

Summary Minutes of the
U.S. Environmental Protection Agency (EPA)
Second Generation Model (SGM) Advisory Panel
Public Meeting
February 4, 2005

Committee Members: Dr. Larry Goulder, SGM Advisory Panel Chair
Dr. Carol Dahl
Dr. Dallas Burtraw
Dr. Glenn Harrison
Dr. Michael Hanemann
Dr. James Opaluch
Dr. William Pizer
Dr. Adam Rose
Dr. Jim Shortle (participating by phone)
Dr. Ian Sue Wing

Date and Time: 8:30am – 3:30pm, February 4, 2005

Location: SAB Conference Center, 1025 F Street, NW
Washington, D.C. 20004

Purpose: The purpose of this meeting was to meet with developers of the Second Generation Model, ask questions about SGM and discuss issues and plans for writing an advisory.

SAB Staff: Dr. Holly Stallworth, Designated Federal Officer

Other EPA Staff:

Other:

Meeting Summary

The discussion followed the issues and general timing as presented in the meeting agenda (Attachment A).

FRIDAY, FEBRUARY 4, 2005

Opening of Public Meeting

After an opening statement by the DFO and a welcome from SAB Staff Office Director Vanessa Vu, Dina Kruger, Director of EPA's Climate Change Division welcomed and thanked the Panel. Ms. Kruger said the Climate Change Division is focal point of U.S. climate policy at EPA, and as such, sought the best tools available for climate policy analysis.

Dr. Jae Edmonds of Pacific Northwest National Laboratory gave an overview of the SGM with particular emphasis on the motivation for the model and the overarching model structure. Dr. Edmonds' and all other presentations from PNNL are captured in PowerPoint slides, appended here at Attachment B. The Panel discussed a number of things with Dr. Edmonds, including PNNL's collaboration with other regions, the representation of technical change in the SGM and the role of expectations in the model.

Dr. Ron Sands continued the PNNL presentation and described the hybrid input-output table. Discussion with Dr. Sands took place around prices, the potential for SGM to link to other models, the model's accounting for finite reserves, the numeraire used in SGM and the representation of trade.

Mr. Hugh Pitcher continued the PNNL presentation shown in Attachment B with an overview of the model's production functions, expectations and solution mechanism. The Panel's discussion with Mr. Pitcher took place around the model's treatment of expectations about future prices, the SGM's nested logic approach, and the treatment of economic profit and the possibility of multiple equilibria.

Dra. Antoinette Brenkert finished the PNNL presentation by describing PNNL's web pages on SGM. Dra. Brenkert pointed the panelists to a user's guide found on a website where the model could be downloaded and unzipped. Dra. Brenkert gave the panelists a number of details regarding use of the model's various files.

After lunch, the panelists continued their questions of the PNNL model developers. The model's solution mechanism was discussed as well as whether the model could handle truly forward looking expectations. The potential use of GTAP (Global Trade Analysis Project) data was also debated. In a return to the topic of international trade, PNNL explained that the model treats trade as a perfect substitute for the "everything else" good. One panelist spoke about how to fully endogenize bilateral trade. The model's problems with exchange rates and the absence of international capital flows were also discussed. One member said the model's treatment of trade and exchange rates limited its ability to capture what happens to reserves and production in response to different policy scenarios.

On the topic of production functions, elasticities of substitution were discussed and one member said the range of values for substitution could be treated as a standard error which could be incorporated into the model. The panelists asked how the model

developers chose between various production possibilities (putty-semiputty, putty-putty, etc.). The possibilities of turning on or off various production assumptions were discussed. The coding work and software required for going to nested CES (constant elasticity of substitution) production functions were considered. The software GAMS (Generic Algebraic Modeling Systems) was mentioned as a possibility for the model. One member spoke about the need for larger substitution elasticities in the long run. Another member mentioned the possibility of modeling the market for SO₂ emissions.

On the topic of SGM's 20 year vintages for capital, one panelist wondered whether the parameters for existing capital could evolve in the model. On the topics of expectations and solutions, one member asked about a more flexible specification in energy and whether GAMS could be useful. The pros and cons of using GTAP-E data were discussed at length. The SGM's use of highly aggregated but small numbers of sectors was mentioned as a liability of the model. The model's treatment of capital depreciation or appreciation was considered. One member asked about a shadow price and whether shadow prices reflected the mix of technology. The model's treatment of fuel/electricity prices was discussed extensively.

Some panelists raised the issue of including damage functions (from climate change) and their effects on infrastructure as well as agricultural productivity. This member said the agricultural sector was particularly sensitive to climate change impacts. Possible improvements in the modeling of land use, e.g. adjustment cost of going to irrigation or dryland agriculture, were also discussed. The influence of the public sector in modeling supply of land functions was emphasized by one panelist.

Some discussion ensued over the labor productivity parameters used in the model. On the topic of the model's solution mechanism, one member asked about whether SGM could implement a sequence of linear MCP (mixed complementarity problems) problems as a way of moving away from SGM's tatonnement routes. Further discussion ensued over the practicality of moving toward MCP, whether multiple equilibria could be detected, and whether truly forward-looking expectations would result in the same difficulties as adaptive expectations.

In a return to the topic of expectations, one member asked whether SGM developers were hesitant to use really forward looking expectations. On the topic of household behavior, the PNNL developers spoke about possible improvements to the model and discussion ensued over the prospect of capturing welfare/utility.

On the subject of emissions modeling, one member lamented the model's failure to capture the U.S. political reality of not having a carbon market. Another panelist spoke about the arbitrage problem that arises when you have endogenous mitigation sectors.

On the subject of data and parameters, panelists asked about the documentation for various parameters. The PNNL developers said this was a weak aspect of the model inasmuch as various staffers came and went and didn't write down where their numbers

came from. One panelist suggested using standard errors in a meta-analytic framework when capturing elasticities.

Discussion returned to how the SGM might incorporate demographic projections (incorporating the effect of age on energy consumption). Clarifications were offered for how the SGM treats prices.

Finally, the prospect of sensitivity analyses and using Monte Carlo techniques to address uncertainty was discussed.

The meeting closed with a discussion of next steps. The Chair asked members to begin writing evaluative comments and to send e-mail for any additional questions. Teleconferences were to be held until an Advisory is written and finalized.

Respectfully Submitted:

/Signed/ Holly Stallworth

Certified as True:

/Signed/ Larry Goulder

Chair