

Bay Area Air Quality Management District
939 Ellis Street
San Francisco, California 94109

APPROVED MINUTES

Advisory Council Technical Committee
9:30 a.m., Wednesday, April 12, 2006

- 1. Call to Order – Roll Call.** Chairperson Bornstein called the meeting to order at 9:44 a.m. Present: Robert Bornstein, Ph.D., Chairperson, Sam Altshuler, P.E., Louise Bedsworth, Ph.D., William Hanna, John Holtzclaw, Ph.D. Absent: Stan Hayes.
- 2. Public Comment Period.** There were no public comments.
- 3. Approval of Minutes of Technical & Air Quality Planning Committee Meeting of February 7, 2006.** Dr. Holtzclaw moved approval of the minutes; seconded by Dr. Bedsworth; carried.
- 4. Climate Change Control Programs in California: An Overview.** Amy Luers, Climate Impact Scientist, Union of Concerned Scientists, presented “Global Warming in California: Choosing our Future,” stating that from 1880 global temperatures on the earth’s surface have risen from 0.2 C° to 0.6 C°. The effect of global warming since that time has increased sea levels by seven inches and significantly melt portions of large glaciers. Weather patterns are also becoming more extreme, with increased hurricane and tropical cyclone intensity, and heat waves such as the one in Europe in 2003 which killed 30,000 people. By 2040, European summer temperatures will more often be as warm as those of 2003.

The consensus in the scientific community is that the earth’s temperatures are increasing because of the deforestation of large segments of land and emissions from fossil fuel combustion for transportation and energy generation. While the rate of change in the global climate is unusual, it matches what is expected in climate models from increasing greenhouse gases (GHGs) and other human activities. Such warming is occurring despite natural solar and volcanic activities which would have contributed to cooling the earth’s surface.

Modeled responses to natural forcings differ from observed temperatures. That is, in the absence of human activities, little variation in temperatures would be expected. However, the contribution of GHGs and other emissions in contemporary models match well with observed temperatures. This type of match also extends to oceanic patterns of warming.

As temperatures increase, impacts will prove more severe and costly. The more severe impacts can be avoided by reducing greenhouse gases now. A compilation of various studies by scientific researchers and set forth in a White Paper entitled “Scenarios of Climate Change in California: An Overview” addresses the impacts of different global warming scenarios across several major sectors in California.

Three different warming emission projections were derived from the Intergovernmental Panel on Climate Change (IPCC) and address higher-, medium-high-, and lower emissions of CO₂. These scenarios are linked with growth pattern projections. Taking three GHG emissions projections in three different climate models to capture differences in sensitivity, the researchers attempted to ascertain how much the climate responds to changes in GHG scenarios. One challenge which arises in such studies is the emergence of a feed-back event in the system: climate changes themselves influence the reflectivity of the sun and oceanic temperatures, and these changes, in turn, have further impacts on the overall warming phenomena. The models account for these variations in different ways.

Results for today's presentation were selected from a parallel climate model for the lower sensitivity temperature change, along with two medium- and medium-high sensitivity models. The Union of Concerned Scientists has evaluated the emission scenarios in California for each of the scenarios. The worst-case projection was for an 11°F increase in the summer by the end of the century, with other scenarios projecting smaller temperature increases. As global climate models, which are large-scale, were used, a statistical downscaling was conducted in order to achieve a smaller-scale prediction for California.

As to the findings on the impacts on air quality and public health from global temperature increases, 90% of the California population does not live in areas that meet the state air quality standards, and it will become even more difficult to meet these standards. There is the potential for up to 9,000 additional deaths annually from air pollution and \$3.5 billion in economic impacts. Significant increases in ozone exceedances will occur in Southern California and the San Joaquin Valley.

In reply to Dr. Bornstein's question on the impact of the sea breeze on mitigating temperature increases and therefore ozone concentrations in coastal areas, Ms. Luers noted that in terms of downscaled and non-downscaled data, there is an inland gradient with a slight cooling on the coast, but even so, temperatures in Los Angeles nevertheless increased in the scenarios evaluated.

If temperatures increase according to the mid-range scenario, air pollution will still be further aggravated by a doubling in the number of major wildfires, exposing the population to large amounts of particulate matter over several days. The cost of responding to such disturbances in the ecosystem in the state will prove costly, on the order of hundreds of millions of dollars.

