

Year 2022 Emissions Modeling Platform Collaboration: Point Source Inventory for Oil and Gas Sources

Jeff Vukovich USEPA

3/14/2024

How was the draft 2022 point source inventory assembled?

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1. If SLT submits year 2022 emissions for sources/facilities, we use those emissions
2. EPA then augments/derives other PM pieces and HAPs from the SLT 2022 emissions if not provided by the SLT
3. EPA adds 2022 Toxics Release Inventory (TRI), 2022 Greenhouse Gases Inventory (GHGEI), 2022 EGUs from CAMD Continuous Emissions Monitoring (CEM) if not provided by SLT
4. If the SLT reported NO pollutant for the whole facility in their 2022, AND the facility operating status does not indicate Permanent Shutdown (PS) or Temporary Shutdown (TS) by 2022 or earlier, EPA uses the 2021NEI as a gap-fill. That 2021NEI will include all the pieces from steps 1-3 above that were also done to build the 2021NEI, but do check to see if TRI, GHG, or EGU reports stopped before 2022 to prevent those from continuing forward as gap fills. **So, if a SLT reports a facility in 2020, but not in 2021 or 2022, the 2021 NEI that is used as a gap fill in 2022 should have the SLTs 2020 emissions in it. Thus, all facilities that a SLT reports in their triennial NEIs continue to be included in the non-triennial NEIs.**

How does EPA breakup the 2022 point source inventory into different “sectors”

- ▶ For better tracking in Emissions Modeling Platforms, EPA breaks up the yearly point source inventories into three separate files/sectors:
 - ▶ ptegu (EGUs)
 - ▶ pt_oilgas (oil and gas-related sources: Midstream and Upstream)
 - ▶ ptnonipm (everything else)
- ▶ The pt_oilgas inventory is determined solely by NAICS code
 - ▶ This allows for identifying oil and gas production, transmission, distribution, and other-related sources

NAICS codes in Oil and Gas Point Source Inventory

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NAICS	NAICS desc	Category/Clusters
2111	Oil and Gas Extraction	PRODUCTION
2212	Natural Gas Distribution	DISTRIBUTION
4861	Pipeline Transportation of Crude Oil	TRANSMISSION
4862	Pipeline Transportation of Natural Gas	TRANSMISSION
21112	Crude Petroleum Extraction	PRODUCTION
21113	Natural Gas Extraction	PRODUCTION
22121	Natural Gas Distribution	DISTRIBUTION
48611	Pipeline Transportation of Crude Oil	TRANSMISSION
48621	Pipeline Transportation of Natural Gas	TRANSMISSION
211120	Crude Petroleum Extraction	PRODUCTION
211130	Natural Gas Extraction	PRODUCTION
213111	Drilling Oil and Gas Wells	EXPLORATION
213112	Support Activities for Oil and Gas Operations	SUPPORT
221210	Natural Gas Distribution	DISTRIBUTION
237120	Oil and Gas Pipeline and Related Structures Construction	SUPPORT
486110	Pipeline Transportation of Crude Oil	TRANSMISSION
486210	Pipeline Transportation of Natural Gas	TRANSMISSION

US pt_oilgas sector: NOX emissions 2020 NEI vs. 2022 draft (tons)

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NAICS description	Cluster	2020NEI NOX	2022 draft NOX	2022 draft - 2020NEI	2022 draft - 2020NEI %diff
Natural Gas Distribution	DISTRIBUTION	19,166	20,199	1,033	5.4%
Drilling Oil and Gas Wells	EXPLORATION	246	254	8	3.4%
Crude Petroleum Extraction	PRODUCTION	60,959	94,374	33,416	54.8%
Natural Gas Extraction	PRODUCTION	78,981	76,205	-2,776	-3.5%
Oil and Gas Extraction	PRODUCTION	76,215	24,945	-51,270	-67.3%
Oil and Gas Pipeline and Related Structures Constr	SUPPORT	82	130	48	58.2%
Support Activities for Oil and Gas Operations	SUPPORT	4,298	5,474	1,176	27.4%
Pipeline Transportation of Crude Oil	TRANSMISSION	540	559	19	3.5%
Pipeline Transportation of Natural Gas	TRANSMISSION	178,499	174,132	-4,367	-2.4%
Total for pt_oilgas sector		418,986	396,272	-22,714	-5.4%
TOTAL PRODUCTION		216,155	195,524	-20,631	-9.5%
TOTAL TRANSMISSION		179,039	174,692	-4,348	-2.4%

