State of California
AIR RESOURCES BOARD

Policy and Scenario Analysis for Managing and Mitigating California's F-Gas Emissions

RESEARCH PROPOSAL

Resolution 15-32

July 23, 2015

Agenda Item No.: 15-6-2

WHEREAS, the Air Resources Board (ARB or Board) has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code sections 39700 through 39705;

WHEREAS, a research proposal, number 2796-283, titled "Policy and Scenario Analysis for Managing and Mitigating California's F-Gas Emissions" has been submitted by the University of California, Berkeley, for a total amount not to exceed $318,382;

WHEREAS, the Research Division staff has reviewed Proposal Number 2796-283 and finds that in accordance with Health and Safety Code section 39701, research is needed to identify recommended policy options to achieve targeted 2030 and 2050 reductions of fluorinated gas (F-gas) emissions in California; and,

WHEREAS, in accordance with Health and Safety Code section 39705, the Research Screening Committee has reviewed and recommends funding the Research Proposal.

NOW, THEREFORE BE IT RESOLVED that the Air Resources Board, pursuant to the authority granted by Health and Safety Code section 39700 through 39705, hereby accepts the recommendations of the Research Screening Committee and staff and approves the Research Proposal.

BE IT FURTHER RESOLVED that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the Research Proposal as further described in Attachment A, in an amount not to exceed $318,382.

I hereby certify that the above is a true and correct copy of Resolution 15-32 as adopted by the Air Resources Board.

Tracy Jensen

Tracy Jensen, Clerk of the Board

ATTACHMENT A

"Policy and Scenario Analysis for Managing and Mitigating California's F-Gas Emissions"

Background

High global warming potential (high-GWP) gases contribute to global warming at levels hundreds to thousands of times greater than carbon dioxide. A majority of future high-GWP emissions in California will be comprised of fluorinated gases (F-gases), which are used primarily in refrigeration, air conditioning, insulation and pesticide applications (notably sulfuryl fluoride (SO_2F_2)). High-GWP gases are the fastest growing greenhouse gases (GHG) source in California because, in response to Montreal Protocol mandates, F-gases are replacing ozone-depleting substances. Even with ARB Scoping Plan regulations already in place, annual F-gas emissions in California are projected to increase by about 40-percent (from 18 to 25 $MMTCO_2e$) between 2012 and 2020, and more than double by 2050, to 43 $MMTCO_2e$. At this level, F-gases alone would represent 50 percent of the ARB 2050 goal of 86 $MMTCO_2e$ in 2050 and make it extremely difficult for the state to meet the 2050 goal. Thus, there is a high degree of urgency to develop programs that address the reduction and control of this GHG source.

Objective

This project recommends regulatory policy options needed to achieve targeted 2030 and 2050 reductions of F-gas emissions in California. The potential design of an F-gas fee program, including distribution of fee revenues, will be specified, and emission reduction strategies other than fees will also be examined and compared according to their feasibility, potential economic efficiency and distributional effects, and interaction with other emission control programs.

Methods

This project identifies, compares, and evaluates policy options for reducing F-gas emissions in the state from 2018 to 2050 and specifies a recommended regulatory design and two "next-best" alternative control programs. The work will comprise four primary tasks: information collection; f-gas fee program analysis; f-gas emission reduction policy analysis; and the final report and recommendations.

The study team will review the literature, consult with experts and collect data to assess key areas including: technical specifications of emerging and existing low-GWP systems and barriers to their adoption; the design and effectiveness of existing GHG and high-GWP regulatory policies and programs; and the size, cost, feasibility and potential economic impacts of F-gas emission reduction opportunities in California through 2050.

Potential designs for an F-gas fee program and other F-gas emission reduction policy options will be compared and evaluated across multiple criteria including: emission reductions; cost-effectiveness; administrative and technological feasibility;

enforceability, economic impacts and interaction with other (state, federal, international) regulatory programs.

Expected Results
The study team will specify the parameters of both the recommended F-gas fee program and the recommended policy or combination of policies needed to achieve targeted 2030 and 2050 F-gas emission reductions. A recommended regulatory design and two "next-best" alternative control programs will be identified.

Significance to the Board
Project results will inform the design of ARB's medium and long-term F-gas emission control programs, essential to meeting long-term GHG emission reduction goals.

Contractor:
University of California, Berkeley

Contract Period:
24 months

Principal Investigator (PI):
Daniel M. Kammen, Ph.D.

Contract Amount:
$318,382

Basis for Indirect Cost Rate:
The State and the UC system have agreed to a ten percent indirect cost rate.

Past Experience with this Principal Investigator
Daniel Kammen successfully completed two recent research projects for the ARB: "Measuring the climate impact of residential buildings: GreenPoint rated climate calculator version 2;" and "The CoolCalifornia.org Challenge: A Pilot Inter-City Household Carbon Footprint Reduction Competition."

Dr. Kammen is a coordinating lead author for the Intergovernmental Panel on Climate Change (IPCC) which won the Nobel Peace Prize in 2007, and serves on the National Technical Advisory Board of the U.S. EPA. He will be collaborating here with economist Dr. Maximilian Auffhammer, also an IPCC lead author, and engineer Dr. Max Wei.

Prior Research Division Funding to the University of California, Berkeley:

Year	2014	2013	2012
Funding	$ 0	$ 1,595,792	$ 1,320,000

BUDGET SUMMARY

University of California, Berkeley

Policy and Scenario Analysis for Managing and Mitigating California's F-Gas Emissions

DIRECT COSTS AND BENEFITS			
1.	Labor and Employee Fringe Benefits	$ 287,024	
2.	Subcontractors	$ 0	
3.	Equipment	$ 0	
4.	Travel and Subsistence	$ 832	
5.	Electronic Data Processing	$ 1500	
6.	Reproduction/Publication	$ 600	
7.	Mail and Phone	$ 400	
8.	Supplies	$ 600	
9.	Analyses	$ 0	
10.	Miscellaneous	$ 1,869	
	Total Direct Costs		$ 292,825
INDIRECT COSTS			
1.	Overhead	$ 25,557	
2.	General and Administrative Expenses	$ 0	
3.	Other Indirect Costs	$ 0	
4.	Fee or Profit	$ 0	
	Total Indirect Costs		$ 25,557
TOTAL PROJECT COSTS			**$ 318,382**