SOURCE REDUCTION: QUANTIFIED BENEFITS AND FUTURE OPPORTUNITIES

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Session: TRI: Promoting Pollution Prevention

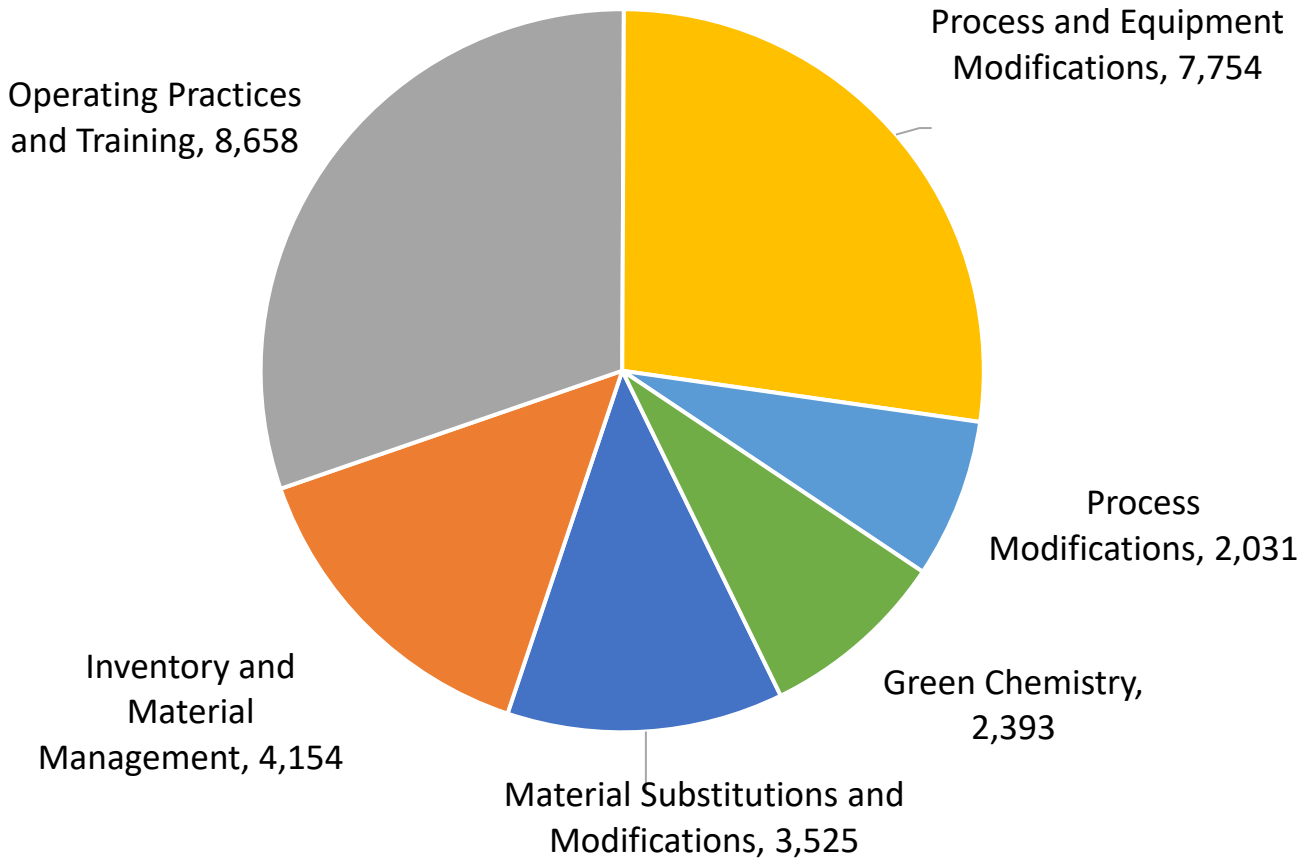
Introduction

- TRI reporting initiated in 1987
- Source reduction reporting began in 1991 as a result of the Pollution Prevention Act (PPA)
- Differences-in-Differences Analysis of Toxic Releases and Waste Managed (1991-2021)
  - Quantities of production-related waste and releases
  - Primary industry sector of facilities
  - Source reduction activities
    - Material Substitutions and Modifications
    - Product Modifications
    - Process and Equipment Modifications
    - Inventory and Material Management
    - Operating Practices & Training
    - Green Chemistry

