State of California
AIR RESOURCES BOARD

RESEARCH PROPOSAL

Resolution 12-16

March 22, 2012

Agenda Item No.: 12-2-1

WHEREAS, the Air Resources Board (ARB) 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 2738-273, entitled "Quantifying the Comprehensive Greenhouse Gas Co-Benefits of Green Buildings," has been submitted by the University of California, Berkeley;

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding:

> Proposal Number 2738-273 entitled "Quantifying the Comprehensive Greenhouse Gas Co-Benefits of Green Buildings," submitted by the University of California, Berkeley, for a total amount not to exceed $180,000.

NOW, THEREFORE, BE IT RESOLVED that the Air Resources Board, pursuant to the authority granted by Health and Safety Code section 39703, hereby accepts the recommendation of the Research Screening Committee and approves the following:

> Proposal Number 2738-273 entitled "Quantifying the Comprehensive Greenhouse Gas Co-Benefits of Green Buildings," submitted by the University of California, Berkeley, for a total amount not to exceed $180,000.

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 effort proposed herein, and as described in Attachment A, in an amount not to exceed $180,000.

I hereby certify that the above is a true and correct copy of Resolution 12-16, as adopted by the Air Resources Board.

Mary Alice Morency, Clerk of the Board

ATTACHMENT A

"Quantifying the Comprehensive Greenhouse Gas Co-Benefits of Green Buildings"

Background
Buildings represent the second largest source of California's greenhouse gas (GHG) emissions when evaluating energy usage alone. Commercial buildings generated 10.8 percent of statewide GHG emissions in 2008. As California moves towards better quantification of GHG emission reductions associated with green buildings, the Climate Change Scoping Plan states that further research is needed to fully account for the additional GHG co-benefits associated with related improvements in the water, waste, and transportation components of building projects.

Objective
The objective of this research is to develop a database of certified commercial green buildings in California to measure the comprehensive GHG reductions and co-benefits due to water savings, waste reduction, and minimized transportation impacts.

Methods
Researchers will collect information on certified commercial green buildings in California. They will gather data and compile methodologies to estimate standard building baseline values, predicted GHG emission reductions, and measured performance to quantify actual GHG reductions and co-benefits. The research team will populate the database and conduct analyses to calculate the GHG co-benefits of certified commercial green buildings. Lastly, the research team will identify opportunities to expand existing building energy use forecasts and surveys to permit a more accurate comparison between green buildings and standard buildings.

Expected Results
Expected results will provide a more accurate accounting of the non-energy GHG reductions and co-benefits associated with certified commercial green buildings. Findings will support achievement of ARB's Green Building Strategy and will also be useful to quantify additional GHG reductions beyond energy savings in commercial buildings to assist with meeting the goals of AB 32 and Executive Order #S-03-03.

Significance to the Board
The results of this study will fill a critical research gap to quantify additional non-energy GHG emission reductions and co-benefits of California green buildings. This work will assist the Board in meeting the 2020 and 2050 GHG emission reduction targets.

Contractor:
University of California, Berkeley

Contract Period:
18 months

Principal Investigators (PIs):
Edward A. Arens, Ph.D.
Louise A. Mozingo, M.L.A.

Contract Amount:
$180,000

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

Past Experience with the Principal Investigators:
Professor Edward Arens and Professor Louise Mozingo will both serve as co-Principal Investigators for this project. Professor Edward Arens is Director of both the Center for the Built Environment and the Center for Environmental Design Research. Professor Louise Mozingo, co-Principal Investigator, serves as the Director of the Center for Resource Efficient Communities. Both co-principal investigators and two of the three project team researchers are working on a related project to analyze residential energy use and GHG emission impacts as a function of land use planning factors. The research team also has experience collecting data on energy use and occupant experience and analyzing the data for trends on building design and performance for over 500 buildings in five continents.

Prior Research Division Funding to University of California, Berkeley:

Year	2011	2010	2009
Funding	$754,264	$801,587	$1,507,702

BUDGET SUMMARY

Contractor: University of California, Berkeley

"Quantifying the Comprehensive Greenhouse Gas Co-benefits of Green Buildings"

DIRECT COSTS AND BENEFITS			
1.	Labor and Employee Fringe Benefits	$ 146,380	
2.	Subcontractors	$ 0	
3.	Equipment	$ 0	
4.	Travel and Subsistence	$ 200	
5.	Electronic Data Processing	$ 0	
6.	Reproduction/Publication	$ 266	
7.	Mail and Phone	$ 0	
8.	Supplies	$ 1,807	
9.	Analyses	$ 0	
10.	Miscellaneous	$ 16,482	
	Total Direct Costs		$165,135
INDIRECT COSTS			
1.	Overhead	$ 14,865	
2.	General and Administrative Expenses	$ 0	
3.	Other Indirect Costs	$ 0	
4.	Fee or Profit	$ 0	
	Total Indirect Costs		$14,865
TOTAL PROJECT COSTS			**$180,000**