Appendix: Database of Major Clean Air Act Regulations, 1997-2019

A. Citation

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B. Identifying Major Clean Air Act Regulations

We constructed a dataset of major Clean Air Act Regulations by reviewing annual OMB reports to Congress on the benefits and costs of federal regulations. Congress required these annual reports through a series of laws over 1997-2000, which included specific information requested on individual rules with a gross annual effect on the economy of at least $100 million (1997 law) or are deemed "major" (1998-2000 laws):

Treasury and General Government Appropriations Act, 1998, Public Law 105-61, October 10, 1997, §625(a)

> "IN GENERAL. – No later than September 30, 1998, the Director of the Office of Management and Budget shall submit to the Congress a report that provides… (2) estimates of the costs and benefits (including quantitative and nonquantitative measures) of each rule that is likely to have a gross annual effect on the economy of $100,000,000 or more in increased costs."

Omnibus Consolidated and Emergency Supplemental Appropriations Act, 1999, Public Law 1065-277, October 21, 1998, §638(a)

> "IN GENERAL. – For calendar year 2000, the Director of the Office of Management and Budget shall prepare and submit to Congress, with the budget submitted under section 1105 of title 31, United States Code, an accounting statement and associated report containing – (1) an estimate of the total annual costs and benefits (including quantifiable and nonquantifiable effects) of Federal rules and paperwork, to the extent feasible – …(C) by major rule."

Treasury and General Government Appropriations Act, 2000, Public Law 106-58, September 29, 1999, §628(a)

> "IN GENERAL. – For calendar year 2001, the Director of the Office of Management and Budget shall prepare and submit to Congress, with the budget submitted under section 1105 of title 31, United States Code, an accounting statement and associated report containing – (1) an estimate of the total annual costs and benefits (including quantifiable and nonquantifiable effects) of Federal rules and paperwork, to the extent feasible – …(C) by major rule."

Consolidated Appropriations Act, 2001, Public Law 106-554, December 21, 2000, §624(a)

> "IN GENERAL. – For calendar year 2002 and each year thereafter, the Director of the Office of Management and Budget shall prepare and submit to Congress, with the budget submitted under section 1105 of title 31, United States Code, an accounting statement and associated report containing – (1) an estimate of the total annual costs and benefits (including quantifiable and nonquantifiable effects) of Federal rules and paperwork, to the extent feasible – …(C) by major rule."

While the 1998-2000 laws do not define "major rule," Congress defined a "major rule" under the 1996 Congressional Review Act as:

> "any rule that the Administrator of the Office of Information and Regulatory Affairs of the Office of Management and Budget finds has resulted in or is likely to result in –
> (A) an annual effect on the economy of $100,000,000 or more;
> (B) a major increase in costs or prices for consumers, individual industries, Federal, State, or local government agencies, or geographic regions; or
> (C) significant adverse effects on competition, employment, investment, productivity, innovation, or the ability of United States-based enterprises to compete with foreign-based enterprises in domestic and export markets"

Thus, the 1997 statute authorizing the OMB report to Congress requires information on individual rules that satisfy one of the conditions for the "major rule" definition. This definition is quite similar to the definition of a "significant regulatory action" under Executive Order 12866 Regulatory Planning and Review, which includes:

> "any regulatory action that is likely to result in a rule that may: (1) Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities" (58 FR 51735, October 4, 1993).

E.O. 12866, issued in 1993 and continues to serve as the guidance for OMB-coordinated regulatory review, requires regulatory agencies to produce analysis of the benefits and costs of rules satisfying this definition, and OMB provides guidance to regulatory agencies on the conduct of such analysis through OMB Circular A-4.[1] The resulting benefit-cost analysis for a given rule is published in a regulatory impact analysis (RIA). Thus, all "major" rules summarized in the annual OMB reports to Congress should have an accompanying RIA.

