



**California Energy Commission
IEPR Lead Commissioner Workshop**

DOCKET

12-IEP-1D

DATE APR 12 2012

RECD. APR 13 2012

Evaluating and Capturing Benefits of Renewable Energy for California

April 12, 2012 – 9:00 a.m.

AGENDA

Introduction

Suzanne Korosec, IEPR Lead

Opening Comments

Commissioner Carla Peterman, Lead Commissioner
Chair Robert Weisenmiller

Workshop Goals

Katie Moore, Energy Commission staff

Panel 1: Assessing Public Benefits of Renewable Energy Generation

Moderator: Al Alvarado, Energy Commission staff

Panelists: Arne Olson, E3 Consulting
James Nelson, UC Berkeley
Warren Leon, Clean Energy States Alliance
Heather Sanders, California Independent System Operator
Shana Lazerow, Communities for a Better Environment
Ben Machol, US Environmental Protection Agency
Margaret Mann, National Renewable Energy Laboratory

Questions to consider

1. *Aside from those that are already sufficiently captured in current policies, what public benefits can various renewable technologies provide? Which benefit(s) is the most important driver for increased penetration of renewable energy?*
2. *To what extent do renewable energy resources reduce localized pollution impacts and provide public health benefits?*
 - a. *Are there particular locations or siting strategies to maximize public health benefits?*

3. *How should we determine the best renewable energy resources, development locations, or siting strategies to maximize the reliability benefits of renewable energy resources?*
4. *Under what circumstances will renewable resources displace and/or replace higher pollution generation (or generators with higher environmental impacts) in the short-term and for long-term resource planning studies (2020, 2030, 2050)?*
5. *What is the size and significance of the public benefits that have been identified by the panel? What's the value (e.g., estimated \$/MWh)?*
6. *What is the size and significance of renewable energy benefits for local government such as tax revenues, property taxes, sales tax, and land leases?*
7. *To what extent do methods and tools sufficiently assess the benefits of renewable energy? Are those methods and tools publicly available?*
8. *What drives the uncertainties in estimates of future benefits of renewable energy? How can these uncertainties be reduced?*
9. *How can the state maximize the value of renewable resources? For example, what can the state do to further improve forecasting and visibility of generation from systems connected to distribution lines?*

Panel 2: State and Local Policies and Programs to Capture Public Benefits of Renewable Energy

Moderator: Gary O'Neill, Energy Commission staff

Panelists: Steve Cliff, California Air Resources Board
 Jim Houson, California Department of Food and Agriculture
 Bill Snyder, CAL FIRE
 Heather Sanders, California Independent System Operator
 Tim Snellings, Butte County Dept. of Development Services
 Steve Weissman, UC Berkeley's Center for Law, Energy, & the Environment

Questions to consider

1. *How does your agency incorporate the benefits of renewable energy into its policy decisions?*
 - a. *Describe your agency's policies or programs that use benefit values of renewable energy.*
 - b. *What benefits are considered? Which ones are not and why?*
 - c. *How are the benefits quantified?*
 - d. *What assumptions are used?*
2. *What are the barriers to incorporating those factors that are not yet accounted for into policy decisions?*
 - a. *Are there data and information gaps that should be addressed? Where are these gaps?*

- b. *Is your agency's statutory authority sufficient to appropriately identify, quantify, and incorporate these benefits into its policy decisions?*
 - c. *Are there other priorities or policies that prevent your agency from incorporating these factors into decisions?*
 - d. *What regulatory barriers or revenue impacts do cities/counties face in siting new renewable energy projects in locations that best capture these benefits? What work is underway to address these issues?*
- 3. *What would be required to overcome the barriers identified in the answers to question 2 above?*
- 4. *To what extent does electricity procurement by utilities address the public benefits of renewable energy generation?*
- 5. *Are renewable resources that displace fossil fuel resources, distribution upgrades, or transmission upgrades being appropriately rewarded?*
- 6. *Are renewable technologies that minimize integration costs and contribute to a diverse energy portfolio being appropriately rewarded?*
- 7. *How can public policy better incentivize social benefits from renewable energy?*
- 8. *What non-energy programs can provide revenue streams to help capture social benefits from renewable energy for California (e.g., grants to improve forest health and reduce wildfire hazard, income generated from fertilizers and fiber resulting from anaerobic digestion, the sale of fly ash to cement manufacturers)?*

Lunch (approximately 12:30 - 1:30 p.m.)

