

# Final Initial Study and Mitigated Negative Declaration: SMUD Central Heating and Cooling Plant Microgrid Project

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State Clearing House # 2010082082



Sacramento Municipal Utility District  
P.O. Box 15830 MS B203  
Sacramento, CA 95852-1830

October 2010



# **Final Initial Study and Mitigated Negative Declaration: SMUD CENTRAL HEATING AND COOLING PLANT MICROGRID PROJECT**

## **Description of Project**

Install and operate three engine-generator sets powered by natural gas. The total electrical output is 300 kilowatts. Waste heat would be recovered for use in SMUD's Central Heating and Cooling Plant. An absorption chiller would be installed for using waste heat to produce building cooling during the summer. A small cooling tower would be used to reject unrecoverable waste heat, or all of the engine-generator heat when neither building heating nor cooling is needed. These components are each small enough to be delivered as a ready to set preconstructed modular unit. The existing natural gas supply for the Central Heating and Cooling Plant will supply the engine-generators. A large trailer mounted, zinc bromine flow battery, capable of supplying 500 kW for 6 hours will also be added to the system.

## **Draft Initial Study and Mitigated Negative Declaration Process**

The Draft Initial Study and Mitigated Negative Declaration was released on September 8<sup>th</sup>, 2010, for a thirty (30) day public and agency comment period ending at close of business on October 7<sup>th</sup>, 2010. The release was advertised in the Sacramento Bee on September 8<sup>th</sup>, in the Classified Marketplace on page E7 with a five column wide public notice advertisement. Mailed notices were sent to over 450 owners, per assessor's rolls, and tenants surrounding (to a 500 feet distance) the SMUD Headquarters/Corporation Yard Campus. Notices were hand delivered to nearby apartments along with two copies of the Draft IS/MND for the office. Copies of the document were mailed to nearby neighborhood associations as well as the McKinley and the Main Libraries. The notices gave the date, time and location of the September 16<sup>th</sup> public meeting and tentative November 3<sup>rd</sup> SMUD Board Committee and November 4<sup>th</sup> SMUD Board of Directors business meetings.

Previous to the September 16<sup>th</sup> public meeting, the apartment manager of the adjacent CSUS apartments (the closest residential sensitive receptors) called expressing concern about potential noise impacts and stated that he could not make the public meeting. A separate appointment was scheduled with him but cancelled subsequent to the public meeting. The apartment manager notified the apartment building lessee whom was the only public member at the meeting. The lessee also expressed concern over potential noise issues but appeared satisfied with the results of the noise analysis (noise from the project would not be detectable to the apartment residents). In addition, one written comment was received during the comment period from Separovich/Domich Real Estate Development, the representatives of the CSUS apartment building owners. Separovich/Domich acknowledged that SMUD had communicated with the building lessee that noise generated from the project would not be a problem, but wished "to reserve the right to contact SMUD for assistance should the Microgrid Project have any negative impact on our property". See attached communication logs and written comment on the following pages.

THEREFORE, NO CHANGES ARE NECESSARY TO THE DRAFT INITIAL STUDY AND MITIGATED NEGATIVE DECLARATION'S ANALYSIS OR CONCLUSIONS; IT IS APPENDED TO THIS FINAL WITHOUT CHANGES.

The SMUD Board of Director's approval process is scheduled for:

**SMUD's Integrated Resources and Customer Service Meeting**  
**November 3, 2010, 5:00 p.m.**  
**Headquarters Conference Center**

**SMUD Board of Directors Meeting**  
**November 4, 2010, 6:00 p.m.**  
**Auditorium**

Both public meetings will be held at  
SMUD Headquarters Building  
6201 S Street, Sacramento, CA 95817

Public comments may be made at either meeting.

## SMUD Communication Log

<b>Date:</b> September 16, 2010	<b>Method of contact:</b> Phone call and follow-up email
<b>Name:</b> Danny Hyche	<b>Representing Firm/ Agency:</b> Allen & O'Hara Education Services, Inc.

**Discussions:**

Mr. Hyche contacted Kim Crawford, SMUD environmental project manager, to express concern regarding the potential noise impacts to the apartment residents located at 6380 and 6400 Folsom Blvd.

**Action Items:**

Mrs. Crawford followed-up the phone discussion with an email clarifying the results of the noise assessment and the fact that the noise assessment found there would be no noise impact to the apartment residents. A follow-up meeting was also scheduled for September 28<sup>th</sup>, but was cancelled by Mr. Hyche.

## SMUD Communication Log

<b>Date:</b> September 16, 2010	<b>Method of contact:</b> Public meeting
<b>Name:</b> Jim Reinhart	<b>Representing Firm/ Agency:</b> University Enterprises Inc. (UEI)

### Discussions:

Mr. Reinhart attended the public meeting for the proposed project and expressed concern regarding the potential noise impacts to the apartment residents located at 6380 and 6400 Folsom Blvd. Mr. Reinhart also expressed concern that UEI did not receive the notice of intent (NOI) regarding the proposed project.

### Action Items:

During the public meeting the noise assessment results were discussed. Mr. Reinhart appeared to be satisfied with the results of the noise assessment (no impact to the apartment residents). Regarding the notice of intent, SMUD based its mailing list on the current assessor's parcel number (APN) map. Due to the fact that UEI is the building lessee and not listed on the APN map they did not receive a NOI. The property owner, individual residents and community management were provided copies of the NOI.



SEPAROVICH/DOMICH  
REAL ESTATE DEVELOPMENT

October 7, 2010

Ms. Kimberly Crawford  
SMUD  
Post Office Box 15830  
MS B203  
Sacramento, CA 95852-1830

**RE: Initial Study and Mitigated Negative Declaration  
SMUD Central Heating and Cooling Plant Microgrid Project**

Dear Ms. Crawford:

I represent the owners of 65<sup>th</sup> and Folsom, a California Limited Partnership who developed the project located at 6438 Folsom Boulevard, Sacramento, CA (Parcel 008-0010-012-0000).

It is our understanding that the proposed generators, chiller and cooling tower cell will be housed approximately 540' from our property. Noise is our concern. Our tenant, University Enterprises Inc., has leased the property for use as residential housing. While SMUD has conveyed to University Enterprises, Inc. that the decibel level will not be a problem, we wish to reserve the right to contact SMUD for assistance should the Microgrid Project have any negative impact on our property.

Please contact me should you have additional questions. Thank you for your consideration.

Sincerely,

**SEPAROVICH/DOMICH**

Sally Freedlander

C: Jim Reinhart  
R. Scott Rasmussen  
George Separovich

3321 Power Inn Road • Suite 100 • Sacramento, CA 95826-3889 • (916) 736-9000 • Fax (916) 736-6979

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Sacramento Municipal Utility District  
P.O. Box 15830 MS B203  
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August 2010



## TABLE OF CONTENTS

Description of Project .....	4
CONTEXT .....	5
Project Location and Adjacent Uses .....	6
Project Need and Siting Process .....	6
Schedule .....	7
Environmental Factors Potentially Affected.....	16
Determination .....	16
Evaluation of Environmental Impacts .....	17
I.    AESTHETICS.....	18
II.   AGRICULTURE AND FOESTRY RESOURCES.....	19
I.    AIR QUALITY.....	20
IV.   GREENHOUSE GAS EMISSIONS.....	28
V.    BIOLOGICAL RESOURCES.....	33
VI.   CULTURAL RESOURCES.....	34
VII.  GEOLOGY AND SOILS.....	35
VIII. HAZARDS AND HAZARDOUS MATERIALS.....	37
IX.   HYDROLOGY AND WATER QUALITY.....	40
X.    LAND USE AND PLANNING.....	42
XI.   MINERAL RESOURCES.....	43
XII.  NOISE.....	44
VIII. POPULATION AND HOUSING.....	48
XIV.  PUBLIC SERVICES.....	49
XV.   RECREATION.....	50
XVI.  TRANSPORTATION/TRAFFIC.....	51
XVII. UTILITIES AND SERVICE SYSTEMS.....	53
XVIII. MANDATORY FINDINGS OF SIGNIFICANCE.....	54
Preparers .....	56
References.....	56

## Figures

Figure 1 Project Vicinity Map.....	8
Figure 2 Project Area .....	9
Figure 3 Site Area Aerial Photo .....	10
Figure 4 Slab To Be Used For Engine-Generator Sets .....	11
Figure 5 Engine-Generator Set.....	12
Figure 6 Engine-Generator Set Housing .....	13
Figure 7 1000 Foot Radius Around Proposed Site.....	14

## Tables

Table 1 Distances: Engine-Generators to Receptors .....	15
Table 2 Substation Construction Emissions Estimate .....	23
Table 3 Potential To Emit.....	24

## Appendices

Appendix A – Mitigation and Monitoring Plan.....	58
Appendix B – Summary of Best Management Practices.....	60
Appendix C – Acronyms and Abbreviations .....	65
Appendix D Draft Authority to Construct .....	67
Appendix E – Greenhouse Gas Calculations .....	83
Appendix F – Noise Assessment .....	86

## Initial Study for Central Plant Microgrid Project

<b>Project title</b>	Central Plant Microgrid Project
<b>Lead agency name and address</b>	Sacramento Municipal Utility District 6201 “S” Street; MS B203 Sacramento, CA 95817
<b>Contact person</b>	Kimberly Crawford, Environmental Project Manager (916) 732-5063 <a href="mailto:kcrawfo@smud.org">kcrawfo@smud.org</a>
<b>Project location</b>	6180 Folsom Boulevard Sacramento, CA 95817
<b>Project sponsor’s name and address</b>	Sacramento Municipal Utility District 6201 “S” Street; MS B203 Sacramento, CA 95817
<b>General Plan</b> Employment Center, Low-rise	<b>Zoning</b> M-1: Light Industrial

### Description of Project

Install and operate three engine-generator sets powered by natural gas. The total electrical output is 300 kilowatts. Waste heat would be recovered for use in SMUD’s Central Heating and Cooling Plant. An absorption chiller would be installed for using waste heat to produce building cooling during the summer. A small cooling tower would used to reject unrecoverable waste heat, or all of the engine-generator heat when neither building heating nor cooling is needed. These components are each small enough to be delivered as a ready to set in place modular unit. The existing natural gas supply for the Central Heating and Cooling Plant will supply the engine-generators. A large trailer mounted, zinc bromine flow battery, capable of supplying 500 kW for 6 hours will also be added to the system.

Approximately 2-million btu/hr of heat output will be generated and used in SMUD’s existing Central Heating and Cooling Plant. Existing boilers, totaling 12 million btu/hour heat input, will run for slightly shorter periods due to the recovery of the engine-generator heat. The existing boilers produce only hot water and are not used for the generation of electricity. During the summer the absorption chiller will allow using less electrical powered cooling adding to overall efficiency of the system. Each engine is 454 cubic inch displacement; equivalent to largest full size pickup truck engines available.

The primary intent of the project is to test, monitor and potentially refine the electrical integration of micro-generation systems with the larger utility electrical supply systems and other small power sources such as photovoltaic or fuel cells. The ultimate desire is to enable reliable, high quality power at end users where electrical reliability and power quality stability is highly

important. The first 12 to 18 months of operation will be the most intensely monitored for those purposes; however it is expected that this facility might be operated for 10 or more years.

## CONTEXT

Electrical end users often are able to tolerate fluctuations in power quality and even occasional electrical outages without suffering physical or economic impact. However, a growing number of users find that diminished power quality or electrical outages can have significant impacts. The use of backup generators, conventional large battery packs, and power conditioning systems are expensive means to mitigate for risks.

The concept of “Microgrid” is evolving as another potential mitigation that overall might be more efficient. In a microgrid, the key electrical loads would be identified, appropriately sized on site electrical generation installed wherein waste heat would be harnessed and electrical control systems, via a “Smart Switch” would allow fast transfer from the electric grid to an in-house electrical island and return to normal operations later without adversely affecting the facility’s critical electrical loads.

The SMUD Microgrid Project, to a large degree, is meant to test and research the feasibility of such systems, particularly the electrical transfer systems. A portion of SMUD’s Headquarters Campus, including the Central Heating and Cooling Plant will be the test “critical systems”. The three engine-generator sets totaling 300 kW is the in-house electrical island’s electrical source. Waste heat will be recovered and used for heating and cooling purposes offsetting some of the load on existing natural gas fired boilers and electrically driven chillers. The existing boilers are not used for generating electricity; they actually produce hot water, not steam. A small cooling tower will be added adjacent to the plant’s existing cooling towers to allow rejecting unrecoverable waste heat, or all of the engine-generators’ waste heat if no heating or cooling is needed in buildings.

The large trailer mounted zinc bromine flow battery can both supplement the engine-generator sets in providing power when “islanding” a portion of the electrical load as well as supplement adjacent photovoltaic power by providing power into the evening as the photovoltaic power drops as the sun’s position lowers in the evening. In this battery zinc and bromide are used in lieu of lead and a dual electrolyte is used rather than hydrochloric acid, these electrolytes are still acidic. The electrolytes are pumped through the plates from electrolyte reservoirs. A temperature monitoring and cooling system maintains proper temperatures. The trailer includes secondary containment should a primary electrolyte path leak.

The microgrid engine-generator sets will have three-way catalyst for air emissions reduction. While the engine-generator waste heat will offset some of the loading on existing Central Plant boilers, there is no direct linkage between the controls of each system. Therefore while averaged over time the boilers would have a lowered usage rate, both the engine-generators and boilers could run simultaneously. The Sacramento Metropolitan Air Quality Management District (SMAQMD) has permitting authority for this project and has assessed it in relation to SMAQMD rules, existing emissions sources in the area and overall air quality. The SMAQMD final permit may set specific emissions limits, operational time limits and testing and monitoring requirements. Air emissions offsets will be required for nitrogen oxides. The SMAQMD assessment process does not allow credit for reduced emissions from lessened boiler use nor emissions offsets for displaced electrical generation thereby making the process extremely conservative. SMUD believes that adherence to SMAQMD limits would mitigate potential air

quality impacts to less than significant. The SMAQMD has issued a draft authority to construct, see Appendix D.

### **Project Location and Adjacent Uses**

The project will be located within SMUD's existing central heating and cooling plant. The plant is central to SMUD's headquarters campus wherein it can provide heated or cooled water to several buildings for the heating and cooling systems. Aside from light rail tracks running through the campus, passing adjacent to the proposed project location, the adjacent uses to the central heating and cooling plant include SMUD's East City Substation, Gas Operations Facility (the front section of the same building containing the Heating and Cooling Plant's Boiler Room), parking areas and the SMUD Headquarters Building. An underpass is adjacent to the project location connecting SMUD's S Street facilities with SMUD's Folsom Boulevard Facilities. Refer to Figures 1 through 4.

Nearby property uses are listed in Table 1; also see Figure 7.

### **Project Need and Siting Process**

Electrical end users often are able to tolerate fluctuations in power quality and even occasional electrical outages without suffering physical or economic impact. However, a growing number of users find that their processes require a high level of power quality or that electrical outages can have significant impacts. The use of backup generators, large conventional lead-acid battery packs, and power conditioning systems are expensive means to mitigate for risks. Even then, the momentary effect of backup power supply startup and power transfer may still create a problem.

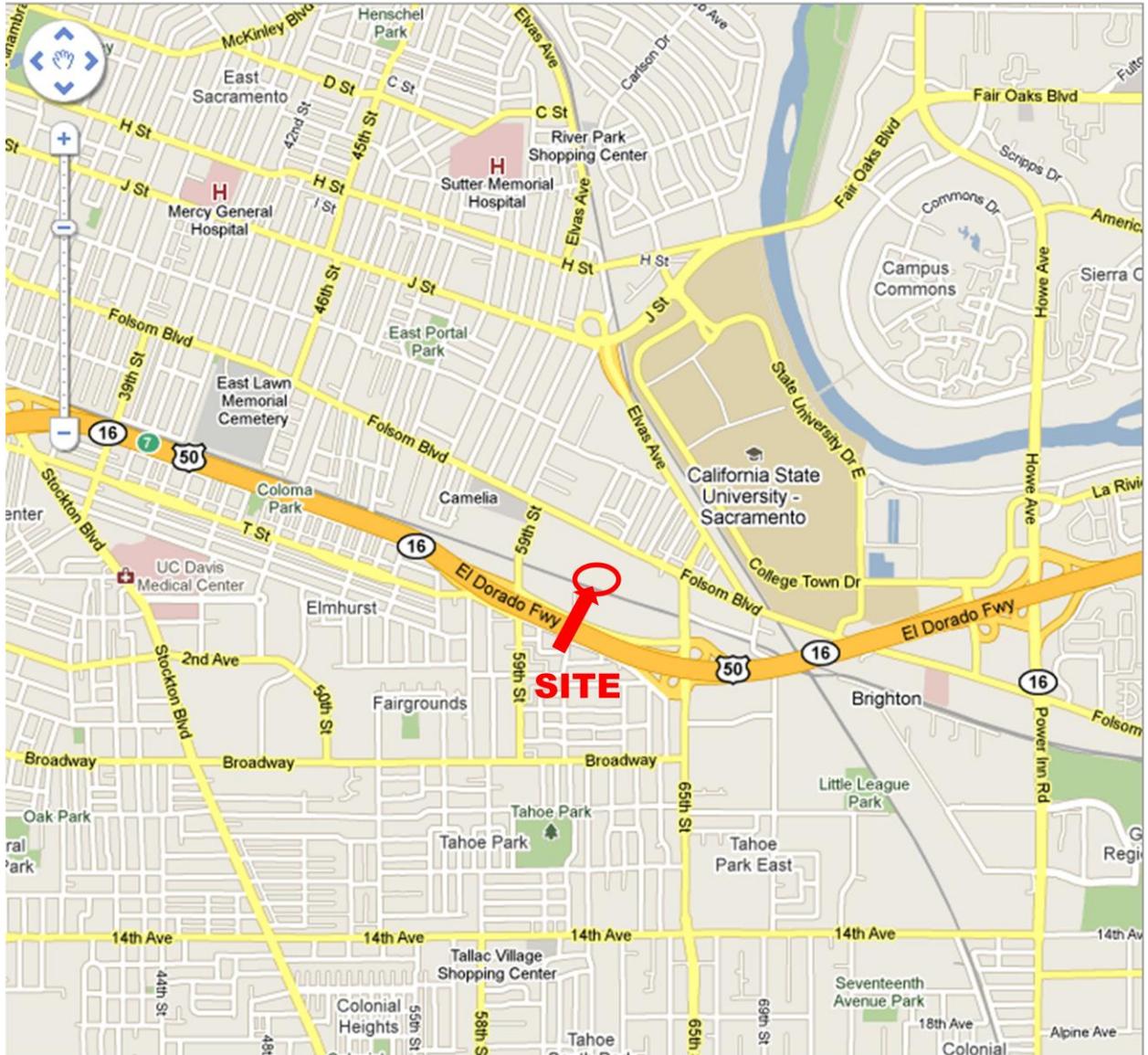
The concept of "Microgrid" is evolving as another potential mitigation that overall may be more energy efficient. In a microgrid, the key electrical loads would be identified, appropriately sized on site electrical generation installed wherein waste heat would be recovered and electrical control systems would allow fast, and smooth, transfer from the electric grid to an in-house electrical island and return to normal operations later without adversely affecting the facility's critical electrical loads.

