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OAKLAND UNIFIED SCHOOL DISTRICT

Memo

To	Board of Education
From	Kyla Johnson-Trammell, Superintendent and Secretary, Board of Education Roland Broach, Interim Deputy Chief, Facilities Planning and Management Marion McWilliams, General Counsel
Board Meeting Date	February 28, 2018
Subject	Grant Agreement - PG & E - Cleveland Elementary School Project
Action Requested	Approval by the Board of Education of Resolution No.1718-0105, a Grant Agreement between the District and PG & E, San Francisco, CA, accepting funding from the latter to provide energy-efficiency measure in the new system, in conjunction with the Cleveland Elementary School Project, more specifically delineated in the Scope of Services in Exhibit "A", incorporated herein by reference as though fully set forth, commencing February 28, 2018 and concluding no later than December 31, 2019, in an amount not-to-exceed $200,000.00.
Background	PG & E is sponsoring this Proposition 39 Zero Net Energy (ZNE) Pilot project (the "Project") in accordance with Advice Letter 3563-G/4587-E filed at the California Public Utilities Commission on February 13, 2015, to establish proof-of-concept demonstration projects that will spur market transformation. PG & E and its Agents will provide consulting services to help the Owner meet ZNE retrofit design goals, evaluate monitoring data to measure how closely the project approaches the zero net energy target, and to identify how the building enclosure, mechanical systems, and other components contribute to this objective. PG & E will also cover the incremental cost of achieving the energy utilization footprint required for ZNE as referenced in Section 3.1. For the purposes of this demonstration, program limits on incentive levels for equipment will not necessarily apply to the Project incremental cost buy-down.
Discussion	The scope of the project is to provide consulting and monitoring services as agreed with Owner to help the Owner meet ZNE design goals.
LBP (Local Business Participation Percentage)	100.00%
Recommendation	Approval by the Board of Education of Resolution No.1718-0105, a Grant Agreement between the District and PG & E, San Francisco, CA, accepting funding from the latter to provide energy-efficiency measure in the new

system, in conjunction with the Cleveland Elementary School Project, more specifically delineated in the Scope of Services in Exhibit "A", incorporated herein by reference as though fully set forth, commencing February 28, 2018 and concluding no later than December 31, 2019, in an amount not-to-exceed $200,000.00.

Fiscal Impact

Funding Resource: Pacific Gas and Electric Company

Attachments

- Professional Service Contract including scope of work
- Resolution of the Board of Education No: 1718-0105

OAKLAND UNIFIED SCHOOL DISTRICT

RESOLUTION OF THE BOARD OF EDUCATION OAKLAND UNIFIED SCHOOL DISTRICT

RESOLUTION NO. 1718-0105

GRANT AGREEMENT FOR FUNDING FROM THE PACIFIC GAS AND ELECTRIC FOR THE PROPOSITION 39 ZERO NET ENERGY (ZNE) CLEVELAND ELEMENTARY SCHOOL PROJECT

WHEREAS, Pacific Gas and Electric, appropriates $200,000.00 to the Proposition 39 Zero Net Energy (ZNE) Cleveland Elementary School site for the Oakland Unified School District, and

WHEREAS, the applicant will enter into an agreement with the Pacific Gas and Electric to carry out energy-efficiency measures in the New System associated with the Proposition 39 Zero Net Energy (ZNE) Cleveland Elementary School; and

NOW, THEREFORE, BE IT RESOLVED, that the Oakland Unified School District:

1. The term of the project is February 28, 2018 through December 31, 2019.
2. The amount of the grant award is $200,000.00.
3. The fund are earmarked for energy-efficiency measures for new system associated with the Proposition 39 Zero Net Energy (ZNE) project at the Cleveland Elementary School.
4. The funds are to be disbursed in accordance with the Agreement from the Grantee, which is attached and incorporated into this resolution.
5. The Grantor's obligations under this resolution are contingent upon the availability of funds. In the event funds are not available the Grantor shall have no liability to pay any funds whatsoever to the Grantee or to furnish any other considerations under this resolution.
6. The Grantee will submit a written report whim 30 days of completion of the project describing the disposition of the grant proceeds.
7. Appoints Division of Facilities, Planning and Management as agent of the Oakland Unified School District to conduct all negotiations, execute and submit all documents, except those documents requiring the approval of the Governing Board, which may be necessary for the completion of the aforementioned project.

OAKLAND UNIFIED
SCHOOL DISTRICT

RESOLUTION OF THE
BOARD OF EDUCATION
OAKLAND UNIFIED SCHOOL DISTRICT

RESOLUTION NO. 1718-0105

GRANT AGREEMENT FOR FUNDING FROM THE PACIFIC GAS AND ELECTRIC FOR THE PROPOSITION 39 ZERO NET ENERGY (ZNE) CLEVELAND ELEMENTARY SCHOOL PROJECT

BE IT FURTHER RESOLVED, that the President and Secretary of this Board be hereby authorized to enter into a contract, subject to form and content approval by the General Counsel, with Pacific Gas and Electric in the amount stated herein for the purpose listed is hereby accepted.

