

Bay Area Air Quality Management District
939 Ellis Street
San Francisco, CA 94109
(415) 749-5000

APPROVED MINUTES

Advisory Council Regular Meeting
9:00 a.m., Tuesday, November 10, 2009

CALL TO ORDER

Opening Comment: Chairperson Brazil called the meeting to order at 9:00 a.m.

Roll Call: Chairperson Harold Brazil; Vice Chairperson Jeffrey Bramlett, Secretary Ken Blonski; and Council Members, Louise Bedsworth, Ph.D., Benjamin Bolles, Robert Bornstein, Ph.D., Emily Drennen, MPA, John Holtzclaw, Ph.D., Robert Huang, Ph.D., Karen Licavoli-Farnkopf, Kraig Kurucz, M.S., Rosanna Lerma, Jane Martin, Dr.Ph.H., Kendal Oku, Jonathan Ruel, Dorothy Vura-Weis, M.D., M.P.H.

Absent: Jennifer Bard, Stan Hayes, Kraig Kurucz, Sarah Martin-Anderson, M.P.P., Neal Osborne

Public Comment Period: There were no public comments.

Consent Calendar:

1. Approval of Minutes of the October 14, 2009 Advisory Council Meeting

Advisory Council Action: Member Holtzclaw made a motion to approve the minutes of October 14, 2009; Member Vura-Weis seconded the motion; unanimously carried without objection.

DISCUSSION

2. Discussion of draft report on the Advisory Council's October 14, 2009 Meeting on California's 2050 GHG Emission Reduction Target – Electricity Generation and Commercial & Residential Energy Sectors

Chair Brazil reported that Dr. Bornstein, Ben Bolles, himself, Stan Hayes and Rosanna Lerman worked on editing the draft report of the October 14, 2009 Advisory Council's meeting on California's 2050 GHG Emission Reduction Target – Electricity Generation and Commercial & Residential Energy Sectors. Input was also received from Council Members. Dr. Bornstein discussed the format chosen for the report and suggested discussing each area at a time.

Council Members and staff reviewed the draft report and arrived at consensus on revisions.

Advisory Council Action: Dr. Holtzclaw made a motion to approve the final draft report; Vice Chairperson Bramlett seconded the motion; carried unanimously without objection.

OTHER BUSINESS

3. Discussion, Recommendation and Selection of Slate of Officers for 2010

Interest in the Secretary role was expressed by Dr. Martin and Mr. Hayes.

Advisory Council Action: Dr. Holtzclaw made a motion to appoint Jeffrey Bramlett as Chairperson, Ken Blonski as Vice Chairperson and Stan Hayes as Secretary; Dr. Bornstein seconded the motion; carried unanimously without objection.

4. Recognition of Outgoing Advisory Council Members

Chairperson Brazil recognized outgoing Advisory Council Members Emily Drennen and Karen Licavoli-Farnkopf, and spoke of their background and service while on the Advisory Council. Both Members were presented with official momentos recognizing their service on the Advisory Council.

5. Chairperson's Report

Chairperson Brazil thanked the Advisory Council Members for their work over the past year, stated that the transition was successful and he believed the Advisory Council was moving in a good direction.

6. Committee Member Comments/Other Business

Deputy APCO, Jean Roggenkamp announced that the Air District is exploring the possibility of moving its headquarters to a new location or remaining at the current location and rehabilitating and retrofitting the building.

Secretary Ken Blonski stated that he was initially skeptical of the new process and format for the Advisory Council, but agreed that it has worked well. Ms. Roggenkamp noted that Advisory Council Members will have an opportunity to discuss and review what worked and what did not from the last year at the upcoming January Retreat.

Dr. Huang added that he also likes the new format, as it forces the Council to focus more on issues and it is more productive. Members were asked to think about topics they would like discussed at the January Retreat.

