Residential High-Performance Windows Measure Package Development

Final Report

ET23SWE0043

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Executive Summary

For this project, the project team developed a measure package for residential high-efficiency windows to the standards of the California Public Utilities Commission (CPUC) requirements for measure packages. The measure package, including all major characterization sections and supporting energy modeling files and outputs, is ready for submission to the California Technical Forum (Cal TF) for review and approval. The Database for Energy Efficiency Resources (DEER) Residential Building Prototypes were used for building energy modeling simulation, and to determine energy savings. The measure package utilizes eligibility criteria specified in the ENERGY STAR® Program Requirements for Residential Windows, Doors, and Skylights, Version 7.0, and provides two measure offerings: new construction and retrofit high-efficiency residential windows.

Abbreviations and Acronyms

Acronym	Meaning
Cal TF	California Technical Forum
CASE	Codes and Standards Enhancement
CPUC	California Public Utility Commission
DAC	Disadvantaged Communities
DEER	Database for Energy Efficiency Resources
EE	Energy Efficiency
EM&V	Evaluation, Measurement and Verification
EUL	Effective Useful Life
GSIA	Gross Savings Installation Adjustment
IMC	Incremental Measure Cost
IOUs	Investor-Owned Utilities
kW	Kilowatt
kWh	Kilowatt-hour
NFRC	National Fenestration Rating Council
NTG	Net-To-Gross
RUL	Remaining Useful Life
SCE	Southern California Edison
SDG&E	San Diego Gas and Electric
SHGC	Solar Heat Gain Coefficient
TRC	Total Resource Cost

Acronym	Meaning
UEC	Unit Energy Consumption
UES	Unit Energy Savings

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Introduction

The project team's objective was to develop a California deemed energy savings measure package for residential high-efficiency windows. The California Decision 23-04-035 outlined a path for eliminating gas incentives; windows are considered a "gas exempt" measure because windows provide gas savings without incentivizing a gas appliance. The California Investor-Owned Utilities (IOUs) have been asked by the CPUC to prioritize gas exempt measures, such as high-efficiency windows, which are connected to existing energy efficiency (EE) programs. These programs can utilize a completed measure package once it is developed. This proposed measure package will also play a large role in supporting California IOU equity programs. For example, this measure has been identified as a need from Southern California Edison's (SCE) Deemed QA/QC group for their residential equity programs.

The California IOUs developed a window workpaper in 2018 (WPSDGEREMI0006, managed by San Diego Gas and Electric (SDG&E)), but the findings are outdated, and the measure packages are inactive. Residential window technology is commercially available and has become more cost effective over the years. The lower costs provide an opportunity to revive and update the measure with current market data. In developing this measure package, the project team calculated the estimated energy savings associated with high-efficiency residential windows in both single family and low-rise (less than four stories) multifamily applications across California's 16 climate zones. The project team also compiled all data needed for measure package submission to Cal TF, including baseline efficiency, measure efficiency, eligibility criteria, measure application type, applicable building types, effective useful life (EUL), incremental measure cost (IMC), and first-year savings.

Background

Residential windows categorized under the ENERGY STAR Residential Windows Specification Version 7.0 have historically not been cost effective. However, given market updates to window efficiency, the measure's cost effectiveness has improved. Residential high-efficiency windows provide both gas savings and electric savings from reduced heating and cooling load and have a long useful life. There are also disadvantaged community (DAC) program requirements for the measure that do not require the normal cost-effectiveness Total Resource Cost (TRC) ratio of 1.0 or greater and are subject to less strict cost-effectiveness values, typically 0.7 TRC ratio or greater. Existing data sources that supported measure development include the most recent update to the ENERGY STAR Residential Windows Specification, Version 7.0, effective October 23, 2023, and California Codes and Standards Enhancement (CASE) Reports on building envelope measures.

Objectives

The California IOUs identified a need to update the 2018 SDG&E residential windows measure, WPSDGEREMI0006, to use in existing programs like the Energy Savings Assistance Program, and others. This project will enable SCE and the California IOUs to incorporate deemed savings and incentives for high-efficiency residential windows into their EE portfolios. This project also supports the electrification of heating by reducing the heating load requirements in residential buildings. The existing residential and equity programs implemented on behalf of the California IOUs will immediately benefit from incorporating the new deemed savings measure.