Panel 3: Stakeholder Experience and New Ideas to Better Capture Benefits of Renewable Energy

Moderator: Kate Zocchetti, Energy Commission staff

Panelists: Aaron Johnson, Pacific Gas & Electric
 JC Thomas, San Diego Gas & Electric
 Tamara Rasberry, Sempra Energy Utilities
 Marc Ulrich, Southern California Edison
 Andrew McAllister, California Center for Sustainable Energy
 Randy Howard, Los Angeles Department of Water & Power
 Nicole Capretz, California Environmental Justice Alliance
 Steven Kelly, Independent Energy Producers Association
 Craig Lewis, Clean Coalition
 Lori Schell, UC Irvine/Empowered Energy
 Laura Wisland, Union of Concerned Scientists

Questions to consider

- 1. *How do current policies or programs capture benefit values of renewable energy?*
 - a. *What benefits are considered? Are these benefits evenly distributed across communities, including low income and environmental justice communities?*

- b. How are the benefits quantified?*
 - c. What assumptions are used?*
- 2. What are the barriers to expanding the inclusion of other benefits of renewable energy into policies and programs?*
 - a. Are there data and information gaps that should be addressed? Where are these gaps?*
 - b. Do state agencies have authority to appropriately identify, quantify, and incorporate these benefits into current programs?*
 - c. Are there other priorities or policies that prevent providing incentives to better capture benefits of renewable energy?*
- 3. What would be required to overcome the barriers identified in the answer to Question 2?*
- 4. What are the major uncertainties about benefits of renewable energy and how can we reduce these uncertainties?*
- 5. How is renewable energy valued for resource adequacy?*

Public Comments

Adjourn (approximately 5:00 p.m.)

Links for Discussion at the April 12, 2012 IEPR Workshop on Evaluating and Capturing Renewable Energy Benefits

Benefits

Abt Associates, Inc. October 2000, *The Particulate-Related Health Benefits of Reducing Power Plant Emissions*. <http://www.abtassociates.com/reports/particulate-related.pdf>

Ascent Environmental, Inc. June 2010, *California Environmental Quality Act, Functional Equivalent Document, Renewable Electricity Standard*, <http://www.arb.ca.gov/regact/2010/res2010/res10e.pdf>.

Bergmann, A., M. Hanley, and R. Wright. *Valuing the attributes of renewable energy investments*. Energy Policy, 2006. 34(9): p. 1004-1014

Borenstein, S. September 2011, *The Private and Public Economics of Renewable Electricity Generation*. Energy Institute at Haas. http://ei.haas.berkeley.edu/pdf/working_papers/WP221.pdf

California Solar Energy Industries Association. April 23, 2010, *Small-Scale Solar Photovoltaics in California: Incremental Value Not Captured in the 2009 Market Price Referent – Description of Methodology*. <http://calseia.org/wp-content/uploads/2010/05/pv-above-mpr-methodology-final-20100423.pdf>

California Solar Energy Industries Association. January 2009, *The Value Proposition of Solar Water Heating in California*. http://calseia.org/wp-content/uploads/2009/01/calseia-report_swh-value-proposition1.pdf

Center for Energy Efficiency and Renewable Technologies. May 2009, *Value Proposition of Large-Scale Solar Power Technologies in California*. <http://www.ceert.org/PDFs/reports/LSSPValueProposition-0509.pdf>

Chen, C., R. Wiser, and M. Bolinger. March 2007, *Weighing the Costs and Benefits of State Renewables Portfolio Standards: A Comparative Analysis of State-Level Policy Impact Projections*. LBNL-61580. <http://eetd.lbl.gov/ea/emp/reports/61580.pdf>

Eastern Research Group, Inc. (ERG) and Energy and Environmental Analysis, Inc., an ICF International Company. 2007, *Opportunities for and Benefits of Combined Heat and Power at Wastewater Treatment Facilities*. U.S. Environmental Protection Agency Combined Heat and Power Partnership. http://water.epa.gov/infrastructure/sustain/upload/2009_5_13_wwtf_opportunities.pdf

Energy+Environmental Economics (E3). March 2012, *Technical Potential for Local Distributed Photovoltaics in California*. <http://www.cpuc.ca.gov/NR/rdonlyres/8A822C08-A56C-4674-A5D2-099E48B41160/0/LDPVPotentialReportMarch2012.pdf>

European Environment Agency, Scientific Committee. September 15, 2011, *Opinion of the EEA Scientific Committee on Greenhouse Gas Accounting in Relation to Bioenergy*.
<http://www.eea.europa.eu/about-us/governance/scientific-committee/sc-opinions/opinions-on-scientific-issues/sc-opinion-on-greenhouse-gas/view>

Hall, J. V., V. Brajer, and F. W. Lurmann. November 2008, *The Benefits of Meeting Federal Clean Air Quality Standards in the South Coast and San Joaquin Valley Air Basins*.
http://business.fullerton.edu/centers/iees/reports/Benefits_of_Meeting_Clean_Air_Standards_11-13-08.pdf

