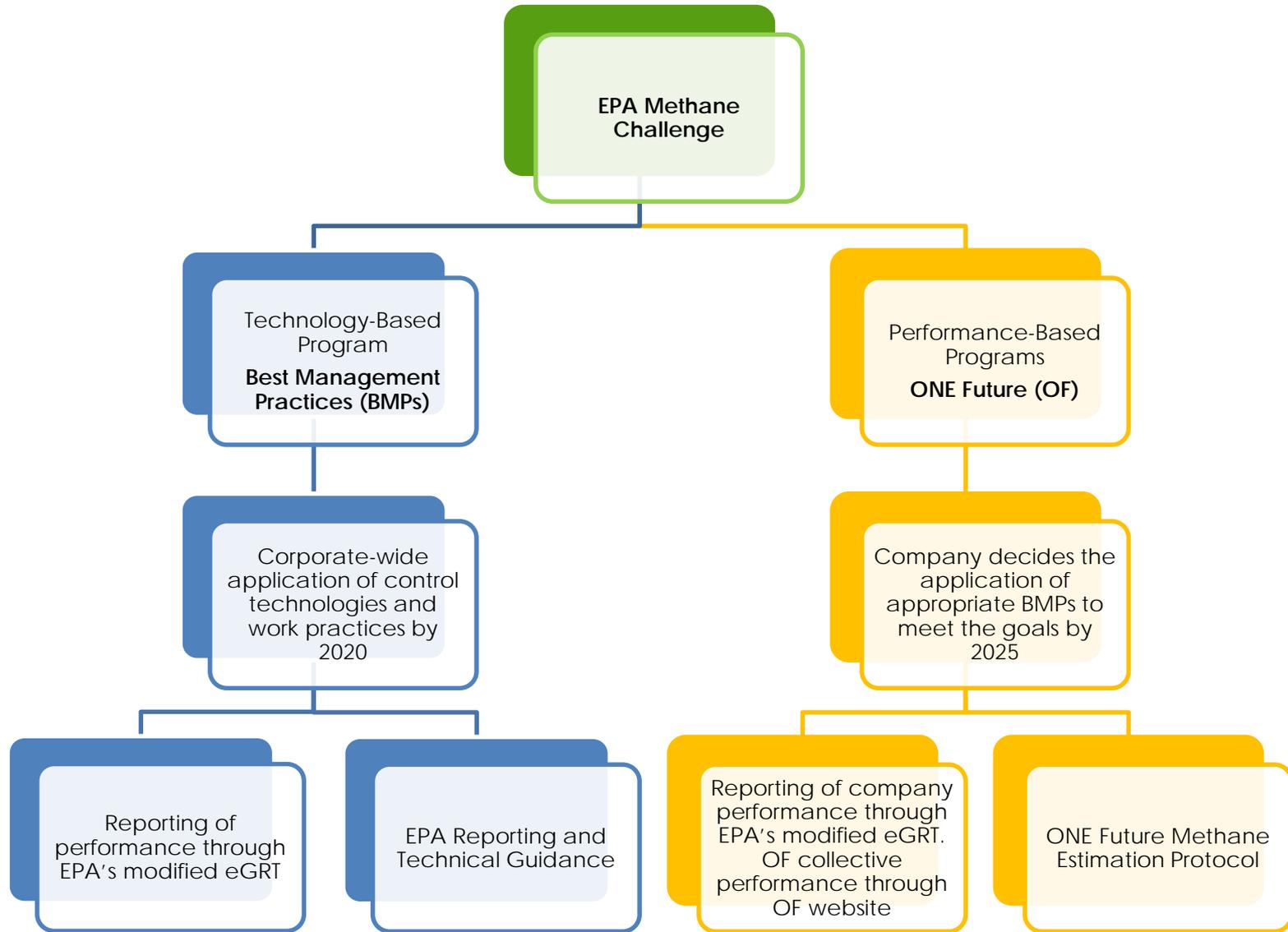
- The MAC analysis provides a comprehensive listing of known emission abatement technologies, reduction potential and costs.
- The intensity targets for each industry segment were developed in accordance with the most cost-effective opportunities for abatement.



Technology options for methane reductions

Methane and VOC emissions reduction technologies	Production	Processing	Transmission	Distribution
Replace high bleed pneumatic devices with low bleed devices	√	√	√	
Replace reciprocating compressor rod packing systems	√	√	√	
Install plunger lift systems in gas wells	√			
Install vapor recovery units on tanks	√			
Redesign blowdown systems for transmission station venting			√	
Replace pneumatic chemical injection pumps with solar electric pumps	√			
Leak detection and repair	√	√	√	
Pipeline venting – pump down before maintenance			√	
Replace Kimray pumps with electric pumps	√	√		
Wet seal degassing recovery system for centrifugal compressors		√	√	
Cast iron main replacement				√

ONE Future and EPA's Methane Challenge program





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