US pt_oilgas sector: VOC emissions 2020 NEI vs. 2022 draft (tons)

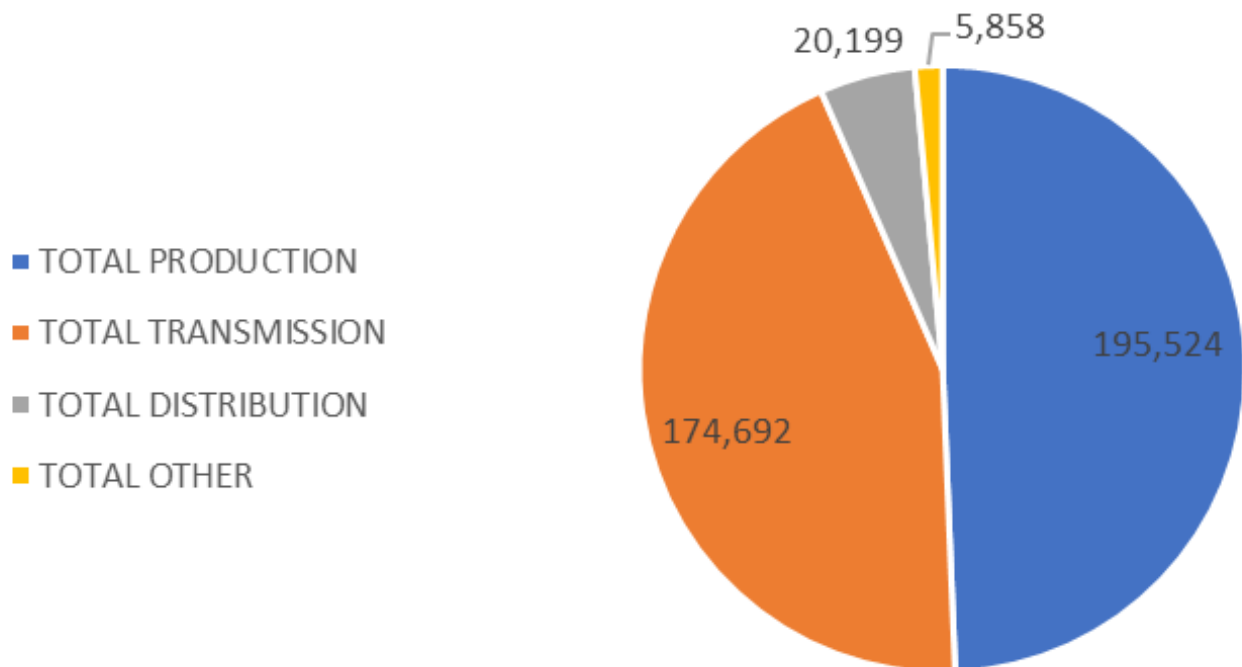
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NAICS description	Cluster	2020NEI VOC	2022 draft VOC	2022 draft - 2020NEI	2022 draft - 2020NEI %diff
Natural Gas Distribution	DISTRIBUTION	3,169	3,155	-14	-0.4%
Drilling Oil and Gas Wells	EXPLORATION	240	246	6	2.6%
Crude Petroleum Extraction	PRODUCTION	47,620	78,731	31,111	65.3%
Natural Gas Extraction	PRODUCTION	63,874	61,409	-2,465	-3.9%
Oil and Gas Extraction	PRODUCTION	77,779	33,767	-44,012	-56.6%
Oil and Gas Pipeline and Related Structures Construction	SUPPORT	186	190	4	2.3%
Support Activities for Oil and Gas Operations	SUPPORT	9,954	11,128	1,174	11.8%
Pipeline Transportation of Crude Oil	TRANSMISSION	6,988	6,659	-328	-4.7%
Pipeline Transportation of Natural Gas	TRANSMISSION	26,793	33,374	6,581	24.6%
Total for pt_oilgas sector		236,603	228,661	-7,943	-3.4%
TOTAL PRODUCTION		189,273	173,907	-15,367	-8.1%
TOTAL TRANSMISSION		33,781	40,034	6,253	18.5%

