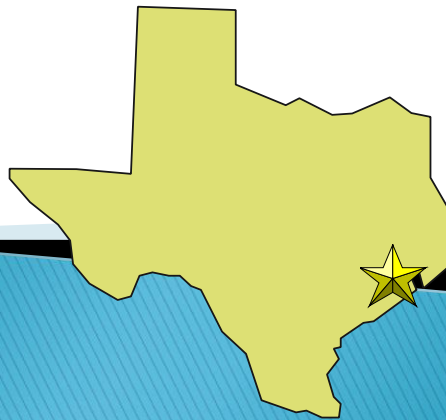


2019 Calendar Year

10-20 Emissions Report to DPCAC
FINAL 11-30-20 as presented

AIR EMISSIONS INVENTORY and TOXICS RELEASE INVENTORY (TRI) for DEER PARK INDUSTRIES

ZOOM PRESENTATION



Does not include ITC.

Deer Park CAC Companies and Plants

Reports both TCEQ Emissions Inventory and EPA Toxics Release Inventory to DPCAC

Clean Harbors

Dow Chemical

GEO Specialty Chemicals

Hexion

Lubrizol

OxyVinyls Deer Park PVC/Caustic

OxyVinyls Deer Park VCM

Shell Deer Park

Reports TCEQ Emissions Inventory. Not required to report TRI

Vopak

Not required to report TCEQ Emissions Inventory but reports VOCs section to DPCAC

Evonik

Reports EPA TRI (not required to report TCEQ Emissions Inventory)

Evonik

Texas Molecular

Valvoline

Delta removed from report after resigning.

No ITC data for 2019. See slide 3.

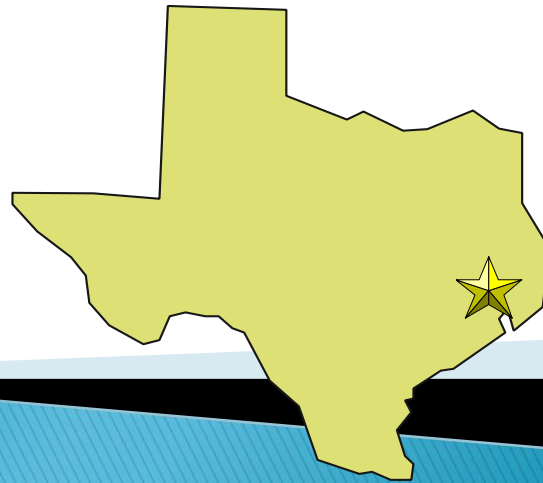
About ITC's Data

- ▶ Intercontinental Terminals (ITC) is usually in the DPCAC report.
- ▶ They are required to file an emissions Inventory with TCEQ.
- ▶ They are not required to file an EPA Toxics Release Inventory but have voluntarily reported TRI numbers to DPCAC for many years.

“After much deliberation, ITC will not be reporting Emissions Inventory or TRI to the CAC this year. We expect to return to reporting next year and will continue supporting and participating in the DP CAC.”

Without ITC data, pounds of emissions for 2019 and trends are incomplete. For better comparison, ITC data has been removed from trends and tables in this report.

2019 Air Emissions Inventory



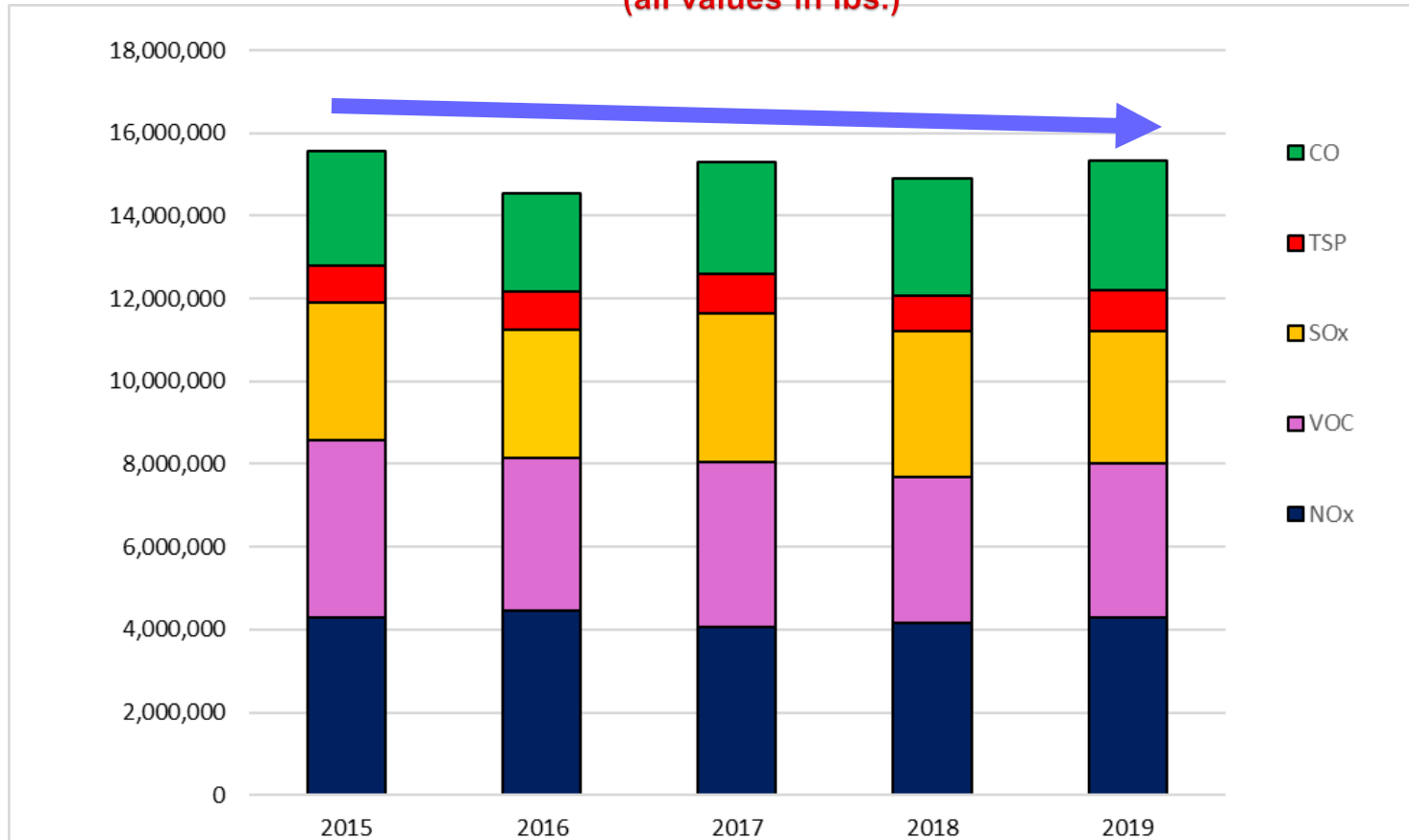
Emissions Inventory of Criteria Pollutants and Ozone Precursors

Criteria Pollutants Include:

- Nitrogen Oxides (NO_x) {ozone precursor}
- Volatile Organic Compounds (VOCs) {ozone precursor}
- Sulfur Oxides (SO_x)
- Carbon Monoxide (CO)
- Total Suspended Particulate (TSP)

Total Reported Criteria Pollutant Emissions

(all values in lbs.)



2015→2019: 2% Decrease in Total Criteria Pollutant Emissions

2018→2019: 3% Increase in Total Criteria Pollutant Emissions

Total Reported Criteria Pollutant Emissions

(all values in lbs.)

| Criteria Pollutant | 2015 | 2016 | 2017 | 2018 | 2019 |
|--------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| NOx | 4,286,383 | 4,440,937 | 4,062,417 | 4,157,619 | 4,296,692 |
| VOC | 4,283,891 | 3,705,354 | 3,989,855 | 3,530,458 | 3,711,286 |
| SOx | 3,342,374 | 3,104,045 | 3,581,571 | 3,521,714 | 3,211,323 |
| TSP | 885,972 | 919,862 | 950,621 | 870,881 | 990,769 |
| CO | 2,776,095 | 2,358,956 | 2,706,505 | 2,815,225 | 3,118,326 |
| Total | 15,574,714 | 14,529,153 | 15,290,969 | 14,895,897 | 15,328,396 |

Changes from 2018 to 2019 by pollutant:

- NOx emissions up 139k lbs
- VOC emissions up 181k lbs
- SOx emissions down 310k lbs
- TSP emissions up 120k lbs
- CO emissions up 303k lbs

Note: "k" equals 1,000

Total Reported Criteria Pollutant Emissions

(all values in lbs.)

| Company | 2017 | 2018 | 2019 |
|---------------------------------|-------------------|-------------------|-------------------|
| Shell Deer Park | 8,085,395 | 7,912,742 | 8,113,373 |
| Dow Chemical | 4,798,506 | 4,874,697 | 4,829,480 |
| Lubrizol | 751,835 | 666,238 | 819,142 |
| Vopak | 801,409 | 692,323 | 735,159 |
| Clean Harbors | 291,114 | 184,111 | 272,840 |
| Hexion | 256,300 | 251,322 | 244,276 |
| OxyVinyls Deer Park VCM | 132,087 | 132,156 | 139,864 |
| OxyVinyls Deer Park PVC/Caustic | 115,601 | 127,988 | 120,544 |
| GEO Specialty Chemicals | 34,122 | 28,820 | 28,219 |
| Evonik | 24,600 | 25,500 | 25,500 |
| Total | 15,290,969 | 14,895,897 | 15,328,396 |

Note: Companies highlighted in green reported data for 2019.

