Natural Gas & Petroleum Systems: Updates Under Consideration for 2025 Greenhouse Gas Inventory (GHGI)

Stakeholder Webinar

November 20, 2024

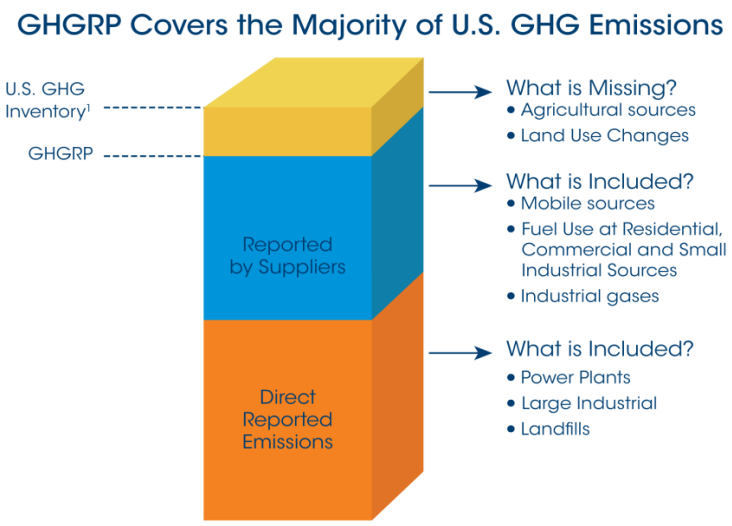
AGENDA

- GHG Inventory Overview
- Overview of State-level GHGI and Gridded CH_4 GHGI
- Updates Under Consideration for 2025 GHGI – Offshore
- Updates Under Consideration for Future (2026 and beyond) GHGIs – Planning for Integration of Updated Data from Subpart W
- Requests for Stakeholder feedback

GHG Inventory Overview

EPA GHG Data: U.S. GHG Inventory (GHGI) and GHG Reporting Program (GHGRP)

- Inventory of U.S. Greenhouse Gas Emissions and Sinks (GHGI), the U.S. official GHG Inventory submission to UNFCCC, tracks total annual U.S. emissions across all sectors of the economy, using mostly national-level data
- GHGRP collects detailed emissions data from large greenhouse gas emitting facilities in the United States, as directed by the Clean Air Act
  - GHGRP covers most, but not all, U.S. GHG sources and sinks (i.e., GHGRP does not include agriculture, land use, and small sources)



Task	Inventory of U.S. GHG Emission and Sinks	Greenhouse Gas Reporting Program
Find total U.S. emissions and sinks	✓	
Review trend data for the past 20+ years	✓	
Browse a map to find the largest emitters in your area		✓
Compare facility emissions across an industrial sector		✓
Find state-level data	Total ✓	Reported ✓

GHGI Overview

- **GHGI**
  - Official U.S. Government data on national GHG emissions and sinks over time by gas, source/sink, and economic sector
  - CO_2, CH_4, N_2O, HFCs, PFCs, SF_6, and NF_3
  - Fulfills U.S. reporting commitment under the UNFCCC
  - Covers a time series beginning with 1990
- **Oil and Gas in the GHGI**
  - IPCC fugitive emissions category; includes leaks, vents, and flaring emissions
  - Oil and gas in GHGI covers hundreds of types of emission sources
  - Emissions calculated using data from GHGRP, research studies, national level activity data, etc.

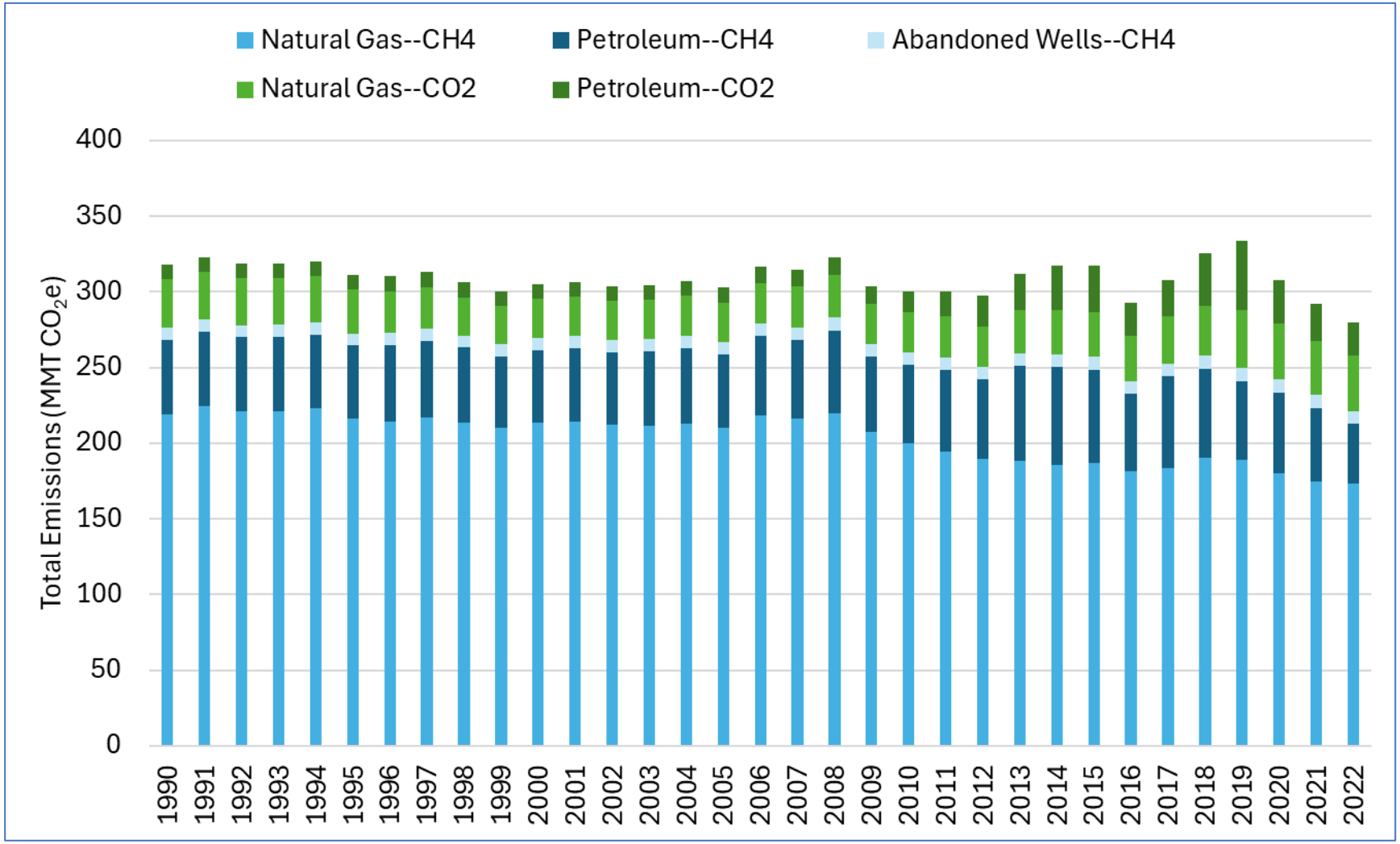
Trends in CH_4 and CO_2 Emissions from Oil and Gas Systems

1990-2022 Trends and Key Drivers

- CH_4-decrease of 19.8%
  - Gas Distribution (upgrades to pipeline and stations)
  - Gas Transmission and storage (changes in compressor types)
- CO_2-increase of 39%
  - Oil and gas production (increased flaring)

2021-2022 Trends and Key Drivers

- CH_4-decrease of 4.6%
  - Oil and gas production (decrease in emissions from pneumatic controllers)
- CO_2-decrease of 2.5%
  - Oil production (decreased flaring of associated gas and at tanks)



EPA Oil and Gas GHGI Stakeholder Process

- Annual stakeholder process since 2012 to discuss improvements to GHGI data and methods
- Typically hold 1-2 webinars/workshops in the development of each GHGI
- Stakeholder website

  (https://www.epa.gov/ghgemissions/natural-gas-and-petroleum-systems)
  - Information on workshops and memos on updates under consideration
  - Full time series of data and information on methods

Previous Updates to GHGI for Oil and Gas

Year	Update
2024	Basin-specific exploration segment calculations, incorporation of additional anomalous leak events, improved transmission activity data
2023	Implemented basin-level calculation methodologies using GHGRP data for select production sources
2022	Inclusion of post-meter estimates and large well blowouts, improved estimates for abandoned wells and voluntary reductions
2021	Updated data on customer meters and produced water
2020	Use of research study EFs for G&B equipment, use of BOEM and GHGRP data on offshore
2019	Use of GHGRP data for G&B and transmission pipelines, LNG, HF oil wells, N_2O emissions
2018	Inclusion of abandoned wells estimate, use of GHGRP for CO_2 and year-specific EFs
2017	Inclusion of Aliso Canyon estimate, GHGRP for processing, associated gas venting and flaring,
2016	Update to production (GHGRP), G&B emission estimate, transmission (GHGRP and research study), distribution (GHGRP and research study)
2015	Use of GHGRP for refineries, use of latest BOEM for offshore, update to well data source
2014	Use of GHGRP data for HF gas wells
2013	Use of API/ANGA data on liquids unloading, use of NSPS OOOO analysis for gas wells

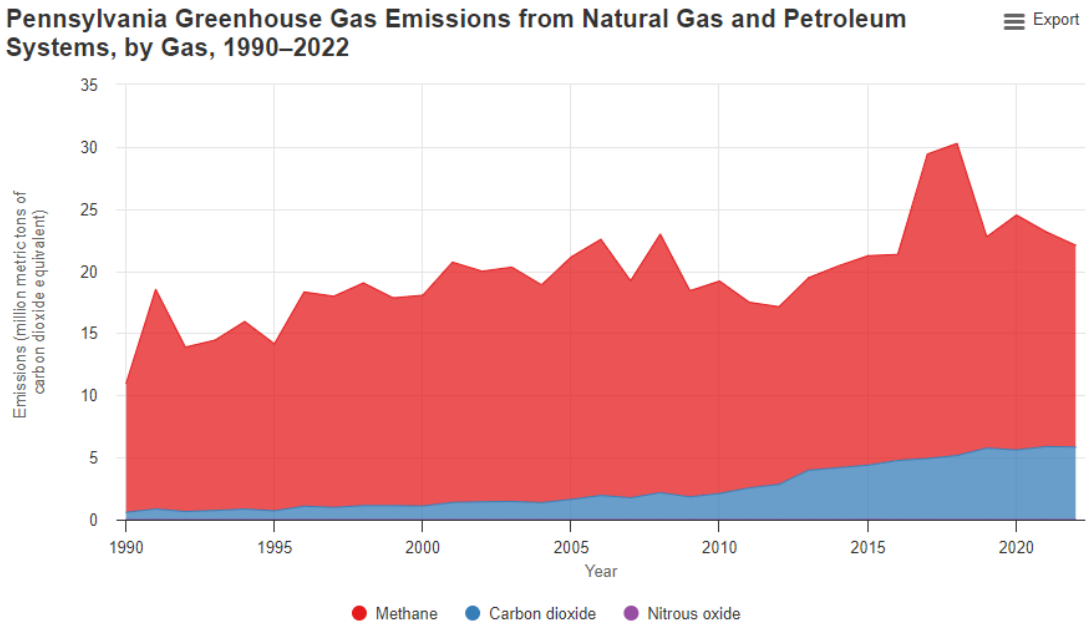
Overview of State-level GHGI and Gridded CH_4 GHGI

GHG State-Level Estimates for Oil and Gas

Approach to allocate emissions to state-level

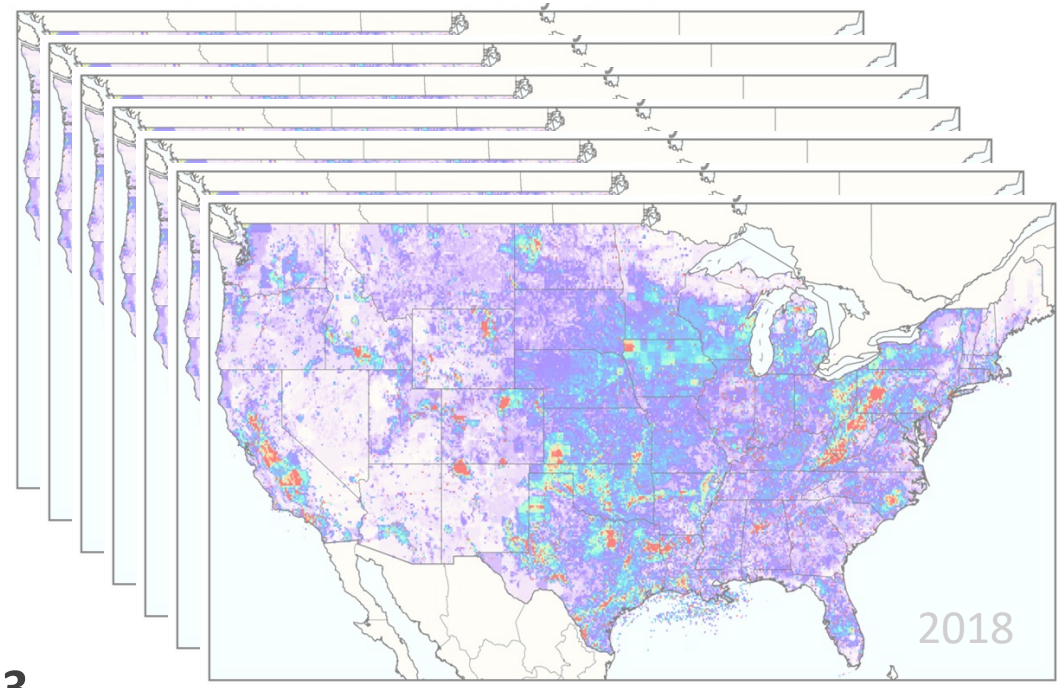
- National GHGI emissions are allocated to each state using datasets with state-specific data that are used to represent the relative contributions of state emissions to the national total
  - e.g., state-specific well counts, pipeline miles, production
- Approach reflects geographic variations for some sources
  - Basin-level inputs for liquids unloading, pneumatic controllers, equipment leaks, and tanks
  - State-specific data on pipeline materials, number and types of wells
- Approach does not reflect certain other variation
  - e.g., differences in technologies and practices, impacts of state regulations (outside of those sources for which basin-level data are applied)

Example: Pennsylvania



Gridded EPA Methane Emissions Inventory

- Spatially and temporally disaggregated version (~10 x 10 km, annual or monthly resolution) of all methane emission sources in the GHGI
- Is used as a prior estimate for inversions of atmospheric methane
- Allows for more direct comparison between the GHGI and the time and location of atmospheric methane observations/emission rates



Version 1—Published 2016

- Emissions for 2012
- Based on 2016 GHGI
- Research study effort

Version 2—Published 2023

- Timeseries (2012 – 2018, "express" data set to 2020)
- Based on 2020 GHGI

Version 3—In the works!

