



**CALIFORNIA
ENERGY COMMISSION**



**California Energy Commission
July 26, 2023 Business Meeting
Backup Materials for Agenda Item No 09c:
Institute of Gas Technology d.b.a GTI Energy (GTI Energy)**

The following backup materials for the above-referenced agenda item are available in this PDF packet as listed below:

1. Proposed Resolution
2. Grant Request Form
3. Scope of Work

STATE OF CALIFORNIA
STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION

RESOLUTION: Institute of Gas Technology d.b.a GTI Energy (GTI Energy)

RESOLVED, that the State Energy Resources Conservation and Development Commission (CEC) adopts the staff CEQA findings contained in the Agreement or Amendment Request Form (as applicable); and

RESOLVED, that the CEC approves agreement PIR-23-003 with GTI Energy for a \$864,506 grant to demonstrate and evaluate high-performance, energy-efficient, and cost-effective secondary window retrofit system to be installed in an existing commercial building in Indian Wells, CA; and

FURTHER BE IT RESOLVED, that the Executive Director or their designee shall execute the same on behalf of the CEC.

CERTIFICATION

The undersigned Secretariat to the CEC does hereby certify that the foregoing is a full, true, and correct copy of a resolution duly and regularly adopted at a meeting of the CEC held on July 26, 2023.

AYE:
NAY:
ABSENT:
ABSTAIN:

Dated:

Kristina Banaag
Secretariat



GRANT REQUEST FORM (GRF)

A. New Agreement Number

IMPORTANT: New Agreement # to be completed by Contracts, Grants, and Loans Office.

New Agreement Number: PIR-23-003

B. Division Information

1. Division Name: ERDD
2. Agreement Manager: Jeanie Mar
3. MS-:None
4. Phone Number: 916-776-0791

C. Recipient's Information

1. Recipient's Legal Name: Institute of Gas Technology d.b.a. GTI Energy
2. Federal ID Number: 36-2170137

D. Title of Project

Title of project: Commercial Install and Non-intrusive Demonstrations of Optimal Window Systems (Comm-INDOWS)

E. Term and Amount

1. Start Date: 9/1/2023
2. End Date: 3/31/2026
3. Amount: \$864,506.00

F. Business Meeting Information

1. Are the ARFVTP agreements \$75K and under delegated to Executive Director? No
2. The Proposed Business Meeting Date: 7/26/2023 .
3. Consent or Discussion? Discussion
4. Business Meeting Presenter Name: Jeanie Mar
5. Time Needed for Business Meeting: 5 minutes.
6. The email subscription topic is: NaturalGas (NG Research Program).

Agenda Item Subject and Description:

Institute of Gas Technology dba GTI Energy (GTI Energy)

Proposed resolution approving agreement PIR-23-003 with GTI Energy for a \$864,506 grant to demonstrate and evaluate high-performance, energy-efficient, and cost-effective secondary window retrofit system to be installed in an existing commercial building in Indian Wells, and adopting staff's determination that this action is exempt from CEQA.

G. California Environmental Quality Act (CEQA) Compliance

1. Is Agreement considered a "Project" under CEQA?

Yes

If yes, skip to question 2.

If no, complete the following (PRC 21065 and 14 CCR 15378) and explain why Agreement is not considered a "Project":



Agreement will not cause direct physical change in the environment or a reasonably foreseeable indirect physical change in the environment because:

2. If Agreement is considered a “Project” under CEQA answer the following questions.

a) Agreement **IS** exempt?

Yes

Statutory Exemption?

No

If yes, list PRC and/or CCR section number(s) and separate each with a comma. If no, enter “None” and go to the next question.

PRC section number: None

CCR section number: None

Categorical Exemption?

Yes

If yes, list CCR section number(s) and separate each with a comma. If no, enter “None” and go to the next question.

CCR section number: Cal. Code Regs., tit. 14, § 15301 ; Cal. Code Regs., tit. 14, § 15306 ;

Common Sense Exemption? 14 CCR 15061 (b) (3)

No

If yes, explain reason why Agreement is exempt under the above section. If no, enter “Not applicable” and go to the next section.

This project fits within Cal. Code Regs. tit. 14, sect. 15301 because it involves minor alteration and installation of windows attachments at an existing facility, with no expansion of capacity. This installation is at an existing, developed site on land that is not environmentally sensitive. No historical resources or buildings will be affected. Noise and odors will not be generated by these installations in excess of existing permitted amounts. The installation will not increase traffic to these sites and will not require permits for air, water, conditional use, building expansion, hazardous waste or rezoning.

Additionally, Cal. Code Regs. tit. 14, sect. 15306 applies because this project also involves basic data collection, research, experimental management, and resource evaluation activities which do not result in serious or major disturbance to an environmental resource.

The project will not impact an environmental resource of hazardous or critical concern where designated, precisely mapped, and officially adopted pursuant to law by federal, state, or local agencies; does not involve any cumulative impacts of successive projects of the same type in the same place that might be considered significant; does not involve unusual circumstances that might have a significant effect on the environment; will not result in damage to scenic resources within a highway officially designated as a state scenic highway; the project site is not included on any list compiled pursuant to Government Code section 65962.5; and the project will not cause a substantial adverse change in the significance of a historical resource. Therefore, none of the exceptions to categorical exemptions listed in



CEQA Guidelines section 15300.2 apply to this project, and this project will not have a significant effect on the environment.

b) Agreement **IS NOT** exempt.

IMPORTANT: consult with the legal office to determine next steps.

No

If yes, answer yes or no to all that applies. If no, list all as “no” and “None” as “yes”.

Additional Documents	Applies
Initial Study	No
Negative Declaration	No
Mitigated Negative Declaration	No
Environmental Impact Report	No
Statement of Overriding Considerations	No
None	Yes

H. Subcontractors

List all Subcontractors listed in the Budget (s) (major and minor). Insert additional rows if needed. If no subcontractors to report, enter “No subcontractors to report” and “0” to funds.

Delete any unused rows from the table.

Subcontractor Legal Company Name	CEC Funds	Match Funds
Frontier Energy, Inc.	\$ 176,969	\$178,026
DOE- Lawrence Berkeley National Laboratory	\$ 240,000	\$200,000
V-Glass, Inc	\$0	\$ 75,000
AeroShield Materials, Inc	\$0	\$ 75,000
Inovues, Inc.	\$0	\$ 25,000

I. Vendors and Sellers for Equipment and Materials/Miscellaneous

List all Vendors and Sellers listed in Budget(s) for Equipment and Materials/Miscellaneous. Insert additional rows if needed. If no vendors or sellers to report, enter “No vendors or sellers to report” and “0” to funds. **Delete** any unused rows from the table.

Vendor/Seller Legal Company Name	CEC Funds	Match Funds
Slipstream Group, Inc.	\$15,908	\$0

J. Key Partners

List all key partner(s). Insert additional rows if needed. If no key partners to report, enter “No key partners to report.” **Delete** any unused rows from the table.