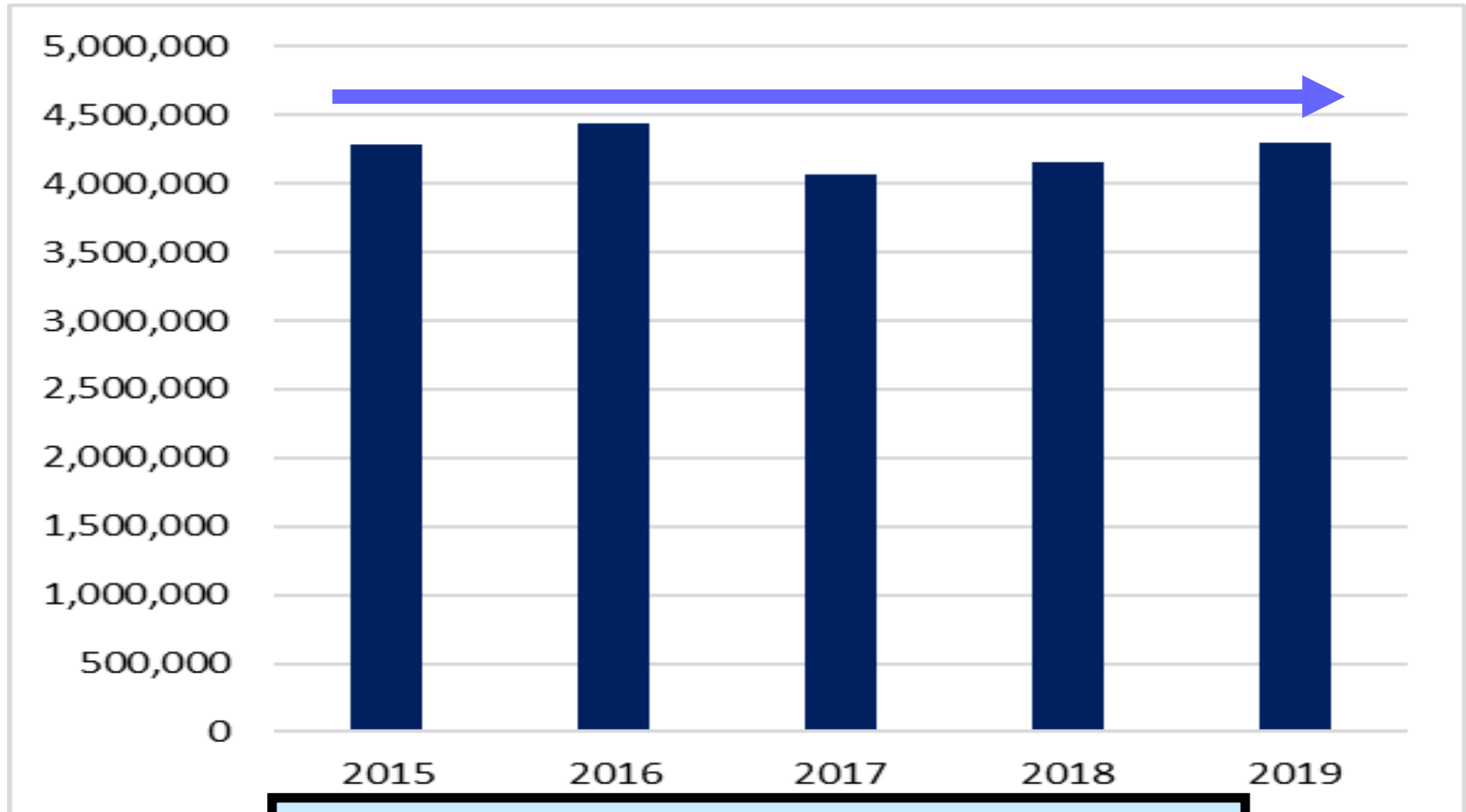
Reported NOx Emissions

(all values in lbs.)

| Company | 2017 | 2018 | 2019 |
|---------------------------------|------------------|------------------|------------------|
| Shell Deer Park | 2,990,496 | 3,223,004 | 3,217,220 |
| Dow Chemical | 617,733 | 555,272 | 658,700 |
| Clean Harbors | 210,640 | 152,167 | 154,028 |
| Lubrizol | 104,265 | 94,204 | 126,357 |
| OxyVinyls Deer Park VCM | 60,169 | 65,250 | 62,133 |
| Vopak | 25,559 | 24,040 | 38,753 |
| OxyVinyls Deer Park PVC/Caustic | 37,039 | 28,225 | 24,965 |
| GEO Specialty Chemicals | 14,016 | 13,258 | 12,374 |
| Hexion | 2,500 | 2,200 | 2,162 |
| Total | 4,062,417 | 4,157,619 | 4,296,692 |

Reported NOx Emissions

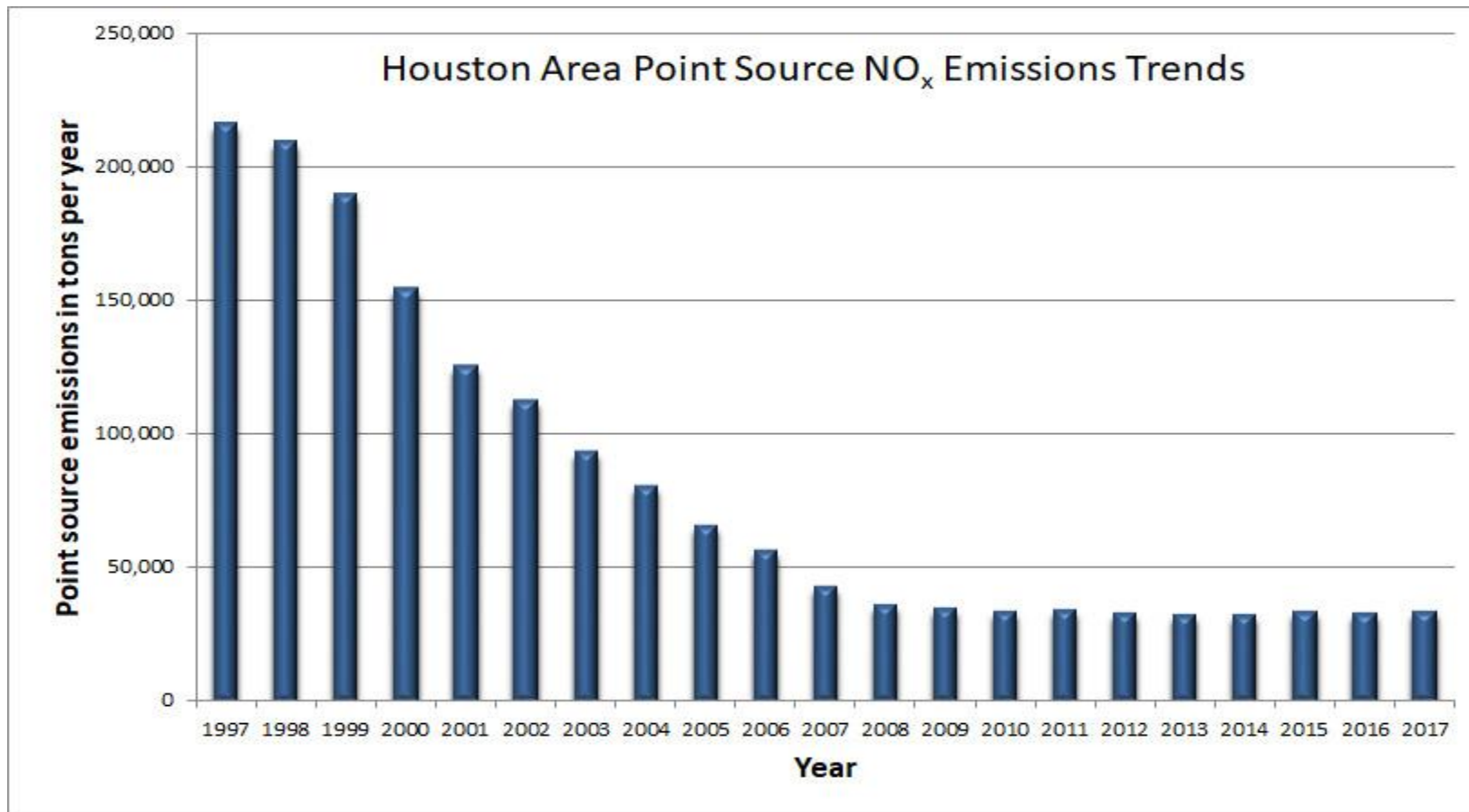
(all values in lbs.)



