



# EPA Remarks on the SAB Review of the Reduced Form Tools Evaluation

Public Meeting of the Chartered Science Advisory Board

November 12, 2020



# Background: Estimating Health Benefits in EPA/OAR Regulations

- EPA's Office of Air & Radiation (OAR) has completed dozens of Regulatory Impact Analyses (RIAs) over the past decade to support air quality regulations under the Clean Air Act.
- To meet E.O. 12866 requirements, these RIAs strive to quantify the potential social benefits (e.g., reduced health and welfare impacts), the social costs, and net effects of the regulation.
  - Follow EPA's Economic Guidelines as well as OMB Circular A-4 requirements
- Due to the volume of RIAs and practical constraints such as regulatory deadlines, EPA/OAR has developed and sometimes employed "reduced-form" approaches to estimating benefits.
- The purpose of this review was to consider the performance of EPA's current reduced-form approach (& other available reduced-form models), relative to a full-form approach.



## Background: Full-Form vs. Reduced Form Modeling

- Whenever possible, EPA/OAR strives to estimate the anticipated impacts of a regulatory action using a state-of-the-science “full-form” (FF) approach:
  - Changes in emissions are based EPA’s National Emissions Inventory and detailed models (e.g., IPM, MOVES)
  - Changes in air quality are estimated from photochemical air quality models (e.g., CMAQ, CAMx)
  - Resulting health impacts are estimated from EPA’s established benefits tool (e.g., BenMAP-CE)
- However, in certain instances, EPA/OAR has used “reduced-form” (RF) approaches, which employ simpler methods to approximate the more complex analyses.
  - RF approaches are used when time or resources are constrained, e.g., rule development timelines are short.
  - Results from RF methods can diverge from FF results to varying degrees, depending on critical factors such as the vintage of modeling that underlies the reduced-form approach and the emissions changes considered.
  - However, in some instances, RF approaches may be the only option for meeting 12866 requirements.
  - ***EPA/OAR expects to continue to need to use RF approaches in the future, informed by this evaluation effort.***



# Background: EPA/OAR Reduced Form Model Evaluation Report

- In October 2017, as part of the proposed rule to repeal the Clean Power Plan, EPA committed to systematically evaluating the uncertainty associated with RF techniques, with the goal of better understanding the suitability of such approaches to estimating the health impacts of pollutant emissions changes.
  - EPA/OAR's "benefit per ton" approach for estimating the benefits of reducing fine particles (PM<sub>2.5</sub>) was specifically highlighted for evaluation.
- In October 2019, EPA released the contractor report: "Evaluating Reduced-Form Tools for Estimating Air Quality Benefits".
  - <https://www.epa.gov/benmap/reduced-form-evaluation-project-report>
  - EPA has made public the modeling inputs and processing scripts to assist model developers and users in conducting similar evaluations and authored a "Data In Brief" publication.
- In April 2020, an SAB review panel was established and provided five charge questions to guide the review. Two public meetings of the panel were held (May/Sep) and a draft report is now available (Oct).



## General EPA/OAR comments on the SAB panel draft report

- EPA/OAR appreciates the efforts of the SAB Reduced Form Tools review panel and the set of recommendations provided to EPA related to evaluating RF tools as part of regulatory analyses.
- These recommendations will influence EPA/OAR's on-going efforts with respect to use of reduced form benefit tools in a regulatory context.
  - EPA/OAR plans to incorporate the panel's recommendations in future efforts to develop, evaluate, and apply (where appropriate) RF approaches to estimating the benefits of air quality actions.
  - EPA/OAR is currently working to update our PM<sub>2.5</sub> benefit-per-ton estimates with a more recent emissions inventory and is continuing to support research into RF approaches through the ACE centers.
  - Throughout these present/future efforts, EPA/OAR will continue to evaluate the usefulness of RFTs, including a benefits per ton approach, in regulatory impact analysis and periodically assess how RF tools compare to full-form models (FFMs).



## Specific EPA/OAR comments on the SAB panel draft report

- The panel recommends EPA explicitly state the rationale for comparing all RFT results to the full-form CMAQ model coupled with BenMAP-CE results. While they provide a logical benchmark for this evaluation exercise, they are imperfect, and their use can influence the results of the evaluation.
  - EPA/OAR concurs and will explicitly state this in future efforts but notes, as the panel acknowledged, that one of the key determinations in evaluating the appropriateness of any RF tool will always be its ability to replicate the results of EPA's existing approach for estimating AQ changes and resultant benefits (i.e., state of the science, FF models like CMAQ with BenMAP-CE).
- The panel had some concerns about the transparency and reproducibility of some of the underlying results in the evaluation report.
  - EPA/OAR acknowledges the need to provide more detailed results, especially at regional scales and acknowledges the difficulty panelists had in reproducing some of the results. Moving forward, we will strive to provide greater detail and clarity in future evaluations.



## Specific EPA/OAR comments on the SAB panel draft report

- The panel had some specific recommendations about future EPA/OAR reduced-form evaluation efforts (e.g., evaluate the sensitivity to alternative C-R functions, consider more scenarios).
  - EPA/OAR intends to incorporate the panel's recommendations in future efforts to evaluate RF approaches to estimating the benefits of air quality actions, as schedules and resources allow.
- Finally, EPA/OAR appreciates the panel's recommendation to provide a discussion on the usefulness of RF tools in different parts of the regulatory decision process.
  - Moving forward, if/when RF approaches are used, EPA/OAR will clarify why a specific tool has been chosen for the analysis given the type of regulatory questions being asked as well as any rule-specific time and resource constraints.