Methodology & Approach

The methodology used for this project followed the requirements of measure package development for California, including the utilization of the California measure package characterization template. This measure package utilized the DEER Residential Building Prototypes for energy modeling. Assumptions for energy savings modeling were obtained from relevant industry information such as ENERGY STAR specifications, DEER Residential Building Prototypes, and the California Energy Code. The project team has and will continue to coordinate with Cal TF about this project until Cal TF approves the measure to move to CPUC review. The project team has proposed another project to CalNEXT (SWEPP-2023-0086) to take the measure package from Cal TF review to CPUC review. The project team has invited Cal TF's input throughout this project.

Measure Package Development

The text below serves as a framework for the measure package characterization. Many sections are copied directly from the electronic technical reference manual (eTRM) Measure Characterization Template Version 5.0, provided by Cal TF.[1] The Measure Package Plan Template submitted to Cal TF is available in Appendix A.

Technology Summary

This measure covered the installation of high-efficiency windows in new construction and retrofit applications of residential buildings with reduced thermal conductance and improved radiant emissivity. This measure is only applicable to windows that serve as a barrier between conditioned spaces and outside air. Energy is saved by reducing cooling and heating loads because of reduced energy loss between the building's interior and exterior.

SCE sponsored a project in CalNEXT to evaluate the energy performance of High-Performance Residential Windows.

[1] https://www.caltf.org/tools

Table 1: Energy Performance of High-Performance Residential Windows

Project Number	Program Funding Year
ET23SWE0043	2023-2024

Measure Case Description

The measure case was defined as the installation of windows that meet the U-factor and solar heat gain coefficient (SHGC) eligibility criteria specified in the ENERGY STAR Program Requirements for Residential Windows, Doors, and Skylights, Version 7.0. To map ENERGY STAR climate zones to California climate zones, a zip code analysis of the Energy Star and California climate zones (available in Appendix C) was used to determine the Energy Star climate zone that was most represented for each California climate zone. The project team considered CZ1 and CZ16 to be North-Central and all other climate zones to be South-Central. Figure 1 below shows the EE requirements for residential windows as listed in the specification.

Figure 1: ENERGY STAR Residential Windows V7.0 Specification Requirements

3) **CERTIFICATION CRITERIA:**

A. Energy Efficiency Requirements: Products shall have NFRC-certified U-Factor and, where applicable, SHGC ratings at levels which meet or exceed the minimum criteria specified in Tables 1 through 3. Windows, sliding glass doors, and skylights shall meet the criteria for a given ENERGY STAR Climate Zone. Swinging doors shall meet the criteria for a given glazing level. Dynamic Glazing Products shall meet the criteria while in the minimum tinted state for Chromogenic Glazing products or the "fully open" position for Internal Shading Systems.

Table 1: Energy Efficiency Requirements for Windows

Climate Zone	U-Factor	SHGC
Northern	≤ 0.22	≥ 0.17
North-Central	≤ 0.25	≤ 0.40
South-Central	≤ 0.28	≤ 0.23
Southern	≤ 0.32	≤ 0.23

ENERGY STAR Program Requirements for Residential Windows, Doors, and Skylights – Eligibility Criteria

Figure 1Table 2: Measure Case Description

Equipment Type	Statewide Measure Offering ID	Measure Offering Description
High-Efficiency Window, New Construction	A	ENERGY STAR Compliant Window

Equipment Type	Statewide Measure Offering ID	Measure Offering Description
High-Efficiency Window, Retrofit	B	ENERGY STAR Compliant Window

Base Case Description

The base case for new construction was defined as a standard-efficiency window that met the 2022 California Building Energy Efficiency Standards (Title 24) mandatory requirements; the U-factor requirement was 0.45 for single family and 0.58 for low-rise multifamily building types, and there were no mandatory requirements for SHGC or mobile home U-factor.2 T3 were utilized for baseline SHGC and mobile home U-factor. A mandatory code baseline was utilized for single family and multifamily new construction as it represented the minimum efficiency required in California new construction by code.

For existing buildings, the DEER Residential Building Prototypes were utilized for baseline efficiency as they represented the CPUC-approved baseline assumptions for building energy modeling of residential windows.

