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**ENERGY SERVICES AGREEMENT**

**by and between**

**Texas A&M University**

**and**

**AMERESCO, INC.**

**Effective upon final signature**

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## TABLE OF CONTENTS

SECTION 1	Scope of Services.	1
SECTION 2	Ownership of and Security Interest in the ECMs.	4
SECTION 3	Financing.	5
SECTION 4	Compensation and Monthly Progress Payments.	5
SECTION 5	Term.	6
SECTION 6	Guarantee of Energy Savings.	6
SECTION 7	Access to Property.	8
SECTION 8	Changes in Work.	8
SECTION 9	Warranties.	9
SECTION 10	Customer Role and Responsibilities.	9
SECTION 11	Defaults by Customer and Ameresco.	11
SECTION 12	Remedies for Defaults.	12
SECTION 13	Intentionally Omitted.	12
SECTION 14	Termination.	12
SECTION 15	Insurance.	13
SECTION 16	Indemnification.	15
SECTION 17	Agreement Interpretation and Performance.	15
SECTION 18	Privileged and Proprietary Information.	15
SECTION 19	Severability.	15
SECTION 20	Assignments and Subcontracting.	15
SECTION 21	Waiver.	16
SECTION 22	Force Majeure.	16
SECTION 23	Contract Documents.	17
SECTION 24	Notices.	17
SECTION 25	Records.	18
SECTION 26	Representations.	18
SECTION 27	Independent Contractor.	19
SECTION 28	Additional Representations of Customer.	19
SECTION 29	Absence of Fraud or Collusion.	20
SECTION 30	Negligent/Wrongful Acts.	20
SECTION 31	Further Documents and Events.	20
SECTION 32	Non-Appropriation.	20
SECTION 33	Third Party Beneficiaries.	21
SECTION 34	Notifications of Governmental Action - Occupational Safety and Health.	21

SECTION 35	References.	22
SECTION 36	Delinquent Child Support Obligations.	22
SECTION 37	Payment of Debt or Delinquency to the State.	22
SECTION 38	Franchise Tax Certification.	22
SECTION 39	Prohibited Bids and Agreements.	22
SECTION 40	Former Employees.	22
SECTION 41	Tax Exempt Status.	23
SECTION 42	Products and Materials Produced in Texas.	23
SECTION 43	Public Information.	23
SECTION 44	Venue.	23
SECTION 45	State Auditor’s Office.	23
SECTION 46	Non-Waiver.	24
SECTION 47	Dispute Resolution.	24
SECTION 48	Limitations.	24
SECTION 49	Prohibition Of Contracts With Companies Boycotting Israel.	24
SECTION 50	Certification Regarding Business With Certain Countries and Organizations.	24
SECTION 51	Records Retention.	24
SECTION 52	Prohibition On Contracts Related To Persons Involved In Human Trafficking.	25
SECTION 53	Not Eligible For Rehire.	25
SECTION 54	Conflict of Interest.	25
SECTION 55	Counterparts.	25
ATTACHMENT A		
ATTACHMENT B		
ATTACHMENT C		
ATTACHMENT D		
ATTACHMENT E		
ATTACHMENT F		
ATTACHMENT G		
ATTACHMENT H		
ATTACHMENT I		
ATTACHMENT J		
ATTACHMENT K		
ATTACHMENT L		
ATTACHMENT M		
ATTACHMENT N		

## ENERGY SERVICES AGREEMENT

**THIS ENERGY SERVICES AGREEMENT** (this “*Agreement*”) shall become effective upon final signature by and between Texas A&M University, having its principal place of business located at 400 Bizzell St., College Station, Texas 77843 (“Customer”) and Ameresco, Inc., having its principal place of business at 2375 E. Camelback Road, Suite 400, Phoenix, Arizona 85016 (“*Ameresco*”). The Customer and Ameresco may be collectively referred to as the “*Parties*” and individually as a “*Party*.”

**WHEREAS**, Customer wishes Ameresco to perform a project (“*Project*”) consisting of certain energy conservation services and installations as set forth in Attachment B (as amended and/or otherwise modified from time to time as provided herein, the “*Scope of Services*”) at Customer’s facilities described in Attachment A (the “*Property*”), and Ameresco wishes to perform such services; and

**WHEREAS**, the Property is owned by the Board of Regents of The Texas A&M University System (sometimes hereinafter referred to as the “*Board*”) and has been assigned to Customer.

**NOW, THEREFORE**, in consideration of the covenants, representations, warranties, and mutual promises and agreements contained herein, and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Parties hereby agree as follows:

### **SECTION 1      Scope of Services.**

(a) Work:

- (i) **Preconstruction Services:** Ameresco has performed an Investment Grade Audit (“IGA”) of the Property, dated as of November 18, 2022 as referenced in Attachment B. Ameresco will also assist Customer in obtaining financing for the Project.
- (ii) **Construction Work:** Upon Ameresco’s receipt of (i) the Notice To Proceed (as defined in Section 4), Ameresco shall furnish all labor, materials and equipment and perform all work required for the completion of the Scope of Services including the installation of the energy conservation measures as set forth in Attachment B (the “*ECMs*”). Customer and Ameresco shall mutually plan the scheduling of the construction work. The construction work will be planned to minimize the interruption of the daily routine of Customer’s staff and students except as permitted in writing by Customer.
- (iii) The Texas A&M University System (“TAMUS”) Office of Facilities Planning and Construction (“FPC”) shall manage the Scope of Work identified in Section (a) (ii) above and shall work with Ameresco and Customer regarding coordination of Ameresco’s duties under this Scope of Work.
- (iv) Ameresco shall utilize TAMUS’s project management software application e-Builder® as the primary system for all project documentation through all phases of the Scope of Work. Contractor shall follow TAMUS’s guidelines on the use of e-Builder®.
- (v) Construction submittals shall be reviewed and approved by designers engaged by Ameresco for the project, with input by the Customer, prior to final approval and installation.
- (vi) Ameresco shall assign a site superintendent to manage the Work and serve as point of contact for FPC.

(b) **Disposal:** Ameresco, at its cost, shall (i) be responsible for disposal of all non-hazardous equipment and materials which are rendered useless and removed as a result of the installation of the ECMs and (ii) cause all lamps which are classified as hazardous wastes by the rules and regulations of the U.S. Environmental Protection Agency (40 CFR Parts 260 through 279) and PCB-contaminated ballasts, if any, which have been rendered useless and removed as a result of the installation of the ECMs to be transported and disposed of. All other existing PCB- contaminated ballasts, lamps and any other hazardous materials, however, shall remain the sole responsibility of Customer and Ameresco shall assume no liability whatsoever in connection with their removal, transportation and disposal.

(c) Asbestos and Lead Paint:

(i) **Asbestos:** The Scope of Services is predicated on the viability of the Project without Ameresco encountering or disturbing asbestos or being required to perform any asbestos abatement or taking any other action with respect to asbestos. Under no circumstances, shall Ameresco be required to handle asbestos. Customer hereby represents to Ameresco that, to the best of its knowledge and belief, there is no asbestos in any area wherein Ameresco will be performing its services hereunder. In the event that Ameresco: (A) encounters any friable or non-friable asbestos which is in the immediate vicinity of its work, (B) determines that its work will result in the disturbance of asbestos material, or (C) determines that the presence of asbestos material will impede its work, Ameresco will notify Customer of the same and Customer will, at its cost, cause the asbestos to be promptly and properly removed, enclosed, encapsulated or otherwise abated in accordance with all applicable laws, regulations and guidelines, or alternatively, Customer, at its cost, may provide written test reports showing that asbestos in such area has been properly removed, enclosed encapsulated or otherwise abated in accordance with all applicable laws. In the event that Ameresco cannot determine whether any particular material does or does not contain asbestos, Customer, upon Ameresco's written request, shall, at Customer's cost, promptly perform tests or cause tests to be performed in order to determine whether or not such material contains asbestos and/or whether there are unacceptable levels of airborne particulate material containing asbestos and provide such test reports to Ameresco. In the event Ameresco encounters asbestos which materially affects its progress of the Project, Ameresco, at its option, may demobilize and cease construction in the area affected by the presence of such asbestos until such time as Customer performs the actions required to be performed by Customer as provided herein. In the event that Customer does not promptly take action, as provided herein, or notifies Ameresco that it will not take such action, Ameresco may, at its option, either remove the affected area from the Scope of Services (and make commensurate adjustments to the rights and obligations of the Parties) or terminate this Agreement in its entirety in accordance with Section 12(a). Customer shall be responsible for all costs (including termination) incurred by Ameresco that relate to the presence of asbestos.

(ii) **Lead Paint:** The Scope of Services is predicated upon the viability of the Project without Ameresco encountering or disturbing lead paint or being required to perform abatement or providing any notice or taking any other action with respect to lead paint. Under no circumstances, shall Ameresco be required to perform services which cause the disturbance of lead paint. Customer hereby represents to Ameresco that, to the best of its knowledge and belief, that there is no lead paint

in any area wherein Ameresco will be performing its services hereunder. In the event that Ameresco encounters any paint in any area where it is to perform services hereunder, which services will involve disturbing paint and Ameresco reasonably believes that such paint may be lead paint or such services will involve disturbing paint which is in a building constructed prior to 1978, Customer, upon Ameresco's written request, will, at Customer's cost, promptly perform tests or cause tests to be performed in order to determine whether or not such paint contains lead and will provide such test reports to Ameresco. In the event that such test reports demonstrate the presence of lead paint or Ameresco reasonably believes that performing its services under this Agreement is likely to cause the disturbance of lead paint in such a manner as to require Ameresco to provide any notification or take any actions pursuant to any federal, state or local laws, rules, regulations or guidelines and Ameresco notifies Customer of the same, Customer will, in either case, at its cost, cause the lead paint to be promptly and properly removed, or otherwise abated in accordance with all applicable laws and regulations. In the event that lead paint materially affects the progress of the Project, Ameresco, at its option, may demobilize and cease construction in the area affected by the presence of lead paint until such time as Customer performs the actions required to be performed by Customer as provided herein. In the event that Customer does not promptly take action as provided herein or notifies Ameresco that it will not take such action, Ameresco may, at its option, either remove the affected area from the Scope of Services (and make commensurate adjustments to the rights and obligations of the Parties) or terminate this Agreement in its entirety in accordance with Section 12(a). Customer shall be responsible for all costs (including termination) incurred by Ameresco that relate to the presence of lead paint.

- (d) **Maintenance and Measurement and Verification:** To the extent provided for in Attachment I, Ameresco will service and maintain during the Term (as defined in Section 5) the equipment scheduled on Attachment I, at a cost to Customer as set forth in Section 4 and Attachment G. Except for the ECMs (or other equipment) which are to be maintained by Ameresco, Customer, at its expense, shall be responsible for servicing and maintaining the ECMs (and such other equipment). To the extent provided for in Attachment M, Ameresco will supply such ongoing measurement and verification services during the Term at a cost to Customer as set forth in Section 4 and Attachment G.
- (e) **Compliance with Law:** Ameresco shall, at its expense, comply with and obtain all applicable licenses and permits required by federal, state and local laws in connection with (i) the installation of the ECMs and (ii) the operation and/or maintenance of the ECMs (to the extent that Ameresco agrees to perform such operations and/or maintenance services). In the event that Ameresco cannot procure any such license or permit in light of a requirement that Customer is required to do so, Customer shall promptly procure the same. Ameresco shall pay the required prevailing wage rates for work in connection with the Project pursuant to the Texas State Labor Law.
- (f) **Taxes:** Customer hereby represents to Ameresco that Customer is a governmental entity and that it shall cooperate with Ameresco and provide Ameresco with all appropriate documentation so that Ameresco may establish that it does not have to pay taxes, fees and assessments or other charges of any character which may be imposed or incurred by any governmental or public authority as an incident to title to, ownership of, or operation of the ECMs.

- (g) **Non-Discrimination:** Ameresco agrees not to knowingly or willfully discriminate against any employee, or applicant for employment, to be employed in the performance of this Agreement, with respect to hire, tenure, terms, conditions or privileges of employment, or any matter directly or indirectly related to employment, because of age, sex, sexual orientation, race, disability, color, religion, national origin, Vietnam era military service or ancestry in accordance with applicable federal, state or local laws.
- (h) **Standards of Service and Comfort:** Customer shall operate the ECMs in a manner that shall provide the standards of service and comfort provided for in Attachment K.
- (i) **Installation/Specifications:** Prior to the commencement of work hereunder, Ameresco may, at its option, provide (or Customer, at its option, may reasonably request to have Ameresco provide) a sample installation of, or written specification of, any ECM to be installed (each, a “**Sample**”). Customer shall furnish its written approval or disapproval of each Sample within ten (10) business days following Customer’s receipt of Ameresco’s written notice of installation and/or delivery of such Sample. Customer’s approval of such Sample shall be in substantially the form of Attachment L. If Customer disapproves any such Sample, Ameresco shall have the right to provide a substitute specification or ECM (each, a “**Substitution**”) which conforms to the applicable specifications or is equivalent to any applicable Sample previously approved by Customer. Upon Customer’s written approval of a Substitution, Ameresco may revise the Attachments to reflect each such Substitution. If, however, Customer does not approve of any Substitution, the Parties hereby agree to negotiate a mutually acceptable solution. Customer shall not unreasonably withhold, condition or delay any approval provided for herein.
- (j) **Duties, Obligations and Responsibilities of Ameresco:**
  - (i) All labor furnished under this Agreement shall be competent to perform the tasks undertaken, all materials and equipment provided shall be new and of appropriate quality and the completed work shall comply in all material respects with the requirements of this Agreement and in a good and workmanlike manner.
  - (ii) Ameresco shall maintain the Project site in a reasonably clean condition during the performance of the construction work set forth in Section 1(a).
  - (iii) Ameresco shall regularly clean the Project site of all debris, trash and excess material or equipment.
  - (iv) During the construction work set forth in Section 1(a), Ameresco shall permit Customer and/or any of its representatives to enter upon the Project site to review or inspect the construction work; provided, that in each case, the Customer and/or its representatives coordinate such review or inspection with Ameresco and agree to comply with all applicable federal, state and local safety laws, rules and regulations, including, without limitation, those promulgated by the U.S. Department of Labor Occupational Safety & Health Administration.
  - (v) Ameresco will provide equipment manuals and other appropriate information regarding equipment installed hereunder to Customer at or about the time of Substantial Completion (as defined in Section 4).

**SECTION 2            Ownership of and Security Interest in the ECMs.**

Title to each ECM and other personal property installed or incorporated into the ECMs shall at all times during the Term remain in the name of Ameresco. Any provision in this Section to the contrary notwithstanding, ownership and title to an ECM shall automatically pass to Customer and Ameresco's security interest in such ECM shall be released and terminated, in each case without further action on either Party's part, upon Ameresco's receipt of both (i) the executed Substantial Completion Certificate (as defined in Section 4) for such ECM and (ii) the indefeasible payment in full of all of Customer's payment obligations to Ameresco for such ECM.

### **SECTION 3      Financing.**

**(a)      Texas A&M University System Revenue Financing System:**

Funding for the project will be provided by Texas A&M University through the use of cash without incurring debt service.

- (b)** The Parties anticipate that the Annual Energy Cost Savings (as defined in Attachment F) guaranteed hereunder pursuant to Section 6, shall be not less than the Guaranteed Savings (as defined in Section 6(a)). If Customer does not issue a Notice to Proceed within sixty (60) days following the approval of the project by the Texas Higher Education Coordinating Board, any (i) changes in capital costs, (ii) changes in interest rates or (iii) other events, circumstances or developments cause or may have the effect of causing the Annual Energy Cost Savings to be less than the Guaranteed Savings, then the Parties agree to mutually and reasonably attempt to negotiate a reduction or modification of the applicable construction costs by removing components of the ECMs to be otherwise installed hereunder in order to ensure that the Annual Energy Cost Savings shall be no less than the Guaranteed Savings. If the Parties cannot agree to such reduction or modification, then Customer and Ameresco shall each have the option, exercisable upon written notice to the other Party, to terminate this Agreement. In that regard, Customer acknowledges and agrees that Ameresco has incurred and will incur further costs and expenses relating to the preconstruction services described in Section 1(a)(i). If Customer exercises such option to terminate this Agreement, Customer shall pay Ameresco \$88,274 in recognition of such preconstruction services.

### **SECTION 4      Compensation and Monthly Progress Payments.**

- (a)** For each month during the construction period of the Project following Customer's issuance to Ameresco of the notice to proceed substantially in the form of Attachment D (the "*Notice to Proceed*"), Customer shall make monthly progress payments to Ameresco based upon the percentage of the Project construction and equipment procurement completed at the end of each month. Ameresco shall be paid the same percentage of the Contract Cost as such percentage of completion. Following the end of each month, during the construction period of the Project, Ameresco will provide to Customer its payment requests to Customer through e-Builder@together with a list in sufficient detail to reasonably identify construction and equipment procurement during such month. Within thirty (30) days after receipt of such invoice, following Customer's review and acceptance of such invoice and detail such acceptance not to be unreasonably withheld, conditioned or delayed), Customer shall pay or cause to be paid to Ameresco the amount due under such invoice. Notwithstanding the foregoing, all invoices and payment shall comply with Texas Prompt Payment laws.



- (b) Within thirty (30) days following each successive twelve (12) month period beginning with the first day of the month following the date of the Final Delivery and Acceptance Certificate, Customer shall pay Ameresco the separate amounts provided for in Attachment G, if any, as an annual fee for measurement and verification services.
- (c) Within thirty (30) days following each successive twelve (12) month period beginning with the first day of the month following the date of the Final Delivery and Acceptance Certificate, Customer shall pay Ameresco the separate amounts set forth in Attachment G, if any, for maintenance (as described in Attachment I) and/or operations services, if any, as agreed by the Parties and to be performed or provided by Ameresco.
- (d) To the extent available and if Customer and Ameresco agree, Customer may purchase an extended warranty from Ameresco on certain portions of the equipment installed under this Agreement on mutually agreeable terms and conditions as set forth in Attachment G.
- (e) All amounts not paid to Ameresco on or before the due dates specified in Sections 4(a), (b), (c) and (d) shall accrue interest at the maximum rate permitted by law in the State of Texas for contracts of this type for the number of days following each such due date until such time as such amount due has been paid in full.
- (f) Upon Substantial Completion of the installation of an ECM (or portion thereof, as applicable), Ameresco will deliver to Customer a substantial completion certificate in the form of Attachment J (the “**Substantial Completion Certificate**”). Within thirty (30) days after receipt of each Substantial Completion Certificate, Customer shall complete, execute and deliver to Ameresco each such Substantial Completion Certificate. A delivery and acceptance certificate in the form of Attachment E (the “**Final Delivery and Acceptance Certificate**”) shall be executed by Customer and delivered to Ameresco within five (5) business days after the Substantial Completion of the installation of all the ECMs under this Agreement. Customer shall not unreasonably withhold, condition or delay the execution and delivery of any Substantial Completion Certificate or the Final Delivery and Acceptance Certificate. As used in this Agreement, the term “**Substantial Completion**” shall mean that the subject ECM has been installed by Ameresco, and, if such ECM is equipment, such equipment is then operating in a manner such that Customer is deriving beneficial use thereof.

**SECTION 5           Term.**

The term of this Agreement (the “**Term**”) shall begin on the date above first written and shall end on that date which is exactly twenty (20) years from the first day of the month following the date of Customer’s execution of the Final Delivery and Acceptance Certificate, unless this Agreement is terminated prior to such date, as provided for in Section 12, 14 or 32. Anything in this Agreement to the contrary notwithstanding, Customer shall not be relieved of its obligation to pay Ameresco when due all amounts which accrued prior to such termination.

**SECTION 6           Guarantee of Energy Savings.**

- (a) Ameresco hereby represents and warrants to Customer that the amount of the Annual Energy Cost Savings (as defined in Attachment F) shall equal or exceed the “**Guaranteed Savings**” (as specified in Table 6(a) below), over the Term (the “**Guarantee of Energy Savings**”). Capital Offset Savings are stipulated and defined in Attachment F.