Hall, J. V., V. Brajer, and F. W. Lurmann. March 2006, *The Health and Related Economic Benefits of Attaining Healthful Air in the San Joaquin Valley*.
<http://business.fullerton.edu/centers/iees/reports/SJVFinalReport.pdf>

Kammen, D. and M. Pacca. August 2004, *Assessing the Costs of Electricity*. Annual Review of Environmental Resources. <http://rael.berkeley.edu/sites/default/files/old-site-files/2004/KammenPaccaCostElec2004.pdf>

Leon, W. March 21, 2012, *Designing the Right RPS: A Guide to Selecting Goals and Program Options for a Renewable Portfolio Standard*.
<http://www.cleanenergystates.org/resource-library/resource/designing-the-right-rps-a-guide-to-selecting-goals-and-program-options-for-a-renewable-portfolio-standard>.

Machol, B. and Rizk, S. US EPA. (forthcoming 2012). *Economic Value of U.S. Fossil Fuel Electricity Health Impacts*.

Manomet Center for Conservation Sciences. *Massachusetts Biomass Sustainability and Carbon Policy Study: Report to the Commonwealth of Massachusetts Department of Energy Resources* (Walker, T., ed. 2010).
http://www.manomet.org/sites/manomet.org/files/Manomet_Biomass_Report_Full_LoRez.pdf.

McKechnie, J, et al. *Forest Bioenergy or Forest Carbon? Assessing Trade-Offs in Greenhouse Gas Mitigation with Wood-Based Fuels*, 45 ENVIRON. SCI. TECHNOL.789 (2011). <http://pubs.acs.org/doi/abs/10.1021/es1024004>.

Mills, A (forthcoming 2012). *Changes in the Economic Value of Variable Generation with Increasing Penetration Levels*. <http://eetd.lbl.gov/ea/emp/re-pubs.html>.

Morris, G. November 1999, *The Value of the Benefits of U.S. Biomass Power*, NREL Report No. NREL/SR-570-2754. http://www.osti.gov/bridge/product.biblio.jsp?osti_id=753813

Morris, G. November 1999, *Biomass Energy Production in California: The Case for a Biomass Policy Initiative*, NREL Report No. NREL/SR-570-28805.
http://www.osti.gov/bridge/product.biblio.jsp?osti_id=772427

National Fuel Cell Research Center, University of California-Irvine. May 2008, *PEM Fuel Cells: Value in California, Background and Methodology*.
http://www.nfcr.c.uci.edu/2/FUEL_CELL_INFORMATION/MonetaryValueOfFuelCells/PEMFuelCellValue_May2008.pdf

National Fuel Cell Research Center, University of California-Irvine. July 24, 2011, *Build-Up of Distributed Fuel Cell Value in California: 2011 Update, Background and Methodology*.
http://www.nfcr.c.uci.edu/2/FUEL_CELL_INFORMATION/MonetaryValueOfFuelCells/Fuel_Cell_Value-Methodology_2011_FINAL_072411_Large-Units_Final.pdf

Nelson, J, et al. February 2012, *Energy Policy* 43: p. 436-447. *High-resolution modeling of the western North American power system demonstrates low-cost and low-carbon futures*.
<http://rael.berkeley.edu/sites/default/files/nelsonetal2012.pdf>

NREL. *Life Cycle Assessment Harmonization Project*, Sustainability Analysis Group.
http://www.nrel.gov/analysis/sustain_lca.html

Rothleder, M. July 1, 2011, *Track I Direct Testimony of Mark Rothleder on behalf of the California Independent System Operator in CPUC Rulemaking proceeding R.10-05-006*. CA ISO. http://www.cpuc.ca.gov/NR/rdonlyres/1DE789A2-29EB-4E95-9284-9E680C0113E6/0/CAISOTestimony70111_FINAL.pdf.

Schmalensee, R. December 2011, *Evaluating Policies to Increase Electricity Generation from Renewable Energy*, R. Review of Environmental Economics and Policy.
<http://reep.oxfordjournals.org/content/6/1/45.short>.

Swezey, B. G., K. L. Porter, and J.S. Feher. 1994, *The Potential Impact of Externalities Considerations on the Market for Biomass Power Technologies*. National Renewable Energy Laboratory. DE-AC36-83CH10093. <http://www.nrel.gov/docs/legosti/old/5789.pdf>.

Tiangco, V., P. Sethi, and Z. Zhang. 2005, *Biomass Strategic Value Analysis Staff Paper*. California Energy Commission, PIER program. CEC-500-2005-109-SD.
<http://www.energy.ca.gov/2005publications/CEC-500-2005-109/CEC-500-2005-109-SD.PDF>.