- Timeseries (2012-2022) based on 2024 GHGI
- Goal: regular update as part of inventory cycle

Update Under Consideration for 2025 GHGI: Offshore Production in Gulf of Mexico – 2021 Data

Current GHGI Methodology - Overview for Offshore Production

3 Offshore production regions:

- **Gulf of Mexico (GOM)**
  - **Uses BOEM data plus state oil/gas production [details on following slides]**
- Pacific
  - Uses subpart W data (for EFs) with oil/gas production
- Alaska
  - Uses subpart W data (for EFs) with oil/gas production

Current GHGI Methodology – Federal Waters

- BOEM provides emissions and activity data for GOM federal waters
- **Activity data**: offshore complex counts
- **Emission factors**: calculated from BOEM emissions inventories for years 2005, 2008, 2011, 2014, and 2017
  - 2017 EFs currently used for 2016-2022
- Categories: 4 combinations
  - Oil or Gas Complex
  - Major or Minor Complex

Current GHGI Methodology – State Waters

- GOM federal waters emissions are used to calculate GOM state waters emissions
- **Emission factors**: year-specific production-based EFs (GOM federal waters emissions divided by GOM federal waters oil/gas production)
- **Activity data**: GOM state waters oil/gas production

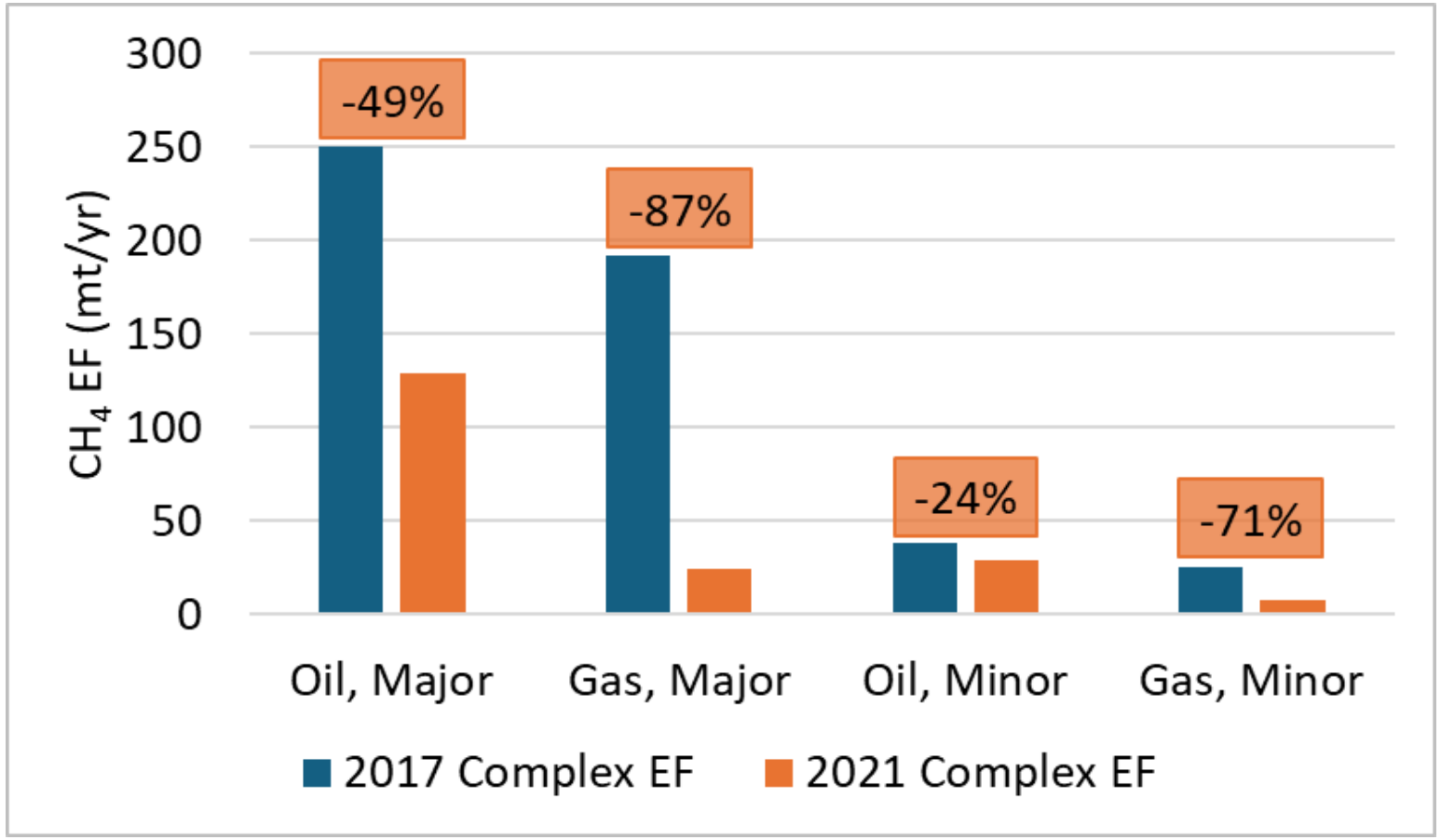
Summary of Update Under Consideration

- Incorporate EFs calculated from BOEM's most recent emissions inventory for **2021**
- EFs are for GOM federal waters, but would necessarily impact GOM state waters emissions

BOEM Emissions Inventory Comparison – Oil, Major Complexes Example

Emission Source	2017 BOEM Data			2021 BOEM Data		
	Complex Count	CH_4 Emissions (mt)	Complex CH_4 EF (mt/yr)	Complex Count	CH_4 Emissions (mt)	Complex CH_4 EF (mt/yr)
Cold Vent	550	55,997	101.8	559	32,055	57.3
Fugitives		39,340	71.5		21,185	37.9
Pneumatic Pump		18,027	32.8		8,446	15.1
Losses from Flashing		3,516	6.4		1,107	2.0
Pneumatic Controller		11,035	20.1		5,081	9.1
Combustion		8,532	15.5		3,411	6.1
Glycol Dehydrator Unit		431	0.8		292	0.5
Storage Tank		479	0.9		222	0.4
Mud Degassing		78	0.1		69	0.1

BOEM Emissions Inventory Comparison

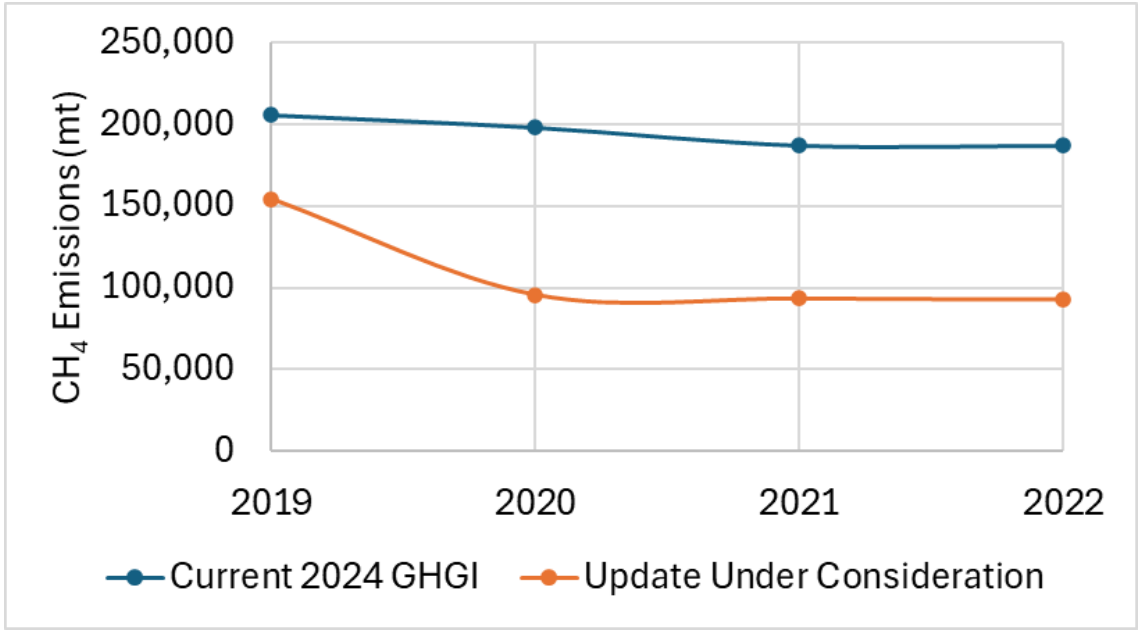


Time Series Considerations

- Update only impacts years 2019 forward
- 2016-2018: BOEM 2017 EFs (no change)
- 2019: Average of BOEM 2017 and 2021 EFs
- 2020-2023: BOEM 2021 EFs

Offshore GOM Emissions – Federal + State Waters

Complex Type	Year 2022 CH_4 Emissions (mt)	
	Current 2024 GHGI	Update Under Consideration
Oil Complexes	164,395	89,752
Gas Complexes	22,712	3,231
Total	**187,107**	**92,983**



Updates Under Consideration for Future GHGIs: Subpart W

Revisions to subpart W

EPA recently finalized updates to the oil & gas sector GHG reporting requirements to ensure that subpart W was based on empirical data, reflects total methane emissions, improves the accuracy of reported data, and improves data verification and transparency

- Added new calculation methods based on direct emissions measurement and revised existing methods to improve accuracy
- Requires reporting for emission sources by well, well-pad site, or G&B site instead of currently aggregated reporting at the sub-basin / basin level
- Expanded reporting of previously included sources to all relevant segments

The finalized rule also added new source categories, including a category called “other large release events”

- Incorporates reporting of “super-emitter events” reported to the EPA’s regulatory “Super Emitter Program”, including quantifying the associated emissions
- Also includes “other large release events” identified by the facility or the EPA
- Other new source categories include mud degassing, produced water tanks, nitrogen removal units & crankcase venting

Revisions to Subpart W and GHGI

- In addition to these updates, recent subpart W revisions also provided revised default EFs for certain emission sources and industry segments
- Reporters implement most changes beginning with reports prepared for the 2025 reporting year and submitted March 31, 2026
- We have identified some emission sources where the revised default EFs could be incorporated into the GHGI calculation methodologies before the reported subpart W data are available. Today we will cover:
  - Production wellpad equipment leaks
  - Pipeline leaks
  - Pneumatic controllers
- We will discuss future (2026 & beyond) updates under consideration for each of these sources

Update Under Consideration for Future GHGIs: Subpart W EFs – Production Wellpad Equipment Leaks

Current GHGI Methodology for Wellpads

- Gas wellpad equipment: gas wellheads, separators, heaters, dehydrators, meters/piping, and compressors
- Oil wellpad equipment: oil wellheads, separators, heater-treaters, and headers
- Does not include storage tank leak emissions
- AFs:
  - 1990-1992/1993: 1996 GRI/EPA study (gas wellpads) or 1999 Radian report (oil wellpads)
  - 1993/1994-2014: Linear Interpolation
  - 2015-2022: Basin- and year-specific, subpart W-based, per-well basis
- Activity Data: Gas/Oil well counts from Enverus
- EFs:
  - Gas wellpads: 1996 GRI/EPA study
  - Oil wellpads: 1996 API workbook

Summary of Future Update Under Consideration – Population EF Methodology

- Incorporate revised subpart W population EFs for oil and gas wellpad equipment
- Replace oil wellpad headers with meters/piping
- Incorporate storage tank leaks
- Combine compressor leak and reciprocating compressor rod packing EFs for gas wellpads
- Remove East/West distinction for gas wellpad EFs
- Remove heavy/light crude distinction for oil wellpad EFs

Population EF methodology would apply to the percent of wells that did not conduct leaker surveys

Summary of Future Update Under Consideration – Leaker Survey Methodology

- Incorporate subpart W leaker survey emissions (starting for year 2017 emissions)
- Calculate year- and basin-specific EFs and AFs

Leaker survey methodology would apply to the percent of wells that conducted leaker surveys

Population Emission Factors – Oil Wellpad Equipment

Equipment	Current GHGI EFs	EFs for Future GHGI Update[a]	EF Units
Heater-Treaters	19	56	scfd CH_4/heater
Separators (light crude)	14	84	scfd CH_4/separator
Separators (heavy crude)	0.15		scfd CH_4/separator
Wellheads (light crude)	16.6	73	scfd CH_4/well
Wellheads (heavy crude)	0.13		scfd CH_4/well
Headers (light crude)	11	n/a	scfd CH_4/header
Headers (heavy crude)	0.08	n/a	scfd CH_4/header
Meters/Piping	n/a	217	scfd CH_4/meters-piping

a. Equals the revised subpart W EFs (which are whole gas EFs on an hourly basis) with adjustments for operating hours (8,100 operating hours per year) and a CH_4 content of 79 percent.