2015→2019 : 0% Decrease in NOx Emissions

2018→2019 : 3% Increase in NOx Emissions

TCEQ NO_x Emissions Trends Houston-Galveston-Brazoria Area



NO_x emissions have Decreased 84% since 1997.

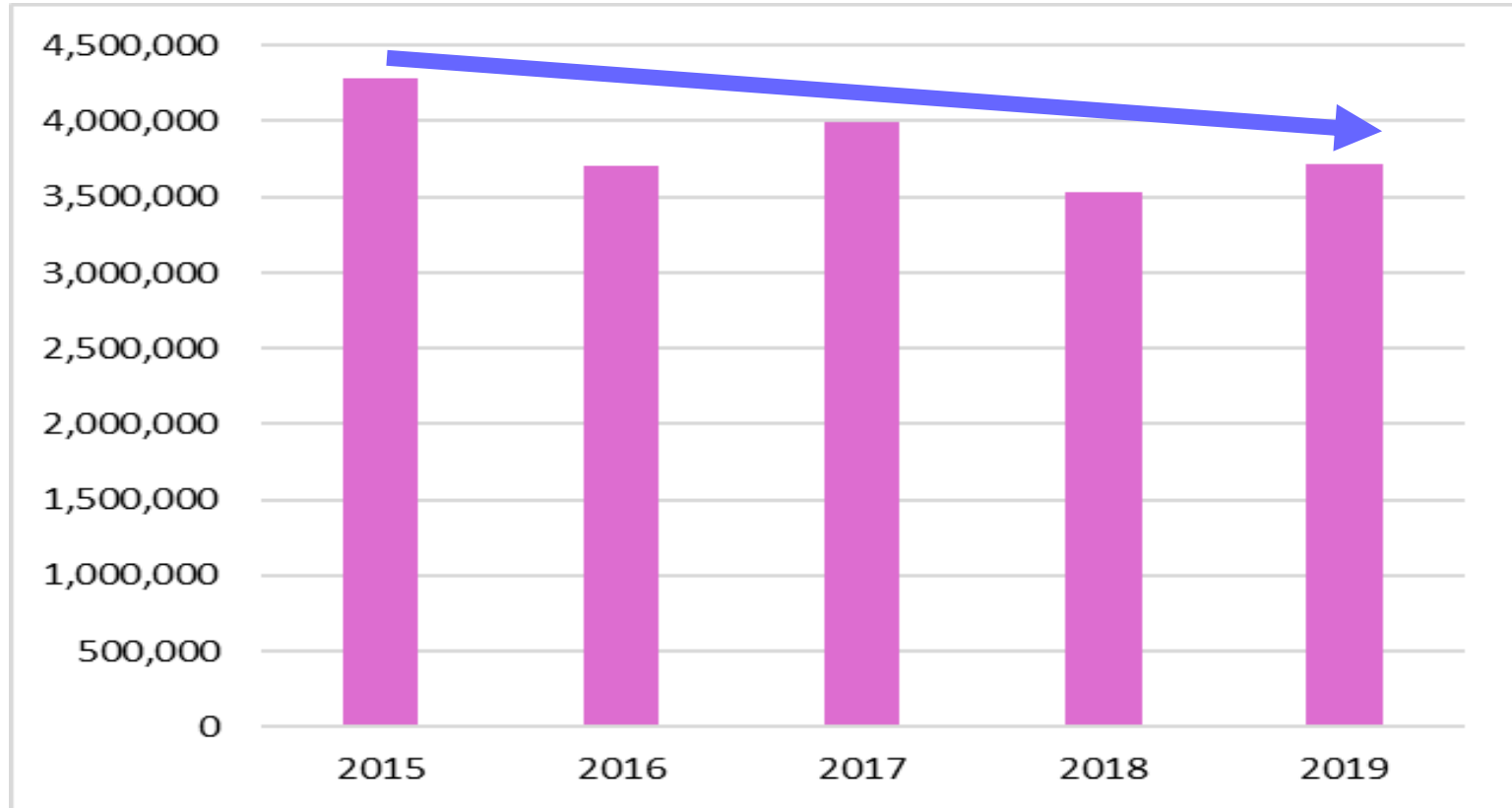
Reported VOC Emissions

(all values in lbs.)

| Company | 2017 | 2018 | 2019 |
|---------------------------------|------------------|------------------|------------------|
| Shell Deer Park | 2,345,133 | 1,944,886 | 1,865,664 |
| Dow Chemical | 454,789 | 547,879 | 697,660 |
| Vopak | 582,958 | 485,401 | 482,134 |
| Lubrizol | 408,574 | 369,897 | 459,746 |
| Hexion | 101,800 | 100,600 | 97,502 |
| OxyVinyls Deer Park PVC/Caustic | 30,951 | 25,757 | 27,759 |
| Clean Harbors | 8,362 | 4,517 | 27,561 |
| Evonik | 24,600 | 25,500 | 25,500 |
| OxyVinyls Deer Park VCM | 29,492 | 22,841 | 24,877 |
| GEO Specialty Chemicals | 3,196 | 3,180 | 2,883 |
| Total | 3,989,855 | 3,530,458 | 3,711,286 |

Reported VOC Emissions Trends

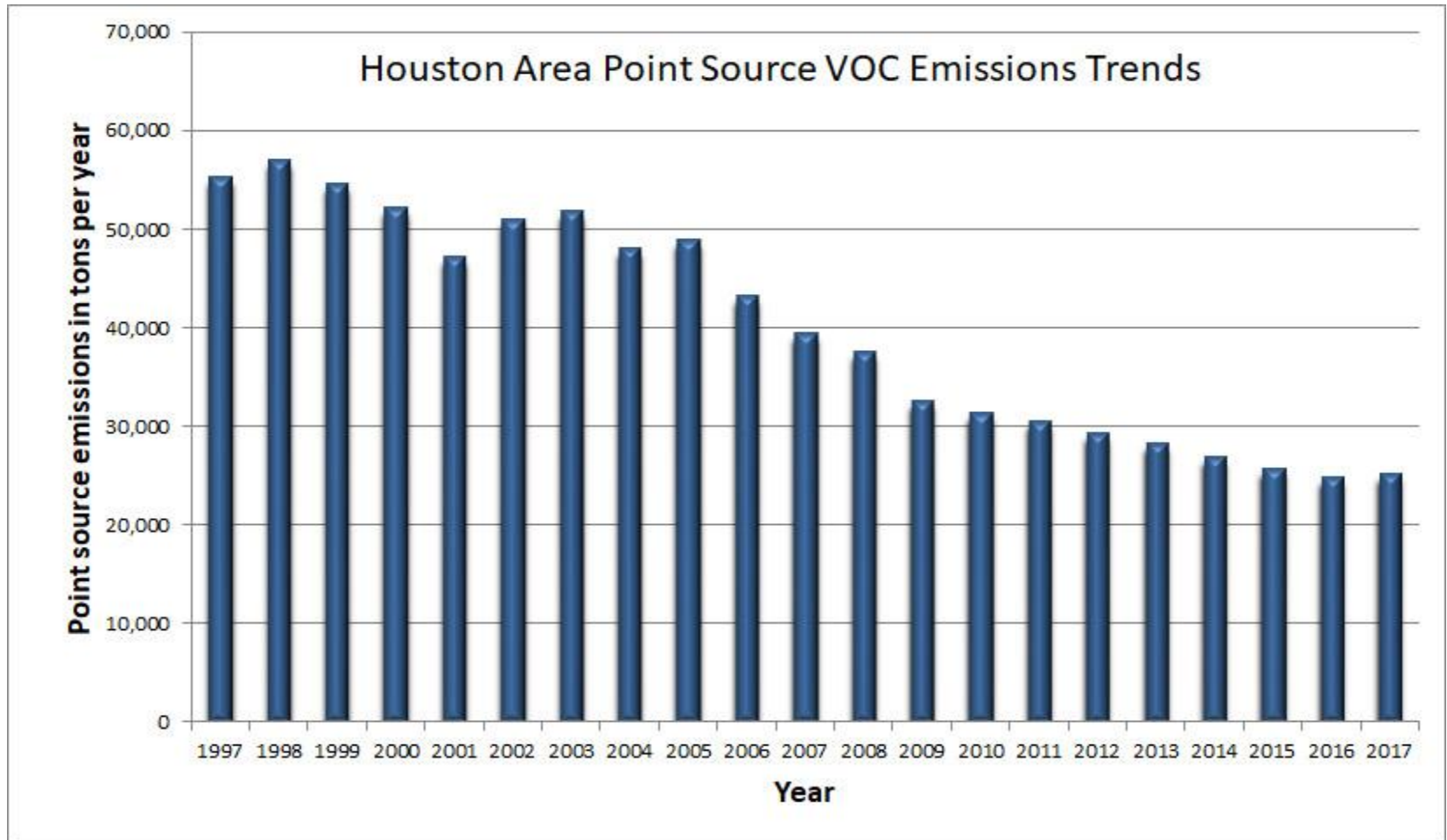
(all values in lbs.)



