

Meeting Summary
U.S.-Mexico Economic and Environmental Modeling Workshop
Hotel Marriott, Mexico City, Mexico
11-12 July 2005

Organized by the
Mario Molina Center for Energy and the Environment
and the
Pacific Northwest National Laboratory
with support from the
U.S. Environmental Protection Agency

Introduction

The purpose of the U.S.-Mexico Workshop on Economic and Environmental Modeling was to assess and to build intellectual capacity in Mexico for assessing energy and environmental policy, and to exchange information that can help policy makers in both countries to address the challenges of climate change. The workshop was hosted by the Mario Molina Center for Energy and the Environment, which was co-organizer with the Pacific Northwest National Laboratory (PNNL). The U.S. Environmental Protection Agency (EPA) sponsored the event.¹

Nobel laureate Mario Molina opened the workshop by welcoming more than 30 Mexican and 9 U.S. economic, environmental, and energy experts. He welcomed the group by articulating the goal that we have to make models useful in order to make decisions. He shared a quote in Spanish from Luis Borges not unlike one by English writer and mathematician Lewis Carroll who wrote, “Nothing is quite so useless as a map on a one-to-one scale.” Mark Heil spoke for U.S. EPA by welcoming the group of experts, recognizing the high caliber of participants in attendance, and outlining his Agency’s goals for the workshop.

This summary is organized in two main parts, one offering details on each of technical presentations, the other providing a synopsis of a policy discussion transcribed from recordings.

Technical presentations can be viewed via hypertext links embedded in the workshop agenda below. The links include biographies, presentation abstracts, and graphics presentations for each presenter. The agenda and the presentations were organized by panels on “top down” (computable general equilibrium) and “bottom-up” (economic-engineering) models, the modeling of non-carbon dioxide greenhouse gases along with land use issues, and special model applications such as transportation issues.

¹ Carlos Mena Brito, director of the Centro Mario Molina, Ana Maria Gomez, and Emmanuel Gomez expertly facilitated the workshop. EPA was represented by Brian McLean (Director of Atmospheric Programs, Michael Shelby (Chief of the Economic Analysis Branch), Jane Leggett (Senior Advisor), and Mark Heil (Senior Economist).

A general conclusion of the U.S.-Mexico Workshop on Economic and Environmental Modeling was that Mexico possesses intellectual and even model capacity that is comparable to that of the international community, including Japan, Europe, and the United States. This view is supported by results of a survey of workshop participants.

However, concern was expressed that official support for Mexican modelers and model development is weak. This attitude found voice in a “policy discussion” session at the end of the workshop, in which a repeated concern is a perceived “lack of continuity” in support for economic and environmental modeling programs. This lack of support manifests itself not only in funding for outside experts, but in funding of government staffers and the ability of the government to review and to serve as a “client” (even non-pecuniary) for model results.

Part I

Agenda, with Biographies, Abstracts, and Graphic Presentations

(Note: Presentations are linked via hypertext embedded in this report.)

July 11th

8:30-9:00	Registration
9:00-9:20	Welcome. <i>Mario Molina, Centro Mario Molina</i>
9:20-9:30	Introduction. <i>Mark Heil, U.S. Environmental Protection Agency</i>

Session I – Issues and New Developments in Top-Down Modeling

Moderator: Carlos Mena, Centro Mario Molina

9:30-9:50	Macroeconomic Modeling: Co-Benefits Analysis. <i>Roy Boyd, University of Ohio</i>
9:50-10:10	To the Future: Environment, Energy, and the Economy in 21 st Century Mexico. <i>Maria Eugenia Ibararan, Universidad de las Americas</i>
10:10-10:30	Second Generation Model: A Global Economic-Environmental Framework. <i>Ron Sands, Pacific Northwest National Laboratory</i>
10:30-11:00	<i>Questions</i>
11:00-11:30	Break
11:30-11:50	Mexico in the Second Generation Energy-Economic-Climate Model. <i>Mariano Bauer, Instituto Mexicano del Petroleo</i>
11:50-12:10	MOEEMA: Investment Requirements to Reduce Emissions with Growth and Income Distribution 2005-2015. <i>German Alarco, Secretaria de Energía</i>
12:10-12:30	Economic Growth and Environmental Sustainability in MZMC. Is there an Environmental Curve? <i>Luis Miguel Galindo, Facultad de Economía-UNAM</i>
12:30-13:00	<i>Questions</i>
13:00-14:00	Lunch

Session II - Issues and Developments in Bottom-Up Modeling

Moderator: Juan Mata, Secretaria de Energia

14:00-14:30	Energy and Emissions Long Term Outlook: A Detailed Simulation of Energy Supply-Demand. <i>Juan Quintanilla, DEGSCA-UNAM</i>
14:30-14:50	SAGE: System for the Analysis of Global Energy Markets. <i>Barry Kapilow-Cohen, U.S. Energy Information Administration</i>