Population Emission Factors – Gas Wellpad Equipment

Equipment	Current GHGI EFs		EFs for Future GHGI Update[a]	EF Units
	East EFs	West EFs		
Heaters	14.21	57.72	92	scfd CH_4/heater
Separators	0.90	122.02	169	scfd CH_4/separator
Dehydrators	21.75	91.13	142	scfd CH_4/dehydrator
Meters/Piping	9.01	52.90	124	scfd CH_4/meters-piping
Compressor Leaks	267.75	267.75	242	scfd CH_4/compressor
Compressor Rod Packing			434	
Wellhead	7.11	36.44	156	scfd CH_4/well

a. Equals the revised subpart W EFs (which are whole gas EFs on an hourly basis) with adjustments for operating hours (8,100 hours per year) and a CH_4 content of 79 percent.

Meters/Piping Analysis

Oil Wellpads

- Replace headers with meters/piping, a more comprehensive source
- Calculated using gas wellpad meters/piping AF
  - Subpart W reported data for oil wellpad meters/piping will not be available until RY2025

Oil and Gas Wellpads

- Apply a maximum of 1 meters/piping per well
  - Assumes a minimum of 1 well per wellpad

Storage Tank Leaks Analysis

- **Storage Tank Subpart W Population EFs:**
  - Crude Service (oil tanks): 1.91 scf whole gas/hour/tank
  - Gas Service (condensate tanks): 1.83 scf whole gas/hour/tank
  - Estimated CH_4 content and operating hours
- **Storage Tank AFs:**
  - Calculated year-specific, basin-specific AFs from subpart W data (tanks per liquids production)
  - Basins without subpart W data: applied national average AFs
- **Total Liquids Production Data:** Enverus

Storage Tank Leaks – Oil Tank AFs and EFs (RY2023 Subpart W)

Basin Name	Basin Number	Tanks per Liquids Production (tanks/mbbl)	EFs for Future GHGI Update (scf CH_4/tank/yr)[a]
Appalachian	160	0	0
Appalachian (Eastern Overthrust)	160A	0.0003	12,326
Gulf Coast	220	0.04	11,987
Anadarko	360	0.2	11,823
Williston	395	0.1	7,753
Permian	430	0.03	10,196
National Average		0.04	10,639

a. Equals the new subpart W storage tank leak EFs (which are whole gas EFs on an hourly basis) with adjustments for operating hours and CH_4 content.

Storage Tank Leaks – Condensate Tank AFs and EFs (RY2023 Subpart W)

Basin Name	Basin Number	Tanks per Liquids Production (tanks/mbbl)	EFs for Future GHGI Update (scf CH_4/tank/yr)[a]
Appalachian	160	0	0
Appalachian (Eastern Overthrust)	160A	0.04	11,314
Gulf Coast	220	0.02	11,966
Anadarko	360	0.1	11,088
Williston	395	0.1	9,059
Permian	430	0.004	11,164
National Average		0.01	11,978

a. Equals the new subpart W storage tank leak EFs (which are whole gas EFs on an hourly basis) with adjustments for operating hours and CH_4 content.

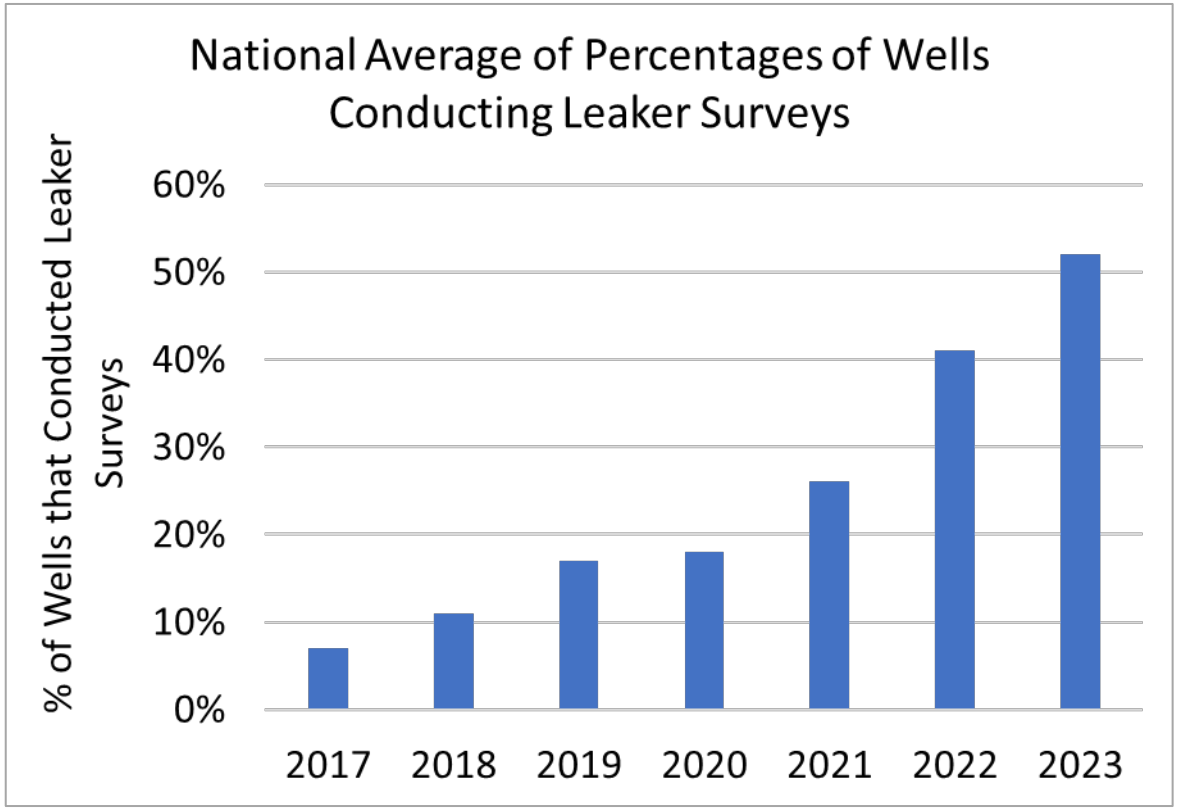
Leaker Survey – EF Ratio

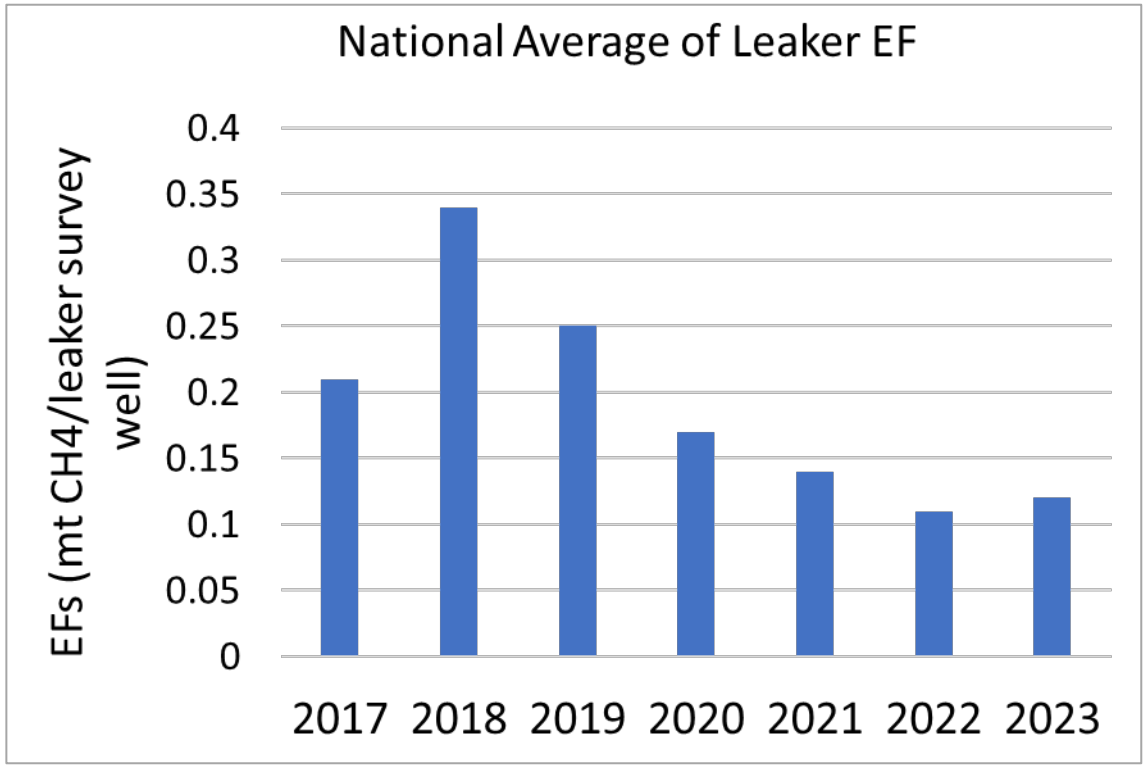
Leak Detection Survey Method	Equipment Component	Subpart W EFs - Gas Service (scf whole gas/hr/ component)		Revised Subpart W Rule - k factor	Overall EF Ratio[a]
		Current EF	Revised EF		
Method 21 with 500 ppm Leak Definition	Valve	3.5	5.5	1.27	2.0
	Connector (other)	0.8	2.8	1.27	4.4
	Pressure Relief Valve	2.8	4.5	1.27	2.0
	Other	2.8	5.3	1.27	2.4
Other - Optical Gas Imaging, Infrared, or Acoustic Leak Detection	Valve	4.9	16	1.25	4.1
	Connector (other)	1.3	7.9	1.25	7.6
	Pressure Relief Valve	4.5	13	1.25	3.6
	Other	4.5	15	1.25	4.2