Goals

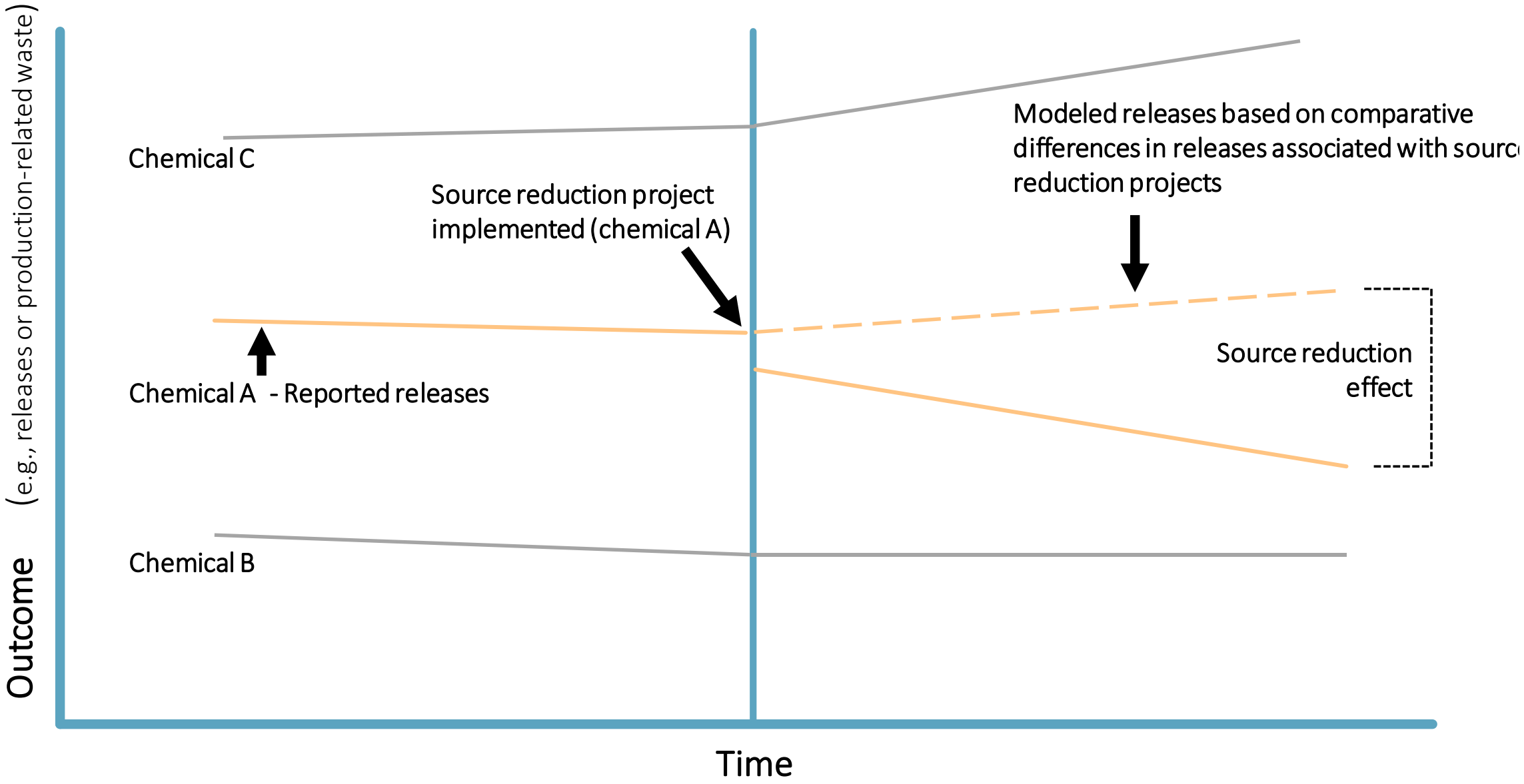
- Quantify the benefits (e.g., reduced releases or waste generated) of implementing individual source reduction projects on a typical facility
- Quantify the impact that source reduction efforts have had on production related wastes and releases of toxic chemicals over the life of the TRI program
- Determine if there are remaining source reduction opportunities