Passed by the following vote:

AYES: Jody London, Nina Senn, Roseann Torres, Shanthi Gonzales, James Harris, President Aimee Eng

NOES: None

ABSTAINED: None

ABSENT: Vice President Jumoke Hinton Hodge

P.AYES: Enasia Mc-Elvaine, Gema Quetzal (Student Directors)

I hereby certify that the foregoing is a full, true and correct copy of a Resolution adopted, at a Regular Meeting of the Governing Board of the Oakland Unified School District held on February 28, 2018.

Kyla Johnson-Trammell, Superintendent
and Secretary, Board of Education

AGREEMENT FOR
Proposition 39 Zero Net Energy (ZNE) Pilot Project for Local Educational Agencies

This agreement ("Agreement") effective as of signature by both parties is entered into between Pacific Gas and Electric Company ("PG&E") a California corporation, located at 77 Beale Street, San Francisco, California, 94105 and Oakland Unified School District ("Owner"), having its principal address at 955 High Street, Oakland, CA 94601. PG&E and Owner are referred to jointly as "Parties."

1. DEFINITIONS

The following capitalized terms shall mean the following:

1.1 Assessment: means the measurement and evaluation of the associated gas and electric energy savings and end-user satisfaction of the New System.

1.2 Benchmarking: refers to the process of measuring and evaluating pre-existing conditions on the Premises prior to the installation of the New System.

1.3 Agent: refers to the PG&E-hired consultant to perform evaluation.

1.4 Monitoring Equipment: means, collectively, the meters, instruments and associated power supplies used by PG&E's Agent to measure and evaluate the performance of the New System.

1.5 Monitoring Period: is a period of time, not less than 12 months commencing with occupancy, during which PG&E or its Agent will conduct Assessment of the New System and post-installation evaluation.

1.6 New System: is the completed ZNE retrofit project, including but not limited to measures whose incremental costs will be paid.

1.7 Premises(s): is Cleveland Elementary School, located at 745 Cleveland Street, Oakland, CA 94606.

1.8 Report: means the Emerging Technologies report to be published on Emerging Technologies Coordinating Council (ETCC) website (www.etcc-ca.com) or other public channels.

1.9 Surveys: means the pre- and post-installation surveys administered to Owner.

1.10 Zero Net Energy (ZNE): refers to the ZNE Source definition per Definition of Zero Net Energy (ZNE) for California State Agency Compliance with Executive Order B-18-12 memo by DGS dated May 19, 2016 attached hereto as Exhibit B.

2. SCOPE OF AGREEMENT

2.1 PG&E is sponsoring this Proposition 39 Zero Net Energy (ZNE) Pilot project (the "Project") in accordance with Advice Letter 3563-G/4587-E filed at the California Public Utilities Commission on February 13, 2015, to establish proof-of-concept demonstration projects that will spur market transformation.

2.2 PG&E and its Agents will provide consulting services to help the Owner meet ZNE retrofit design goals, evaluate monitoring data to measure how closely the Project approaches the zero net energy target, and to identify how the building enclosure, mechanical systems, and other components contribute to this objective.

2.3 PG&E will also cover the incremental cost of achieving the energy utilization footprint required for ZNE as referenced in Section 3.1. For the purposes of this demonstration, program limits on incentive levels for equipment will not necessarily apply to the Project incremental cost buy-down.

3. DUTIES AND OBLIGATIONS OF PG&E

PG&E agrees to:

3.1 Pay to Owner all costs of the energy-efficiency measures as described in Exhibit A, not to exceed Two hundred thousand dollars ($200,000). Final cost and payment due by PG&E to Owner will be determined per Section 4.3. Payment will be contingent upon installation of all energy efficiency measures listed on Exhibit A. Costs associated with renewable energy system installation are specifically excluded from the incremental costs to be provided.

3.2 PAYMENT TERMS: PG&E will make payments to Owner in 2017, after all energy efficiency measures listed on Exhibit A are installed. PG&E will have 30 business days from date of a submitted invoice to review, and either approve, reject, or request corrections of, the invoice, per Section 4.3. PG&E's payment terms are net 45 days after invoice is submitted.

3.3 Provide consulting services as agreed with Owner to help the Owner meet ZNE design goals. Such services are provided to assist Owner and Owner's architect and engineer of record and do not affect mutual obligations between the Owner and the Owner's architect and engineer of record for provision of services.

3.4 Provide Monitoring Equipment for the Project, which is not part of the New System. The Monitoring Equipment shall remain the property of PG&E or its Agent as applicable, and may only be removed by PG&E or its Agent.

3.5 Coordinate with Owner to install the Monitoring Equipment necessary for the Project, in a manner that is acceptable to the Owner or its agent.

3.6 Coordinate visits to the Premises with the Owner, or its agent so as to minimize any disruptions or inconvenience to the Owner.

3.7 Comply with all federal, state, and municipal laws, ordinances, rules, orders, and regulations, which apply to its actions to the Project.