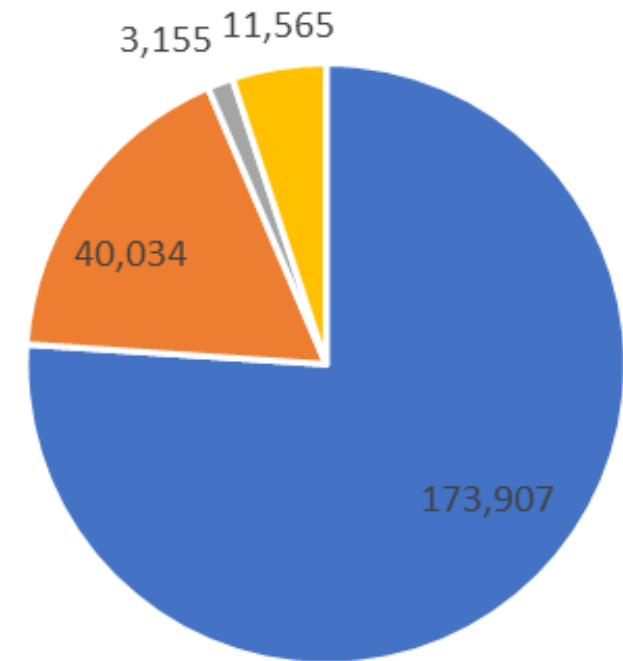
US pt_oilgas sector: Production and Transmission sources dominate (tons)

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2022 draft NOX



2022 draft VOC



US pt_oilgas sector: all CAPs comparison (tons)

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Pollutant	2020NEI	2022 draft	2022draft -2020NEI	2022draft - 2020NEI %diff
CO	233,013	211,360	-21,653	-9.3%
NH3	8,273	9,345	1,072	13.0%
NOX	418,986	396,272	-22,714	-5.4%
PM10-PRI	14,528	14,906	378	2.6%
PM25-PRI	13,193	13,419	226	1.7%
SO2	37,062	33,180	-3,882	-10.5%
VOC	236,603	228,661	-7,943	-3.4%

US pt_oilgas sector: Top 10 states NOX emissions (tons)

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State	2020NEI NOX	2022 draft NOX	2022 draft - 2020NEI	% diff
Texas	47,687	46,426	-1,261	-2.6%
Alaska	38,507	38,698	191	0.5%
Oklahoma	38,383	33,873	-4,510	-11.8%
New Mexico	29,913	29,048	-865	-2.9%
Louisiana	28,813	27,864	-949	-3.3%
Mississippi	19,064	22,465	3,402	17.8%
Kansas	19,734	17,757	-1,976	-10.0%
Colorado	14,819	14,550	-269	-1.8%
Wyoming	13,865	13,551	-314	-2.3%
Alabama	8,695	10,609	1,914	22.0%

US pt_oilgas sector: Top 10 states VOC emissions (tons)