We reviewed the following OMB reports to Congress to identify "major" EPA rules implementing the Clean Air Act over 1997-2019:

1998:
Report to Congress on the Costs and Benefits of Federal Regulations
Table 9
URL (last accessed April 6, 2020):
https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/assets/OMB/inforeg/costbenefitreport1998.pdf

2000:
Report to Congress on the Costs and Benefits of Federal Regulations
Table 7
URLs (last accessed April 6, 2020):
https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/assets/OMB/inforeg/2000fedreg-report.pdf
https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/assets/OMB/inforeg/2000fedreg-charts.pdf

[1] Refer to https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/circulars/A4/a-4.pdf.

2001:
Making Sense of Regulation: 2001 Report to Congress on the Costs and Benefits of Regulations and Unfunded Mandates on State, Local, and Tribal Entities
Table 4
URL (last accessed April 6, 2020):
https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/assets/OMB/inforeg/costbenefitreport.pdf

2002:
Stimulating Smarter Regulation: 2002 Report to Congress on the Costs and Benefits of Regulations and Unfunded Mandates on State, Local, and Tribal Entities
Table 9
URL (last accessed April 6, 2020):
https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/assets/OMB/inforeg/2002_report_to_congress.pdf

2003:
Informing Regulatory Decisions: 2003 Report to Congress on the Costs and Benefits of Federal Regulations and Unfunded Mandates on State, Local, and Tribal Entities
Table 4
URL (last accessed April 6, 2020):
https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/assets/OMB/inforeg/2003_cost-ben_final_rpt.pdf

2004:
Progress in Regulatory Reform: 2004 Report to Congress on the Costs and Benefits of Federal Regulations and Unfunded Mandates on State, Local, and Tribal Entities
Table 4
URL (last accessed April 6, 2020):
https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/assets/OMB/inforeg/2004_cb_final.pdf

2005:
Validating Regulatory Analysis: 2005 Report to Congress on the Costs and Benefits of Federal Regulations and Unfunded Mandates on State, Local, and Tribal Entities
Table 1-4
URL (last accessed April 6, 2020):
https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/assets/OMB/inforeg/2005_cb/final_2005_cb_report.pdf

2006:
2006 Report to Congress on the Costs and Benefits of Federal Regulations and Unfunded Mandates on State, Local, and Tribal Entities
Table 1-4
URL (last accessed April 6, 2020):
https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/assets/OMB/inforeg/2006_cb/2006_cb_final_report.pdf

2007:
2007 Report to Congress on the Benefits and Costs of Federal Regulations and Unfunded Mandates on State, Local, and Tribal Entities
Table 1-4
URL (last accessed April 6, 2020):
https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/assets/OMB/inforeg/2007_cb/2007_cb_final_report.pdf

2008:
2008 Report to Congress on the Benefits and Costs of Federal Regulations and Unfunded Mandates on State, Local, and Tribal Entities
Table 1-4
URL (last accessed April 6, 2020):
https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/assets/information_and_regulatory_affairs/2008_cb_final.pdf

2009:
2009 Report to Congress on the Benefits and Costs of Federal Regulations and Unfunded Mandates on State, Local, and Tribal Entities
Table 1-4
URL (last accessed April 6, 2020):
https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/assets/legislative_reports/2009_final_BC_Report_01272010.pdf

2010:
2010 Report to Congress on the Benefits and Costs of Federal Regulations and Unfunded Mandates on State, Local, and Tribal Entities
Table 1-4
URL (last accessed April 6, 2020):
https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/legislative/reports/2010_Benefit_Cost_Report.pdf

2011:
2011 Report to Congress on the Benefits and Costs of Federal Regulations and Unfunded Mandates on State, Local, and Tribal Entities
Table 1-5
URL (last accessed April 6, 2020):
https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/inforeg/inforeg/2011_cb/2011_cba_report.pdf

2012:
2012 Report to Congress on the Benefits and Costs of Federal Regulations and Unfunded Mandates on State, Local, and Tribal Entities
Table 1-5
URL (last accessed April 6, 2020):
https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/inforeg/inforeg/2012_cb/2012_cost_benefit_report.pdf