3.7.1 Although Owner has determined that fingerprinting is not applicable to this Agreement, PG&E expressly acknowledges that the following conditions shall apply to any work performed by PG&E and/or its Agents on a school site:

3.7.1.1 All site visits shall be arranged through the Owner;

3.7.1.2 PG&E and its Agents shall inform Owner or their proposed activities and location at the school site, allowing Owner time to arrange site visits without a disruption to the educational process;

3.7.1.3 PG&E and/or its Agents shall check in with the school office each day immediately upon arriving at the school;

3.7.1.4 Once at such location, PG&E and its Agents shall not change locations without contacting the Owner

3.7.1.5 PG&E and its Agents shall not use student restroom facilities; and

3.7.1.6 If PG&E and its agents find themselves alone with a student, PG&E and its Agent shall immediately contact the school office and request that a member of the school staff be assigned to the work location.

3.8 Remove Monitoring Equipment upon completion, and leave the Premises in substantially the same condition as it was pre-installation.

4. DUTIES AND OBLIGATIONS OF OWNER

Owner agrees to:

4.1 Purchase and/or install the New System on the Premises so that PG&E, or its Agent, may conduct the Project on the Premises.

4.2 Operate the New System in accordance with the Agents' instructions.

4.3 Owner shall provide to PG&E an invoice of the energy-efficiency measures of the New System as described in Exhibit A after all energy efficiency measure installations are complete. Invoice shall include sufficient cost information for PG&E to determine the costs of the energy efficiency measures, including labor and materials.

4.4 Provide PG&E, or its Agent, reasonable access to and egress from the Premises, Subject to section 3.7.1, to be scheduled with the Owner, to enable PG&E to install Monitoring Equipment, and to perform Assessment of New System during Monitoring Period.

4.5 Allow PG&E to publish in technical literature, electronic media, and promotional publications, materials related to the New System, including its operation and performance, subject to the provisions of Section 5 of this Agreement. PG&E shall give appropriate credit to Owner in such literature and publications, as may be reasonably requested by Owner. Any such use of Owner's name or other identifying marks, logos, or intellectual property shall be subject to the prior consent of Owner.

4.6 Allow PG&E, or its Agent, to photograph the Premises before, during, and after installation of the New System, subject to section 3.7.1 and use the pictures in technical literature, electronic media and promotional publications.

4.7 Provide PG&E, or its Agent, with all information that PG&E reasonably requests regarding the Premises' energy usage and costs, for use by PG&E to perform this Assessment.

4.8 Allow PG&E, or its Agent, to conduct tours of the Premises and the New System, subject to section 3.7.1, upon at least two (2) business days' advance notice to Owner. Owner may reasonably limit the number of tours and visitors, the time and date of tours, and prohibit tour access to certain areas so as to avoid conflicts with its operations. All tours shall be escorted by Owner representative(s).

4.9 Allow PG&E, or its Agent, to interview and/or survey Owner's personnel and/or future tenant for the purpose of obtaining satisfaction rating, testimonials and statements concerning the New System, which PG&E shall have the right to use for publicity purposes.

4.10 Except for the specific liabilities and obligations PG&E is explicitly agreeing to be responsible for under this Agreement, Owner shall be solely responsible for liabilities and to make arrangements, including entering into and performing under any contracts with third parties, for this Agreement.

4.11 Owner agrees, if applicable, to obtain all necessary permits and ensure licensed contractors are used for installation of New System.

4.12 Refrain, to the extent practicable, from making any adjustments to, and from tampering with, Monitoring Equipment in any way.

4.13 During the term of this Agreement, if Owner intends to sell or rent the Premises to a party that is not a signatory to this Agreement, the Owner will notify PG&E promptly. If such sale or rental situation arises, the Owner agrees to provide PG&E-furnished disclosures relative to the Project to all prospective buyers or tenants. If the ultimate buyer or tenant refuses to cooperate, this Agreement shall terminate and the Parties shall perform all of their respective agreed upon termination responsibilities. Owner agrees to notify PG&E in writing promptly upon determination by Owner's governing board to sell, rent, or otherwise dispose of the Premises.

4.14 Provide PG&E, or its Agent, with all information that PG&E reasonably requests regarding the Premises' renewable energy production data, for use by PG&E to perform this Assessment.

5. CONFIDENTIALITY

5.1 Each Party shall treat all non-Project-related information designated in writing as confidential provided by the other Party pursuant to this Agreement as proprietary, confidential and trade secrets ("Confidential Information"), shall safeguard such information as it would its own proprietary and confidential information and trade secrets, and shall not disclose such information to any third party except as authorized herein; provided however, that PG&E recognizes that Owner is a California public agency and, accordingly, certain Confidential Information that are public records are subject to the California Public Records Act.

5.2 To the extent provided by law, neither Party shall use any of the other Party's Confidential Information except for the purposes of performing this Agreement.

5.3 Each Party shall endeavor to promptly notify the other of any third-party request for disclosure of the other Party's Confidential Information, and shall cooperate with the other Party to prevent disclosure of such Confidential Information, to the extent permitted by law. The Parties hereby expressly acknowledge that this Agreement, including all attachments, is a public record subject to disclosure, and neither Party is obligated to undertake any conduct toward avoiding disclosure hereof.