Source Reduction Reporting, 2012-2021



Analysis examined 116,175 source reduction projects implemented since 1991

Methodology: Differences-in-differences

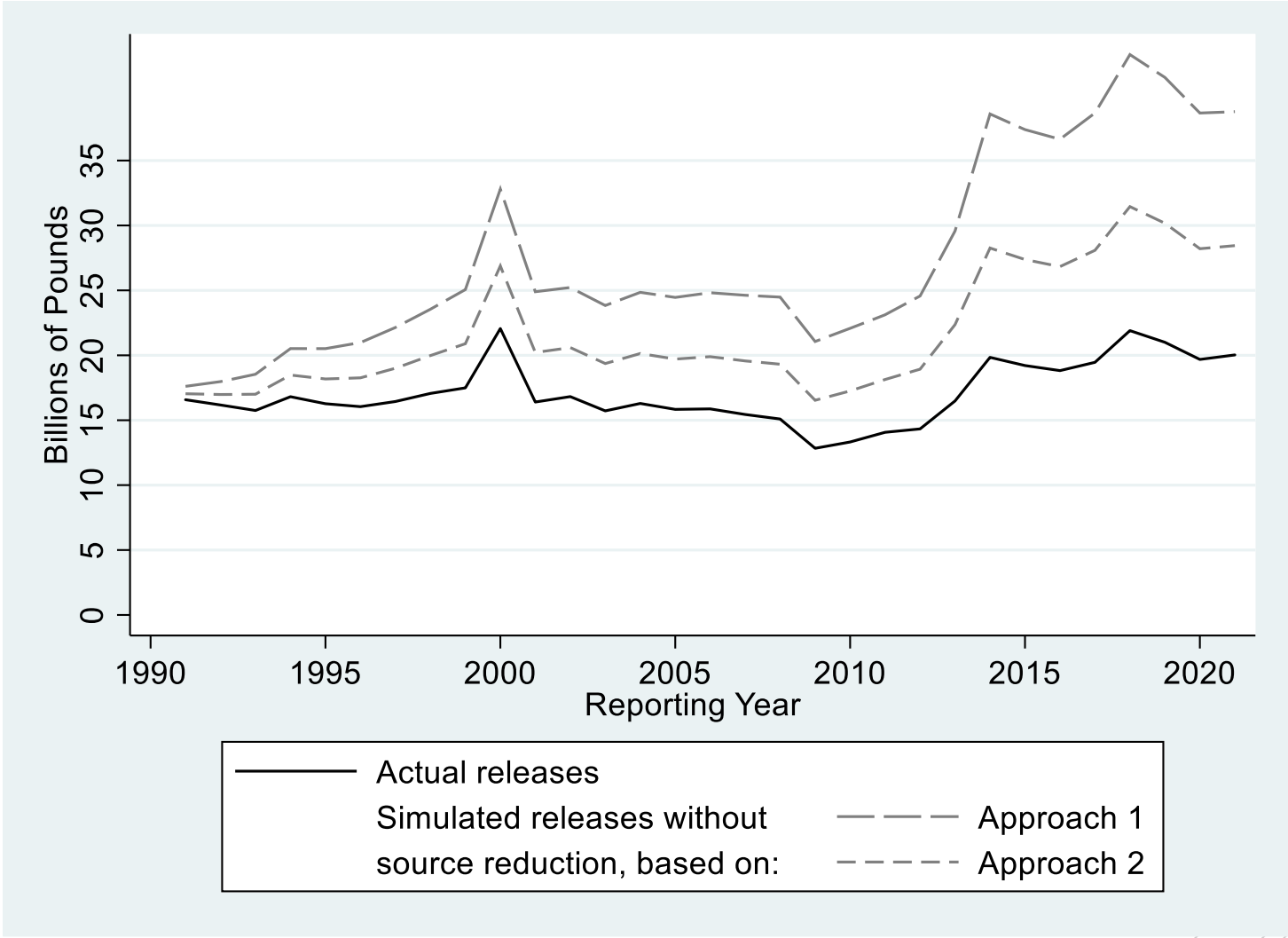