*Table 6(a)*

<b>Year</b>	<b>Guaranteed Savings</b>
1	\$364,898
2	\$383,142
3	\$402,300
4	\$422,415
5	\$443,535
6	\$465,712
7	\$488,998
8	\$513,448
9	\$539,120
10	\$566,076
11	\$594,380
12	\$624,099
13	\$655,304
14	\$688,069
15	\$722,472
16	\$758,596
17	\$796,526
18	\$836,352
19	\$878,170
20	\$922,078

For purposes of the Guarantee of Energy Savings, the following assumptions and provisions shall apply:

- (i) Calculation of the Annual Energy Cost Savings, inclusive of energy savings and operational and maintenance cost savings, shall be performed under, and governed by, the methods, formulas, and procedures described in Attachment M.
- (ii) As it relates to the Annual Energy Cost Savings and the Guarantee of Energy Savings, the term “year” shall mean the consecutive twelve (12) month period beginning with the first day of the month following the date of the Final Delivery and Acceptance Certificate (the “*Anniversary Date*”), and each similar twelve (12) month period thereafter.
- (iii) The unit prices, including the escalation thereof, to be used to calculate the Annual Energy Cost Savings for the purposes of the Guarantee of Energy Savings are described in Attachment M.
- (iv) The Guarantee of Energy Savings herein is subject to Customer performing its maintenance and other obligations under this Agreement. Ameresco agrees as part of its responsibilities to provide O&M manuals from the equipment manufacturers and facilitate training sessions between equipment representatives and Customer representatives. Customer agrees to attend training sessions, perform maintenance and retain maintenance records for major equipment. If Customer fails to perform, or fails to properly perform, its obligations under this Agreement or interferes with, or permits any person to take any action which, in the reasonable opinion of Ameresco, prevents the achievement of the Annual Energy Cost Savings under the Guarantee of Energy Savings, then Ameresco may equitably adjust the Annual

Energy Cost Savings during the period wherein savings were affected to reflect the same. Ameresco shall notify Customer if Ameresco notices any maintenance deficiencies during the regular course of performing the M&V services, provided that Ameresco shall have no obligation to perform any maintenance or provide an in-depth inspection or investigation of Customer's maintenance in connection with such M&V services, and Ameresco's failure to notice and report any such condition to Customer shall in no event constitute an acceptance of the same or waiver of the right to adjust the baseline on Ameresco's part. Prior to making any such adjustment, Ameresco will notify Customer of the same and permit Customer a reasonable amount of time to establish, to Ameresco's reasonable satisfaction, based on Customer's accurate maintenance records, that the Annual Energy Cost Savings have not been adversely affected by the Customer's maintenance of the related equipment. If, following such review, Ameresco still feels that an adjustment to the baseline is warranted, Ameresco shall notify Customer of the same. If Customer objects to the proposed adjustment, the parties shall attempt to arrive at a mutually agreeable solution. If the parties are unable to do so, they shall proceed in accordance with the dispute resolution provisions of this Agreement. Ameresco's rights in this section shall not be in limitation of any other rights it possesses under this Agreement.

- (v) Ameresco will perform and submit to Customer a guarantee reconciliation ("**Guarantee Reconciliation**") upon the later of (i) one hundred twenty (120) days after each Anniversary Date and (ii) sixty (60) days after Customer delivers to Ameresco all utility billing and other data necessary for Ameresco's completion of the Guarantee Reconciliation. The Guarantee Reconciliation will include a calculation of the cumulative Annual Energy Cost Savings achieved in relation to the cumulative Guaranteed Savings for the period being reconciled.
- (vi) Ameresco hereby guarantees that if the cumulative Annual Energy Cost Savings realized by Customer as of any Anniversary Date, as detailed in the Guarantee Reconciliation, is less than the cumulative Guaranteed Savings as of such Anniversary Date, then Ameresco will pay to Customer that amount by which the cumulative Guaranteed Savings exceeds the cumulative Annual Energy Cost Savings, such payment to be made within sixty (60) days after the date of the Guarantee Reconciliation. Any such payments made by Ameresco shall be included in the cumulative Annual Energy Cost Savings total for purposes of future Guarantee Reconciliation calculations.

## **SECTION 7      Access to Property.**

During the Term, Customer shall provide Ameresco, its employees, agents and subcontractors access to the Property for the purpose of fulfilling Ameresco's obligations under this Agreement. Customer shall provide mutually satisfactory rent-free space for the installation and operation of the ECMs and shall protect such equipment in the same careful manner that Customer protects its own property.

## **SECTION 8      Changes in Work.**

The quantity, quality, dimensions, type or other characteristics of the ECMs may be changed only by written consent of Customer and Ameresco by the execution of a change order form in the form of Attachment H (a "**Change Order Form**"). In addition, the Scope of Services may be reduced or expanded including,

without limitation, the addition or reduction of other energy efficiency measures and facilities not included within the ECMs scheduled on Attachment B by the execution and delivery of a Change Order Form.

**SECTION 9           Warranties.**

- (a) Ameresco warrants that the design, engineering, and installation services it performs will be performed consistent with good engineering practices and that such work is warranted to be free from defects in materials and workmanship for a period of one (1) year from the date of execution of a Substantial Completion Certificate by Customer for such work. Any manufacturers' warranties which exceed this one (1) year period shall be assigned to Customer to the extent allowed by the manufacturer. Except as provided above, AMERESCO MAKES NO WARRANTIES OR REPRESENTATIONS OF ANY KIND, WHETHER STATUTORY, WRITTEN, ORAL OR IMPLIED, INCLUDING WITHOUT LIMITATION, WARRANTIES AS TO THE VALUE, DESIGN, AND CONDITION OR FITNESS FOR USE OR PARTICULAR PURPOSE OR MERCHANTABILITY, REGARDING THE EQUIPMENT, ECMS OR ANY SERVICES PROVIDED HEREUNDER.
- (b) Customer may purchase extended warranty coverage for equipment installed hereunder as provided in Section 4(d).

**SECTION 10          Customer Role and Responsibilities.**

- (a) **Operations:** Customer shall operate the equipment installed hereunder in accordance with the manufacturers' recommendations and any supplemental procedures supplied to Customer by Ameresco.
- (b) **Maintenance:** Customer shall, at its expense, repair, operate and maintain the Property in good working order during the Term. Except as may otherwise be provided for in Attachment I, and subject to the provisions of Section 9(a) hereof, following the date of Substantial Completion of an ECM, Customer shall, at its expense, repair and maintain (i) the equipment and all other components which comprise the ECM and (ii) all other equipment which is attached thereto and/or is integral to the proper functioning of the ECM.
- (c) **Malfunctions:** Customer shall notify Ameresco immediately in the event of any malfunction in the operation of the ECMs or the equipment installed hereunder.
- (d) **Protection of ECM:** Except in the case of emergency, Customer shall not remove, move, alter, turn off or otherwise significantly affect the operation of the equipment installed hereunder or the operation of the ECMs, or any individual part thereof, without the prior written approval of Ameresco, which approval shall not be unreasonably withheld. After receiving Ameresco's written approval, Customer shall proceed as instructed. Customer shall act reasonably to protect the ECMs from damage or injury, if, due to an emergency, it is not reasonable to notify Ameresco before acting. Customer agrees to protect and preserve the facility envelope and the operating condition of all ECMs, mechanical systems, and other energy consuming systems located on the Property.
- (e) **Measurement System:** Customer shall not alter, move, modify or otherwise change the measurement and verification system or any component thereof without the prior written

consent of Ameresco unless such action is in accordance with operating procedures provided by Ameresco.

- (f) **Adjustment to Baseline:** If, in the reasonable opinion of Ameresco, Customer does not reasonably operate, maintain, repair or otherwise protect the ECMs and/or maintain the Property in good repair and good working condition, then Ameresco may equitably adjust the baseline, as referenced in Attachment F, for any increased energy usages at the Property.
- (g) **Changes to Property or Addition of Equipment:** Customer shall notify Ameresco in writing at least thirty (30) days prior to making any change(s) to the Property that could reasonably be expected to have an effect on the energy usage at the Property including, without limitation, changes in (i) the hours, days or time of year that the Property is occupied or operated, (ii) the number of staff, faculty and students at the Property, (iii) the activities conducted at the Property and (iv) the equipment, the facilities, or the size of the Property. Customer shall notify Ameresco regarding increases, over time, in numbers and usage of “plug in” devices such as computers and printers. In the event that Ameresco receives such notification or otherwise determines that such a change has occurred, it will make the appropriate revisions to the Attachments or take such other action as may be provided for hereunder. Ameresco may also make retroactive adjustments where Customer has not provided timely notice and, in such instances, any payments made between the Parties shall be retroactively reconciled to reflect the changed baseline.
- (h) **Energy Usage Data:** If requested in writing by Ameresco, Customer shall provide to Ameresco, on a monthly basis during the Term (and in any event, within thirty (30) days of its receipt of the same), copies of all energy bills, energy usage data, and any and all other such documentation maintained by Customer, as requested by Ameresco, which is necessary for Ameresco to determine and satisfy all of its obligations under this Agreement.
- (i) **Insurance and Risk of Loss or Damage:** Ameresco acknowledges that, because Customer is an agency of the State of Texas, liability for the tortious conduct of the agents and employees of Customer or for injuries caused by conditions of tangible state property is provided solely by the provisions of the Texas Tort Claims Act (*Texas Civil Practice and Remedies Code*, Chapters 101 and 104), and that Workers’ Compensation Insurance coverage for employees of Customer is provided by Customer as mandated by the provisions of Chapter 502, *Texas Labor Code*. Customer shall have the right, at its option, to (a) obtain liability insurance protecting Customer and its employees and property insurance protecting Customer’s buildings and contents, to the extent authorized by Section 51.966, *Texas Education Code*, or other law, or (b) self-insure against any risk that may be incurred by Customer as a result of its operations under this Agreement.

Customer assumes all risk of loss of or damage to the ECMs from any cause whatsoever except to the extent that such loss or damage was caused by the negligence of Ameresco. Upon damage to any item of the equipment installed hereunder or the ECMs, Customer shall promptly notify Ameresco and immediately place the same in good repair with the proceeds of any insurance received applied to the cost of such repair. If Customer determines that any item of the ECMs are lost, stolen, confiscated, destroyed or damaged beyond repair, Customer shall replace the same with like equipment in good repair in a timely fashion.

If at any time after the date of the Final Delivery and Acceptance Certificate and after Customer's complete payment to Ameresco in accordance with Section 4(a), as such amount may be modified from time to time in accordance with this Agreement, any fire, flood, other casualty, or condemnation renders a majority of the Property incapable of being occupied and renders the ECMs or the equipment installed hereunder inoperable and, in the case of a casualty, the affected portion of such ECMs or equipment is not reconstructed or restored within one hundred twenty (120) days from the date of such casualty, Ameresco and/or Customer may terminate this Agreement by delivery of a written notice to the other Party. Upon such termination, Customer shall pay Ameresco any amounts, or pro-rata portions thereof, accrued under Sections 4(b), (c), (d) and (e) and Attachment G.

- (j) **Telephone and Internet:** Customer shall be responsible for installing and maintaining telephone lines and all associated costs, including internet/Ethernet charges, for the energy management system's telephone and communication lines. Ameresco may use Customer's LAN for the purposes of the energy management system.
- (k) **Protection:** Customer shall at all times act reasonably to protect the ECMs from damage, theft or injury to the same extent and in the same manner in which it protects its other property.
- (l) **Alteration:** Customer shall not move, alter or change the ECMs in any way that causes a reduction in the level of efficiency or savings generated by any ECM or the equipment installed hereunder without obtaining Ameresco's prior written approval which shall not be unreasonably withheld.
- (m) **Storage:** Customer shall provide reasonable rent free space for Ameresco and/or its subcontractors, to mobilize and store their supplies, tools and equipment during installation of the ECMs or other activities by Ameresco within the Property pursuant to this Agreement for which such storage may be required. Only Ameresco and/or its subcontractors and Customer's assigned personnel shall have access to the storage. Customer assumes no responsibility nor will Customer provide any additional security for the storage provided.
- (n) **Fuel:** Customer shall procure and pay for all energy and fuel for the operation of the Property.

#### **SECTION 11 Defaults by Customer and Ameresco.**

- (a) Customer shall be in default under this Agreement upon the occurrence of any of the following:
  - (i) Customer fails to pay from monies appropriated or approved by the Board and available for the purpose of this Agreement, as provided by Section 32 of this Agreement, when due any amount to be paid under this Agreement and such failure continues for a period of five (5) business days after notice of overdue payment is delivered by Ameresco to Customer; or

- (ii) any representation made by Customer in this Agreement or in any writing delivered by Customer pursuant hereto proves at any time to have been false, misleading or erroneous in any material respect as of the time when made; or
  - (iii) Customer fails to perform or meet any of its required duties or obligations under this Agreement and fails to cure such failure and the effects of such failure within thirty (30) days of receipt of written notice of default, unless such failures and effects cannot be completely cured within thirty (30) days after said written notice, in which case a default shall exist only if Customer does not commence and diligently pursue to cure such failure and effects as soon as possible; or
  - (iv) Customer goes into receivership or makes an assignment for the benefit of creditors whether voluntary or involuntary, or a petition is filed by or against Customer under any bankruptcy, insolvency or similar law and such petition is not dismissed within sixty (60) days.
- (b) Ameresco shall be in default under this Agreement upon the occurrence of either of the following:
- (i) Ameresco fails to perform or meet any of its required duties or obligations under this Agreement and fails to cure such failure or effects of such failure within thirty (30) days of receipt of written notice of default, unless such failure or effects of such failure cannot be completely cured within thirty (30) days after said written notice, in which case a default shall exist only if Ameresco does not commence and diligently pursue to cure such failure as soon as possible; or
  - (ii) Ameresco goes into receivership or makes an assignment for the benefit of creditors whether voluntary or involuntary, or a petition is filed by or against Ameresco under any bankruptcy, insolvency or similar law and such petition is not dismissed within sixty (60) days.

**SECTION 12 Remedies for Defaults.**

- (a) In the event Customer defaults under this Agreement, Ameresco may:
- (i) bring actions for any remedies available at law or in equity or other appropriate proceedings for the recovery of direct damages (including amounts past due), and/or bring an action in equity for specific performance; or
  - (ii) without recourse to legal process, Ameresco may terminate this Agreement by delivery of written notice of termination consistent with the notice provisions in Section 24 below.
- (b) In the event Ameresco defaults under this Agreement, Customer may terminate this Agreement and bring an action in law for direct damages.

**SECTION 13 Intentionally Omitted.**

**SECTION 14 Termination.**

At any time after the date of the Final Delivery and Acceptance Certificate, Customer may terminate this Agreement upon thirty (30) days prior written notice to Ameresco, provided that Customer has paid to

Ameresco all amounts due, subject to Section 32, as set forth in Section 4 (including, without limitation, pro-rata portions thereof accrued under Sections 4(b), (c), (d) and (e)) and on Attachment G (other than amounts due for future performance by Ameresco).

**SECTION 15 Insurance.**

Ameresco shall obtain and maintain, for the duration of this Agreement or longer, the minimum insurance coverage set forth below. With the exception of Professional Liability (E&O), all coverage shall be written on an occurrence basis. All coverage shall be underwritten by companies authorized to do business in the State of Texas or eligible surplus lines insurers operating in accordance with the Texas Insurance Code and have a financial strength rating of A- or better and a financial strength rating of VII or better as measured by A.M. Best Company or otherwise acceptable to Customer. By requiring such minimum insurance, the Owner shall not be deemed or construed to have assessed the risk that may be applicable to Ameresco under this Agreement. Ameresco shall assess its own risks and if it deems appropriate and/or prudent, maintain higher limits and/or broader coverage. Ameresco is not relieved of any liability or other obligations assumed pursuant to this Agreement by reason of its failure to obtain or maintain insurance in sufficient amounts, duration, or types. No policy will be canceled without unconditional written notice to Customer at least ten days before the effective date of the cancellation.

**Insurance:**

<b><u>Coverage</u></b>	<b><u>Limit</u></b>
<b>(a) Worker’s Compensation</b>	
Statutory Benefits (Coverage A)	Statutory
Employers Liability (Coverage B)	\$1,000,000 Each Accident \$1,000,000 Disease/Employee \$1,000,000 Disease/Policy Limit
Workers’ Compensation policy must include under on the information page of the workers’ compensation policy the state in which work is to be performed for TSU. Workers’ compensation insurance is required, and no “alternative” forms of insurance will be permitted	
<b>(b) Automobile Liability</b>	
Owned Vehicles	\$5,000,000
Uninsured/Under insured Motorists	\$5,000,000
Medical or PIP	\$5,000
Non-owned Vehicles	\$5,000,000
Hired Vehicles	\$5,000,000
<b>(c) Commercial General Liability</b>	
Each Occurrence Limit	\$1,000,000
General Aggregate Limit	\$2,000,000
Products / Completed Operations	\$1,000,000
Personal / Advertising Injury	\$1,000,000
Damage to rented Premises	\$300,000
Medical Payments	\$5,000
<b>(d) Umbrella/Excess Liability Insurance</b>	<b>\$5,000,000</b>



The required commercial general liability policy will be issued on a form that insures Ameresco's or its subcontractors' liability for bodily injury (including death), property damage, personal and advertising injury assumed under the terms of this Agreement.

- (e) Ameresco will deliver to Customer: Evidence of insurance on a Texas Department of Insurance approved certificate form verifying the existence and actual limits of all insurance after the execution and delivery of this Agreement and prior to the performance of any services by Ameresco under this Agreement. Additional evidence of insurance will be provided on a Texas Department of Insurance approved certificate form verifying the continued existence of all required insurance no later than thirty (30) days after each annual insurance policy renewal.

**All insurance policies**, with the exception of worker's compensation, employer's liability and professional liability will be endorsed and name The Board of Regents for and on behalf of The Texas A&M University System, The Texas A&M University System and Texas A&M University as Additional Insureds up to the actual liability limits of the policies maintained by Ameresco. Commercial General Liability and Business Auto Liability will be endorsed to provide primary and non-contributory coverage. The Commercial General Liability Additional Insured endorsement will include on-going and completed operations and will be submitted with the Certificates of Insurance.

**All insurance policies** will be endorsed to provide a waiver of subrogation in favor of The Board of Regents of The Texas A&M University System, The Texas A&M University System and Texas A&M University. No policy will be canceled without written notice to Texas A&M University at least ten days before the effective date of the cancellation. **All insurance policies** will be endorsed to require the insurance carrier providing coverage to send notice to Texas A&M University ten (10) days prior to the effective date of cancellation or non-renewal relating to any insurance policy required in this Section 11.

Any deductible or self-insured retention must be declared to and approved by Texas A&M University prior to the performance of any services by Ameresco under this Agreement. Ameresco is responsible to pay any deductible or self-insured retention for any loss. All deductibles and self-insured retentions will be shown on the Certificates of Insurance.

Certificates of Insurance and Additional Insured Endorsements as required by this Agreement will be delivered electronically, hand delivered, or 1st class mail to customer's Department of Contract Administration at 400 Bizzell St., College Station, Texas 77843 – [contracts@tamu.edu](mailto:contracts@tamu.edu)

The insurance coverage required by this Agreement will be kept in force until all services have been fully performed and accepted by Texas A&M University in writing.

Ameresco shall, after receipt of the Notice to Proceed and prior to the commencement of construction, deliver to Customer payment and performance bonds in a sum equal to the Contract Cost (the "***Payment and Performance Bonds***") with sureties licensed by the State of Texas and reasonably satisfactory to Customer. Such Payment and Performance Bonds shall be in form provided by Customer and shall be conditioned upon the faithful performance by Ameresco, for the implementation of the ECMs. The Payments and Performance Bonds shall only apply to the installation portion of this Agreement and do not apply in any way to energy savings guarantees, payments or maintenance provisions, except that the performance bond shall guarantee that the installation will be free of

defective materials and workmanship for a period of twelve (12) months following completion and acceptance of the work.

