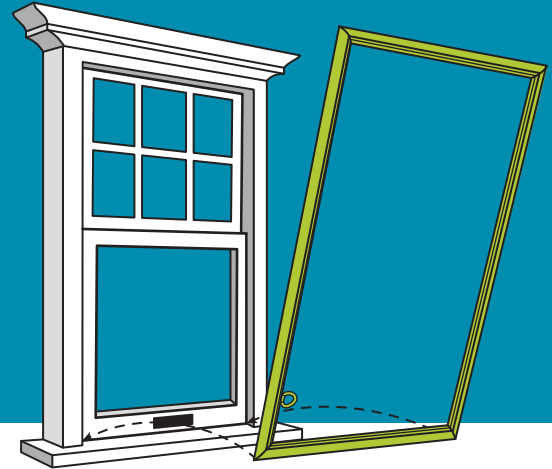


ted

Technology Early Deployment

Indow

**An Easy-to-Install
Window Retrofit**
for improved home insulation,
comfort, & noise reduction

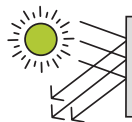


Indow interior storm window inserts are designed to reduce noise and drafts that pass through the window openings in the home or building envelope. In creating a tight seal around leaky windows, Indow inserts aim to reduce heating and cooling bills and improve occupant comfort. Their recent ready-to-assemble IndowKIT product line seeks to make efficient windows more accessible to more homeowners. While many window insulation solutions are expensive and difficult to order and install, IndowKIT offers an affordable, long-term solution that is easy to order and install.

TECHNOLOGY BENEFITS

99%

BLOCKING
of all window drafts.



REDUCES HEAT LOSS
through windows.



EASY TO INSTALL AND REMOVE
without damaging the window.



**EASY TO PROPERLY SIZE
AND ORDER**

10%

REDUCTION
in HVAC energy usage.

Disclaimer: Indow window inserts were chosen for TED because they support **California's clean energy goals** of increased energy efficiency, reduced GHG emissions, and reaching under-served customers. This document does not constitute or imply endorsement, recommendation, or favoring by EPRI or SCE of the product or company described herein. This publication is funded and administered by Southern California Edison's Emerging Technologies Program.

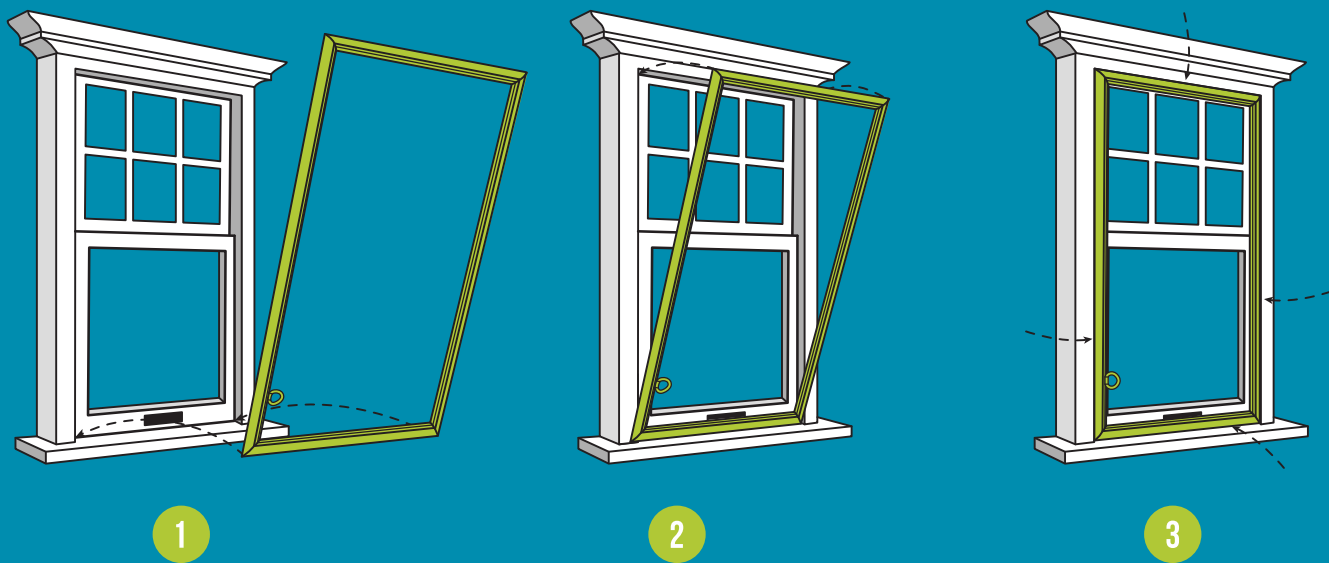
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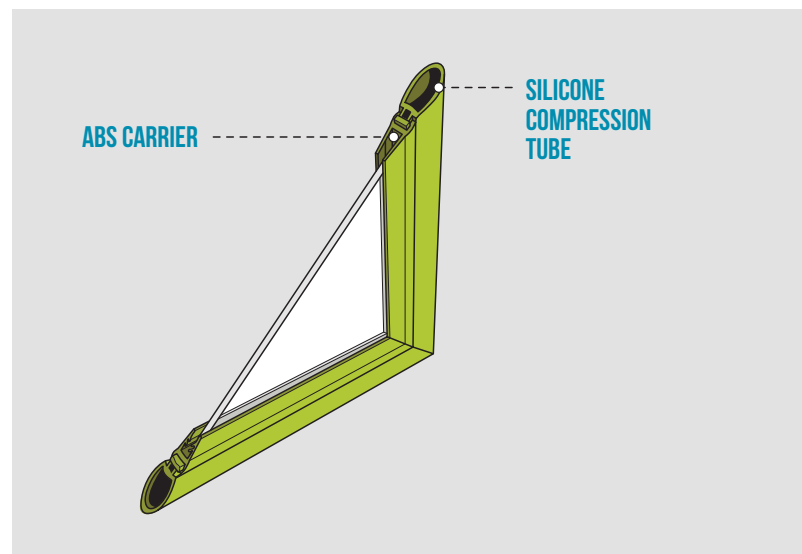
Indow window inserts