Diff-in Diff Methodology: Compare Records with Source Reduction vs Controls

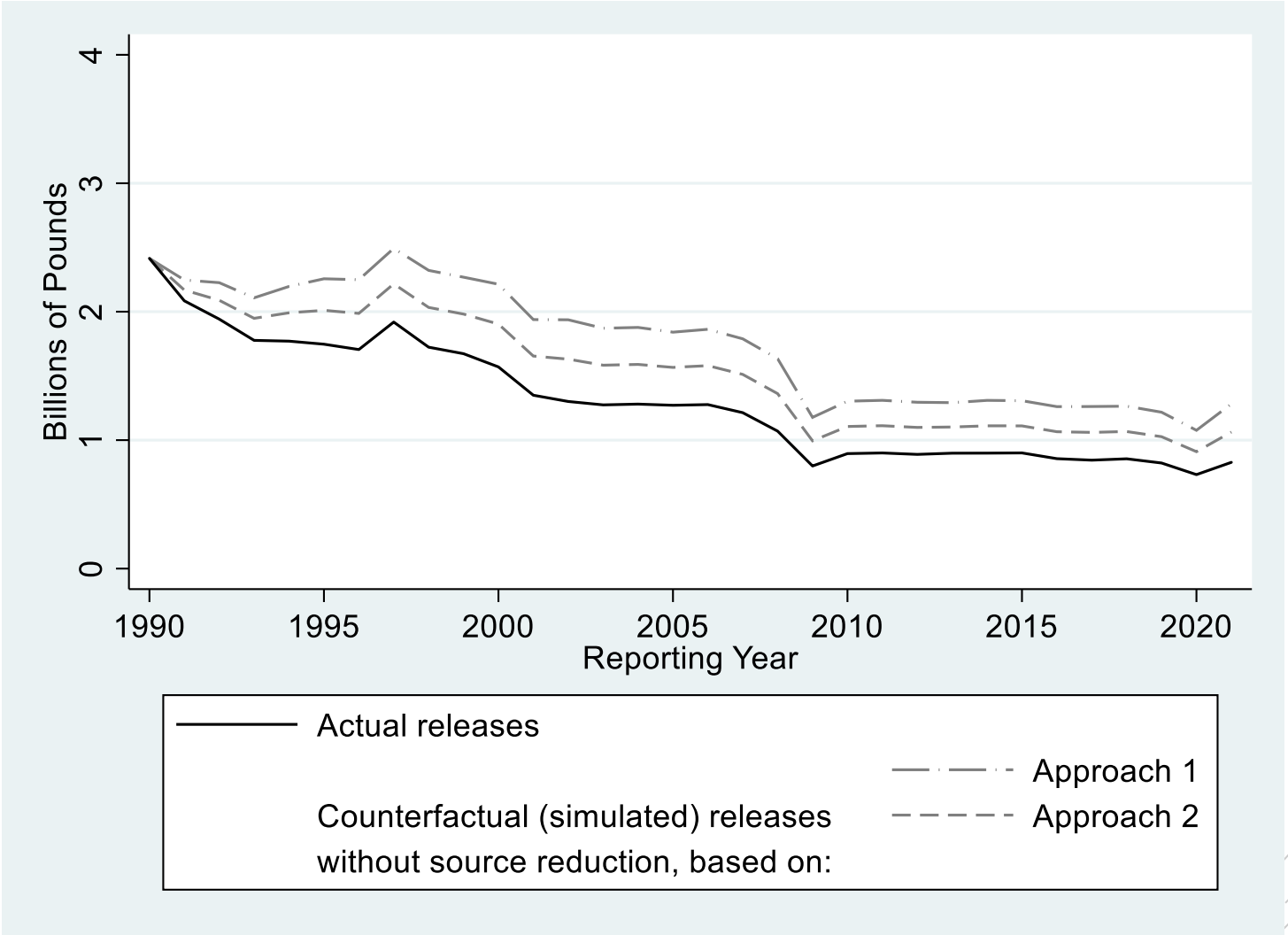
Approach 1:
Same facility > Different chemicals