Key Partner Legal Company Name

No key partners to report

K. Budget Information

Include all budget information. Insert additional rows if needed. If no budget information to report, enter "N/A" for "Not Applicable" and "0" to Amount. **Delete** any unused rows from the table.

Funding Source	Funding Year of Appropriation	Budget List Number	Amount
NG Subaccount, PIERDD	20-21	501.001OS	\$ 102,666
NG Subaccount, PIERDD	20-21	501.001O	\$ 761,840

TOTAL Amount: \$ 864,506

R&D Program Area: EERB: Buildings

Explanation for "Other" selection Not applicable

Reimbursement Contract #: Not applicable

Federal Agreement #: Not applicable

L. Recipient's Contact Information

1. Recipient's Administrator/Officer

Name: Kate Jauridez

Address: 1700 S Mount Prospect Rd

City, State, Zip: Des Plaines, IL 60018-1804

Phone: 847-768-0905

E-Mail: kate.jauridez@gastechnology.org

3. Recipient's Project Manager

Name: Jason LaFleur

Address: 1700 S Mount Prospect Rd

City, State, Zip: Des Plaines, IL 60018-1804

Phone: 847-768-0765

E-Mail: jlafleur@gti.energy

M. Selection Process Used

There are three types of selection process. List the one used for this GRF.

Selection Process	Additional Information
Competitive Solicitation #	GFO-22-501
First Come First Served Solicitation #	Not applicable



Other	Not applicable
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N. Attached Items

1. List all items that should be attached to this GRF by entering "Yes" or "No".

Item Number	Item Name	Attached
1	Exhibit A, Scope of Work/Schedule	Yes
2	Exhibit B, Budget Detail	Yes
3	CEC 105, Questionnaire for Identifying Conflicts	Enter Yes or No.
4	Recipient Resolution	Enter Yes or No.
5	Awardee CEQA Documentation	Enter Yes or No.

Approved By

Individuals who approve this form must enter their full name and approval date in the MS Word version.

Agreement Manager: Jeanie Mar

Approval Date: 7/13/2023

Branch Manager: Virginia Lew

Approval Date: Office Manager's Approval Date

Director: Deputy Director Name

Approval Date: Deputy Director's Approval Date

Exhibit A
Scope of Work
Institute of Gas Technology dba GTI Energy

I. TASK ACRONYM/TERM LISTS

A. Task List

Task #	CPR ¹	Task Name
1		General Project Tasks
2		Technology Assessment and Market Characterization
3		Lab Testing and Condensation Mitigation
4	X	Field Validation
5		Market Transformation
6		Evaluation of Project Benefits
7		Technology/Knowledge Transfer Activities

B. Acronym/Term List

Acronym/Term	Meaning
ACTS	Attachment Calibration Testing Standard
AERC	Attachments Energy Rating Council
CAM	Commission Agreement Manager
CAO	Commission Agreement Officer
CBECC	California Building Energy Code Compliance
CEC	California Energy Commission
CI	Condensation Index
CIU	Condensation Index for Unsealed Cavities
CPR	Critical Project Review
GTI	GTI Energy
HVAC	Heating, Ventilation, and Air Conditioning
IGSDB	International Glazing and Shading Database
IRT	Infrared Thermography
M&V	Measurement and Verification
MoWITT	Mobile Window Thermal Testing
R	Thermal Resistance
SHGC	Solar Heat Gain Coefficient
SWS	Secondary Window System
TAC	Technical Advisory Committee
TRL	Technology Readiness Level
U-Factor	Thermal Transmittance
VT	Visible Light Transmittance

II. PURPOSE OF AGREEMENT, PROBLEM/SOLUTION STATEMENT, AND GOALS AND OBJECTIVES

¹ Please see subtask 1.3 in Part III of the Scope of Work (General Project Tasks) for a description of Critical Project Review (CPR) Meetings.

Exhibit A
Scope of Work
Institute of Gas Technology dba GTI Energy

A. Purpose of Agreement

The purpose of this Agreement is to advance and demonstrate high-performance window retrofit technologies in existing commercial buildings to reduce costs, increase energy performance, increase ease of installation, and maximize commercialization and deployment.

B. Problem/ Solution Statement

Problem

High-performance windows, such as triple pane and vacuum insulated glass windows, are commercially available but represent less than 2% of the U.S. window market, limited by technical and cost challenges with replacing existing windows. Replacing existing windows with code compliant windows to meet energy efficiency goals is disruptive, expensive and with difficult economics for building owners, often results in a “do nothing” approach. This results in a missed significant opportunity for improvement in commercial buildings.

Solution

Secondary window systems (SWS) are an alternative to full window replacement, attaching to the interior or exterior of an existing (i.e., primary) window. Currently, SWS employs a single pane or double pane of glass. The Recipient will be working with an existing product line of SWS to expand the manufacturer’s products to offer a triple-pane SWS capable of a thermal resistance of R 7.7. The SWS will create a quadruple pane window when installed over existing single pane glass, delivering significantly improved energy performance compared to a Title 24 compliant full replacement window at R 2.9, in a non-invasive and cost-effective retrofit package. The research will perform laboratory validation for the improved SWS product. It will also demonstrate and leverage a commercially available thin triple pane window glazing unit and integrate with the manufacturer’s current retrofit window system.

The demonstration will occur in a commercial building with single pane glass. The SWS will serve as a validation of claims for thermal performance, energy impact, ease of installation, and manufacturing costs, while reducing concerns around condensation potential. Outcomes of the project will include data collection for energy efficiency measure development for the California Electronic Technical Reference Manual, and product certification of the SWS. By providing fair and credible ratings, the Attachments Energy Rating Council (AERC) may enable code officials to adopt new pathways for code compliance that goes beyond full window replacements.

C. Goals and Objectives of the Agreement

Agreement Goals

The goals of this Agreement are to:

- Meet aggressive window performance goals: U-Factor ≤ 0.13 Btu/h·ft²·°F thermal transmittance and visible light transmittance (VT) of > 0.42 .
- Demonstrate installation ease and lower cost of implementation compared to current practices, with installed cost premiums $\leq \$5$ per square foot.

Ratepayer Benefits: This Agreement will result in the ratepayer benefits of documenting the performance and benefits of high-performance window retrofits through demonstrations, modeling, and presentations to commercial building owners, manufacturers, utilities, regulatory agencies and other stakeholders..

Exhibit A

Scope of Work

Institute of Gas Technology dba GTI Energy

Technological Advancement and Breakthroughs: This Agreement will lead to technological advancement and breakthroughs to overcome barriers to the achievement of the State of California's statutory energy goals by decreasing energy consumption and greenhouse gas emissions in commercial buildings resulting from the high-performance window retrofits.

