

U.S. Environmental Protection Agency

2020 GTAP Advisory Board Report

GTAP Model and Data Base Usage

The U.S. Environmental Protection Agency (EPA) uses models based on the GTAP data base for analyses of congressional legislation, economic and environmental projections, and other research. EPA offices that are currently using or have used GTAP-based models include the Office of Atmospheric Programs (OAP), the Office of Transportation and Air Quality (OTAQ), and the Office of Policy (OP).

Publications/Papers

1. Marten, A., Schreiber, A., and Wolverton, A. 2019. *SAGE Model Documentation (1.2.0)*. U.S. Environmental Protection Agency: <https://www.epa.gov/environmental-economics/cge-modeling-regulatory-analysis>.

Presentations

1. Ensieh Shojaeddinni (presenter), Ann Wolverton, Andrew Schreiber, and Alex Marten. "The Importance of Consumer Demand in Evaluating Economy-Wide Impacts of Environmental Regulation", 2020 AERE Meetings (virtual).

Special Reports

1. Update of non-CO2 greenhouse gas assessments

The US EPA (OAP) published an update to its non-CO2 greenhouse gas assessments in October. The report, *Global Non-CO2 Greenhouse Gas Emission Projections & Mitigation Potential: 2015-2050*, combines two long-running EPA report series, *Non-CO2 Greenhouse Gases: International Emissions and Projections* (USEPA, 2006, 2012) and *Global Mitigation of Non-CO2 Greenhouse Gases* (USEPA, 2005, 2013). The new report and underlying data may be found at <https://www.epa.gov/global-mitigation-non-co2-greenhouse-gases>.

This report provides a consistent and comprehensive set of historical and projected estimates of emissions, as well as technical and economic mitigation estimates of non-carbon dioxide (non-CO2) greenhouse gases (GHGs) from anthropogenic sources for 195 individual countries. The analysis provides information that can be used to understand national contributions of GHG emissions, historical progress on reductions, and mitigation opportunities. The projections are generated using a combination of country-reported inventory data supplemented with USEPA-estimated calculations consistent with IPCC inventory guidelines. The mitigation estimates are generated using a bottom-up, engineering cost approach, which analyzes the costs of a wide range of mitigation technologies and incorporates them into marginal abatement cost curves.

OAP is developing R scripts for estimating marginal abatement cost curve substitution elasticities, based on the Hyman et al. 2002 approach, that can be flexibly tailored to a model's regional and sectoral aggregation. The vision is to make the code publicly available to the modeling community.

Projects

1. Development of SAGE (SAGE is an Applied General Equilibrium model)

The National Center for Environmental Economics (within the Office of Policy) was tasked by the Science Advisory Board (SAB) with building the capacity for computable general equilibrium modeling at EPA. SAGE is a multi-regional dynamic CGE model of the US economy that relies on GTAP (v7) Armington elasticities for intra- and international trade (aggregated using information from GTAP v9). The model is currently configured to quantify the impacts of environmental regulation in the form of command and control style technology mandates and is under review by the SAB.

Modeling updates relevant to GTAP:

Large open economy assumption: The reference SAGE model is written assuming that the United States is a small open economy, or world price taker, without explicit treatment of other countries. For environmental regulations within the United States that impact trade exposed sectors, this assumption may not be appropriate. We are currently working on a version of the model that extends this base assumption to approximate the changes to US export prices and import prices following a policy shock. This work relies on both the GTAP data and model to estimate import supply and export demand price elasticities for each SAGE sector in the US economy. We are currently working on assessing when the small vs. large open economy assumption may be most appropriate.

2. Funding WiNDC (Wisconsin National Data Consortium)

The National Center for Environmental Economics and the Office of Atmospheric Programs jointly fund the development of sub-national data from WiNDC. WiNDC produces open source regionalized input output tables for the United States. Part of this effort has focused on linking this state level dataset with GTAP.

3. Development of ADAGE

OTAQ funds and works with RTI on the development of the ADAGE model. ADAGE is a CGE model that is built on the GTAP database. Developments this year have included updates and enhancements to the transportation sector of the model, such as modeling vehicle turnover and updating cost and fuel efficiency assumptions. Further information on the ADAGE model is available at: <https://www.rti.org/publication/applied-dynamic-analysis-global-economy-rti-adage-model-2013>.