The SMUD Microgrid Project, to a large degree, is meant to test and research the feasibility of such systems, particularly the electrical transfer systems in a quasi utility and customer type application. A portion of SMUD's Headquarters Campus, including the Central Heating and Cooling Plant will be the test "critical systems". The three engine-generator sets totaling 300 kW is the in-house electrical island's electrical source. Refer to Figures 5 and 6. Waste heat, approximately two-million btu/hour at full power, will be recovered and used for heating and cooling purposes offsetting some of the thermal load on the existing natural gas fired boilers. The existing Central Heating and Cooling Plant has two five-million btu/hour thermal input and two one-million btu/hour thermal input boilers. This project will be a field test of the concepts and equipment developed by the National Renewable Energy Laboratory, Lawrence Berkeley National Laboratory, U.S. Department of Energy, University of Wisconsin and others. Funding and technical is also being provided by the California Energy Commission.

Ultimately, the goal of SMUD, and others, is to meet the electrical service needs of customers in a safe, reliable, economic and environmentally responsible manner.

## **Schedule**

Current scheduling could allow startup by spring of 2011.



**Figure 1 Project Vicinity Map**

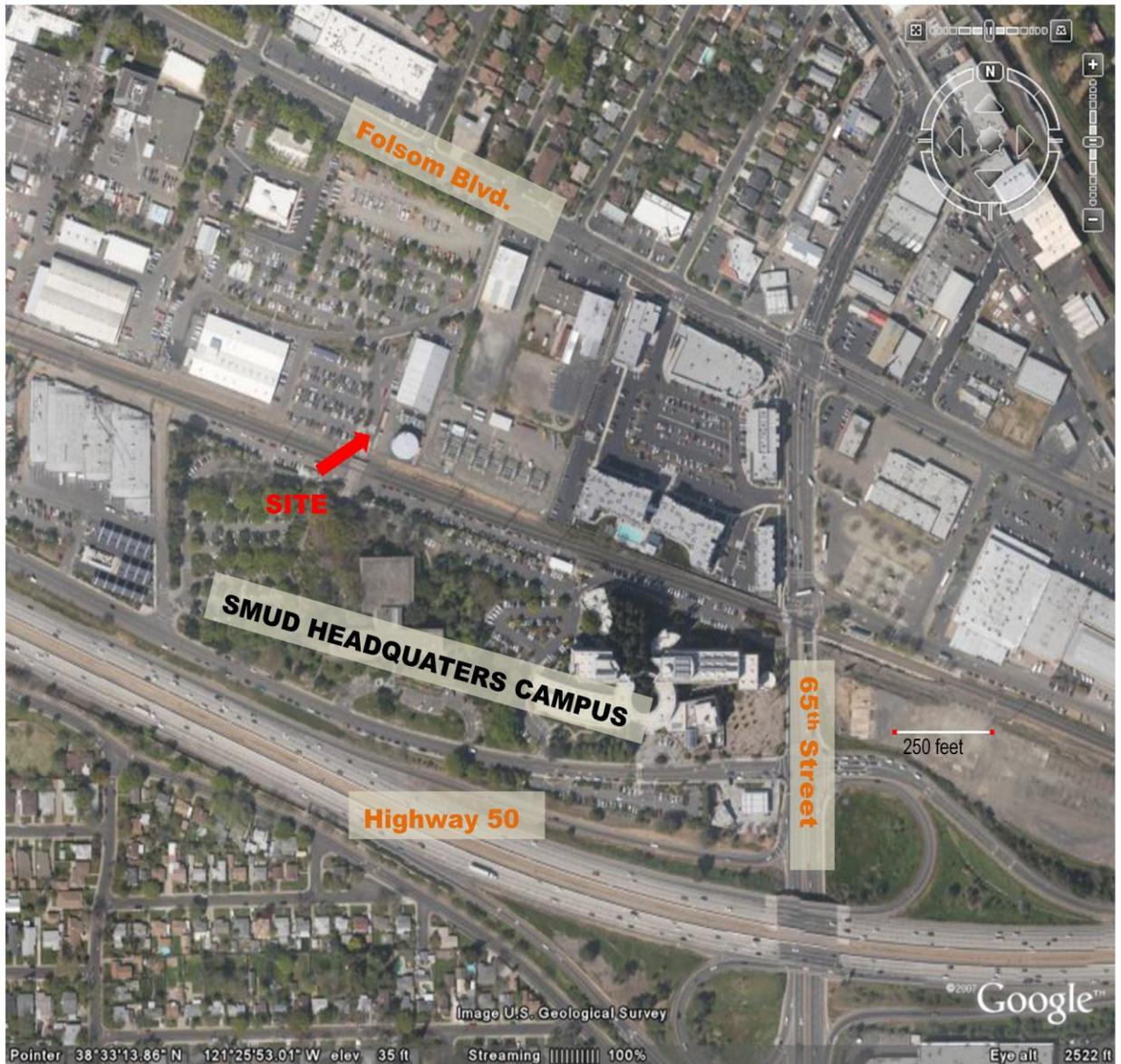
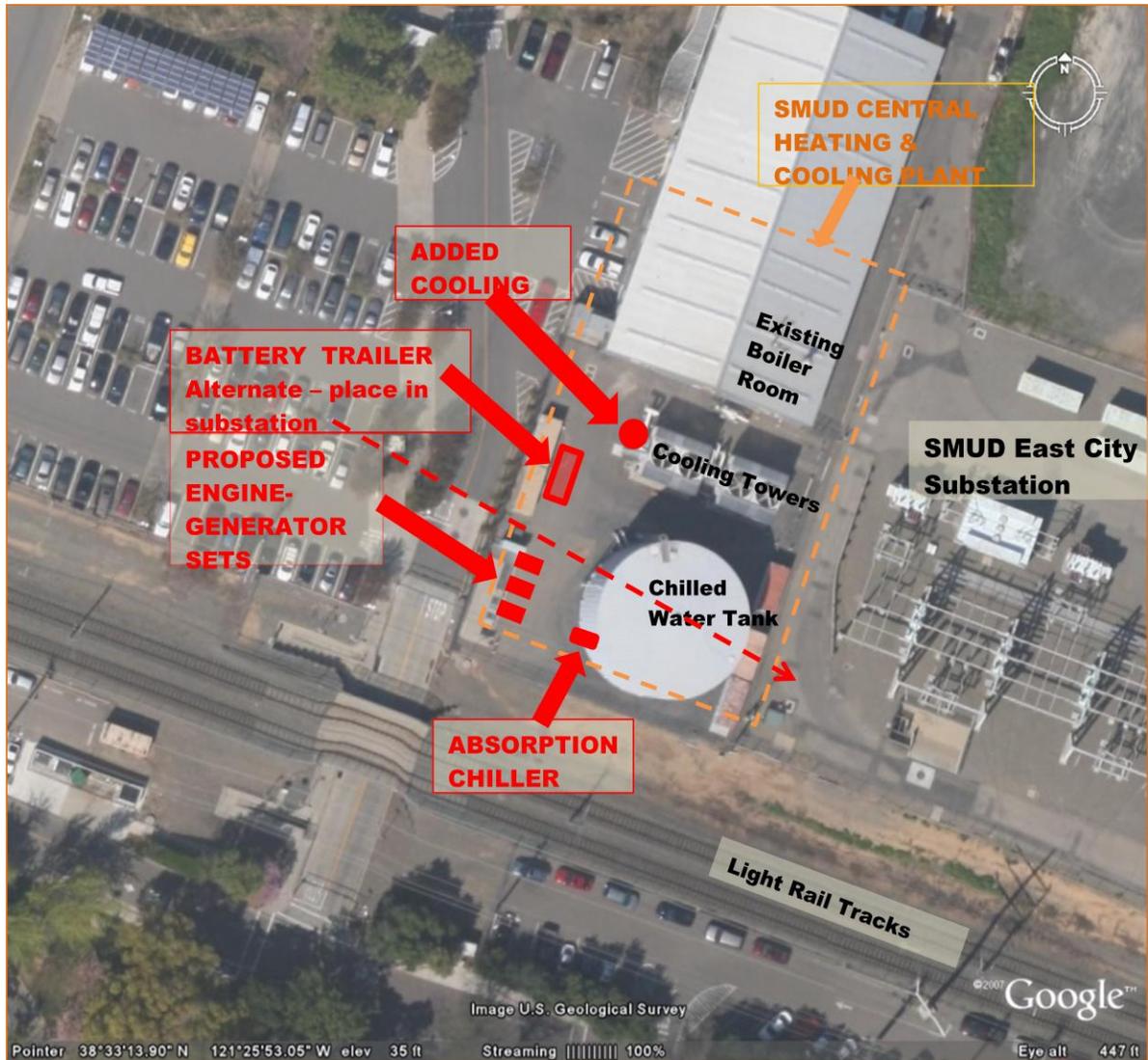


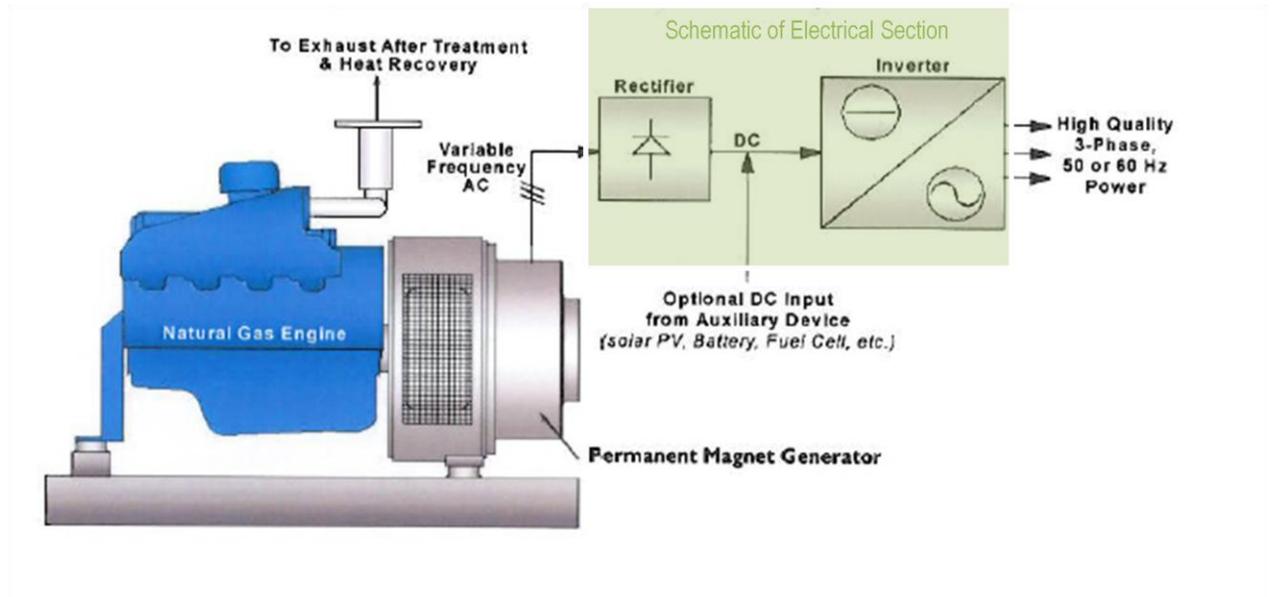
Figure 2 Project Area



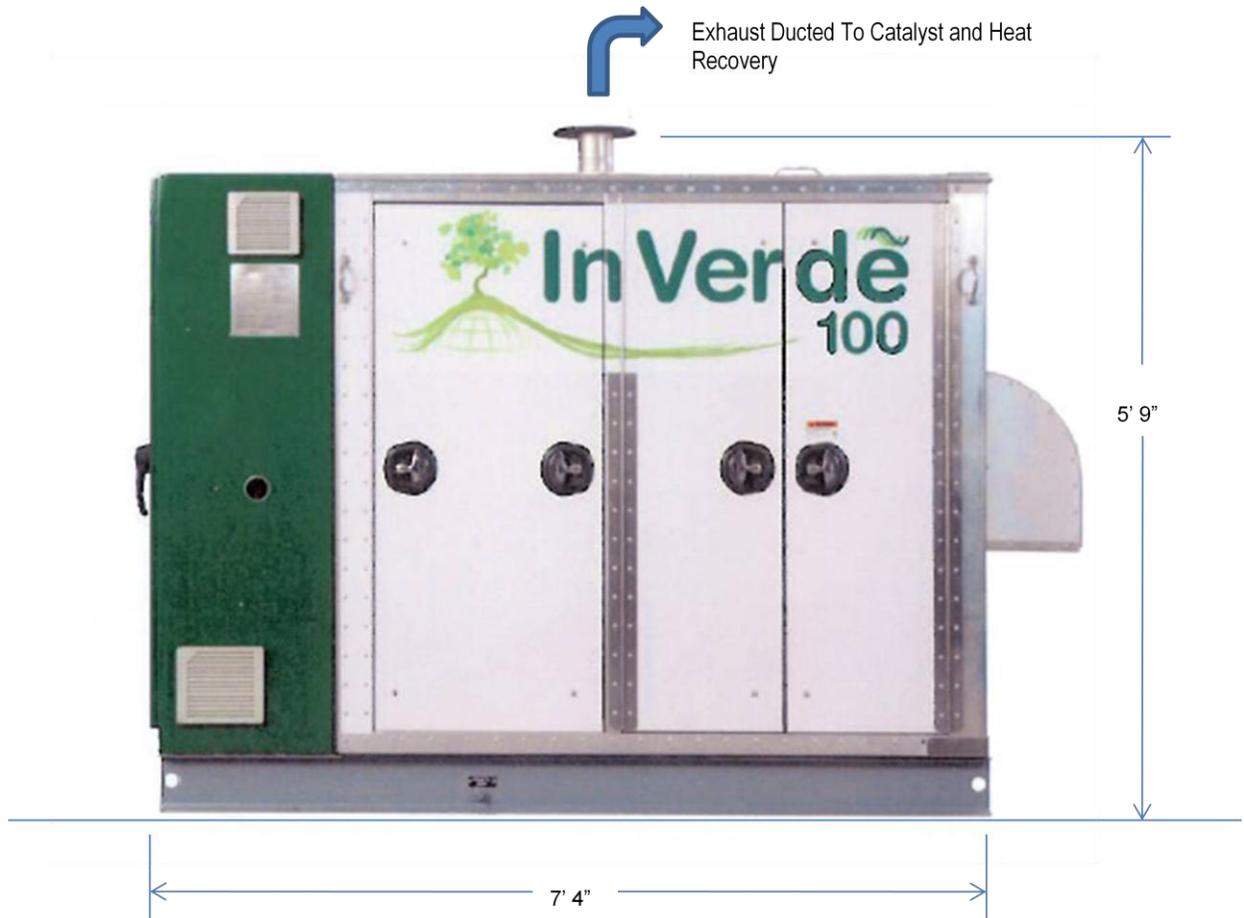
**Figure 3 Site Area Aerial Photo**



**Figure 4 Slab To Be Used For Engine-Generator Sets**



**Figure 5 Engine-Generator Set**



**Figure 6 Engine-Generator Set Housing**



<b>Rs</b>	<b>Residential Single Family</b>
<b>Rm</b>	<b>Residential Multifamily</b>
<b>S</b>	<b>School</b>
<b>CC</b>	<b>Child Care</b>
<b>CT</b>	<b>CalTrans</b>
<b>C</b>	<b>Commercial</b>
<b>SMUD</b>	<b>Sacramento Municipal Utility District</b>

**Figure 7 1000 Foot Radius Around Proposed Site**

**Table 1 Distances: Engine-Generators to Receptors**

Uses	Notes	Approximate Direction	Distance
<b>Schools</b> (to 2000')			
Phoebe Hearst Elem. School		NNW	1070' to prop. line; 1260' to building
St. Mary's Catholic School		NNW	2000' to building
St. Francis High School		NNE	1840' to building
<b>Known Child Care</b>			
	SMUD's on campus child care	WSW	1020' to building
<b>Residential</b>			
Apartments	6380, 6400 Folsom Blvd.	ESE	540' to nearest building
Single Family	North side of Folsom Blvd.	NNE to NE	760'
Single Family	South of Highway 50	SE to SW	960+feet
Single Family	West of Camellia Center (55 <sup>th</sup> St.)	WNW	2670+feet
<b>CalTrans Materials Lab</b>			
	Folsom Blvd./59 <sup>th</sup> Street	WNW to NNW	580+ feet
<b>Commercial</b>			
Kramer Carton	VACANT	W	580'
Camellia Center	Corti Bros., nearest	NW	1700'
Radio Country, etc	North side of Folsom Blvd.	N	850'
Giovanni's (6200 Folsom Bl.), etc	South side of Folsom Blvd., includes restaurants	NE	450-630'
Commercial Center	Folsom & 65 <sup>th</sup> Street, SW corner	ENE-E	700-970'
Chevron	65 <sup>th</sup> & S Street	SE	1300'
<b>SMUD Campus</b> (Portion East of 59th Street)			
Central Heating/Cooling Plant, Gas Operations Office		NE	140'
East City Substation	Unmanned switchyard	E	280'
Customer Service Center	6301 S St	SE	800'
Headquarters Building	6201 S St	S	300'
Child Care Center	Listed above in known child care	WSW	1020'
Energy Management Center	6001 S Street	W	970'
Field Reporting Facility	6100 Folsom Blvd.	NW	290'

Distances from engine sets to nearest property line (or wall) of receptor. Distances determined using GoogleEarth. Also refer to Figure 7.

**Environmental Factors Potentially Affected**

The environmental factors checked below would be potentially affected by this proposed project, as indicated by the checklists on the following pages.

- |   |   |   |
|---|---|---|
| <input type="checkbox"/> Aesthetics             | <input checked="" type="checkbox"/> Greenhouse Gases            | <input type="checkbox"/> Population and Housing             |
| <input type="checkbox"/> Agricultural Resources | <input checked="" type="checkbox"/> Hazards/Hazardous Materials | <input type="checkbox"/> Public Services                    |
| <input checked="" type="checkbox"/> Air Quality | <input type="checkbox"/> Hydrology/Water Quality                | <input type="checkbox"/> Recreation                         |
| <input type="checkbox"/> Biological Resources   | <input type="checkbox"/> Land Use and Planning                  | <input checked="" type="checkbox"/> Transportation/Traffic  |
| <input type="checkbox"/> Cultural Resources     | <input checked="" type="checkbox"/> Mineral Resources           | <input type="checkbox"/> Utilities & Service Systems        |
| <input type="checkbox"/> Geology and Soils      | <input checked="" type="checkbox"/> Noise                       | <input type="checkbox"/> Mandatory Findings of Significance |

**Determination** (To be completed by the Lead Agency)

On the basis on this initial evaluation:

- I find that the proposed project could not have a significant effect on the environment, and a Negative Declaration will be prepared.
- I find that although the proposed project could have significant effect on the environment, there will not be a significant effect in this case because the mitigation measures described on an attached sheet have been added to the project. A Negative Declaration will be prepared.
- I find that the proposed project may have a significant effect on the environment, and an Environmental Impact Report is required.
- I find that the proposed project may have a significant effect(s) on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets, if the effect is a “potentially significant impact” or “potentially significant unless mitigated.” An Environmental Impact Report is required, but must analyze only the effect that remains to be addressed.
- I find that, although the proposed project could have a significant effect on the environment, there will NOT be a significant effect in this case because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or Negative Declaration pursuant to applicable standards and (b) have been avoided or mitigated pursuant to that earlier EIR or Negative Declaration, including revisions or mitigation measures that are imposed upon the proposed project.