Over the years, a number of approaches have been developed to improve the efficiency of existing windows without the expense of complete replacement. The most common approaches have been through interior or exterior storm windows. Yet these technologies have faced several barriers to adoption due to the cost and complexity of installation, which typically involves the use of mounting rails. This can present compatibility and cost issues and require physically altering or damaging the existing window frame.

Indow window inserts are made of a patented silicone compression tube that is pressed into the interior window frame without mounting brackets or a track system.

Acrylonitrile Butadiene Styrene (ABS), a type of food-grade plastic, is used for the injection molding. This design allows the inserts to be easily installed and removed by the homeowner, enabling low-cost installation and quick, simple removal to open the window.



Ordering is made simple through Measure by Indow, their proprietary software that verifies the accuracy of window measurements. This enables compatibility with older homes, which often pose a challenge for window retrofits due to their unique size and/or shape, which can be exacerbated as the home settles over time.

IndowKIT inserts are shipped directly to the home / building owner and are quickly assembled using around 15 constituent parts with only a butter knife and hairdryer required.

TARGET CUSTOMERS

- ✓ Residential and commercial building owners.
- ✓ Existing building stock in cold climates - best ROI.
- ✓ Historic, low-income and manufactured housing.

HARDWARE COMPATIBILITY

- ✓ Compatible with many window types and vintages.
- ✓ Custom fit to existing windows, including “sagged” or out-of-square.
- ✓ Requires at least 3/4” of unobstructed flat ledge around window frame.
- ✓ Common obstructions include blinds, hardware, latches, locks, and hinge.

SYSTEM BENEFITS



IMPROVES COMFORT



SAVES ENERGY UP TO 10%



**CUSTOMIZABLE TO FIT
EXISTING WINDOWS**



**REMOVABLE BY USER TO
ALLOW OPENING WINDOW**



EASY TO INSTALL/REMOVE



**NON-DESTRUCTIVE -
NO DAMAGE TO EXISTING
WINDOWS**



**LOW UP-FRONT COST
COMPARED TO OTHER
WINDOW UPGRADES**

CARBON NEUTRAL BY 2045

California's decarbonization challenge

California's executive order B-55-18 mandates that the state achieve carbon neutrality by 2045. Additional legislation supports this goal through multiple strategies that include doubled energy savings by 2030 (SB 350), increased demand flexibility (19-OIR-01), advanced energy storage and 100 percent of all retail electricity from renewable energy (SB 100). Applying these strategies to new construction and upgrades to existing buildings provides a path to achieving carbon neutrality, but also comes with a new set of challenges:

1.