Agreement Objectives

The objectives of this Agreement are to:

- Advance high-performance window technologies by addressing the retrofit technical and cost challenges, such as replacement cost, existing window size and weight incompatibilities, and durability;
- Demonstrate increased energy performance (e.g., higher energy efficiency) with a U-Factor ≤ 0.13 and VT > 0.42 . and decreased heating, ventilation, and air conditioning (HVAC) energy consumption by at least 15% compared to current HVAC energy use with existing single pane windows;
- Reduce installation costs compared to code compliant windows; and
- Accelerate high-performance window uptake in the retrofit market through direct partnerships with manufacturers, suppliers, and others.

III. TASK 1 GENERAL PROJECT TASKS

PRODUCTS

Subtask 1.1 Products

The goal of this subtask is to establish the requirements for submitting project products (e.g., reports, summaries, plans, and presentation materials). Unless otherwise specified by the Commission Agreement Manager (CAM), the Recipient must deliver products as required below by the dates listed in the **Project Schedule (Part V)**. All products submitted which will be viewed by the public, must comply with the accessibility requirements of Section 508 of the federal Rehabilitation Act of 1973, as amended (29 U.S.C. Sec. 794d), and regulations implementing that act as set forth in Part 1194 of Title 36 of the Federal Code of Regulations. All technical tasks should include product(s). Products that require a draft version are indicated by marking “**(draft and final)**” after the product name in the “Products” section of the task/subtask. If “(draft and final)” does not appear after the product name, only a final version of the product is required. With respect to due dates within this Scope of Work, “**days**” means working days.

The Recipient shall:

For products that require a draft version, including the Final Report Outline and Final Report

- Submit all draft products to the CAM for review and comment in accordance with the Project Schedule (Part V). The CAM will provide written comments to the Recipient on the draft product within 15 days of receipt, unless otherwise specified in the task/subtask for which the product is required.
- Consider incorporating all CAM comments into the final product. If the Recipient disagrees with any comment, provide a written response explaining why the comment was not incorporated into the final product.
- Submit the revised product and responses to comments within 10 days of notice by the CAM, unless the CAM specifies a longer time period, or approves a request for additional time.

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Institute of Gas Technology dba GTI Energy

For products that require a final version only

- Submit the product to the CAM for acceptance. The CAM may request minor revisions or explanations prior to acceptance.

For all products

- Submit all data and documents required as products in accordance with the following.

Instructions for Submitting Electronic Files and Developing Software:

○ **Electronic File Format**

- Submit all data and documents required as products under this Agreement in an electronic file format that is fully editable and compatible with the California Energy Commission's (CEC) software and Microsoft (MS)-operating computing platforms, or with any other format approved by the CAM. Deliver an electronic copy of the full text of any Agreement data and documents in a format specified by the CAM, such as memory stick.

The following describes the accepted formats for electronic data and documents provided to the CEC as products under this Agreement, and establishes the software versions that will be required to review and approve all software products:

- Data sets will be in MS Access or MS Excel file format (version 2007 or later), or any other format approved by the CAM.
- Text documents will be in MS Word file format, version 2007 or later.
- Project management documents will be in Microsoft Project file format, version 2007 or later.

○ **Software Application Development**

Use the following standard Application Architecture components in compatible versions for any software application development required by this Agreement (e.g., databases, models, modeling tools), unless the CAM approves other software applications such as open-source programs:

- Microsoft ASP.NET framework (version 3.5 and up). Recommend 4.0.
- Microsoft Internet Information Services (IIS), (version 6 and up) Recommend 7.5.
- Visual Studio.NET (version 2008 and up). Recommend 2010.
- C# Programming Language with Presentation (UI), Business Object and Data Layers.
- SQL (Structured Query Language).
- Microsoft SQL Server 2008, Stored Procedures. Recommend 2008 R2.
- Microsoft SQL Reporting Services. Recommend 2008 R2.
- XML (external interfaces).

Any exceptions to the Electronic File Format requirements above must be approved in writing by the CAM. The CAM will consult with the CEC's Information Technology Services Branch to determine whether the exceptions are allowable.

MEETINGS

Subtask 1.2 Kick-off Meeting

The goal of this subtask is to establish the lines of communication and procedures for implementing this Agreement.

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Institute of Gas Technology dba GTI Energy

The Recipient shall:

- Attend a “Kick-off” meeting with the CAM, the Commission Agreement Officer (CAO), and any other CEC staff relevant to the Agreement. The Recipient will bring its Project Manager and any other individuals designated by the CAM to this meeting. The administrative and technical aspects of the Agreement will be discussed at the meeting. Prior to the meeting, the CAM will provide an agenda to all potential meeting participants. The meeting may take place in person or by electronic conferencing (e.g., WebEx), with approval of the CAM.

The administrative portion of the meeting will include discussion of the following:

- Terms and conditions of the Agreement;
- Invoicing and auditing procedures;
- Administrative products (subtask 1.1);
- CPR meetings (subtask 1.3);
- Match fund documentation (subtask 1.7);
- Permit documentation (subtask 1.8);
- Subcontracts (subtask 1.9); and
- Any other relevant topics.

The technical portion of the meeting will include discussion of the following:

- The CAM's expectations for accomplishing tasks described in the Scope of Work;
 - An updated Project Schedule;
 - Technical products (subtask 1.1);
 - Progress reports (subtask 1.5);
 - Final Report (subtask 1.6);
 - Technical Advisory Committee meetings (subtasks 1.10 and 1.11); and
 - Any other relevant topics.
- Provide *Kick-off Meeting Presentation* to include but not limited to:
 - Project overview (i.e. project description, goals and objectives, technical tasks, expected benefits, etc.)
 - Project schedule that identifies milestones
 - List of potential risk factors and hurdles, and mitigation strategy
 - Provide an *Updated Project Schedule*, *Match Funds Status Letter*, and *Permit Status Letter*, as needed to reflect any changes in the documents.

The CAM shall:

- Designate the date and location of the meeting.
- Send the Recipient a *Kick-off Meeting Agenda*.

Recipient Products:

- Kick-off Meeting Presentation
- Updated Project Schedule (*if applicable*)
- Match Funds Status Letter (subtask 1.7) (*if applicable*)
- Permit Status Letter (subtask 1.8) (*if applicable*)

CAM Product:

- Kick-off Meeting Agenda

Exhibit A
Scope of Work
Institute of Gas Technology dba GTI Energy

Subtask 1.3 Critical Project Review (CPR) Meetings

The goal of this subtask is to determine if the project should continue to receive CEC funding, and if so whether any modifications must be made to the tasks, products, schedule, or budget. CPR meetings provide the opportunity for frank discussions between the CEC and the Recipient. As determined by the CAM, discussions may include project status, challenges, successes, advisory group findings and recommendations, final report preparation, and progress on technical transfer and production readiness activities (if applicable). Participants will include the CAM and the Recipient and may include the CAO and any other individuals selected by the CAM to provide support to the CEC.