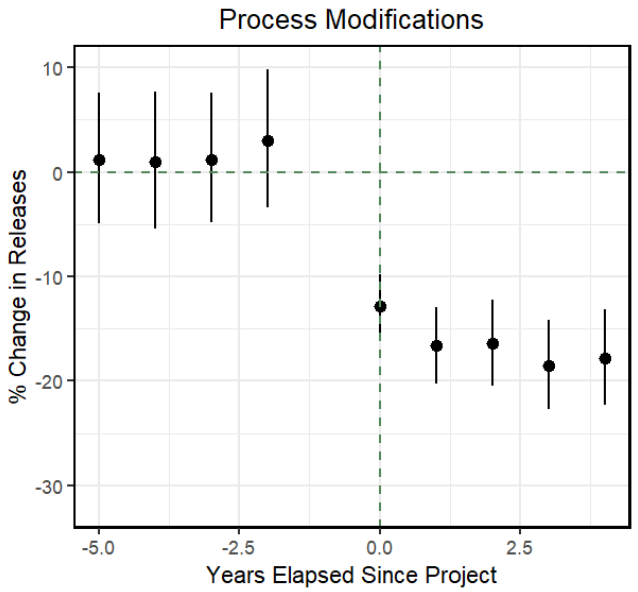
Approach 2:
Same chemical and industry > Different facilities

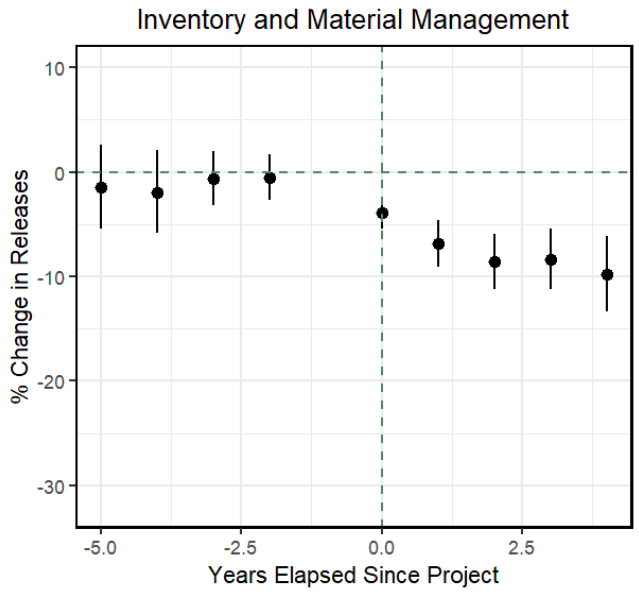
Quantifying Reductions in Production Related Waste