2015→2019 : 13% Decrease in VOC Emissions

2018→2019 : 5% Increase in VOC Emissions

TCEQ VOC Emissions Trends Houston-Galveston-Brazoria Area



VOC emissions have decreased 54% since 1997.

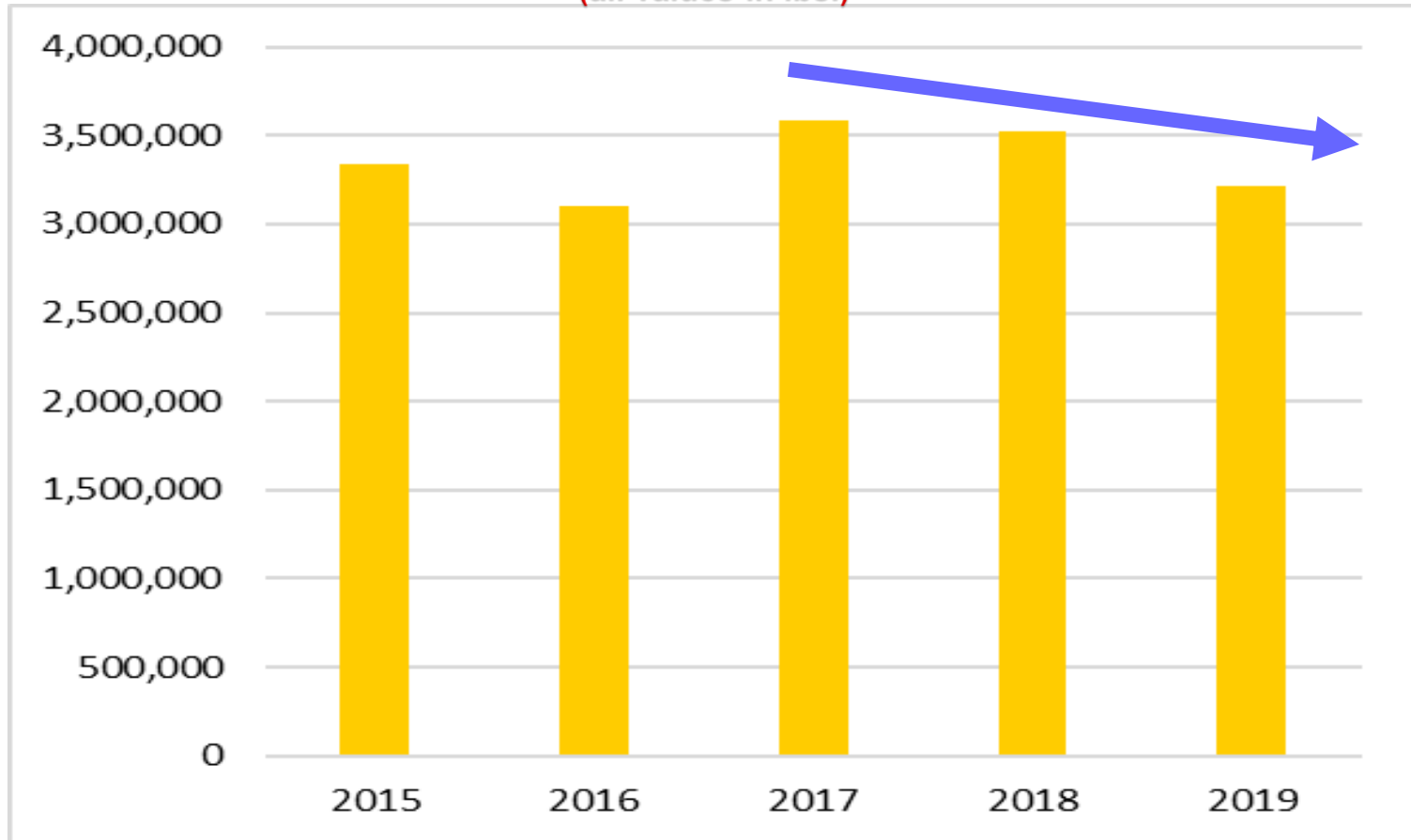
Reported SOx Emissions

(all values in lbs.)

| Company | 2017 | 2018 | 2019 |
|---------------------------------|------------------|------------------|------------------|
| Dow Chemical | 3,092,206 | 2,976,875 | 2,651,120 |
| Shell Deer Park | 368,875 | 418,779 | 417,572 |
| Hexion | 82,700 | 82,700 | 90,804 |
| Lubrizol | 35,553 | 37,766 | 43,963 |
| Vopak | 110 | 4,701 | 5,927 |
| Clean Harbors | 1,641 | 464 | 1,534 |
| OxyVinyls Deer Park VCM | 260 | 293 | 278 |
| OxyVinyls Deer Park PVC/Caustic | 226 | 136 | 125 |
| GEO Specialty Chemicals | 0 | 0 | 0 |
| Total | 3,581,571 | 3,521,714 | 3,211,323 |