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State	2020NEI VOC	2022 draft VOC	2022 draft - 2020NEI	% diff
Wyoming	51,000	53,281	2,281	4.5%
New Mexico	45,921	46,225	304	0.7%
Oklahoma	28,508	26,182	-2,326	-8.2%
Texas	21,894	20,208	-1,686	-7.7%
Colorado	12,519	11,849	-670	-5.4%
Louisiana	8,091	8,143	52	0.6%
West Virginia	2,971	3,261	290	9.8%
Kansas	2,966	3,010	44	1.5%
North Dakota	2,435	2,736	301	12.4%
California	2,544	2,668	124	4.9%

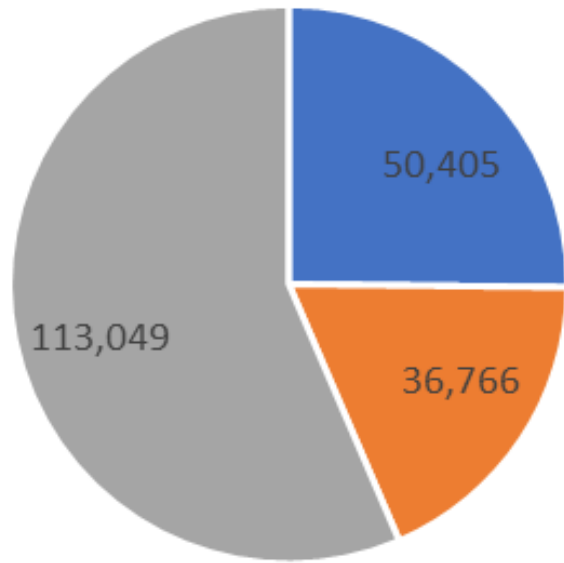
US pt_oilgas sector: NOX emissions (tons)

How much emissions came from 2020NEI and 2021?

NAICS description	Cluster	CALC_YR2020 NOX	CALC_YR2021 NOX	CALC_YR2022 NOX	NOX TOTAL	% CALC_YR2022
Natural Gas Distribution	DISTRIBUTION	2,293	24	17,881	20,199	88.5%
Drilling Oil and Gas Wells	EXPLORATION	241		13	254	5.3%
Crude Petroleum Extraction	PRODUCTION	23,475	34,876	40,552	98,903	41.0%
Natural Gas Extraction	PRODUCTION	18,016	1,175	57,284	76,475	74.9%
Oil and Gas Extraction	PRODUCTION	8,915	715	15,213	24,843	61.2%
Oil and Gas Pipeline and Related Structures Con	SUPPORT	4		126	130	97.2%
Support Activities for Oil and Gas Operations	SUPPORT	1,240	29	4,205	5,474	76.8%
Pipeline Transportation of Crude Oil	TRANSMISSION	252	0	306	559	54.8%
Pipeline Transportation of Natural Gas	TRANSMISSION	24,721	1,293	148,119	174,132	85.1%
Calc Year Totals		79,155	38,112	283,701	400,968	70.8%