a. Overall EF Ratio = (Revised EF × 'k factor') / Current EF

See the Memo for the full table

Leaker Survey – Activity Factor and Methane Emission Factors

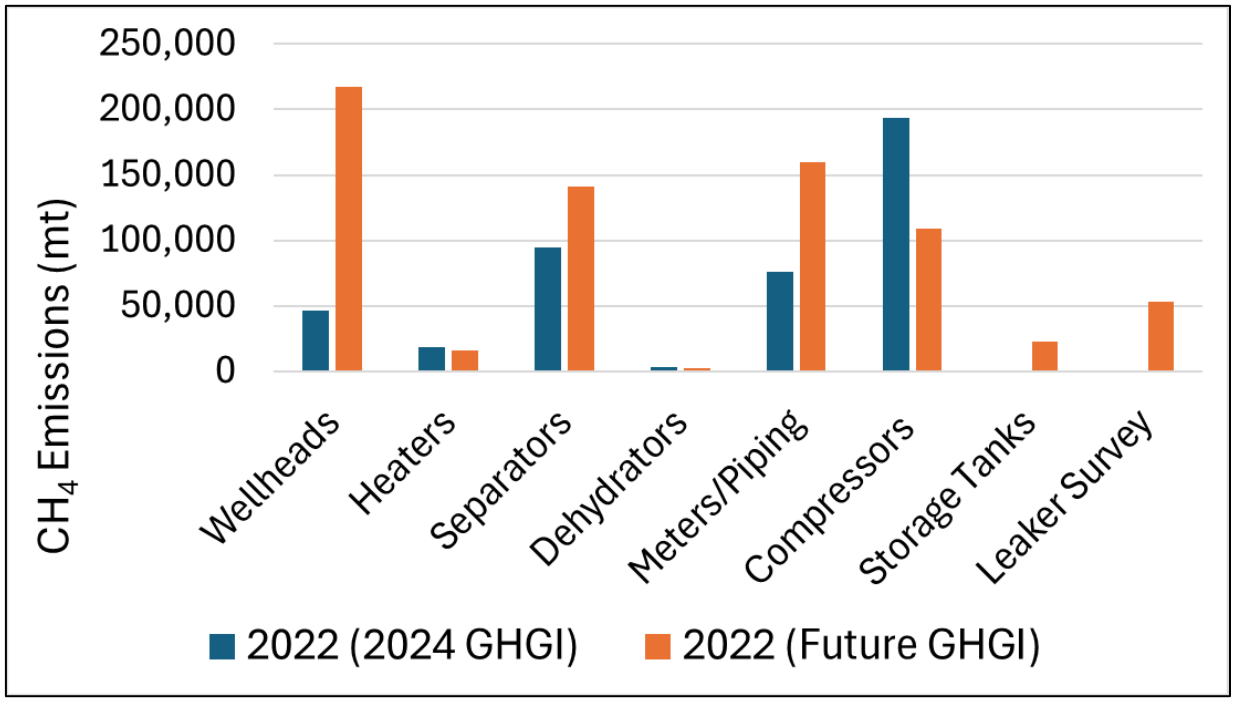


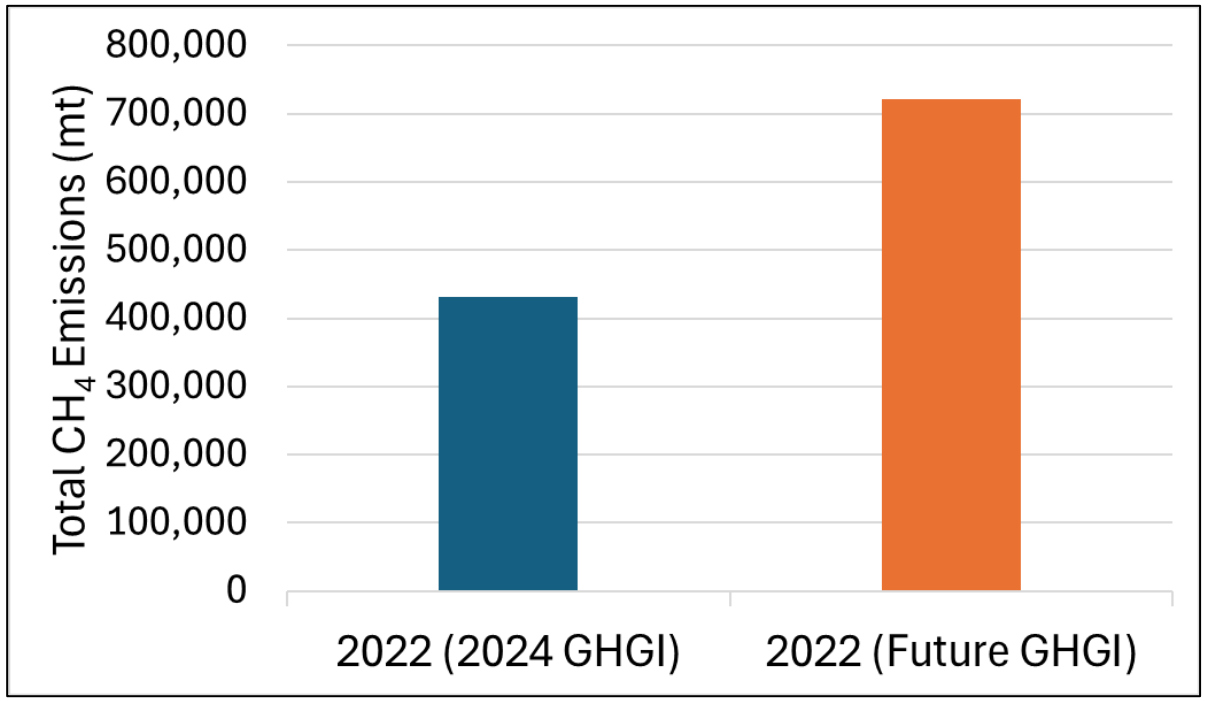


Time Series Considerations

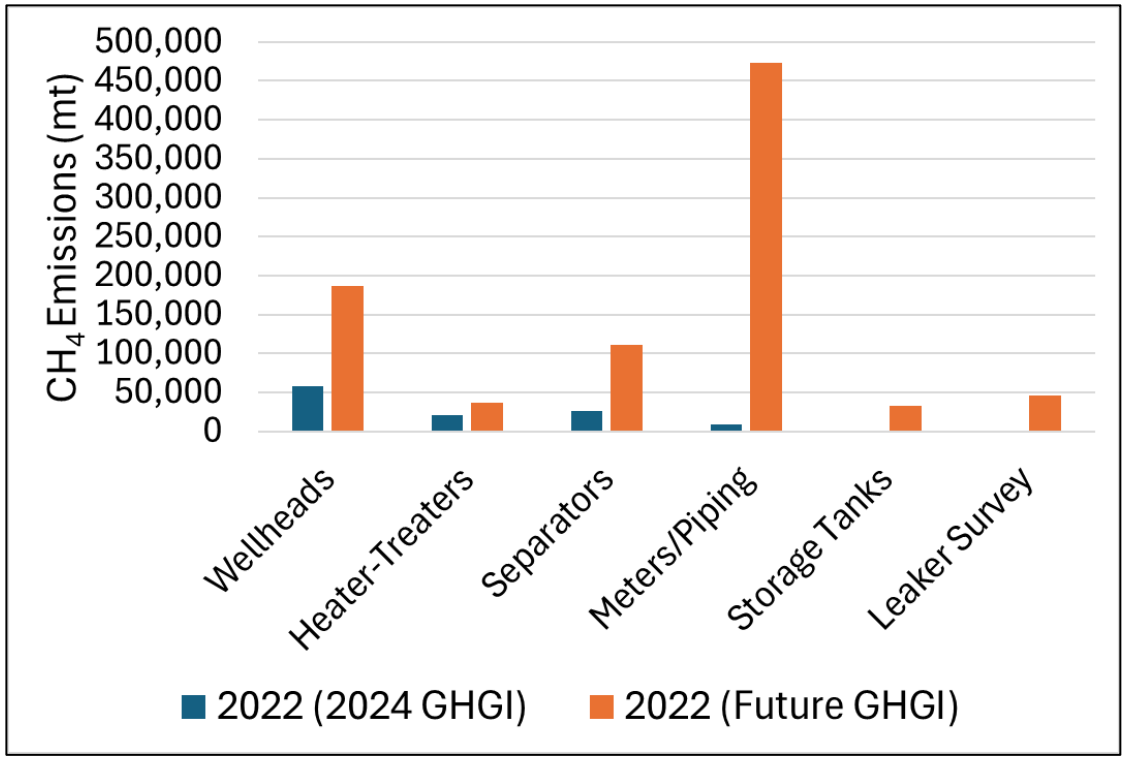
- Apply revised subpart W population EFs across the time series
- 1990-2016: All wells (and equipment) subject to population EF methodology only
- 2017-2023:
  - Population EF methodology would apply to the percent of wells that did not conduct leaker surveys
  - Leaker survey EF methodology would apply to the percent of wells that did conduct leaker surveys

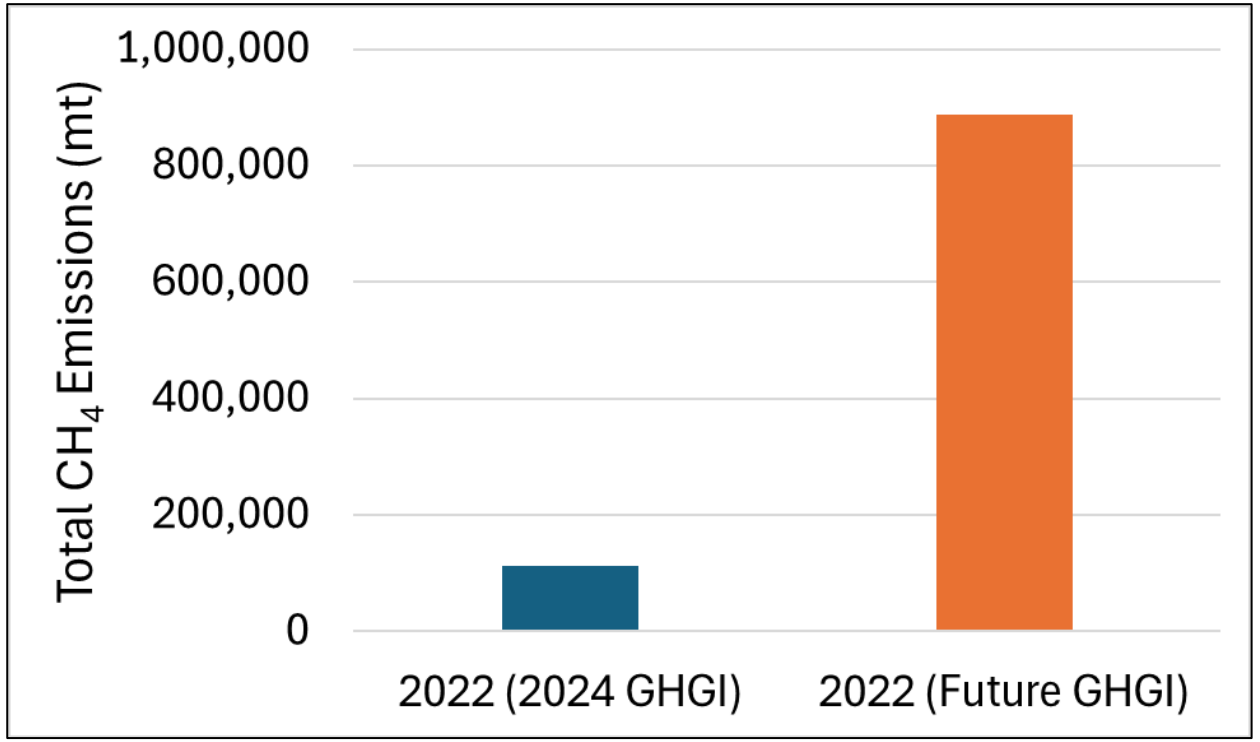
Production Wellpad Equipment Leak Emissions (Gas Wellpad Leaks)



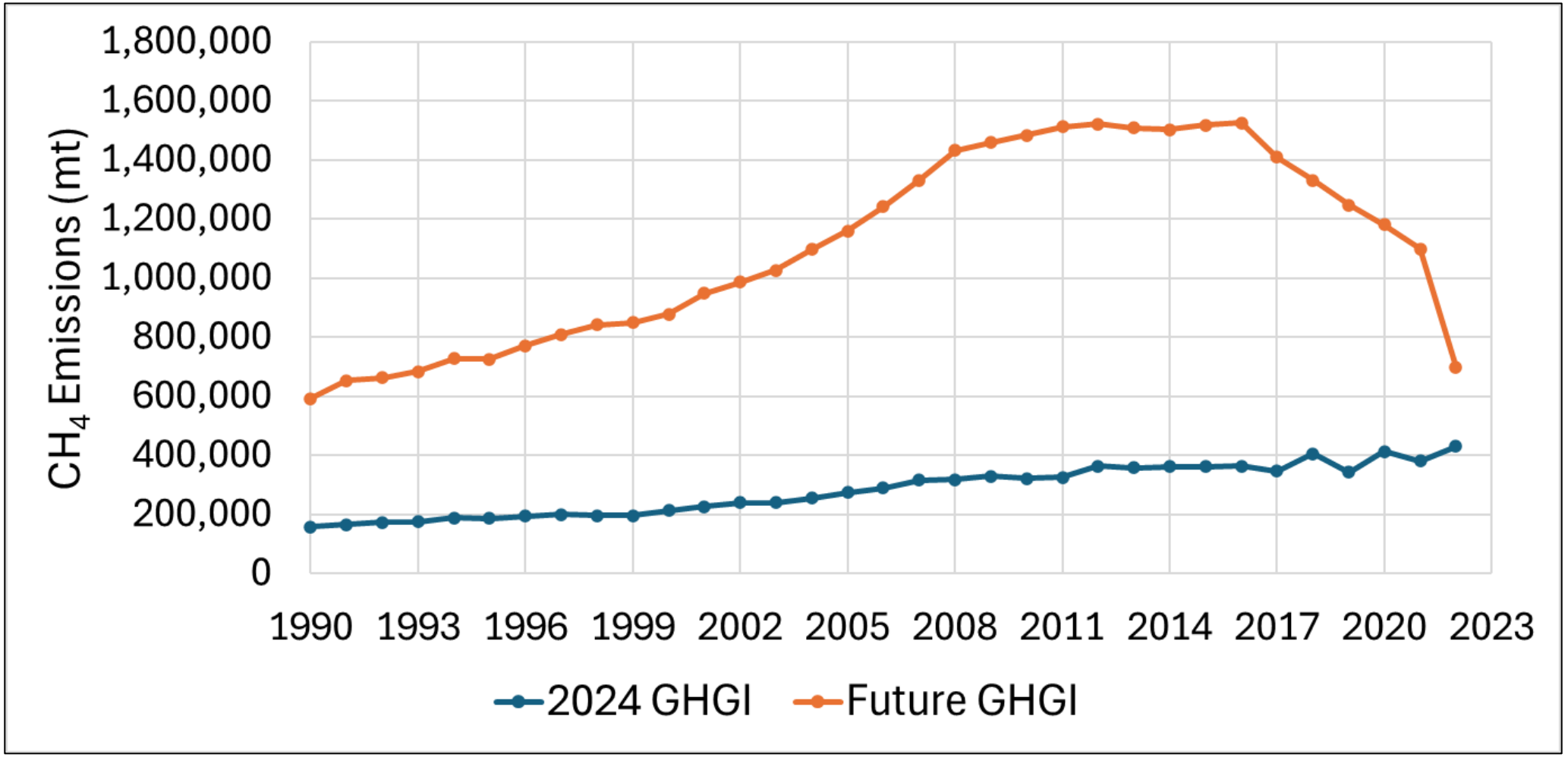


Production Wellpad Equipment Leak Emissions (Oil Wellpad Leaks)