Reported SOx Emissions

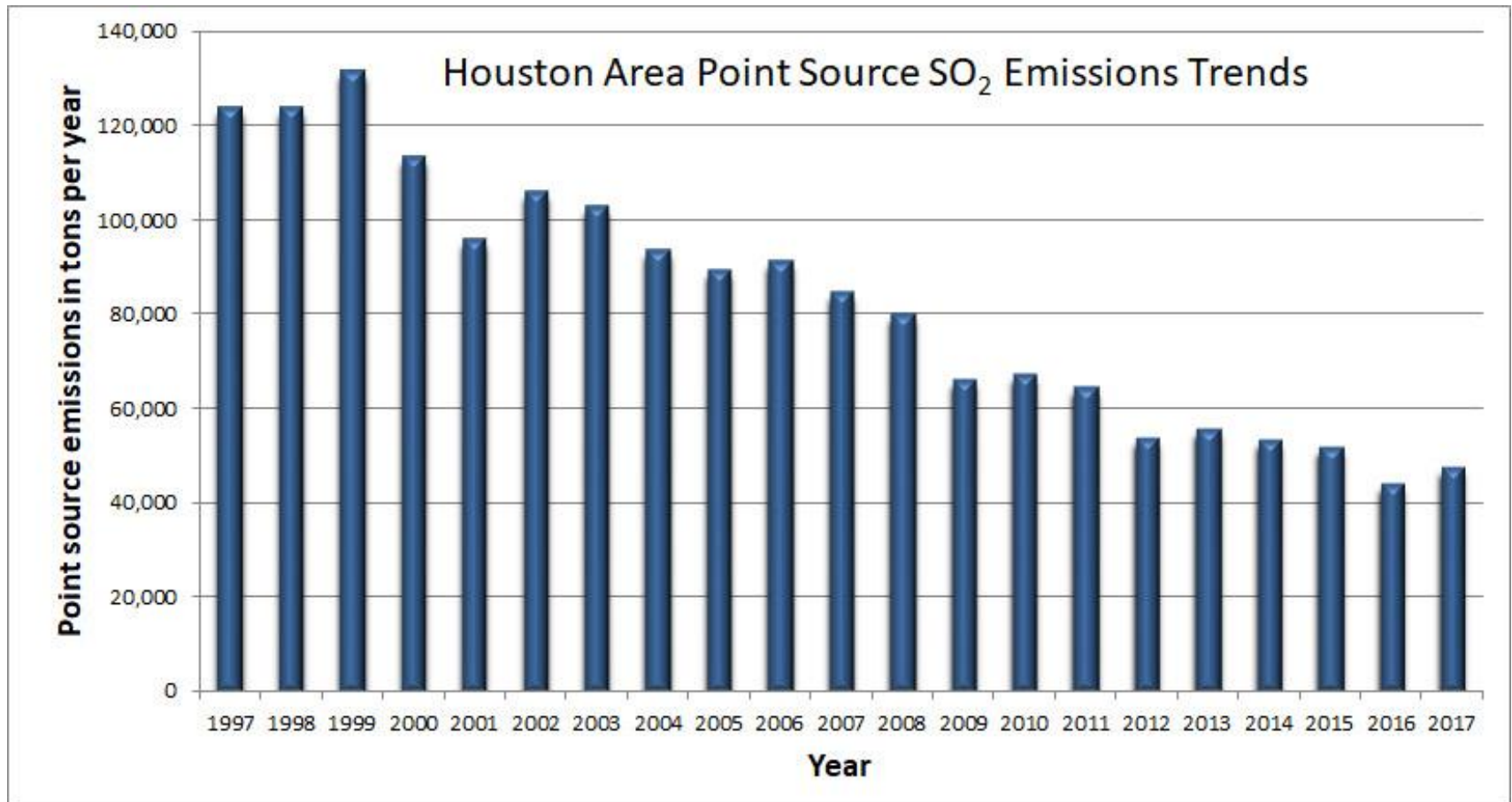
(all values in lbs.)



2015→2019 : 4% Decrease in SOx Emissions

2018→2019 : 9% Decrease in SOx Emissions

TCEQ SOx Emissions Trends Houston-Galveston-Brazoria Area



SOx emissions have Decreased 61% since 1997.

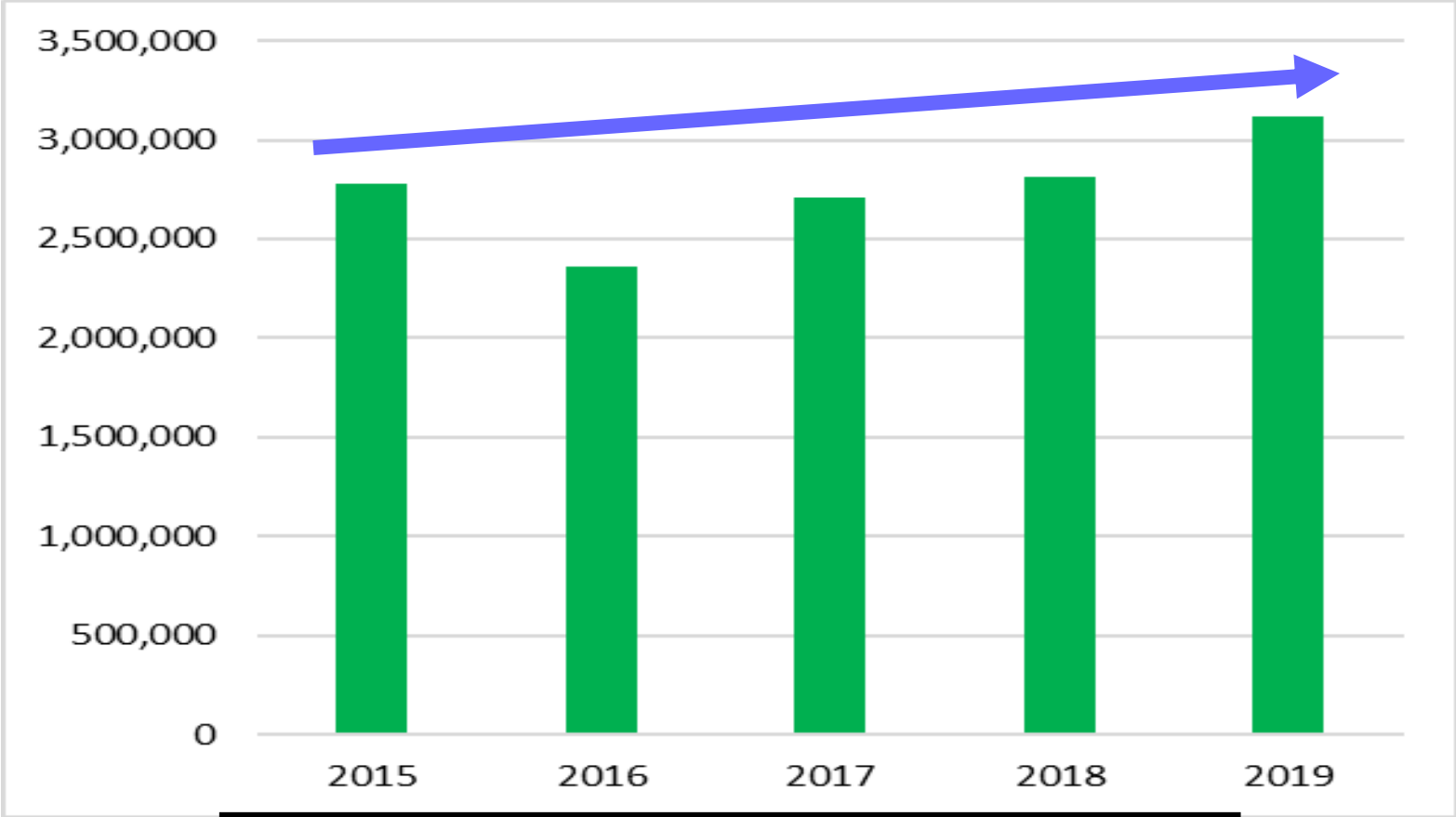
Reported CO Emissions

(all values in lbs.)

| Company | 2017 | 2018 | 2019 |
|---------------------------------|------------------|------------------|------------------|
| Shell Deer Park | 1,816,176 | 1,825,994 | 2,051,066 |
| Dow Chemical | 454,018 | 581,906 | 595,220 |
| Vopak | 188,547 | 173,989 | 203,095 |
| Lubrizol | 174,037 | 140,768 | 165,415 |
| OxyVinyls Deer Park VCM | 22,610 | 25,034 | 33,406 |
| OxyVinyls Deer Park PVC/Caustic | 7,992 | 33,879 | 30,322 |
| Hexion | 21,300 | 19,222 | 18,535 |
| GEO Specialty Chemicals | 14,794 | 10,828 | 11,477 |
| Clean Harbors | 7,031 | 3,605 | 9,791 |
| Total | 2,706,505 | 2,815,225 | 3,118,326 |

Reported CO Emissions

(all values in lbs.)



2015→2019 : 12% Increase in CO Emissions
2018→2019 : 11% Increase in CO Emissions