CPR meetings generally take place at key, predetermined points in the Agreement, as determined by the CAM and as shown in the Task List on page 1 of this Exhibit. However, the CAM may schedule additional CPR meetings as necessary. The budget will be reallocated to cover the additional costs borne by the Recipient, but the overall Agreement amount will not increase. CPR meetings generally take place at the CEC, but they may take place at another location, or may be conducted via electronic conferencing (e.g., WebEx) as determined by the CAM.

The Recipient shall:

- Prepare and submit a *CPR Report* for each CPR meeting that: (1) discusses the progress of the Agreement toward achieving its goals and objectives; and (2) includes recommendations and conclusions regarding continued work on the project.
- Attend the CPR meeting.
- Present the CPR Report and any other required information at each CPR meeting.

The CAM shall:

- Determine the location, date, and time of each CPR meeting with the Recipient's input.
- Send the Recipient a *CPR Agenda* with a list of expected CPR participants in advance of the CPR meeting. If applicable, the agenda will include a discussion of match funding and permits.
- Conduct and make a record of each CPR meeting. Provide the Recipient with a schedule for providing a Progress Determination on continuation of the project.
- Determine whether to continue the project, and if so whether modifications are needed to the tasks, schedule, products, or budget for the remainder of the Agreement. If the CAM concludes that satisfactory progress is not being made, this conclusion will be referred to the Deputy Director of the Energy Research and Development Division.
- Provide the Recipient with a *Progress Determination* on continuation of the project, in accordance with the schedule. The Progress Determination may include a requirement that the Recipient revise one or more products.

Recipient Products:

- CPR Report(s)

CAM Products:

- CPR Agenda
- Progress Determination

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Institute of Gas Technology dba GTI Energy

Subtask 1.4 Final Meeting

The goal of this subtask is to complete the closeout of this Agreement.

The Recipient shall:

- Meet with CEC staff to present project findings, conclusions, and recommendations. The final meeting must be completed during the closeout of this Agreement. This meeting will be attended by the Recipient and CAM, at a minimum. The meeting may occur in person or by electronic conferencing (e.g., WebEx), with approval of the CAM.

The technical and administrative aspects of Agreement closeout will be discussed at the meeting, which may be divided into two separate meetings at the CAM's discretion.

- The technical portion of the meeting will involve the presentation of findings, conclusions, and recommended next steps (if any) for the Agreement. The CAM will determine the appropriate meeting participants.
- The administrative portion of the meeting will involve a discussion with the CAM and the CAO of the following Agreement closeout items:
 - Disposition of any procured equipment.
 - The CEC's request for specific "generated" data (not already provided in Agreement products).
 - Need to document the Recipient's disclosure of "subject inventions" developed under the Agreement.
 - "Surviving" Agreement provisions such as repayment provisions and confidential products.
 - Final invoicing and release of retention.
- Prepare a *Final Meeting Agreement Summary* that documents any agreement made between the Recipient and Commission staff during the meeting.
- Prepare a *Schedule for Completing Agreement Closeout Activities*.
- Provide copies of *All Final Products* on a USB memory stick, organized by the tasks in the Agreement.

Products:

- Final Meeting Agreement Summary (*if applicable*)
- Schedule for Completing Agreement Closeout Activities
- All Final Products

REPORTS AND INVOICES

Subtask 1.5 Progress Reports and Invoices

The goals of this subtask are to: (1) periodically verify that satisfactory and continued progress is made towards achieving the project objectives of this Agreement; and (2) ensure that invoices contain all required information and are submitted in the appropriate format.

The Recipient shall:

- Submit a monthly *Progress Report* to the CAM. Each progress report must:
 - Summarize progress made on all Agreement activities as specified in the scope of work for the preceding month, including accomplishments, problems, milestones, products, schedule, fiscal status, and an assessment of the ability to complete the Agreement within the current budget and any anticipated cost overruns. See the Progress Report Format Attachment for the recommended specifications.
- Submit a monthly or quarterly *Invoice* that follows the instructions in the "Payment of Funds"

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section of the terms and conditions, including a financial report on Match Funds and in-state expenditures.

Products:

- Progress Reports
- Invoices

Subtask 1.6 Final Report

The goal of this subtask is to prepare a comprehensive Final Report that describes the original purpose, approach, results, and conclusions of the work performed under this Agreement. When creating the Final Report Outline and the Final Report, the Recipient must use the CEC Style Manual provided by the CAM.

Subtask 1.6.1 Final Report Outline

The Recipient shall:

- Prepare a *Final Report Outline* in accordance with the *Energy Commission Style Manual* provided by the CAM.

Recipient Products:

- Final Report Outline (draft and final)

CAM Product:

- Energy Commission Style Manual
- Comments on Draft Final Report Outline
- Acceptance of Final Report Outline

Subtask 1.6.2 Final Report

The Recipient shall:

- Prepare a *Final Report* for this Agreement in accordance with the approved Final Report Outline, Energy Commission Style Manual, and Final Report Template provided by the CAM with the following considerations:
 - Ensure that the report includes the following items, in the following order:
 - Cover page (**required**)
 - Credits page on the reverse side of cover with legal disclaimer (**required**)
 - Acknowledgements page (optional)
 - Preface (**required**)
 - Abstract, keywords, and citation page (**required**)
 - Table of Contents (**required**, followed by List of Figures and List of Tables, if needed)
 - Executive summary (**required**)
 - Body of the report (**required**)
 - References (if applicable)
 - Glossary/Acronyms (If more than 10 acronyms or abbreviations are used, it is required.)
 - Bibliography (if applicable)
 - Appendices (if applicable) (Create a separate volume if very large.)
 - Attachments (if applicable)

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- Submit a draft of the Executive Summary to the TAC for review and comment.
- Develop and submit a *Summary of TAC Comments on Draft Final Report* received on the Executive Summary. For each comment received, the recipient will identify in the summary the following:
 - Comments the recipient proposes to incorporate.
 - Comments the recipient does propose to incorporate and an explanation for why.
- Submit a draft of the report to the CAM for review and comment. The CAM will provide written comments to the Recipient on the draft product within 15 days of receipt.
- Incorporate all CAM comments into the Final Report. If the Recipient disagrees with any comment, provide a *Written Responses to Comments* explaining why the comments were not incorporated into the final product.
- Submit the revised Final Report electronically with any Written Responses to Comments within 10 days of receipt of CAM's Written Comments on the Draft Final Report, unless the CAM specifies a longer time period or approves a request for additional time.

Products:

- Summary of TAC Comments on Draft Final Report
- Draft Final Report
- Written Responses to Comments (*if applicable*)
- Final Report

CAM Product:

- Written Comments on the Draft Final Report

MATCH FUNDS, PERMITS, AND SUBCONTRACTS

Subtask 1.7 Match Funds

The goal of this subtask is to ensure that the Recipient obtains any match funds planned for this Agreement and applies them to the Agreement during the Agreement term.