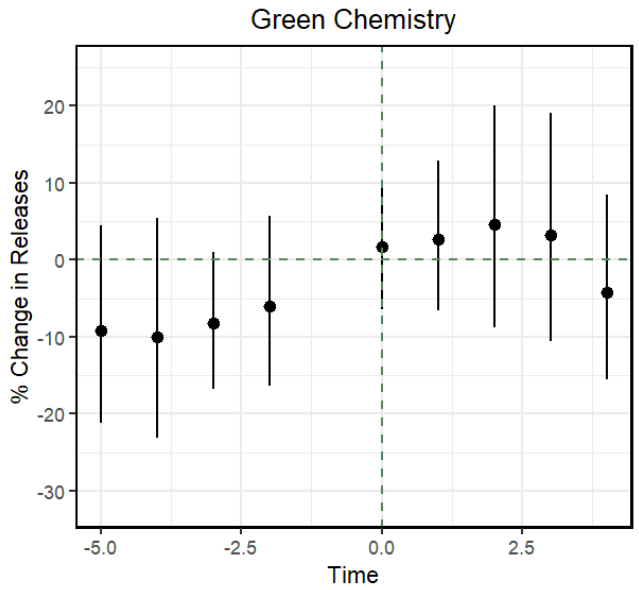


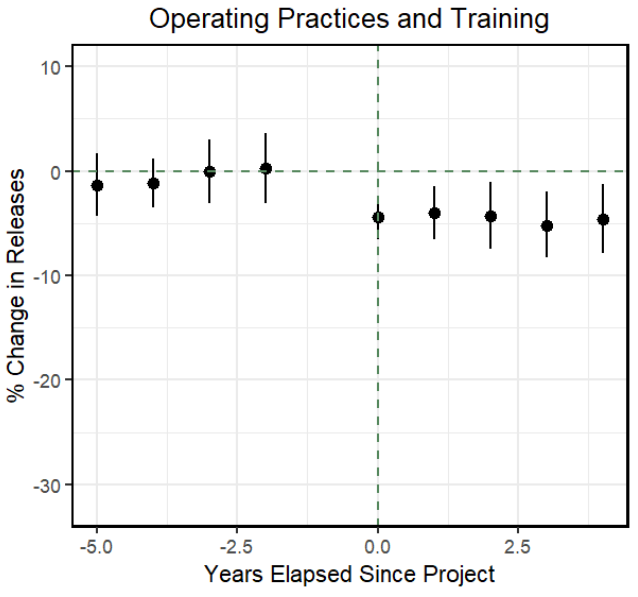
Quantifying Reductions in Releases

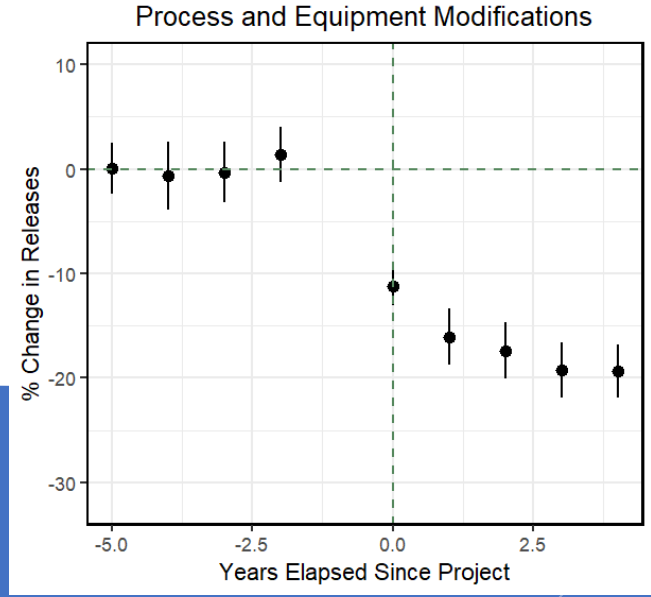


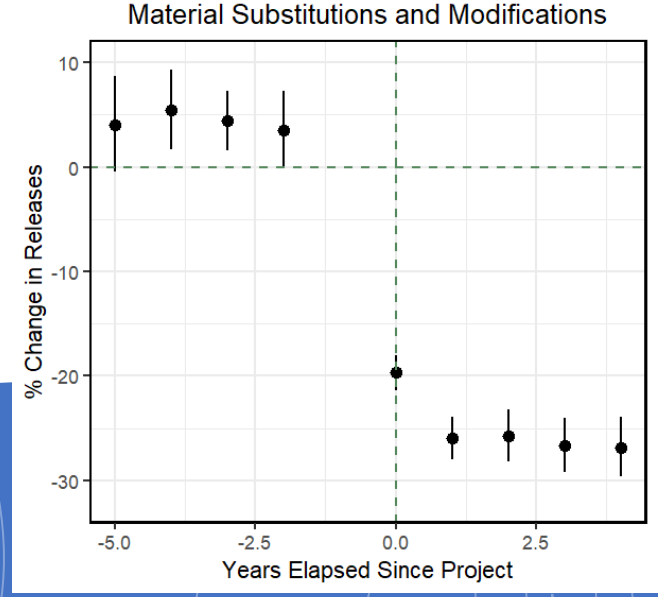












Change in Releases Associated with Type of Source Reduction

Conclusions

Process Modification, Process & Equipment Modification, and Material Substitutions & Modifications are associated with the largest reductions in production-related waste