CALC_YR2020 = 2020NEI CALC_YR2021 = 2021 inventory

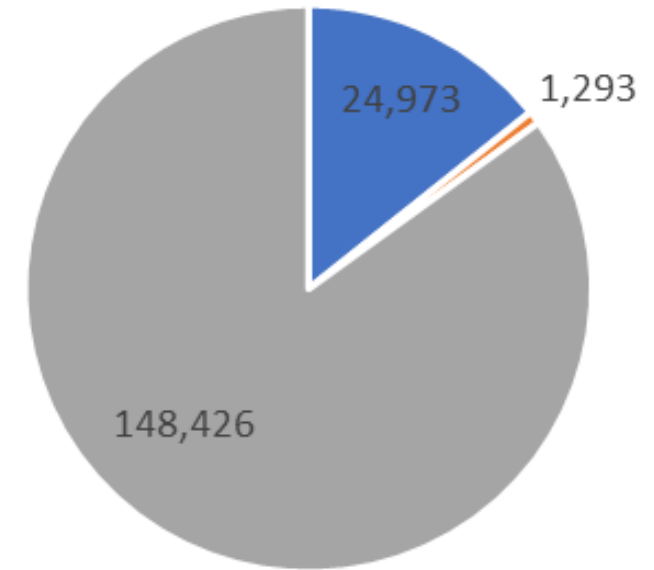
TOTAL PRODUCTION



■ CALC_YR2020 NOX ■ CALC_YR2021 NOX ■ CALC_YR2022 NOX

About 85% of NOX for TRANSMISSION from CALC_YR2022

TOTAL TRANSMISSION



■ CALC_YR2020 NOX ■ CALC_YR2021 NOX ■ CALC_YR2022 NOX

About 55% of NOX for PRODUCTION from CALC_YR2022

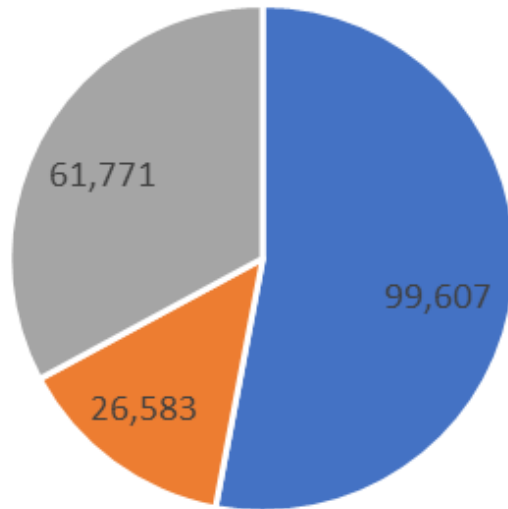
Units are tons

US pt_oilgas sector: VOC emissions (tons)

How much emissions came from 2020NEI and 2021?

NAICS description	Cluster	CALC_YR2020 VOC	CALC_YR2021 VOC	CALC_YR2022 VOC	VOC TOTAL	% CALC_YR2022
Natural Gas Distribution	DISTRIBUTION	362	5	2,788	3,155	88.4%
Drilling Oil and Gas Wells	EXPLORATION	239		7	246	3.0%
Crude Petroleum Extraction	PRODUCTION	53,670	25,081	15,463	94,214	16.4%
Natural Gas Extraction	PRODUCTION	23,993	987	35,951	60,930	59.0%
Oil and Gas Extraction	PRODUCTION	21,944	515	10,358	32,817	31.6%
Oil and Gas Pipeline and Related Structure	SUPPORT	10		180	190	94.5%
Support Activities for Oil and Gas Operatic	SUPPORT	6,066	63	4,999	11,128	44.9%
Pipeline Transportation of Crude Oil	TRANSMISSION	1,728	73	4,859	6,659	73.0%
Pipeline Transportation of Natural Gas	TRANSMISSION	5,740	6,879	20,755	33,374	62.2%
Calc Year Totals		113,751	33,603	95,360	242,714	39.3%

TOTAL PRODUCTION



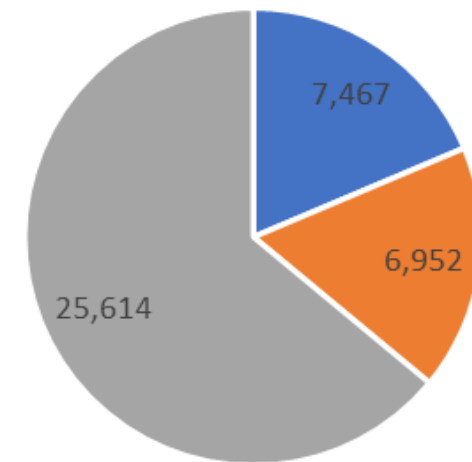
■ CALC_YR2020 VOC ■ CALC_YR2021 VOC ■ CALC_YR2022 VOC