The analysis on water resource impacts of various temperature projection scenarios indicates that precipitation levels will not vary that much from current levels, but significant losses in the snow pack in the Sierras will occur. Between 2070 and 2099 only 30 % of the current snow pack will remain in the lowest temperature rising model and 10% in the highest range. This has negative implications for the state's water supply and for the ski industry. The Sierra snow pack provides approximately one-third of California's surface water storage.

Global warming also presents challenges for the state's agricultural industry, which is dependent on the availability of water for irrigation. Increases in ozone concentrations can adversely affect crop productivity, and also the spread of weeds and pests. Temperature increases will reduce the number of chill hours (below 45°F) that are necessary for fruit trees to set their fruits properly, resulting in either deformed or no fruit produced.

Sea levels will rise in each of the global warming scenarios studied, such that between 2000 and 2100, there will be an increased likelihood of flooding and coastal erosion. In the highest warming scenario, the rise is predicted to be up to 30 inches, and up to 10 inches in the lower temperature scenario. The models that have been used show a slower rate of destabilization of the arctic glaciers than what is actually occurring.

In the overall context of global warming, however, the hopeful news is that the more severe impacts can be avoided if GHGs emissions are sufficiently reduced:

- In the high temperature increase scenario, there is an anticipated 90% loss of the Sierra snow pack, a 20-30 inch increase in the sea level, and an 85% increase in days conducive to ozone formation.
- In the medium-high scenario, there is an projected loss of 70-80% in the Sierra snow pack, a 12-20 inches in sea level, and a 75-85% increase in the days conducive to ozone formation.
- In the lowest temperature increase scenario, there is an anticipated 30-60% loss of the Sierra snow pack, a 4-12 inch rise in the sea level, and a 25-30% increase in the days conducive to ozone formation.

Ms. Luers concluded her presentation by noting that, in order to avoid the worst-case scenarios by 2050, the industrialized world must follow California's lead and reduce emissions of GHGs 80% below 1990 levels.

Chairperson Bornstein invited Ms. Luers to give her lecture to his students at San Jose State University. He added that the University has atmospheric models that can conduct simulations on a one-kilometer basis for California meteorology. While these focus on urban areas and sea breezes, there is interest in conducting further downscaling. Dr. Holtzclaw urged that Ms. Luers also provide her presentation to the District's Governing Board.

In reply to questions, Ms. Luers noted that the model assumes that CO₂ emissions have a consistent mix. California is the 12th largest emitter of GHGs in the world, and has the power to influence policy in the United States, which contributes 25% of worldwide GHG emissions. Dr. Bornstein replied that both China and India will contribute increasing GHG emissions in the coming years, but seem unwilling to take the emission reduction measures identified as necessary by scientists, unless the western developed countries are prepared to pay for such measures. Ms. Luers noted that in 30-40 years, China and India will compete with the United States, but the latter will still be a major contributor of emissions, especially on a *per capita* basis. While emission trading might be a component of emission reduction strategies, the inequity of emissions impacts needs to figure into the overall evaluation.

Ms. Luers noted that while additional study of global warming *per se* is not needed, three key steps should be taken now: (a) more study to evaluate better the dynamics of the impacts that must be avoided, and also how on to adjust to them; (b) investment in efficiency programs and clean technologies; and (c) setting a cap on GHG emissions based on current science.

Chairperson Bornstein inquired if Ms. Luers had studied the effect of coastal flooding in the San Francisco Bay Area if the sea level were to rise. Ms. Luers responded that the Union of Concerned Scientists assessed the San Francisco Bay for the additive effect of a sea rise, storm intensity and variations in oceanic warming patterns. The graph that resulted was complex from a technical perspective. She noted that there are two websites that address this and that she would forward that information to the Chairperson.

- 5. Committee Member Comments/Other Business.** Dr. Holtzclaw called attention to a letter from Jack P. Broadbent, Executive Officer/APCO to each Council member, which announces that ethics training will take place for the Board of Directors, Advisory Council and Hearing Board members regarding AB 1234 on Thursday, May 11, 2006, from 9:30 a.m. – 11:30 a.m. in the District's Board Room.
- 6. Time and Place of Next Meeting.** 10:00 a.m., Wednesday, June 14, 2006, 939 Ellis Street, San Francisco, CA 94109.
- 7. Adjournment.** 11:05 a.m.

James N. Corazza

James N. Corazza
Deputy Clerk of the Boards