5.4 Confidential Information shall not include public information, information subject to a public information request under the California Public Records Act, information in connection with complying with any law, court or administrative order, or official request or guidance or complying with or responding to any subpoena, civil investigation demand, warrant, or other request or process, or information known to a Party prior to its disclosure to such Party by the other Party.

6. TECHNICAL REPORTS AND PUBLICATIONS

6.1 All reports and publications related to this Prop 39 ZNE Pilot Project for Local Educational Agencies, which PG&E intends to offer to the public, shall be provided to Owner at least 15 days prior to their release. During the 15-day period Owner shall have the right to review and approve, delete or amend any portion which contains Owner's Confidential Information. However, descriptions, photographs, technical parameters and performance information of the New System shall not be considered Confidential Information.

6.2 PG&E will provide Owner with information about its findings regarding this Project. PG&E, and its Agent shall have all ownership rights including exclusive copyright ownership, in all data, reports, research results, summaries, information, or other written, recorded, photographic or visual materials (hereinafter "Information") produced and collected during the term of this Agreement, and the unrestricted right of use and reproduction of any such Information.

7. TERM AND TERMINATION

7.1 The term of this Agreement shall be in effect until December 31, 2019.

7.2 PG&E or Owner may terminate this Agreement by giving 30 days written notice to the other Party.

7.3 PG&E Terminates the Agreement: PG&E shall have the right to immediately terminate this Agreement under any of the following circumstances: (a) PG&E reasonably determines this Agreement would be inconsistent with, or violate any rule, regulation, or policy of the California Public Utilities Commission (CPUC) or other applicable law; or (b) the New System is not installed and operating on or before August 31, 2018

7.4 7.3.1 If PG&E terminates this Agreement and the District has entered into a contract to purchase and/or install the New System, PG&E will be required to deliver all payments due to the District for any out-of-pocket costs up until the date of termination that are not refundable, unless PG&E's reason for termination is because the New System was not installed and can be operational on or before August 31, 2018.

7.5 Upon expiration of the term or any such early termination, PG&E shall remove Monitoring Equipment, and restore the Premises to substantially the same condition as it was pre-installation.

8. NOTICES

8.1 All notices required shall be in writing to the respective Party as follows:

To PG&E: Peter Turnbull
Principal, Zero Net Energy
Pacific Gas and Electric Company
PO Box 770000
Mail Code N6F
San Francisco, CA 94177
Phone: (415) 973-2164
E-Mail: PWT1@pge.com

To Owner:Cesar Monterrosa
Oakland United School District
955 High St.
Oakland, CA 94601
Phone: (510) 535-7053
E-Mail: cesar.monterrosa@ousd.org

9. INDEMNIFICATION AND LIMITATION OF LIABILITY

9.1 Owner shall indemnify and hold harmless PG&E, its parent company, affiliates, directors, shareholders, invitees, employees, agents, contractors, successors and assigns, from any and all costs, liabilities, claims and expenses, including those from death or injury to any person or from a loss or damage to any real, personal or other property, arising from, or in connection with third party claims arising from, this Agreement from individual's, contractors or companies Owner has retained to implement this Agreement, unless caused by the negligence or willful misconduct of PG&E.

9.2 Unless caused by PG&E's negligence or willful misconduct, PG&E shall not be liable for any costs, liabilities, claims and expenses, including death or injury to any person, or any loss or damage to any real, personal or other property of Owner.

9.3 In the performance of this Agreement, each Party assumes responsibility for incidental or consequential damages due to its own negligence, including responsibility for the negligence of its employees, contractors, subcontractors and agents, and for the claims of third parties resulting from such negligence.

9.4 EXCEPT AS PROVIDED IN SECTION 9.3, IN NO EVENT SHALL EITHER PARTY BE LIABLE FOR ANY INCIDENTAL, INDIRECT, SPECIAL, CONSEQUENTIAL, OR PUNITIVE DAMAGES FOR ANY CAUSE OF ACTION, WHETHER IN CONTRACT OR TORT, ARISING IN ANY MANNER FROM THIS AGREEMENT, REGARDLESS OF THE CAUSE OR FORESEEABILITY THEREOF.

10. OWNERSHIP

10.1 All rights, title and interest in the monitoring data and derivative reports on the New System are and shall remain the sole and exclusive property of PG&E. This Agreement does not grant Owner any rights or implied licenses to the New System monitoring data unless otherwise specified herein.

11. WARRANTY DISCLAIMER

11.1 PG&E MAKES NO WARRANTIES OR REPRESENTATIONS OF ANY KIND REGARDING THE PROJECT OR ITS BENEFIT, EXPRESSED OR IMPLIED, WITH REGARD TO THE NEW SYSTEM, ITS MERCHANTABILITY, OR FITNESS FOR A PARTICULAR PURPOSE.

12. APPLICABLE LAW/VENUE

12.1 This Agreement shall be governed and construed under California law, with venue proper in Alameda County, California.

13. DISPUTE RESOLUTION

13.1 The Parties agree to resolve any dispute related to or arising from this Agreement first through non-binding mediation. All negotiations conducted pursuant to this section shall be treated as confidential and be subject to compromise and settlement negotiations under section 1152 of the California Evidence Code shall apply. The foregoing shall not otherwise limit the Parties' other remedies, whether at law or in equity.