Table 3: Baseline Efficiency

Equipment Type	Existing Description	Standard Description
High-Efficiency Window, New Construction	Code Compliant Window	Code Compliant Window
High-Efficiency Window, Retrofit	Single-Pane Window	Single-Pane Window

[2] www.energy.ca.gov/sites/default/files/2022-12/CEC-400-2022-010_CMF.pdf

[3] www.github.com/sound-data/DEER-Prototypes-EnergyPlus

Code Requirements

The 2022 Title 24 specifies U-factor requirements for fenestration products, including windows. The requirements for fenestration products installed in single family buildings are listed in Section 150.0(q)1. The requirements for fenestration products installed in multifamily buildings are listed in Section 160.1(e)1.

Table 4: Code Requirements

Code	Applicable Code Reference	Effective Date
CA Appliance Efficiency Regulations – Title 20	N/A	N/A
CA Building Energy Efficiency Standards – Title 24	Sections 150.0(q)1, 160.1(e)1	1/1/2023
Federal Standards	N/A	N/A

Program Requirements

Measure Implementation Eligibility

All measure application type, delivery type, and sector combinations established for this measure are specified in Table 5. Measure application type was determined based on the circumstances and timing of the measure installation; each measure application type was distinguished by the baseline determination, cost basis, eligibility, and documentation requirements. Delivery type was determined based on the delivery channel through which the market intervention strategy (financial incentives or other services) was targeted. This table also designates the broad market sector(s) that are applicable for this measure.

Note that some of the implementation combinations below may not be allowed for some measure offerings by all program administrators.

Table 5: Measure Implementation Eligibility

Measure Application Type	Delivery Type	Sector
New Construction	DnDeemed	Residential
New Construction	UpDeemed	Residential
Normal Replacement	DnDeemed	Residential
Normal Replacement	UpDeemed	Residential

Table 5Eligible Products

Primary windows that meet the criteria specified in the Measure Case Description Section are eligible for this measure.

Windows must be certified by the NFRC.

Eligible Building Types and Vintages

This measure is applicable to all residential building types. The existing building vintage is eligible for the normal replacement measure application types. The new construction measure application type will use the new building vintage.

Eligible Climate Zones

This measure is applicable in all California climate zones.

Program Exclusions

Window films or specialty window treatments are not eligible for this measure. Secondary windows are not eligible for this measure.

Data Collection Requirements

Data collection requirements are described in DEER Resolutions *E-5152* and *E-5221* with the objectives of:

1. Better tracking the installed equipment that received a rebate
2. Ensuring that eligible measures are submitted in applications.
3. Performing proper evaluation and application of savings, per California evaluation, measurement, and verification (EM&V) protocols
4. Properly and correctly applying cost effectiveness values for each application/project

Table 6: Data Collection Requirements

Data Collection Requirements	Required for Upstream	Required for Downstream
Site ID - Unique identifier for the shipping destination (upstream) or installed location (midstream/downstream/direct install) of the incentivized equipment (e.g., site address)	Yes	Yes
Quantity per site – Total units of incentivized equipment located at the site or project	Yes	Yes
Measure equipment ID[4] - Unique identifier for each unit of incentivized equipment (e.g., serial number)	Yes	Yes
Measure equipment model number	Yes	Yes
Measure equipment manufacturer	Yes	Yes
Measure equipment U-factor	Yes	Yes
Measure equipment SHGC	Yes	Yes
Measure equipment type (primary window, secondary window)	Yes	Yes

[4] Exemptions to the equipment identifier requirement will be made for measure package offerings where leveraging a serial number or other practical unique identifier is infeasible. Exemptions will need to be approved by the CPUC in advance.

Data Collection Requirements	Required for Upstream	Required for Downstream
Climate zone	Yes	Yes
Building type[5]	Yes	Yes

For upstream and midstream delivery types, the participant baselines and measure equipment installation details may be unknown. The manufacturer or distributor may not be aware of the building type of the measure equipment location. If baseline or measure equipment data cannot be provided for each application for upstream delivery type, an alternative method to collect data may be used if approved by the CPUC and Program Administrator.