*Original signature on file*  
 \_\_\_\_\_  
 Signature

Kimberly Crawford  
 \_\_\_\_\_  
 Printed Name

September 3, 2010  
 \_\_\_\_\_  
 Date

Sacramento Municipal Utility District  
 \_\_\_\_\_  
 For

**Purpose of this Initial Study**

This Initial Study has been prepared consistent with CEQA Guidelines Section 15063, to determine whether the installation and operation of a Microgrid power system, may have a significant effect on the environment. Based upon the findings contained within this report, the Initial Study will be used in support of the preparation of a Negative Declaration.

### **Evaluation of Environmental Impacts**

1. A brief discussion is provided for each section relative to the potential effect. The letter in parenthesis references the section that precedes the discussion.
2. All answers take into account the “whole of the action”, including off-site as well as on-site, cumulative as well as project-level, indirect, and construction as well as operational impacts.
3. “Potentially Significant Impact” is an appropriate designation if there is substantial evidence that an effect is significant. If there are one or more “Potentially Significant Impact” entries when the determination is made, an EIR is required. There are no such designations in this Initial Study.
4. “Less Than Significant with Mitigation Incorporated” applies where the incorporation of mitigation measures has reduced an effect from “Potentially Significant Impact” to a “Less than Significant Impact”. The Initial Study describes the mitigation measures and briefly explains how they reduce the effect to a less than significant level.
5. Earlier analyses may be used where, pursuant to the tiering, program EIR or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration [Section 15063 (c)(3)(D)]. Earlier analyses are discussed in Section XVII at the end of the checklist.
6. Preparers are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g. general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated. A source list should be attached and other sources used or individual contacts should be cited in the discussion.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
<b>I. AESTHETICS.</b> Would the project:				
a) Have a substantial adverse effect on a scenic vista?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

**Discussion**

- a) The project site is SMUD’s existing Central Heating and Cooling Plant – an industrial setting.
- b) The area is not within a state scenic highway. The project site is currently paved , with concrete pads containing heating and cooling equipment.
- c) The project site is SMUD’s existing Central Heating and Cooling Plant – an industrial setting. The dominant feature is an insulated water storage tank.
- d) No additional lighting is likely to be required for this project.

Addition of the microgrid project within SMUD’s existing Central Heating and Cooling Plant is likely only visible from adjacent SMUD property and light rail tracks that divide SMUD’s S Street property from SMUD’s Folsom Boulevard property. Refer to Figures 2 through 4.

Based on the considerations listed above, it is not likely that there would be a substantive affect on aesthetics from this project.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
<b>II. AGRICULTURE AND FOESTRY RESOURCES.</b> Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Result in the loss of forest land or conversion of forest land to non-forest use?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Involve other changes in the existing environment, which, due to their location or nature, could result in conversion of Farmland to non-agricultural use?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

**Discussion**

a-e) The microgrid project will be within SMUD’s Central Heating and Cooling Plant. The area is developed with buildings, cooling towers, a water tank and paved or concreted open areas. There are no agricultural, timber or forest aspects, or potential aspects with this property. Refer to Figures 2 through 4.

Based on the considerations listed above, there would be no affect on agriculture, forests or timberlands from this project.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
<b>I. AIR QUALITY.</b> Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Expose sensitive receptors to substantial pollutant concentrations?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
e) Create objectionable odors affecting a substantial number of people?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

### Environmental Setting

The U.S. Environmental Protection Agency (USEPA) and the California Air Resources Board (CARB) have designated each county within California as either attainment or non-attainment for the National Ambient Air Quality Standards (NAAQS) and the California Ambient Air Quality Standards (CAAQS). Pursuant to the federal Clean Air Act, USEPA has designated Sacramento County as:

- non-attainment for ozone (O<sub>3</sub>), with a “severe-15” classification [effective June 4, 2010: has 15 years to reach attainment];
- non-attainment for particulate matter (PM) less than 10 microns in diameter (PM<sub>10</sub>), with a “moderate” classification; attainment for PM less than 2.5 microns in diameter (PM<sub>2.5</sub>), and
- a moderate maintenance area for carbon monoxide (CO), with respect to the NAAQS.

CARB has designated Sacramento County as non-attainment for O<sub>3</sub> (with a one-hour classification of “serious”), non-attainment for PM<sub>10</sub>, non-attainment for PM<sub>2.5</sub>, and attainment for CO with respect to the CAAQS (CARB, 2006 and 2007).

The Sacramento Metropolitan Air Quality Management District (SMAQMD) is the regional agency that establishes and administers air quality regulations in the proposed project area. SMAQMD regulates air pollution from stationary sources through rules, regulations, and permits. In 1994, SMAQMD established a Clean Air Plan or State Implementation Plan for attaining the federal 1-hour O<sub>3</sub> standard in the Sacramento Air Basin. This plan includes assumptions and allowances for growth and development in the region and details the control measures and BMPs that must be employed for the region to make progress toward

attainment. The 1994 Clean Air Plan has been updated numerous times since its promulgation. The most recent update to the Clean Air Plan is the Sacramento Regional 8-Hour Ozone Attainment and Reasonable Further Progress Plan (Plan) (release date December 18, 2008). The air districts in Sacramento Federal Nonattainment Area (SFNA) held public hearings in January and February 2009 to consider its adoption. In addition to the Plan adoption, SMAQMD will consider certification of the Plan's EIR. The Plan covers all of Sacramento and Yolo counties, and portions of Placer, El Dorado, Solano, and Sutter counties. The SFNA air districts approved the Plan in January and February 2009, and the California Air Resources Board approved and adopted the Plan March 26, 2009.

The Plan shows that the region is meeting requirements of the Clean Air Act for the 1997 8-hour ozone standard including meeting minimum emission reduction progress and reaching air quality standards not later than 2018. The Plan also updates the emission inventory and establishes new emission budgets for transportation and general conformity. In addition, the plan makes commitments to adopt and implement new reasonably available control measures.

### Impacts

The air quality impacts of the proposed project were evaluated based on the SMAQMD CEQA Thresholds of Significance. SMAQMD has adopted the following three types of thresholds (SMAQMD, 2009):

#### Mass Emission Thresholds

- Construction (short-term): generate more than 85 pounds per day (lb/day) of oxides of nitrogen (NO<sub>x</sub>)
- Operation (long-term): generate more than 65 lb/day of either reactive organic gases (ROG) or NO<sub>x</sub>

#### Emission Concentration Threshold

- CAAQS would be applied as significance criteria to all phases of a project

#### Substantial Contribution Threshold

If the project would emit pollutants at a level equal to or greater than 5 % of the CAAQS, it would be considered to contribute substantially to an existing or projected CAAQS violation. These are also incorporated in SMAQMD's Guide to Air Quality Assessment in Sacramento County (SMAQMD, 2009).

For construction projects, the main pollutant of concern that could potentially exceed 5 % of the CAAQS is PM<sub>10</sub>, primarily from generation of fugitive dust. The CAAQS for PM<sub>10</sub> is 50 micrograms per cubic meter (µg/m<sup>3</sup>) (24-hour averaging time). Consequently, if a construction project were to increase ambient off-site PM<sub>10</sub> concentrations by more than 2.5 µg/m<sup>3</sup>, then the impact would be considered significant. Another potential pollutant of concern emitted during construction would be PM<sub>2.5</sub>. The primary source of PM<sub>2.5</sub> from construction would be exhaust from construction equipment. The CAAQS for 24-hour average PM<sub>2.5</sub> is 35 µg/m<sup>3</sup>. Consequently, if a construction project were to increase PM<sub>2.5</sub> concentrations by more than 1.75 µg/m<sup>3</sup>, the impact would be considered significant.

To determine whether construction emissions would exceed 2.5 µg/m<sup>3</sup> of PM<sub>10</sub> or 1.75 µg/m<sup>3</sup> of PM<sub>2.5</sub> would require use of an ambient air quality dispersion model. The Guide to Air Quality Assessment contains guidelines to determine if the use of an ambient air quality dispersion model is required to demonstrate compliance (SMAQMD, 2009). If the proposed project does not exceed the recommended criteria, then the project is considered to have a less-than-significant impact. The criteria state that projects less than 5 acres are below the significance threshold for PM<sub>10</sub> construction impacts and no mitigation measures are required. The total disturbance from microgrid project construction would be less than 0.1 acre since existing slabs and paved areas will be used; therefore mitigation measures for PM<sub>10</sub> would not be required. Because SMAQMD has not established thresholds for PM<sub>2.5</sub>, it is assumed that the same criteria for PM<sub>10</sub> would apply to PM<sub>2.5</sub>.

SMAQMD has not established significance thresholds for construction-related emissions of ROG and USEPA and CARB has not established NAAQS or CAAQS for this group of air pollutants. However, SMAQMD recommends including ROG emissions from construction as part of an air quality assessment because ROG and NO<sub>x</sub> are precursors to O<sub>3</sub> formation.

### ***Answers to Checklist Questions***

#### **Questions a-c: Construction**

The proposed project would result in short-term emissions from construction activities. For construction projects, mitigation measures are prescribed if the emissions of NO<sub>x</sub> from the project exceed the SMAQMD significance thresholds.

Construction would consist of modifications to the existing concrete slab and paved area. Most of the project consists of modular units. Piping and electrical conduit interconnections would be necessary. Some minor amounts of trenching might be necessary. A couple of small adjacent concrete pads may be added in the existing paved area.

A 10-12 person crew would be used during construction, with up to 13 people working onsite during the peak of construction activities. Major construction equipment would include a small crane, crew truck, small dump truck, small backhoe or trencher, and delivery trucks.

Fugitive dust from construction equipment would be minimal due to the minimally disturbed area. Best Management Practices (BMPs) for dust suppression would be employed when soils are exposed (see mitigation section). Air emissions would also be generated during the construction phase by short-term exhaust emissions from construction equipment and worker vehicles. Therefore, construction would result in the temporary generation of ROG, NO<sub>x</sub>, and PM<sub>10</sub> emissions. These activities have been analyzed, and based on the results of the analysis, it is concluded that construction impacts would be less than significant.

The SMAQMD-approved URBEMIS model estimates emissions from equipment exhaust, worker vehicle trips, and land disturbance. URBEMIS2007 v. 9.2.4 has been previously used to estimate the maximum daily emission rates associated with construction of a typical SMUD substation. The model for substations consisted of a fine site grading component and a facility construction component. For the microgrid project an existing paved site with concrete slabs will be used so there is no grading component; otherwise the construction components are similar.

Table 2 presents the maximum potential daily emission rates for construction of a typical SMUD substation. As discussed above, construction emissions of the proposed microgrid project would be similar to that of a typical SMUD substation. These conservative estimates assume that the following types and number of equipment are used for 8 hours per day, running concurrently: a small crane, crew truck, small dump truck, small backhoe or trencher, and delivery truck.

**Table 2 Substation Construction Emissions Estimate \***

Project Phases	ROG (lb/day)	NO <sub>x</sub> (lb/day)	PM <sub>10</sub> (lb/day) (Unmitigated)	PM <sub>10</sub> (lb/day) (Mitigated)
Facility Construction	1.3	9.5	0.65	0.65
SMAQMD Construction Threshold*	None	85.0	>2.5 µg/m <sup>3</sup>	>2.5 µG/M <sup>3</sup>
<b>Significant?</b>	--	<b>No</b>	<b>No</b>	<b>No</b>

\* Microgrid project construction would be comparable to, but even a lesser project than, construction of a typical SMUD substation.

\*\* Note that the significance criteria for PM10 is in µg/m3 rather than lb/day.

**Construction Impacts.** Construction of the microgrid project is planned to begin in the fall of 2010 and be operational in February of 2011. Construction of the proposed project would take about 3 months.

### NO<sub>x</sub> and ROG

As presented in Table 1, the maximum construction-related emissions of NO<sub>x</sub> would be 9.5 lb/day. Emissions would be less than the SMAQMD significance threshold of 85 lb/day. Therefore, construction impacts would be considered less than significant.

SMAQMD has not established construction emission thresholds for Reactive Organic Gases (ROG) and no NAAQS or CAAQS exist for ROG. SMAQMD recommends including ROG emissions in the construction emissions because ROG is a precursor to O<sub>3</sub>. ROG emissions associated with the proposed project are minimal and expected to result in a less-than-significant impact.

### PM<sub>10</sub>

SMAQMD has not established a mass emission threshold for PM<sub>10</sub>, but has a “substantial contribution” threshold to determine whether a project would violate or contribute to a projected violation of the CAAQS for PM<sub>10</sub>. The SMAQMD Guide to Air Quality Assessment outlines screening criteria for construction projects to determine if an ambient air quality assessment using a computer model is required (SMAQMD, 2009). The Guide to Air Quality Assessment indicates that projects less than 5 acres are below the significance threshold for PM<sub>10</sub> construction impacts and no mitigation measures are required (SMAQMD, 2009). The microgrid project construction would disturb less than 0.1 acre since the area already has concrete slabs and paving. Maximum construction-related emissions of PM<sub>10</sub> would be 0.65 lb/day during construction. This is considered to be a less-than-significant impact; nevertheless, as part of its BMPs to further reduce emissions, SMUD would implement air quality BMPs as applicable (see Mitigation section).

SMAQMD has not established a mass emission threshold or screening criteria for PM<sub>2.5</sub>. Therefore, because PM<sub>10</sub> emissions would be less than significant, it was determined that PM<sub>2.5</sub> emissions from construction would also be less than significant.

### **Questions a-c: Operation**

The microgrid project is being assessed and permitted as if the three engines will operate year round. During October through May the recovered heat will lower the amount of time the existing Central Heating and Cooling Plant boilers would be running offsetting some of the boiler emissions. During the rest of the year the recovered heat would run an absorption chiller

lowering some of the need for electrically driven cooling, thus offsetting some of the emissions from generating power. Finally, the 300 kW generated would further offset electrical generation and its emissions. Given unknowns as to actual run time for the microgrid engines and unknowns on actual heating and cooling demands on the Central Heating and Cooling, only rough estimates of actual overall emission and direct offsets could be made.

Regardless, the Sacramento Metropolitan Air Quality Management District uses a much more conservative methodology to assess potential impacts, set emission limits, and if threshold of significance limits are reached, require use of emission reduction certificates [offsets via formal emission reduction credits].

The microgrid engine-generator sets are required to be permitted by the Sacramento Metropolitan Air Quality Management District. The SMAQMD draft Authority to Construct is attached as Appendix D. The permitting process examines the potential to emit, potential for requiring best available pollution control technology (BACT) and calculation of offset triggers. Finally, a source test is required to ensure the emission limits are met.

Potential to Emit

The SMAQMD accessed the potential to emit pollutants for the project without taking credit for offsetting boiler and electrical reductions. Daily, quarterly and annual emissions limits were established based on the assumption the units would operate year round. Air Quality mitigation measures AQ-1 through AQ-4 are adopted to ensure these limits are maintained. The table below represents the potential to emit for each of the three engine-generator sets. It is also the proposed emission limit for each engine assuming each runs 8760 hours per year.

<b>Table 3 Potential To Emit</b>				
Pollutant	Emission Factor g/hp-hr	Proposed Emissions		
		Lb/day	Lb/quarter	Lb/year
ROC	0.6	5	423	1,692
NO <sub>x</sub>	0.094	1	66	264
SO <sub>x</sub>	0.002	0.02	1	4
PM <sub>10</sub>	0.152	2	107	428
CO	4.0	31	2,823	11,293

To ensure this limit is maintained the following air quality mitigation measures will be applied:

AQ-1, Each unit will be factory derated from 181 bhp @3000 rpm to 145 bhp at 2500 rpm.

AQ-2, Each unit will be equipped with a 3-way catalyist.

AQ-3, Each unit will be equipped with an air to fuel ratio controller.

AQ-4, Fuel supply will be restricted to natural gas only.

The SMAQMD also assessed the potential to emit of the project added to the emissions other existing, permitted facilities on SMUD’s Headquarters Campus/Corporation Yard. These facilities include a standby turbine-generator, two standby engine-generators, four boilers, a gasoline bulk plant, five gasoline dispensers, a diesel particulate filter, and two printing presses. If the total for each pollutant: reactive

organic carbon (ROC), nitrogen oxides (NO<sub>x</sub>), sulfur oxides (SO<sub>x</sub>), particulate matter equal or less than 10 microns (PM<sub>10</sub>) or carbon monoxide (CO) exceeds an established threshold for that pollutant, offset emissions reductions credits must be submitted unless some other mechanism can be used to reduce emission below the threshold.

The totals and thresholds are listed below.

Lb/quarter	ROC	NO <sub>x</sub>	SO <sub>x</sub>	PM <sub>10</sub>	CO
Total	4,953	29,628	3,199	3,266	23,572
Offset Trigger Level	>5,000	>5,000	>13,650	>7,500	>49,500

Only NO<sub>x</sub> exceeds the trigger level requiring submission of offset certificates. Air Quality mitigation AQ-5 is adopted requiring SMUD to submit offset credits per quarter pursuant to AQMD table and adjusted per their calculation procedure which requires 1.2 pounds submitted for each pound listed in the table if the project and the certificate point of origin are no more than 15 miles apart or 1.5 pounds if the distance is between 15 and 50 miles.

**OFFSETS REQUIRED**

Quarter 1	Quarter 2	Quarter 3	Quarter 4
194.7 lbs	196.9 lbs	199.0 lbs	199.0 lbs

Calculation:  $QTR_q = (P_{q \leq 15} / 1.2) + (P_{q \geq 15} / 1.5) + (P_{qcom} / 1.0)$

Where:

$P_q$  = emission offset credit for pollutant in lb/qtr

QTR = Quarter (1,2,3, or 4)

$\leq 15$  = Those emission reduction credit certificates whose point of origin are within 15 miles of the applicants proposed location.

$\geq 15$  = Those emission reduction credit certificates whose point of origin are greater than 15 miles but less than 50 from the applicants proposed location.

Com = Those emission reduction credit certificates that are leased from the SMAQMD's community bank.

SMUD expects to use certificates originated within 15 miles of the project site thus the certificates used would be 1.2 pounds submitted for each pound requiring certificates.

**OFFSETS LIKELY TO BE SUBMITTED**

Quarter 1	Quarter 2	Quarter 3	Quarter 4
233.6 lbs	236.3 lbs	238.8 lbs	238.8 lbs

### Best Available Control Technology

The SMAQMD also examined emissions as to whether they would trigger the requirement for addition of best available control technology (BACT). No pollutant was high enough to trigger the requirement for the more stringent technology.