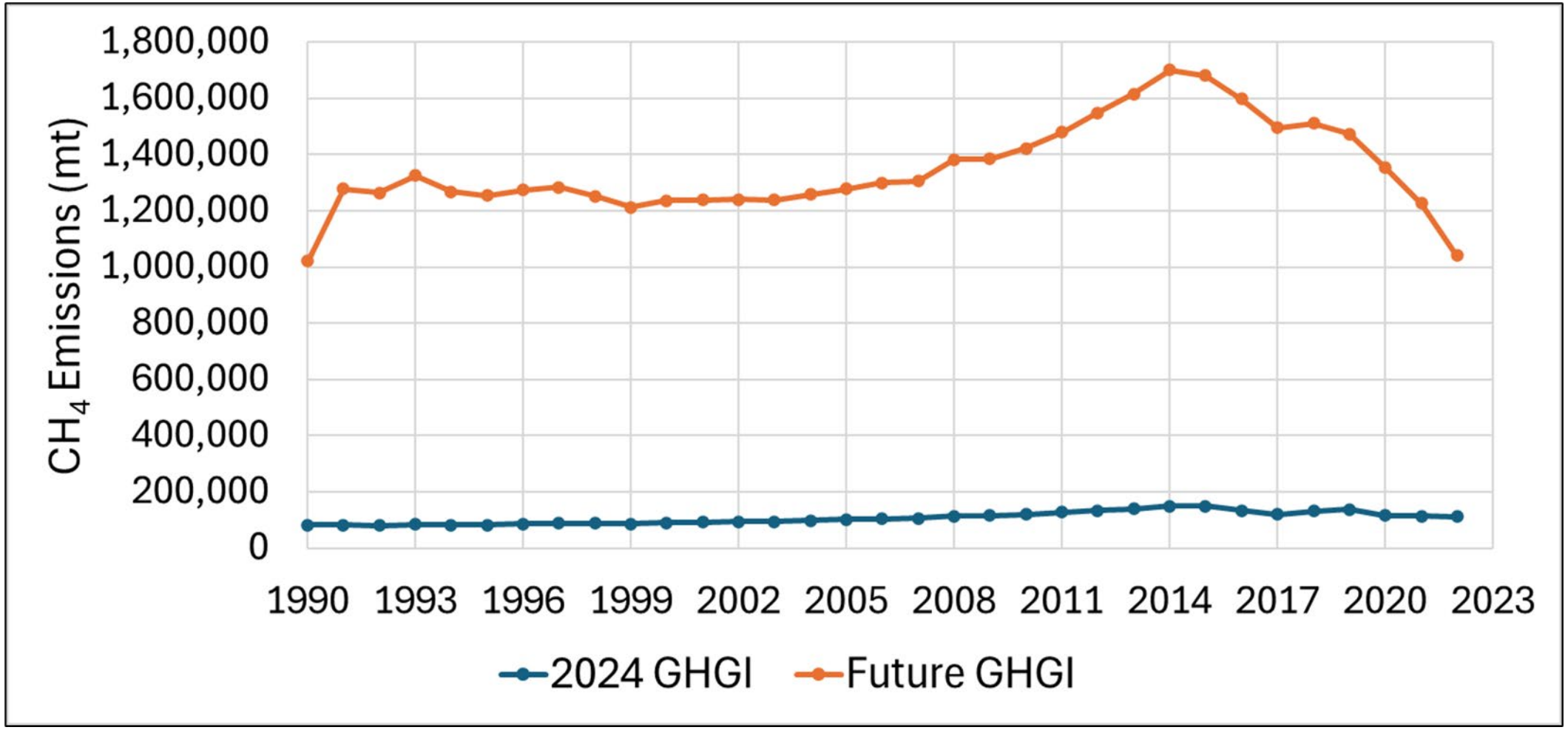




Production Wellpad Equipment Leak Emissions (Gas Wellpads)



Production Wellpad Equipment Leak Emissions (Oil Wellpads)



Update Under Consideration For Future GHGIs: Subpart W EFs – Production Pneumatic Controllers

Current GHGI Methodology

- **Activity Data**: Gas and oil well counts (Enverus)
- **AFs**: Controllers/well; Fraction high-bleed, low-bleed, intermittent-bleed
  - 1990-1992 (gas wells): 1996 GRI/EPA study
  - 1993-2010 (gas wells): Linear interpolation
  - 1990-1993 (oil wells): Industry Review Panel
  - 1994-2010 (oil wells): Linear interpolation
  - 2011-2023: Year- and basin-specific, calculated with subpart W data
    - 2011-2014 controllers/well = RY2015 value
- **EFs**: scfd/controller
  - 1990-2010: RY2011 value
  - 2011-2023: Year- and basin-specific, calculated with subpart W data

Summary of Update Under Consideration

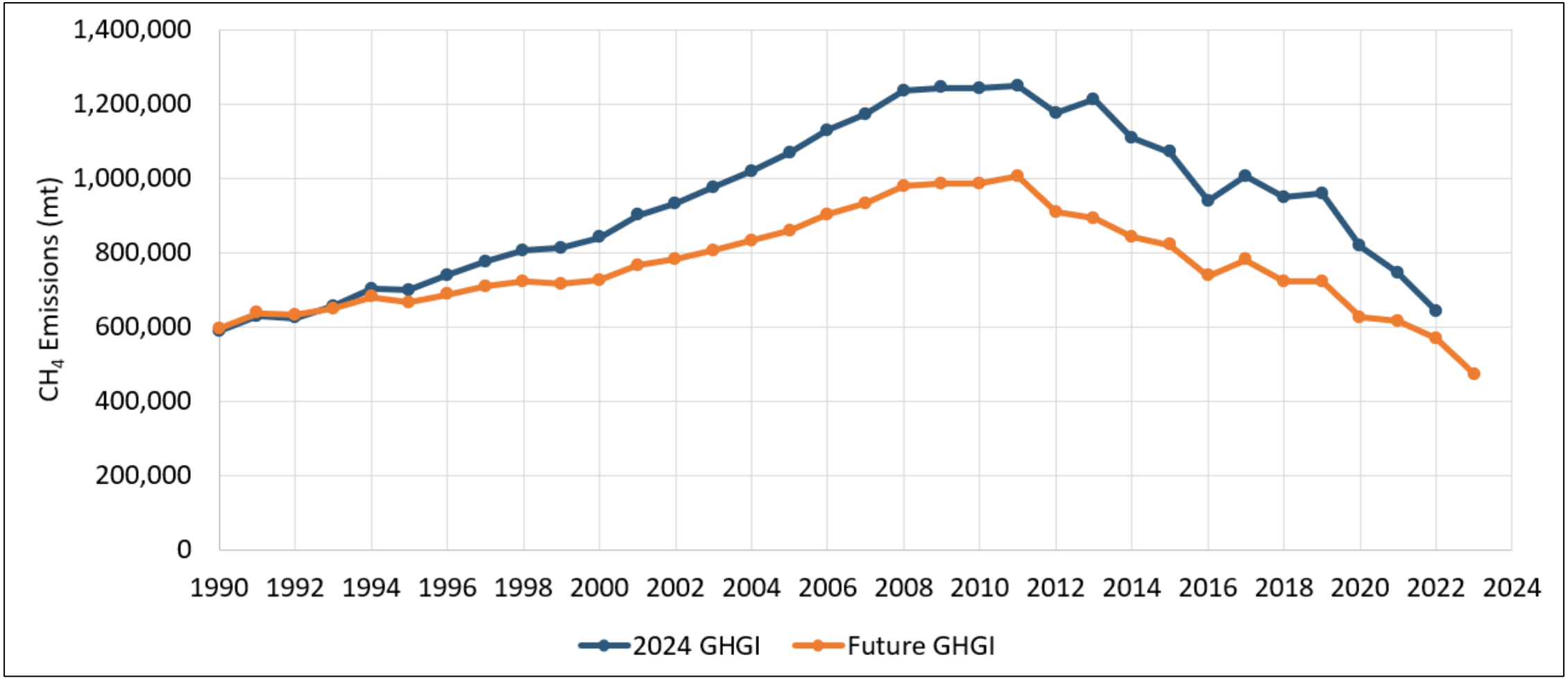
- Incorporate revised subpart W population EFs
- Multiply reported CH_4 emissions by EF ratio, according to bleed type

Bleed Type	Subpart W EFs (scf/hr/device)		Bleed Type EF Ratio (Revised/Current)
	Current EF	Revised EF	
Low-Bleed	1.39	6.8	4.89
High-Bleed	37.3	21	0.56
Intermittent-Bleed	13.5	8.8	0.65

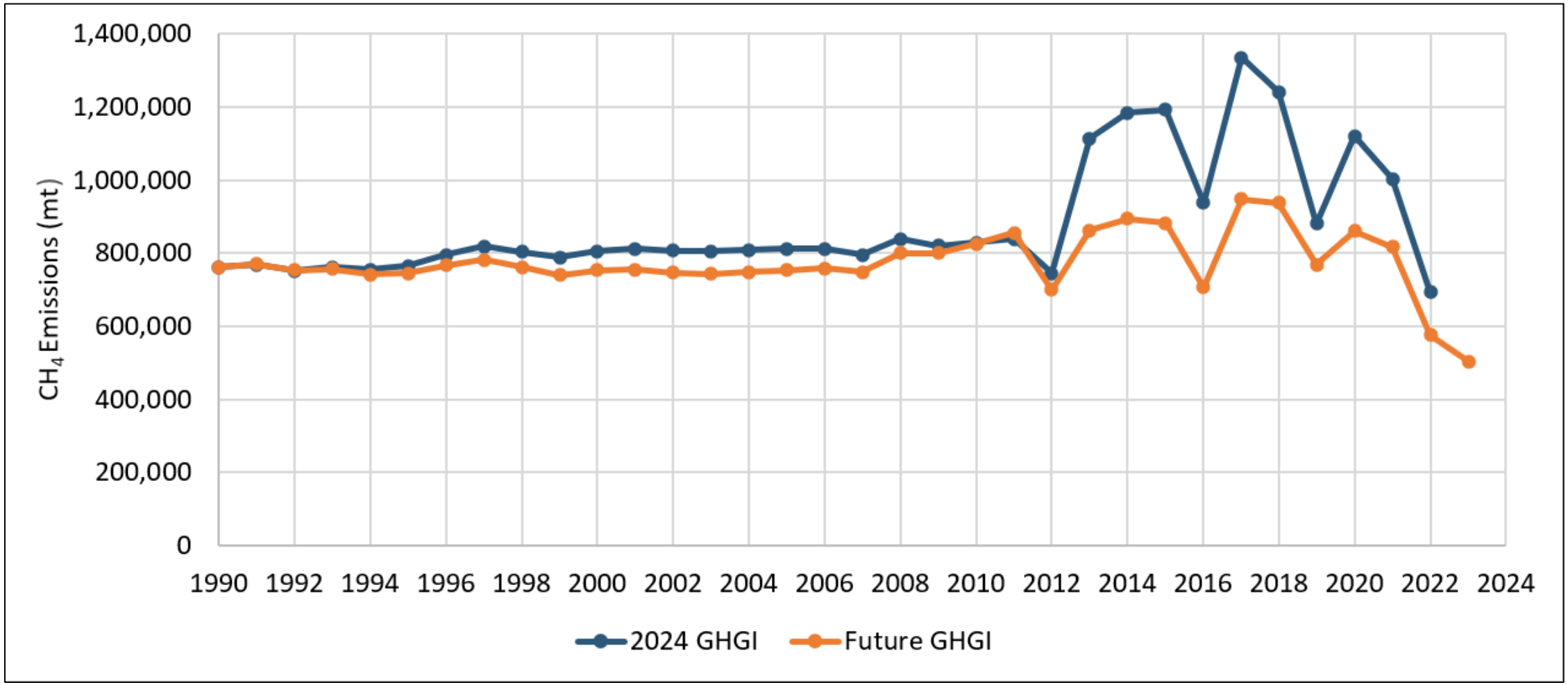
Time Series Considerations

- 1990-1992 EFs: Maintain current GHGI EFs (1996 GRI/EPA basis)
  - Current GHGI EFs = Current subpart W-based 2011 EFs without incorporating revised population EFs
- 1993-2010: Linear interpolation
- 2011-2023: Year- and basin-specific, calculated with subpart W data, incorporating revised population EFs

Production Pneumatic Controller Emissions (Gas Wells)



Production Pneumatic Controller Emissions (Oil Wells)



Update Under Consideration For Future GHGIs: Subpart W EFs – G&B Pneumatic Controllers

Current GHGI Methodology

- **Activity Data**: High-bleed, intermittent-bleed, and low-bleed controller counts
  - 1990-2015: G&B station counts * RY2016 controllers/station (specific to bleed-type)
  - 2016-2023: G&B station counts * controllers/station (specific to bleed-type)
    - Year-specific, calculated with subpart W data
    - Note: Subpart W controller counts were scaled up to the national level by assuming that 93% of all G&B stations report to subpart W
- **EFs**: mt/controller
  - 1990-2015: RY2016 value
  - 2016-2023: Year-specific, calculated with subpart W data