If baseline or measure equipment data cannot be provided for each application for the midstream delivery type, the following solutions may be implemented:

- The Implementer shall survey at least 10 percent of the midstream installations to determine the actual baseline equipment types, baseline and measure equipment system configurations, baseline and measure equipment operating parameters, and measure equipment installation location. The Program Administrator shall adjust claimed savings based upon the survey results. This survey will be conducted monthly by e-mail or some other trackable digital means. Sample survey questions are as follows:
    - "What is the building type of the location that the measure equipment will be installed at?" (Residential/Multifamily/Single Family/Mobile Home/I'm not sure)
- An alternative method to collect data requirements such as equipment type and/or installation location may be used if approved by the CPUC and Program Administrator.

[5] Refer to guidance below for obtaining existing equipment type and building type for upstream and midstream.

Electric Savings (kWh)

The electric unit energy savings (UES) of this measure were derived from building energy use simulation results and were calculated as the difference between the baseline and measure building unit energy consumption (UEC). Building energy use and demand were estimated using EnergyPlus Version 9.5.

Table 7: Electric Savings with EnergyPlus 9.5

Platform	EnergyPlus
Model Type	DEER Modified
Energy Modeling Engine	EnergyPlus Version 9.5
Energy Modeling Interface	Modelkit
Batch Processor	Modelkit
Weather Files	DEER-Prototypes-EnergyPlus Package
Prototype Source	DEER-Prototypes-EnergyPlus Package

UEC values are expected to change with climate zone, building type, and vintage. Modeling was performed using the DEER Residential Prototypes. Modeling was conducted for all climate zones and residential building types.

Table 8: Residential Building Types

BUILDING TYPE	BUILDING TYPE CODE	MODELED
Residential Single Family	SFm	Yes
Residential Multifamily	MFm	Yes
Residential Mobile Home	DMo	Yes

Table 9: Non-Mobile Home Vintages

VINTAGE ERA	VINTAGE	VINTAGE CODE	MODELED
Old (Old)	1975	Before 1978	Yes
	1985	1987 - 1992	Yes
	1996	1993 - 2001	No
Median (Ex)	2003	2002 - 2005	No
	2007	2006 - 2009	No
	2011	2010 - 2013	No
	2015	2014 - 2016	No
Recent (Rec)	2017	2017-2019	No
	2020	After 2019	No
New (New)	New	New Construction	Yes

Table 10: Mobile Home Vintages

VINTAGE ERA	VINTAGE	VINTAGE CODE	MODELED
Old (Old)	MH72	Before 1976	Yes
	MH85	1976 – 1994	Yes
Median (Ex)	MH00	1995 – 2005	Yes
	MH06	2006 – 2014	Yes

VINTAGE ERA	VINTAGE	VINTAGE CODE	MODELED
Recent (Rec)	MH15	After 2014	No
New (New)	New	New Construction	Yes

Baseline Energy Use Simulation

Modeling was performed using the DEER Residential Prototypes for all climate zones and residential building types. Table 11 provides the baseline U-factors and SHGC used in the modeling. The DEER Residential Prototype baselines were modified to reflect 2022 California Energy Code Mandatory U-factor requirements for new construction. Baseline efficiency for retrofits was assumed to be the DEER Residential Prototype baseline U-factor. No modifications were made to DEER Residential Prototype SHGC values.

Table 11: Base Case Energy Use Simulation

Building Type	DMO	MFM	SFM	MF M-T24	SFM-T24	DMO	MFM	SFM	MF M-T24	SFM-T24
Year	1972 -1985	1985	1975 -1985	2022	2022	1972 -1985	1985	1975 -1985	2022	2022
Metric	U-Factor	U-Factor	U-Factor	U-Factor	U-Factor	SHGC	SHGC	SHGC	SHGC	SHGC
CZ1	1.09	0.66	0.66	0.58	0.45	0.80	0.52	0.52	0.52	0.52
CZ2	1.09	0.59	0.59	0.58	0.45	0.80	0.46	0.46	0.23	0.23
CZ3	1.09	0.66	0.66	0.58	0.45	0.80	0.50	0.50	0.50	0.50
CZ4	1.09	0.60	0.60	0.58	0.45	0.80	0.47	0.47	0.23	0.23
CZ5	1.09	0.68	0.68	0.58	0.45	0.80	0.51	0.51	0.51	0.51
CZ6	1.09	0.69	0.69	0.58	0.45	0.80	0.51	0.51	0.23	0.23
CZ7	1.09	0.68	0.68	0.58	0.45	0.80	0.51	0.51	0.23	0.23
CZ8	1.09	0.71	0.71	0.58	0.45	0.80	0.53	0.53	0.23	0.23
CZ9	1.09	0.71	0.71	0.58	0.45	0.80	0.53	0.53	0.23	0.23
CZ10	1.09	0.68	0.68	0.58	0.45	0.80	0.52	0.52	0.23	0.23
CZ11	1.09	0.61	0.61	0.58	0.45	0.80	0.49	0.49	0.23	0.23
CZ12	1.09	0.61	0.61	0.58	0.45	0.80	0.47	0.47	0.23	0.23
CZ13	1.09	0.74	0.74	0.58	0.45	0.80	0.56	0.56	0.23	0.23
CZ14	1.09	0.69	0.69	0.58	0.45	0.80	0.54	0.54	0.23	0.23
CZ15	1.09	0.65	0.65	0.58	0.45	0.80	0.49	0.49	0.23	0.23