While the costs to obtain and document match funds are not reimbursable under this Agreement, the Recipient may spend match funds for this task. The Recipient may only spend match funds during the Agreement term, either concurrently or prior to the use of CEC funds. Match funds must be identified in writing, and the Recipient must obtain any associated commitments before incurring any costs for which the Recipient will request reimbursement.

The Recipient shall:

- Prepare a *Match Funds Status Letter* that documents the match funds committed to this Agreement. If no match funds were part of the proposal that led to the CEC awarding this Agreement and none have been identified at the time this Agreement starts, then state this in the letter.
If match funds were a part of the proposal that led to the CEC awarding this Agreement, then provide in the letter:
 - A list of the match funds that identifies:
 - The amount of cash match funds, their source(s) (including a contact name, address, and telephone number), and the task(s) to which the match funds will be applied.
 - The amount of each in-kind contribution, a description of the contribution type

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(e.g., property, services), the documented market or book value, the source (including a contact name, address, and telephone number), and the task(s) to which the match funds will be applied. If the in-kind contribution is equipment or other tangible or real property, the Recipient must identify its owner and provide a contact name, address, telephone number, and the address where the property is located.

- If different from the solicitation application, provide a letter of commitment from an authorized representative of each source of match funding that the funds or contributions have been secured.
- At the Kick-off meeting, discuss match funds and the impact on the project if they are significantly reduced or not obtained as committed. If applicable, match funds will be included as a line item in the progress reports and will be a topic at CPR meetings.
- Provide a *Supplemental Match Funds Notification Letter* to the CAM of receipt of additional match funds.
- Provide a *Match Funds Reduction Notification Letter* to the CAM if existing match funds are reduced during the course of the Agreement. Reduction of match funds may trigger a CPR meeting.

Products:

- Match Funds Status Letter
- Supplemental Match Funds Notification Letter (*if applicable*)
- Match Funds Reduction Notification Letter (*if applicable*)

Subtask 1.8 Permits

The goal of this subtask is to obtain all permits required for work completed under this Agreement in advance of the date they are needed to keep the Agreement schedule on track. Permit costs and the expenses associated with obtaining permits are not reimbursable under this Agreement, with the exception of costs incurred by University of California recipients. Permits must be identified and obtained before the Recipient may incur any costs related to the use of the permit(s) for which the Recipient will request reimbursement.

The Recipient shall:

- Prepare a *Permit Status Letter* that documents the permits required to conduct this Agreement. If no permits are required at the start of this Agreement, then state this in the letter. If permits will be required during the course of the Agreement, provide in the letter:
 - A list of the permits that identifies: (1) the type of permit; and (2) the name, address, and telephone number of the permitting jurisdictions or lead agencies.
 - The schedule the Recipient will follow in applying for and obtaining the permits.

The list of permits and the schedule for obtaining them will be discussed at the Kick-off meeting (subtask 1.2), and a timetable for submitting the updated list, schedule, and copies of the permits will be developed. The impact on the project if the permits are not obtained in a timely fashion or are denied will also be discussed. If applicable, permits will be included as a line item in progress reports and will be a topic at CPR meetings.

- If during the course of the Agreement additional permits become necessary, then provide the CAM with an *Updated List of Permits* (including the appropriate information on each permit) and an *Updated Schedule for Acquiring Permits*.
- Send the CAM a *Copy of Each Approved Permit*.

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- If during the course of the Agreement permits are not obtained on time or are denied, notify the CAM within 5 days. Either of these events may trigger a CPR meeting.

Products:

- Permit Status Letter
- Updated List of Permits (*if applicable*)
- Updated Schedule for Acquiring Permits (*if applicable*)
- Copy of Each Approved Permit (*if applicable*)

Subtask 1.9 Subcontracts

The goals of this subtask are to: (1) procure subcontracts required to carry out the tasks under this Agreement; and (2) ensure that the subcontracts are consistent with the terms and conditions of this Agreement.

The Recipient shall:

- Manage and coordinate subcontractor activities in accordance with the requirements of this Agreement.
- Incorporate this Agreement by reference into each subcontract.
- Include any required Energy Commission flow-down provisions in each subcontract, in addition to a statement that the terms of this Agreement will prevail if they conflict with the subcontract terms.
- If required by the CAM, submit a draft of each *Subcontract* required to conduct the work under this Agreement.
- Submit a final copy of each executed subcontract.
- Notify and receive written approval from the CAM prior to adding any new subcontractors (see the discussion of subcontractor additions in the terms and conditions).

Products:

- Subcontracts (*draft if required by the CAM*)

TECHNICAL ADVISORY COMMITTEE

Subtask 1.10 Technical Advisory Committee (TAC)

The goal of this subtask is to create an advisory committee for this Agreement. The TAC should be composed of diverse professionals. The composition will vary depending on interest, availability, and need. TAC members will serve at the CAM's discretion. The purpose of the TAC is to:

- Provide guidance in project direction. The guidance may include scope and methodologies, timing, and coordination with other projects. The guidance may be based on:
 - Technical area expertise;
 - Knowledge of market applications; or
 - Linkages between the agreement work and other past, present, or future projects (both public and private sectors) that TAC members are aware of in a particular area.
- Review products and provide recommendations for needed product adjustments, refinements, or enhancements.
- Evaluate the tangible benefits of the project to the state of California, and provide recommendations as needed to enhance the benefits.

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- Provide recommendations regarding information dissemination, market pathways, or commercialization strategies relevant to the project products.
- Help set the project team's goals and contribute to the development and evaluation of its statement of proposed objectives as the project evolves.
- Provide a credible and objective sounding board on the wide range of technical and financial barriers and opportunities.
- Help identify key areas where the project has a competitive advantage, value proposition, or strength upon which to build.
- Advocate, to the extent the TAC members feel is appropriate, on behalf of the project in its effort to build partnerships, governmental support and relationships with a national spectrum of influential leaders.
- Ask probing questions that insure a long-term perspective on decision-making and progress toward the project's strategic goals.

The TAC may be composed of qualified professionals spanning the following types of disciplines:

- Researchers knowledgeable about the project subject matter;
- Members of trades that will apply the results of the project (e.g., designers, engineers, architects, contractors, and trade representatives);
- Public interest market transformation implementers;
- Product developers relevant to the project;
- U.S. Department of Energy research managers, or experts from other federal or state agencies relevant to the project;
- Public interest environmental groups;
- Utility representatives;
- Air district staff; and
- Members of relevant technical society committees.

The Recipient shall:

- Prepare a *List of Potential TAC Members* that includes the names, companies, physical and electronic addresses, and phone numbers of potential members. The list will be discussed at the Kick-off meeting, and a schedule for recruiting members and holding the first TAC meeting will be developed.
- Recruit TAC members. Ensure that each individual understands member obligations and the TAC meeting schedule developed in subtask 1.11.
- Prepare a *List of TAC Members* once all TAC members have committed to serving on the TAC.
- Submit *Documentation of TAC Member Commitment* (such as Letters of Acceptance) from each TAC member.