Summary of Update Under Consideration

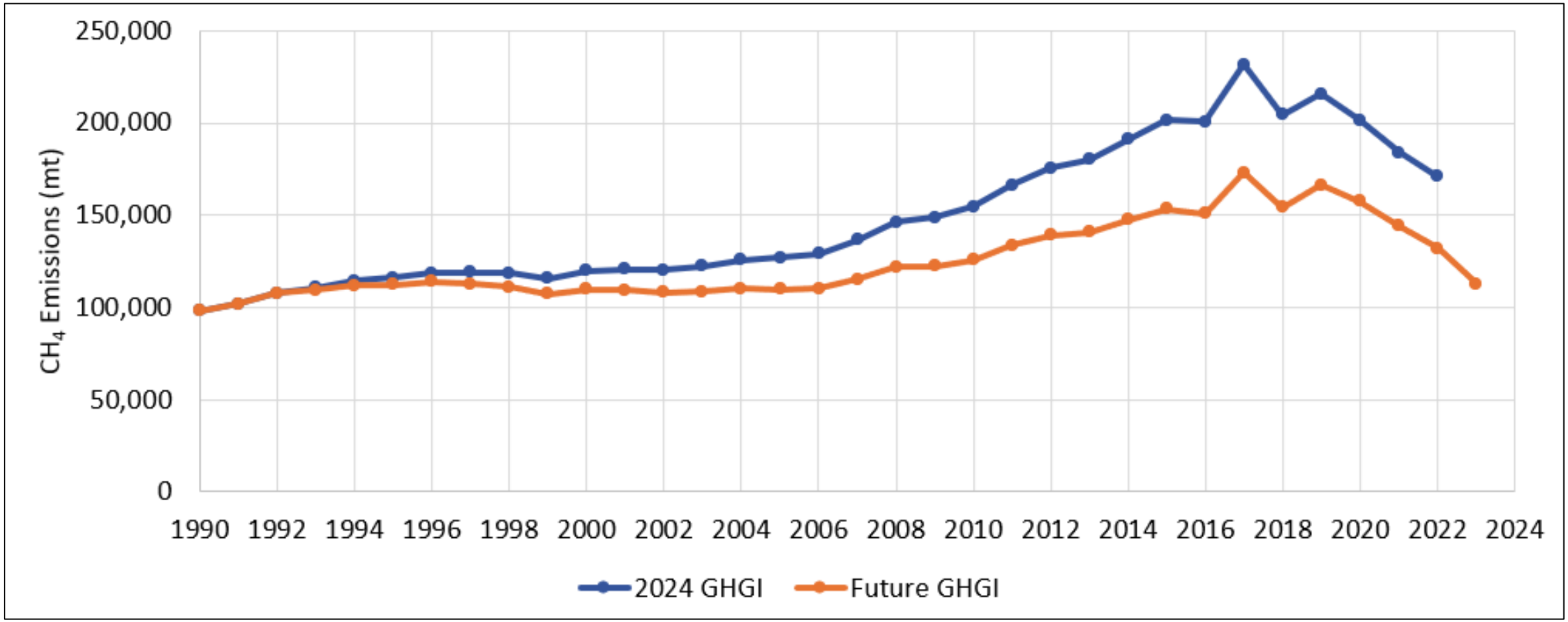
- Incorporate revised subpart W population EFs
- Multiply reported CH_4 emissions by EF ratio, according to bleed type

Bleed Type	Subpart W EFs (scf/hr/device)		Bleed Type EF Ratio (Revised/Current)
	Current EF	Revised EF	
Low-Bleed	1.39	6.8	4.89
High-Bleed	37.3	21	0.56
Intermittent-Bleed	13.5	8.8	0.65

Time Series Considerations

- 1990-1992: Maintain current GHGI EFs (1996 GRI/EPA basis)
  - Current GHGI EFs = Current subpart W-based 2016 EFs without incorporating revised population EFs
- 1993-2015: Linear interpolation
- 2016-2023: Year- and basin-specific, calculated with subpart W data, incorporating revised population EFs

G&B Pneumatic Controller Emissions



Update Under Consideration for Future GHGIs: Subpart W EFs – Transmission and Storage Pneumatic Controllers

Current GHGI Methodology

- **Activity Data**: Controller counts
  - 1990-1992: 1996 GRI/EPA study
  - 1993-2010: Linear interpolation
  - 2011-2023: Station counts * controllers/station (Year-specific, subpart W)
- **AFs**: Fraction high-bleed, low-bleed, intermittent-bleed
  - 1990-2010: N/A (EPA only calculates total pneumatic controller emissions, not disaggregated by controller-type)
  - 2011-2023: Year-specific, calculated with subpart W data
- **EFs**: scfy/controller
  - 1990-1992: 1996 GRI/EPA study
  - 1993-2010: Linear interpolation to weighted RY2011 total pneumatic controller EF
  - 2011-2023: Year-specific, calculated with subpart W data

Summary of Update Under Consideration – Recent Years

- Incorporate revised subpart W population EFs
- Multiply reported CH_4 emissions by EF ratio, according to bleed type

Bleed Type	Subpart W EFs (scf/hr/device)		Bleed Type EF Ratio (Revised/Current)
	Current EF	Revised EF	
Low-Bleed	1.37	6.8	4.96
High-Bleed	18.2	30	1.65
Intermittent-Bleed	2.3	2.3	1

Summary of Update Under Consideration – Early Years

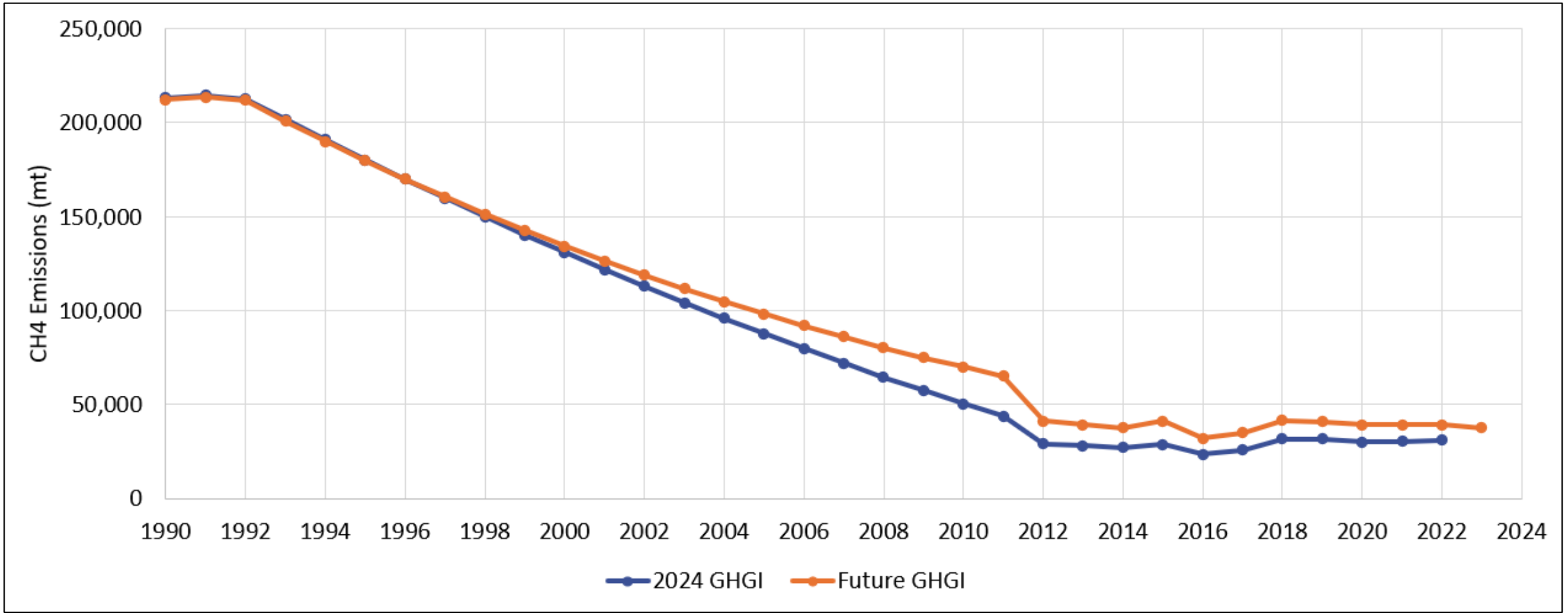
- 1990-1992: Use 1996 GRI/EPA data to disaggregate combined data
  - Total pneumatic controllers → Controller counts by bleed type (unique AFs)
  - Total pneumatic controllers EF → Controller bleed type EFs

Controller Type	1990-1992	
	AF (fraction of total controllers)	EF (scf whole gas/yr/controller)
High-Bleed (Future GHGI)	**0.32**	**497,584**
Continuous-Bleed Controllers (GRI/EPA)	0.32	497,584
Intermittent-Bleed (Future GHGI)	**0.68**	**20,209**
Turbine Controllers (GRI/EPA)	0.16	67,599
Displacement Controllers (GRI/EPA)	0.52	5,627

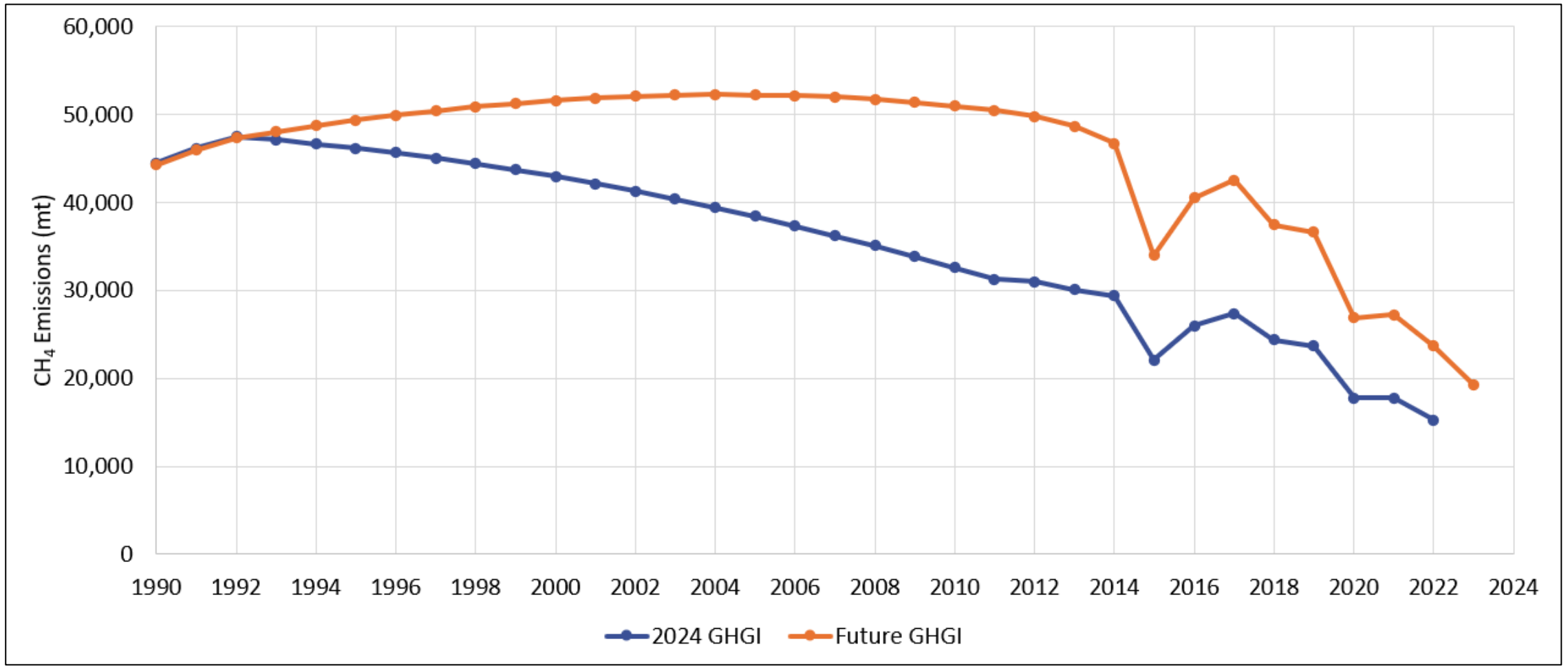
Time Series Considerations

- 1990-1992:
  - Fraction high-bleed, intermittent-bleed: use fractions in 1996 GRI/EPA data
  - Fraction low-bleed = 0
  - High-bleed, intermittent-bleed EFs: disaggregate combined 1996 GRI/EPA EF
- 1993-2010:
  - High-bleed and intermittent-bleed EFs: Linear interpolation
  - Low-bleed: RY2011 EF applied to all prior years
  - Fraction high-bleed, intermittent-bleed, low-bleed: Linear interpolation
- 2011-2023:
  - Year-specific EFs, calculated with subpart W data, incorporating revised population EFs
  - Fraction high-bleed, intermittent-bleed, low-bleed: Year-specific, calculated with subpart W data

Transmission Pneumatic Controller Emissions



Storage Pneumatic Controller Emissions



Update Under Consideration for Future GHGIs: Subpart W EFs – Gathering and Transmission Pipeline Leaks

Current GHGI Methodology

- **Gathering Pipeline Leak EFs**
  - 2016-2022: Year-specific, subpart W-based
  - 1990-2015: 2016 EF is applied
- **Gathering Pipeline Miles**
  - 2016-2022: Subpart W data
  - 1990-2015: Estimated mileage based on 1996 GRI/EPA study