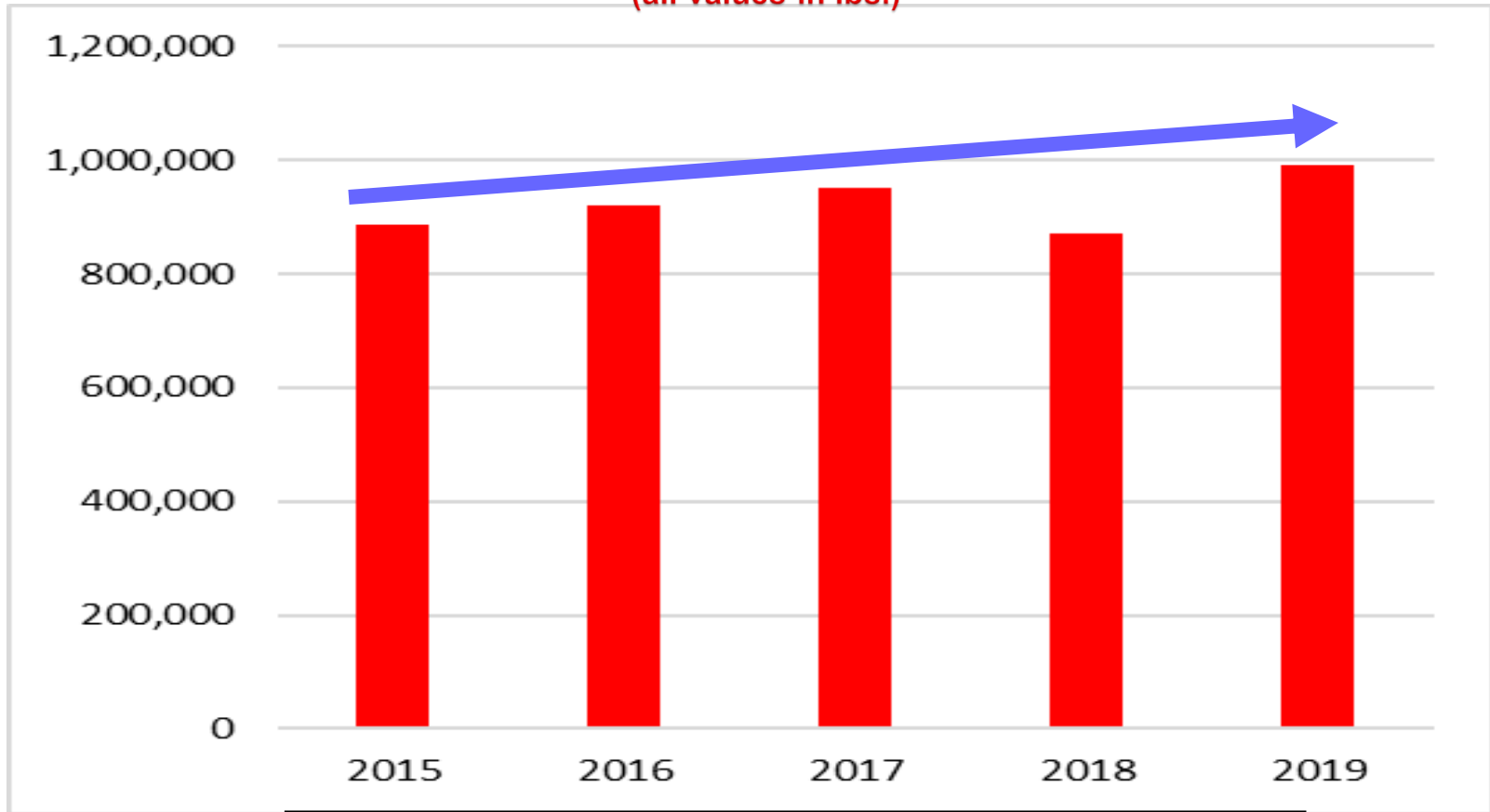
Reported TSP Emissions

(all values in lbs.)

| Company | 2017 | 2018 | 2019 |
|---------------------------------|----------------|----------------|----------------|
| Shell Deer Park | 564,715 | 500,080 | 561,850 |
| Dow Chemical | 179,760 | 212,765 | 226,780 |
| Clean Harbors | 63,440 | 23,358 | 79,926 |
| OxyVinyls Deer Park PVC/Caustic | 39,393 | 39,991 | 37,373 |
| Hexion | 48,000 | 46,600 | 35,274 |
| Lubrizol | 29,406 | 23,603 | 23,662 |
| OxyVinyls Deer Park VCM | 19,556 | 18,738 | 19,170 |
| Vopak | 4,235 | 4,192 | 5,249 |
| GEO Specialty Chemicals | 2,116 | 1,554 | 1,485 |
| Total | 950,621 | 870,881 | 990,769 |

Reported TSP Emissions

(all values in lbs.)

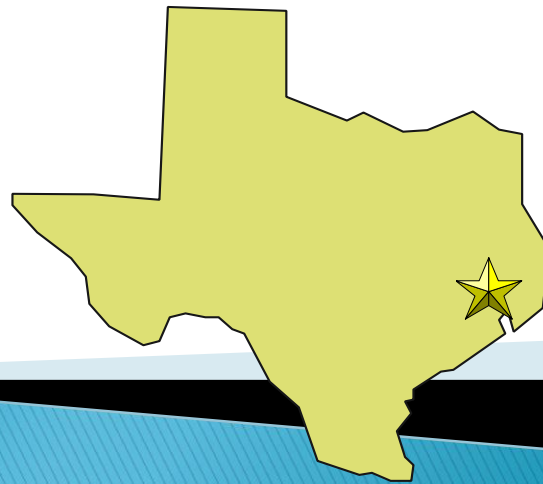


2015→2019 : 12% Increase in TSP Emissions

2018→2019 : 14% Increase in TSP Emissions

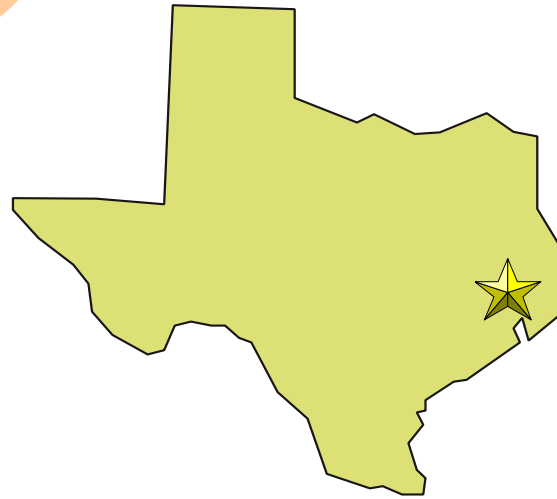


Questions?



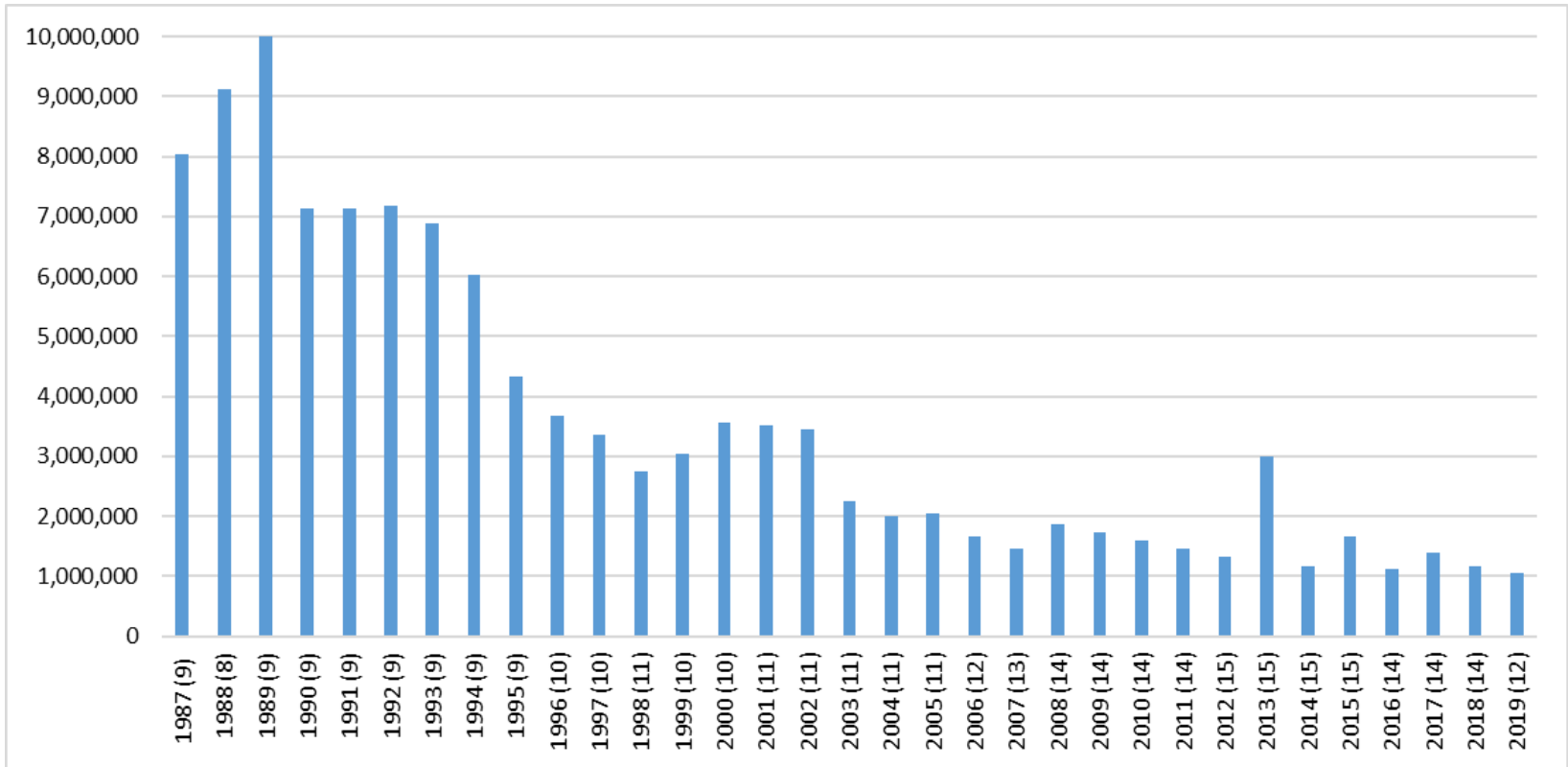


2019 TRI Releases to Air



Reported TRI Air Releases

(all values in lbs.)