About 33% of VOC for PRODUCTION from CALC_YR2022

Units are tons

About 65% of VOC for TRANSMISSION from CALC_YR2022

TOTAL TRANSMISSION



■ CALC_YR2020 VOC ■ CALC_YR2021 VOC ■ CALC_YR2022 VOC

Project PRODUCTION-related point sources using state historical production data

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- ▶ Oil and Natural Gas production does change year-to-year
- ▶ Generate state Oil and Natural Gas factors using EIA historical data
 - ▶ https://www.eia.gov/dnav/pet/pet_crd_crpdn_adc_mbbl_a.htm
 - ▶ https://www.eia.gov/dnav/ng/ng_prod_sum_a_EPG0_FGW_mmcf_a.htm
- ▶ Generate state factors to project to year 2022 for CALC_YR2020 and CALC_YR2021 production-related sources
 - ▶ 2020 to 2022 projection factor
 - ▶ 2021 to 2022 projection factor
- ▶ Apply above factors to 2022 draft to create 2022v1-to-be-reviewed
 - ▶ Only PRODUCTION-related sources change
- ▶ Do not project TRANSMISSION-related or other sources (leave as is)
 - ▶ PRODUCTION to TRANSMISSION-related emissions relationship not linear it seems

Date	STABBV	2020	2021	2022	2020to2022fac	2021to2022fac
U.S. Field Production of Crude Oil (Thousand Barrels)	US	4142504	4112721	4347377	1.0495	1.0571
Texas Field Production of Crude Oil (Thousand Barrels)	TX	1773072	1744882	1846806	1.0416	1.0584
New Mexico Field Production of Crude Oil (Thousand Barrels)	NM	375419	450353	579837	1.5445	1.2875
North Dakota Field Production of Crude Oil (Thousand Barrels)	ND	433563	405138	386203	0.8908	0.9533
Colorado Field Production of Crude Oil (Thousand Barrels)	CO	171635	153423	160149	0.9331	1.0438
Oklahoma Field Production of Crude Oil (Thousand Barrels)	OK	172804	147837	151537	0.8769	1.0250
California Field Production of Crude Oil (Thousand Barrels)	CA	142221	136520	124727	0.8770	0.9136
Wyoming Field Production of Crude Oil (Thousand Barrels)	WY	89076	85455	90906	1.0205	1.0638
Utah Field Production of Crude Oil (Thousand Barrels)	UT	31001	35774	45251	1.4597	1.2649
Louisiana Field Production of Crude Oil (Thousand Barrels)	LA	36420	34286	36493	1.0020	1.0644
Kansas Field Production of Crude Oil (Thousand Barrels)	KS	28261	27905	28161	0.9965	1.0092

Date	STABBV	2020	2021	2022	2020to2022fac	2021to2022fac
U.S. Natural Gas Gross Withdrawals (MMcf)	US	40729927	41676743	43802269	1.0754	1.0510
Texas Natural Gas Gross Withdrawals (MMcf)	TX	10489727	10743106	11602524	1.1061	1.0800
Pennsylvania Natural Gas Gross Withdrawals (MMcf)	PA	7168902	7647068	7511179	1.0477	0.9822
Louisiana Natural Gas Gross Withdrawals (MMcf)	LA	3211491	3448542	4070087	1.2674	1.1802
West Virginia Natural Gas Gross Withdrawals (MMcf)	WV	2567990	2675145	2920613	1.1373	1.0918
Oklahoma Natural Gas Gross Withdrawals (MMcf)	OK	2673207	2555430	2764019	1.0340	1.0816
New Mexico Natural Gas Gross Withdrawals (MMcf)	NM	2005518	2277035	2710427	1.3515	1.1903
Ohio Natural Gas Gross Withdrawals (MMcf)	OH	2389629	2278731	2244971	0.9395	0.9852
Colorado Natural Gas Gross Withdrawals (MMcf)	CO	1999784	1891913	1834478	0.9173	0.9696
Wyoming Natural Gas Gross Withdrawals (MMcf)	WY	1472873	1375454	1297497	0.8809	0.9433
North Dakota Natural Gas Gross Withdrawals (MMcf)	ND	986977	1075553	1071706	1.0858	0.9964

PRODUCTION-related emissions only (tons)