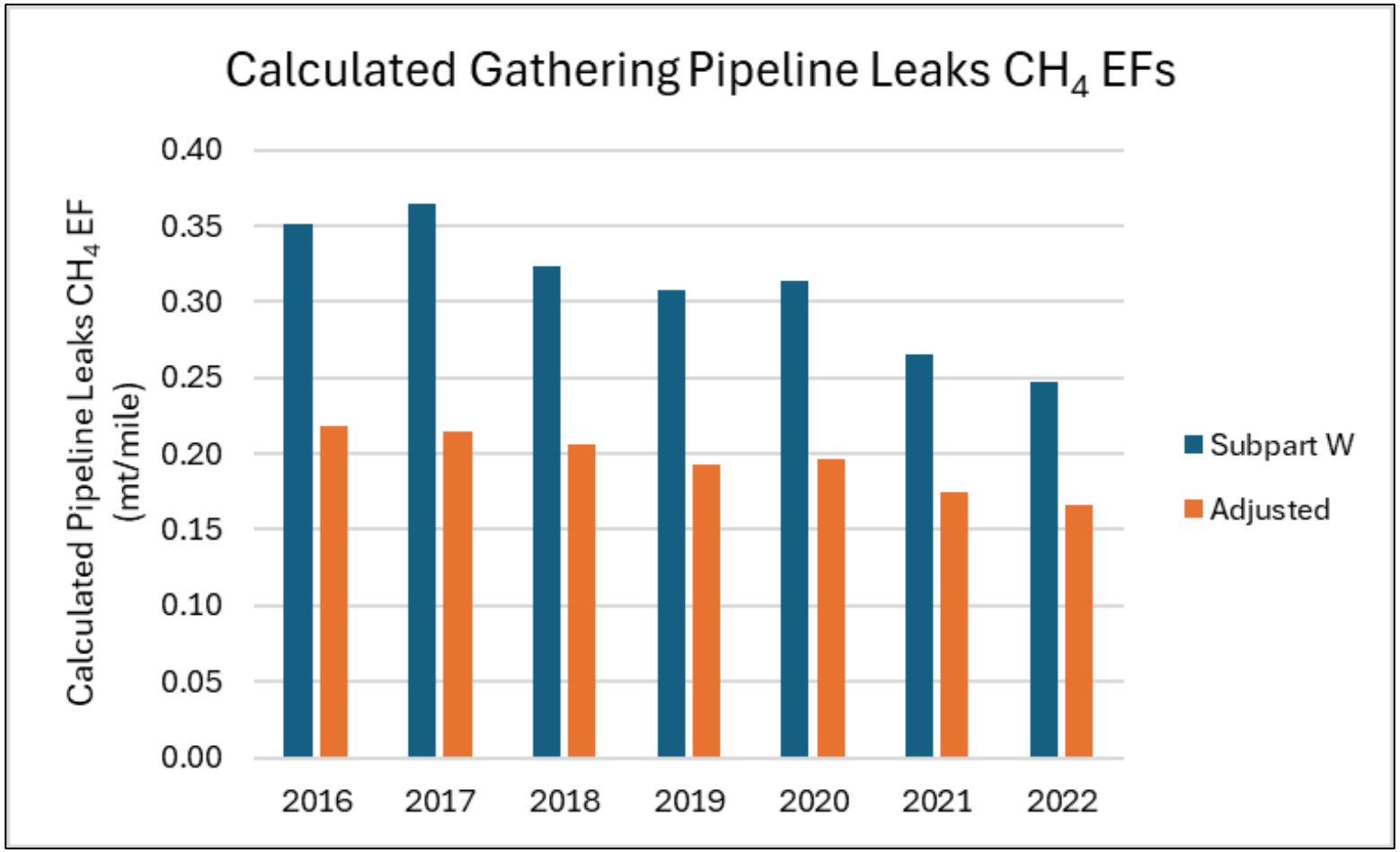
- **Transmission Pipeline Leak EF:** 1996 GRI/EPA Study
- **Transmission Pipeline Miles:** Pipeline and Hazardous Materials Safety Administration (PHMSA)

Summary of Update Under Consideration – Gathering Pipelines

- Incorporate the revised subpart W population EFs (specific to pipeline material type)
- Multiply reported CH_4 emissions by pipeline EF ratio, according to pipeline material

Pipeline Material	Subpart W EFs (scf/hr/mile pipeline)		Pipeline EF Ratio (Revised/Current)
	Current EF	Revised EF	
Protected Steel	0.47	0.93	1.98
Unprotected Steel	16.59	8.2	0.49
Plastic/Composite	2.5	0.28	0.11
Cast Iron	27.6	8.4	0.30

Gathering Pipelines EF Analysis

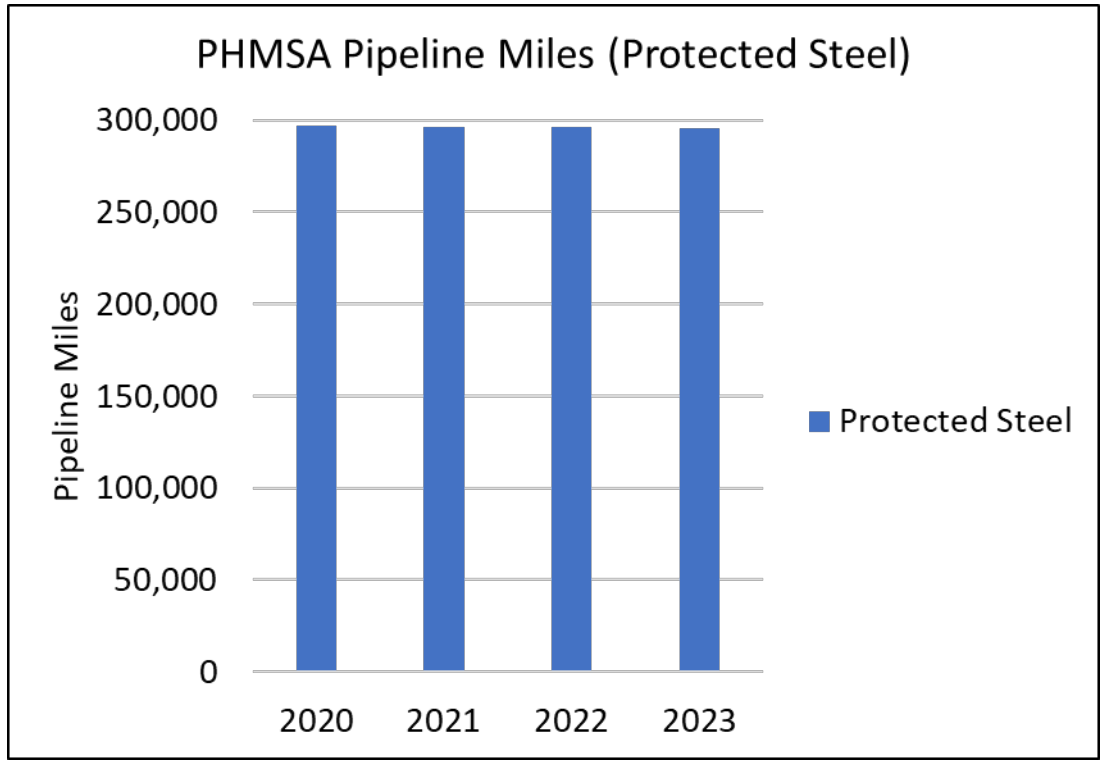


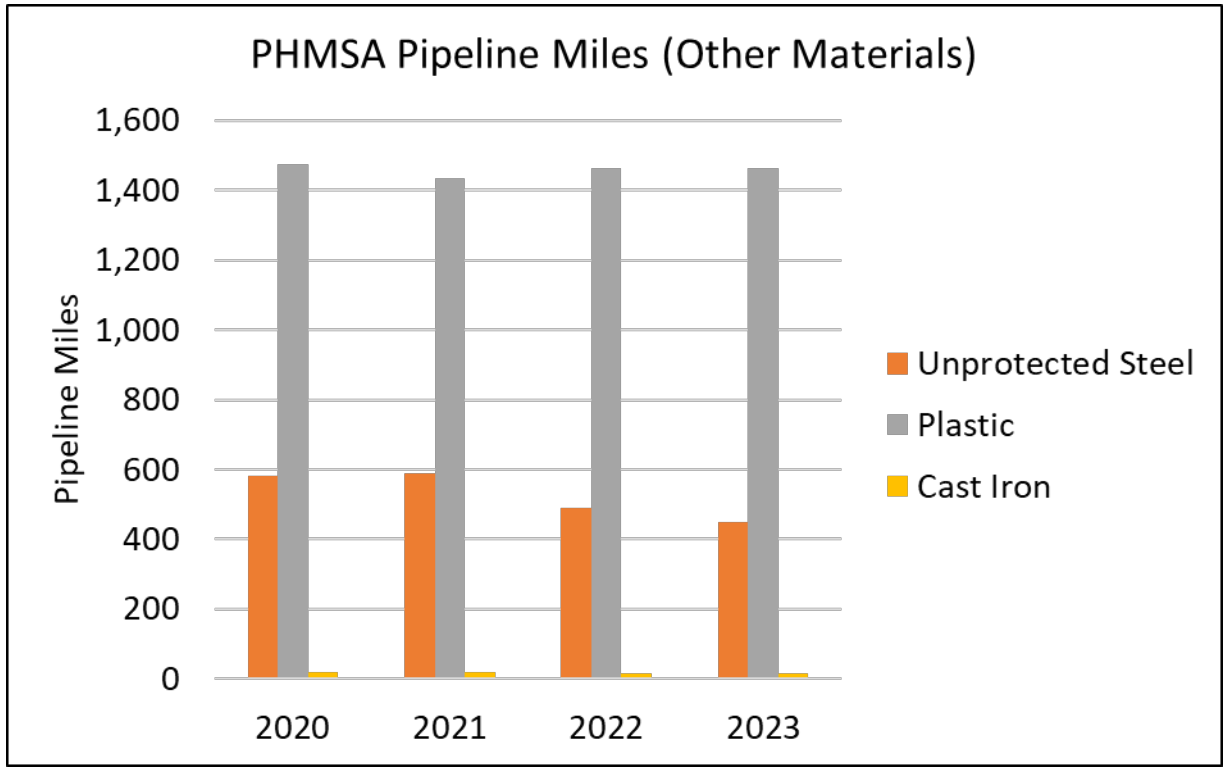
Summary of Update Under Consideration – Transmission Pipelines

- Incorporate the new subpart W population EFs (specific to pipeline material)
- Only include onshore transmission pipeline mileage (instead of also including offshore pipelines)

Pipeline Material	Current CH_4 EF (1996 GRI/EPA) (scf/hr/mi pipeline)	Revised CH_4 EF (Subpart W) (scf/hr/mi pipeline)
Total Transmission Pipeline	0.065	-
Protected Steel	-	0.041
Unprotected Steel	-	0.74
Plastic	-	0.061
Cast Iron	-	27