7. Time and Place of Next Meeting - 9:00 a.m. Wednesday, January 13, 2010, 939 Ellis Street, San Francisco, CA 94109.

8. Adjournment: The meeting adjourned at 11:32 p.m.

/s/ Lisa Harper
Lisa Harper
Clerk of the Boards

FINAL REPORT ON THE OCTOBER 14, 2009 ADVISORY COUNCIL MEETING ON CALIFORNIA'S 2050 GHG EMISSION REDUCTION TARGET - ELECTRICITY GENERATION AND COMMERCIAL & RESIDENTIAL ENERGY SECTORS

SUMMARY

The following presentations were made at the October 14, 2009 Advisory Council Meeting on California's 2050 GHG emission reduction target of 80% below 1990 levels: electricity generation and commercial & residential energy sectors:

1. ***GHG Emission Reduction Technologies for Electricity Generation and Demand Reduction*** by Hal LaFlash, Director of Renewable Energy Policy and Planning in the Energy Procurement organization at Pacific Gas and Electric Company. In June 2005, he represented PG&E on the World Environment Day panel "From Skyscrapers to Greenhouses: Leaders Take Action to Reduce CO₂." He also co-authored "Hedging Carbon Risk: Protecting Customers and Shareholders from the Financial Risk Associated with Carbon Dioxide Emissions," published by the Electricity Journal in July 2005.
2. ***GHG Control Measures for Commercial and Residential Sectors*** by Brian Gitt, Principal, Bevilacqua-Knight, Inc., is an entrepreneurial, results-oriented, industry leader with 10 years experience in energy efficiency and green buildings. He studied environmental studies at Prescott College in Prescott, Arizona and is widely published in a variety of housing journals and magazines, including Urban Land and Metropolitan Home. He currently works with governments and utilities throughout California to develop community-scale building retrofit and solar programs.
3. ***Prioritizing GHG Mitigation Alternatives by Cost-Effectiveness*** by Nic Lutsey, who joined the STEPS research team in the summer of 2008 after completing his Ph.D. in Transportation Technology and Policy in the ITS program at UC Davis. His primary research interest is the cost-effectiveness of emerging technologies to achieve environmental goals. For his dissertation, he created an analytical tool for evaluating technologies to reduce vehicle-related GHG emissions and to compare those strategies with options in other economic sectors.

DISCUSSION MEETING

The Advisory Council held a meeting on November 10, 2009 to discuss the presentations of October 14, 2009, 2009 and a draft of this report. Minutes of the November 10th discussion meeting are attached.

KEY POINTS

Based upon speakers, members of the public, and Advisory Council discussion, below is a summary of key points made by the three speakers.

1. **Electrification of a variety of commercial and residential energy loads is necessary to achieve California's GHG targets.** Electricity generation represents 20% of California GHG emissions, but more than half of this is from out of state generation. Many regulatory issues that slow down renewable development are not within the Air District's purview, e.g., environmental permitting, habitat, large spaces for solar, coordination of regulations, and transmission. Emerging renewables include:
 - Enhanced Geothermal Systems (EGS) fracture hot rocks and circulate water, but this may cause earthquakes and requires drilling depths beyond one mile.
 - Wave-power techniques include point absorbers, oscillating water columns, or overtopping devices.
 - Off-shore wind has a higher potential in California than on-shore sources, but floating designs are still too expensive for wide-spread use.
 - Biomethane from anaerobic digestion and thermo-chemical conversion into natural gas substitutes--has current challenges including possible adverse effects on ozone levels, waste management, and water quality.
 - Solar photovoltaic (PV) technology, in which the biggest advances will occur between now and 2050, now uses silicon based solar cells, but will move into the less expensive (but less efficient) thin film technology before moving to inexpensive and highly efficient third generation technologies, such as multi-junction nano materials and Multi-Exciton Generation (MEG).
2. **Building Integrated Photovoltaics (BIPVs) are required to meet California's goals of net-zero energy homes by 2020 and net-zero energy businesses by 2030.** Inexpensive building integration techniques include: (a) PV built into façades and/or roofs via solar roof tiles, membranes, or peel and stick techniques and (b) see-and light-thru solar glazing, roofs, solar curtain walls, spandrel glass, and vision glass that integrates PV into shading glass. Control of building demand-response also includes smart air condition and other appliances that can be turned off during periods of peak electricity demand via switches or pagers.
3. **A common need for all the above is to overcome the funding gap in the new technology development-cycle.** R&D is funded mainly by government, and once new products are commercialized and sold, they are funded by standard financing markets. The challenge is getting from R&D to the commercial phase, and a financing program and market structure can be the best way to make this happen. The right incentives and market structure will help determine which new technologies will succeed.
4. **Buildings are the most cost effective path to achieve GHG emission targets.** Buildings are the second largest GHG source (with transportation leading at 38%) at 23% of the total; residential emissions are double that of commercial buildings. Thirteen million California homes must achieve an average 40% energy reduction by 2020 at a cost of \$15,000 to