**SECTION 16 Indemnification.**

Ameresco agrees to defend, indemnify and hold Customer harmless from and against any and all third party claims for damages arising by reason of bodily injury, death or damage to property caused by Ameresco's negligence (or the negligence of any sub-contractor hired by Ameresco) or willful misconduct. Ameresco, however, in no event shall be obligated to indemnify Customer to the extent that any injury or damage is caused by the negligence of Customer or any entity for which Customer is legally responsible.

**SECTION 17 Agreement Interpretation and Performance.**

The interpretation and performance of this Agreement, and the interpretation and enforcement of the rights of the Parties hereunder, shall be construed in accordance with and governed by the laws of the State of Texas. In the event of any ambiguity or conflict in meaning, the terms of this Agreement shall not be construed against the drafting Party based upon that Party's having drafted this Agreement.

**SECTION 18 Privileged and Proprietary Information.**

Ameresco's systems, means, cost, and methodologies of evaluating, implementing, accomplishing and determining energy savings and the terms of this Agreement for the Project shall be considered privileged and proprietary information. Customer shall use the same level of effort to protect and safeguard such information as it employs to safeguard its own confidential information. Customer shall not disclose such proprietary information without the express written consent of an officer of Ameresco unless required to do so by statute or regulation. When any request for disclosure of such information is made under any applicable freedom of information law (the "**FOIL**"), Customer shall provide prompt written notice to Ameresco such that Ameresco will have the opportunity to timely object under the FOIL should it desire to object to such disclosure of that information in whole or in part. In the event that Customer is required to make a filing with any agency or other governmental body, which includes such information, Customer shall notify Ameresco in order to permit Ameresco to seek confidential treatment of such information included within any such filing.

**SECTION 19 Severability.**

Any term or provision of this Agreement that is declared invalid by any court of competent jurisdiction, shall not affect the validity or enforceability of the remaining terms and provisions of this Agreement.

**SECTION 20 Assignments and Subcontracting.**

- (a) Ameresco may elect to use subcontractors and/or subconsultants in meeting its obligations hereunder.
- (b) Customer shall not assign, transfer, or otherwise dispose of, in whole or in part, this Agreement, the ECMs, or any interest therein, or sublet or lend the ECMs or permit the ECMs to be used by anyone other than Customer and Customer's employees without the prior express written consent of Ameresco (or, if applicable, the Lessor) such consent not to be unreasonably withheld, conditioned or delayed. If Customer transfers ownership or its interest in the Property, Customer shall terminate this Agreement in accordance with Section 14.

- (c) Ameresco shall not assign this Agreement, in whole or in part, to any other party without first obtaining the written consent of Customer, which consent shall not be unreasonably withheld, conditioned or delayed. The foregoing notwithstanding, Ameresco may assign, without the prior written consent of Customer, its (i) rights and obligations under this Agreement, in whole or in part, to any affiliated or associated company of Ameresco and (ii) rights for payments under this Agreement to any financial institution, lender or investor in connection with a leasing or financing arrangement for the ECMs. Ameresco will notify Customer ten (10) business days prior to any such assignment and Customer agrees to acknowledge receipt of such notice in writing within three (3) business days after such notice.

## **SECTION 21      Waiver.**

The failure of either Party to require compliance with any provision of this Agreement shall not affect that Party's right to later enforce the same. It is agreed that the waiver by either Party of performance of any term of this Agreement or of any breach thereof will not be held or deemed to be a waiver by that Party of any subsequent failure to perform the same or any other term or condition of this Agreement or any breach thereof.

## **SECTION 22      Force Majeure.**

Neither party will be in breach of its obligations under this Agreement (other than payment obligations) or incur any liability to the other party for any losses or damages of any nature whatsoever incurred or suffered by that other party if and to the extent that it is prevented from carrying out those obligations by, or such losses or damages are caused by, a Force Majeure, except to the extent that the relevant breach of its obligations would have occurred, or the relevant losses or damages would have arisen, even if the Force Majeure had not occurred. Force Majeure is defined as 1) acts of God; 2) war; 3) act(s) of terrorism; 4) fires; 5) explosions; 6) natural disasters, to include without limitation, hurricanes, floods, and tornadoes; 7) failure of transportation; 8) strike(s); 9) loss or shortage of transportation facilities; 10) lockout, or commandeering of materials, products, plants or facilities by the government or other order (both federal and state); 11) interruptions by government or court orders (both federal and state); 12) present and future orders of any regulatory body having proper jurisdiction; 13) civil disturbances, to include without limitation, riots, rebellions, and insurrections; 14) epidemic(s), pandemic(s), or other national, state, or regional emergency(ies); and 15) any other cause not enumerated in this provision, but which is beyond the reasonable control of the party whose performance is affected and which by the exercise of all reasonable due diligence, such party is unable to overcome. Notwithstanding the foregoing, a party's financial inability to perform its obligations shall in no event constitute a Force Majeure.

**In the event of a Force Majeure, this Agreement shall remain in effect but the affected Party's obligations shall be suspended for a period equal to the disabling circumstances, provided that:**

- (a) the non-performing Party gives the other Party prompt written notice describing the particulars of the Force Majeure, including but not limited to the nature of the occurrence and its expected duration, and continues to furnish timely regular reports with respect thereto during the period of Force Majeure;
- (b) the suspension of performance is of no greater scope and of no longer duration than is required by the Force Majeure;

- (c) no obligations of either Party that arose before the Force Majeure causing the suspension of performance are excused as a result of the Force Majeure;
- (d) the non-performing Party uses reasonable efforts to remedy its inability to perform; and
- (e) the Term, upon written agreement of the Parties', shall be extended for a period equal to the number of days that the Force Majeure prevented the non-performing Party from performing.
- (f) Any decision by Customer to close or change the use of the facilities or ECMs at the Property shall not constitute a Force Majeure excusing Customer's performance under this Agreement.

**SECTION 23 Contract Documents.**

- (a) Upon execution of this Agreement by both Parties, this Agreement and its Attachments (including the IGA attached as a part of Attachment B) shall constitute the entire Agreement between the Parties relating to the subject matter hereof, and shall supersede all proposals, previous agreements, discussions, correspondences, and all other communications, whether oral or written, between the Parties relating to the subject matter of this Agreement.
- (b) Section headings used herein are for the convenience of reference only and are not to be construed as a part of this Agreement.
- (c) This Agreement may not be modified or amended except in writing signed by the Parties.

**SECTION 24 Notices.**

All notices, requests, demands, claims and other communications hereunder shall be in writing. Any notice, request, demand, claim or other communication hereunder (other than regularly scheduled payments) shall be deemed properly given or made upon receipt if delivered in person or sent by electronic facsimile with regular mail follow-up, or two business days after being deposited in the mail if sent by registered or certified mail, return receipt requested, postage prepaid, or the next business day if sent by overnight delivery service, in each case, addressed as follows:

**Texas A&M University**  
 1182 TAMU  
 College Station, TX 77843-1182  
 Attention: Contract Administration  
 Facsimile: 979.862.7130

**AMERESCO, INC.**  
 111 Speen Street  
 Suite 410  
 Framingham, MA 01701  
 Attention: Counsel  
 Facsimile: 508.661.2201

**WITH COPY TO:**

Texas A&M Health Clinical Bldg. 1, Suite 3100  
 8441 Riverside Pkwy  
 Bryan, TX 77807  
 Attention: Vice President & Chief Financial  
 Officer Finance & Administration

2375 E. Camelback Road  
 Suite 400  
 Phoenix, AZ 85016  
 Attention: Robert Georgeoff

**The Texas A&M University System,  
Office of Facilities Planning and Construction**  
Billy C. Hamilton, Deputy Chancellor and Chief Financial Officer  
Office of Facilities Planning & Construction  
The Texas A&M University System  
301 Tarrow Street, 2<sup>nd</sup> Floor  
College Station, Texas 77840-7896

With Copies to:

Brett McCully, Chief Facilities Officer  
Office of Facilities Planning & Construction  
The Texas A&M University System  
301 Tarrow Street, 2<sup>nd</sup> Floor  
College Station, Texas 77840-7896

Either Party may change such address from time to time by written notice to the other Party.

**SECTION 25      Records.**

To assist Ameresco in its performance of this Agreement, Customer shall (to the extent it has not already done so) furnish (or cause its energy suppliers and transporters to furnish) to Ameresco, upon its request, accurate and complete data (kept by Customer or Customer's energy suppliers and transporters in the regular course of their respective businesses) concerning energy usage for the existing facilities at the Property. Such records shall include, without limitation, the following data for the most current thirty-six (36) month period: (i) utility records; (ii) occupancy information; (iii) descriptions of any changes in building structure or heating, cooling or other systems or energy requirements; (iv) descriptions of all energy consuming or saving equipment used on Property; and (v) descriptions of all energy management procedures presently utilized. If requested by Ameresco, Customer shall also provide any prior energy analyses of the Property to the extent reasonably available.

**SECTION 26      Representations.**

Each Party represents to the other that:

- (a) it has all requisite power, authority, licenses, permits and franchises, corporate or otherwise, to execute and deliver this Agreement and perform its obligations hereunder;
- (b) its execution, delivery and performance of this Agreement have been duly authorized by, and are in accordance with, as to Ameresco, its organic instruments and, as to Customer, by all requisite Board or other action and policies and regulations, and are not in breach of any applicable law, code or regulation;
- (c) this Agreement has been duly executed and delivered by the signatories so authorized, and constitutes its valid and binding obligation;
- (d) its execution, delivery and performance of this Agreement shall not result in a breach or violation of, or constitute a default under, any agreement, lease or instrument to which it is a party or by which it or its properties may be bound or affected;

- (e) it has not received any notice of, nor to the best of its knowledge there is no, pending or threatened violation of any applicable laws, ordinances, regulations, rules, decrees, awards, permits or orders which would materially adversely affect its ability to perform its obligations hereunder; and
- (f) the persons executing this Agreement are duly authorized to do so.
- (g) Customer represents to Ameresco that Customer has obtained all necessary governmental, legal, administrative and any other approval necessary for it to enter into this Agreement.

**SECTION 27 Independent Contractor.**

Nothing in this Agreement shall be construed as reserving to Customer any right to exercise any control over or to direct in any respect the conduct or management of business or operations of Ameresco. The entire control or direction of such business and operations shall be in and shall remain in Ameresco, subject only to Ameresco's performance of its obligations under this Agreement. Neither Ameresco nor any person performing any duties or engaged in any work on the Property on behalf of Ameresco shall be deemed an employee or agent of Customer. Nothing in this Section shall be deemed to be a waiver of Customer of the right to use its property. Customer and Ameresco are independent of one another and shall have no other relationship relating to or arising out of this Agreement. Neither Party shall have or hold itself out as having the right or authority to bind or create liability for the other by its intentional or negligent act or omission, or to make any contract or otherwise assume any obligation or responsibility in the name of or on behalf of the other Party.

**SECTION 28 Additional Representations of Customer.**

Customer hereby represents to Ameresco that:

- (a) Customer intends to continue to use the Property in a manner reasonably similar to its present use;
- (b) Customer does not intend to make any changes to the electrical and thermal consumption characteristics of the Property from those which existed during the base period except as may have been disclosed in writing by Customer to Ameresco prior to the date of this Agreement;
- (c) Customer has provided Ameresco with all records heretofore requested by Ameresco (and, in that regard, Ameresco acknowledges that it has received base period data from Customer which appear to be complete as of the date of this Agreement) and that the information set forth therein is, and all information in other records to be subsequently provided pursuant to this Agreement shall be, true and accurate in all material respects except as may be disclosed by Customer in writing;
- (d) Customer has not entered into any contracts or agreements for the Property with persons or entities other than Ameresco regarding the provision of the services referenced herein.
- (e) Since November 18, 2022 (the date of the IGA), there has been no change, event, circumstance or development that has or could reasonably be expected to have a material adverse effect on (i) the operation or condition of the Property, (ii) the energy usage at the Property, or (iii) the ability of Customer to perform its obligations hereunder.

**SECTION 29      Absence of Fraud or Collusion.**

Ameresco hereby certifies, by its execution of this Agreement, that no official or employee of Customer or its Board has any direct or indirect interest in this Agreement or in the expected profits to arise hereunder, and that this Agreement is made in good faith without fraud or collusion with any other person involved in the bidding process.

**SECTION 30      Negligent/Wrongful Acts.**

It is understood and agreed that neither Party to this Agreement shall be liable for any negligent or wrongful acts, either of commission or omission, chargeable to the other, unless such liability is imposed by law, and that this Agreement shall not be construed as seeking to either enlarge or diminish any obligation or duty owed by one Party against the other or against third parties.

**SECTION 31      Further Documents and Events.**

The Parties shall execute and deliver all instruments and documents and perform all further acts that may be reasonably necessary to effectuate the provisions of this Agreement. Ameresco agrees to execute and deliver all documents reasonably required to release any lien held by Ameresco or its assignees upon the termination of this Agreement and payment of all amounts required to be paid by Customer to Ameresco pursuant to this Agreement. Customer agrees to execute and deliver all documents which may be required by an entity which provides funds for any financing contemplated herein and to cooperate with Ameresco in obtaining such funds. Customer agrees to execute and deliver all instruments and documents which may be required to obtain all licenses, permits and governmental approvals required by Ameresco for installation and operation of the ECMs. Ameresco's obligations hereunder are subject to obtaining all such required licenses, permits and governmental approvals.

**SECTION 32      Non-Appropriation.**

- (a) This Agreement shall be deemed executory only to the extent of the monies appropriated by the Board and available for the purpose of this Agreement, and no liability on account therefore shall be incurred beyond the amount of such monies. This Agreement is not a general obligation of Customer. The full faith and credit of Customer is not pledged to the payment of any amount due or to become due under this Agreement. All pecuniary obligations of Customer are subject and subordinate to the timely payment of Parity Obligations issued or incurred pursuant to the Master Resolution Establishing the Revenue Financing System for the Texas A&M University System, adopted on November 19, 1990, as amended on September 17, 1993 and August 1, 1997. It is understood that neither this Agreement nor any representation by any public employee or officer creates any legal or moral obligation to request, appropriate or make available monies for the purposes of this Agreement. Notwithstanding the foregoing statutory provision, Customer hereby covenants and agrees to the following:

  - (i) Customer shall not engage any other party to perform the services described herein, or services similar to those described herein, during the Term.
  - (ii) Subject to applicable legal limitations, Customer shall take all necessary and timely action during the Term to obtain funds and maintain appropriations sufficient to satisfy its obligations under this Agreement (the "**Obligations**") including, without limitation, providing for the Obligations in each required budget

submitted to obtain applicable appropriations, using its best efforts to obtain approval of such budget, and exhausting all available reviews and appeals in order to effectuate an appropriation sufficient to satisfy the Obligations.

- (b) Ameresco and Customer agree that upon the occurrence of all the events described in subparagraphs (i) through (iv) below (collectively, the “*Non-Appropriation Occurrence*”) that Customer may terminate this Agreement in accordance with Section 14 (subject to said legal limitations), effective as of the first day of fiscal year (July 1 through June 30) for which funds have not been appropriated. The descriptions of the following events are not intended to impose requirements beyond the current term of the presently constituted Board but rather to set forth occurrences which give rise to the right of Customer to terminate this Agreement.
- (i) An authorized governmental action, or non-action, of the Board, including a Board to be constituted in the future, shall have resulted in the lack of an appropriation of funds sufficient to satisfy the Obligations and Customer shall have provided Ameresco a true, correct and complete copy of a document describing such action.
  - (ii) Customer shall have exhausted all lawfully available funds and have no funds lawfully available from any other source to satisfy the Obligations.
  - (iii) Customer agrees to provide written notice to Ameresco of the governmental action resulting in the lack of appropriations of funds (as described in subsection (i)) within twenty (20) days of Customer’s knowledge thereof.
- (c) If this Agreement is terminated following a Non-Appropriation Occurrence, Customer and Ameresco agree that during the Term (as would otherwise have been in effect): (i) Customer shall not purchase, lease, rent, engage the services of an agent or independent contractor or otherwise pay for the use of a system or equipment performing functions or services similar to those performed by the ECMs installed pursuant to this Agreement and (ii) if Customer receives an appropriation of funds which permits Customer to purchase, lease, rent, engage the services of an agency or independent contractor, or otherwise pay for the use of a system or equipment performing functions or services similar to those performed by the ECMs installed pursuant to this Agreement, upon receipt of such funds such other obligations shall immediately be rescinded and Customer shall satisfy the Obligations then owed to Ameresco prior to Customer’s appropriation of such funds for the purpose of paying any other payee(s).

**SECTION 33 Third Party Beneficiaries.**

Except as may be specifically provided for in this Agreement, the Parties hereto do not intend to create any rights for, or grant any remedies to, any third party beneficiary of this Agreement.

**SECTION 34 Notifications of Governmental Action - Occupational Safety and Health.**

The Parties agree to notify each other as promptly as is reasonably possible upon becoming aware of an inspection under, or any alleged violation of, the Occupational Safety and Health Act or any other provision of federal, state or local law rule or regulation relating in any way to the undertakings of either Party under this Agreement.



**SECTION 35      References.**

Unless otherwise stated all references to a particular “*Attachment*” or to “*Attachments*” are to the referenced Attachment or Attachments which are attached to this Agreement and all such referenced Attachments are incorporated by reference within this Agreement. All references herein to a Section or subsection shall refer to a Section or a subsection, as the case may be, of this Agreement unless this Agreement specifically provides otherwise.

**SECTION 36      Delinquent Child Support Obligations.**

A child support obligor who is more than 30 days delinquent in paying child support and a business entity in which the obligor is a sole proprietor, partner, shareholder, or owner with an ownership interest of at least 25 percent is not eligible to receive payments from state funds under an agreement to provide property, materials, or services until all arrearages have been paid or the obligor is in compliance with a written repayment agreement or court order as to any existing delinquency. The *Texas Family Code* requires the following statement be included in this Contract, which is certified by the signatory of the vendor hereto: “Under Section 231.006, *Texas Family Code*, the vendor or applicant certifies that the individual or business entity named in this contract, bid, or application is not ineligible to receive the specified grant, loan, or payment and acknowledges that this contract may be terminated and payment may be withheld if this certification is inaccurate.”

**SECTION 37      Payment of Debt or Delinquency to the State.**

Pursuant to Section 2252.903, *Texas Government Code*, Ameresco agrees that any payments owing to Ameresco under this Agreement may be applied directly toward certain debts or delinquencies that Ameresco owes the State of Texas or any agency of the State of Texas regardless of when they arise, until such debts or delinquencies are paid in full.

**SECTION 38      Franchise Tax Certification.**

If Ameresco is a taxable entity subject to the Texas Franchise Tax (Chapter 171, *Texas Tax Code*), then Ameresco certifies that it is not currently delinquent in the payment of any franchise (margin) taxes or that Ameresco is exempt from the payment of franchise (margin) taxes.

**SECTION 39      Prohibited Bids and Agreements.**

A state agency may not accept a bid or award a contract that includes proposed financial participation by a person who received compensation from the agency to participate in preparing the specifications or request for proposals on which the bid or contract is based. The *Texas Government Code* requires the following statement: “Under Section 2155.004, *Texas Government Code*, the vendor certifies that the individual or business entity named in this bid or contract is not ineligible to receive the specified contract and acknowledges that this contract may be terminated and payment withheld if this certification is inaccurate.”

**SECTION 40      Former Employees.**

Section 2252.901 of the *Texas Government Code* provides that a state agency may not enter into an employment contract, a professional services contract under Chapter 2254, or a consulting services contract under Chapter 2254 with a former or retired employee of the agency before the second anniversary of the last date on which the individual was employed by the agency, if appropriated money will be used to make payments under the contract.

**SECTION 41 Tax Exempt Status.**

As an agency of the State of Texas, Customer is tax exempt. Tax exemption certification will be furnished upon request.