Transmission Pipelines – Onshore PHMSA Data



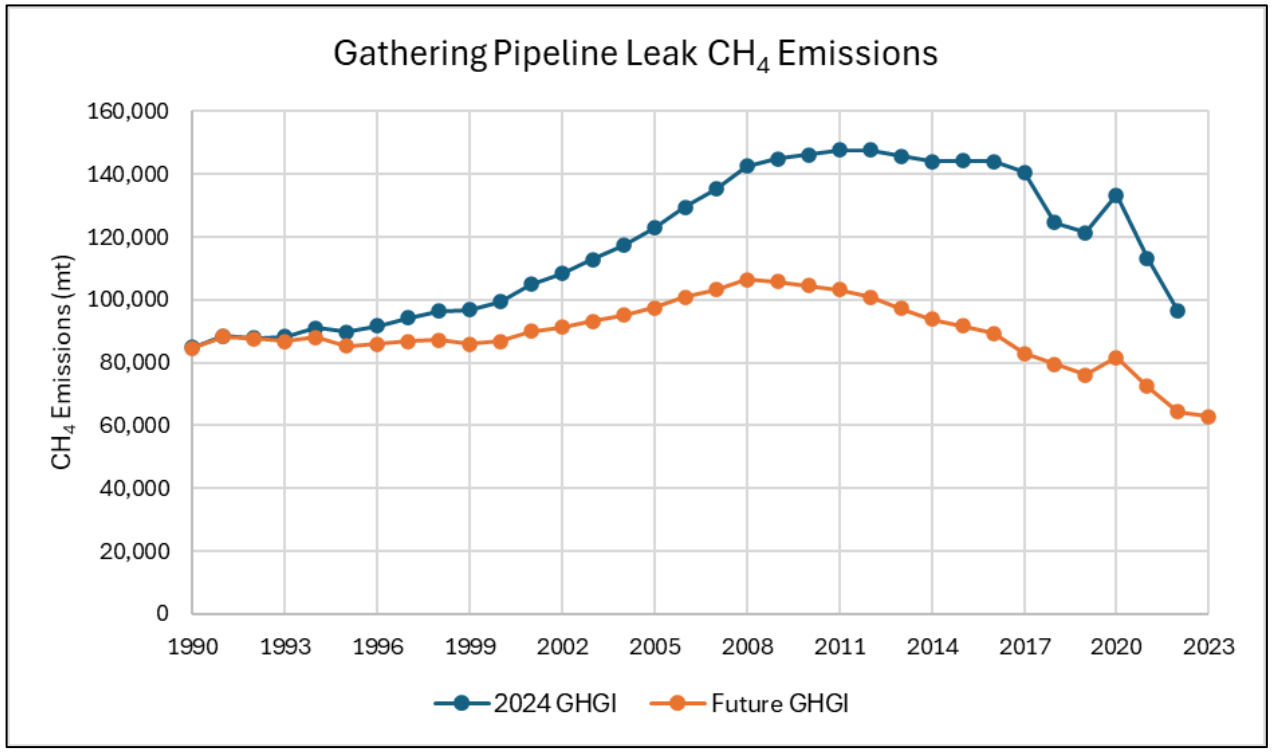


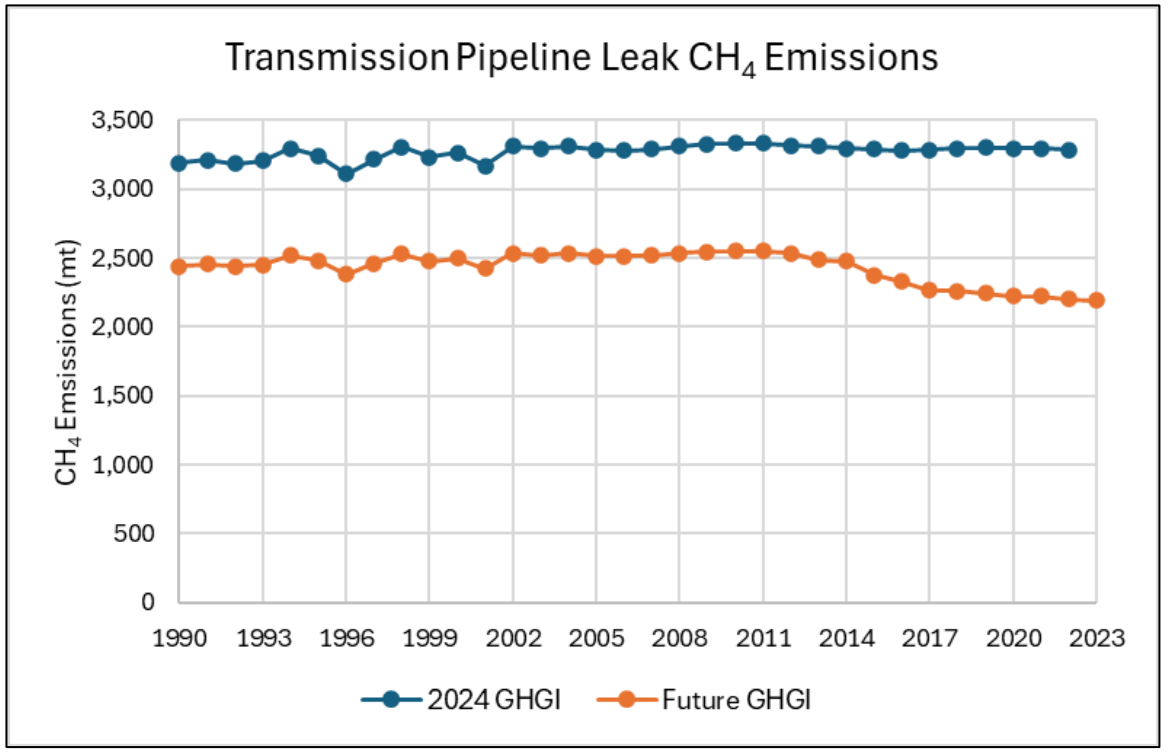
Time Series Considerations

- **Gathering:**
  - 2016-2023: Year-specific, adjusted EFs
  - 1993-2015: Linear Interpolation
  - 1990-1992: Unadjusted 2016 EF based on subpart W

- **Transmission:**
  - Apply revised subpart W default EFs to all years of the time series
  - Only use onshore transmission pipeline mileage

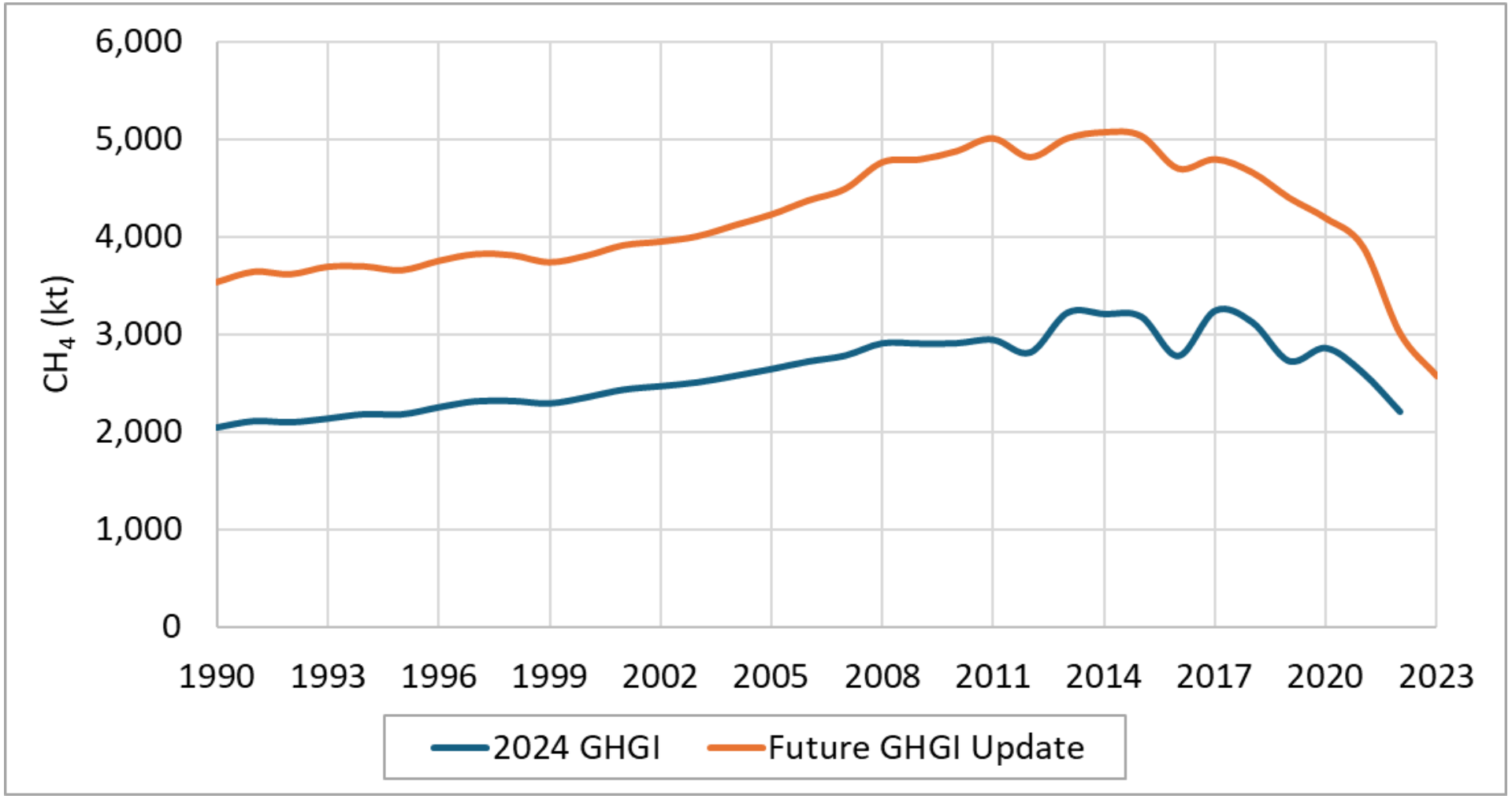
Gathering and Transmission Pipeline Leak Emissions





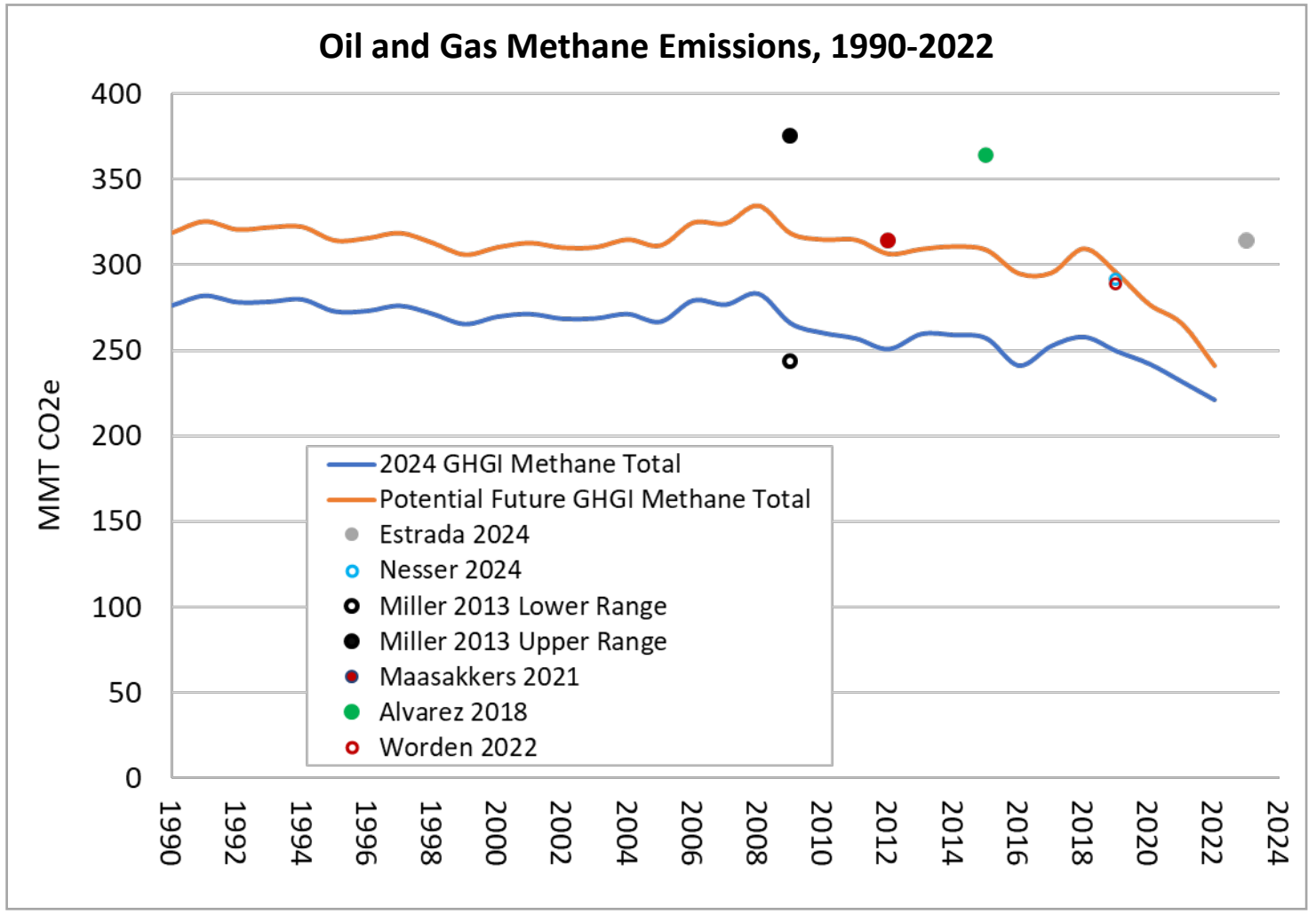
Summary of Updates Under Consideration for Future GHGIs - Subpart W EFs

Emissions Overview for Future Updates To Use Subpart W EFs



Comparison with Recent Atmospheric Inversions

- Several studies have suggested oil and gas emissions could be higher than estimated in the GHGI.
- Incorporation of revised Subpart W EFs is a potential future update, and we do not know what the full recalculation would look like if/when they are implemented.
- If we add the changes from the potential future updates to last year's (2024) GHGI and assume all else is equal, we can get a rough ballpark of future GHGI.
- Potential future estimate may be closer to recent inversion analyses.



Requests for Stakeholder Feedback

Requests for Stakeholder Feedback

Offshore

1. EPA seeks feedback on an alternative approach for the time series, which would use linear interpolation between BOEM study years to reflect gradual changes in emissions between years

Subpart W - Overarching

1. Requests feedback on the timing of W-based updates, noting that revised EFs reflect improved data over current GHGI EFs but also considering that additional data will become available from subpart W for some of these sources in future years

Requests for Stakeholder Feedback

Subpart W – Production Wellpad Equipment Leaks

1. EPA requests feedback on using the revised population EFs for all years
2. Requests feedback on the leaker survey methodology, including whether it should apply only to subpart W wells or to all U.S. wells
3. Requests feedback on the meters/piping AF analysis

Subpart W – Pneumatic Controllers

1. Requests feedback on the time series approach for all segments to use the revised EFs for recent years and the current GHGI EFs or early years
2. For transmission and storage, EPA requests feedback on the GRI/EPA disaggregation analysis for 1990-1992

Subpart W – Pipeline Leaks

1. Requests feedback on the time series approach for all segments to use the revised EFs for recent years and the current GHGI EFs for early years

Wrap-Up

Next Steps

- Memos on updates under consideration to be available soon at https://www.epa.gov/ghgemissions/stakeholder-process-natural-gas-and-petroleum-systems-1990-2023-inventory
- Please send feedback to ghginventory@epa.gov
- Public review draft available in early 2025

Additional Information:

State GHGI: https://www.epa.gov/ghgemissions/state-ghg-emissions-and-removals

Gridded CH_4 GHGI: https://www.epa.gov/ghgemissions/us-gridded-methane-emissions

Subpart W Revisions: https://www.epa.gov/ghgreporting/subpart-w-rulemaking-resources