PROPOSED

State of California
CALIFORNIA AIR RESOURCES BOARD

ZERO-CARBON BUILDINGS IN CALIFORNIA: A FEASIBILITY STUDY

RESEARCH CONTRACT AUGMENTATION

Resolution 18-11

March 22, 2018

Agenda Item No.: 18-2-3

WHEREAS, the California Air Resources Board (CARB 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, the Research Division staff has reviewed Contract No. 16RD004, titled "Zero-Carbon Buildings in California: A Feasibility Study," and recommended a contract augmentation for approval to the University of California, Berkeley, for a total amount not to exceed $250,000;

WHEREAS, the Research Division finds that in accordance with Health and Safety Code section 39701, the results of this study will explore the technical feasibility of zero or near-zero carbon building for both residential and commercial buildings. It will assess the practicality and appropriate timeframe for a zero or near-zero carbon building State policy or program;

WHEREAS, the Research Division recommends a contract augmentation to address a critical research gap to determine which strategies are better implemented at the neighborhood scale rather than the building level to achieve zero net carbon community performance.

WHEREAS, the contractor will assess the technical feasibility, quantify the GHG emission reduction potential, and assess the basic cost of community scale strategies. The results of this study will be essential to identify cost effective GHG mitigation strategies to achieve California's 2050 climate target; and

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

NOW, THEREFORE BE IT RESOLVED, that CARB, 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 augmentation.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the Augmentation proposed herein, and as described in Attachment A, in an amount not to exceed $250,000.

Resolution 18-11

March 22, 2018

Identification of Attachments to Board Resolution 18-11

Attachment A: "Zero-Carbon Buildings in California: A Feasibility Study" Summary and Budget Summary

ATTACHMENT A

Zero-Carbon Buildings in California: A Feasibility Study

Background

California passed landmark legislation in 2006 (Assembly Bill 32) to reduce greenhouse gas (GHG) emissions to 1990 levels by 2020. Signed in 2016, Senate Bill 32 requires California to reduce GHG emissions 40 percent below 1990 levels by 2030. As a long term climate goal, California must reduce GHG emissions 80 percent below 1990 levels by 2050. The California Air Resources Board (CARB) funded a research study to explore the technical feasibility of developing a statewide policy for zero carbon buildings. The proposed zero net carbon community research study would expand the scope of the zero carbon building research project and leverage a $2.6 million Advanced Energy Community (AEC) project funded by the California Energy Commission in a disadvantaged community.

Objective

The objective of this research is to leverage a low-income zero net energy (ZNE) housing project in Richmond to create a benchmarking and GHG emissions reduction framework for zero net carbon (ZNC) communities. The proposed research will build upon the zero carbon building research underway and evaluate GHG emission reduction strategies that can be implemented at the community scale by municipalities.

Methods

This study will identify how zero net carbon communities are different from zero carbon buildings. The research team will compile a summary of the GHG emissions inventory for Richmond to benchmark baseline GHG emissions. They will assess the technical feasibility, quantify the GHG emission reduction potential, and assess the basic cost of a variety of strategies that can be implemented by municipal governments at the community scale. “Community-scale” strategies refer to those that are carried out in a collection of buildings, a block, a neighborhood, or the entire municipality. The research team will develop a zero net carbon community-scale framework for evaluating community-level GHG emission reduction strategies that may otherwise not be accounted for in a ZNE framework. The study will identify and recommend the policy and planning measures that Richmond should pursue to carry out the zero net carbon community framework, and also will develop guidance and recommendations for transferring the findings from Richmond to other municipal contexts throughout California.

Expected Results

This project will inform CARB decision makers about the practicality and appropriate timeframe for development of a zero carbon building State policy or program. It will address a critical research gap to determine which strategies are better implemented at the neighborhood scale rather than the building level to achieve zero net carbon community performance.

Significance to the Board
The results of this study will be essential to identify cost effective GHG mitigation strategies to achieve California's 2050 climate target.

Contractor:
University of California, Berkeley (UC Berkeley)

Contract Period:
24 months (48 months total)

Principal Investigator (PI):
Louise Mozingo, M.L.A.

Contract Amount:
$250,000

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:
The research will be led out of the Center for Resource Efficient Communities (CREC) at UC Berkeley, a center devoted to supporting the State of California's climate change and resource efficiency goals through interdisciplinary research, public communication and professional outreach. The CREC has previously completed two successful research contracts for CARB, and the same leadership (PI Louise Mozingo, and Lead Researcher Bill Eisenstein) will manage this project and coordinate the activities of the research team.