1987→2019: 87% Decrease in TRI Air Emissions!

number of plants in parentheses

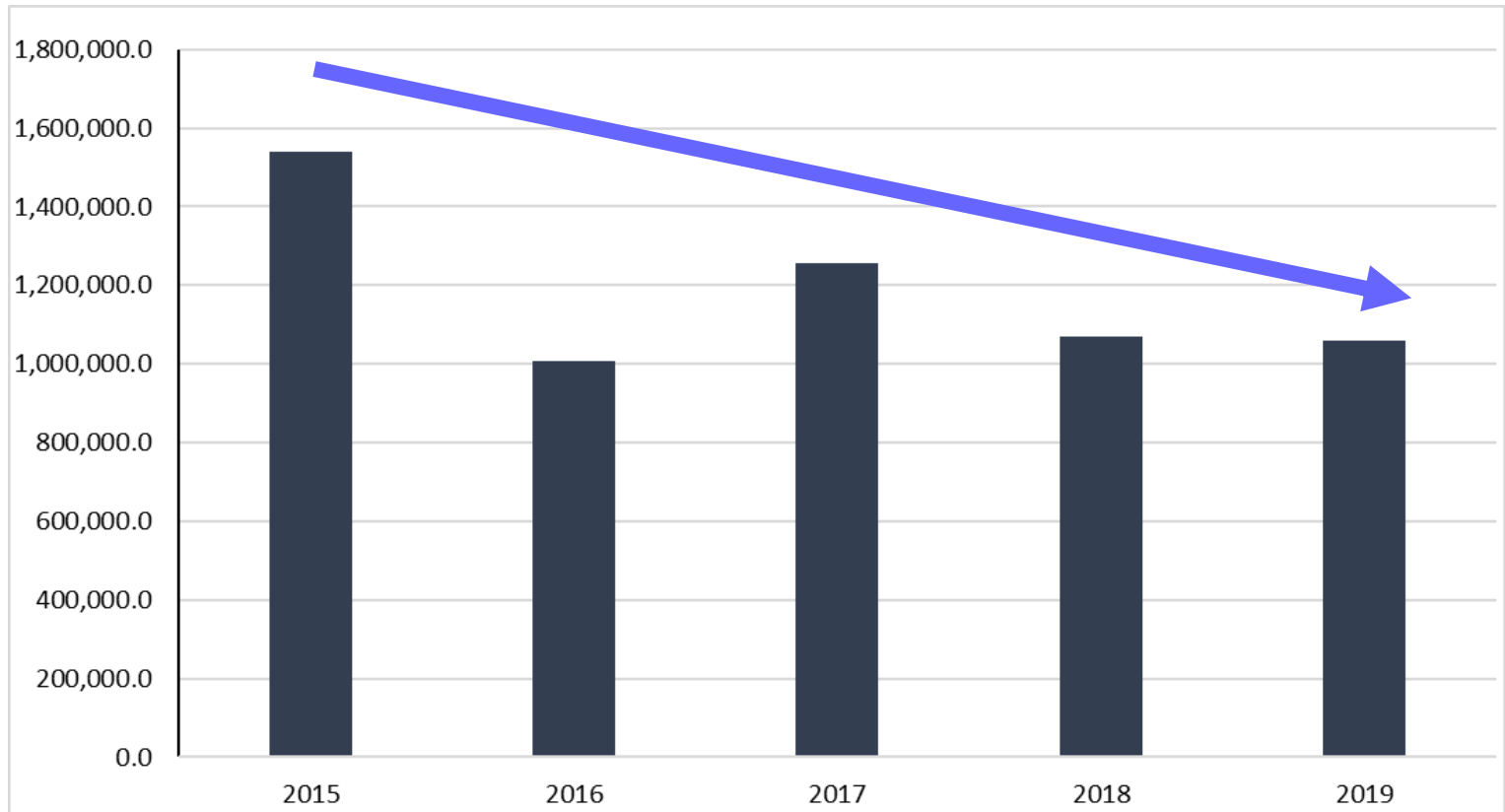
Reported TRI Air Releases

(all values in lbs.)

| Company | 2017 | 2018 | 2019 |
|---------------------------------|------------------|------------------|------------------|
| Shell Deer Park | 827,456 | 638,075 | 605,796 |
| Dow Chemical | 218,339 | 243,622 | 244,795 |
| Hexion | 46,500 | 46,500 | 46,800 |
| OxyVinyls Deer Park VCM | 45,753 | 39,605 | 41,882 |
| Lubrizol | 51,207 | 35,693 | 37,138 |
| OxyVinyls Deer Park PVC/Caustic | 34,154 | 31,849 | 32,567 |
| GEO Specialty Chemicals | 24,398 | 25,479 | 27,559 |
| Clean Harbors | 7,259 | 4,961 | 19,574 |
| Texas Molecular | 1,221 | 916 | 2,103 |
| Evonik | 1,287 | 1,397 | 1,409 |
| Valvoline | 5 | 1 | 1 |
| TRI Air Total | 1,257,579 | 1,068,098 | 1,059,624 |

Reported TRI Air Releases

(all values in lbs.)



2015→2019: 31% Decrease in TRI Air Emissions

2018→2019: 1% Decrease in TRI Air Emissions

Reported Benzene Air Releases

(all values in lbs.)

| Company | Activity | 2017 | 2018 | 2019 |
|-------------------------|--------------------------|---------------|---------------|---------------|
| Shell Deer Park | Production | 45,228 | 36,371 | 39,159 |
| Vopak | Storage/Loading | 23,257 | 23,144 | 21,713 |
| Clean Harbors | Waste Contaminant | 338 | 171 | 583 |
| Texas Molecular | Waste Contaminant | 176 | 147 | 288 |
| Lubrizol | Raw Material Contaminant | 23 | 15 | 20 |
| OxyVinyls Deer Park VCM | Reaction By-product | 5 | 4 | 4 |
| Hexion | Reaction By-product | 3 | 3 | 3 |
| Total | | 69,030 | 59,855 | 61,770 |

Only companies that reported data are listed.