13.2 If a claim, or any portion thereof, remains in dispute upon satisfaction of all applicable dispute resolution requirements, PG&E shall comply with all claims presentation requirements as provided in Chapter 1 (commencing with section 900) and Chapter 2 (commencing with section 910) of Part 3 of Division 3.6 of Title 1 of Government Code as a condition precedent to PG&E's right to bring a civil action against Owner. For purposes of those provisions, the running of the time within which a claim must be presented to Owner shall be tolled from the time the claimant submits its written claim until the time the claim is denied, including any time utilized by any applicable meet and confer process.

14. CPUC APPROVAL

14.1 This Agreement shall at all times be subject to changes or modifications by the CPUC. Owner understands that this Project is funded and approved by the Energy Efficiency Program.

15. ENTIRE AGREEMENT

15.1 This Agreement contains the entire Agreement and understanding between the Parties and merges and supersedes all prior representations and discussions between PG&E and Owner pertaining to its subject matter.

[SIGNATURES ON FOLLOWING PAGE]

16. SIGNATURES

IN WITNESS WHEREOF, the Parties have caused this Agreement to be executed by their duly authorized representatives to be effective upon the signature by the Parties; provided that effectiveness of this Agreement is subject to ratification or approval by the Owner's governing board.

OAKLAND UNIFIED SCHOOL DISTRICT

By: _____

Name: _____

Title: Cesar Monterrosa, Director of Facilities

Date: 10/6/17

PACIFIC GAS AND ELECTRIC COMPANY, a California corporation

By: _____

Name: Peter W. Tournour

Title: Principal, PG&E

Date: 10/12/2017

OAKLAND UNIFIED SCHOOL DISTRICT

Aimee Eng, President
Board of Education

Kyla Johnson-Trammell
Superintendent and Secretary, Board of Education

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18-0294
2/28/18
er

Approved as to Form

Marion McWilliams
General Counsel

EXHIBIT A

This is a list of the energy-efficiency measures in the New System. The final set of energy-efficiency features may vary from this plan if agreed by both parties in writing; however, the PG&E payments will not exceed $200,000.00 (Two Hundred Thousand and NO/100 Dollars)

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Delamp CR Lighting fixtures and replace lamps with LED Equivalents	29615	-198	81,237	25.4	11%
Install ECM motors in Classrooms	10857	9	37,944	27.1	5.2%
Install ECM motors in unit heaters	11607	53	44,903	26.9	6.2%
Install smart thermostats	0	119.5	11,950	28.2	1.6%
Daylighting in mixed use space	6053	22	22,853	27.7	3.1%
Replace Bard HVAC units with new high efficiency Bard units	2046	0	6,981	28.4	1.0%
Daylighting in classrooms	12785	-157	27,922	27.5	3.8%

EXHIBIT B

Definition of Zero Net Energy (ZNE) for California State Agency Compliance with Executive Order B-18-12 memo

Definition of Zero Net Energy (ZNE) for California State Agency Compliance with Executive Order B-18-12

May 10, 2016

Executive Summary

With the issuance of Executive Order B-18-12, mandating zero net energy (ZNE) for new and existing state buildings, it has become necessary for the state of California to determine how it will define ZNE for compliance with state targets, and what strategies or prioritization it will encourage.

A focus group of 20 energy professionals representing state agencies, utilities, federal and private sectors, recommended the acceptance of one definition, which was accepted by the governor's office as the primary definition for use by state agencies in achieving and reporting on ZNE status for new and existing state buildings, and to be consistent with federally adopted definition as follows:

> *ZNE Source – Produces as much energy as it consumes over the course of a year, when accounted for at the energy generation source.*

By adopting this definition, the state of California will require 39 percent less renewable energy generation capacity, and save the state over $1.9 billion over the next nine years while still achieving the requirements of the executive order, as compared with the "ZNE site" definition, which only accounts for energy within the site. "ZNE source" can effectively be measured for existing as well as new buildings, whereas the California Energy Commission's "ZNE Time-Dependent Valuation (ZNE TDV)" is a code definition for modeling energy based on the utility cost value of energy, and it cannot currently be used to measure existing building compliance.

In order to enable attainment of ZNE on site-constrained or challenging state sites, additional variations of ZNE source are acceptable to allow various boundaries for defining ZNE for buildings, campuses, portfolios and communities, to accommodate the wide variety of state facilities and locations and to provide a more feasible path to achieve ZNE at new and existing state buildings. The focus group also emphasized energy efficiency, energy storage, renewable orientation and other important strategies to reduce long-term operating costs to the state, and reduce impacts to the energy grid.

Background

Zero Net Energy was introduced into state policies as a strategy to reduce greenhouse gas emissions, conserve state energy resources, and lead the state by example.

i. AB 32 Scoping Plan
AB 32 was signed into law in 2006, with a Scoping Plan and

Background (Cont.)