### Source Test

Finally, the SMAQMD will require a source test, the actual analysis of the exhaust to ensure that the project meets design criteria and permit limitations. Failure would necessitate equipment repair or re-permitting adding more abatement, greater submittal of offset certificates, and/or more limits on the operation of the project. Therefore, Air Quality mitigation AQ-6 is adopted requiring a source test be conducted pursuant to the SMAQMD permit.

Compliance with SMAQMD permit requirements through application of the air quality mitigation measures discussed above will limit potential impacts to less than significant.

**Question d:** Locations where the very young, elderly, and those suffering from certain illnesses or disabilities reside are considered to be “sensitive receptors” to air quality impacts. Examples of sensitive receptors include schools, daycare centers, parks, recreational areas, medical facilities, rest homes, convalescent care facilities, and residences. Land use conflicts can arise when sensitive receptors are located near major sources of air pollutant emissions. Table 1, Distances: Engine-Generators to Receptors, lists potential sensitive receptors as: nearest school – 1070 feet to property line, SMUD’s Child Care Center - 1020 feet, and nearest residences – 540 feet. Although the proposed project would be located near potential sensitive receptors, compliance with permit conditions will limit potential impacts to less than significant.

**Question e:** The proposed project, by virtue of being run on natural gas, is not anticipated to generate any objectionable odors, so it would not affect a substantial number of people and no impact would occur.

### **Mitigation**

AQ-1 Factory de-rating from 181 bhp @3000 rpm to 145 bhp at 2500 rpm

AQ-2 Equip with 3-way catalyst

AQ-3 Equip with air to fuel ratio controller.

AQ-4 Fuel with natural gas only

AQ-5 Submit NO<sub>x</sub> emission reduction certificates to the SMAQMD based on their quarterly table as adjusted pursuant to their calculation methodology.

AQ-6 Perform a source test pursuant to the SMAQMD requirement and schedule.

AQ-7 Maintain operational and maintenance records per SMAQMD permit requirements.

Discussions above are based on the draft SMAQMD draft Authority to Construct (ATC). Any more stringent conditions that may appear in the final ATC will automatically be adopted as additional or modified mitigation measures. CEQA allows adding more stringent requirements to the CEQA document upon adoption without necessitating recirculation unless that more stringent requirement might cause a potentially significant impact.

The project, existing site conditions, and short construction period are likely to preclude any significant amount of fugitive dust. However, should conditions arise where any of the following best management practices (BMP) might be applied, they will be implemented to reduce fugitive dust.

**Air Quality Best Management Practices**

- a) Apply water or suitable soil stabilizers to inactive areas or other areas that can give rise to airborne dust.
- b) Water exposed surfaces up to three times daily to prevent fugitive dust from migrating beyond the project's boundaries.
- c) Cover all inactive stockpiles with tarps or water to prevent airborne dust.
- d) Water all haul roads as needed to prevent airborne dust.
- e) Limit speeds on any unpaved roads to less than 15 miles per hour.
- f) Replace ground cover in disturbed areas as soon as construction in these areas is completed.
- g) Maintain 2 feet of freeboard space on haul trucks.
- h) Water soil piles three times daily.
- i) Minimize the amount of disturbed area, the amount of material actively worked, and the amount of material stockpiled.
- j) Sweep or wash paved streets adjacent to the project construction site at least once a day to remove accumulated dust.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
<b>IV. GREENHOUSE GAS EMISSIONS.</b> Where available, the significance criteria established by the applicable air quality management or air pollution control district, or lead agency may be relied upon to make the following determinations. Would the project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significance impact on the environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

### Environmental Setting

Some scientists have concluded that climate change (“global warming”) is a regional as well as global concern that may be caused in large part by human activity. Many believe that it may have serious and potentially damaging effects in the decades ahead. GHG emissions, primarily CO<sub>2</sub>, from cars, power plants, and other human activities, are believed to be the primary cause of contemporary global warming, due largely to the combustion of fossil fuels, atmospheric concentrations of CO<sub>2</sub>, the principal GHG, are at elevated levels. N<sub>2</sub>O and free CH<sub>4</sub> are also believed to be contributors in small amounts. GHGs from human activities are believed to trap more of the sun’s heat in the earth’s atmosphere, resulting in warming.

Currently there are few formally adopted quantitative CEQA thresholds of significance to address project-related GHGs. On June 2, 2010, the Bay Area Air Quality Management District (BAAQMD) adopted a GHG significance threshold for stationary sources of 10,000MT/yrCO<sub>2</sub>e, operational emissions (BAAQMD). The Sacramento Metropolitan Air Quality Management District (SMAQMD) is considering adopting the same threshold (SMUD, 2010). In 2008, the Office of the California Attorney General issued “The California Environmental Quality Act—Addressing Global Warming Impacts at the Local Agency Level” (Office of California Attorney General, 2008). This document provides information that may be helpful to local agencies in carrying out their duties under CEQA as they relate to global warming. Included in this document are various measures that may help to reduce the global warming-related impacts of a project. As appropriate, the measures can be included as design features of a project, required as changes to the project, or imposed as mitigation (whether undertaken directly by the project proponent or funded by mitigation fees). The list of measures is not exhaustive. Moreover, the measures cited may not be appropriate for every project. The decision of whether to approve a project as proposed or with required changes or mitigation—is for the local agency, exercising its informed judgment in compliance with the law and balancing a variety of public objectives.

The Attorney General’s document presents feasible mitigation measures for seven specific areas:

- Energy efficiency
- Renewable energy
- Water conservation and efficiency

Solid waste measures

Land use measures

Transportation and motor vehicles

Off-site mitigation

The suggested mitigation measures consist of a wide variety of methods, practices, and products to reduce thermal and electric energy use and thus reduce activities that contribute to the formation of GHG. A discussion of GHG studies and regulations follows.

### **Federal Framework**

The U.S. Environmental Protection Administration (EPA) prepared a national GHG inventory report, which presents estimates of U.S. GHG emissions and sinks for the years 1990 through 2009 (USEPA, 2009). This report discusses the methods and data used to calculate the emission estimates. The purpose of the inventory is to track the national trend in emissions and removals since 1990. The national GHG inventory was submitted to the United Nations in accordance with the Framework Convention on Climate Change. On March 10, 2009, in response to the Consolidated Appropriations Act of 2008 (House of Representatives [H.R.] 2764; Public Law 110–161), USEPA proposed a rule (EPA Docket ID. No. EPA-HQ-OAR-2008-0508, 40 Code of Federal Register [CFR] Parts 86, 87, 89, *et al.*) that requires mandatory reporting of GHG emissions from large sources in the United States. The proposed rule would collect accurate and comprehensive emissions data to inform future policy decisions. The public comment period for this rule closed June 9, 2009; EPA approved the reporting rule on September 22, 2009 to be effective December 29, 2009.

On April 17, 2009, USEPA began the process of creating a comprehensive regulatory program aimed at climate change by releasing a proposed finding that GHGs in the atmosphere endanger public health and welfare. The USEPA also proposed a finding that GHG emissions from new motor vehicles are contributing to these atmospheric GHG levels. If finalized, it is likely that regulations addressing GHG emissions from new motor vehicles will be forthcoming. Legislation is also in process that may take the form of a cap-and-trade program that would require emitters of CO<sub>2</sub> and other GHGs to buy emission permits.

### **State Framework**

The California Global Warming Solutions Act of 2006 (California Assembly Bill [AB] 32) recognizes the serious threat to the “economic wellbeing, public health, natural resources, and the environment of California” resulting from global warming. To counter such effects, AB 32 requires the State to reduce its carbon emissions by approximately 25 percent by the year 2020 (Cyberregs, 2009). AB 32 requires the CARB to adopt a scoping plan and regulations to reduce emissions, establish a statewide GHG emissions cap, require monitoring and reporting protocols for GHG emission sources, and account for GHG emissions.

The CARB has issued a preliminary draft staff proposal for setting interim significance thresholds for GHGs for public review (CARB, 2008). CARB describes the document as a “first step toward developing recommended statewide interim thresholds of significance for GHGs that may be adopted by local agencies for their own use,” and has solicited feedback, in the form of public comment.

CARB believes that different GHG thresholds of significance may apply to projects in different sectors. They are currently developing interim threshold concepts for sectors such as residential, commercial, transportation projects, large dairies, and electricity generation. CARB is in favor of a threshold that allows small projects to be considered insignificant. CARB used existing data for the industrial sector to derive a “proposed hybrid threshold” of 7,000 metric tons of CO<sub>2</sub> equivalent per year (MTCO<sub>2</sub>e/year) for operational emissions, and performance standards for construction and transportation emissions.

California law (SB 97, Chapter 185, 2007) states GHG emissions and the effects of GHG emissions are subject to the CEQA. Pursuant to this law, the Governor’s OPR has recently adopted amendments to

Public Resources Code (PRC), Sections 21083.05 and 21097, the state CEQA Guidelines for GHG emissions “for the mitigation of GHG emissions or the effects of GHG emissions”. Under the amendments, a lead agency should make a good faith effort to determine the significance of GHG emissions based on available information and describe, calculate, or estimate the amount of GHG emissions. The lead agency would have the discretion to use a mode or methodology to quantify the GHG emissions or rely on a qualitative analysis or performance-based standards. The lead agency may consider the following:

- 1) The extent to which the project may increase or reduce GHG emissions as compared to the existing environmental setting;
- 2) Whether the project emissions exceed a threshold of significance that the lead agency applies to the project;
- 3) The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions. Such regulations or requirements must be adopted by the relevant public agency through a public review process and must include specific requirements that reduce or mitigate the project’s incremental contribution of GHG emissions. If there is substantial evidence that the possible effects of a particular project are still cumulatively considerable notwithstanding compliance with the adopted regulations or requirements, an EIR must be prepared for the project.

The amendments state that lead agencies shall consider mitigation measures to reduce GHG emissions from an existing plan, implementation of project features and designs, off-site measures, including offsets, measures to sequester GHG, and under an adopted plan or ordinance identification of specific measures on a project-by-project basis. The Natural Resources Agency amendments to the state CEQA Guideline became effective on April 18, 2010.

### **Local Framework**

The SMAQMD is the regional agency that establishes and administers air quality regulations in the proposed project area. Currently there are no formally adopted quantitative thresholds of significance for project-related GHGs. However, the CAPCOA has issued a resource guide to addressing GHG emissions from projects subject to CEQA (CAPCOA, 2008). This guide provides guidance on the analysis and mitigation of GHG emissions for commercial and other projects. The BAAQMD has adopted a threshold of 10,000MT/yrCO<sub>2</sub>e, operational emissions. The SMAQMD is considering the same threshold.

### **Impacts**

#### **Answers to Checklist Questions**

**Question a.** The proposed project would result in the generation of GHG emissions through the combustion of gasoline and diesel fuel by construction equipment and associated vehicles. The GHG impacts of the proposed project were evaluated considering the documents and policies discussed above.

**Construction Impacts.** Short-term exhaust emissions would be generated by construction equipment. Several pieces of medium or light-duty construction equipment might be used during construction. In a previous analysis for a typical SMUD distribution substation project, construction GHG emissions were quantified using modeling software URBEMIS 2007, a California Air Resources Board approved emissions model for estimating exhaust emissions from vehicles and construction equipment associated with land use development projects. (SMUD 2009). The analysis for the substation considered that, for the total of two construction phases (Fine Site Grading and Facility Construction) the predicted increase in GHG emissions would be 27.4 tons of CO<sub>2</sub>. (SMUD 2009). The microgrid project, while similar to a substation construction project, will use an existing site that is paved, has existing concrete slabs, and existing electrical, water and gas infrastructure. The microgrid project will, additionally use smaller, lighter, modular components and therefore it is expected to produce approximately a third to a half the amount of construction CO<sub>2</sub> (9.1 to 13.7 tons) as would a substation. Until final design is complete and a contractor selected a more specific CO<sub>2</sub> emissions number cannot be determined. As discussed previously, neither SMAQMD nor any other governmental agency has established a mass emission significance threshold for

construction or operational GHGs, but these emissions are of concern and will be under greater scrutiny in the future. However, in the interim, and based on their analysis of available data, CARB believes that the 7,000 MTCO<sub>2</sub>e/year benchmark may be a suitable significance threshold for GHG emissions. The construction GHG emissions for the Proposed Microgrid Project are well below this proposed threshold; therefore, the temporary construction GHG emissions would be considered to be a less-than-significant impact.

Operational Impacts. The microgrid project uses three natural gas fired internal combustion engine generator sets with waste heat recovery. During periods of heating demand in SMUD's Central Heating and Cooling Plant, waste heat from the engines would offset some of the demand on SMUD's existing boilers. There are two one-million Btu per hour boilers and two five- million Btu per hour boilers in SMUD's Central Heating and Cooling Plant. The boilers are not used to generate electricity, they actually produce hot water, not steam. During periods of cooling demand, the microgrid waste heat would drive an absorption-chiller lowering the need for electrical driven chillers. Additionally, the microgrid electrical output would lessen outside electrical demand by 300 kilowatts.

The engine-generator sets are being permitted with the Sacramento Metropolitan Air Quality Management District to run constantly all year. Assuming they actually are running all year, they would produce 2,628 megawatt-hours of electricity per year (2,628,000 kilowatt-hours). In doing so, they would produce 1,761 metric tons of CO<sub>2</sub> during the year. As discussed above, this is below the CARB 7,000 MTCO<sub>2</sub>e/year benchmark. However, since the units generate both electricity and recoverable heat energy they will displace CO<sub>2</sub> that would otherwise be generated making the project nearly CO<sub>2</sub> neutral. In Summary:

Running the microgrid generators will emit CO<sub>2</sub>.

For part of the year (fall to spring heating) the recovered heat from the microgrid project will reduce CO<sub>2</sub> from the existing boilers by reducing their run time.

For part of the year (summer cooling) the recovered heat from the microgrid project would drive an absorption chiller reducing some of the need for electrically driven chillers.

The electricity generated by the microgrid generators would reduce the demand for electricity generated elsewhere.

The electricity demand reduced by the microgrid generation and reduced use of an electric chiller involves electricity generated by a mix of resources consisting of purchased power, gas fired generation, hydroelectric generation and smaller amounts of wind and solar; therefore offsetting demand for some of this electricity would offset some CO<sub>2</sub>.

Balancing the factors listed above results in an estimated additional 134.8 metric tons of CO<sub>2</sub> emissions per year with this project when compared with SMUD's mixed sources of electricity. If the electrical offset were balanced only against gas-fired electrical generation, rather than the average of multiple electrical sources, the microgrid project might then actually reduce total CO<sub>2</sub> emissions by about 127.9 metric tons per year. Calculation sheets are attached as Appendix E.

Therefore the project Greenhouse Gas emissions estimates are all far below the CARB 7,000 MTCO<sub>2</sub>e/year threshold; thus, the projects operational Greenhouse Gas impacts are considered to be less than significant.

**Question b:** With the passage of AB 32 in 2006, California has addressed the issue of climate change. SMUD supports long term carbon reduction goals that are consistent with minimizing climate impacts, specifically a reduction of GHGs from generation of electricity to 10 percent of its 1990 CO<sub>2</sub> emission levels by 2050 (i.e. - <350,000 metric tons/year), and a near-term reduction target to reduce emissions by 15 percent below today's levels by 2020. SMUD is also supporting the statewide Renewable Portfolio Standard (RPS) by taking steps to maintain one of the cleanest resource mixes in California by adopting a 33 percent RPS by 2020.

SMUD's RPS includes, but is not limited to photovoltaic solar, wind, biomass development, and ongoing research into the use of distributed generation and related technologies. SMUD continues to work in engaging customers to reduce GHG emissions. These efforts include helping to develop and implement a customer carbon calculator and a local GHG offset program, launching our Solar Shares program, and replacing gas mowers with rechargeable mowers. SMUD plans on installing 615,000 smart-meters at area residences and businesses by the end of 2011, that will allow customers the opportunity to monitor the use of their electricity consumption. Nearly 50,000 smart-meters have already been installed. Further, SMUD is working with the SMAQMD and the City of Sacramento to bring a broader group of local governments to the table on the climate change issue.

SMUD continues to participate in the California Climate Action Registry (CCAR) and is currently working toward SMUD's 7th year of certified emissions inventories. This participation has provided useful input to the CARB's development of mandatory reporting guidelines for the electric sector. SMUD's internal efforts to reduce GHG emissions include the adoption of Leadership in Energy and Environmental Design (LEED) building standards, improved sulfur hexafluoride (SF<sub>6</sub>) gas reporting, and the ongoing development of an Environmental Sustainability Program that addresses SMUD's Clean Fleet, Environmental Procurement, Green Building, Information Technology Energy Efficiency, and Waste Management Programs. In addition, SMUD is evaluating carbon offset programs to reduce its fleet vehicle emissions.

The proposed project would not conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of GHGs. Therefore, no impact would occur.

### **Mitigation**

No significant impacts have been identified, so no mitigation is required.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
<b>V. BIOLOGICAL RESOURCES.</b> Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Have a substantial adverse effect on federally protected wetlands, as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal wetlands, etc.), through direct removal, filling, hydrological interruption or other means?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional or state habitat conservation plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

**Discussion**

a-f) The microgrid project will be within SMUD’s Central Heating and Cooling Plant – an industrial facility. The area is developed with buildings, cooling towers, a water tank and paved or concreted open areas. There are no biological aspects, or potential biological aspects with these properties. Refer to Figures 2 through 4.

Therefore it is unlikely any impact would occur from additional of the microgrid project by SMUD.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
<b>VI. CULTURAL RESOURCES.</b> Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Directly or indirectly destroy a unique paleontological resource or site or unique geological feature?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Disturb any human remains, including those interred outside of formal cemeteries?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

**Discussion**

a-d) The addition of the microgrid project to SMUD’s existing Central Heating and Cooling Plant will have no impact. The site and adjacent areas are existing SMUD facilities. Any minor excavation or trenching will be within previously disturbed soil so there would be no inadvertent disturbance of resources. Refer to Figures 2 through 4.

Based on the considerations listed above, it is not likely that there would be a substantive affect on cultural resources from this project.

Best Management Practices for Cultural Resources should any unexpected resource be discovered are listed in Appendix B (Cultural BMP 1 – 3).

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
<b>VII. GEOLOGY AND SOILS.</b> Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury or death, involving:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? (Refer to Division of Mines and Geology Special Publication 42)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
ii) Strong seismic ground shaking?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
iii) Seismic-related ground failure, including liquefaction?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
iv) Landslides?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Result in substantial soil erosion or the loss of topsoil?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

### Discussion

a) The site does not appear within known earthquake fault risk areas per the most recent Alquist-Priolo Earthquake Fault Zoning Map. The site is flat and already fully developed. This project will add small components to an industrial facility.

b-e) The addition of the microgrid project to SMUD's existing Central Heating and Cooling Plant will have no impact. The site and adjacent areas are existing SMUD facilities and an existing slab will be used for the bulk of the equipment. Any minor excavation or trenching will be within previously disturbed soil so there would be no inadvertent disturbance of resources or inducement of earth or soil failure. Refer to Figures 2 through 4.