14:50-15:10	Transport Energy Demand and Environment: Used Vehicles Impact on the Incorporation of Cleaner and Renewable Energies Policies in Developing Countries. <i>Elizabeth Mar, Instituto Mexicano del Petroleo</i>
15:10-15:40	<i>Questions</i>
15:40-16:10	Break
16:10-16:30	Defining the Pollutants Base Line for the Insurgentes Avenue - Metrobus Project. <i>Adriana Lobo, Centro de Transporte Sustentable</i>
16:30-16:50	Nitrogen Oxide Emissions Growth in the Mexican Transport Sector. <i>Jorge Gasca, Instituto Mexicano del Petroleo</i>
16:50-17:10	Defining Environmental Strategies and Policies: Use of Optimization Models <i>Rodrigo Favela, Petroleos Mexicanos</i>
17:10-17:30	Externalities Evaluation Using the SIMPACTS Model. <i>Carlos Garcia Moreno, Secretaria de Medio Ambiente y Recursos Naturales</i>
17:30-18:00	<i>Questions</i>

July 12th

Session III – Modeling of Non-CO₂ Gases and Agriculture/Land Use Issues

Moderator: Israel Laguna, INE

9:00-9:20	“Non-CO ₂ ” Green House Gases in the 2 nd Generation Model: EMF21. <i>Michael Shelby, U.S. Environmental Protection Agency</i>
9:20-9:40	LBUL/EPA Forest Sector Climatic Cooperation Mitigation: Potential and Costs. <i>Jayant Sathaye, Lawrence Berkeley National Laboratory</i>
9:40-10:00	Social Aspects of Deforestation Process in Mexico. <i>Ben De Jong, El Colegio de la Frontera Sur</i>
10:00-10:20	Biogas Mexican Model. <i>Gustavo Rosiles, Secretaria de Desarrollo Social</i>
10:20-11:00	<i>Questions</i>

11:00-11:30 Break

Session IV – Modeling Applications

Moderator: Julia Martinez, INE

11:30-11:50	Climate Change Risk Assessment Framework. <i>Jane Leggett, U.S. Environmental Protection Agency</i>
11:50-12:10	Salamanca’s Refinery Quality Impact Air Modeling. <i>Gustavo Sosa, Instituto Mexicano del Petroleo</i>
12:10-12:30	Instituto Nacional de Ecología Co-Benefits Studies. <i>Miriam Zuk / Patricia Osnaya, Instituto Nacional de Ecología</i>
12:30-13:00	<i>Questions</i>
13:00-14:00	Lunch
14:00-14:20	Emission and Atmospheric Pollution Control: Numeric Modeling. <i>Francisco Hernandez, Secretaria del Medio Ambiente del D.F.</i>
14:20-14:40	Modeling of SO _x Dispersion From Oil Sector Activities in Sonda de Campeche. <i>Moises Magdaleno, Instituto Mexicano del Petroleo</i>
14:40-15:00	Energy-Environmental Scenarios to 2030. <i>Gerardo Bazan, Programa Universitario de Energia-UNAM.</i>
15:00-15:30	<i>Questions</i>

15:30-16:00 Break

Session V – Policy Implications
Moderator: Francisco Barnes, CRE

- 16:00-17:30** Mariano Bauer, *Instituto Mexicano del Petroleo*; William Chandler, *Pacific Northwest National Laboratory*; Adrian Fernandez, *Presidente, Instituto Nacional de Ecologia*; Jane Leggett, *U.S. Environmental Protection Agency*; Juan Mata, *Secretaria de Energia*; Brian McLean, *U.S. Environmental Protection Agency*; Carlos Mena, *Centro Mario Molina*
- 17:30-17:45** Closing Remarks Francisco Barnes, *Comision Reguladora de Energia*

Part II
Policy Implications, Summary of Comments

Moderator:

Francisco Barnés, *Comision Reguladora de Energia*

Panelists:

Mariano Bauer, *Mexican Institute of Petroleum*
William Chandler, *Pacific Northwest National Laboratory*
Adrián Fernandez, *National Institute of Ecology*
Jane Leggett, *U.S. Environmental Protection Agency*
Juan Mata, *Secretary of Energy*
Brian McLean, *U.S. Environmental Protection Agency*
Carlos Mena, *Centro Mario Molina*

Mariano Bauer noted the “great dispersion” and lack of coordination of Mexican modeling efforts, and especially a lack of continuity in model development and use. Governmental organizations cannot, in his view, serve as repositories of modeling efforts.

Bauer suggested that Mexico needs an institution that can guarantee continuity of modeling efforts. He proposed that IMP (the Mexican Petroleum Institute) could serve as that institution because it offers a platform for consistent modeling as it is required to do to support the power and environmental planning needs for the country.