**SECTION 42 Products and Materials Produced in Texas.**

Ameresco agrees that in accordance with Section 2155.4441, *Texas Government Code*, in performing its duties and obligations under this Agreement, Ameresco will purchase products and materials produced in Texas when such products and materials are available at a price and time comparable to products and materials produced outside of Texas.

**SECTION 43 Public Information.**

(a) Ameresco acknowledges that Customer is obligated to strictly comply with the Public Information Act, Chapter 552, *Texas Government Code*, in responding to any request for public information pertaining to this Agreement, as well as any other disclosure of information required by applicable Texas law. Customer will endeavor to give the notices required under Section 18 hereof, and otherwise comply with the provisions of Section 18, to the extent permitted by law.

(b) Upon Customer's written request, Ameresco will provide specified contracting information exchanged or created under this Agreement for or on behalf of Customer.

(c) Ameresco acknowledges that Customer may be required to post a copy of the fully executed Agreement on its Internet website in compliance with Section 2261.253(a)(1), *Texas Government Code*.

(d) The requirements of Subchapter J, Chapter 552, Texas Government Code, may apply to this agreement and the Contractor agrees that the agreement can be terminated if the Contractor knowingly or intentionally fails to comply with a requirement of that subchapter.

**SECTION 44 Venue.**

The substantive laws of the State of Texas (and not its conflicts of law principles), USA, govern all matters arising out of or relating to this Agreement and all of the transactions it contemplates. Pursuant to Section 85.18 (b), *Texas Education Code*, venue for a state court suit filed against The Texas A&M University System, any member of The Texas A&M University System, or any officer or employee of The Texas A&M University System is in the county in which the primary office of the chief executive officer of the system or member, as applicable, is located. At execution of this Agreement, such county is Brazos County, Texas. Venue for any suit brought against The Texas A&M University System in federal court must be in the Houston Division of the Southern District of Texas.

**SECTION 45 State Auditor's Office.**

Ameresco understands that acceptance of funds under this Agreement constitutes acceptance of the authority of the Texas State Auditor's Office, or any successor agency (collectively, "Auditor"), to conduct an audit or investigation in connection with those funds pursuant to Section 51.9335(c), *Texas Education Code*. Ameresco agrees to cooperate with the Auditor in the conduct of the audit or investigation, including

without limitation, providing all records requested. Ameresco will include this provision in all contracts with permitted subcontractors.

**SECTION 46 Non-Waiver.**

Ameresco expressly acknowledges that Customer is an agency of the State of Texas and nothing in this Agreement will be construed as a waiver or relinquishment by Customer of its right to claim such exemptions, privileges, and immunities as may be provided by law.

**SECTION 47 Dispute Resolution.**

The dispute resolution process provided in Chapter 2260, Texas Government Code, and the related rules adopted by the Texas Attorney General pursuant to Chapter 2260, shall be used by Customer and Ameresco to attempt to resolve any claim for breach of contract made by Ameresco that cannot be resolved in the ordinary course of business. Ameresco shall submit written notice of a claim of breach of contract under this Chapter to Jeff Burton, Vice President & Chief Financial Officer of Texas A&M Health, at Clinical Building 1, Suite 3100, 8441 Riverside Pkwy, Bryan, TX 77807, who shall examine Ameresco's claim and any counterclaim and negotiate with Ameresco in an effort to resolve the claim.

**SECTION 48 Limitations.**

The Parties are aware that there are constitutional and statutory limitations on the authority of Customer (a state agency) to enter into certain terms and conditions of this Agreement, including, but not limited to, those terms and conditions relating to liens on Customer's property; disclaimers and limitations of warranties; disclaimers and limitations of liability for damages; waivers, disclaimers and limitations of legal rights, remedies, requirements and processes; limitations of periods to bring legal action; granting control of litigation or settlement to another party; liability for acts or omissions of third parties; payment of attorneys' fees; dispute resolution; indemnities; and confidentiality (collectively, the "Limitations"), and terms and conditions related to the Limitations will not be binding on Customer except to the extent authorized by the Constitution and the laws of the State of Texas. Neither the execution of this Agreement by Customer nor any other conduct, action, or inaction of any representative of Customer relating to this Agreement constitutes or is intended to constitute a waiver of Customer's or the state's sovereign immunity to suit.

**SECTION 49 Prohibition Of Contracts With Companies Boycotting Israel.**

To the extent that Texas Government Code, Chapter 2271 applies to this Agreement, Ameresco certifies that (a) it does not currently boycott Israel; and (b) it will not boycott Israel during the term of this Agreement. Ameresco acknowledges this Agreement may be terminated and payment withheld if this certification is inaccurate.

**SECTION 50 Certification Regarding Business With Certain Countries and Organizations.**

Pursuant to Subchapter F, Chapter 2252, Texas Government Code, Ameresco certifies it is not engaged in business with Iran, Sudan, or a foreign terrorist organization. Ameresco acknowledges this Contract may be terminated if this certification is inaccurate.

**SECTION 51 Records Retention.**

Ameresco will preserve all contracting information, as defined under Texas Government Code, Section 552.003 (7), related to the Agreement for the duration of the Agreement and for seven years after the conclusion of the Agreement.

**SECTION 52 Prohibition On Contracts Related To Persons Involved In Human Trafficking.**

Under Section 2155.0061, Government Code, Ameresco certifies that the individual or business entity named in this Agreement is not ineligible to receive the specified Agreement and acknowledges that this Agreement may be terminated and payment withheld if this certification is inaccurate.

**SECTION 53 Not Eligible For Rehire.**

A designation of Not Eligible for Rehire will disqualify a former employee from being (a) employed or retained by a member as an independent contractor, consultant or volunteer, or (b) assigned to perform work for a member while an employee of a business entity for the duration of the specified term. Any former employee acting as an independent contractor, consultant, or volunteer must disclose their designation of Not Eligible for Rehire to the member for whom they are proposing to perform work. A business entity employing a former member employee designated as Not Eligible for Rehire is responsible for ensuring that its employee is not involved in any work for the A&M System.

**SECTION 54 Conflict of Interest.**

By executing this Agreement, Ameresco and each person signing on behalf of Ameresco certifies, and in the case of a sole proprietorship, partnership or corporation, each party thereto certifies as to its own organization, that to the best of their knowledge and belief, no member of The Texas A&M University System or The Texas A&M University System Board of Regents, nor any employee, or person, whose salary is payable in whole or in part by The Texas A&M University System or its members, has direct or indirect financial interest in the award of this Agreement, or in the services to which this Agreement relates, or in any of the profits, real or potential, thereof.

**SECTION 55 Counterparts.**

This Agreement may be executed in multiple counterparts, each of which shall be deemed an original, and both of which will constitute one Agreement.

\* \* \* \* \*

**IN WITNESS WHEREOF**, the duly authorized officers or representatives of the Parties have set their hand on the date first written above with the intent to be legally bound.

**Texas A&M University**

*M. K. Banks*

\_\_\_\_\_  
Katherine Banks  
President / CEO

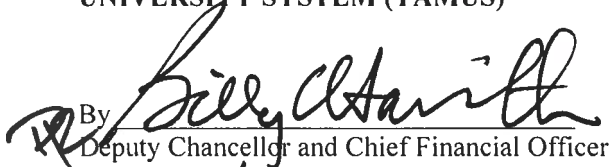
Dated: 03/01/2023

**AMERESCO, INC.**

  
\_\_\_\_\_  
Robert Georgeoff  
Executive Vice President

Dated: 02.28.23

**BOARD OF REGENTS OF THE TEXAS A&M  
UNIVERSITY SYSTEM (TAMUS)**

By   
Deputy Chancellor and Chief Financial Officer


Date 3/1/23

**APPROVAL RECOMMENDED:**

  
Chief Facilities Officer  
Office of Facilities Planning & Construction

Date 3-1-23

**APPROVED AS TO FORM:**

  
Bradley T. Sharpe, Assistant General Counsel  
Office of General Counsel

Date 02-28-2023

*[Signature page to Energy Services Agreement]*

## ATTACHMENT A

### PROPERTY DESCRIPTION

The following buildings, facilities, and areas, which are owned and operated by Customer, are included in the Scope of Services detailed in Attachment B:

<b>Facility</b>	<b>Address</b>
1000 Health Professions	8447 Riverside Pkwy, Bryan, TX 77807
1001 Medical Research	8447 Riverside Pkwy, Bryan, TX 77807
1004 Medical Research Annex	8447 Riverside Pkwy, Bryan, TX 77807
1504 Medical Sciences	206 Olsen Blvd, College Station, TX 77845
1518 Public Health A	212 Adriance Lab Rd, College Station, TX 77845
1519 Public Health B	212 Adriance Lab Rd, College Station, TX 77845
1520 Public Health C	212 Adriance Lab Rd, College Station, TX 77845
3500 Alkek Building	2121 W Holcombe Blvd, Houston, TX 77030
3600 Dentistry Building	3302 Gaston Ave, Dallas, TX 75246
3602 Imaging Center	3302 Gaston Ave, Dallas, TX 75246

## ATTACHMENT B

### SCOPE OF SERVICES

#### DESCRIPTION OF THE ENERGY CONSERVATION MEASURES AND EQUIPMENT

This Attachment B provides a description of existing equipment and the ECMs and related equipment to be installed by Ameresco at the facilities scheduled on Attachment A. Installation of the ECMs and the included equipment is subject to change if Ameresco discovers unforeseen conditions at the Property that render its preliminary analysis of the Property inaccurate, or significantly affect Ameresco’s anticipated economic benefit or the Guarantee of Energy Savings.

This Attachment B includes by reference the IGA dated as of November 18, 2022 for the Property and submitted under separate cover.

The following table summarizes the ECMs recommended and described in the IGA:

ECM No.	Measure Name	1000 Health Professions	1001 Medical Research	1004 Medical Research Annex	1504 Medical Science	1518 Public Health A	1519 Public Health B	1520 Public Health C	3500 Alkek Building	3600 Dentistry Building	3602 Imaging Center
1.0	Lighting Improvements	X	X	X	X	X	X	X	X	X	X
1.1	Interior Lighting Retrofits	X	X	X	X	X	X	X	X	X	X
1.2	Exterior Lighting Retrofits	X	X	X	X	X	X	X	X	X	
2.0	Water Fixture Improvements								X		
2.1	Toilet Replacements								X		
2.2	Urinal Replacements								X		
2.3	Aerator Retrofits								X		
3.0	Network Pneumatic Thermostats								X		
3.1	Thermostat Replacements								X		
3.2	Thermostat BAS Integration								X		
4.0	Lab Control Improvements								X		
4.1	Room Control Replacements								X		
4.2	Hood Control Replacements								X		
4.3	Lab BAS Integration								X		
5.0	Transformer Improvements				X				X	X	
6.0	Air Handling Unit Lifecycle Replacements								X		
6.1	Air Handling Unit Replacements								X		
6.2	Air Handling Unit Control Improvements								X		

**ATTACHMENT C**  
**PROJECT CASH FLOW**



Initial Project Costs:	
Investment Grade Audit	\$ 88,274
Implementation Costs	\$ 13,587,781
<b>Total Ameresco Contract Amount</b>	<b>\$ 13,676,055</b>
Project Owner Contingency	\$ 683,802
3rd Party Engineering Review	\$ 5,000
FP&C Management Fee	\$ 380,669
<b>Total Project Costs</b>	<b>\$ 14,745,526</b>
Customer Cash Contribution	\$ (14,745,526)
<b>Net Project Costs to be Financed</b>	<b>\$ -</b>
Construction Period Interest	
<b>Total Amount Financed</b>	<b>\$ -</b>

Financial Assumptions	
Term of Project (years)	
Project Duration (years)	20.0 yrs
Estimated Financing Rate	0.00%
Payments per Year (frequency)	-
Discount Rate	0.00%
Energy Escalation Rates (annual)	Electricity 5%, Natural Gas 5%, Water and Sewer 5%
M&V Cost Escalation Rate (annual)	3.00%
O&M Cost Escalation Rate (annual)	N/A

Proforma	Initial Values	Year									
		1	2	3	4	5	6	7	8	9	10
1 Projected Annual Energy Cost Savings	\$ 386,135	\$ 405,442	\$ 425,714	\$ 447,000	\$ 469,350	\$ 492,817	\$ 517,458	\$ 543,331	\$ 570,497	\$ 599,022	\$ 628,973
2 Guaranteed Energy Cost Savings	\$ 347,522	\$ 364,898	\$ 383,143	\$ 402,300	\$ 422,415	\$ 443,535	\$ 465,712	\$ 488,998	\$ 513,447	\$ 539,120	\$ 566,076
3 Capital Cost Offset		\$ 6,664,326									
4 Utility Rebates (Note 4)		\$ 44,217									
5 <b>Total Project Savings (Line 2 + Line 3 + Line 4)</b>	<b>\$ 347,522</b>	<b>\$ 7,073,441</b>	<b>\$ 383,143</b>	<b>\$ 402,300</b>	<b>\$ 422,415</b>	<b>\$ 443,535</b>	<b>\$ 465,712</b>	<b>\$ 488,998</b>	<b>\$ 513,447</b>	<b>\$ 539,120</b>	<b>\$ 566,076</b>
6 Payments for Financing Equipment		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
7 Payments for Measurement and Verification Services	\$ 15,568	\$ 16,036	\$ 16,517	\$ 17,012	\$ 17,522	\$ 18,048	\$ 18,590	\$ 19,147	\$ 19,722	\$ 20,313	\$ 20,923
8 Payments for Operation and Maintenance Services	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
9 <b>Total Payments</b>		<b>\$ 16,036</b>	<b>\$ 16,517</b>	<b>\$ 17,012</b>	<b>\$ 17,522</b>	<b>\$ 18,048</b>	<b>\$ 18,590</b>	<b>\$ 19,147</b>	<b>\$ 19,722</b>	<b>\$ 20,313</b>	<b>\$ 20,923</b>
10 <b>Net Annual Benefit</b>		<b>\$ 7,057,405</b>	<b>\$ 366,626</b>	<b>\$ 385,288</b>	<b>\$ 404,893</b>	<b>\$ 425,487</b>	<b>\$ 447,122</b>	<b>\$ 469,851</b>	<b>\$ 493,725</b>	<b>\$ 518,807</b>	<b>\$ 545,153</b>
11 <b>Cumulative Cash Flow</b>	<b>\$ 18,343,352</b>	<b>\$ 7,057,405</b>	<b>\$ 7,424,031</b>	<b>\$ 7,809,319</b>	<b>\$ 8,214,212</b>	<b>\$ 8,639,699</b>	<b>\$ 9,086,821</b>	<b>\$ 9,556,672</b>	<b>\$ 10,050,397</b>	<b>\$ 10,569,204</b>	<b>\$ 11,114,357</b>

Line #	Year										Totals
	11	12	13	14	15	16	17	18	19	20	
1 Projected Annual Energy Cost Savings	\$ 660,422	\$ 693,443	\$ 728,115	\$ 764,521	\$ 802,747	\$ 842,884	\$ 885,028	\$ 929,280	\$ 975,744	\$ 1,024,531	\$ 13,406,319
2 Guaranteed Energy Cost Savings	\$ 594,380	\$ 624,099	\$ 655,304	\$ 688,069	\$ 722,472	\$ 758,596	\$ 796,525	\$ 836,352	\$ 878,170	\$ 922,078	\$ 12,065,689
3 Capital Cost Offset											\$ 6,664,326
4 Utility Rebates (Note 4)											\$ 44,217
5 <b>Total Project Savings (Line 2 + Line 3 + Line 4)</b>	<b>\$ 594,380</b>	<b>\$ 624,099</b>	<b>\$ 655,304</b>	<b>\$ 688,069</b>	<b>\$ 722,472</b>	<b>\$ 758,596</b>	<b>\$ 796,525</b>	<b>\$ 836,352</b>	<b>\$ 878,170</b>	<b>\$ 922,078</b>	<b>\$ 18,774,232</b>
6 Payments for Financing Equipment	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
7 Payments for Measurement and Verification Services	\$ 21,550	\$ 22,197	\$ 22,863	\$ 23,549	\$ 24,255	\$ 24,983	\$ 25,732	\$ 26,504	\$ 27,299	\$ 28,118	\$ 430,880
8 Payments for Operation and Maintenance Services	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
9 <b>Total Payments</b>	<b>\$ 21,550</b>	<b>\$ 22,197</b>	<b>\$ 22,863</b>	<b>\$ 23,549</b>	<b>\$ 24,255</b>	<b>\$ 24,983</b>	<b>\$ 25,732</b>	<b>\$ 26,504</b>	<b>\$ 27,299</b>	<b>\$ 28,118</b>	<b>\$ 430,880</b>
10 <b>Net Annual Benefit</b>	<b>\$ 572,830</b>	<b>\$ 601,902</b>	<b>\$ 632,441</b>	<b>\$ 664,520</b>	<b>\$ 698,217</b>	<b>\$ 733,613</b>	<b>\$ 770,793</b>	<b>\$ 809,848</b>	<b>\$ 850,871</b>	<b>\$ 893,960</b>	<b>\$ 18,343,352</b>
11 <b>Cumulative Cash Flow</b>	<b>\$ 11,687,187</b>	<b>\$ 12,289,089</b>	<b>\$ 12,921,530</b>	<b>\$ 13,586,050</b>	<b>\$ 14,284,267</b>	<b>\$ 15,017,880</b>	<b>\$ 15,788,673</b>	<b>\$ 16,598,521</b>	<b>\$ 17,449,392</b>	<b>\$ 18,343,352</b>	

Notes:

- 1 This cash flow reflects 100% cash payment with no long-term financing.
- 2 Energy Savings or revenues are based on current utility rate structures and usage information provided for purposes of this project.
- 3 The performance and payment bonds apply only to the installation portion of the contract and do not apply in any way to energy savings guarantees, payments or maintenance provisions, except that the performance bond shall guarantee that the installation will be free of defective materials and workmanship for a period of 12 months following completion and acceptance of the work.
- 4 The amount of the utility rebate(s) are not guaranteed. The final rebate amount will be determined by the utility company.

**ATTACHMENT D**

**NOTICE TO PROCEED**

[PLACE ON CUSTOMER LETTERHEAD]

Mr. Robert Georgeoff  
Vice President  
Ameresco, Inc.  
2375 E. Camelback Road  
Suite 400  
Phoenix, AZ 85018

**SUBJECT: NOTICE TO PROCEED**

Dear Mr. Georgeoff:

In accordance with Section 1(a) of the Energy Services Agreement (the “*ESA*”) dated as of \_\_\_\_\_, 20\_\_\_\_, by and between the Texas A&M University (“*Customer*”) and Ameresco, Inc. (“*Ameresco*”), Customer hereby submits to Ameresco this Notice to Proceed in relation to the Scope of Services as defined in the ESA.

Sincerely,

**Texas A&M University**

By: \_\_\_\_\_

Duly Authorized Signatory Name:

\_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

**ATTACHMENT E**

**FINAL DELIVERY AND ACCEPTANCE CERTIFICATE**

[PLACE ON CUSTOMER LETTERHEAD]

Mr. Robert Georgeoff  
Vice President  
Ameresco, Inc.  
2375 E. Camelback Road  
Suite 400  
Phoenix, AZ 85018

**Re:** Energy Services Agreement (the “*ESA*”; capitalized terms used and not defined herein shall have the meanings given to such terms in the *ESA*) dated as of \_\_\_\_\_, 20\_\_\_\_, by and between Texas A&M University (“*Customer*”) and Ameresco, Inc. (“*Ameresco*”)

Dear Mr. Georgeoff:

Customer hereby acknowledges its receipt and acceptance of all ECMs described in Attachment B of the *ESA* which are installed and in good working condition.

Sincerely,

**Texas A&M University**

By: \_\_\_\_\_

Duly Authorized Signatory Name:

\_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

## ATTACHMENT F

### DETERMINATION OF ENERGY COST SAVINGS

The following is a breakdown of annual energy and other cost savings such as operations and maintenance (as modified below, the “*Annual Energy Cost Savings*”). The “*Base Year*” period as used herein is based on the utility system information as provided by Customer.