Based on the considerations listed above, it is not likely that there would be a substantive affect on geology or soils from this project.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
<b>VIII. HAZARDS AND HAZARDOUS MATERIALS.</b> Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use or disposal of hazardous materials?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances or waste within one-quarter mile of an existing or proposed school?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code § 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) For a project located within an airport land use plan area or, where such a plan has not been adopted, within two miles of a public airport or a public use airport, would the project result in a safety hazard for people residing or working in the project area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
g) Impair implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

**Discussion**

a) The three microgrid engine-generators will have routine oil and filter changes. This could involve up to 18 gallons of used oil per each engine’s oil and filter change. Used oil and filters are handled pursuant to current federal, state and local waste regulations. Oil is recycled and currently filters are drained and sent to a recycler for recovery of metal.

The large, trailer mounted, zinc bromide flow battery will be transported without electrolyte. An initial filling of electrolyte will occur once the battery trailer is positioned. Thereafter, electrolyte is expected to last for several years.

Therefore, given that routine transport or use or disposal of hazardous materials will occur in small quantities only, there are no significant impacts associated with project construction and operation.

b) The project will have a 120 ton absorption-chiller purchased as a standard vendor supplied item. The working fluid is likely to be non-toxic lithium bromide and water, or a water ammonia mix. These type units are common and reliable. Accident scenarios generally involve a small leak of concern only to personnel immediately adjacent to a unit.

The large, trailer mounted, zinc bromide flow battery will be transported without electrolyte. An initial filling of electrolyte will occur once the battery trailer is positioned. The trailer system provides internal secondary containment should the primary electrolyte pathways leak. An on-board cooling system cools the electrolyte to prevent overheating. Monitoring systems will shut the system down and alarm if operational parameters are exceeded. Work will be done by qualified technicians wearing appropriate protective gear for the task at hand. Spill containment and cleanup kits will be available at the battery trailer.

Since there is no significant hazard to the public or the environment through reasonably foreseeable upset or accident conditions involving the release of hazardous materials into the environment, impacts are considered to be less-than-significant for operation of this project.

c) During construction, construction equipment and vehicles containing petroleum products will be onsite. During construction activities, minor spills of fuel or oils/lubricants from ruptured fuel and/or hydraulic lines on the construction equipment could occur. Best construction practices have been incorporated into the design and construction of the project. These include:

- Hazmat 1. If an accidental release occurs during equipment use, the release shall be cleaned up immediately and reported in accordance with applicable federal, state, and local requirements.
- Hazmat 2. If an accidental spill occurs during construction, the release shall be cleaned up immediately and reported in accordance with applicable federal, state, and local requirements.
- Hazmat 3. Inspect equipment containing hazardous materials periodically for signs of spills or leakage.

There is one school within ¼-mile, Phobe Hearst Elementary School, and two more schools just beyond ¼-mile, St. Mary's Catholic School and St. Francis High School of the project site. SMUD's on-site Child Care Facility is located about 1000-feet away. Given the small quantity of materials of concern, no significant impacts are expected.

d) The property is SMUD's existing Central Heating and Cooling Plant. The property is not listed as a hazardous materials concern.

Therefore, there are no impacts relative to hazardous materials sites associated with the construction and/or operation of this project.

e, f) The University of California Davis (UCD) Sacramento Medical Center's tower-top helipads are located about 6,700 feet west of the project site. Otherwise the site is more than 2-miles from airports and outside airport land use areas. The project heights are below adjacent structures' heights and below any Federal Aviation Administration notification limits (California Airportbug, 2008 and GoogleEarth).

Therefore, the project would not result in a safety hazard for people residing or working in the project area; there are no impacts associated with the construction and/or operation of this project.

g) The project is not located in an area that would impair implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan.

Therefore, there are no impacts related to any adopted or proposed emergency response plan or evacuation plan associated with the construction and/or operation of this project.

h) The project area is not located in a wildlands area; it is located within SMUD's Central Heating and Cooling Plant. The project would not expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands. Refer to Figures 1 through 4.

Therefore, there are no impacts relative to any wildlands area associated with the construction and/or operation of this project.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
<b>IX. HYDROLOGY AND WATER QUALITY.</b> Would the project:				
a) Violate any water quality standards or waste discharge requirements?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation on- or off-site?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Create or contribute runoff water which would exceed the capacity of existing or planned storm-water drainage systems or provide substantial additional sources of polluted runoff?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) Otherwise substantially degrade water quality?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of a failure of a levee or dam?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
j) Inundation by seiche, tsunami or mudflow?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

### Discussion

a-j) The microgrid project will be within SMUD's Central Heating and Cooling Plant – an industrial facility. The area is developed with buildings, cooling towers, a water tank and paved or concreted open areas. No changes will occur to storm water runoff or water quality. Minor amounts of water will be need

to charge the new sections of internal piping. No housing is involved. This project constitutes a minor change to the existing heating and cooling plant. Refer to Figures 2 through 4.

Therefore no impact is expected to occur to, or as a result of this project.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
<b>X. LAND USE AND PLANNING.</b> Would the project:				
a) Physically divide an established community?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Conflict with any applicable land use plan, policy or regulation of an agency with jurisdiction over the project (including, but not limited to, the general plan, specific plan, local coastal program or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

**Discussion**

a) This project is the addition of microgrid engine-generator sets to SMUD’s existing Central Heating and Cooling Plant.

Therefore, there would be no division of an existing community.

b) This project is the addition of microgrid engine-generator sets to SMUD’s existing Central Heating and Cooling Plant. It will not conflict with existing plans.

c) This project is the addition of microgrid engine-generator sets to SMUD’s existing Central Heating and Cooling Plant. Since no species of concern are involved and the site is paved, there is no conflict with habitat conservation plans or natural community conservation plans.

Refer to Figures 1 through 4.

Therefore, no adverse impact is expected.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
<b>XI. MINERAL RESOURCES.</b> Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

**Discussion**

a, b) The addition of the microgrid engine-generator sets will add to natural gas consumption; however, it is expected that less loading on existing boilers would offset the new consumption. The existing boilers do not result in any electrical generation. The microgrid engine-generator sets produce electricity and recoverable heat. The project is the addition of equipment to SMUD’s existing Central Heating and Cooling Plant and in no way affects important mineral resources delineated in any type of land use plan.

Therefore, no adverse impact is expected.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
<b>XII. NOISE.</b> Would the project result in:				
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance or of applicable standards of other agencies?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) For a project located within an airport land use plan area or, where such a plan has not been adopted, within two miles of a public airport or a public use airport, would the project expose people residing or working in the project area to excessive noise levels?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

## Setting

The project area is within SMUD's Headquarters campus, specifically within SMUD's Central Heating and Cooling Plant. Folsom Boulevard is the northern public boundary street, 65<sup>th</sup> Street to the east, U.S. Highway 50 to the south, and 59<sup>th</sup> Street to the west. Light rail tracks bisect this area, running east-west.

Noise in this urbanized area is dominantly by transportation, especially from local roadways. U.S. Highway 50 is a major freeway in the southern Sacramento area. It is elevated at the 65<sup>th</sup> Street interchange and below grade at the 59<sup>th</sup> Street interchange. Noise levels from this freeway are 75 dBA L<sub>dn</sub> at 230 feet, 70 dBA L<sub>dn</sub> at 517 feet, and 65 dBA L<sub>dn</sub> at 1113 feet from 59<sup>th</sup> to 65<sup>th</sup> streets. Noise levels along Folsom Boulevard from 59<sup>th</sup> to 65<sup>th</sup> streets are 75 L<sub>dn</sub> at 20 feet, 70 L<sub>dn</sub> at 42 feet, and 65 L<sub>dn</sub> at 113 feet (Ref. 1). L<sub>dn</sub> is a day-night sound level where nighttime (10:00 p.m. to 7:00 a.m.) noise levels receive a weighting factor of 10 dBA above measured noise levels to compensate for nighttime disturbances.

The light rail tracks are at surface level with stations at 65<sup>th</sup> Street and at 59<sup>th</sup> Street. The 65<sup>th</sup> Street station is larger since multiple bus routes connect with light rail at this station. Noise measurements from rail traffic have been measured to range from approximately 60 to 75 dBA (City of Pomona, 2006).

Folsom Boulevard and 65<sup>th</sup> Street have small commercial establishments. However, Folsom Boulevard has a large shopping center from 55<sup>th</sup> Street to 59<sup>th</sup> Street. There is a smaller commercial center on the southwest corner of 65<sup>th</sup> Street at the Folsom Boulevard intersection. This center also contains lofts and

apartments, which represents the nearest noise sensitive location to the Microgrid project. This noise sensitive receptor is approximately 540 feet northeast of the Microgrid project area. The next nearest noise sensitive receptors are single-family homes north of Folsom Boulevard and south of U.S. Highway 50 at about 760 feet and 960 feet, respectively. However, the residential areas to the south of U.S. Highway 50 will be dominated by freeway noise as indicated above. These locations represent the nearest noise sensitive locations to the Microgrid project site (Refer to Table 1 and Figure 7).

City of Sacramento noise standards, §8.68.060, sets long-term residential and agricultural property noise levels at 55 dBA between 7:00 a.m. and 10:00 p.m. and 50 dBA between 10:00 p.m. and 7:00 a.m. The City has not established noise limits for construction, rather they have established time periods when construction activities are permissible. Under the Sacramento City Code, Title 8 Health and Safety, Chapter 8.68 Noise Control, Article II Noise Standards (§ 8.68.080E), construction related noise activities are limited from between the hours of 7:00 a.m. and 6:00 p.m., on Monday, Tuesday, Wednesday, Thursday, Friday and Saturday, and between 9:00 a.m. and 6:00 p.m. Sunday. Increases in A-weighted noise level can be described in the following ways:

- Except in carefully controlled laboratory experiments, humans cannot perceive a change of 1 dBA;
- Outside the laboratory, a 3 dBA change is considered a reasonable perceivable difference;
- A change in noise level of at least 5 dBA is required before any noticeable change in community response would be expected; and
- A 10-dBA increase is subjectively heard as approximately a doubling in loudness, while an increase of 20 dBA is four times as loud, and so on (Beranek, 1988; Burlison, 2009).

The additive sound level, based on a straight line, unobstructed distance falls below perceptible for what would be day or night ambient levels. Additionally, buildings and dense landscaping, or a large water storage tank obstruct sound paths between the microgrid project and potential receptors. Therefore it is unlikely that there would be a noise impact.

## Discussion

### **a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance or of applicable standards of other agencies?**

#### Construction Noise

The construction noise would be temporary and intermittent. Construction activities associated with the project include the following activities

- Installing modular units consisting of three engine generator set, one small cooling tower-cell, and one absorption chiller.
- Constructing a small concrete pad which is estimated to take approximately 20 to 30 minutes to construct with a small concrete delivery.
- New piping consisting of 4 inch exhaust stacks, 1 ½ inch or smaller gas and water pipes, and 2 inch electric conduit. Some of the lines may be buried in a small trench. The trencher used would be similar to one used to lay irrigation pipes for home and gardens.
- A few holes will be drilled in the existing slab by hand drills to set red-head or epoxy set bolts.

Construction will be limited to hours required by the City ordinance of between 7:00 a.m. and 6:00 p.m. Monday through Saturday. Given the very short length of any one of the construction activities, the low noise levels associated with most of the types of construction activity, distance to the nearest noise sensitive location, existing baseline noise from roadways, and noise attenuation of buildings and other objects

between the sensitive location and the site, construction noise impacts are expected to be less than significant.

#### Operational Noise

The three engine-generator sets have a maximum noise load of 70 dBA each at 20 feet. Cumulative noise levels for these engines have been calculated at 74.8 dBA at 20 feet (see Appendix F). Sound attenuation is determined by using the Inverse Square Law of Noise Propagation. The nearest noise sensitive receptor is at 65<sup>th</sup> Street and Folsom Boulevard, approximately 540-feet distant from the SMUD engines. The calculated attenuation is about 46.2 dBA (see Appendix F). This calculation is for a simple straight line, unobstructed path. However, buildings, a water storage tank, dense landscaping, and/or other obstructions to sound paths are located between the Microgrid project and noise sensitive receptors. These obstructions would further reduce the noise levels at sensitive receptors. Furthermore, the engines would be located in an enclosure further reducing the noise levels at sensitive locations. Therefore, the projected noise at the nearest noise sensitive location would be further reduced by approximately 8.5 dBA (see Appendix F) or to about 38 dBA. As indicated previously, the noise level along Folsom Boulevard from 59<sup>th</sup> to 65<sup>th</sup> streets near this noise sensitive receptor are 75 L<sub>dn</sub> at 20 feet, 70 L<sub>dn</sub> at 42 feet, and 65 L<sub>dn</sub> at 113 feet. Assuming worst-case condition at the noise sensitive receptor of 65 dBA, the cumulative noise level from the project to this location would increase this noise level by approximately 0.4 dBA (see Appendix F). As indicated above, a noise increase of 1 dBA cannot be perceived by the human ear except in carefully controlled laboratory experiments.

Other noise sensitive receptors are farther away and have the same or higher noise levels along roadways. Therefore, there noise impacts would be less than that indicated for the nearest noise sensitive receptor above. Consequently, the operational noise levels would be less than significant.

#### **b) Exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels?**

Some groundborne vibration/noise level would occur during construction. However, these impacts would be insignificant due to the type of construction activities, except for possible jack-hammering for constructing the small concrete slab foundation. Groundborne vibrations from jack-hammering would be limited (e.g., lasting 20 to 30 minutes), localized, and would definitely not exceed beyond the SMUD campus area. The engines would be mounted on concrete pads designed to control groundborn vibration/noise to well within the immediate site. Therefore, groundborn vibration/noise would be less-than-significant.

#### **c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?**

As indicated above, the noise levels from local roadways could exceed the standards set by the City of 55 dBA between 7:00 a.m. and 10:00 p.m. and 50 dBA between 10:00 p.m. and 7:00 a.m. However, the noise calculations discussed in (a) above, demonstrate that the project would be below existing noise levels and not noticed at the sensitive locations. Therefore, the potential impacts would be less-than-significant.

#### **d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?**

As discussed in (a) above, there would be a temporary increase in localized ambient noise levels associated with construction and operation of the proposed project. However, these increases have been demonstrated to be less-than-significant.

#### **e) For a project located within an airport land use plan area or, where such a plan has not been adopted, within two miles of a public airport or a public use airport, would the project expose people residing or working in the project area to excessive noise levels?**

The nearest public airport is the Sacramento Executive Airport, located about 4 miles southwest of the proposed Project site. Another public airport, Mather Field, is approximately 6 miles east of the site and McClellan Field is approximately 6 miles north-northeast of the site. Therefore, both of these airports are well over two miles from the Microgrid project site. The University of California Davis (UCD) Sacramento Medical Center's tower-top helipads are located about 6,700 feet west of the project site. Regardless, the Microgrid project would be a compatible land use with regard to the helipad and airport noise impacts. Therefore, the proposed project would not have an impact to these airports.

**f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project**

The Microgrid project is in a heavily urbanized area of Sacramento. Therefore, there are no private airstrips near the proposed project site. As a result, there is no noise impact associated with the construction and/or operation of this project relative to private airports or airstrips.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
<b>VIII. POPULATION AND HOUSING.</b> Would the project:				
a) Induce substantial population growth in an area, either directly (e.g., by proposing new homes and businesses) or indirectly (e.g., through extension of roads or other infrastructure)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

**Discussion**

a, b, c)

This project is the addition of microgrid engine-generator sets to SMUD’s existing Central Heating and Cooling Plant. It will neither induce nor displace housing.

Since potential impacts relating to population and housing do not exist, no impacts will result.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
<b>XIV. PUBLIC SERVICES.</b> Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the following public services:				
a) Fire protection?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Police protection?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Schools?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Parks?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Other public facilities?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

**Discussion**

a, b, c, d, e) Fire and police protection, schools, parks or other public facilities would not be adversely affected by the project. It is a small addition to existing SMUD infrastructure. Operation and any needed maintenance will be conducted by SMUD. No other public services are required or affected.

Therefore, there is no impact relative to public services.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
<b>XV. RECREATION.</b>				
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Does the project include recreational facilities, or require the construction or expansion of recreational facilities, which might have an adverse physical effect on the environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

**Discussion**

a, b) This project is the addition of microgrid engine-generator sets to SMUD’s existing Central Heating and Cooling Plant. There is no adjacent recreational facility. The project will not affect existing parks and recreational areas in the vicinity.

Therefore, there is no impact relative to recreational facilities.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
<b>XVI. TRANSPORTATION/TRAFFIC.</b> Would the project:				
a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Conflict with an applicable congestion management program, including but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Result in inadequate emergency access?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) Conflict with adopted policies, plans or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

### Discussion

a-f) Most components of the microgrid system are modular, approximately 8 feet x 4 feet by 6 feet high; thus, they are easily transported. During construction of the project, these components would be delivered from Highway 50 to SMUD's 6100 Folsom Boulevard entrance via either 59<sup>th</sup> Street or 65<sup>th</sup> Street. No special traffic controls or over size or over weight permits are likely to be required. The trailer mounted battery will weigh about 130,000 pounds and measure 53-feet long, 8.5-feet wide, and 13.5-feet high. It has four axles with 4 tires per axle. Final weight and configuration of the load will be used to assess if a transportation permit would be needed. There is sufficient driveway clearance that as each load arrives; the delivery vehicle can pull fully off of Folsom Boulevard. Access from SMUD's S Street entrances cannot be made since SMUD's internal light rail undercrossing has insufficient overhead clearance. Construction crew size is not expected to about a dozen workers; 4 to 5 being existing on-site SMUD workers. SMUD has adequate onsite room for parking and equipment storage. Construction and operation of the project does not conflict with plans or programs supporting alternative transportation; the substation is an unstaffed facility. Light rail tracks pass adjacent to the project location; however, no construction or operational parameters would interfere with light rail operation.

Therefore, potential impacts are considered to be less than significant.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
<b>XVII. UTILITIES AND SERVICE SYSTEMS.</b> Would the project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Result in a determination by the wastewater treatment provider that serves or may serve the project that it has adequate capacity to serve the project's projected demand, in addition to the provider's existing commitments?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
g) Comply with federal, state and local statutes and regulations related to solid waste?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

**Discussion**

a-g) This project is the addition of microgrid engine-generator sets to SMUD's existing Central Heating and Cooling Plant. Aside from modifications to SMUD's own facility, there are no impacts non-SMUD utilities and services. The existing facility has gas, water, electrical and phone service. All work is internal to the SMUD control aspects of each utility.