Products:

- List of Potential TAC Members
- List of TAC Members
- Documentation of TAC Member Commitment

Subtask 1.11 TAC Meetings

The goal of this subtask is for the TAC to provide strategic guidance for the project by participating in regular meetings, which may be held via teleconference.

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The Recipient shall:

- Discuss the TAC meeting schedule with the CAM at the Kick-off meeting. Determine the number and location of meetings (in-person and via teleconference) in consultation with the CAM.
- Prepare a *TAC Meeting Schedule* that will be presented to the TAC members during recruiting. Revise the schedule after the first TAC meeting to incorporate meeting comments.
- Prepare a *TAC Meeting Agenda* and *TAC Meeting Back-up Materials* for each TAC meeting.
- Organize and lead TAC meetings in accordance with the TAC Meeting Schedule. Changes to the schedule must be pre-approved in writing by the CAM.
- Prepare *TAC Meeting Summaries* that include any recommended resolutions of major TAC issues.

The TAC shall:

- Help set the project team's goals and contribute to the development and evaluation of its statement of proposed objectives as the project evolves.
- Provide a credible and objective sounding board on the wide range of technical and financial barriers and opportunities.
- Help identify key areas where the project has a competitive advantage, value proposition, or strength upon which to build.
- Advocate on behalf of the project in its effort to build partnerships, governmental support and relationships with a national spectrum of influential leaders.
- Ask probing questions that insure a long-term perspective on decision-making and progress toward the project's strategic goals.
- Review and provide comments to proposed project performance metrics.
- Review and provide comments to proposed project Draft Technology Transfer Plan.

Products:

- TAC Meeting Schedule (draft and final)
- TAC Meeting Agendas (draft and final)
- TAC Meeting Back-up Materials
- TAC Meeting Summaries

Subtask 1.12 Project Performance Metrics

The goal of this subtask is to finalize key performance targets for the project based on feedback from the TAC and report on final results in achieving those targets. The performance targets should be a combination of scientific, engineering, techno-economic, and/or programmatic metrics that provide the most significant indicator of the research or technology's potential success.

The Recipient shall:

- Complete and submit the project performance metrics section of the *Initial Project Benefits Questionnaire*, developed in the Evaluation of Project Benefits task, to the CAM.
- Present the draft project performance metrics at the first TAC meeting to solicit input and comments from the TAC members.
- Develop and submit a *TAC Performance Metrics Summary* that summarizes comments received from the TAC members on the proposed project performance metrics. The TAC

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Performance Metrics Summary will identify:

- TAC comments the Recipient proposes to incorporate into the *Initial Project Benefits Questionnaire*, developed in the Evaluation of Project Benefits task.
- TAC comments the Recipient does not propose to incorporate with and explanation why.
- Develop and submit a *Project Performance Metrics Results* document describing the extent to which the Recipient met each of the performance metrics in the *Final Project Benefits Questionnaire*, developed in the Evaluation of Project Benefits task.
- Discuss the *Project Performance Metrics Results* at the Final Meeting.

Products:

- TAC Performance Metrics Summary
- Project Performance Metrics Results

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IV. TECHNICAL TASKS

TASK 2: TECHNOLOGY ASSESSMENT

The goals of this task are to 1) determine which product has the potential to meet both technical and cost requirements; 2) outline the technology advancements required to advance the current Technology Readiness Level (TRL) of 7 by at least one level; and 3) assess the California retrofit commercial market to determine the current and future market potential for high performance windows of this type. The Project Team will use publicly available databases to characterize the commercial window retrofit market in California, and energy modeling tools to project the energy savings and decarbonization impact.

Subtask 2.1 Technology Assessment and Advancement

The goals of this subtask are to 1) determine available or emerging products having the potential to meet technical requirements of achieving the window thermal and solar-optical performance of $U \leq 0.13 \text{ Btu}/(\text{hr} \cdot \text{ft}^2 \cdot \text{F})$, or $\sim R7.7$ and $VT > 0.42$ and 2) determine the technology advancement of the improved design and construction of the product, with the goal to increase the TRL by at least one level.

The Recipient shall:

- Develop preliminary market characterization for commercial glazing systems meeting some or all of the desired performance targets, organized in the Commercial Window Technology Assessment Database which includes but is not limited to:
 - Analysis of full retrofit of frame and glazing systems;
 - Analysis of secondary window systems, applied either internally or externally to existing glazing;
 - Analysis of single pane, double pane, and triple pane SWS;
 - Quantify the labor and time in addition to performance criteria; and
 - Identify gaps and steps necessary to meet desired performance related to U-factor, solar heat gain coefficient (SHGC), and VT for each product;
- Select a SWS retrofit solution for deployment.
- Outline how the selected SWS can be modified to meet more aggressive energy performance leveraging a commercially available triple pane window product.
- Perform computer modeling using WINDOW and THERM software tools to confirm integrated expected level of performance of the improved assembly.
- Prepare a *Commercial Window Technology Assessment Database Summary and Secondary Window Design and Thermal Modeling Report* which includes but is not limited to:
 - The purpose and website of the database;
 - The layout of the database with screenshots;
 - The analysis of
 - full retrofit of frame and glazing systems;
 - secondary window systems, applied either internally or externally to existing glazing;
 - single pane, double pane, and triple pane SWS;
 - other promising technology; and
 - performance criteria, the labor and time for each product type.
 - Functional specifications
 - Design integration drawings
 - WINDOW and THERM modeling results

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- Description of the selected SWS retrofit solution for deployment and reasons for selection compared to others evaluated.

Products:

- Commercial Window Technology Assessment Database Summary and Secondary Window Design and Thermal Modeling Report (Draft and Final)

Subtask 2.2 Techno Economic Assessment

The goal of this subtask is to gather manufacturer's cost data and apply standard markup and profit provisions and survey prospective cost of installation to determine if the total installed price premium meets the cost requirement of not exceeding \$5/ft² over the code level double-pane window.

The Recipient shall:

- Complete a *Preliminary Techno-Economic Assessment of Secondary Window Systems* for large commercial buildings and sectors in California, and for each sector and sub-sector (e.g., large commercial – health care), that includes but is not limited to:
 - Cost information from technology providers when implemented at scale;
 - Amount and rank of the product cost, installation costs, operating costs, from each technology option, by sector and subsector; and
 - Estimated incremental cost for retrofitting existing single-pane glazing versus business-as-usual, for multiple scenarios including:
 - Replacement with Title 24 compliant glazing;
 - Double pane SWS window retrofit;
 - Triple pane SWS window retrofit; and
 - Advanced SWS window retrofit (vacuum, aerogel)

Product:

- Preliminary Techno-Economic Assessment of Secondary Window Systems Report (Draft and Final)

TASK 3: LABORATORY TESTING AND CONDENSATION MITIGATION

The goals of this task are to 1) test and verify product thermal and condensation resistance performance in laboratory conditions and 2) develop a model that is appropriate for the unsealed space between the prime window and secondary window system and to characterize performance for implementation into AERC rating process that could be applied to any secondary window system (SWS). This will provide a tool to the marketplace to assess risk potential and increase adoption of advanced window retrofits.