#### Baseline Development:

The baseline energy usage for purposes of this Agreement is as detailed below:

Building	Electricity [kWh]	Chilled Water [MMBtu]	Natural Gas [MMBtu]	Heating Water [MMBtu]	Steam [MMBtu]	Water/ Sewer [kGal]
1000 Health Professions	1,275,407	5,815	0	490	0	467
1001 Medical Research [I]	7,511,368	72,978	12,599	19,031	0	5,571
1004 Medical Research Annex						
1005 Medical Research II [NIS]						
1504 Medical Sciences	2,133,163	23,116	1,744	7,045	0	10,887
1518 Public Health A	1,551,071	12,487	0	3,535	0	836
1519 Public Health B						
1520 Public Health C						
3500 Alkek Building	5,089,439	61,233	0	0	24,233	9,932
3600 Dentistry Building	3,928,091	46,873	47	0	11,718	3,176
3602 Imaging Center	32,399	0	71	0	0	32
<b>Total</b>	<b>21,520,938</b>	<b>222,502</b>	<b>14,462</b>	<b>30,100</b>	<b>35,951</b>	<b>30,902</b>

Above baseline is based on March 2021 through February 2022 utility usage.



**Annual Energy Cost Savings:**

As part of the IGA, Ameresco modeled the savings associated with each of the specific measures described therein. Customer has reviewed such models and agrees to the level of savings associated with each specific measure and the total savings of all measures combined. Therefore, “Annual Cost Savings” shall be further defined as specified below:

<b>Year</b>	<b>Guaranteed Energy Savings</b>	<b>Stipulated Capital Offset Savings</b>	<b>Stipulated Utility Rebate</b>	<b>Annual Cost Savings</b>
1	\$364,898	\$6,664,326	\$44,217	\$7,073,441
2	\$383,143	\$0	\$0	\$383,143
3	\$402,300	\$0	\$0	\$402,300
4	\$422,415	\$0	\$0	\$422,415
5	\$443,535	\$0	\$0	\$443,535
6	\$465,712	\$0	\$0	\$465,712
7	\$488,998	\$0	\$0	\$488,998
8	\$513,447	\$0	\$0	\$513,447
9	\$539,120	\$0	\$0	\$539,120
10	\$566,076	\$0	\$0	\$566,076
11	\$594,380	\$0	\$0	\$594,380
12	\$624,099	\$0	\$0	\$624,099
13	\$655,304	\$0	\$0	\$655,304
14	\$688,069	\$0	\$0	\$688,069
15	\$722,472	\$0	\$0	\$722,472
16	\$758,596	\$0	\$0	\$758,596
17	\$796,525	\$0	\$0	\$796,525
18	\$836,352	\$0	\$0	\$836,352
19	\$878,170	\$0	\$0	\$878,170
20	\$922,078	\$0	\$0	\$922,078

**ATTACHMENT G**

**CONTRACT COST AND ANNUAL SERVICES**

- (a) **Contract Cost:** Customer shall pay to Ameresco, an amount equal to Thirteen Million Six Hundred Seventy Six Thousand Fifty Five Dollars and No Cents (\$13,676,055.00) (the “*Contract Cost*”) in accordance with the terms described in Section 4 of this Agreement. The Contract Cost includes the preconstruction services described in Section 1(a)(i) of this Agreement.
- (b) **Operations and/or Maintenance:** Not Applicable.
- (c) **Measurement and Verification:** Ameresco will perform measurement and verification (M&V) services upon completion of construction and every year thereafter for the twenty (20) year performance period, or at a shorter term as directed in writing by Customer. Customer may cancel the M&V services at any time upon thirty (30) days’ prior written notice to Ameresco. Termination of the M&V services as aforesaid will also terminate the Guarantee of Energy Savings as of the effective date of such termination of the M&V services. The cost of measurement and verification services for each year of the agreement is defined in the following table:

<b>Year</b>	<b>Annual M&amp;V Fee Schedule</b>
1	\$16,036
2	\$16,517
3	\$17,012
4	\$17,522
5	\$18,048
6	\$18,590
7	\$19,147
8	\$19,722
9	\$20,313
10	\$20,923
11	\$21,550
12	\$22,197
13	\$22,863
14	\$23,549
15	\$24,255
16	\$24,983
17	\$25,732
18	\$26,504
19	\$27,299
20	\$28,118

- (d) **Other Annual Services:** Not applicable.
- (e) **Extended Warranty:** Not applicable.

**ATTACHMENT H**

**CHANGE ORDER FORM**

(Request & Agreement for change in Plans and/or Specifications and/or Contract)

Change Request No.: \_\_\_\_\_

Customer: \_\_\_\_\_

Department: \_\_\_\_\_

Project No.: \_\_\_\_\_

Contract No.: \_\_\_\_\_

Site: \_\_\_\_\_

Title: \_\_\_\_\_

**I. REQUEST**

Date: \_\_\_\_\_

(a) Requested by: \_\_\_\_\_

(b) Description of change: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

**II. AMERESCO'S AGREEMENT**

For all costs involved in this change including extensions of time herein requested Ameresco proposes to perform the work described in accordance with the provisions of the subject Agreement and certifies that the attached cost data is accurate, complete and current, and mathematically correct.

**Payment shall be made on the basis of:**

(a) Predetermined lump sum total of: (add) (deduct) \$ \_\_\_\_\_

(b) Lump sum "not-to-exceed": (add) (deduct) \$ \_\_\_\_\_

(Max. price based on contract or negotiated unit prices)

(c) Time & Material Basis "not-to-exceed": (add) (deduct) \$ \_\_\_\_\_

(Computed in accordance with provisions of the Contract)

Place an "X" beside selected proposal method and strike out either (add) or (deduct) whichever does not apply. If necessary, attach detailed estimates and breakdown for above in accordance with change order instruction. A claim for work performed under protest shall be submitted per (c) above.

An extension of contract time of \_\_\_\_\_ calendar days to \_\_\_\_\_ is requested.

Ameresco, Inc.: \_\_\_\_\_  
(name and title)

by: \_\_\_\_\_  
(signature)

Date: \_\_\_\_\_

**CUSTOMER APPROVAL:**

Date: \_\_\_\_\_

Customer: \_\_\_\_\_

By: \_\_\_\_\_

Title: \_\_\_\_\_

Contract Award	\$ _____
Previous Additions	\$ _____
Previous Deductions	\$ _____
Net Total	\$ _____
This Change	\$ _____
Total	\$ _____



## ATTACHMENT I

### MAINTENANCE SERVICES

Except as otherwise provided in Section 10(b) of this Agreement, Ameresco will provide the following maintenance services on the equipment listed below (installed under this Project) during the Term and at the cost to Customer as set forth in Section 4 and Attachment G of this Agreement. Detailed terms and conditions relating to this maintenance service are included in this Attachment.

**No maintenance services are included under this Agreement.**

**ATTACHMENT J**

**CERTIFICATE OF SUBSTANTIAL COMPLETION**

PROJECT NAME & ADDRESS: \_\_\_\_\_ PROJECT NO.: \_\_\_\_\_  
\_\_\_\_\_ CONTRACT DATE: \_\_\_\_\_  
\_\_\_\_\_ DESCRIPTION: \_\_\_\_\_  
\_\_\_\_\_ \_\_\_\_\_  
\_\_\_\_\_ \_\_\_\_\_

The installation of [list each ECM being accepted with this certificate] under the Agreement has/have been reviewed and found to be substantially complete. The date of Substantial Completion of the forgoing ECM(s) is hereby established as:

**SUBSTANTIAL COMPLETION DATE:**

The date of Substantial Completion of an ECM is the date certified by Customer when such ECM is sufficiently complete in accordance with the Agreement so that Customer derives beneficial use thereof.

The Substantial Completion date set forth above is the date of commencement of applicable warranties for such ECM(s), as required by the Agreement. A list of items to be completed or corrected is identified below as punchlist items. The failure to include any items on such punchlist does not alter the responsibility of Ameresco to complete all work in accordance with the Agreement.

**CONTRACTOR:** Ameresco, Inc., 2375 E. Camelback Road, Suite 400, Phoenix, AZ 85016

**AUTHORIZED SIGNATURE:** \_\_\_\_\_ **DATE:** \_\_\_\_\_

**NAME:** \_\_\_\_\_  
(type or print)

**CUSTOMER:** [CUSTOMER ADDRESS]

**AUTHORIZED SIGNATURE:** \_\_\_\_\_ **DATE:** \_\_\_\_\_

**NAME:** \_\_\_\_\_  
(type or print)

**PUNCHLIST ITEMS**

Attach additional page(s) as necessary. Number of pages attached \_\_\_\_\_.

**ATTACHMENT K**  
**STANDARDS OF SERVICE & COMFORT**





In general, the occupied and unoccupied standard of operation for the Science Building laboratories will be as follows:

Alkek Building Laboratory Standards of Operation		
	Hours of Operation	ACH <sup>[1,2]</sup>
<b>Pre Retrofit Standards of Operation</b>		
Occupied Sequence	2,868	7
Unoccupied Sequence (No Existing Sequence)	5,892	7
<b>Post Retrofit Standards of Operation</b>		
Occupied Sequence	2,168	8
Unoccupied Sequence	6,592	4
<p><sup>[1]</sup> Minimum air changes per hour. Savings have been calculated based on the maximum of the hood requirements or the minimum number of ACHs for each space.</p> <p><sup>[2]</sup> Measured baseline ventilation rates were below the TAMU system design guideline for occupied periods on average. Air handling units and exhaust fans were out of service at some locations.</p>		

**ATTACHMENT L**

**TEST INSTALLATION ACCEPTANCE LETTER**

[PLACE ON CUSTOMER LETTERHEAD]

Date \_\_\_\_\_

Mr. Robert Georgeoff  
Vice President  
Ameresco, Inc.  
2375 E. Camelback Road  
Suite 400  
Phoenix, AZ 85018

**RE:** Energy Services Agreement (the “*ESA*”); capitalized terms used and not defined herein shall have the meanings given to such terms in the *ESA*) dated as of \_\_\_\_\_, 20\_\_\_\_ by and between Texas A&M University (“*Customer*”) and Ameresco, Inc. (“*Ameresco*”)

Dear Mr. Georgeoff:

Customer has reviewed samples of certain ECMs (as set forth on the list attached hereto) to be installed pursuant to the *ESA*. Customer hereby approves such ECMs and, if applicable, their respective lighting levels, for installation in Customer’s Property located at [ ]. Ameresco and its lenders may rely upon Customer’s approval herein for the purpose of procuring such ECMs to be used in the performance of the *ESA*.

Sincerely,

**Texas A&M University**

By: \_\_\_\_\_

Duly Authorized Signatory Name:

\_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

## **ATTACHMENT M**

### **MEASUREMENT AND VERIFICATION**

Measurement and Verification services include services integral to the measurement and verification plan for the Guarantee of Energy Savings. Included in these measurement and verification services are the annual Guarantee Reconciliation as defined in Section 6.



## F.0 Measurement and Verification

The long-term success of any comprehensive energy efficiency program depends on the development of an accurate and successful measurement and verification (M&V) plan. The main objective is to develop a cost-effective plan that quantifies and verifies the performance results of the energy and water conservation measures (ECMs). Ameresco subscribes to using industry standard M&V protocols that have been developed in response to the need for reliable and consistent measurement practices.

Ameresco used the International Performance Measurement and Verification Protocol (IPMVP) for the development of M&V procedures for this project.

The protocols help to allocate various risks associated with achieving energy cost savings and allow risk reduction and better risk management. The M&V options description, provided herein, was developed by summarizing the IPMVP and contains excerpts taken from that document. The protocols have several benefits:

- Define the role of verification in energy contracts and implementation
- Discuss procedures with varying levels of accuracy and cost for verifying baseline and project installation conditions and long-term energy savings performance
- Provide techniques for calculating whole-facility savings, individual technology savings, and stipulated savings
- Provide procedures that are consistent, industry-accepted, impartial, and reliable
- Provide procedures for the investigation and resolution of disagreements related to performance issues

The general approach to determining energy savings in these plans involves comparing the energy use of the retrofitted system before installation of the energy and water conservation measure (baseline) and after installation of the energy and water conservation measure (post-retrofit). In general:

$$\text{Energy Savings} = \text{Baseline Energy Use} - \text{Post Retrofit Energy Use} \pm \text{Adjustments}$$

The IPMVP protocols have defined four M&V options (Options A through D) that meet the needs of a wide range of performance contracts and provide suggested procedures for baseline development and post-retrofit verification. These M&V options are flexible and reflect the aforementioned considerations. The options are summarized in Table F.0.

**Table F.0.** Measurement and Verification Options

M&V Option	How Savings Are Calculated	Typical Applications
<b>Option A: Partially Measured Retrofit Isolation</b>		
<p>Savings are determined by partial field measurement of the energy use of the system(s) to which an ECM was applied, separate from the energy use of the rest of the facility. Measurements may be either short-term or continuous of the error they may introduce.</p> <p>Partial measurement means that some but not all parameter(s) may be stipulated, if the total impact of possible stipulation error(s) is not significant to the resultant savings. Careful review of ECM design and installation will ensure that stipulated values fairly represent the probable actual value. Stipulations should be shown in the M&amp;V plan along with analysis of the significance of the error they may introduce.</p>	<p>Engineering calculations using short term or continuous post-retrofit measurements and stipulations.</p>	<p>Lighting retrofit where power draw is measured periodically. Operating hours of the lights are stipulated.</p>
<b>Option B: Retrofit Isolation</b>		
<p>Savings are determined by field measurement of the energy use of the systems to which the ECM was applied, separate from the energy use of the rest of the facility. Short-term or continuous measurements are taken throughout the post-retrofit period.</p>	<p>Engineering calculations using short term or continuous measurements.</p>	<p>Application of controls to vary the load on a constant speed pump using a variable speed drive. Electricity use is measured by a kWh meter installed on the electrical supply to the pump motor. In the base year, this meter is in place for a week to verify constant loading. The meter is in place throughout the post-retrofit period to track variations in energy use.</p>
<b>Option C: Whole Facility (Bill Comparison)</b>		
<p>Savings are determined by measuring energy use at the whole facility level. Short-term or continuous measurements are taken throughout the post-retrofit period.</p>	<p>Analysis of whole facility utility meter or sub-meter data using techniques from simple comparison to regression analysis.</p>	<p>Multifaceted energy management program affecting many systems in a building. Energy use is measured by the gas and electric utility meters for a 12-month base year period and throughout the post-retrofit period.</p>
<b>Option D: Calibrated Simulation (Calibrated Building Modeling)</b>		
<p>Savings are determined through simulation of the energy use of components or the whole facility. Simulation routines must be demonstrated to adequately model actual energy performance measured in the facility. This option usually requires considerable skill in calibrated simulation.</p>	<p>Energy use simulation, calibrated with hourly or monthly utility billing data and/or end- use metering.</p>	<p>Multifaceted energy management program affecting many systems in a building but where no base year data are available. Post-retrofit period energy use is measured by the gas and electric utility meters. Base year energy use is determined by simulation using a model calibrated by the post-retrofit period utility data.</p>

The table on the following pages provides a summary of the proposed M&V plans for the project. All specific protocols in the plans must be explained to and accepted by Texas A&M Health (TAMH) before construction on the project can begin. If TAMH does not agree with the protocols used to verify the savings, there is potential for significant disagreement once verification efforts begin.

Table F.1. Summary of Proposed Measurement and Verification Plans

ECM	IPMVP Option	M&V Requirements			Measurement and Metering	Stipulated Variables
		Baseline	Post Retrofit	Performance Period		
ECM 1.0 Lighting Improvements	A	<p>Fixture power consumption based on spot measurement at select fixtures.</p> <p>Hours of operation based on short term logging of fixture operating hours during the IGA.</p> <p>HVAC system efficiencies.</p> <p>Exterior hours of operation based on dusk to dawn operation.</p>	<p>Fixture power consumption based on spot measurement at select fixtures.</p>	<p>Periodic phone review with facility personnel on operational practices.</p>	<p>Baseline fixture wattage is to be measured prior to retrofit. Post-installation wattages will be measured after retrofit. Number of selected fixtures shall be statistically significant. Sample size will be decided by post retrofit sample group. (FEMP 80/20 sampling plan).</p> <p>Operating hours are based on discussions with facility personnel and sample short-term data logging during the IGA.</p>	<p>Baseline and post-retrofit fixture power consumption measurements to be used for baseline and post-retrofit fixture power consumption for the duration of the performance period.</p> <p>Baseline and post-retrofit operating hours for each fixture group provided in the IGA to be used for baseline and post-retrofit operating hours for the duration of the performance period.</p> <p>Baseline HVAC efficiencies (1.0 kW/Ton) to be used to for the baseline and post-retrofit HVAC efficiencies for the duration of the performance period.</p>
ECM 2.0 Water Fixture Improvements	A	<p>Fixture flow rate based on spot measurement at select fixtures.</p> <p>Fixture usage based on occupancy and occupant usage factors.</p> <p>Water heating system efficiency.</p>	<p>Fixture flow rate based on spot measurement at select fixtures.</p>	<p>Periodic phone review with facility personnel on operational practices.</p>	<p>Baseline fixture flow rate measured pre-retrofit. Post-installation flow rate will be measured after retrofit.</p> <p>Number of selected fixtures shall be statistically significant. Sample size will be decided by post retrofit sample group. (FEMP 90/10 sampling plan).</p> <p>Fixture usage based on discussions with facility personnel, occupancy, occupant usage factors, and reconciliation with metered data.</p>	<p>Baseline and post-retrofit fixture flow measurements to be used for baseline and post-retrofit fixture flow rate for the duration of the performance period.</p> <p>Baseline fixture usage provided in the IGA to be used for the baseline and post retrofit fixture usage for the duration of the performance period.</p> <p>Baseline and post retrofit heating system efficiency is 80%</p>
ECM 4.0 Network Pneumatic Thermostats	A	<p>Occupied and unoccupied hours of operation. Occupied and unoccupied heating and cooling temperature setpoints.</p> <p>Heating and cooling system efficiencies and load profiles.</p>	<p>BAS programmed occupied and unoccupied schedules. BAS programmed occupied and unoccupied heating and cooling temperature setpoints.</p> <p>Heating and cooling system efficiencies and load profiles.</p>	<p>Periodic review of room temperature set points and schedules.</p>	<p>Baseline conditions including set points and hours of occupancy are based on discussions with facility personnel and reconciliation with metered data. Post-retrofit conditions will be collected from Building Automation System (BAS). Programmed schedules and occupied and unoccupied set points will be documented from the BAS.</p>	<p>Baseline and post-retrofit heating and cooling system efficiencies and load profiles.</p> <p>Baseline operating hours provided in the IGA to be used for baseline and post-retrofit operating hours for the duration of the performance period.</p>
ECM 4.0 Lab Control Improvements	A	<p>Lab air changes per hour (ACH).</p> <p>Occupied and unoccupied hours of operation determined by logging during the IGA. Occupied and unoccupied heating and cooling temperature setpoints.</p> <p>Heating and cooling system efficiencies and load profiles.</p>	<p>BAS programmed lab air changes per hour (ACH) reset strategy.</p> <p>Occupied and unoccupied hours of operation based on baseline profile. Occupied and unoccupied heating and cooling temperature setpoints.</p> <p>Heating and cooling system efficiencies and load profiles.</p>	<p>Annual operational verification of select lab systems, ACH sequence of operation, and review of ACH reset performance. Sample size will be statistically significant (Reference FEMP 80/20 sampling plan).</p>	<p>Baseline conditions including set points and hours of occupancy are based on discussions with facility personnel and reconciliation with metered data.</p> <p>Post-retrofit ACH set points and reported flow measurements will be collected from the Building Automation System (BAS). Sample size will be statistically significant (Reference FEMP 80/20 sampling plan).</p>	<p>Baseline and post-retrofit heating and cooling system efficiencies and load profiles. Baseline air changes per hour. Baseline and post-retrofit occupied and unoccupied heating and cooling set points. Baseline hours of machine operation and occupancy provided in the IGA to be used for baseline and post-retrofit operating hours and space use assignment for the duration of the performance period.</p>
ECM 5.0 Transformer Improvements	A	<p>Baseline transformer load and losses.</p> <p>Occupied and Unoccupied hours of operation. Equipment operating hours per day. Equipment Operating days per year.</p>	<p>Post-retrofit transformer load and losses.</p> <p>Occupied and Unoccupied hours of operation. Equipment operating hours per day. Equipment Operating days per year.</p>	<p>None.</p>	<p>Baseline loading and average losses are measured prior to retrofit. Post-installation loading and average losses will be measured after retrofit. Sample size will be statistically significant (Reference FEMP 80/20 sampling plan).</p>	<p>Baseline unit and post-retrofit unit power consumption measurements to be used for baseline and post-retrofit power consumption for the duration of the performance period.</p> <p>Baseline operating hours provided in the IGA to be used for baseline and post-retrofit operating hours for the duration of the performance period.</p> <p>HVAC interactive effects to be based plant and distribution efficiencies of 1.0 kW/ton for cooling and 80.0% for heating. HVAC efficiencies to be used to for the baseline and post retrofit HVAC efficiencies for the duration of the performance period.</p>
ECM 6.0 Air Handling Unit Lifecycle Replacements	N/A	<p>Planned capital expenditure.</p>	<p>Planned capital expenditure.</p>	<p>None.</p>	<p>Non-measured stipulated savings.</p>	<p>Capital cost offset stipulated as provided.</p>