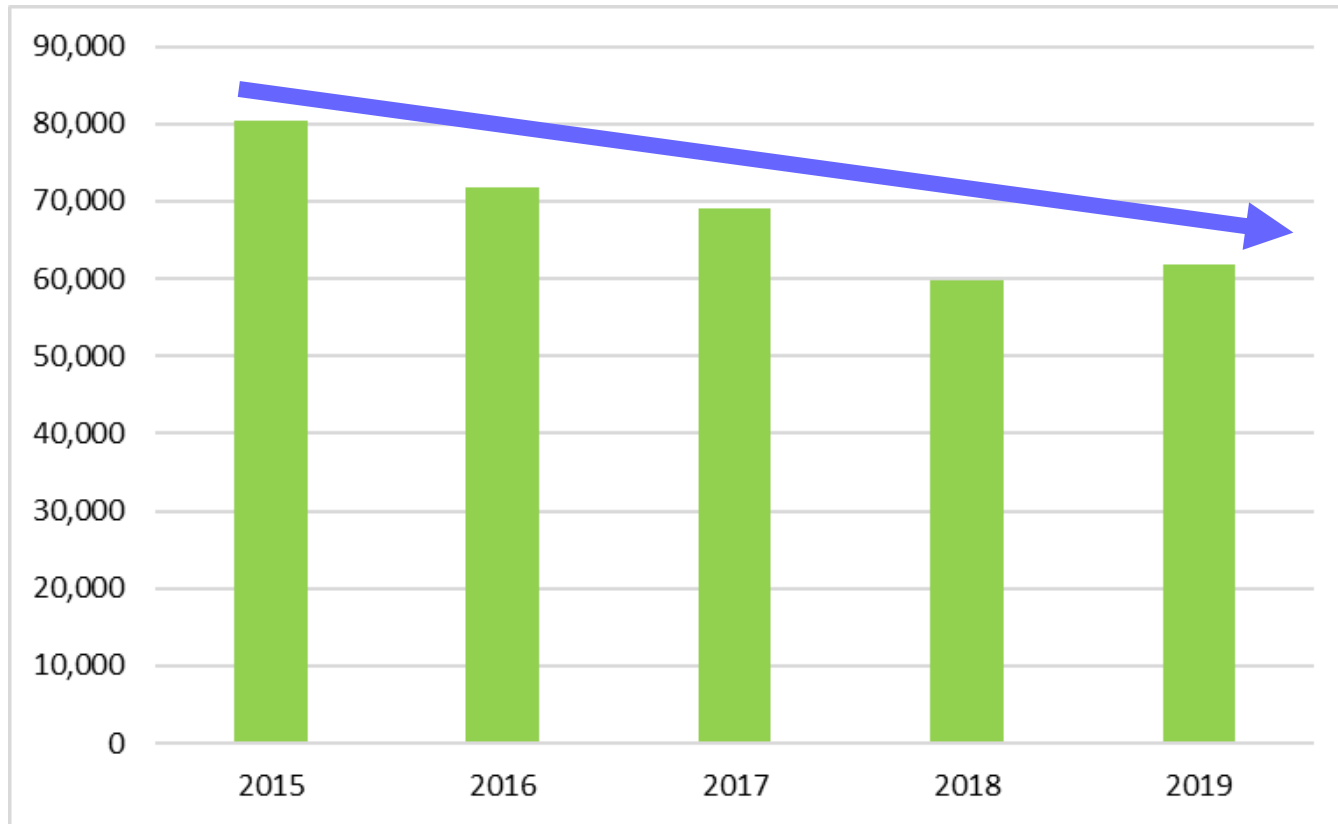
Highlights

Shell Deer Park

- 15% (1.5k lbs) increase due to large turn around in 2019 with increased fugitive monitoring.

Reported Benzene Air Releases

(all values in lbs.)



2015→2019: 23% Decrease in Benzene Air Emissions

2018→2019: 3% Increase in Benzene Air Emissions

Reported 1,3-Butadiene Air Releases

(all values in lbs.)

| Company | 2017 | 2018 | 2019 |
|-----------------|---------------|---------------|---------------|
| Shell Deer Park | 65,224 | 52,558 | 53,663 |
| Lubrizol | 1,649 | 1,649 | 2,182 |
| Texas Molecular | 0 | 0 | 5 |
| Clean Harbors | 1 | 0 | 0 |
| Total | 66,874 | 54,207 | 55,850 |

Highlights

Shell Deer Park

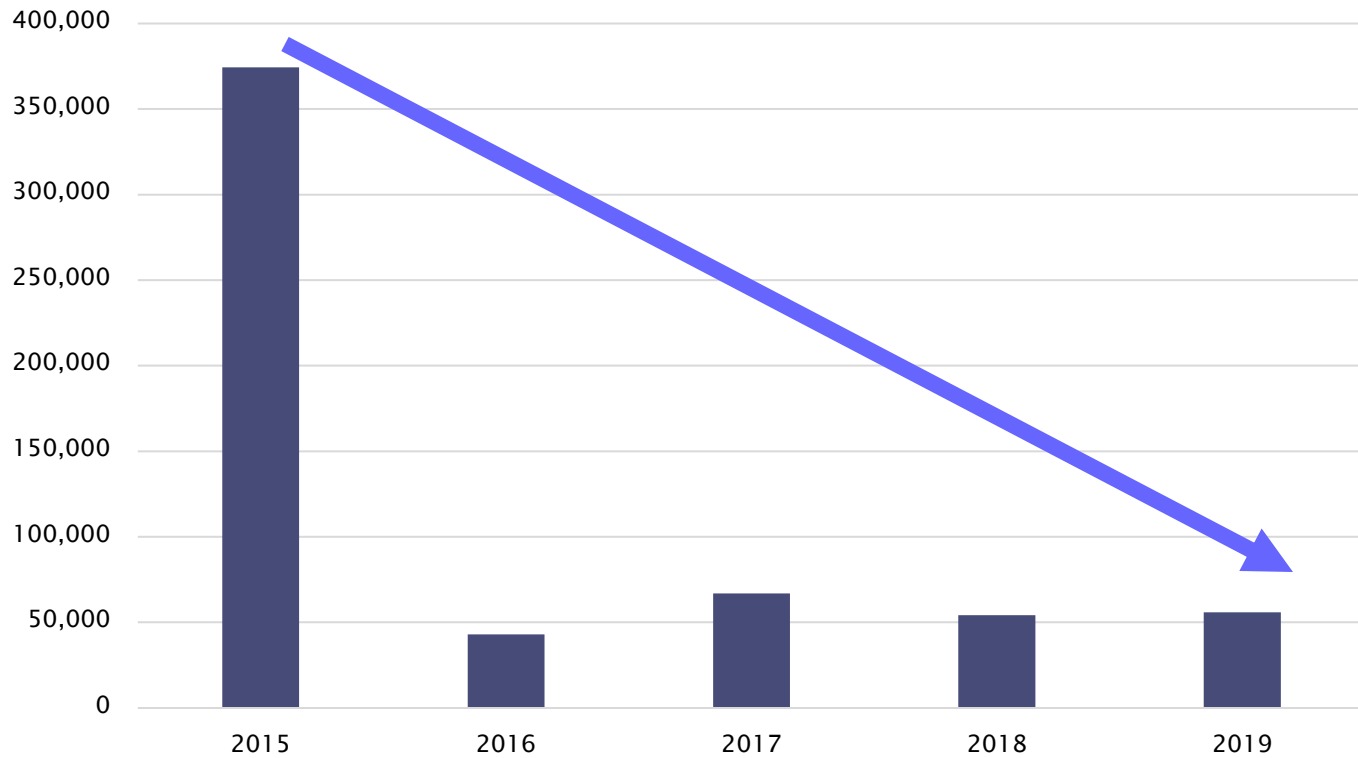
- 22% (990 lbs) increase due to large turn around in 2019 with increased fugitive monitoring.

Lubrizol

- 117% (514 lbs) increase due to emission profile updates

Reported 1,3-Butadiene Air Releases

(all values in lbs.)



2015→2019: 85% Decrease in 1,3-Butadiene Air Emissions

2018→2019: 3% Increase in 1,3-Butadiene Air Emissions

Comparison With Other CACs 2010 – 2018

▶ BAYCAP (26 plants)

- TRI air - 23 %
- NOx - 5 %
- VOCs - 17 %

▶ Pasadena CAC (18 plants)

- TRI air - 26 %
- NOx + 14 %
- VOCs - 15 %

▶ Deer Park CAC (12 plants)

- **TRI air - 31 %**
- **NOx - 17 %**
- **VOCs - 32 %**

▶ La Porte CAC (47 reports)

- TRI air - 19 %
- NOx - 1 %
- VOCs - 7 %

2018 State and County Comparisons

VOCs

- Texas 178,977,109 lbs.
- Harris Co. 33,171,085 lbs.
- DPCAC 3,530,458 lbs.

- 2% of state VOC Emissions Inventory from DPCAC plants
- 11% of county VOC EI from DPCAC plants

NOx

- Texas 496,879,418 lbs.
- Harris Co. 32,407,690 lbs.
- DPCAC 4,157,619 lbs.

- 0.8% of state NOx Emissions Inventory from DPCAC plants
- 13% of county NOx EI from DPCAC plants

Number of facilities submitting an emissions inventory to TCEQ:
1,947 in TX, 273 in Harris Co., 9 in DPCAC

Summary of Changes 2018-2019

Emissions Inventory

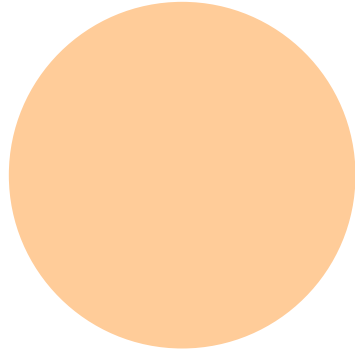
- SO_x ↓
- NO_x, VOC, CO, & TSP ↑

Toxics Release Inventory

- TRI Releases to Air ↓

Benzene ↑

1,3-Butadiene Emissions ↑



Questions?