Subtask 3.1 Condensation Resistance Tool Development

The goal of this subtask is to develop a model that is appropriate to evaluate the condensation resistance potential in the unsealed space between the SWS and the primary window. Condensation can be mitigated through the design improvements; however, there are no reliable and cost-effective software tools that can be used by the designer or manufacturer to evaluate condensation resistance.

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The Recipient shall:

- Develop condensation resistance model, based on the new National Fenestration Rating Council condensation index rating (CI), but applied to window attachments with unsealed window cavities.
- Submit a new Condensation Index for Unsealed Cavities (CIU) rating procedure to AERC to be adopted.
- Prepare *Condensation Resistance Technical Report* which includes but is not limited to:
 - The purpose of the new Condensation Resistance model for unsealed cavities;
 - Model development methodology;
 - A user manual for the new model;
 - The CIU rating index for SWS;
 - Stakeholder comments/support for the CIU rating procedure; and
 - Status of AERC adoption.

Product:

- Condensation Resistance Technical Report (Draft and Final)

Subtask 3.2 Laboratory Testing and Certification

The goal of this subtask is to model SHGC and VT using measured solar-optical properties of glass available in the International Glazing and Shading Database (IGSDB), or if not available, the solar-optical performance will be measured in the team's optical laboratory. In addition to the measurement of U-factor and/or solar-optical properties of glass, the team will make detailed temperature measurements in the Infrared Thermography (IRT) apparatus to determine temperature and relative humidity distribution on the high-performance window solution.

The Recipient shall:

- Develop and prepare a *Laboratory Test Plan* which includes but is not limited to a description of the:
 - Arrangement for the manufacturer's product to be shipped to the team's laboratory site.
 - Installation of SWS over the baseline window in an IRT chamber and performance of a set of tests for detailed temperature distributions to validate U-factor and compare to modeling results from WINDOW and THERM.
 - Performance air leakage testing of the selected SWS.
 - Installation SWS over the attachment calibration testing standard (ACTS) in the IRT chamber, and measurement of heat flow distribution through the window system. Again, compare this setup to modeling results from WINDOW and THERM.
 - Installation SWS over the ACTS in the IRT chamber laboratory test facility and measurement of overall heat flow and temperature distribution across the window.
- Arrange for AERC certification for the new SWS product.
- Prepare a *Measurement and Modeling Report* that includes but is not limited to:
 - Confirmation of energy performance rating EP_C and EP_H using AERCalc;
 - Comparison of laboratory tests and THERM and WINDOW modeling results;
 - Air leakage test results of the selected SWS; and
 - AERC certification lab results.

Product:

- Laboratory Test Plan (Draft and Final)
- Measurement and Modeling Report (Draft and Final)

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TASK 4: FIELD VALIDATION

The goals of this task are to 1) install, monitor and collect at least 9 months each of pre and post M&V data for the new secondary window system product and the other advanced glazing SWSs; 2) compare the demonstration product with single-glazed windows and cost-share supported advanced glazing, and 3) analyze the related energy and comfort impact performance information compared to baseline conditions.

Subtask 4.1 Field Test Planning and Product Acquisition

The goals of this subtask are to take initial action for a successful field demonstration of the SWS technology, to include collecting baseline performance monitoring, contractor selection and training, and qualitative surveys.

The Recipient shall:

- Develop *Field Demonstration Measurement and Verification Plan*, which includes but is not limited to intended instrumentation selection and placement, and approaches for data collection and processing for both baseline and field-testing conditions.
- Secure a commercial building site for field demonstration that consist of greater than 50,000 square feet, 25%-30% window-to-wall area, and 24/7 occupancy.
- Install baseline monitoring equipment and prepare a *Baseline M&V Commissioning Report* which includes but is not limited to:
 - Description of selected commercial building site, including square footage, occupancy schedule and percentage of window to wall area.
 - Independent baseline M&V to validate existing energy consumption and comfort for 9-12 months to include both winter and summer seasons; and
 - Feedback from occupants including facility personnel on comfort in the space(s) during baseline monitoring.
- Submit purchase order for the SWS equipment to apply a minimum of 2,500 square feet of the window system.

Product:

- Field Demonstration Measurement and Verification Plan (Draft and Final)
- Baseline M&V Commissioning Report (Draft and Final)

Subtask 4.2 Installation and Field Testing

The goal of this subtask is to field test the SWS in an existing commercial building. The project will install at least 2,500 square feet of installed SWS over the existing single-glazed windows. Additionally, novel high performance glazing systems using at least 500 square feet of aerogel glass and at least 500 square feet of vacuum insulated glass will be monitored in other areas of the building (covered by match funds).

The Recipient shall:

- Coordinate with host site property manager and occupants for installation.
- Install demonstration product on selected building, recording time and motion details at multiple intervals to characterize installer efficiency at beginning, middle, and near the end of the installation.
- Commission field data acquisition system for measurement and verification of energy performance, condensation risk, and impact on occupant comfort.

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- Monitor independent HVAC systems for energy performance impacts in the areas served by the technology.
- Collect feedback from occupants and facility personnel on comfort in the space(s) following installation.
- Deliver presentation on installation findings to the research team, sponsors, and TAC.
- Prepare *Field Data and Overcoming Installation Challenges Report* which includes but is not limited to:
 - Field data summary of energy performance, condensation risk and occupant comfort;
 - A detailed installation process;
 - Description of challenges and barriers;
 - Solutions identified to inform future SWS installations; and
 - Description of the performance of the novel high performance glazing systems using at least 500 square feet of aerogel glass and at least 500 square feet of vacuum insulated glass that was installed with match funds. Discuss their performance relative to SWS installations.

Product:

- Field Data and Overcoming Installation Challenges Report (Draft and Final)

Subtask 4.3 Performance Validation

The goals of this subtask are to 1) collect post installation data for at least 9 months which includes both winter and summer seasons; 2) monitor and compare the performance of the demonstration SWS product and the novel advanced glazing SWS products over the existing single-glazed windows; and 3) analyze the energy impact performance information related to energy and comfort compared to the baseline conditions.