Appendices issued in 2008. Among recommended actions for greening new and existing state buildings, it states:

a. "Beginning in 2025, all new buildings would be ZNE (five years earlier than the statewide mandate for commercial buildings)."[1]

II. Executive Order B-18-12 & Green Building Action Plan
Issued April 25, 2012, EO B-18-12 established targets for achieving Zero Net Energy (ZNE) on new and existing state buildings as follows:

a. "All new state buildings and major renovations beginning design after 2025 shall be constructed as Zero Net Energy facilities with an interim target for 50 percent of new facilities beginning design after 2020 to be Zero Net Energy. State agencies shall also take measures toward achieving Zero Net Energy for 50 percent of the square footage of existing state-owned building area by 2025."

Scope of State Facilities Affected

The state of California is a large real estate holder and a major consumer of energy within the state. California state government has a large task required to meet state-mandated ZNE targets.

I. **State building area affected**
   a. State building area[2] totals approximately 112 million square feet.
   b. 50 percent of state building area would equal approximately 56 million square feet.

II. **State facility energy use**
   a. 2015 grid purchases of energy are approximately 9.9 billion kBtu[3].

III. **Current on-site renewable energy generation at state facilities**
   a. 2015 on-site renewable energy generation was approximately 78.41 million kWh (267.4 million kBtu).
   b. Equivalent to approximately 3 percent of total state building energy use.

[1] AB 32 Scoping Plan Appendices – Volume I, Page C-143
[2] Includes building area of executive branch state facilities
[3] kBtu is a common unit of energy measurement meaning thousand British thermal units

Progress to Date

Following the issuance of EO B-18-12, state agencies have taken measures toward achieving ZNE targets for new and existing state buildings, and many efforts are underway.

I. **Identification of State ZNE Pilot Projects**
   a. Eight potential ZNE pilot projects were identified in 2014 report to governor's office including new construction, a major renovation, and existing buildings.
   b. Most projects were not funded, but two of the original projects are still pursuing measures to achieve ZNE:
      1. Caltrans warehouse facility, Oakland
         - Completing construction summer 2016.
      2. CDPH Richmond Building P
         - Implemented some measures, installing on-site renewables through PPA.

II. **Completion of state buildings attempting to achieve ZNE**
   a. To date, two state facilities have been completed that are intending to achieve ZNE after verification period:
      1. Department of Motor Vehicles (DMV) Fresno Field Office, Fresno
      2. CA Lottery Office, Santa Fe Springs

III. **Buildings pursuing ZNE in design or construction**
   a. Four DMV projects are under design, pursuing ZNE.
   b. Two additional projects are seeking funding to pursue ZNE, including projects from California's Air Resources Board (ARB) and California Conservation Corps (CCC).
   c. CA Lottery has one additional new project under construction pursuing ZNE, and five more following
   d. One California Department of Corrections and Rehabilitation (CDCR) project under design is pursuing ZNE.

IV. **Commitments of state agencies toward ZNE**
   a. DMV, Department of General Services (DGS), CA Lottery, CDCR and CCC are committed to building every new facility to ZNE.
   b. ARB is committed to achieving ZNE at the Southern California Consolidation Project, a laboratory and emissions testing facility.

Defining ZNE

Several ZNE definitions were analyzed for their potential use for designing and verifying ZNE for state new and existing buildings:

1. **ZNE source**
   a. Produces as much energy as it consumes over the course of a year, when accounted for at the energy generation source.
   b. Includes site energy plus energy consumed in extraction, processing and transport of primary fuels such as coal, oil and natural gas; energy losses in thermal combustion in power generation plants; and energy losses in transmission and distribution to the building site.
   c. Used by U.S. Department of Energy (DOE), federal agencies, and endorsed by the American Institute of Architects (AIA) and American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE). In September 2015, the DOE published *A Common Definition for Zero Energy Buildings*,[4] which identified source energy as the primary basis for calculating zero energy buildings. This paper developed a common definition for ZNE intended for use by government, utilities and private entities.
   d. Advantages include nationally accepted definitions, allowing comparison with ZNE buildings outside California. ZNE source can be easily calculated for newly constructed as well as existing buildings. Typically, the renewable energy requirement is smaller than for the ZNE site definition, whenever buildings use natural gas or other energy types (see Table 1).
   e. Disadvantages include the possibility of a slightly larger renewable energy requirement or greater overgeneration of electricity during parts of the day than a ZNE TDV building, unless this is addressed through other strategies such as energy storage, because source energy fails to address timing of generation.
   f. Measurement of energy converts all energy sources into common units of kBtu using different factors for each energy source. The DOE definition uses national average conversion factors, which is recommended both for consistency and because 26 percent of California energy is purchased from outside the state.

[4] A Common Definition for Zero Energy Buildings, September 2015, U.S. Department of Energy

Defining ZNE (Cont.)