William Chandler observed that economic and environmental models serve as good tools to educate policy makers of the decisions they must take, and that they are useful to understand trends and challenges and to evaluate the effectiveness and costs of the different policies. They serve to clarify alternatives and in the selection of strategies, but not as forecasting tools because they have serious limitations. Top-down models, for example, assume perfect competition and bottom-up models do not adequately take into account human behavior. Moreover, insufficient research is done to understand well human behavior with respect to the energy efficiency and the role of subsidies and economic distortions.

Chandler proposed that it is necessary to have multiple modeling capabilities in each major economy, and that participation of diverse interests and institutions is useful. The

Government could better serve as a “client” in supporting modeling efforts and in applying their results in decision making.

Adrián Fernandez commented that much remains to be done in the development and use of Mexican models, and that in some respects there has been regression. He noted that there exists no general practice of applying models for decision making, but the government uses simpler approaches that are less demanding of time and resources. Development of models is not of high priority for decision-makers, he observed. Institutions and experts need to do more to convince the policy-makers of the need to invest in the development of models, that their use is not a luxury. He suggested that several institutions pool their resources to support a permanent modeling group. The great challenge is to take the next step and to ensure that models really be used in decision making.

Jane Leggett said that the United States and Mexico both have very good foundations for modeling, and that models are better tools and better represent issues than a decade ago. It is important, she asserted, that models be designed to respond to the questions policy makers actually ask, and thus provide a practical approach to evaluate real policy options. Mexico should plan modeling work now to inform the next set of leaders about climate change when they come to office in 2006. Leggett proposed that this group within two years evaluate the continuity of model development and application that will unfold over that time.

Juan Mata suggested that there exists great diversity of models and modelers in Mexico, but there is insufficient effort to relate them one to another or to make them more effective tools for communication among regulators and policy makers. Models must be made more reliable tools for policy makers. If politicians cannot trust models, model results will remain academic publications and will not be used to make decisions. Mata noted that Mexico does not collect the data required to run many existing models effectively, and that foreign models take much time and resources to adapt to Mexican conditions. The policy maker has little time or patience for this, he said. Mata added that CFE, PEMEX, and SENER do not take into account environmental variables when they run their models, and that is a barrier that needs to be overcome. He proposed that it would be useful to unify criteria applied in modeling design and application.

Brian McLean stated that it is surprising and positive to find the great diversity of models that have appeared in Mexico. For policy makers, the most important aspect of modeling is to understand what will happen if they, the policy makers, take a decision, and what will happen if they do *not* make a decision. Policy makers must be able to place a high level of confidence in conclusions drawn from model results, and must be able to ascertain how much uncertainty remains. For the modeler, it is very important to: 1) capture the major relationships, and 2) select appropriate variables which identify the critical issues and which will provide results understandable in a straightforward way. Additionally, implementation mechanisms (such as market mechanisms) should be represented, and uncertainties should be incorporated.

McLean proposed that policy makers should develop patience for and be willing to listen to model practitioners, and be sufficiently open-minded to be able to change an opinion in the face of compelling evidence that such a change is warranted. A dialogue between policymakers and modelers would be helpful.

Carlos Mena noted that many of the decisions on Mexico's key policy issues – particularly fiscal and investment issues – will have environmental consequences, especially when those decisions involve the energy sector. He believes it is important to get environmental issues on the research and policy agenda and identified four questions that deserve more research in the near term: 1) income elasticities for Mexico; 2) cross price elasticities for Mexico; 3) better modeling of block pricing of electricity in Mexico; and 4) social impacts of energy policies by income groups.

Francisco Barnés summarized the policy discussion by concluding that economic-environmental models are indispensable tools for understanding the complex interplay between energy and the environment. In fact, he said, what is needed is not a single model, but a set of models capable of providing a coherent and consistent vision of the problems that we need to address. He proposed that to use models well it is necessary to understand clearly who is affected—and how—by various modeling outcomes. In other words, we need to know “who wins and who loses” as a result of certain policies. Then we could respond better to the collective public interest and help find viable solutions . We must close the breach between the politicians who make decisions and academics who develop the models, and in this way make our tools more useful.

Barnés proposed that Mexico needs institutions to bring the policy and academic communities closer and to provide continuity for modeling efforts. In the United States and Japan, he said, institutions exist which insulate models and modelers from political changes. What is needed in Mexico, he asserted, is the equivalent of an “Energy Information Administration.” He suggested that if INE (National Institute of Ecology) were made more independent, it could guarantee the continuity of modeling efforts and help close the gap between the academic world and that of decision makers.

In summary, Barnés added, what is needed in Mexico is more, and better, models, and better modeling specialists; better civil employees, ones capable of understanding model results; and an improved structure capable of supporting continuity of this work and able to help close a breach between the academic world and the world of decision making