Building Type	DMO	MFM	SFM	MF M-T24	SFM-T24	DMO	MFM	SFM	MF M-T24	SFM-T24
CZ16	1.09	0.64	0.64	0.58	0.45	0.80	0.50	0.50	0.50	0.50

Measure Case Energy Use Simulation

Modeling was performed using the DEER Residential Prototypes for all climate zones and residential building types. The U-factors and SHGC values were modified per Table 12 and all other values were unchanged.

Table 12: Measure Case Energy Use Simulation

Parameter	Parameter Description	Measure Value/Assumption
U-factor	Thermal Conductance of the Window	CZ01,16 - 0.25 CZ02-15 - 0.28
SHGC	Solar Heat Gain Coefficient	CZ01,16 - 0.40 CZ02-15 - 0.23

Calculation of Unit Energy Savings

The annual UES was calculated as the difference between the baseline and measure case annual UEC. Results were normalized per square foot of window area. Modeling results for existing single-family homes are provided below. Full modeling results are provided in Appendix B.

Table 13: Modeling Results for Existing Single-Family Homes

Climate Zone	Base kWh/ft2	Measure kWh/ft2	Base therms/ft2	Measure therms/ft2	Savings kWh/ft2	Savings therms/ft2
CZ01	29.37	29.11	1.83	1.60	0.26	0.23
CZ02	32.49	31.08	2.34	2.19	1.41	0.15
CZ03	33.97	33.11	1.95	1.78	0.86	0.18
CZ04	33.54	32.99	1.95	1.78	0.55	0.17
CZ05	34.02	33.09	2.01	1.83	0.94	0.18

Climate Zone	Base kWh/ft2	Measure kWh/ft2	Base therms/ft2	Measure therms/ft2	Savings kWh/ft2	Savings therms/ft2
CZ06	34.19	32.40	1.54	1.49	1.78	0.05
CZ07	33.41	32.12	1.51	1.44	1.29	0.07
CZ08	35.71	33.80	1.50	1.42	1.91	0.09
CZ09	38.63	36.04	1.62	1.52	2.59	0.10
CZ10	39.28	37.42	1.52	1.41	1.86	0.11
CZ11	45.60	42.49	2.27	2.04	3.11	0.23
CZ12	40.35	38.07	2.20	2.02	2.28	0.18
CZ13	52.32	48.22	2.21	2.00	4.10	0.21
CZ14	49.56	46.36	2.13	1.90	3.20	0.23
CZ15	68.38	61.79	1.40	1.29	6.60	0.12
CZ16	42.08	41.32	1.77	1.57	0.76	0.20

Window directionality was analyzed, and the figures below illustrate the savings of the north wall windows compared to all walls. This provides a sense of the variability in heating and cooling savings for each climate based on directionality. The yellow bars show north wall savings while the purple bars show savings from all walls. Please note that fan savings are separated from cooling system savings.