2013:
2013 Report to Congress on the Benefits and Costs of Federal Regulations and Unfunded Mandates on State, Local, and Tribal Entities
Table 1-6
URL (last accessed April 6, 2020):
https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/inforeg/inforeg/2013_cb/2013_cost_benefit_report-updated.pdf

2014:
2014 Report to Congress on the Benefits and Costs of Federal Regulations and Unfunded Mandates on State, Local, and Tribal Entities
Table 1-6
URL (last accessed April 6, 2020):
https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/inforeg/inforeg/2014_cb/2014-cost-benefit-report.pdf

2015:
2015 Report to Congress on the Benefits and Costs of Federal Regulations and Agency Compliance with the Unfunded Mandates Reform Act
Table 1-6
URL (last accessed April 6, 2020):
https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/inforeg/inforeg/2015_cb/2015-cost-benefit-report.pdf

2016:
2016 Draft Report to Congress on the Benefits and Costs of Federal Regulations and Agency Compliance with the Unfunded Mandates Reform Act
Table 1-6
URL (last accessed April 6, 2020):
https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/assets/legislative_reports/draft_2016_cost_benefit_report_12_14_2016_2.pdf

2017:
2017 Report to Congress on the Benefits and Costs of Federal Regulations and Agency Compliance with the Unfunded Mandates Reform Act
Table 1-6
URL (last accessed April 6, 2020):
https://www.whitehouse.gov/wp-content/uploads/2019/12/2019-CATS-5885-REV_DOC-2017Cost_BenefitReport11_18_2019.docx.pdf

2018-2020:
2018, 2019, 2020 Draft Report to Congress on the Benefits and Costs of Federal Regulations and Agency Compliance with the Unfunded Mandates Reform Act
Table 1-6 (in associated spreadsheets)
URL (last accessed April 6, 2020):
https://www.whitehouse.gov/wp-content/uploads/2019/12/2019-CATS-5899-REV_DOC-Draft2018_2019_2020Cost_BenefitReport11_20_2019.pdf

https://www.whitehouse.gov/wp-content/uploads/2019/12/Draft2018Benefit_CostReport11_20_2019.xlsx
https://www.whitehouse.gov/wp-content/uploads/2019/12/Draft2019Benefit_CostReport11_20_2019.xlsx
https://www.whitehouse.gov/wp-content/uploads/2019/12/Draft2020Benefit_CostReport11_20_2019.xlsx

After having identified this list, we obtained the Federal Register notice of each final rule as promulgated from www.federalregister.gov and the EPA RIA for that rule, primarily from these EPA online publication databases: https://www.epa.gov/economic-and-cost-analysis-air-pollution-regulations/regulatory-impact-analyses-air-pollution (last accessed April 6, 2020) and https://nepis.epa.gov/ (last accessed July 1, 2020).

C. Organization of Major Clean Air Act Regulations Database

The database is organized in a Microsoft Excel spreadsheet. Every regulation in the database is represented by its own worksheet, which is identified by that regulation's regulation identifier number (RIN). In the few cases in which a RIN is used more than once for a major regulation, we have modified the latter occurrence by adding _YY to the end of the RIN, were YY refers to the two-digit calendar year in which EPA promulgated the final regulation. The Synthesis worksheet draws key data from each of the regulation-specific worksheets to create a single dataset that was used for the graphs and analyses in the paper. The Table A1 worksheet draws the data used for constructing Appendix Table 1 in the paper. Note: the Excel functions used to construct the Synthesis and Table A1 worksheets are sensitive to the filename "CAA RIAs 1997-2000.xlsx". A change to the filename would require changing the functions in each worksheet accordingly.

