

## **U.S. Environmental Protection Agency**

### 2016 GTAP Advisory Board Report

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).

#### ***Use of GTAP in EPA analyses of climate legislation:***

OAP uses the IGEM and ADAGE CGE models in the analysis of major climate legislation. While IGEM is a U.S. only model, ADAGE models are built on the GTAP data base and includes other countries/regions in addition to the U.S. EPA uses two versions of the ADAGE model: an intertemporal version and a recursive dynamic version that focuses on agriculture and biofuels (aka ADAGE-biofuels or ADAGE-ALU). ADAGE is developed and run by RTI International for the EPA. ADAGE has been updated and enhanced to include:

- Linkage to a wholesale electricity dispatch model for generation, capacity planning, fuel use, and emissions estimates
- Collaboration with the National Renewable Energy Laboratory (NREL) to improve the characterization of wind electricity possibilities
- Inclusion of new technology options for vehicles
- Representation of policies such as CAFE standards, RPS, and RFS
- Addition of ethanol to fuel mix

OAP has used ADAGE in a number of Energy Modeling Forum (EMF) exercises. Further information on the ADAGE model is available at:

<http://www.rti.org/publication/applied-dynamic-analysis-global-economy-rti-adage-model-2013-us-regional-module-final>

#### ***Development of the Phoenix model:***

Phoenix is a 26 region 26 sector global dynamic CGE model using GTAP 7 data. Phoenix replaced the Second Generation Model (SGM). Development of Phoenix is ongoing at Boston University, Pennsylvania State University, the Joint Global Change Research Institute, and OAP. The model includes both CO<sub>2</sub> and non-CO<sub>2</sub> GHG emissions. Other enhancements include border carbon adjustments and calibration of the electric power sector. Further information on the Phoenix model is available at:

<http://www.globalchange.umd.edu/models/phoenix/>

***Development of GDyn-E-BIO:***

OTAQ funded and worked with the GTAP Center and RTI on the development of the GTAP GDyn-E-BIO model. The model, with energy and biofuels detail, is linked to detailed global land use (e.g., AEZ) characterizations. The model was used to assist EPA in the lifecycle assessment of GHG emissions from biofuels.

Further information on the GDyn-E-BIO model is available at:

<http://www.rti.org/page.cfm?objectid=DDC06637-7973-4B0F-AC46B3C69E09ADA9>