Figure 2: Window Directionality Sensitivity Analysis - Heating

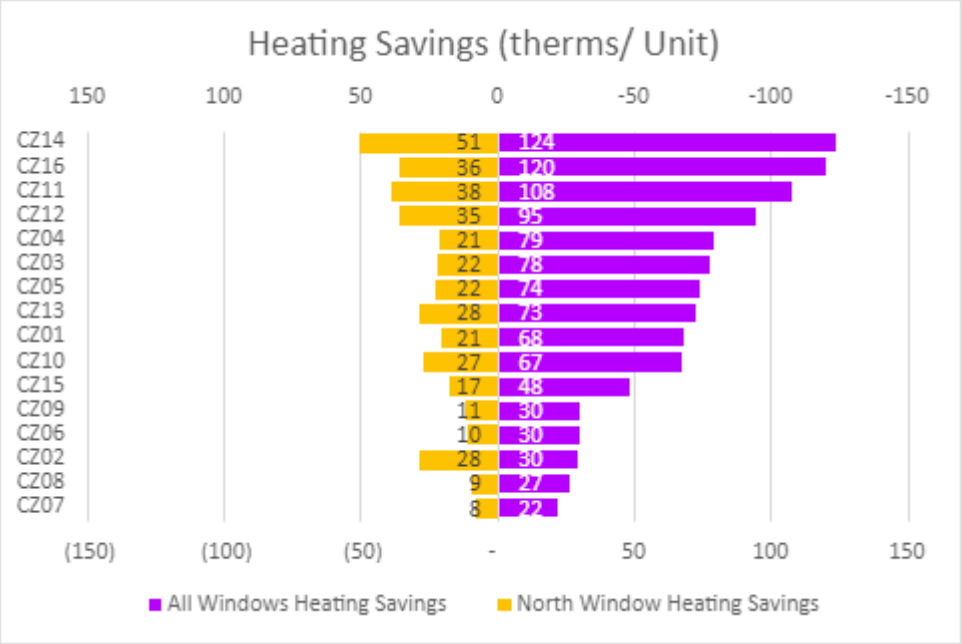


Figure 3: Window Directionality Sensitivity Analysis - Cooling

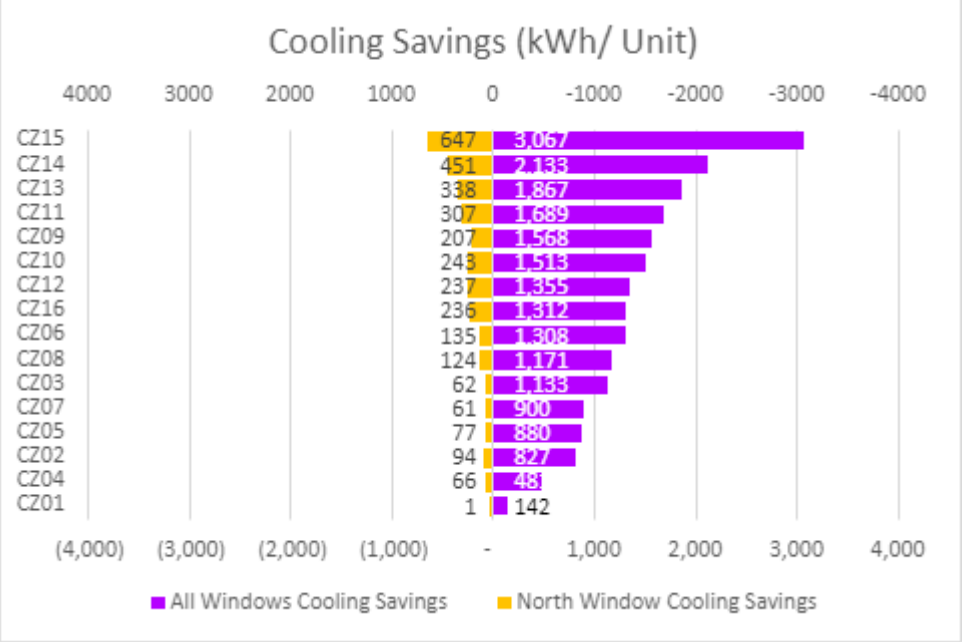


Figure 4: Window Directionality Sensitivity Analysis – Fan Savings

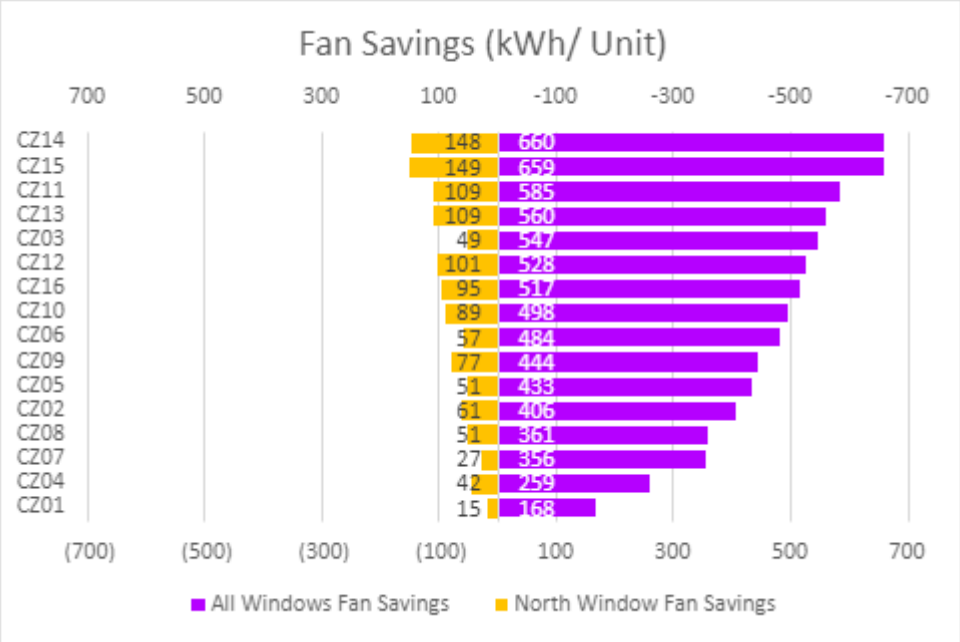
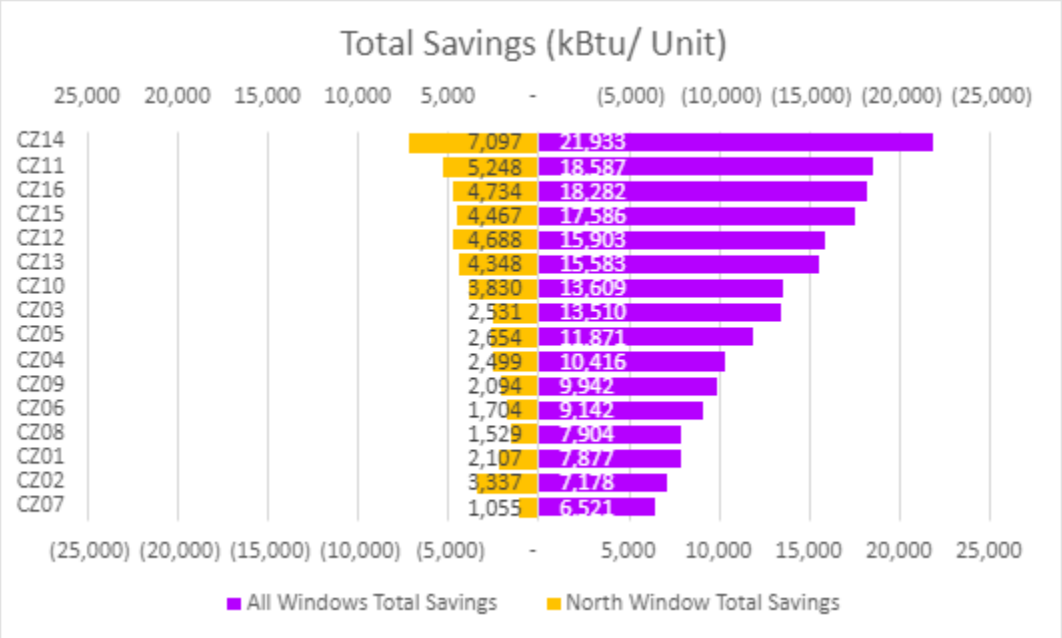


Figure 5: Window Directionality Sensitivity Analysis - Total



Peak Electric Demand Reduction (kW)

Peak demand reduction values were derived using the methodology presented in Electric Savings (kWh). The peak demand reduction was calculated as the difference between the baseline and measure case average hourly peak demand for the 15 hours of the peak period from 4:00 p.m. to 9:00 p.m. during the three consecutive weekday period within the dates of June 1 through September 30 that was defined within each climate zone by having the highest algebraic sum of the average temperature over the three-day period from 12:00 p.m. to 6:00 p.m.

Gas Savings (therms)

Gas UES values were derived using the methodology presented in Electric Savings.