II. ZNE site
   a. Produces as much energy as it consumes over the course of a year, when accounted for within the building site boundary.
   b. This excludes the energy losses that occur off-site, including generation, transmission and distribution systems losses (total system efficiency is approximately 30 percent) to get the energy to the building; as a result, this metric is dramatically inconsistent with building energy bills
   c. Widely used by many design professionals as an early ZNE calculation method because of its simplicity.
   d. Advantages include its simplicity and straightforward conversion of all forms of energy into common units (kBtu). The calculation simply measures total energy used within the site boundaries and compares with total energy generated within site boundaries.
   e. A disadvantage is that the required on-site renewable generation is the largest of the three definitions evaluated. The exception is with all-electric buildings where on-site energy consumption and on-site renewable energy generation result in identical renewable requirements. ZNE site energy fails to address timing of generation, and like ZNE source energy, would need to address this through other strategies.
   f. Measurement is made by converting all energy to common units of kBtu. Annual total energy generated is greater than or equal to annual energy used within site.
   g. Favors electric resistance heating over natural gas heating because the losses of grid-supplied electricity and benefits of on-site combustion are not addressed in the energy calculations.

III. ZNE TDV: Time-Dependent Valuation (TDV)
   a. ZNE TDV is a California Energy Commission (CEC) developed and promulgated definition for the "utility cost" value of energy whereby the energy consumed by the building over the course of a typical year is less than or equal to the utility cost value of the on-site renewable energy generated.
   b. Currently only used within California in current energy codes (California Code of Regulations Title 24, Part 6). TDV will likely be used to provide a code definition for new buildings and major renovations in future code

Defining ZNE (Cont.)

developments targeting ZNE for residential by 2020, and nonresidential by 2030.

c. Advantages of TDV include addressing timing of renewable energy generation and that it would encourage the use of energy storage systems to more closely align the time of energy production with peak energy demand on the grid to better manage overgeneration. ZNE TDV may result in renewable generation requirements slightly smaller than source, and definitely smaller than ZNE site definitions.
d. Disadvantages of using TDV to define ZNE are that it is intended for design of new construction and not currently for measuring performance on existing buildings. Software is under development for new construction. No existing meters or programs currently exist to calculate TDV values based on existing building energy use.
e. In order to measure and verify existing buildings for achievement of ZNE, hourly energy use data is needed for every hour of the year, and a program would need to be created to apply hourly energy data to hourly TDV values assigned.

IV. Zero Emissions Building
a. Produces or purchases enough emissions-free renewable energy to offset emissions from all energy used in the building over the course of a year.
b. Measures in mass of carbon-equivalent CO2 greenhouse gas (GHG) emissions related to energy use in the building, including Scope 1 and Scope 2 emissions.
c. Not a stated target yet for state buildings and difficult to achieve given that most existing state buildings include combustion equipment that use natural gas or other fuels to generate heat for water and/or air.
d. This option was not explored nor discussed at any depth by the ZNE focus group.

Definition of Zero Net Energy (ZNE) for California State Agency Compliance with Executive Order B-18-12

May 19, 2016

Selected Definition: ZNE Source & Prioritized Approaches	*ZNE source* is the selected definition for state agency implementation of Executive Order B-18-12. The following variations of the ZNE *source* definition are needed to accommodate the variety of state buildings, campuses and portfolios. To the extent possible, the following ZNE definition variations should be sought in the order listed below:

i. **ZNE building** – An energy-efficient building where, on a source energy basis, the actual annual consumed energy is less than or equal to the on-site renewable generated energy
   a. The building footprint (i.e., rooftop), or around the building site (i.e., parking lot, adjacent land) can be utilized for on-site renewable generation.
   b. The Renewable Energy Credits (RECs) must be retired (not sold) for all on-site renewable energy systems. This will prevent double-counting of the systems' environmental benefits.
   c. Achievement of this definition is based upon 12 consecutive months of actual energy performance data.

ii. **ZNE campus** – An energy-efficient campus where, on a source energy basis, the actual annual consumed energy is less than or equal to the on-site renewable generated energy.
   a. A multiple building campus can be utilized as a boundary for on-site renewable generation to offset energy use of all or a portion of the campus buildings.
   b. This approach would allow ZNE to be achieved for energy-efficient buildings within the campus where the individual building capacity for on-site renewable energy is very restricted.
   c. This would also provide an outlet for on-site energy use for periods of the day when overgeneration of electricity is likely, to avoid financial losses from selling back excess energy wholesale to utilities.
   d. The RECs must be retired (not sold) for all renewable energy systems within the campus boundary.

iii. **ZNE portfolio** – An energy-efficient portfolio in which, on a source energy basis, the actual annual consumed energy is less than or equal to the on-site renewable generated energy.
   a. Multiple building sites by the same owner could be used and aggregated so that the combined on-site renewable energy could offset the combined building energy from