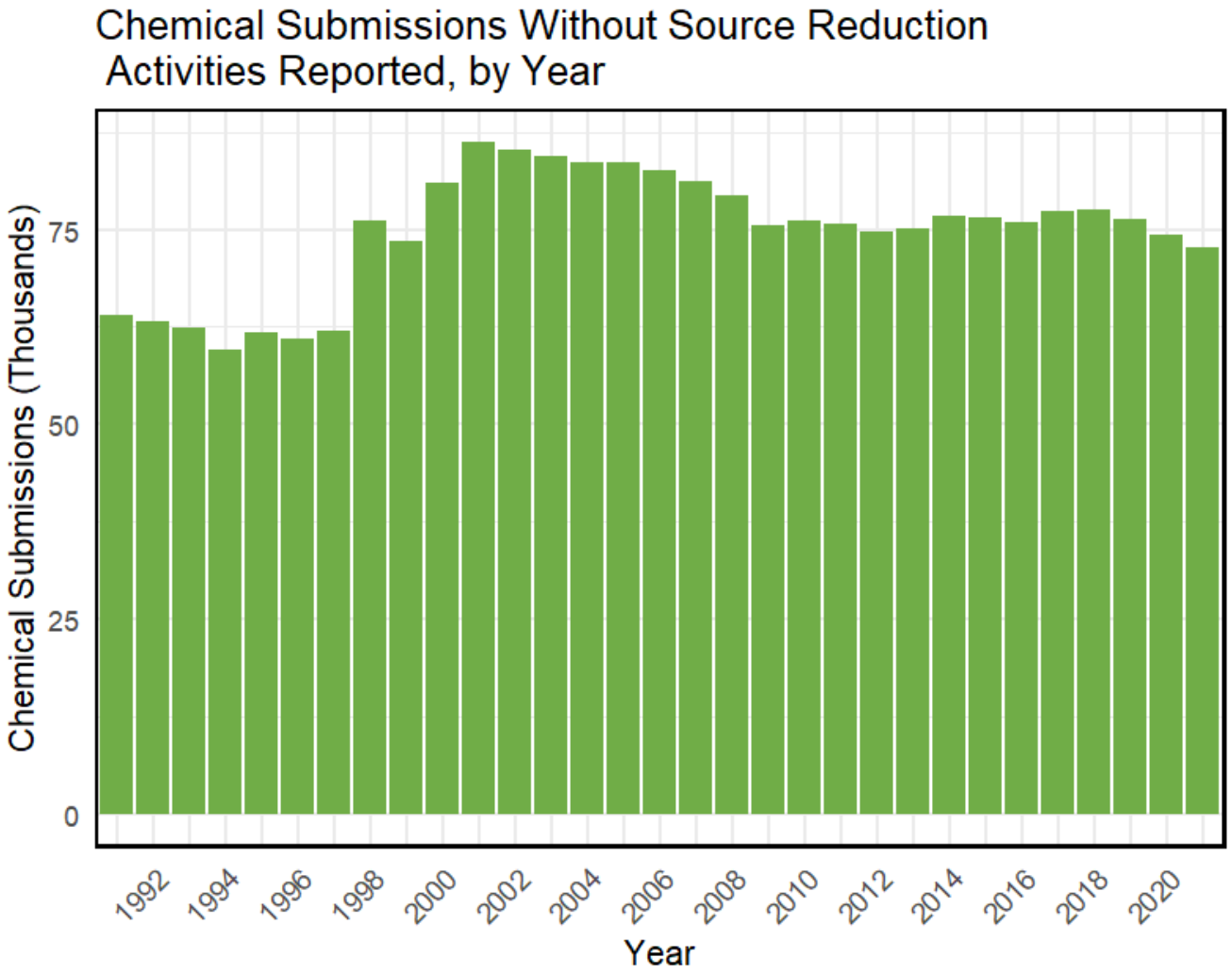
Manufacturing facilities carry out source reduction projects most frequently

Between 81 and 352 billion pounds of production related waste avoided attributable to source reduction projects over 31 years

Between 7 and 19 billion pounds of releases to the environment avoided attributable to source reduction projects over 31 years

Are There Additional Source Reduction Opportunities?

Remaining Source Reduction Opportunities



More than three quarters of facilities reporting to TRI in the last five years do not report any source reduction.

Selected Source Reduction Opportunities, by Chemical

Chemical	% of Forms Reporting Source Reduction	Facilities Reporting Chemical but No Source Reduction Projects in last 5 years
Toluene	8%	2,267
Xylene (mixed isomers)	8%	2,229
Styrene	10%	1,179
N-Methyl-2-pyrrolidone	10%	477
Dichloromethane	11%	282
Acetonitrile	10%	166
Trichloroethylene	12%	158
Di(2-ethylhexyl) phthalate	13%	139
Dimethyl phthalate	9%	97
1-Bromopropane	10%	82
Chlorodifluoromethane (HCFC-22)	10%	61
o-Xylene	13%	59

Questions

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