Therefore, no impacts are expected to Utilities and Service Systems.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
<b>XVIII. MANDATORY FINDINGS OF SIGNIFICANCE.</b>				
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of rare or endangered plants or animals, or eliminate important examples of the major periods of California history or prehistory?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Does the project have impacts that are individually limited, but cumulatively considerable? "Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Does the project have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Discussion**

a) The Environmental Checklist was completed to assess the potential significance of environmental impacts that could result from the proposed project. As noted in the Initial Study environmental checklist, no effects of construction or operation have been identified that would result in a significant impact to biological resources, including any degradation of any fish or wildlife habitat, cause any species to drop below a self-sustaining level, or reduce or eliminate any habitat of species of concern. The project will not have an adverse effect on cultural or historical properties or places.

b) The project itself is approximately equivalent to using three full size pickup truck engines, fired with natural gas, to run generators and capture waste heat. The captured waste heat would offset some of the run-time on SMUD’s existing Central Heating and Cooling Plant’s boilers. The up to 300 kilowatts (kW) generated would offset 300 kW generated elsewhere. Since the existing boilers and microgrid units could run simultaneously, albeit the boilers for a shorter period, mitigation will be applied to offset nitrogen oxides – catalytic NO<sub>x</sub> reduction and the surrender of some air emissions offsets.

Given the small size of the project and the chief intent to confirm and refine methods to ensure power reliability and power quality for sensitive users it is not expected that this project would have cumulative negative environmental effects.

All of the potential impacts identified in this Initial Study will result in a less than significant impact due to:

- Use of existing slabs and paved areas,
- Incorporation of best management practices, and
- Mitigation for air quality purposes.

Therefore, for the project overall, a less than significant impact would occur individually or cumulatively.

c) As indicated throughout this Initial Study, significant environmental impacts are not expected to occur as a result of project construction or operation, including those potential effects on human beings.

## Preparers:

- Kimberly Crawford, Environmental Project Manager
- Ron Knierim, Environmental , Health and Safety Specialist II
- Stu Husband, , Health and Safety Specialist III
- Ted Huff, , Health and Safety Specialist II
- Robert Labbe, Principal Civil Engineer

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## **Appendix A – Mitigation and Monitoring Plan**

**MITIGATION AND MONITORING PLAN FOR THE SMUD CENTRAL HEATING AND COOLING PLANT MICROGRID PROJECT<sup>1</sup>**

Impact		Mitigation	Implementation Duration		Monitoring Duration		Responsibility	
			One-time	Ongoing	One-time	Ongoing	Implementation	Monitoring
Air Quality <sup>2</sup>								
Factory Derate Engines	AQ-1		Placement of order for engines		Confirmation upon delivery		SMUD	SMUD
Install 3-way Catalyst	AQ-2		During construction		Confirmation on inspection/ acceptance		SMUD	SMUD
Install Air-Fuel Controllers	AQ-3		Placement of order for engines		Confirmation upon delivery		SMUD	SMUD
Natural Gas Fuel	AQ-4		Gas line hookup during construction			Annual reporting per permits	SMUD	SMUD
Air Quality Offset Certificates	AQ-5		Prior to final permitting				SMUD	SMAQMD
Source Test	AQ-6						SMUD	SMAQMD
Records Keeping	AQ-7			From first startup		For life pursuant to SMAQMD	SMUD	SMUD

<sup>1</sup> Mitigation measures for air quality are the only mitigation measures adopted. Also see Best Management Practices.

<sup>2</sup> These mitigation measures are based on the Draft Authority to Construct from the SMAQMD, any tighter, or new requirements in the final ATC or Permits will supersede the existing mitigation or be added as a new mitigation.

## **Appendix B – Summary of Best Management Practices**

### **Introduction**

The Sacramento Municipal Utility District (SMUD) will, where feasible considering the small size of the project, be implementing a series of best management practices (BMPs) for the proposed Mircogrid project. Those measures incorporated into this Best Management Practices Summary could help to reduce impacts that are found not to be significant, or define a response to an issue that is not normally expected to arise but still possible.

### **BMP Implementation and Monitoring**

Implementing these BMPs is ultimately the responsibility of SMUD, although for certain BMPs, others have been assigned the responsibility of actually implementing the practice. SMUD will be responsible for monitoring the implementation of these BMPs.

SMUD retains primary responsibility for ensuring that the proposed project observes the practices as described in this Negative Declaration.

### **Alternatives**

SMUD will be responsible for ensuring all feasible BMPs are observed. If alternative practices are identified that would be equally effective in addressing the protection of a given resource, the implementation of the practice will not occur until agreed upon by SMUD.

<b>SMUD Best Management Practices (BMPs) Summary for the SMUD Central Heating and Cooling Plant Microgrid Project</b>							
Resource or other activities	Best Management Practice (BMP)	BMP Implementation Duration		Monitoring Duration		BMP Implementation	BMP Monitoring
		One-time	Ongoing	One-time	Ongoing		
Air quality	<b>AQ BMP 1</b> Apply water, asphalt oil, or suitable soil stabilizers to inactive areas or other areas that can give rise to airborne dust.		Throughout the project construction period		Throughout the project construction period	<b>SMUD</b>	<b>SMUD</b>
Air quality	<b>AQ BMP 2</b> Water exposed surfaces up to three times daily to prevent fugitive dust from migrating beyond the project's boundaries.		Throughout the project construction period		Throughout the project construction period	<b>SMUD</b>	<b>SMUD</b>
Air quality	<b>AQ BMP 3</b> Cover all inactive stockpiles with tarps or water to prevent airborne dust.		Throughout the project construction period		Throughout the project construction period	<b>SMUD</b>	<b>SMUD</b>
Air quality	<b>AQ BMP 4</b> Replace ground cover in disturbed areas as soon as construction in these areas is completed.		Throughout the project construction period		Throughout the project construction period	<b>SMUD</b>	<b>SMUD</b>
Air quality	<b>AQ BMP 5</b> Maintain two feet of freeboard space on haul trucks.		Throughout the project construction period		Throughout the project construction period	<b>SMUD</b>	<b>SMUD</b>
Air quality	<b>AQ BMP 6</b> Water soil piles three times daily.		Throughout the project construction period		Throughout the project construction period	<b>SMUD</b>	<b>SMUD</b>
Air quality	<b>AQ BMP 7</b> Minimize the amount of disturbed area, the amount of material actively worked, and the amount of material stockpiled.		Throughout the project construction period		Throughout the project construction period	<b>SMUD</b>	<b>SMUD</b>

<b>SMUD Best Management Practices (BMPs) Summary for the SMUD Central Heating and Cooling Plant Microgrid Project</b>							
<b>Resource or other activities</b>	<b>Best Management Practice (BMP)</b>	<b>BMP Implementation Duration</b>		<b>Monitoring Duration</b>		<b>BMP Implementation</b>	<b>BMP Monitoring</b>
Air quality	<b>AQ BMP 8</b> Sweep or wash paved streets adjacent to the project construction site at least once a day to remove accumulated dust.		Throughout the project construction period		Throughout the project construction period	<b>SMUD</b>	<b>SMUD</b>
Air quality	<b>AQ BMP 9</b> Emissions from all off-road diesel-powered equipment used at the project site shall not exceed 40 percent opacity for more than 3 minutes in any one hour.		Throughout the project construction period		Throughout the project construction period	<b>SMUD</b>	<b>SMUD</b>
Cultural	<b>Cultural BMP 1</b> If any cultural resources, such as structure features, unusual amounts of bone or shell, artifacts, human remains, or architectural remains are encountered during any project development activities, work shall be suspended and the County Department of Environmental Review and Assessment shall be immediately notified. At that time, the Planning Department will coordinate with SMUD to ensure any necessary investigations of the site with appropriate specialists is performed. SMUD shall be required to implement any mitigation deemed necessary for the protection of the cultural resources.		Throughout the project construction period		Throughout the project construction period	<b>SMUD</b>	<b>SMUD</b>

<b>SMUD Best Management Practices (BMPs) Summary for the SMUD Central Heating and Cooling Plant Microgrid Project</b>							
<b>Resource or other activities</b>	<b>Best Management Practice (BMP)</b>	<b>BMP Implementation Duration</b>		<b>Monitoring Duration</b>		<b>BMP Implementation</b>	<b>BMP Monitoring</b>
Cultural	<b>Cultural BMP 2</b> When Native American archaeological, ethnographic, or spiritual resources are involved, all identification and treatment shall be conducted by qualified archaeologists who meet the federal standards as stated in the Code of Federal Regulations (CFR) (36 CFR 61), and Native American representatives who are approved by the local Native American community as keepers of their cultural traditions. In the event that no such Native American is available, persons who represent tribal governments and/or organizations in the locale in which resources could be affected shall be consulted.		Throughout the project construction period		Throughout the project construction period	<b>SMUD</b>	<b>SMUD</b>
Cultural	<b>Cultural BMP 3</b> Pursuant to Section 5097.98 of the California Public Resources Code and Section 7050.5 of the State Health and Safety Code, if human remains or bone of unknown origin is found during construction, all work shall stop in the vicinity of the find and the Sacramento County Coroner shall be contacted immediately. If the remains are determined to be Native American, the coroner shall notify the Native American Heritage Commission who shall notify the person it believes to be the most likely descendant. The most likely descendant shall work with the contractor to develop a program for re-interment of the human remains and any associated artifacts. No additional work shall take place within the immediate vicinity of the find until the identified appropriate actions have been implemented.		Throughout the project construction period		Throughout the project construction period	<b>Qualified archaeologist or cultural resource specialist</b>	<b>SMUD</b>
Hazmat	<b>Hazmat BMP 1</b> If an accidental release occurs during refueling or transformer transport, the release shall be cleaned up immediately and reported in accordance with applicable federal, state, and local requirements.		Throughout the project construction period		Throughout the project construction period	<b>SMUD</b>	<b>SMUD</b>

<b>SMUD Best Management Practices (BMPs) Summary for the SMUD Central Heating and Cooling Plant Microgrid Project</b>							
<b>Resource or other activities</b>	<b>Best Management Practice (BMP)</b>	<b>BMP Implementation Duration</b>		<b>Monitoring Duration</b>		<b>BMP Implementation</b>	<b>BMP Monitoring</b>
		Hazmat	<b>Hazmat BMP 2</b> If an accidental spill occurs during construction, the release shall be cleaned up immediately and reported in accordance with applicable federal, state, and local requirements.		Throughout the project construction period		Throughout the project construction period
Hazmat	<b>Hazmat BMP 3</b> Inspect equipment containing hazardous materials periodically for signs of spills or leakage.	Throughout the project construction period	Throughout the project construction period	Throughout the project construction period	During project operation	<b>SMUD</b>	<b>SMUD</b>
Noise	<b>Noise BMP 1</b> Construction activities will be limited to occur between the hours of 7:00 a.m. and 7:00 p.m. Monday through Saturday.		Throughout the project construction period		Throughout the project construction period	<b>SMUD</b>	<b>SMUD</b>
Noise	<b>Noise BMP 2</b> Construction activities will be prohibited on federal- and state-recognized holidays.		Throughout the project construction period		Throughout the project construction period	<b>SMUD</b>	<b>SMUD</b>
Noise	<b>Noise BMP 3</b> Construction equipment powered by an internal combustion engine shall be equipped with suitable exhaust and intake silencers, in accordance with manufacturers' specifications, and shall be maintained in good working order.		Throughout the project construction period		Throughout the project construction period	<b>SMUD</b>	<b>SMUD</b>
Noise	<b>Noise BMP 4</b> Stationary construction equipment (i.e., portable power generators, compressors) shall be located at the furthest distance possible from nearby residential units.		Throughout the project construction period		Throughout the project construction period	<b>SMUD</b>	<b>SMUD</b>

## Appendix C – Acronyms and Abbreviations

AB	Assembly Bill
APN	Assessor's Parcel Number
ATC	Authority to Construct
BAAQMD	Bay Area Air Quality Management District
Bhp	Brake Horse Power
BMPs	Best Management Practices
BTU	British Thermal Unit
CAAQS	California Ambient Air Quality Standards
CAPCOA	California Air pollution Control Officers Association
CARB	California Air resources Board
CCAR	California Climate Action Registry
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CH <sub>4</sub>	Methane
CO	Carbon monoxide gas
CO <sub>2</sub>	Carbon Dioxide
dBA	decibels, A weighted
EIR	Environmental Impact Report
GHG	Greenhouse Gasses
g/hp-hr	Grams per horse power-hour
kW	kilowatt (1,000 watts)
LEED	Leadership in Energy and Environmental Design
MTCO <sub>2</sub> e	Metric Ton Carbon Dioxide equivalent
MW	Megawatt (1,000 kW or 1,000,000 watts)
NAAQS	National Ambient Air Quality Standards
NO <sub>x</sub>	Oxide(s) of nitrogen gas
O <sub>3</sub>	Ozone
OPR	Office of Planning and Research
PM <sub>10</sub>	Particulate matter $\leq$ 10 micrometers in diameter
PM <sub>2.5</sub>	Particulate matter that measures 2.5 micrometers in diameter

PRC	Public Resources Code
ROC	Reactive Organic Compounds
ROG	Reactive Organic Gasses
Rpm	Revolutions per minute
RPS	Renewable Portfolio Standard
SB	Senate Bill
SF <sub>6</sub>	Sulfur Hexafluoride
SFNA	Sacramento Federal Nonattainment Area
SMAQMD	Sacramento Metropolitan Air Quality Management District
SMUD	Sacramento Municipal Utility District
SO <sub>x</sub>	Sulfur Oxides
SPCC	Spill Prevention Control and Countermeasure Plan
µg/m <sup>3</sup>	Micrograms per cubic meter
USEPA	United States Environmental Protection Agency

# Appendix D Draft Authority to Construct

July 16, 2010

SMUD  
Attn: Brad Gacke  
6201 S St  
Sacramento, CA 95817

Dear Applicant:

This is to inform you of the Air Pollution Control Officer's decision to issue a Preliminary Authority to Construct for Sacramento Municipal Utility District for the construction of 3 – spark ignited engines for prime power generation. Enclosed for your information is a copy of the engineering evaluation and Authority to Construct for this application. Written comments must be received by the District by 8/16/10.

If you have any questions, you may contact me at (916) 874-4861.

Sincerely,



Venk Reddy  
Air Quality Engineer

Enclosure

777 12th Street, 3rd Floor ☎ Sacramento, CA 95814-1908  
916/874-4800 ☎ 916/874-4899 fax  
[www.airquality.org](http://www.airquality.org)

**AIR QUALITY  
MANAGEMENT DISTRICT**

**AUTHORITY TO CONSTRUCT**

**A/C NO.:** 22496, 22497, 22506

**ISSUED BY:** Draft  
VENK REDDY

**DATE ISSUED:** TBD

**DATE EXPIRES:** TBD

**ISSUED TO:** SMUD

**LOCATION:** 6180 FOLSOM BLVD, SACRAMENTO, CA

**DESCRIPTION:**

**A/C 22496:** IC ENGINE PRIME POWER, MAKE: GENERAL MOTORS, MODEL: TECODRIVE 7400 LE SERIAL NO.: TBD, 181 BHP @ 3,000 RPM, DERATED TO 145 AT 2500 RPM, 454 CU. INCHES DISPLACEMENT, NATURAL GAS FIRED, DRIVING A COGENERATION UNIT EQUIPPED WITH A 3-WAY CATALYST AND AIR TO FUEL RATIO CONTROLLER. INSTALLED AND RE-BRANDED BY TECOGEN

**A/C 22497:** IC ENGINE PRIME POWER, MAKE: GENERAL MOTORS, MODEL: TECODRIVE 7400 LE SERIAL NO.: TBD, 181 BHP @ 3,000 RPM, DERATED TO 145 AT 2500 RPM, 454 CU. INCHES DISPLACEMENT, NATURAL GAS FIRED, DRIVING A COGENERATION UNIT EQUIPPED WITH A 3-WAY CATALYST AND AIR TO FUEL RATIO CONTROLLER. INSTALLED AND RE-BRANDED BY TECOGEN

**A/C 22506:** IC ENGINE PRIME POWER, MAKE: GENERAL MOTORS, MODEL: TECODRIVE 7400 LE SERIAL NO.: TBD, 181 BHP @ 3,000 RPM, DERATED TO 145 AT 2500 RPM, 454 CU. INCHES DISPLACEMENT, NATURAL GAS FIRED, DRIVING A COGENERATION UNIT EQUIPPED WITH A 3-WAY CATALYST AND AIR TO FUEL RATIO CONTROLLER. INSTALLED AND RE-BRANDED BY TECOGEN

**AUTHORITY TO CONSTRUCT CONDITIONS**

**GENERAL**

1. THE EQUIPMENT SHALL BE PROPERLY MAINTAINED AND OPERATED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AT ALL TIMES.
2. THE AIR POLLUTION CONTROL OFFICER AND/OR AUTHORIZED REPRESENTATIVES, UPON THE PRESENTATION OF

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**AIR QUALITY  
MANAGEMENT DISTRICT**

**AUTHORITY TO CONSTRUCT**

A/C NO.: 22496, 22497, 22506

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CREDENTIALS SHALL BE PERMITTED:

- A. TO ENTER UPON THE PREMISES WHERE THE SOURCE IS LOCATED OR IN WHICH ANY RECORDS ARE REQUIRED TO BE KEPT UNDER THE TERMS AND CONDITIONS OF THIS AUTHORITY TO CONSTRUCT, AND
  - B. AT REASONABLE TIMES TO HAVE ACCESS TO AND COPY ANY RECORDS REQUIRED TO BE KEPT UNDER TERMS AND CONDITIONS OF THIS AUTHORITY TO CONSTRUCT, AND
  - C. TO INSPECT ANY EQUIPMENT, OPERATION, OR METHOD REQUIRED IN THIS AUTHORITY TO CONSTRUCT, AND
  - D. TO SAMPLE EMISSIONS FROM THE SOURCE OR REQUIRE SAMPLES TO BE TAKEN.
3. THIS AUTHORITY TO CONSTRUCT DOES NOT AUTHORIZE THE EMISSION OF AIR CONTAMINANTS IN EXCESS OF THOSE ALLOWED BY DIVISION 26, PART 4, CHAPTER 3, OF THE CALIFORNIA HEALTH AND SAFETY CODE OR THE RULES AND REGULATIONS OF THE AIR QUALITY MANAGEMENT DISTRICT.
  4. THE EQUIPMENT SHALL NOT DISCHARGE SUCH QUANTITIES OF AIR CONTAMINANTS OR OTHER MATERIAL WHICH CAUSE INJURY, DETRIMENT, NUISANCE OR ANNOYANCE OR ANY CONSIDERABLE NUMBER OF PERSONS OR TO THE PUBLIC, OR WHICH ENDANGER THE COMFORT, REPOSE, HEALTH, OR SAFETY OF ANY SUCH PERSONS OR THE PUBLIC OR WHICH CAUSE OR HAVE A NATURAL TENDENCY TO CAUSE INJURY OR DAMAGE TO BUSINESS OR PROPERTY.
  5. A LEGIBLE COPY OF THIS AUTHORITY TO CONSTRUCT SHALL BE MAINTAINED ON THE PREMISES WITH THE EQUIPMENT.