The Recipient shall:

- Coordinate with host site property manager and occupants during the monitoring period.
- Prepare a *CPR Report* which includes but is not limited to:
 - Title 24 compliant replacement windows and demonstration SWS window performance data;
 - Extrapolations of annual energy and cost savings and greenhouse gas and other air emissions reductions relative to baseline conditions and based on actual M&V performed;
 - Estimate cost effectiveness of SWS and other high performance glazing systems evaluated (e.g., simple payback);
 - Detailed site service and troubleshooting logs; and
 - Complete survey results which includes occupant and facility personnel feedback.
- Prepare CPR Report #1.
- Participate in a CPR meeting per Subtask 1.3.
- Decommission data acquisition systems at the conclusion of the monitoring period. SWS technologies will be abandoned in place and transferred to the host site.

Product:

- CPR Report #1

TASK 5: MARKET TRANSFORMATION

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The goals of this task are to 1) model the performance of standard Title 24 compliant windows and the proposed high-performance window solution using a CEC Title 24 code compliance software such as CBECC 2022 or EnergyPlus in all 16 California climate zones; 2) identify research and knowledge gaps to increase adoption of high-performance commercial window retrofits; and to 3) quantify the full costs of commercially available products in the future, including an industry-wide conversion. The market deployment plan will include recommendations to increase penetration in disadvantaged communities.

Subtask 5.1 Code Compliance Modeling

The goal of this subtask is to model performance of standard Title 24 compliant and the proposed high-performance window solution in all 16 climate zones using a CEC approved Title 24 compliance software tool such as CBECC 2022 modeling software or EnergyPlus using California specific prototypes, climate zones and Alternative Calculation Method schedule assumptions. This will include the modeling of the demonstration SWS in WINDOW which is then used in the CEC approved Title 24 compliance software tool with California specific inputs.

The Recipient shall:

- Consult the California Technical Forum (Cal TF) to ensure data collection needs and/or modeling needs are consistent with Energy Efficient Statewide measure development.
- Develop Title 24 models using CBECC 2022 or EnergyPlus modeling software of the demonstration buildings, informed by SWS performance outputs from WINDOW.
- Prepare a *Compliance Report and Multi-Climate Modeling Report* that includes but is not limited to:
 - An outline for SWS to become adopted as an alternative compliance pathway for California energy codes in lieu of full window replacements;
 - CBECC 2022 or EnergyPlus performance modeling analysis of Title 24 window replacements and selected secondary inserts in all 16 California climate zones for the demonstration site building; and
 - A completed Cal TF Measure Proposal Form.

Product:

- Compliance and Multi-Climate Modeling Report (Draft and Final)

Subtask 5.2: Market Impact Assessment

The goals of this task are to 1) identify research and knowledge gaps to increase the adoption of high-performance commercial window retrofits and 2) quantify the full breadth of costs associated with commercially available products in the future (up to and including an industry-wide conversion). Special consideration in the market analysis will provide recommendations to increase penetration in disadvantaged communities.

The Recipient shall:

- Prepare *Market Transformation Assessment for Deploying High Performance Secondary Windows* which includes but is not limited to:
 - Extrapolated performance and cost-effectiveness results for the demonstration site to other building types and climate zones in California;
 - Key early target markets where cost-effectiveness is greatest, along with more challenging markets that may require further research to overcome market barriers; and

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- Strategies to ensure equity and increase penetration of SWS in disadvantaged communities and include long-term program benefits, energy cost savings, job creation, local air emission reductions, and other impacts.

Product:

- Market Transformation Assessment for Deploying High Performance Secondary Windows

TASK 6: EVALUATION OF PROJECT BENEFITS

The goal of this task is to report the benefits resulting from this project.

The Recipient shall:

- Complete the *Initial Project Benefits Questionnaire*. The Initial Project Benefits Questionnaire shall be initially completed by the Recipient with 'Kick-off' selected for the 'Relevant data collection period' and submitted to the CAM for review and approval.
- Complete the *Annual Survey* by December 15th of each year. The Annual Survey includes but is not limited to the following information:
 - Technology commercialization progress
 - New media and publications
 - Company growth
 - Follow-on funding and awards received
- Complete the *Final Project Benefits Questionnaire*. The Final Project Benefits Questionnaire shall be completed by the Recipient with 'Final' selected for the 'Relevant data collection period' and submitted to the CAM for review and approval.
- Respond to CAM questions regarding the questionnaire drafts.
- Complete and update the project profile on the CEC's public online project and recipient directory on the [Energize Innovation website \(www.energizeinnovation.fund\)](http://www.energizeinnovation.fund), and provide *Documentation of Project Profile on EnergizeInnovation.fund*, including the profile link.
- If the Prime Recipient is an Innovation Partner on the project, complete and update the organizational profile on the CEC's public online project and recipient directory on the [Energize Innovation website \(www.energizeinnovation.fund\)](http://www.energizeinnovation.fund), and provide *Documentation of Organization Profile on EnergizeInnovation.fund*, including the profile link.

Products:

- Initial Project Benefits Questionnaire
- Annual Survey(s)
- Final Project Benefits Questionnaire
- Documentation of Project Profile on EnergizeInnovation.fund
- Documentation of Organization Profile on EnergizeInnovation.fund

TASK 7: TECHNOLOGY/KNOWLEDGE TRANSFER ACTIVITIES

The goal of this task is to conduct activities that will accelerate the commercial adoption of the technology being supported under this agreement. Eligible activities include, but are not limited to, the following:

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- Scale-up analysis including manufacturing analysis, independent design verification, and process improvement efforts.
- Technology verification testing, or application to a test bed program located in California.
- Legal services or licensing to secure necessary intellectual property to further develop the technology.
- Market research, business plan development, and cost-performance modeling.
- Entry into an incubator or accelerator program located in California.

The Recipient Shall:

- Develop and submit a *Technology Transfer Plan* that identifies the proposed activities the recipient will conduct to accelerate the successful commercial adoption of the technology.
- Present the *Draft Technology Transfer Plan* to the TAC for feedback and comments.
- Develop and submit a *Summary of TAC Comments* that summarizes comments received from the TAC members on the *Draft Technology Transfer Plan*. This document will identify:
 - TAC comments the recipient proposes to incorporate into the *Final Technology Transfer Plan*.
 - TAC comments the recipient does not propose to incorporate with and explanation why.
- Submit the *Final Technology Transfer Plan* to the CAM for approval.
- Implement activities identified in *Final Technology Transfer Plan*.
- Develop and submit a *Technology Transfer Summary Report* that includes high level summaries of the activities, results, and lessons learned of tasks performed relating to implementing the *Final Technology Transfer Plan*. This report should not include any proprietary information.
- When directed by the CAM, develop presentation materials for an CEC- sponsored conference/workshop(s) on the project.
- Provide at least (6) six *High Quality Digital Photographs* (minimum resolution of 1300x500 pixels in landscape ratio) of pre and post technology installation at the project sites or related project photographs.

Products:

- Technology Transfer Plan (draft and final)
- Summary of TAC Comments
- Technology Transfer Summary Report (draft and final)
- High Quality Digital Photographs

V. PROJECT SCHEDULE

Please see the attached Excel spreadsheet.