## F.1 Utility Rate Summary

Table F.2. Utility Providers

Building	Rate Table
1000 Health Professions	Table F.3 Bryan UES Rates
1001 Medical Research	Table F.3 Bryan UES Rates
1004 Medical Research Annex	Table F.3 Bryan UES Rates
1504 Medical Sciences	Table F.4 College Station UES Rates
1518 Public Health A	Table F.4 College Station UES Rates
1519 Public Health B	Table F.4 College Station UES Rates
1520 Public Health C	Table F.4 College Station UES Rates
3500 Alkek Building	Table F.5 Houston Medical District Rates
3600 Dentistry Building	Table F.6 Dallas Medical District Rates
3602 Imaging Center	Table F.7 Dallas Market Rates

Table F.3. Bryan UES Rates

Year	Electrical Demand (\$/kW)	Electrical Energy (\$/kWh)	Chilled Water Demand (\$/ton-hr/day)	Chilled Water Energy (\$/ton-hr)	Heating Water Energy (\$/MMBtu)	Steam Demand (\$/lb/Day)	Steam Energy (\$/Mlb)	Natural Gas Energy (\$/therm)	Water/Sewer Consumption (\$/kGal)
Baseline	\$0.0000	\$0.0780	\$0.0000	\$0.1916	\$16.8650	\$0.0000	\$0.0000	\$0.8312	\$6.6280
Year 1	\$0.0000	\$0.0819	\$0.0000	\$0.2012	\$17.7083	\$0.0000	\$0.0000	\$0.8728	\$6.9594
Year 2	\$0.0000	\$0.0860	\$0.0000	\$0.2112	\$18.5937	\$0.0000	\$0.0000	\$0.9164	\$7.3074
Year 3	\$0.0000	\$0.0903	\$0.0000	\$0.2218	\$19.5233	\$0.0000	\$0.0000	\$0.9622	\$7.6727
Year 4	\$0.0000	\$0.0948	\$0.0000	\$0.2329	\$20.4995	\$0.0000	\$0.0000	\$1.0103	\$8.0564
Year 5	\$0.0000	\$0.0995	\$0.0000	\$0.2445	\$21.5245	\$0.0000	\$0.0000	\$1.0608	\$8.4592
Year 6	\$0.0000	\$0.1045	\$0.0000	\$0.2568	\$22.6007	\$0.0000	\$0.0000	\$1.1139	\$8.8822
Year 7	\$0.0000	\$0.1098	\$0.0000	\$0.2696	\$23.7307	\$0.0000	\$0.0000	\$1.1696	\$9.3263
Year 8	\$0.0000	\$0.1152	\$0.0000	\$0.2831	\$24.9173	\$0.0000	\$0.0000	\$1.2281	\$9.7926
Year 9	\$0.0000	\$0.1210	\$0.0000	\$0.2972	\$26.1632	\$0.0000	\$0.0000	\$1.2895	\$10.2822
Year 10	\$0.0000	\$0.1271	\$0.0000	\$0.3121	\$27.4713	\$0.0000	\$0.0000	\$1.3539	\$10.7963
Year 11	\$0.0000	\$0.1334	\$0.0000	\$0.3277	\$28.8449	\$0.0000	\$0.0000	\$1.4216	\$11.3361
Year 12	\$0.0000	\$0.1401	\$0.0000	\$0.3441	\$30.2871	\$0.0000	\$0.0000	\$1.4927	\$11.9029
Year 13	\$0.0000	\$0.1471	\$0.0000	\$0.3613	\$31.8015	\$0.0000	\$0.0000	\$1.5674	\$12.4981
Year 14	\$0.0000	\$0.1544	\$0.0000	\$0.3794	\$33.3915	\$0.0000	\$0.0000	\$1.6457	\$13.1230
Year 15	\$0.0000	\$0.1622	\$0.0000	\$0.3983	\$35.0611	\$0.0000	\$0.0000	\$1.7280	\$13.7791
Year 16	\$0.0000	\$0.1703	\$0.0000	\$0.4182	\$36.8142	\$0.0000	\$0.0000	\$1.8144	\$14.4681
Year 17	\$0.0000	\$0.1788	\$0.0000	\$0.4392	\$38.6549	\$0.0000	\$0.0000	\$1.9051	\$15.1915
Year 18	\$0.0000	\$0.1877	\$0.0000	\$0.4611	\$40.5876	\$0.0000	\$0.0000	\$2.0004	\$15.9511
Year 18	\$0.0000	\$0.1971	\$0.0000	\$0.4842	\$42.6170	\$0.0000	\$0.0000	\$2.1004	\$16.7486
Year 20	\$0.0000	\$0.2070	\$0.0000	\$0.5084	\$44.7479	\$0.0000	\$0.0000	\$2.2054	\$17.5861

Table F.4. College Station UES Rates

Year	Electrical Demand (\$/kW)	Electrical Energy (\$/kWh)	Chilled Water Demand (\$/ton-hr/day)	Chilled Water Energy (\$/ton-hr)	Heating Water Energy (\$/MMBtu)	Steam Demand (\$/lb/Day)	Steam Energy (\$/Mlb)	Natural Gas Energy (\$/therm)	Water/Sewer Consumption (\$/kGal)
Baseline	\$0.0000	\$0.0780	\$0.0000	\$0.1916	\$16.8650	\$0.0000	\$0.0000	\$0.9194	\$6.6280
Year 1	\$0.0000	\$0.0819	\$0.0000	\$0.2012	\$17.7083	\$0.0000	\$0.0000	\$0.9654	\$6.9594
Year 2	\$0.0000	\$0.0860	\$0.0000	\$0.2112	\$18.5937	\$0.0000	\$0.0000	\$1.0136	\$7.3074
Year 3	\$0.0000	\$0.0903	\$0.0000	\$0.2218	\$19.5233	\$0.0000	\$0.0000	\$1.0643	\$7.6727
Year 4	\$0.0000	\$0.0948	\$0.0000	\$0.2329	\$20.4995	\$0.0000	\$0.0000	\$1.1175	\$8.0564
Year 5	\$0.0000	\$0.0995	\$0.0000	\$0.2445	\$21.5245	\$0.0000	\$0.0000	\$1.1734	\$8.4592
Year 6	\$0.0000	\$0.1045	\$0.0000	\$0.2568	\$22.6007	\$0.0000	\$0.0000	\$1.2321	\$8.8822
Year 7	\$0.0000	\$0.1098	\$0.0000	\$0.2696	\$23.7307	\$0.0000	\$0.0000	\$1.2937	\$9.3263
Year 8	\$0.0000	\$0.1152	\$0.0000	\$0.2831	\$24.9173	\$0.0000	\$0.0000	\$1.3584	\$9.7926
Year 9	\$0.0000	\$0.1210	\$0.0000	\$0.2972	\$26.1632	\$0.0000	\$0.0000	\$1.4263	\$10.2822
Year 10	\$0.0000	\$0.1271	\$0.0000	\$0.3121	\$27.4713	\$0.0000	\$0.0000	\$1.4976	\$10.7963
Year 11	\$0.0000	\$0.1334	\$0.0000	\$0.3277	\$28.8449	\$0.0000	\$0.0000	\$1.5725	\$11.3361
Year 12	\$0.0000	\$0.1401	\$0.0000	\$0.3441	\$30.2871	\$0.0000	\$0.0000	\$1.6511	\$11.9029
Year 13	\$0.0000	\$0.1471	\$0.0000	\$0.3613	\$31.8015	\$0.0000	\$0.0000	\$1.7337	\$12.4981
Year 14	\$0.0000	\$0.1544	\$0.0000	\$0.3794	\$33.3915	\$0.0000	\$0.0000	\$1.8203	\$13.1230
Year 15	\$0.0000	\$0.1622	\$0.0000	\$0.3983	\$35.0611	\$0.0000	\$0.0000	\$1.9114	\$13.7791
Year 16	\$0.0000	\$0.1703	\$0.0000	\$0.4182	\$36.8142	\$0.0000	\$0.0000	\$2.0069	\$14.4681
Year 17	\$0.0000	\$0.1788	\$0.0000	\$0.4392	\$38.6549	\$0.0000	\$0.0000	\$2.1073	\$15.1915
Year 18	\$0.0000	\$0.1877	\$0.0000	\$0.4611	\$40.5876	\$0.0000	\$0.0000	\$2.2126	\$15.9511
Year 18	\$0.0000	\$0.1971	\$0.0000	\$0.4842	\$42.6170	\$0.0000	\$0.0000	\$2.3233	\$16.7486
Year 20	\$0.0000	\$0.2070	\$0.0000	\$0.5084	\$44.7479	\$0.0000	\$0.0000	\$2.4394	\$17.5861

Table F.5. Houston Medical District Rates

Year	Electrical Demand (\$/kW)	Electrical Energy (\$/kWh)	Chilled Water Demand (\$/ton-hr/day)	Chilled Water Energy (\$/ton-hr)	Heating Water Energy (\$/MMBtu)	Steam Demand (\$/lb/Day)	Steam Energy (\$/Mlb)	Natural Gas Energy (\$/therm)	Water/Sewer Consumption (\$/kGal)
Baseline	\$10.7962	\$0.0387	\$3.4722	\$0.0476	\$0.0000	\$0.2358	\$6.0178	\$0.5860	\$14.2100
Year 1	\$11.3360	\$0.0406	\$3.6458	\$0.0500	\$0.0000	\$0.2476	\$6.3187	\$0.6153	\$14.9205
Year 2	\$11.9028	\$0.0427	\$3.8281	\$0.0525	\$0.0000	\$0.2600	\$6.6346	\$0.6461	\$15.6665
Year 3	\$12.4980	\$0.0448	\$4.0195	\$0.0551	\$0.0000	\$0.2730	\$6.9664	\$0.6784	\$16.4499
Year 4	\$13.1228	\$0.0470	\$4.2205	\$0.0579	\$0.0000	\$0.2866	\$7.3147	\$0.7123	\$17.2723
Year 5	\$13.7790	\$0.0494	\$4.4315	\$0.0608	\$0.0000	\$0.3009	\$7.6804	\$0.7479	\$18.1360
Year 6	\$14.4679	\$0.0519	\$4.6531	\$0.0638	\$0.0000	\$0.3160	\$8.0644	\$0.7853	\$19.0428
Year 7	\$15.1913	\$0.0545	\$4.8857	\$0.0670	\$0.0000	\$0.3318	\$8.4676	\$0.8246	\$19.9949
Year 8	\$15.9509	\$0.0572	\$5.1300	\$0.0703	\$0.0000	\$0.3484	\$8.8910	\$0.8658	\$20.9946
Year 9	\$16.7484	\$0.0600	\$5.3865	\$0.0738	\$0.0000	\$0.3658	\$9.3356	\$0.9091	\$22.0444
Year 10	\$17.5859	\$0.0630	\$5.6558	\$0.0775	\$0.0000	\$0.3841	\$9.8024	\$0.9545	\$23.1466
Year 11	\$18.4652	\$0.0662	\$5.9386	\$0.0814	\$0.0000	\$0.4033	\$10.2925	\$1.0023	\$24.3039
Year 12	\$19.3884	\$0.0695	\$6.2356	\$0.0855	\$0.0000	\$0.4235	\$10.8071	\$1.0524	\$25.5191
Year 13	\$20.3578	\$0.0730	\$6.5474	\$0.0898	\$0.0000	\$0.4446	\$11.3475	\$1.1050	\$26.7951
Year 14	\$21.3757	\$0.0766	\$6.8747	\$0.0942	\$0.0000	\$0.4669	\$11.9148	\$1.1602	\$28.1348
Year 15	\$22.4445	\$0.0805	\$7.2185	\$0.0990	\$0.0000	\$0.4902	\$12.5106	\$1.2183	\$29.5416
Year 16	\$23.5668	\$0.0845	\$7.5794	\$0.1039	\$0.0000	\$0.5147	\$13.1361	\$1.2792	\$31.0186
Year 17	\$24.7451	\$0.0887	\$7.9583	\$0.1091	\$0.0000	\$0.5405	\$13.7929	\$1.3431	\$32.5696
Year 18	\$25.9823	\$0.0931	\$8.3563	\$0.1146	\$0.0000	\$0.5675	\$14.4826	\$1.4103	\$34.1981
Year 18	\$27.2815	\$0.0978	\$8.7741	\$0.1203	\$0.0000	\$0.5959	\$15.2067	\$1.4808	\$35.9080
Year 20	\$28.6455	\$0.1027	\$9.2128	\$0.1263	\$0.0000	\$0.6256	\$15.9670	\$1.5548	\$37.7034



Table F.6. Dallas Medical District Rates

Year	Electrical Demand (\$/kW)	Electrical Energy (\$/kWh)	Chilled Water Demand (\$/ton-hr/day)	Chilled Water Energy (\$/ton-hr)	Heating Water Energy (\$/MMBtu)	Steam Demand (\$/lb/Day)	Steam Energy (\$/Mlb)	Natural Gas Energy (\$/therm)	Water/Sewer Consumption (\$/kGal)
Baseline	\$0.0000	\$0.0663	\$0.0000	\$0.1643	\$0.0000	\$0.0000	\$6.9962	\$0.3511	\$8.5700
Year 1	\$0.0000	\$0.0696	\$0.0000	\$0.1725	\$0.0000	\$0.0000	\$7.3460	\$0.3687	\$8.9985
Year 2	\$0.0000	\$0.0731	\$0.0000	\$0.1811	\$0.0000	\$0.0000	\$7.7133	\$0.3871	\$9.4484
Year 3	\$0.0000	\$0.0768	\$0.0000	\$0.1902	\$0.0000	\$0.0000	\$8.0990	\$0.4064	\$9.9208
Year 4	\$0.0000	\$0.0806	\$0.0000	\$0.1997	\$0.0000	\$0.0000	\$8.5039	\$0.4268	\$10.4169
Year 5	\$0.0000	\$0.0846	\$0.0000	\$0.2097	\$0.0000	\$0.0000	\$8.9291	\$0.4481	\$10.9377
Year 6	\$0.0000	\$0.0888	\$0.0000	\$0.2202	\$0.0000	\$0.0000	\$9.3756	\$0.4705	\$11.4846
Year 7	\$0.0000	\$0.0933	\$0.0000	\$0.2312	\$0.0000	\$0.0000	\$9.8444	\$0.4940	\$12.0589
Year 8	\$0.0000	\$0.0980	\$0.0000	\$0.2427	\$0.0000	\$0.0000	\$10.3366	\$0.5187	\$12.6618
Year 9	\$0.0000	\$0.1029	\$0.0000	\$0.2549	\$0.0000	\$0.0000	\$10.8534	\$0.5447	\$13.2949
Year 10	\$0.0000	\$0.1080	\$0.0000	\$0.2676	\$0.0000	\$0.0000	\$11.3961	\$0.5719	\$13.9596
Year 11	\$0.0000	\$0.1134	\$0.0000	\$0.2810	\$0.0000	\$0.0000	\$11.9659	\$0.6005	\$14.6576
Year 12	\$0.0000	\$0.1191	\$0.0000	\$0.2951	\$0.0000	\$0.0000	\$12.5642	\$0.6305	\$15.3905
Year 13	\$0.0000	\$0.1250	\$0.0000	\$0.3098	\$0.0000	\$0.0000	\$13.1924	\$0.6621	\$16.1600
Year 14	\$0.0000	\$0.1313	\$0.0000	\$0.3253	\$0.0000	\$0.0000	\$13.8520	\$0.6952	\$16.9680
Year 15	\$0.0000	\$0.1378	\$0.0000	\$0.3416	\$0.0000	\$0.0000	\$14.5446	\$0.7299	\$17.8164
Year 16	\$0.0000	\$0.1447	\$0.0000	\$0.3586	\$0.0000	\$0.0000	\$15.2718	\$0.7664	\$18.7072
Year 17	\$0.0000	\$0.1520	\$0.0000	\$0.3766	\$0.0000	\$0.0000	\$16.0354	\$0.8047	\$19.6426
Year 18	\$0.0000	\$0.1596	\$0.0000	\$0.3954	\$0.0000	\$0.0000	\$16.8372	\$0.8450	\$20.6247
Year 18	\$0.0000	\$0.1675	\$0.0000	\$0.4152	\$0.0000	\$0.0000	\$17.6790	\$0.8872	\$21.6560
Year 20	\$0.0000	\$0.1759	\$0.0000	\$0.4359	\$0.0000	\$0.0000	\$18.5630	\$0.9316	\$22.7388



Table F.7. Dallas Market Rates

Year	Electrical Demand (\$/kW)	Electrical Energy (\$/kWh)	Chilled Water Demand (\$/ton-hr/day)	Chilled Water Energy (\$/ton-hr)	Heating Water Energy (\$/MMBtu)	Steam Demand (\$/lb/Day)	Steam Energy (\$/Mlb)	Natural Gas Energy (\$/therm)	Water/Sewer Consumption (\$/kGal)
Baseline	\$9.5151	\$0.0384	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.8465	\$8.9900
Year 1	\$9.9909	\$0.0403	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.8888	\$9.4395
Year 2	\$10.4904	\$0.0423	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.9333	\$9.9115
Year 3	\$11.0149	\$0.0445	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.9799	\$10.4070
Year 4	\$11.5657	\$0.0467	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$1.0289	\$10.9274
Year 5	\$12.1439	\$0.0490	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$1.0804	\$11.4738
Year 6	\$12.7511	\$0.0515	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$1.1344	\$12.0475
Year 7	\$13.3887	\$0.0540	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$1.1911	\$12.6498
Year 8	\$14.0581	\$0.0567	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$1.2507	\$13.2823
Year 9	\$14.7610	\$0.0596	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$1.3132	\$13.9464
Year 10	\$15.4991	\$0.0625	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$1.3789	\$14.6438
Year 11	\$16.2741	\$0.0657	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$1.4478	\$15.3760
Year 12	\$17.0878	\$0.0690	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$1.5202	\$16.1447
Year 13	\$17.9421	\$0.0724	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$1.5962	\$16.9520
Year 14	\$18.8392	\$0.0760	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$1.6760	\$17.7996
Year 15	\$19.7812	\$0.0798	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$1.7598	\$18.6896
Year 16	\$20.7703	\$0.0838	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$1.8478	\$19.6240
Year 17	\$21.8088	\$0.0880	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$1.9402	\$20.6052
Year 18	\$22.8992	\$0.0924	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$2.0372	\$21.6355
Year 18	\$24.0442	\$0.0970	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$2.1391	\$22.7173
Year 20	\$25.2464	\$0.1019	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$2.2460	\$23.8531

## F.2 Measurement and Verification Plans

### ECM 1.0 Lighting Improvements

#### Measurement and Verification Overview

The M&V protocol for this measure is based on IPMVP Option A. Option A includes engineering calculations with one-time representative measured values, resulting in measured verification of performance. With the chosen method, hours of operation are agreed to for the duration of the project. Post installation fixture wattages will be determined from one-time after spot measurements of representative fixture types.