**EMISSION LIMITATIONS**

6. THE IC ENGINES SHALL NOT DISCHARGE INTO THE ATMOSPHERE ANY VISIBLE AIR CONTAMINANT OTHER THAN UNCOMBINED WATER VAPOR, FOR A PERIOD OR PERIODS AGGREGATING MORE THAN THREE MINUTES IN ANY ONE HOUR, WHICH IS AS DARK OR DARKER THAN RINGELMANN NO. 1 OR EQUIVALENT TO OR GREATER THAN 20% OPACITY.
7. THE EMISSIONS FROM EACH RESPECTIVE IC ENGINE SHALL NOT EXCEED THE FOLLOWING LIMITS:

POLLUTANT	EMISSION FACTOR (A) G/HP-HR	MAXIMUM ALLOWABLE EMISSIONS (B)	
		LB/DAY	LB/QUARTER
ROC	0.6	5	423
NOx	0.094	1	66
SOx	0.002	0.02	1
PM10	0.152	1	107
CO	4.0	31	2,823

- (A) THE INDIVIDUAL EMISSION FACTOR FOR SOX AND PM10 ARE BASED ON AP-42 DATA FOR THIS SOURCE CATEGORY. NOX, ROC AND CO EMISSION FACTORS ARE BASED ON THE APPLICANT'S REQUEST, TO BE VERIFIED THROUGH A SOURCE TEST.
- (B) EMISSIONS ARE BASED ON 145 BHP, 24 HOURS/ DAY, 92 DAYS/QTR, CONTINUOUS OPERATION.

**THIS IS NOT A PERMIT TO OPERATE**

**AIR QUALITY  
MANAGEMENT DISTRICT**

**AUTHORITY TO CONSTRUCT**

A/C NO.: 22496, 22497, 22506

*Draft*

8. THE NOX EMISSION INCREASE FOR THE THREE ENGINES COMBINED IS AS FOLLOWS:

NOX QUARTERLY EMISSION INCREASE			
QTR 1	QTR 2	QTR 3	QTR 4
194.7 LBS	196.9 LBS	199.0 LBS	199.0 LBS

THE APPLICANT SHALL PROVIDE SMAQMD EMISSION REDUCTION CREDIT CERTIFICATES IN SUFFICIENT QUANTITY TO SHOW COMPLIANCE WITH THE QUARTERLY EMISSION INCREASE BY THE USE OF THE FOLLOWING CALCULATION PROCEDURE FOR APPLICATION OF EMISSION CREDITS FROM THE SAME QUARTER.

$$QTR_q = (P_{q \leq 15} / 1.2) + (P_{q > 15} / 1.5) + (P_{qcom} / 1.0)$$

Where

$P_q$  = EMISSION OFFSET CREDIT FOR POLLUTANT IN LB/QTR

QTR = QUARTER (1,2,3 OR 4)

$\leq 15$  = THOSE EMISSION REDUCTION CREDIT CERTIFICATES WHOSE POINT OF ORIGIN WAS WITHIN 15 MILES OF THE PROPOSED LOCATION

$> 15$  = THOSE EMISSION REDUCTION CREDIT CERTIFICATES WHOSE POINT OF ORIGIN WAS GREATER THAN 15 MILES BUT LESS THAN 50 FROM THE PROPOSED LOCATION.

com = THOSE EMISSION REDUCTION CREDIT CERTIFICATES THAT ARE LEASED FROM THE SMAQMD'S COMMUNITY BANK.

**EQUIPMENT OPERATION**

9. EACH IC ENGINE SHALL BE EQUIPPED WITH A NON-RESETTING HOUR METER, WITH A MINIMUM DISPLAY CAPABILITY OF 9,999 HOURS.
10. UPON REQUEST OF THE AIR POLLUTION CONTROL OFFICER OR DESIGNEE, ONCE EACH YEAR, DURING DAYLIGHT HOURS, THE IC ENGINE(S) SHALL BE RUN AT MAXIMUM ANTICIPATED LOAD, FOR OBSERVATION OF COMPLIANCE WITH OPACITY LIMITATIONS.
11. THE AIR TO FUEL RATIO CONTROLLER ON EACH RESPECTIVE ENGINE MUST BE PROPERLY MAINTAINED PER THE MANUFACTURER. THE AIR TO FUEL RATIO CONTROLLER INSTALLED ON EACH RESPECTIVE ENGINE MUST BE IN OPERATION ANYTIME THAT RESPECTIVE ENGINE IS OPERATED.
12. THE IC ENGINES SHALL BE FUELED WITH NATURAL GAS ONLY.

**SOURCE TEST**

13. AN INITIAL SOURCE TEST FOR EACH RESPECTIVE ENGINE IS REQUIRED WITHIN 60 DAYS OF INITIAL OPERATION OF EACH RESPECTIVE ENGINE.
  - A. AN INITIAL NOTIFICATION SHALL BE SUBMITTED TO THE EPA AND SMAQMD 30 DAYS PRIOR TO THE SOURCE TEST
  - B. A SOURCE TEST PLAN SHALL BE SUBMITTED TO SMAQMD 45 DAYS PRIOR TO SOURCE TEST

**AIR QUALITY  
MANAGEMENT DISTRICT**

**AUTHORITY TO CONSTRUCT**

A/C NO.: 22496, 22497, 22506

*Draft*

- C. ALL ITEMS NEEDED FOR THE SOURCE TEST SHALL BE PROVIDED BY THE APPLICANT
    - 1. SAMPLING PORTS
    - 2. CONSTRUCTION OF THE AIR POLLUTION CONTROL SYSTEM SUCH THAT VOLUMETRIC FLOW RATES AND POLLUTANT EMISSION RATES CAN BE ACCURATELY DETERMINED BY APPLICABLE TEST METHODS AND PROCEDURES
    - 3. PROVIDE A STACK OR DUCT FREE OF CYCLONIC FLOW DURING PERFORMANCE TESTS AS DEMONSTRATED BY APPLICABLE TEST METHODS AND PROCEDURES.
    - 4. SAFE SAMPLING PLATFORMS
    - 5. SAFE ACCESS TO SAMPLING PLATFORM(S)
    - 6. UTILITIES FOR SAMPLING AND TESTING EQUIPMENT.
  - D. THE TEST SHALL CONSIST OF THREE SEPARATE RUNS USING THE APPLICABLE TEST METHODS. FOR THE PURPOSES OF DETERMINING COMPLIANCE WITH APPLICABLE STANDARDS, THE ARITHMETIC MEANS OF THE RESULTS OF THE THREE RUNS SHALL APPLY.
  - E. TEST METHODS SHALL BE AS FOLLOWS (PER 40 CFR 60 PART JJJJ, TABLE 2)
    - 1. SAMPLING PORT LOCATIONS – EPA METHOD 1 OR 1A
    - 2. O2 – METHOD 3, 3A, OR 3B
    - 3. EXHUAST FLOW RATE – EPA METHOD 2 OR 19
    - 4. MOISTURE – EPA METHOD 4 OR METHOD 320
    - 5. NOX – EPA METHOD 7E METHOD D6522-00, METHOD 320, OR ASTM D6348-03
    - 6. CO – EPA METHOD 10, METHOD D6522-00, METHOD 320
    - 7. VOC - EPA METHOD 25A AND 18. METHOD 25A WITH THE USE OF A METHAND CUTTER AS DESCRIBED IN 40 CFR 1065.265, METHOD 18 OR 40 CFR PART 60 APPENDIX A OR ASTM D6348-03. RESULTS OF THIS TEST CONSIST OF THE AVERAGE OF THREE 1 – HOUR OR LONGER RUNS.
  - F. SOURCE TEST SHALL BE CONDUCTED IN THE RANGE OF 90 - 100 PERCENT LOAD
  - G. THREE RUNS ARE REQUIRED FOR ALL POLLUTANTS AND LAST FOR AT LEAST 1 HOUR
14. FINAL SOURCE TEST REPORT SHALL BE SUBMITTED TO EPA AND SMAQMD WITHIN 60 DAYS OF TEST COMPLETION. CALCULATIONS FOR NOX, CO, AND VOC SHALL BE BASED ON 40 CFR 60 PART JJJJ 60.4244 (d) THROUGH (g)

**RECORD KEEPING**

- 15. THE FOLLOWING RECORDS SHALL BE CONTINUOUSLY MAINTAINED ONSITE FOR THE MOST RECENT THREE YEAR PERIOD AND SHALL BE MADE AVAILABLE TO THE AIR POLLUTION CONTROL OFFICER UPON REQUEST. MONTHLY, QUARTERLY, AND YEARLY RECORDS SHALL BE MADE AVAILABLE WITHIN 30 DAYS OF END OF REPORTING PERIOD.

FREQUENCY	INFORMATION TO BE RECORDED
QUARTERLY	A. TOTAL NUMBER OF HOURS OF OPERATION (HOURS/QUARTER).
YEARLY	B. TOTAL NUMBER OF HOURS OF OPERATION (HOURS/YEAR).
ALL TIMES	C. MAINTENANCE PLAN TO KEEP THE ENGINES AND AIR TO FUEL RATO CONTROLLERS PROPERLY OPERATING PER THE MANUFACTURER'S STANDARDS. D. RECORD OF MAINTENANCE ACTIVITIES PERFORMED DURING MAINTENANCE OF THE ENGINES. E. ALL NOTIFICATIONS SUBMITTED TO EPA F. COPIES OF SOURCE TEST PLAN AND FINAL REPORT

**START-UP**

- 16. UPON INSTALLATION OF THE EQUIPMENT AUTHORIZED IN THIS AUTHORITY TO CONSTRUCT, THE OWNER/OPERATOR SHALL CONTACT THE SACRAMENTO AIR QUALITY MANAGEMENT DISTRICT AT (916) 874-4800 TO ARRANGE FOR A START-

# AIR QUALITY

## MANAGEMENT DISTRICT

### AUTHORITY TO CONSTRUCT

A/C NO.: 22496, 22497, 22506

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UP INSPECTION.

- 17. THIS AUTHORITY TO CONSTRUCT SHALL SERVE AS A TEMPORARY PERMIT TO OPERATE PROVIDED THAT:
  - A. THE SMAQMD HAS BEEN NOTIFIED FOR A START-UP INSPECTION.
  - B. THE EQUIPMENT INSTALLED MATCHES THE EQUIPMENT AUTHORIZED IN THE AUTHORITY TO CONSTRUCT.
  - C. THE EQUIPMENT IS OPERATED IN COMPLIANCE WITH ALL CONDITIONS LISTED WITHIN THE AUTHORITY TO CONSTRUCT.

YOUR APPLICATION FOR THIS AIR QUALITY AUTHORITY TO CONSTRUCT WAS EVALUATED FOR COMPLIANCE WITH SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT (AQMD), STATE AND FEDERAL AIR QUALITY RULES. THE FOLLOWING LISTED RULES ARE THOSE THAT ARE MOST APPLICABLE TO THE OPERATION OF YOUR EQUIPMENT. OTHER RULES MAY ALSO BE APPLICABLE.

<u>AQMD RULE NO.</u>	<u>RULE TITLE</u>
201	GENERAL PERMIT REQUIREMENTS
202	NEW SOURCE REVIEW
401	RINGELMANN CHART
402	NUISANCE
406	SPECIFIC CONTAMINANTS
420	SULFUR CONTENT OF FUELS
40 CFR 60 SUBPART JJJJ	STANDARD PERFORMANCE FOR STATIONARY SPARK IGNITION INTERNAL COMBUSTION ENGINES.

IN ADDITION, THE CONDITIONS ON THIS AUTHORITY TO CONSTRUCT MAY REFLECT SOME, BUT NOT ALL, REQUIREMENTS OF THESE RULES. THERE MAY BE OTHER CONDITIONS THAT ARE APPLICABLE TO THE OPERATION OF YOUR EQUIPMENT. FUTURE CHANGES IN PROHIBITORY RULES MAY ESTABLISH MORE STRINGENT REQUIREMENTS WHICH MAY SUPERSEDE THE CONDITIONS LISTED HERE.

FOR FURTHER INFORMATION PLEASE CONSULT YOUR AQMD RULEBOOK OR CONTACT THE AQMD FOR ASSISTANCE.

THIS IS **NOT** A PERMIT TO OPERATE

**AUTHORITY TO CONSTRUCT**

<b>APPLICATION NO.:</b>	<u>22496, 22497, 22506</u>
<b>DATE:</b>	<u>06/08/10</u>
<b>EVALUATED BY:</b>	<u>Venk Reddy</u>

**FACILITY NAME:** SMUD**LOCATION OF EQUIPMENT:** 6180 Folsom Blvd, Sacramento, CA

**PROPOSAL:** Obtain an Authority to Construct for three prime power natural gas fired, standby IC Engines for electrical power generation. The engines are equipped with a 3 way catalyst and air to fuel ratio controllers. The engines are part of a cogeneration system made by Tecogen.

**INTRODUCTION:**

The applicant is applying for an Authority to Construct/Permit to Operate three natural gas IC engines that will be used as prime power. Each engine is rated at 185 HP by the manufacturer of the entire unit that contains the engine, but will be restricted to operate at 145 HP by removing the peaking ability as well as software controls that would limit the KW output. The engines do not have federal certifications and are subject to conditions regarding uncertified engines in Title 40 Part 60 Subpart JJJJ, which includes source testing.

The applicant operates several pieces of equipment at the adjacent buildings. For the purposes of offsets, the equipment located on adjacent properties will be aggregated. Two of the emergency engines located on one of the adjacent properties have been grandfathered in to have no limit on emergency operation. For equipment with no limit, for the purposes of offset calculations, EPA has given guidance in the past to use 500 hrs per year. This quantity of hours will be used for this permitting action. The applicant has also indicated that the permitted HP rating of these engines is higher than permitted. Offset tables will reflect this higher HP rating.

The turbine permitted under 4365 does not have a potential to emit listed on the permit. Based on current hours of 200 and 35 gal/hr fuel usage, AP-42 values, from 4-00 Chapter 3.1 were used to determine emission values.

**FLOW DIAGRAM:** Not applicable.**EQUIPMENT DESCRIPTION:**

For each respective engine

Make:	General Motors 7400LE Rich burn, Re-branded as Tecogen
Model No.:	TBD
ID No.:	TBD
Engine BHP:	181 HP@3000rpm, but derated to 145 HP.
Fuel Type:	Natural gas
Secondary Fuel:	None
Normal Aspiration	

Driving an electrical generator  
Equipped with a three way catalyst & air to fuel ratio controller.

**CONTROL EQUIPMENT EVALUATION:**

The engines are equipped with a three way catalyst & air to fuel ratio controller.

**PROCESS RATE:**

The units will be permitted as prime power, full time operation, with no restriction.

**EMISSIONS CALCULATIONS:**

1. **HISTORIC POTENTIAL TO EMIT:** These are newly permitted units, no historical Potential to Emit.
2. **PROPOSED POTENTIAL TO EMIT:**

For each respective engine the proposed potential to emit are as follows:

Pollutant	Emission Factor(A) g/hp-hr	Proposed Emissions(B)		
		Lb/day	Lb/quarter	Lb/year
ROC	0.6	5	423	1,692
Nox	0.094	1	66	264
Sox	0.002	0.02	1	4
PM10	0.152	2	107	428
CO	4.0	31	2,823	11,293

- A. Emission factors for SOx and PM10 are from AP-42, *Compilation of Air Pollutant Emission Factors*, Chapter 3. ROC, NOx are per the applicant's request, to be verified by a source test and CO emissions are based on limiting BACT, and offset requirements.
- B. Emissions based on 145 HP, 24 hours/day, 2208 hours/quarter

**3. CALCULATION OF BACT TRIGGER:**

NEI (BACT) = Net Emissions Increase  
= Proposed Potential to Emit - Historic Potential to Emit  
MPE = Maximum Potential Emissions on a 24-Hour Day Operation  
For each Respective Engine

Pollutant	NEI (BACT) Lb/qtr	Is NEI (BACT) >0?	MPE lb/day	BACT Trigger lb/day	Is BACT Required?
ROC	423	Yes	5	>10	No
NOx	66	Yes	1	>10	No
SOx	1	Yes	2E-2	>10	No
PM10	107	Yes	2	>10	No
CO	2,823	Yes	31	>550	No

**4. CALCULATION OF OFFSET TRIGGER FOR ROC AND NO<sub>x</sub>:**

Permit No.	Emissions Unit	Stationary Source Cumulative Emissions Increase lb/qtr	
		ROC	NO <sub>x</sub>
4365 (A)	Turbine Standby	0.4	856
10061(B)	Standby Engine, 1135 HP	350	13,625
10062 (B)	Standby Engine, 1135 HP	350	13,625
21333	GDF	381	0
18170	GDF	76	0
17913	Gasoline Bulk Plant	310	0
21334	GDF	381	0
20320	GDF	76	0
21310	GDF	114	0
19665	Boiler	61	402
19666	Boiler	61	402
20366	Printing Press	1,000	0
20367	Printing Press	500	0
20554	Boiler	12	80
20555	Boiler	12	80
21790	Diesel Particulate Filter	0	0
22496	Cogen, 145 HP	423	66
22497	Cogen, 145 HP	423	66
22506	Cogen, 145 HP	423	66
22313,22380 & 22378 are portable wire pullers and although permitted at this address, are not included in the facility total			
Total		4,953	29,268
Trigger Level		>5,000	>5,000

(A) Emissions have been revised to reflect latest AP-42 emission factors

(B) Emissions have been revised to reflect a higher rated HP of 1135, reported by the applicant

**5. CALCULATION OF OFFSET TRIGGER FOR SO<sub>x</sub>, PM<sub>10</sub> AND CO:**

Permit No.	Emissions Unit	Stationary Source Cumulative Emission Increase Since 01-01-77 lb/quarter		
		SO <sub>x</sub>	PM <sub>10</sub>	CO
4365 (A)	Turbine Standby	1.5	12	3.2
10061(B)	Standby Engine, 1135 HP	1,589	1,364	3,628
10062 (B)	Standby Engine, 1135 HP	1,589	1,364	3,628
21333	GDF	0	0	0
18170	GDF	0	0	0
17913	Gasoline Bulk Plant	0	0	0
21334	GDF	0	0	0
20320	GDF	0	0	0
21310	GDF	0	0	0
19665	Boiler	7	84	3,268
19666	Boiler	7	84	3,268
20366	Printing Press	0	0	0
20367	Printing Press	0	0	0
20554	Boiler	1	17	654
20555	Boiler	1	17	654
21790	Diesel Particulate Filter	0	3	0
22496	Cogen, 145 HP	1	107	2,823
22497	Cogen, 145 HP	1	107	2,823
22506	Cogen, 145 HP	1	107	2,823
22313,22380 & 22378 are portable wire pullers and although permitted at this address, are not included in the facility total				
Total		3,199	3,266	23,572
Offset Trigger Level		>13,650	>7,500	>49,500

(A) Emissions have been revised to reflect latest AP-42 emission factors

(B) Emissions have been revised to reflect a higher rated HP of 1135, reported by the applicant

**6. CALCULATION OF EMISSION OFFSETS FOR ROC AND NO<sub>x</sub>:**

Offsets are required for NO<sub>x</sub> since it exceeds the 5,000 lbs threshold.