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State	2022 draft NOX	2022 after proj NOX	proj - draft NOX	% diff
TX	31,101	31,226	125	0.4%
NM	20,256	26,190	5,933	29.3%
OK	22,106	22,103	-3	0.0%
CO	11,746	10,838	-908	-7.7%
WY	9,984	9,716	-268	-2.7%
KS	4,622	4,605	-17	-0.4%
LA	4,178	4,197	19	0.4%

State	2022 draft VOC	2022 after proj VOC	proj - draft VOC	% diff
NM	41,464	59,035	17,571	42.4%
WY	43,744	41,688	-2,056	-4.7%
OK	20,174	20,105	-69	-0.3%
TX	16,467	16,592	125	0.8%
CO	10,424	9,648	-775	-7.4%
LA	4,112	4,129	17	0.4%
CA	1,956	1,718	-238	-12.2%
KS	1,631	1,630	-1	-0.1%

Emissions
before and
after
projection for
top states

Summary of pt_oilgas inventory

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- ▶ Majority of the point source oil and gas emissions consists of PRODUCTION-related and TRANSMISSION-related sources
- ▶ Emissions estimates for the 2020NEI, year 2021 and year 2022 are included in the point source inventory
- ▶ NOX emissions total around 400K tons and VOC emissions around 240K tons
- ▶ EIA state historical production data was used to do projection of PRODUCTION-related only sources for 2020 and 2021 emissions
- ▶ SLTs/MJOs will have a review period next month to examine the point source emissions
 - ▶ Stack parameters QA: Alternative datasets available?