\$20,000 each, beyond the means of many homeowners without economic incentives. With new construction forecasted at 1% a year, two-thirds of all 2050 buildings already exist, making standards for retrofits as important as new construction.

5. **Required building transformations for GHG reductions require sequential alignment of government policy, business capacity, and consumer demand.** Voluntary policy tools include rebates and incentives, education and outreach, technical assistance, easy and cheap permits, and emerging technologies. Phased-in mandatory tools include codes and standards, green remodeling requirements, mandatory Home Energy Rating System (HERS) audits, time of sale requirements, mandatory retrofits by date certain, and carbon energy surcharges. Voluntary market based approaches engage the private sector to create jobs and bolster local economies. Business capacity and workforce development ensures consistent standards, contractor qualifications, training, testing, certification, field mentoring, and quality assurance. Regional programs achieve economies of scale and centralized information, while increased consumer demand requires reduced cost barriers, bundled incentives, and bulk purchasing to reduce costs.
6. **Challenges exist and must be overcome to achieve building GHG targets.** Market transformations require sequential alignment of government policy, business capacity, and consumer demand. These will require:
 - building-specific retrofitting, including demographics, lifestyle, culture, and behavioral aspects,
 - plans on how to: drive participation; create reasonable standards; foster regional consistency, and accountability,
 - voluntary policy tools include: rebates and incentives, technical assistance, and easy and cheap permits,
 - government needs to supply: resources, marketing tools, technology advancements, and Leadership in Energy and Environmental Design (LEED) building certification referrals,
 - mandatory tools must be phased in, and include: codes and standards, green remodeling requirements, mandatory HERS audits, time of sale requirements, mandatory retrofits by date certain, and carbon energy surcharges,
 - market-based approaches to: create jobs and bolster local economies,
 - workforce development to ensure: consistent standards, contractor qualifications, training, testing, certification, field mentoring, and quality assurance,
 - consumer cost-barriers must be lowered and incentives bundled, while bulk purchasing, education, outreach, and technical assistance must be provided, and
 - regional programs to achieve economies of scale and centralized information.
7. **The Air District could coordinate with other entities to achieve consistent GHG reduction programs and to leverage collective funding.** The Air District could support state legislation, e.g., the CEC's AB 758 with its regulatory authority over existing buildings and the CPUC changing cost effectiveness rules to achieve deeper energy reductions. The Air District could also help bolster region-wide campaigns for consumer education and outreach (including consumer handbooks), demonstration projects, test pilot programs, and technology evaluation. Air District funding not targeted at energy efficiency retrofits or specific

programs could be used to fund basic planning efforts, such as General Plans, building and zoning codes, and aid low and moderate income persons and renters to participate in GHG emission programs.

8. **A new bottom-up analytical tool can estimate mitigation cost-curves for ranking emissions reduction strategies by cost effectiveness.** The model was applied within individual and across a variety of sectors. Results indicate that only a combination of technologies will produce the required 2020-2035 GHG reductions, including:
 - auto CO₂ reductions of 25% at a cost of \$1,000 per vehicle,
 - hybrid electric vehicles now cost an additional \$3,000, but that will decrease,
 - heavy duty trucks with efficient technologies for engines, transmissions, and tires can pay back costs over the vehicle's lifetime,
 - building efficiency can include increased usage of efficient Energy Star appliances, HVAC, lighting, distributed power, windows, and insulation,
 - power generation reductions involves shifting from coal to: natural gas, nuclear, geothermal, wind, cleaner coal, biomass (including from agricultural waste), solar, and/or and natural-gas carbon capture and sequestration (CCS),
 - more advanced technologies, such as solar panels and beyond hybrid vehicles, will cost above \$50 per ton, and
 - to achieve 2050 GHG goals, entirely new (and costlier) technologies are needed, e.g., fuel cell vehicles, larger scale solar panels, wind turbines, smart grids, EV fast-charging, hydrogen stations, planning efforts for land use, changes from truck to rail transit, pricing, smart growth, VMT reduction, building zoning, and co-benefits (e.g., cleaner water, public health, economic development, standard of living).