Selected Definition ZNE Source & Prioritized Approaches (Cont.)		the aggregated project sites. This could apply to the entire portfolio, or portions of the portfolio. b. This approach would allow ZNE to be achieved for energy-efficient buildings within the portfolio where the capacity for on-site renewable energy is very restricted. c. This would also provide an outlet for excess renewable energy production during periods of the day when overgeneration of electricity is likely, to avoid financial losses from selling back excess energy wholesale to utilities.
	IV	ZNE community – An energy-efficient community where, on a source energy basis, the actual annual consumed energy is less than or equal to the on-site renewable generated energy. a. This could be applied to allow long-term purchase agreements of locally generated, renewable energy, dedicated to providing energy for the building(s). Agreements should extend a minimum of 20 years. b. Purchased Renewable Energy Certificates (RECs) are typically short-term and not necessarily locally based within the community. While they are an effective strategy to reduce GHG emissions, they would not be allowed to be counted toward achievement of ZNE. c. The RECs must be retired (not sold) for all renewable energy systems within the community.
Strategies for all ZNE Applications	Beyond defining ZNE, a number of strategies should be considered and employed in ZNE facilities whenever possible to ensure the highest output and efficiency possible, reduce long-term operating budgets and avoid overgeneration.	
	I.	Energy efficiency – Ultra-low energy use through energy conservation, passive systems and whole-building integrated energy efficiency measures should always be the initial focus for each building pursuing ZNE.
	II.	Share excess generation – Whenever possible, excess generation should be utilized on-site through energy storage, with other buildings on campus, or through utility agreements with other buildings in portfolio.
	III.	Install energy storage – Utilize on-site energy storage (batteries, thermal, etc.) to shift energy use for peak load reduction, limit overgeneration sent back to the grid, reduce

Strategies for all ZNE Applications (Cont.)		demand charges, reduce energy costs by taking advantage of time-of-use (TOU) rates, and provide cloud cover and outage protection for the facility.
	IV.	PV array orientation – To the extent possible, consistent with California Solar Initiative's Flexible Installation (CFI) option, orient the PV arrays between 150 and 270 degrees from true north to delay the maximum generation to later in the day to better coincide with the CAL-ISO grid's high peak periods. This approach should be reviewed and adjusted over time to provide alignment with the needs of the utility grid.
	V.	Use overgenerated energy for EVSE charging – Electric vehicle service equipment (EVSE) can utilize excess energy generated to charge electric vehicles. This will help reduce or avoid export of overgenerated electricity, and help agencies meet zero-emission vehicle charging infrastructure goals. Energy used for electric vehicle charging does not count toward building energy use, nor does it need to be included in ZNE building calculations. Energy generated through on-site renewables used for EVSE charging can be included in the annual calculation of ZNE using the same source energy factor as overgenerated energy delivered to the utility grid
Next Steps	I.	Review and approval of concept at agency and governor's offices – ZNE white paper definitions and strategies approved by the Government Operations Agency and by the governor's office May 19, 2016.
	II.	Draft new management memo defining ZNE and outlining strategies a. Develop and issue new policy through management memo into the State Administrative Manual (SAM) to define ZNE and strategies to be used by state agencies in pursuit of their achievement of ZNE for meeting EO B-18-12 objectives. b. Edit and refine any existing management memos referencing ZNE to accurately reflect and/or reference definitions and strategies.

Table 1: Sample building scenarios showing renewable energy generation requirements using different ZNE definitions

	ZNE source PVs required (kW)[3]	ZNE site PVs required (kW)	ZNE TDV PVs required (kW)[4]
1 Capitola DMV 10,619 sq. ft. 206,070 kWh 2,999 therms	168	198	148
% PV to offset gas	12%	30%	unknown
2. All electric DMV 11,436 sq. ft. 364,794 kWh 0 therms	243	243	254
% PV to offset gas	0%	0%	unknown
3 Large office bldg DOT District 11 San Diego 202,148 sq. ft. 3,855,250 kWh 23,738 therms	2,597	2,901	2,590
% PV to offset gas	6%	16%	unknown
4 50% of total state energy use 588,082,738 kWh 29,505,725 therms	590,199	967,217	unknown

Summary By utilizing the *ZNE source* definition for attainment of ZNE targets for state facilities, the state will align with federal government ZNE definitions. State efforts to achieve ZNE on 50 percent of state facility building area will require approximately 377 MW[7] (approximately 39 percent) less renewable energy installations using the *ZNE source* definition than the *ZNE site* definition, saving the state approximately $1.9 billion over the next nine years.

[3] Source and site PV calculations & percentages provided by Kent Peterson, PZS Engineering

[4] TDV calculations provided by Mazi Hanain, California Energy Commission

[7] Estimate based on 2013 California executive branch total energy use. Further energy efficiency improvements through 2015 will further reduce the renewable generation requirements.

State of California ZNE Definitions Focus Group

DGS formed and led a group of state and national energy professionals to review ZNE definitions and discuss the practicality and feasibility of each definition for measuring and determining achievement of ZNE on both new and existing state facilities.

I. California Department of General Services
   - Dan Burgoyne – group chair
   - Joe Flores
   - Paul Wilburn
   - Brian Ferguson
   - Glenn Connor
   - Diane Elliott

II. California Government Operations Agency
   - Matt Henigan

III. California Energy Commission
   - Bill Pennington
   - Maziar Shirakh
   - Gabriel Taylor

IV. California Department of Corrections and Rehabilitation
   - Jeff Henninger

V. California Public Utilities Commission
   - Mindy Craig – Consultant (Bluepoint)

VI. Pacific Gas & Electric
   - Peter Turnbull
   - Can Anbarlilar

VII. Sacramento Municipal Utility District
   - Michele Friedrich

VIII. National Renewable Energy Laboratory
   - Paul Torcellini
   - Shanti Pless

IX. New Buildings Institute
   - Ralph DiNola
   - Jim Edelson

X. P2S Engineering
   - Kent Peterson