US EPA. 2010, *Assessing the Multiple Benefits of Clean Energy: A Resource for States*.
<http://www.epa.gov/statelocalclimate/resources/benefits.html>

USFS Southwest Research Station. January 2010, *Biomass to Energy: Forest management for Wildfire Reduction, Energy Production and Other Benefits*. California Energy Commission, PIER program. CEC-500-2009-080,
<http://www.energy.ca.gov/2009publications/CEC-500-2009-080/index.html>

Wei, M. and D. Kammen. July 7, 2010, *Economic Benefits of a Comprehensive Feed-In Tariff: An Analysis of the REESA in California*.
http://www.clean-coalition.org/storage/resources/studies/economic-benefits-of-a-fit/economic_benefits_of_a_comprehensive_feed-in_tariff-july072010.pdf

Zanchi, G., et al. May 2010, *The Upfront Carbon Debt of Bioenergy*.
http://www.birdlife.org/eu/pdfs/Bioenergy_Joanneum_Research.pdf.

Programs and Policies

American Farmland Trust. December 2010, prepared for the California Department of Food and Agriculture and the State Board of Food and Agriculture. *California Agricultural Vision: Strategies for Sustainability*.
http://www.cdfa.ca.gov/agvision/docs/Ag_Vision_Final_Report_Dec_2010.pdf.

CAL FIRE. *Proposition 40 Fuels Management Program*.
http://www.fire.ca.gov/resource_mgt/resource_mgt_forestryassistance_prop40.php.

California Air Resources Board. *Cap-and-Trade Program*.
<http://www.arb.ca.gov/cc/capandtrade/capandtrade.htm>. *Final Regulation Order*:
<http://www.arb.ca.gov/regact/2010/capandtrade10/finalrevfro.pdf>.

California County Planning Directors Association. February 2012, *Solar Energy Facility Permit Streamlining Guide*. <http://www.ccpda.org/solar>

California County Planning Directors Association. February 2012, *Model Solar Energy Facility Permit Streamlining Ordinance*. <http://www.ccpda.org/solar>

California Environmental Justice Alliance. January 2012, *Solar for All*, http://caleja.org/wp-content/uploads/2012/01/SmallScaleRDGfitProposal_FINALv4.pdf.

CalEPA. *Permit Guidance For Anaerobic Digesters And Co-Digesters*.
<http://www.calepa.ca.gov/Digester/Documents/GuideDigester.pdf>

California ISO. October 11, 2011, *Renewable Integration Market Vision and Roadmap*
<http://www.caiso.com/Documents/RenewablesIntegrationMarket-ProductReviewPhase2Vision-Roadmap.pdf>.

California Public Utilities Commission. March 2011, *Order Instituting Rulemaking to Address Utility Cost and Revenue Issues Associated with Greenhouse Gas Emissions*. Assigned Commissioner and Administrative Law Judges' Joint Scoping Memo and Ruling.
<http://docs.cpuc.ca.gov/efile/RULC/142511.pdf>

California Public Utilities Commission. *Renewables Portfolio Standard Quarterly Report, 4th Quarter 2011. Cost Reporting in Compliance with SB 836*.
<http://www.cpuc.ca.gov/NR/rdonlyres/3B3FE98B-D833-428A-B606-47C9B64B7A89/0/Q4RPSReporttotheLegislatureFINAL3.pdf>

CalRecycle. *Compostable Materials: Anaerobic Digestion. Final Program EIR and guidance documents*. <http://www.calrecycle.ca.gov/SWFacilities/Compostables/AnaerobicDig/>

CalRecycle. *Recycling Market Development Zones Program*.
<http://www.calrecycle.ca.gov/RMDZ/>

Central Valley Water Board. *Waste Discharge Regulatory Program for Dairy Manure Digester and Co-Digester Facilities*.

http://www.waterboards.ca.gov/rwqcb5/water_issues/dairies/dairy_program_regs_requirements/index.shtml

Russell, J, and S. Weissman. February 27, 2012, *California's Transition to Local Renewable Energy: 12,000 Megawatts by 2020*. Public Draft. Center for Law, Energy & the Environment, UC Berkeley School of Law. <http://www.law.berkeley.edu/12901.htm>.

US EPA. *Landfill Methane Outreach Program*. <http://www.epa.gov/lmop/>

US EPA. *Renewable Energy Options for Water and Wastewater Utilities*
http://water.epa.gov/infrastructure/sustain/renew_energy.cfm

US EPA. *AgSTAR Program*. <http://epa.gov/agstar/>

USDA. May 2011, Farm Service Agency. *Biomass Crop Assistance Program (BCAP)*.
http://www.fsa.usda.gov/Internet/FSA_File/bcap_update_may2011.pdf.