**7. CALCULATION OF EMISSION OFFSETS FOR SO<sub>x</sub>, PM<sub>10</sub> AND CO:**

The pollutants in question do not exceed offset thresholds

**COMPLIANCE WITH RULES AND REGULATIONS:**

**1. H&S Code §42301.6 COMPLIANCE:**

Noticing requirements are not triggered for natural gas fueled equipment.

**2. NSR COMPLIANCE:**

**Rule 202 - New Source Review**

Section 301 - BACT

BACT requirements are not triggered since no pollutant exceeds current BACT threshold requirements.

Section 302 - Offsets

NOx offsets are required for this permitting action. Offset quantities will be estimated based on full use during the quarter. The quarters will be assessed at 90,91,92,92 days for quarter 1,2,3,&4. The quantity of NOx from each engine will be 65 lbs, 65 lbs, 66 lbs & 66 lbs for quarters 1,2,3 and 4.

For all three engines the combined NOx requirements in lbs/qtr

Q1	Q2	Q3	Q4
194.7 lbs	196.9 lbs	199.0 lbs	199.0 lbs

The applicant shall provide SMAQMD emission reduction credit certificates in sufficient quantity to show compliance with the quarterly emission increase by the use of the following calculation procedure for application of emission credits from the same quarter.

$$QTR_q = (P_{q \leq 15} / 1.2) + (P_{q > 15} / 1.5) + (P_{qcom} / 1.0)$$

Where

$P_q$  = emission offset credit for pollutant in lb/qtr

QTR = Quarter (1,2,3 or 4)

$\leq 15$  = Those emission reduction credit certificates whose point of origin are within 15 miles of the applicant's proposed location.

$> 15$  = Those emission reduction credit certificates whose point of origin are greater than 15 miles but less than 50 from the applicant's proposed location.

com = Those emission reduction credit certificates that are leased from the SMAQMD's community bank.

Section 307 - Denial, Failure to Meet CEQA

The SMAQMD has developed a comprehensive permitting CEQA Guidance document. Project reviews conducted in accordance with the policy manuals contained therein meet the CEQA criteria of ministerial and are therefore exempt from CEQA. This engine project falls within the scope of the IC Engine permitting manual and has been determined to be ministerial. No further review is required.

Sections 405-408 - CARB, EPA and Public Notification:

Public noticing is required for projects that have emission credits being surrendered

**3. PSD COMPLIANCE:** Not applicable

**4. PROHIBITORY RULES COMPLIANCE**

**Rule 401** - Ringelmann Chart

Visible emissions are expected to comply with the 20% opacity requirement of this rule.

**Rule 402** - Nuisance

The IC engines are fired on Natural gas and it is expected to comply with the requirement of this rule.

**Rule 406** - Specific Contaminants

These emissions units are expected to comply with the emissions limit of 0.2% by volume sulfur compound as SO<sub>2</sub> and 0.1 gr/dscf of other combustion gases calculated to 12% CO<sub>2</sub>.

**Rule 420** - Sulfur Content of Fuels

Natural gas will comply with the 50 grains/100 cf sulfur content requirement of this rule.

**5. NSPS COMPLIANCE: SUBPART JJJJ - Standards of Performance for Stationary Spark Ignition Internal Combustion Engines.**

The table below details compliance requirements that can be verified and are imposed on the end user. Some requirements are imposed on the manufacturer and are difficult to verify. The proposed engine is not certified to any federal standard

Section	Explanation	Implementation
60.4230 (a)(4)(iii) 3(iv)	(The spark ignition engines are applicable for construction) on or after July 1, 2008, for engines with a maximum engine power less than 500 hp	The requirements of the subpart will be implemented into the Authority to construct
60.4233 (e)	Owners and operators of stationary SI ICE with a maximum engine power greater than or equal to 75 KW (100 HP) (except gasoline and rich burn engines that use LPG) must comply with the emission standards in <b>Table 1</b> to this subpart for their stationary SI ICE. <b>Table 1</b> emission standards as applicable in g/hp-hr NOX-2.0, CO 4.0 & VOC 1.0	The applicant has provided data from the manufacturer that the emission rates are lower than Table 1. Since these engines are not certified a source test will be performed to verify compliance.
60.4236 (a)	After July 1, 2010, owners and operators may not install stationary SI ICE with a maximum engine power of less than 500 HP that do not meet the applicable requirements in 60.4233	Applicant has proposed to meet the emission standards of section 60.4233
60.4243 (b)	If you are an owner or operator of a stationary SI internal combustion engine and must comply with the emission standards specified in 60.4233(d) or (e), you must demonstrate compliance according to one of the methods specified in paragraphs (b)(1)	Applicant will be required to meet the requirements of 60.4243 (b)(2)

	and (2) of this section.	
60.4243 (b)(2)	Purchasing a non-certified engine and demonstrating compliance with the emission standards specified on 60.4233 (d) or (e) and according to the requirements specified on 60.4244 as applicable, and according to paragraph (b)(2)(i) and (ii) of this section.	Applicant is purchasing a non certified engine. And will be demonstrating compliance as specified in section 60.4244 and will be demonstrating compliance with section 60.4233 (e)
60.4243 (b)(2)(i)	If you are an owner or operator of a stationary SI internal combustion engine greater than 25 HP and less than or equal to 500 HP, you must keep a maintenance plan and records of conducted maintenance and must, to the extent practicable maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions. In addition you must conduct an initial performance test to demonstrate compliance.	Records will be maintained per <b>condition 15</b> . An initial source test will be required per <b>condition 13</b> .
60.4243 (f)	If you are an owner or operator of a stationary SI internal combustion engine that is less than or equal to 500 hp and you purchase a non-certified engine or you do not operate and maintain your certified stationary SI internal combustion engine and control device according to the manufacturer's written emission related instructions, you are required to perform initial performance testing as indicated in this section, but you are not required to conduct subsequent performance testing unless the stationary engine is rebuilt or undergoes major repair or maintenance. A rebuilt stationary SI ICE means an engine that has been rebuilt as that term is defined in 40 cfr 94.1	Initial testing will be required per <b>condition 13</b> . Only one test will be required.
60.4243 (g)	It is expected that air-to-fuel ratio controller will be used with the operation of three way catalysts/non-selective catalytic reduction. The AFR controller must be maintained and operated appropriately in order to ensure proper operation of the engine and control device to minimize emission at all times.	An Air to fuel ratio controller will be required as part of this permitting action to be installed on each of the engines. <b>Condition 11</b> addresses operation and maintenance.
60.4244	Owners and operators of stationary SI ICE who conduct performance tests must follow the procedures in paragraphs (a) through (f) of this section.	
60.4244 (a)	Each performance test must be conducted within 10 percent of 100 percent peak (or highest achievable) load and according to the requirements in 60.8 and	Testing shall be conducted per 60.8 and Table 2

	under the specific conditions that are specified by table 2	See Condition <b>13</b>
60.4244 (b)	You may not conduct performance tests during periods of startup, shutdown or malfunction , as specified in 60.8 (c) IF your stationary SI internal combustion engine is non-operational, you do not need to startup the engine solely to conduct a performance test; however, you must conduct the performance test immediately upon startup of the engine.	See <b>condition 13</b>
60.4244 (c)	You must conduct three separate test runs for each performance test required in this section, as specified in 60.8 (f). Each test run must be conducted within 10- percent of 100 percent peak (or the highest achievable) load and last at least 1 hour.	See condition <b>13.G</b>
60.4244 (d)	Calculations to determine NOx, CO and VOC	<b>See Condition 14</b>
60.4245 (a)	Owners must maintain records of (1) All notifications (2) Maintenance conducted on the engine (4) documentation that the engine meets the emission standards.	<b>See condition 15.F</b>
60.4245 (d)	Owners and operators of stationary SI ICE that are subject to performance testing must submit a copy of each performance test as conducted in 60.4244 within 60 days after the test has been completed.	<b>See condition 14</b>
60.4246	Follow Table 3 -> Table 3 Mail copies of the source test to EPA and provision of 60.8 regarding conditions on source testing.	See condition <b>14</b>

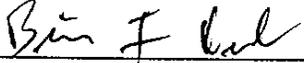
**6. NESHAP COMPLIANCE: Subpart ZZZZ - National Emission Standard for Hazardous Air Pollutants for Reciprocating Internal Combustion Engines**

This NESHAP addresses HAP emissions from new and reconstructed stationary reciprocating internal combustion engines (RICE) that are located at area sources and all new and reconstructed RICE units located at major sources that are less than or equal to 500 HP.

This engine is subject to the NESHAP because it will be manufactured after 2009 and will be located at an area source. This engine complies with NESHAP requirements by meeting the emission standards specified in 40 CFR part 60 subpart JJJJ.

**RECOMMENDATION:**

This equipment should comply with all applicable District rules and regulations. An Authority to Construct should be issued indicating the conditions outlined in this Authority to Construct Evaluation.

<b>PREPARED BY:</b>	<u>Venk Reddy</u>	<b>DATE:</b>	<u>6/8/10</u>
<b>REVIEWED BY:</b>	<u></u>	<b>DATE:</b>	<u>6-9-10</u>

## Appendix E – Greenhouse Gas Calculations

## CO<sub>2</sub> CALCULATIONS

### Estimate Annual Microgrid CO<sub>2</sub> Emissions

Assume 3 units run 24/7 all year; 145 hp each, 100 kW each, no peaking capability.

Determine tons/yr CO<sub>2</sub> for three units:

$$1238 \frac{\text{scf}}{\text{hr}} \times 1020 \frac{\text{Btu}}{\text{scf}} \times 0.000001 \frac{\text{MMBtu}}{\text{Btu}} = 1.26 \frac{\text{MMBtu}}{\text{hr}}$$

$$1.26 \text{ MM} \frac{\text{Btu}}{\text{hr}} \times 53.06 \frac{\text{kg CO}_2}{\text{MMBtu}} = \frac{67(\text{kg CO}_2)}{\text{hr}}$$

$$67 \frac{\text{kg CO}_2}{\text{hr}} \times 8760 \frac{\text{hr}}{\text{yr}} \times 0.001 \frac{\text{metric tons}}{\text{kg}} = 587 \frac{\text{metric tons CO}_2}{\text{yr}}$$

$$587 \frac{\text{metric tons CO}_2}{\text{yr}} \times 3 \text{ engines} = \mathbf{1,761 \text{ metric tons}} \frac{\text{tons}}{\text{yr}}$$

### Electric Generation CO<sub>2</sub> OFFSET

Three engine-generator sets total 300kW

$$300 \text{ kW} \times 8760 \frac{\text{hrs}}{\text{yr}} \times 0.001 \frac{\text{MW}}{\text{kW}} = 2628 \frac{\text{MWhr}}{\text{yr}}$$

Determine Offset Using System-wide Electric Supply CO<sub>2</sub> Rate

$$2628 \frac{\text{MWhr}}{\text{yr}} \times 632 \frac{\text{lbs CO}_2}{\text{MWhr}} \div 2205 \frac{\text{lbs}}{\text{metric ton}} = \mathbf{753 \frac{\text{metric tons CO}_2}{\text{yr}}}$$

Determine Offset Using Natural Gas Power Plant CO<sub>2</sub> Rate

$$2628 \frac{\text{MWhr}}{\text{yr}} \times 838 \frac{\text{lbs CO}_2}{\text{MWhr}} \div 2205 \frac{\text{lbs}}{\text{metric ton}} = \mathbf{999 \frac{\text{metric tons CO}_2}{\text{yr}}}$$

## Boiler Use CO<sub>2</sub> OFFSET

Central Plant boilers run October through May.

Boilers and engines have essentially the same CO<sub>2</sub> emission rate per MM Btu; thus if each engine Btu displaced a boiler Btu the CO<sub>2</sub> off set would be 1:1. However, for conservatism, assume only 70% efficiency.

$$1761 \frac{\text{metric tons}}{\text{yr}} \times 70\% \times \left(8 \text{ months} \div 12 \frac{\text{months}}{\text{yr}}\right) = \mathbf{821.8 \text{ metric tons}}$$

## Absorption Chiller CO<sub>2</sub> OFFSET

120 ton chiller  
Efficiency 50%, kW/ton

$$120 \text{ tons} \times 50\% \frac{\text{kW}}{\text{ton}} = 60 \text{ kW}$$

Usage factor, 34% of year

$$34\% \text{ of yr} \times 8760 \frac{\text{hrs}}{\text{yr}} = 2978.4 \text{ hrs}$$

$$60 \text{ kW} \times 2978.4 \frac{\text{hrs}}{\text{yr}} \times 0.001 \frac{\text{Mw}}{\text{kW}} = 178.7 \frac{\text{MWhr}}{\text{yr}}$$

Determine Offset Using System-wide Electric Supply CO<sub>2</sub> Rate:

$$178.7 \frac{\text{MWhr}}{\text{yr}} \times 632 \frac{\text{lbs CO}_2}{\text{MWhr}} \div \frac{2205 \text{ lbs}}{\text{metric ton}} = \mathbf{51.2 \text{ metric tons} \frac{\text{CO}_2}{\text{yr}}}$$

Determine Offset Using Natural Gas Power Plant CO<sub>2</sub> Rate:

$$178.7 \frac{\text{MWhr}}{\text{yr}} \times 838 \frac{\text{lbs CO}_2}{\text{MWhr}} \div \frac{2205 \text{ lbs}}{\text{metric ton}} = \mathbf{67.9 \text{ metric tons} \frac{\text{CO}_2}{\text{yr}}}$$

## Appendix F – Noise Assessment

The proposed project consists of three Microgrid engine generator sets. The engines are similar to full sized pickup truck engines fueled with natural gas. Intuitively, the project would seem not likely to create a noise problem; however, a preliminary noise analysis was performed to determine if the project would create an impact to nearby noise sensitive locations. Based on that result a conclusion of no insignificant-impact, or the need for a more refined analysis would occur.

The above determination was based on a four step process analysis. This four step analysis consisted of the following elements:

- Determine the cumulative sound level of three 70 dBA engine generator units at 20 feet. The basic sound level of the engines are based on data provided by the engine manufacturer.
- Determine the attenuation of that sound level over the distance to the nearest sensitive receptors (loft and apartments at the corner of 65<sup>th</sup> Street and Folsom Boulevard). The distance between the Microgrid project site and the noise sensitive receptor is approximately 540 feet.
- Determine the effects of current noise attenuation between the nearest noise sensitive receptor due to current buildings and other obstructions in the area.
- Determine the cumulative sound level at the receptor when the project's sound level is added to the ambient sound level.

### TOTAL ENGINE GENERATORE SOUND LEVEL

Sound levels are generally expressed in decibels, which are logarithmic and cannot be manipulated without being converted back to a linear scale. One must first antilog each number, add or subtract them and then log them again in the following manner. The formula for performing this calculation is provided below (noisemeters.com):

$$L = 10 + \text{Log}_{10} \left( \sum_{i=1}^n 10^{(Li/10)} \right)$$

Where: L is the total noise level,  
Li is the individual noise level, and  
n is the number of noise sources added.

Total sound level of each engine = 70 dBA (Li) at 20 feet  
Number of engines to be installed =3 (n)

Calculation for L

$$\begin{aligned} &= 10 * \text{Log}_{10} \left( \sum_{i=1}^3 10^{(L_i/10)} \right) \\ &= 10 * \text{Log}_{10} \left( 10^{(70/10)} + 10^{(70/10)} + 10^{(70/10)} \right) \\ &= 10 * \text{Log}_{10} ( 30,000,000 ) \\ &= 10 * 74.77 \end{aligned}$$

Therefore, L = 74.8 at 20 feet (L)

### **ATTENUATION OF SOUND OVER DISTANCE TO THE NEAREST NOISE SENSITIVE LOCATION**

To calculate the noise level at a given distance from a noise source, the noise levels are mathematically propagated using the Inverse Square Law of Noise Propagation. Briefly, this formulation states that noise decreases by approximately six (6) dBA with every doubling of the distance from the source. This methodology is represented by the following formula:

$$L_2 = L_1 - 20 \text{Log} \left( \frac{R_2}{R_1} \right)$$

Where  $L_1$  = Noise level measured at distance  $R_1$  from the source, and  
 $L_2$  = Noise level at a selected distance  $R_2$  from the source.

Noise level of three engines = 74.8 ( $L_1$ ),  
Noise level distance from the engines = 20 feet ( $R_1$ ),  
Noise level to nearest noise sensitive location = 540 feet ( $R_2$ )

$$\begin{aligned} L_2 &= 74.8 - 20 \text{Log} (540/20) \\ &= 74.8 - 20 \text{Log} (27) \\ &= 74.8 - 20 \times 1.43 \\ &= 74.8 - 28.6 \end{aligned}$$

Therefore, the sound level at the nearest noise sensitive receptor for the engines = 46.2 dBA

This calculation assumes an open pathway between the sound source and the distance calculated. Other more complex calculations can account for attenuation when vegetation and structures are present.

### **NOISE REDUCTION DUE TO BUILDINGS AND OTHER LINE-OF-SITE OBSTRUCTIONS**

The calculation above assumes an open straight line-of-site pathway between the sound source (engines) and the nearest noise sensitive receptor. Obstructions such as buildings, the water tank, fences, etc. would further reduce noise levels at this sensitive receptor.

The U.S. Department of Transportation, Federal Highway Administration has developed a method for calculating the general noise reduction associated with barriers in their Traffic Barriers at a Glance

document. This report indicated a 5 dBA reduction occurs if a barrier was placed between the line-of-site of a noise source and a location away from the source. A further 1.5 dBA occurs for every meter (approximately 3 feet) above the line-of-site.

Examination of potential barriers between the SMUD project location and the nearest noise sensitive location indicates a number of potential barriers such as on-site buildings, automobiles, and a water tank. A conservative estimate for obstructions between the project location and the nearest noise sensitive location is approximately 10 feet. It was assumed that the engines are located about 3 feet above ground level. Therefore, a 10 foot barrier would reduce the noise by approximately 8.5 dBA (5 dBA plus 3.5 dBA for the added 7 feet).

### **DETERMINATION OF CUMULATIVE SOUND LEVEL OF THE NOISE SOURCE AND NEAREST SENSITIVE RECEPTOR**

To determine the cumulative sound level at a distance involves the combination of the ambient sound level with the attenuated sound level of the engines, the following formula was used.

$$A = B - \text{Log}(\text{Log } B - \text{Log } C)$$

Where, A = Total noise level, B = Current noise level at the sensitive location, and C = Added noise level of the engines

Therefore, current noise level is 65 dBA (A) and the added noise level is 65 dBA (current noise level) – 38 dBA (noise level from the engine at the sensitive location) = 27 dBA

$$\begin{aligned} A &= 65 - \text{Log}(\text{Log } 65 - \text{Log } 27) \\ &= 65 - \text{Log}(1.813 - 1.431) \\ &= 65 - \text{Log}(0.382) \\ &= 65 - 0.4 \\ &= 65.4 \text{ dBA} \end{aligned}$$

Therefore, cumulative noise increases associated with the Microgrid project would increase the background levels by approximately 0.4 dBA.