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

Year	2017	2016	2015
Funding	$ 0	$ 0	$ 1,048,956

B U D G E T S U M M A R Y

Contractor: University of California, Berkeley

Zero-Carbon Buildings in California: A Feasibility Study

		Original Budget	Augmented Budget
DIRECT COSTS AND BENEFITS			
1.	Labor and Employee Fringe Benefits	$ 198,411	$ 114,173
2.	Subcontractors*	$ 203,461	$ 119,538
3.	Equipment	$ 0	$ 0
4.	Travel and Subsistence	$ 300	$ 1,165
5.	Electronic Data Processing	$ 0	$ 0
6.	Reproduction/Publication	$ 1,737	$ 0
7.	Mail and Phone	$ 0	$ 0
8.	Supplies	$ 1,473	$ 991
9.	Analyses	$ 0	$ 0
10.	Miscellaneous	$ 0	$ 0
	Total Direct Costs	$ 405,382	$ 235,867
INDIRECT COSTS			
1.	Overhead	$ 25,192	$ 14,133
2.	General and Administrative Expenses	$ 0	$ 0
3.	Other Indirect Costs	$ 0	$ 0
4.	Fee or Profit	$ 0	$ 0
	Total Indirect Costs	$ 25,192	$ 14,133
TOTAL PROJECT COSTS		**$ 430,574**	**$ 250,000**

***Subcontractors Budgets:**

Fehr and Peers Associates	$ 168,461	$ 49,543
Resource Refocus	$ 35,000	$ 29,995
Energy Solutions	$ 0	$ 40,000[1]

[1] Budget indicates a fixed price for a total of 264 hours at $151.51/hour

ATTACHMENT 1

S U B C O N T R A C T O R S' B U D G E T S U M M A R Y

Subcontractor: Fehr and Peers Associates

Description of subcontractor's responsibility: Fehr and Peers Associates will be primarily responsible for the transportation related components of the project.

DIRECT COSTS AND BENEFITS		Original Budget	Augmented Budget
DIRECT COSTS AND BENEFITS			
1.	Labor and Employee Fringe Benefits	$ 126,085	$ 38,110
2.	Subcontractors	$ 0	$ 0
3.	Equipment	$ 0	$ 0
4.	Travel and Subsistence	$ 0	$ 0
5.	Electronic Data Processing	$ 3,500	$ 0
6.	Reproduction/Publication	$ 0	$ 0
7.	Mail and Phone	$ 0	$ 0
8.	Supplies	$ 0	$ 0
9.	Analyses	$ 0	$ 0
10.	Miscellaneous	$ 0	$ 0
	Total Direct Costs	$ 129,585	$ 38,110
INDIRECT COSTS			
1.	Overhead	$ 38,876	$ 11,433
2.	General and Administrative Expenses	$ 0	$ 0
3.	Other Indirect Costs	$ 0	$ 0
4.	Fee or Profit	$ 0	$ 0
	Total Indirect Costs	$ 38,876	$ 11,433
TOTAL PROJECT COSTS		**$ 168,461**	**$ 49,543**

ATTACHMENT 2

S U B C O N T R A C T O R S' B U D G E T S U M M A R Y

Subcontractor: Resource Refocus

Description of subcontractor's responsibility: Resource Refocus will evaluate energy storage and time-of-day energy usage strategies to mitigate GHG emissions.

DIRECT COSTS AND BENEFITS		**Original Budget**	**Augmented Budget**
DIRECT COSTS AND BENEFITS			
11.	Labor and Employee Fringe Benefits	$ 30,975	$ 26,820
12.	Subcontractors	$ 0	$ 0
13.	Equipment	$ 0	$ 0
14.	Travel and Subsistence	$ 928	$ 493
15.	Electronic Data Processing	$ 0	$ 0
16.	Reproduction/Publication	$ 0	$ 0
17.	Mail and Phone	$ 0	$ 0
18.	Supplies	$ 0	$ 0
19.	Analyses	$ 0	$ 0
20.	Miscellaneous	$ 0	$ 0
	Total Direct Costs	$ 31,903	$ 27,313
INDIRECT COSTS			
5.	Overhead	$ 3,097	$ 2,682
6.	General and Administrative Expenses	$ 0	$ 0
7.	Other Indirect Costs	$ 0	$ 0
8.	Fee or Profit	$ 0	$ 0
	Total Indirect Costs	$ 3,097	$ 2,682
TOTAL PROJECT COSTS		**$ 35,000**	**$ 29,995**