Ameresco will perform equipment measurements to verify that the performance of the installed equipment will operate at the levels defined in the Investment Grade Audit (IGA) report. This will be established by measuring a percentage of fixtures (either individual fixtures or on a given lighting circuit) of the same lamp/ballast combination as defined in the project specific M&V plan. If the lighting systems do not perform as proposed, Ameresco will either change the systems or compensate TAMH if the overall energy savings for all measures in the project are not achieved. For the site operating hours, Ameresco has no control over the hours of operation of the facility. Therefore, TAMH and Ameresco will agree to the run-hours for the life of the contract.

Table F.8. Hours of Operation for ECM 1.0 Lighting Improvements

Area Code	Area Description	Existing Annual Hours of Operation	Proposed Annual Hours of Operation
LOW	Low Usage, Mechanical Rooms	544	544
24/7	24 Hours Continuous	8,760	8,760
AUX, OCC	Auxiliary (Conference/Copy/Break)	1,192	1,192
OO	Open Office	3,196	3,196
AUX	Auxiliary (Conference/Copy/Break)	1,324	1,324
PO	Private Office	1,584	1,584
PO, OCC	Private Office	1,426	1,426
PRIR, OCC	Private Restrooms	958	958
COR, OCC	Corridors	5,263	5,263
COR	Corridors	5,848	5,848
PUBR, OCC	Public Restrooms	4,280	4,280
LOW, OCC	Low Usage, Mechanical Rooms	490	490
PRIR	Private Restrooms	1,064	1,064
CR/LH, OCC	Classroom/Lecture	1,894	1,894
CR/LH	Classroom/Lecture	2,104	2,104
EXM	Exam/Patient	2,234	2,234
PUBR	Public Restrooms	4,756	4,756
OO, OCC	Open Office	2,876	2,876
EXT	Exterior Lights	3,664	3,664
LAB, OCC	Lab	2,970	2,970
LAB	Lab	3,300	3,300
EXM, OCC	Exam/Patient	2,011	2,011

## Energy Savings Calculation Methodology

Ameresco will measure the baseline and post-retrofit fixture input power using Federal Energy Management Plan (FEMP) 80/20 sampling plan of the representative fixtures at the time of commissioning. The average value for all fixtures of the same type will be used as the baseline and post-retrofit wattage.

Lighting interactive effects with HVAC result on cooling energy savings due to lower sensible energy dissipated in the space and conditioned by the cooling coil. The reduction on heat load has the opposite effect on heating requiring an increase in heating consumption. These interactive effects are calculated using standard formulas and are stipulated savings.

### Lighting Savings

Energy savings for this portion of the ECM are generated directly by reducing the energy consumption at the fixture. The following was used to determine the annual energy savings for each fixture.

$$\text{Lighting kW Savings} = \text{Base Light kW} - \text{Post Light kW}$$

$$\text{Base Light kW} = \text{Base Fixture kW} \times \text{Diversity Factor}$$

$$\text{Post Light kW} = \text{Post Fixture kW} \times \text{Diversity Factor}$$

$$\text{Lighting kWh Savings} = \text{Base Lighting kWh} - \text{Post Lighting kWh}$$

$$\text{Base Lighting kWh} = \text{Base Light kW} \times \text{Base Hours}$$

$$\text{Post Lighting kWh} = \text{Post Light kW} \times \text{Base Hours}$$

The diversity factor account for the variability in the lighting operation. The diversity is established based on the building use. An 80% diversity factor has been applied for the facilities, except for at Public Health B where lights were in more consistent use and a 90% percent factor was applied. The diversity factor has only a limited effect here due to a lack of demand assessments in most of the rate structures.

### HVAC Interactive Effects

Energy savings for this portion of the ECM are generated by reducing the thermal load in the building. The load reductions reduce the operating hours and increase the heating operating hours.

$$\begin{aligned} \text{Cooling Thermal Energy Savings [kBtu]} \\ = \frac{\text{Lighting kWh Savings} \times 3.412 \text{ kBtu/kWh}}{12 \text{ months}} \times \text{Load to Space [\%]} \times \text{Cooling Months} \end{aligned}$$

$$\begin{aligned} \text{Heating Thermal Energy Savings [kBtu]} \\ = - \frac{\text{Lighting kWh Savings} \times 3.412 \text{ kBtu/kWh}}{12 \text{ months}} \times \text{Load to Space [\%]} \times \text{Heating Months} \end{aligned}$$

## Electric Cooling Systems

Cooling Electrical Demand Savings [kW]

$$= \sum_{\text{Month}} \frac{\text{Lighting kW Savings}_{\text{Monthly Peak Temperature}} \times 3.412 \text{ kBtu/kWh}}{12 \text{ kBtu/tonhours}} \times \text{Load Factor} \\ \times \text{Cooling Efficiency HVAC}$$

Cooling Electrical Energy Savings [kWh]

$$= \text{Cooling Thermal Savings [kBtu]} \times \frac{\text{Cooling Efficiency [kW/ton]}}{12 \text{ kBtu/tonhours}}$$

## Electric Resistance Heating Systems

Heating Electrical Energy Savings [kWh] = Heating Thermal Energy Savings [kBtu] × Heating Months

## Gas Heating Systems

Heating Gas Energy Savings [therms]

$$= \frac{\text{Heating Thermal Energy Savings [kBtu]}}{\text{Heating System Efficiency}} \times \frac{1,000 \text{ Btu}}{1 \text{ kBtu}} \times \frac{1 \text{ therm}}{100,000 \text{ Btu}}$$

## District Chilled Water Cooling Systems

Cooling CHW Energy Savings [ton\_hours]

$$= \text{Cooling Thermal Energy Savings [kBtu]} \times \frac{1,000 \text{ Btu}}{1 \text{ kBtu}} \times \frac{1 \text{ ton\_hours}}{12,000 \text{ Btu}}$$

Cooling CHW Demand Savings [ton\_hours per day]

$$= \sum_{12 \text{ Month}} \text{Cooling CHW Energy Savings [ton\_hours]}_{\text{Peak Day}}$$

## District Heating Water Heating Systems

Heating HW Energy Savings [MMBtu]

$$= \text{Heating Thermal Energy Savings [kBtu]} \times \frac{1,000 \text{ Btu}}{1 \text{ kBtu}} \times \frac{1 \text{ MMBtu}}{1,000,000 \text{ Btu}}$$

## District Steam Water Heating Systems

Heating Steam Energy Savings [Mlb]

$$= \text{Heating Thermal Energy Savings [kBtu]} \times \frac{1,000 \text{ Btu}}{1 \text{ kBtu}} \times \frac{1 \text{ lb}}{1,189 \text{ Btu}} \times \frac{1 \text{ Mlb}}{1,000 \text{ lb}}$$

Heating Steam Demand Savings [lbs per day] =  $\sum_{12 \text{ Month}} \text{Heating Steam Energy Savings [lbs]}_{\text{Peak Day}}$

The load to space factor is used to account for the fixture type and the heat losses to unconditioned spaces. The majority of fixtures are recessed, therefore, an 85% load to space factor has been applied for the facilities.

## Metering Plan

Ameresco will measure the fixture input power based on FEMP 80/20 accuracy level for the fixtures representing at least 80 percent of kWh savings. The existing fixtures will be measured per Table F.9.

**Table F.9.** Sampling Plan for ECM 1.0 Lighting Improvements

Existing Fixture Description	% of Total Energy Usage Savings	Retrofit Quantity	M&V Quantity
2x4 4F32T8	24%	3,189	11
2x4 3F32T8	12%	1,806	11
2x4 4F32T8/50K	11%	1,203	11
2x4 2F54T5HO/50K	7%	781	11
1x4 2F32T8	7%	1,338	11
2x4 2F32T8	5%	640	11
2x4 2F54T5HO	4%	290	11
1x4 1F54T5HO	4%	867	11
CF 32W	3%	917	11
2x2 2F32UT8	2%	329	11
<b>Total:</b>	<b>80%</b>	<b>11,360</b>	<b>110</b>

The upgraded fixtures will be measured at the same locations and quantities provided in Table F.9.

No long-term, physical metering of equipment energy will be provided for this measure.

## Performance Period Operational Verification

As part of the monitoring services, Ameresco will remotely meet annually to review operational practices regarding the retrofit lighting project. TAMH staff for each site to provide information on any maintenance replacements required during the year and to provide model information for replacement stock for verification of consistency with retrofit performance. A summary of the operational practices review will be made a part of the Annual Reconciliation Report.

## ECM 2.0 Water Fixture Improvements

### Measurement and Verification Overview

The M&V protocol for this measure is based on IPMVP Option A. Option A includes engineering calculations with one-time representative measured values, resulting in measured verification of performance. With the chosen method, occupancy and usage factors are agreed to for the duration of the project. Pre- and post-installation flow rates will be determined from one-time spot measurements of a sample of representative fixture types. Ameresco will measure the flow rate per fixture based on the Federal Energy Management Plan (FEMP) 90/10 sampling protocol.

For baseline conditions, Ameresco utilized occupancy data provided by TAMH for usage and occupancy. Ameresco has no control over building occupancy and cannot be reasonably requested to assume the risk for this variable. Therefore, TAMH and Ameresco will agree to the building occupancy rates for the life of the contract. See Table F.10. Contracted Building Occupancy Rates for these values.

**Table F.10.** Contracted Building Occupancy Rates

Building Occupancy Rates	3500 Alkek Building	
Daily Occupants	217	persons
Area of Occupied Facilities	228,420	square feet
Occupancy Factor	0.95	
Occupied Days Annually	365	days/yr
Toilet Usage Rate	2.66	flushes/day/occ.
Urinal Usage Rate	0.33	flushes/occ-days
Lavatory Sink Usage Factor	1.0	min/occ-days
Drinking Water	0.05	gal/occupant day
Leaks % Total Water Use	0.3%	
Total Loss	3.524	kGal
% of Loss Repaired During Retrofits	10%	
Heater Efficiency	98%	
Ground Water Temperature	59	deg F
Sink Temperature	100	deg F

### Savings Calculation Methodology

#### Water and Sewer

Water savings for restroom fixture retrofits are determined by comparing the existing water consumption of fixtures to the post-retrofit consumption and subtracting the two values for a savings rate per average fixture use. The usage factor for the baseline and post-retrofit calculations are assumed the same. The full-time equivalency method is used to determine daily average building occupancy and usage factor. This method utilizes occupancy data provided by TAMH for classes, events, staff, and resident occupancy to calculate a daily average occupancy for the year with an occupancy factor to adjust for possible daily absences. Standard water fixture consumption profiles for male and female occupants follow the U.S. Green Building Council (USGBC) Guidelines. Each calculation is done on a per building bases by average flow

rate per fixture in the building.

$$\text{Occupant Days} = [(\sum \text{Yearly Occupants})/365] \times \text{Occ. Factor} \times \text{Occ. Days Annually}$$

$$\text{Base Usage} = \text{Usage Factor} \times \text{Base Average Flow Rate}$$

$$\text{Base kGal} = \text{Occupant Days} \times \text{Base Usage}$$

$$\text{Post Usage} = \text{Usage Factor} \times \text{Post Average Flow Rate}$$

$$\text{Post kGal} = \text{Occupant Days} \times \text{Post Usage}$$

$$\text{kGal Savings} = \text{Base kGal} - \text{Post kGal}$$

Reference the Appendix for detailed spreadsheet calculation of the water and cost savings.

## Energy

Energy savings for restroom fixture retrofits is determined by assessing the energy requirement to raise the amount of water saved from the average ground water temperature to tap or shower temperature. Energy savings is only assessed for lavatory aerators replacement and showerhead replacement, as these are the only aspects of this ECM utilizing domestic hot water. Energy savings is determined by calculating the energy required to heat the previously calculated post-retrofit water volume from the local ground water temperature to the assumed fixture usage temperature. Temperatures at the showerhead are assumed to be 105°F and 100°F at the sinks.

*Thermal Savings*

$$= \text{Water Savings Mass} \times \text{Heat Capacity of Water} \times (\text{Fixture Temperature} - \text{Ground Water Temperature})$$

$$\text{Actual Thermal Savings (MMBtu)} = \frac{\text{Thermal Savings}}{\text{Efficiency}}$$

## Metering Plan

Pre-retrofit and post-retrofit flow rate measurements will be taken prior to retrofit. A summary of the expected pre-retrofit flow rates is provided below. Ameresco will measure the flow rate per fixture based on the Federal Energy Management Plan (FEMP) 90/10 sampling protocol.

**Table F.11.** Baseline and Post-Retrofit Flow Rate Assumptions and Sample Size

Fixture Type	Pre-Retrofit Flow Rate	Post-Retrofit Flow Rate	Units	Retrofit Quantity	Sample Quantity
Toilets	2.6	1.1	Gallons per Flush	56	31
Urinals	1	0.125	Gallons per Flush	22	17
Lavatory	0.9	0.5	Gallons per Minute	51	30

## Annual Inspection

As part of the monitoring services, Ameresco will remotely meet annually to review operational practices regarding the retrofit water project. TAMH staff for each site to provide information on any maintenance replacements required during the year and to provide model information for replacement stock for verification of consistency with retrofit performance. A summary of the operational practices review will be made a part of the Annual Reconciliation Report.

## ECM 3.0 Network Pneumatic Thermostats

### Measurement and Verification Overview

The M&V protocol for this measure is based on IPMVP Option A. Option A includes engineering calculations with one-time representative measured values, resulting in measured verification of performance. With the chosen method, hours of operation are agreed to for the duration of the project. Pre-installation verification of lack of scheduling is established by the motor logging and lack of temperature setpoint reset controls at the pneumatic thermostats. Pre-installation setpoints were established based on a sample of space conditions.

Installation verification and/or commissioning of this ECM will be utilized to ensure that the stipulations are realistic and attainable. Ameresco will spot inspect the zone temperature setpoints and schedules for occupied and unoccupied periods to verify that the system is operating according to the intended design.

TAMH and Ameresco agreed to stipulate the periods of facility occupancy. Hours of operation have been estimated based on detailed surveys, observations, TAMH input, and occupant interviews. As facility operating hours and facility usage are beyond the control of Ameresco, stated values will not be adjusted during the performance period.

**Table F.12.** Standards of Operation for ECM 3.0 Network Pneumatic Thermostats

	Occupied				Unoccupied	
	Days	Time Period	Cool	Heat	Cool	Heat
			°F	°F	°F	°F
<b>Pre-Retrofit Standards of Operation</b>						
General Spaces, Office Spaces	MTWTFSS	00:00 – 23:59	71.5	71.5	71.5	71.5
Vivarium Spaces <sup>[1]</sup>	MTWTFSS	00:00 – 23:59	71.5	71.5	71.5	71.5
<b>Post Retrofit Standards of Operation</b>						
General Spaces, Office Spaces	MTWTFSS	07:00 – 19:00	75.0	70.0	85.0	60.0
Vivarium Spaces <sup>[1]</sup>	MTWTFSS	00:00 – 23:59	71.5	71.5	71.5	71.5

<sup>[1]</sup> Occupied setpoints have been assumed to remain the same pre and post retrofit.

The baseline internal loads were established when the building was originally constructed. Ameresco assumed the HVAC equipment selections were accurate and no changes to the type of occupancy and occupancy rate have occurred. Since future equipment loads and facility usage are not influenced by Ameresco, the loads are stipulated for the performance period. The design conditions for the affected air handling units (AHUs) are shown in Table F.13. The baseline load assumptions that will remain through the performance term are shown in Table F.14.



Table F.13. Controlled Equipment Design Conditions for ECM 3.0 Network Pneumatic Thermostats

	Mark	AHU 3-1	AHU 3-3	AHU 3-4	AHU 3-7	AHU 3-8	AHU 11-1
General	Type	VAV	VAV	VAV	VAV	VAV	VAV
	Make (E)	Trane	Trane	Trane	Trane	Trane	Trane
	Model (E)	NA	CCDB3###0J	CCDB14CF0J	CCDB50Q20J	NA	CCDB41QF0J
	Total CFM	5,260	19,000	6,550	30,520	38,630	21,380
	T.S.P.	3.9	3.5	3.5	4.25	3.8	3.6
	HP (E)	7.5	20	7.5	40	40	25
	V/P	460/3	460/3	460/3	460/3	460/3	460/3
	VFD (N)	YES	YES	YES	YES	YES	YES
Cooling	GSH	204,509	582,358	214,908	1,120,695	939,248	683,707
	GTH	394,816	890,055	355,174	2,064,220	1,438,495	1,069,855
	E.A.T.	88.5/74.7	80.9/67.5	82.88/69.44	86.5/72.9	81/67.5	80/67
	L.A.T.	52.5	52.5	52.5	52.5	52.5	52.5
	Rows/FPI (E)	NA/12	NA/12	NA/12	NA/10	NA/12	NA/12
	GPM (E)	56.4	127.2	50.7	294.9	205.5	152.8
	E.W.T./L.W.T.	42/NA	42/NA	42/NA	42/NA	42/NA	42/NA
	Ft. P.D. (E)	15	15	15	15	15	15
Pre-Heating	BTU/Hr.	99,414	NONE	NONE	576,828	NONE	NONE
	Rows/FPI (E)	NA/8	NONE	NONE	NA/8	NONE	NONE
	GPM (E)	5	NONE	NONE	29	NONE	NONE
	E.W.T./L.W.T.	180/NA	NONE	NONE	180/NA	NONE	NONE
	Ft. P.D. (E)	5	NONE	NONE	5	NONE	NONE
Remarks	Service	1st Level Offices	2nd Level Offices	3rd Level Offices	Offices 4-10	Labs 4-10	11th Level Offices
	Location	MR 308	MR 308	MR 308	MR 308	MR 314	MR 1116
	Additions	Pre-Heat with Bypass			Pre-Heat with Bypass		

Table F.14. Baseline Cooling & Heating Loads for ECM 3.0 Network Pneumatic Thermostats

Unit	Annual Baseline Chilled Water Consumption (MBH)	Annual Baseline Hot Water Consumption (MBH)	Annual Baseline Chilled Water Demand (kBtu)	Annual Baseline Hot Water Demand (kBtu)
AHU 3-1	680,701	101,432	38,604	11,667
AHU 3-3	1,526,421	195,842	86,567	22,527
AHU 3-4	618,819	85,975	35,095	9,889
AHU 3-7	3,547,898	203,585	201,209	23,417
AHU 3-8	2,475,278	257,445	140,379	29,613
AHU 11-1	1,835,831	216,102	104,114	24,857
<b>Total:</b>	<b>10,684,950</b>	<b>1,060,380</b>	<b>605,968</b>	<b>121,971</b>

## Energy Savings Calculation Methodology

Energy savings are determined using the following equations:

$$\text{Electricity Savings} = \text{Motor Savings}$$

$$\text{Motor Savings} = \text{Base Motor kWh} - \text{Post Motor kWh}$$

$$\text{Base Motor kWh} = \text{Base Constant Speed Motor kWh} + \text{Base Variable Speed Motor kWh}$$

$$\begin{aligned} \text{Base Constant Speed Motor kWh} \\ = \frac{\text{Motor HP} \times \text{Load Factor} \times 0.746 \text{ kW/hp}}{\text{Motor Efficiency}} \times \text{Base Hours} \times \text{Utilization} \end{aligned}$$

$$\begin{aligned} \text{Base Variable Speed Motor kWh} \\ = \frac{\text{Motor HP} \times \text{Load Factor} \times 0.746 \text{ kW/hp}}{\text{Motor Efficiency}} \times \text{Base Hours} \times \text{Utilization}^{\text{VFD Power Index}} \end{aligned}$$

$$\text{Post Motor kWh} = \text{Post Constant Speed Motor kWh} + \text{Post Variable Speed Motor kWh}$$

$$\text{Post Constant Speed Motor kWh} = \frac{\text{Motor HP} \times \text{Load Factor} \times 0.746 \text{ kW/hp}}{\text{Motor Efficiency}} \times \text{Post Hours}$$

$$\begin{aligned} \text{Post Variable Speed Motor kWh} \\ = \frac{\text{Motor HP} \times \text{Load Factor} \times 0.746 \text{ kW/hp}}{\text{Motor Efficiency}} \times \text{Post Hours} \times \text{Utilization}^{\text{VFD Power Index}} \end{aligned}$$

## District Chilled Water Cooling Systems

$$\text{Cooling CHW Energy Savings [ton\_hours]} = \text{Base Cooling Ton\_Hours} - \text{Post Cooling Ton\_Hours}$$

$$\text{Base Cooling Ton\_Hours} = \text{Cooling Capacity Tons} \times \text{Base Load} \times \text{Hours}$$

$$\text{Post Cooling Ton\_Hours} = \text{Cooling Capacity Tons} \times \text{Post Load} \times \text{Hours}$$

$$\begin{aligned} \text{Cooling CHW Demand Savings [ton\_hours per day]} \\ = \sum_{12 \text{ Month}} \text{Cooling CHW Energy Savings [ton\_hours]}_{\text{Peak Day}} \end{aligned}$$

## District Steam Water Heating Systems

$$\text{Heating Steam Energy Savings [Mlb]} = \text{Base Heating} - \text{Post Heating}$$

$$\text{Base Gas Heating} = \text{Heating Capacity MBH} \times \text{Base Load} \times \text{Hours} \times \frac{1,000 \text{ Btu/hr}}{1 \text{ MBH}} \times \frac{1 \text{ lb}}{1,189 \text{ Btu}} \times \frac{1 \text{ Mlb}}{1,000 \text{ lb}}$$

$$\text{Post Gas Heating} = \text{Heating Capacity MBH} \times \text{Post Load} \times \text{Hours} \times \frac{1,000 \text{ Btu/hr}}{1 \text{ MBH}} \times \frac{1 \text{ lb}}{1,189 \text{ Btu}} \times \frac{1 \text{ Mlb}}{1,000 \text{ lb}}$$

$$\text{Heating Steam Demand Savings [lbs per day]} = \sum_{12 \text{ Month}} \text{Heating Steam Energy Savings [lbs]}_{\text{Peak Day}}$$

## Metering Plan

The baseline conditions were established by spot measurement of the space conditions at a sampling of spaces. At the completion of this ECM, post-retrofit conditions will be collected from Building Automation System (BAS). Programmed schedules and occupied and unoccupied set points will be documented from the BAS. Ameresco will verify the required schedules and set points outlined in the Standards of Operation are programmed and functioning.