EMERGING ISSUES

1. **Mandates, legislative, and regulatory initiatives to help achieve building GHG emission goals.** These include AB 32, Scoping Plan, PUC strategic plan, local government reduction goals, Green Building Standards Code, AB811's Property Assessed Clean Energy (PACE), HERS II home energy rating system, AB 758 that gives the CPUC regulatory authority over existing buildings and homes, and SB 375 that addresses transportation, but has implications for buildings, as it promotes mixed use neighborhoods, high-density shared-wall buildings, bike, public transit, and smaller homes, which provides reduced energy usage. Funding for these efforts will be unprecedented.
2. **Smart Grids.** These consist of intelligent sensing and control devices, data communication, and computing. They will manage: demand response, grid assets, grid level renewables, smart homes, real time supply and distribution, distributed storage, and plug-in vehicle integration.
3. **Carbon capture and sequestration.** Technology and capability development is needed. Success will require costs of no more than \$50 per ton, but capture and sequestration will only be part of GHG-reduction solutions.

4. **AB 920.** Net Metering and Solar Initiative Programs have only had a goal of meeting customer loads, but AB 920 now allows generation of excesses to be sold back to utilities. Pricing must be determined, and the current 2.5% net metering cap may be raised to 5%.
5. **Detailed weather, climate, and climate-change data.** Such data are currently used to forecast hydroelectric production and wind, and in building irrigation programs across California, but they could also be used with solar energy development and building energy efficiency programs.
6. **Electric vehicle charging.** Current pricing policy encourages nighttime charging, but neighborhood cluster-charging programs are being developed.
7. **Bottom-up analytical tools to estimate mitigation cost-curves for ranking emissions reduction strategies by cost effectiveness.** This model can be applied within one or across a variety of sectors.
8. **Increasing adoption of voluntary and government-mandated third party building and development standards to reduce environmental footprints.** Such programs include LEED and Build It Green. Requirements include optimization of air quality and energy benefits.

RECOMMENDATIONS

The following Advisory Council recommendations to the Board are based on the above presentations and subsequent discussions among Advisory Council members.

1. Expand the scoring criteria in Air District's grant programs to encourage funding to government- and private-entities to promote promising new GHG emission reduction techniques.
2. Expand the Air District's economic analysis capabilities for its current and future efforts in the linked areas of air quality management, energy use, and climate change.
3. Work with government agencies to promote streamlined and centralized permitting of GHG, toxic, and criteria-pollution reduction projects.
4. Expand and coordinate with organizations on the Air District's education and outreach efforts to include effective personal, government, corporate, and media actions to improve indoor and outdoor air quality and to reduce criteria pollutant-, toxic-, and GHG-emissions in the areas, for example, of energy demand and home retrofits.
5. Continue to support local planning efforts to improve air quality and to reduce GHG emissions through technical assistance, funding, and legislation.

6. Convene annual Air District sponsored seminars and one-day symposia for the exchange of ideas on GHG emission reduction technologies between representatives from the Air District, businesses, regional universities, local government agencies, and community groups.
7. Expand the Air District's existing land use, meteorological, climate, climate change, building, emissions, and air quality data bases and forecasts into a regional archive and clearinghouse of quality data bases. Provide links on the Air District's web sites to other complementary data bases. These data provide newly available information on local spatial- and temporal-variations in weather, climate, and climate change patterns and trends across the Bay Area. This would be useful to architects, planners, engineers, and air quality modelers to address energy efficiency issues in the planning and building of structures and larger projects.
8. Increase inter-agency collaboration to identify and quantify co-benefits arising from efforts to reduce energy use. Co-benefits might include improved public health, water conservation, equity, and economic development. This information would allow the Air District and other agencies to prioritize actions that will achieve co-benefits across disciplines.