In a given worksheet, we report the following information:

Regulation Publication Information

- RIN: Regulation identifier number
- Rule: Rule title as it appears in the Federal Register
- Date: Date final regulation promulgated in Federal Register
- FR: Federal register volume and initial page number
- Agency: Agency or agencies promulgating the regulation

OMB Report to Congress Information Specific to this Regulation

- OMB_USD: Base year dollars for the OMB annual report to Congress used to identify regulation
- OMB_Cost_LB: Lower bound of the cost estimate for this regulation in the OMB annual report
- OMB_Cost_UB: Upper bound of the cost estimate for this regulation in the OMB annual report
- OMB_Cost: Average of lower and upper bounds, or the point estimate in the OMB annual report
- OMB_Ben_LB: Lower bound of the benefit estimate for this regulation in the OMB annual report
- OMB_Ben_UB: Upper bound of the benefit estimate for this regulation in the OMB annual report
- OMB_Ben: Average of lower and upper bounds, or the point estimate in the OMB annual report

RIA Evaluation Approach

- Method: “Annual in Future Year” refers to a full-implementation year in which EPA compares benefits and costs; “Annualized” refers to an amortized annual value for benefits and costs; “Present Value” refers to a stream of annual benefits and costs and a present value of each
- Monetized: Y (yes) or N (no) to identify whether RIA presents monetized benefits for the regulation
- Year$: Base year dollars used in the RIA
- Targets: Pollutants (and fuel economy) targeted by the regulation under the CAA (or CAA and EPCA) authority
- Reg_Poll: Pollutants (and fuel economy) subject to emission standards in the regulation; Reg_Poll may differ from Targets in cases in which one pollutant is a precursor to the targeted pollutant and in cases in which EPA employs a proxy pollutant for the targeted pollutant
- Snapshot_year: Full-implementation year identified in RIAs using “Annual in Future Year” method or a year after full implementation selected by authors in the “Present Value” RIAs

Internet Links

- Rule_URL: Link to the regulation on Federal Register website
- RIA_URL: Link to the RIA on the EPA website or from our dropbox repository
- OMB_URL: Link to the OMB annual report used to identify regulation on White House website

RIA Costs and Benefits

The balance of each worksheet presents the monetized costs and benefits from the RIA. This includes the lower and upper bounds of each cost and benefit at a 3% discount rate (columns E and F) and 7% discount rate (columns G and H). For this paper, we focused on the 7% discount rate results, which were common for costs and benefits across virtually all categories of benefits and costs (except when noted in the worksheet) and virtually all regulations. The lower and upper bound values (columns C and D) correspond to the 7% discount rate lower and upper bounds. The mean value (column B) is the average of the lower and upper bound, or the point estimate when the RIA presents a single value. Notes (column J) identify the source for the estimate in the RIA and explains necessary details regarding a specific estimate (e.g., the CO2 reduction benefits are based on a 5% discount rate social cost of carbon, since EPA did not use a 7% discount rate SCC before 2017). The costs and benefits categories include:

- Total Costs: total monetized costs for the regulation
- Total Benefits: total monetized benefits for the regulation
- Tgt Ben: total monetized benefits associated with the target of the regulation
- CoBen: total monetized benefits associated with ancillary impacts of the regulation
- Benefits (“Ben_”) by category:
    - O3: ozone
    - PM25: particulate matter less than 2.5 microns in diameter
    - PM: particulate matter
    - SO2: sulfur dioxide
    - NOX: nitrogen oxides
    - NMHC: non-methane hydrocarbons
    - HAP: hazardous air pollutants
    - CO2: carbon dioxide
    - CH4: methane
    - nitrogendep: nitrogen deposition to waterbodies
    - fuelsavings: fuel savings and energy savings
    - energysecurity: energy security benefits

- congestaccidents: congestion and traffic accidents impacts
- timesavings: time savings (typically from less time spent refueling)
- travel: benefits from travel
- VIS: visibility
- GHGothr: non-CO2/non-CH4 greenhouse gas benefits
- PB: lead

Some worksheets also present key tables from the RIA on various sub-categories of pollutant-specific monetized benefits in order to construct the values on a pollutant-by-pollutant basis.