2022 COLLABORATION UPDATE OIL AND GAS EMISSIONS

Important timeline details for Oil and Gas sector: 2022 Base Year

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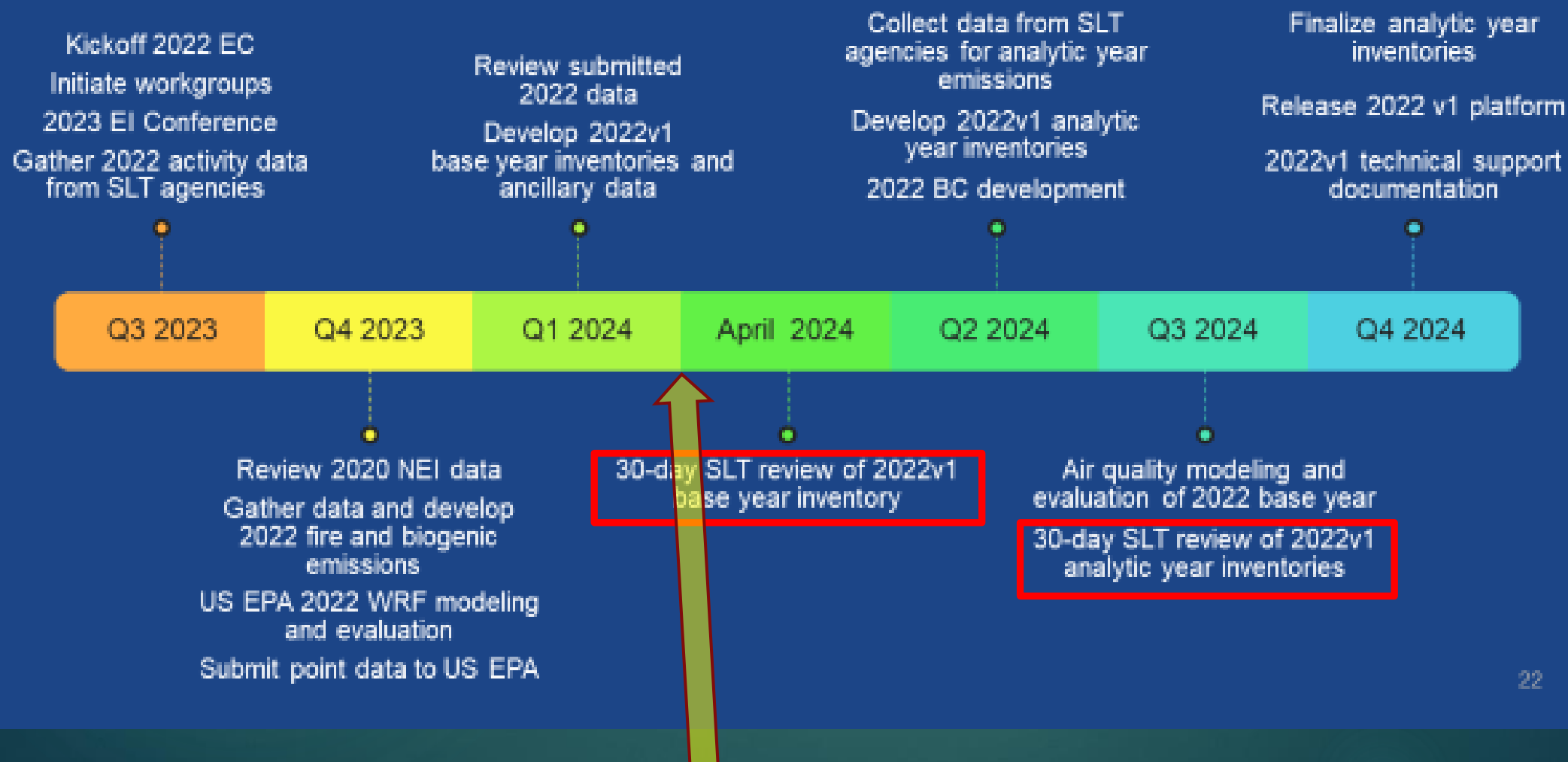
Year	Inventory/Platform data	Source type	Date(s)	Feedback due or Deadline
2022	Initial County Activity for year 2022 available for review	Non-point	1/19/2024	2/19/2024
2022	Deadline to submit Oil and Gas Tool other input data changes to EPA for draft version	Non-point	n/a	1/31/2024
2022	Oil and Gas Tool work period	Non-point	Jan-Mar 2024	n/a
2022	Initial national point source inventory becomes available	Point	Feb-24	n/a
2022	Point source inventory review including reconciliation with non-point sources at EPA	Non-point and point	Feb-Mar 2024	n/a
2022	Alternate oil and gas emissions inventories with documentation submitted by SLT to EPA for 2022v1	Non-point or point or both	n/a	2/29/2024
2022	Point source inventory for oil and gas sources available for review	Point	4/1/2024	4/30/2024
2022	Oil and Gas Tool data and emissions available for review	Non-point	Likely before April 1	4/30/2024
2022	Abandoned Well emissions available for review	Non-point	Likely before April 1	4/30/2024
2022	Blowdown/Pigging emissions available for review	Non-point	Likely before April 1	4/30/2024
2022	Monthly profiles, speciation info, and gridding surrogates available for review	Non-point and point	4/1/2024	4/30/2024
2022	EPA takes feedback and makes modifications to generate 2022v1	Non-point and point	May-June 2024	n/a

SLT/MJO/others review

SLT/MJO/others submit data

EPA tasks

Timeline for 2022v1 Platform Development



Data Review Kickoff orientation on March 27th

2022v1 Data Review Kickoff

- Wednesday March 27 @ 1 PM Eastern
- Webinar to learn how to use the online Emissions Data Retrieval Tool to review 2022 data and enter comments for the April review

Notice!!!

The 2022v1 data review is the process through which air agencies and stakeholders can review/comment on the 2022 base year data

Microsoft Teams meeting

[Click here to join the meeting](#)

Meeting ID: 214 896 643 619

Passcode: ukK3Br

[Join on the web](#)

Or call in (audio only) [+1 323-676-6261](#)

Phone Conference ID: 390 220 484#

QUESTIONS?

Vukovich.Jeffrey@epa.gov