Life Cycle

EUL is an estimate of the median number of years that a measure installed through a program is still in place and operable. Remaining useful life (RUL) is an estimate of the median number of years that a technology or piece of equipment replaced or altered by an EE program would have remained in service and operational had the program intervention not influenced the replacement or alteration. Table cells with no data mirror what is provided in the California electronic Technical Reference Manual (eTRM).

Table 14: Effective Useful Life

EUL ID	EUL Description	Sector	EUL YRS	RUL Years (Optional)	Start Date	Expire Date
BS-Win	High-Performance Windows	Res	20	6.70	2013-01-01	--

Base Case and Measure Case Material Cost

Cost data for windows was gathered through a survey of online retailers. Products were grouped into base case and measure case based on U-factor. IMC was then determined by subtracting baseline efficiency cost from the measure case efficiency cost. A survey of IMCs from other state TRMs was also conducted, and the IMC values were found to be lower but in a similar range to the online retailer survey. Pricing is listed by source in Table 15. Table cells without data are due to sources not providing detailed baseline and measure costs; these sources only provided IMC values.

Table 15: Residential Windows Costs Analysis

Measure Offering	Baseline Product (U-factor)	Measure Efficiency Product (U-factor)	Baseline Cost ($/ft2)	Measure Cost ($/ft2)	Incremental Measure Cost ($/ft2)
Online Retailers	0.5	0.21–0.3	$35.33	$40.25	$4.92
2023 Michigan Energy Measures Database	--	--	--	--	$4.28
IL TRM v12	--	--	--	--	$2.18–$3.85

Base Case and Measure Case Labor Cost

Labor costs were derived using the 2023 edition of RSMeans Unit Cost data. The data indicated that it would take roughly one hour for a carpenter to install a window up to 30 ft^2 in size. The labor rate used to calculate findings below in Table 16 was the 2023 residential labor rates for carpenters.

Table 16: Labor Cost

Measure Offering	Baseline Labor Cost ($/$ft^2$)	Measure Labor Cost ($/$ft^2$)
New Construction and Existing Window Replacement	$2.10	$2.10

Net-to-Gross

The net-to-gross (NTG) ratio represents the portion of gross impacts that are determined to be directly attributed to a specific program intervention. The NTG value adopted for this measure is designated specifically for emerging technologies by the California Public Utilities Commission (CPUC). Table cells with no data mirror what is provided in the California eTRM.

Table 17: Net-to-Gross Ratio

Net to Gross Ratio ID	NTG kWh	NTG Therm	Expire Date
ET-Default	0.8500	0.8500	--

Gross Savings Installation Adjustment

The gross savings installation adjustment (GSIA) rate represents the ratio of the number of verified installations of the measure to the number of claimed installations reported by the utility. This factor varies by end use, sector, technology, application, and delivery method.

This GSIA rate is the current "default" rate specified for measures for which an alternative GSIA has not been estimated and approved.

Table 18: Gross Savings Installation Adjustment

GSIA ID	GSIA Value
Def-GSIA	1.000

Non-Energy Impacts

Non-energy impacts for this measure have not been quantified.

DEER Differences Analysis

Table 19 below reflects the expected values when modeling is completed with DEER Prototypes.

Table 19: DEER Differences Analysis

DEER Item	Comment
Modified DEER Methodology	No
Scaled DEER Measure	No
DEER Base Case	Yes
DEER Measure Case	No
DEER Building Types	Yes

DEER Item	Comment
DEER Operating Hours	Yes
DEER eQUEST Prototypes	No
DEER Version	N/A
Reason for Deviation from DEER	DEER does not contain this type of measure
DEER Measure IDs Used	N/A

Stakeholder Feedback

SCE submitted the measure package plan on December 14, 2023 and the draft measure package was loaded to the eTRM shortly afterwards. Feedback from SCE, CalTF, and CPUC will be implemented as the measure package moves through the review stages.

Next Steps

Distribution Report– Energy Solutions will develop the Distribution Report and disseminate the Final Report to the distribution list once the Final Report is reviewed and approved.

Measure Package Development – Energy Solutions will coordinate with SCE to move the measure package through the CPUC review process.

Appendix A: Measure Package Plan Template

Appendix B: Full Modeling Results

Appendix C: Energy Star - California Climate Zone Mapping