**Table F.15.** Baseline Setpoints

Room No.	Temperature (°F)
406	69.0
412	75.0
403	71.2
510	69.1
516	72.4
603F	70.4
703F	68.0
719	67.5
810	68.6
814	76.0
913	67.0
909A	71.0
921	69.2
107	68.8
214M	74.6
214H	73.0
213B	70.0
212	67.4
214 Lobby	71.0
105	74.4
121	67.6
128	71.7
<b>Average:</b>	<b>70.5</b>

No long term, physical metering of equipment energy will be provided for this measure. The high level of confidence in the engineering of the ECM and calculation of the associated savings allow the M&V plan to eliminate the cost of a metering strategy and not adversely impact the economics of the measure.

## Annual Operational Verification

As part of the monitoring services, Ameresco will remotely meet annually to review operational practices regarding ECM 3.0 Network Pneumatic Thermostats. Ameresco will review the schedules and setpoints via remote access to the BAS to document compliance with the Standards of Operation ensures that this ECM performs as designed. TAMH will provide information regarding operating schedules and space temperature set points for Ameresco’s review to ensure compliance with the Standards of Operation.

## ECM 4.0 Lab Control Improvements

### Measurement and Verification Overview

The M&V protocol for this measure is based on IPMVP Option A. Option A includes engineering calculations with one-time representative measured values, resulting in measured verification of performance. With the chosen method, pre-installation verification of air changes per hour (ACH) is based on measurements taken at the exhaust fans serving the labs. Air handling unit (AHU) trending is used to establish that occupied and unoccupied operation is not substantially different.

Ameresco will verify the operation of new proposed sequence of operation through one-time review of the building automation system and the integrated lab air flow instrumentation. Ameresco will specifically verify the air changes per hour setpoint and performance during occupied mode and unoccupied mode. The baseline effective hours of operation have been established based on the existing lab schedules. The effective post-installation hours of operation have been established based on logged occupancy data collected during the Investment Grade Audit (IGA). As facility operating hours and facility usage are beyond the control of Ameresco, stated values will not be adjusted during the performance period.

**Table F.16.** Standards of Operation for ECM 4.0 Lab Control Improvements

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Effective Occupancy Rate
<b>Pre-Retrofit Standards of Operation</b>							
8:00-18:00	8:00-18:00	8:00-18:00	8:00-18:00	8:00-18:00	8:00-13:00	0:00-0:00	32.7%
<b>Post Retrofit Standards of Operation</b>							
8:00-15:00	8:00-15:00	8:00-15:00	8:00-16:00	8:00-15:00	8:00-10:00	0:00-0:00	24.4% <sup>[1]</sup>

[1] The calculated occupancy based upon the proposed schedule deviates 1% from the Logged Occupancy data collected during the Investment grade audit

### Energy Savings Calculation Methodology

Energy savings for this measure is based on reducing the conditioning load by reducing the amount of outside that requires treatment. Ventilation rates are reduced when occupants are not present. The heating and cooling savings methodology is presented below.

$$\text{Heating Steam Energy Savings [Mlb]} = \text{Base Heating} - \text{Post Heating}$$

$$\text{Base Heating Steam [Mlb]} = \text{Base Preheating Steam} + \text{Base Reheating Steam}$$

$$\text{Post Heating [Mlb]} = \text{Post Preheating Steam} + \text{Post Reheating Steam}$$

$$\text{Base Preheating Steam [Mlb]}$$

$$= 1.03 \times \text{Base Airflow [CFM]} \times (T_{\text{Preheat}} - T_{\text{OA}}) \times \frac{1,000 \text{ Btu/hr}}{1 \text{ MBH}} \times \frac{1 \text{ lb}}{1,189 \text{ Btu}} \times \frac{1 \text{ Mlb}}{1,000 \text{ lb}}$$

$$\text{Base Reheating Steam [Mlb]}$$

$$= 1.03 \times \text{Base Airflow [CFM]} \times (T_{\text{After Coil}} - T_{\text{Before Coil}}) \times \frac{1,000 \text{ Btu/hr}}{1 \text{ MBH}} \times \frac{1 \text{ lb}}{1,189 \text{ Btu}} \times \frac{1 \text{ Mlb}}{1,000 \text{ lb}}$$

Post Preheating Steam [Mlb]

$$= 1.03 \times \text{Post Airflow [CFM]} \times (T_{\text{Preheat}} - T_{\text{OA}}) \times \frac{1,000 \text{ Btu/hr}}{1 \text{ MBH}} \times \frac{1 \text{ lb}}{1,189 \text{ Btu}} \times \frac{1 \text{ Mlb}}{1,000 \text{ lb}}$$

Base Reheating Steam [Mlb]

$$= 1.03 \times \text{Post Airflow [CFM]} \times (T_{\text{After Coil}} - T_{\text{Before Coil}}) \times \frac{1,000 \text{ Btu/hr}}{1 \text{ MBH}} \times \frac{1 \text{ lb}}{1,189 \text{ Btu}} \times \frac{1 \text{ Mlb}}{1,000 \text{ lb}}$$

$$\text{Heating Steam Demand Savings [lbs per day]} = \sum_{12 \text{ Month}} \text{Heating Steam Energy Savings [lbs]}_{\text{Peak Day}}$$

Cooling CHW Energy Savings [ton\_hours] = Base Cooling Energy – Post Cooling Energy

$$\text{Base Cooling Energy [ton_hours]} = 1.03 \times \text{Base Airflow [CFM]} \times (T_{\text{Outside Air}} - T_{\text{Supply}}) \times \frac{1 \text{ ton\_hours}}{12,000 \text{ Btu}}$$

$$\text{Post Cooling Energy [ton_hours]} = 1.03 \times \text{Post Airflow [CFM]} \times (T_{\text{Outside Air}} - T_{\text{Supply}}) \times \frac{1 \text{ ton\_hours}}{12,000 \text{ Btu}}$$

Cooling CHW Demand Savings [ton\_hours per day]

$$= \sum_{12 \text{ Month}} \text{Cooling CHW Energy Savings [ton\_hours]}_{\text{Peak Day}}$$

## Metering Plan

Ameresco will perform a one-time verification of air changes per hour sequence of operation (reset) at each room after sequence modification. Existing air flow conditions were established through measurements taken at the exhaust fans serving the labs. Trending of the AHU variable frequency drive (VFD) speed has been used to establish that the baseline occupied and unoccupied flow rates are substantially the same. The post-installation measurements will be provided using the BAS instrumentation once test and balance establishes the accuracy of the instrumentation. During unoccupied periods, the ACH will be reset to the rating established in the new sequence of operation. Post-installation sequences will be established through review of the BAS.

**Table F.17.** Lab Ventilation Rates

Ventilation Schedule	Modeled Lab CFM	Measured Lab CFM
Baseline, Occupied	55,517	55,517
Baseline, Unoccupied	55,517	
Post-Installation, Occupied	64,725	TBD
Post-Installation, Unoccupied	31,457	TBD

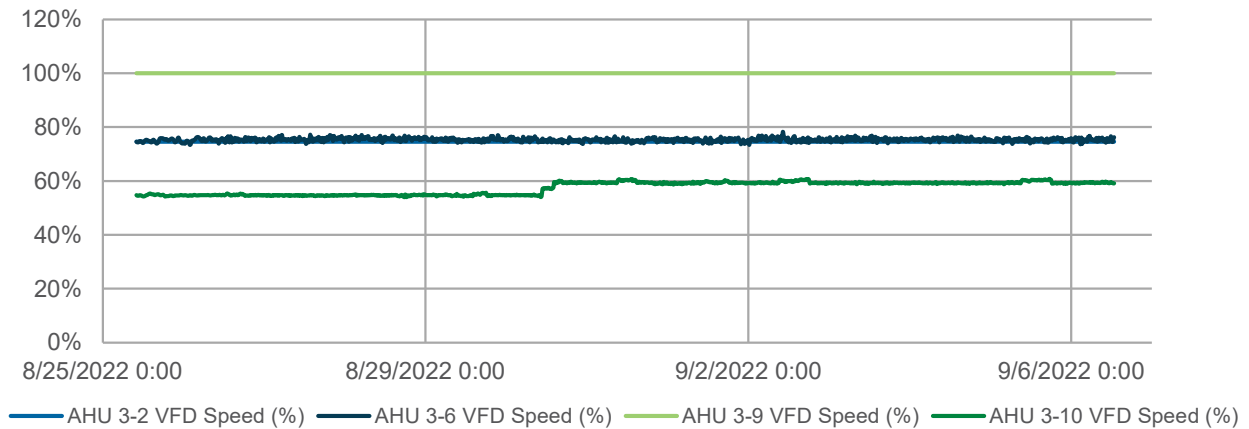


Figure F.0. Lab AHU Supply Fan Speed Trends

### Savings Reconciliation

If the measured parameters meet the proposed ACH reset control sequences, post-construction savings will not be recalculated. If the measured parameters do not achieve the proposed turndown in ACH, Ameresco will re-calculate the proposed savings based upon the achieved ach set points. Ameresco will evaluate the combined performance of all measures to determine the net savings.

No long-term, physical metering of equipment energy will be provided for this measure. Savings will not be recalculated during the performance term.

### Performance Year Operational Verification

As part of the monitoring services, Ameresco will remotely review the sequence through the BAS. Ameresco will review the ACH setpoints via remote access to the BAS to document compliance with the Standards of Operation ensures that this ECM performs as designed. TAMH will provide information regarding ACH setpoints to ensure persistence of savings.

## ECM 5.0 Transformer Improvements

### Measurement and Verification Overview

The M&V protocol for this measure is based on IPMVP Option A. Option A includes engineering calculations with one-time representative measured values, resulting in measured verification of performance. With the chosen method, hours of operation are agreed to for the duration of the project. Pre-installation transformer loading and losses will be determined from one-time spot measurements of representative of sample of the transformers. Post-installation losses for the baseline load profile will be established based on the transformer losses measured in a lab at manufacture.

### Energy Savings Calculation Methodology

Energy savings for this ECM is accomplished through the reduction in voltage conversion losses under both occupied and unoccupied base loads. Energy savings for this portion of the ECM are calculated by the following method:

#### Transformer Savings

Energy savings for this portion of the ECM are generated directly by reducing the energy loss at the transformer. A statistical survey was used to determine losses of the current transformers against the manufacturer documented losses of the new transformers. The following was used to determine the annual energy savings for each unit.

$$\text{Transformer kW Savings} = \text{Base Transformer Loss kW} - \text{Post Transformer Loss kW}$$

$$\text{Base Transformer Loss kW} = \text{Base No Load Losses} + \text{Load Factor} \times (\text{Base Full Load Losses} - \text{Base No Load Losses})$$

$$\text{Post Transformer Loss kW} = \text{Post No Load Losses} + \text{Load Factor} \times (\text{Post Full Load Losses} - \text{Post No Load Losses})$$

$$\text{Transformer kWh Savings} = \text{Base Transformer Loss kWh} - \text{Post Transformer Loss kWh}$$

$$\text{Base Transformer Loss kWh} = \text{Base Transformer Occ. Loss kW} \times \text{Occ. Hours} + \text{Base Transformer UnOcc. Loss kW} \times \text{UnOcc. Hours}$$

$$\text{Post Transformer Loss kWh} = \text{Post Transformer Occ. Loss kW} \times \text{Occ. Hours} + \text{Post Transformer UnOcc. Loss kW} \times \text{UnOcc. Hours}$$

#### HVAC Interactive Effects

Energy savings for this portion of the ECM are generated by reducing the thermal load in the building. The load reductions reduce the operating hours and increase the heating operating hours.

$$\begin{aligned} &\text{Cooling Thermal Energy Savings [kBtu]} \\ &= \frac{\text{Transformer kWh Savings} \times 3.412 \text{ kBtu/kWh}}{12 \text{ months}} \times \text{Load to Space [\%]} \times \text{Cooling Months} \end{aligned}$$

$$\begin{aligned} & \text{Heating Thermal Energy Savings [kBtu]} \\ &= - \frac{\text{Trasnformer kWh Savings} \times 3.412 \text{ kBtu/kWh}}{12 \text{ months}} \times \text{Load to Space [\%]} \\ & \times \text{Heating Months} \end{aligned}$$

### Electric Cooling Systems

$$\begin{aligned} & \text{Cooling Electrical Demand Savings [kW]} \\ &= \sum_{\text{Month}} \frac{\text{Lighting kW Savings}_{\text{Monthly Peak Temperature}} \times 3.412 \text{ kBtu/kWh}}{12 \text{ kBtu/tonhours}} \times \text{Load Factor} \\ & \times \text{Cooling Efficiency HVAC} \end{aligned}$$

$$\begin{aligned} & \text{Cooling Eletrical Energy Savings [kWh]} \\ &= \text{Cooling Thermal Savings [kBtu]} \times \frac{\text{Cooling Efficiency [kW/ton]}}{12 \text{ kBtu/tonhours}} \end{aligned}$$

### Electric Resistance Heating Systems

$$\text{Heating Electrical Energy Savings [kWh]} = \text{Heating Thermal Energy Savings [kBtu]} \times \text{Heating Months}$$

### Gas Heating Systems

$$\begin{aligned} & \text{Heating Gas Energy Savings [therms]} \\ &= \frac{\text{Heating Thermal Energy Savings [kBtu]}}{\text{Heating System Efficiency}} \times \frac{1,000 \text{ Btu}}{1 \text{ kBtu}} \times \frac{1 \text{ therm}}{100,000 \text{ Btu}} \end{aligned}$$

### District Chilled Water Cooling Systems

$$\begin{aligned} & \text{Cooling CHW Energy Savings [ton_hours]} \\ &= \text{Cooling Thermal Energy Savings [kBtu]} \times \frac{1,000 \text{ Btu}}{1 \text{ kBtu}} \times \frac{1 \text{ ton\_hours}}{12,000 \text{ Btu}} \end{aligned}$$

$$\begin{aligned} & \text{Cooling CHW Demand Savings [ton_hours per day]} \\ &= \sum_{12 \text{ Month}} \text{Cooling CHW Energy Savings [ton\_hours]}_{\text{Peak Day}} \end{aligned}$$

### District Heating Water Heating Systems

$$\begin{aligned} & \text{Heating HW Energy Savings [MMBtu]} \\ &= \text{Heating Thermal Energy Savings [kBtu]} \times \frac{1,000 \text{ Btu}}{1 \text{ kBtu}} \times \frac{1 \text{ MMBtu}}{1,000,000 \text{ Btu}} \end{aligned}$$

### District Steam Water Heating Systems

$$\begin{aligned} & \text{Heating Steam Energy Savings [Mlb]} \\ &= \text{Heating Thermal Energy Savings [kBtu]} \times \frac{1,000 \text{ Btu}}{1 \text{ kBtu}} \times \frac{1 \text{ lb}}{1,189 \text{ Btu}} \times \frac{1 \text{ Mlb}}{1,000 \text{ lb}} \end{aligned}$$

$$\text{Heating Steam Demand Savings [lbs per day]} = \sum_{12 \text{ Month}} \text{Heating Steam Energy Savings [lbs]}_{\text{Peak Day}}$$



## Metering Plan

Ameresco will measure the baseline transformer loading and losses using Federal Energy Management Plan (FEMP) 90/10 sampling plan of the representative fixtures at the time of installation.

**Table F.18.** Sample Size and Measurements for ECM 5.0 Transformer Improvements

Transformer Sample kVa Rating	Retrofit Quantity	Sample Size	Loading %		Average Losses (kW)	
			Baseline	Post-Retrofit	Baseline	Post-Retrofit
15	4	4	TBD	Baseline %	TBD	TBD
30	25	19	TBD	Baseline %	TBD	TBD
37.5	1	1	TBD	Baseline %	TBD	TBD
45	6	6	TBD	Baseline %	TBD	TBD
50	2	2	TBD	Baseline %	TBD	TBD
75	3	3	TBD	Baseline %	TBD	TBD
112.5	3	3	TBD	Baseline %	TBD	TBD
150	3	3	TBD	Baseline %	TBD	TBD
225	17	14	TBD	Baseline %	TBD	TBD
300	8	8	TBD	Baseline %	TBD	TBD
<b>Total:</b>	<b>72</b>	<b>63</b>				

Post-installation losses for conditions representative of the baseline load profile will be established based on the transformer losses measured in an ISO 17205 certified lab at the time of manufacture.

## Performance Period Operational Verification

No performance year operational verification is included for this ECM.

## ECM 6.0 Air Handling Unit Life Cycle Replacements

### Measurement and Verification Overview

ECM 6.0 Air Handling Unit Life Cycle Replacements is a capital improvement with associated capital offset savings. No measurements are performed for this ECM.

### Savings Calculation Methodology

The capital offset savings are stipulated to be \$6,664,326 in year 1.

### Performance Year Operational Verification

ECM 6.0 Air Handling Unit Life Cycle Replacements is a capital improvement with capital offset. No performance year operational verification is included for this ECM.

## **ATTACHMENT N**

### **EXTENDED WARRANTY**

No extended warranty coverage is included under this Agreement.