Supporting the goal

New technologies for buildings must support most or all of the desired outcomes for California.

2.

Testing and codes

Implementation requires extensive testing, compliance with existing codes and standards, utility participation and an enabled workforce.

3.

Replacing the old

Requires replacement of old technologies. The new technologies must meet or exceed expectations for performance and return on investment.



New technologies for buildings must support most or all of the desired outcomes for California.

Implementation requires extensive testing, compliance with existing codes and standards, utility participation and an enabled workforce.

Adoption requires replacement of old technologies that builders and consumers have come to trust. The new technologies must meet or exceed expectations for performance and return on investment.

Market readiness



8-9

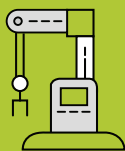
**TECHNOLOGY
READINESS
LEVEL SCORE**

- Existing product line has been on the market for 10+ years.
- Additional field validation needed for full program rollout.



1
**YEAR
TO MARKET**

- New product addresses adoption barriers of installation cost & purchase complexity.
- Successful demonstration of new product expected to open new sales channels through distributors and ecommerce.



8-9

**MANUFACTURER
READINESS
LEVEL SCORE**

- New IndowKit product line launch in Q4 2022.
- Pilot testing new products underway.
- Scaling up production for market rollout.



3
**KEY
OUTCOMES**

- **LOWER THE COST AND COMPLEXITY** of purchasing and installing window treatments.
- **EXPAND PRODUCT LINE OFFERINGS** with enhanced performance and additional features.

Supporting Utility Goals for Decarbonization

1.

Energy Savings

Reduces energy consumption by up to **60%**.

2.

Decarbonization

Reduces emissions from heating/cooling equipment.

3.

C&S Alignment

Improves single-pane insulation to **1.68 (84%** of double-pane).

Modeled case studies

Indow inserts can save 11% of the energy used to heat and cool an existing home in the Pacific Northwest.”



	SINGLE-PANE WINDOW	DOUBLE-PANE WINDOW	SINGLE-PANE + INDOW INSERT
Sealing drafts & heat	0.5 cfm to very drafty	0.1 to 0.3 cfm	0.024 cfm
Thermal insulation (R-Value)	R-1.0	R-2.0	R 1.68 84% of standard double-pane
Lead	No Issues	EPA lead containment regulations apply	No Issues
Visible light transmittance	88%	51% to 81%	87%
Solar heat gain coefficient	0.86	0.42 to 0.75	0.65 to 0.75

Addressing market barriers to efficient windows in residential and commercial buildings

Indow is working to address the cost and complexity challenge presented by traditional storm windows. Indow window inserts require no mounting hardware and can be quickly installed by the owner. The latest IndowKIT product line offers a lower price point, reduces complexity in ordering, and allows for upgradeable glazing. The energy performance of this product has not yet been validated in the field and needs further evaluation before inclusion in utility programs.

BARRIERS STILL EXIST IN SEVERAL AREAS:

Barriers

FOR EXPANSION

- ✓ Window frame compatibility.
- ✓ Field demonstration data.
- ✓ Utility-specific use cases.
- ✓ Lack of brand awareness.

TO SCALE

- ✓ Manufacturing and distribution. supply chain.
- ✓ Customer adoption.

CREATING A PATH TO COMMERCIALIZATION THROUGH THE FOLLOWING ACTIVITIES:

Opportunities

UTILIZE LEVERAGE POINTS

- ✓ Demonstration with TVA through EPRI Incubatenergy Labs 2021.
- ✓ Only window efficiency product selected for the 2021 The Clean Fight New York accelerator.
- ✓ Widely covered in energy efficiency and home renovation media.
- ✓ Recipient of many industry awards including CleanTech Open, Portland Business Journal, and Oregon Entrepreneurs Network.

REALIZE COMPANY GOALS

- ✓ Field demonstrations with customers in NE and SW.
- ✓ Expand manufacturing capabilities.
- ✓ Apply for CA CEC EPIC Program funding.
- ✓ Apply to utility RFOs for region-specific field testing and support their demand flexibility strategies.
- ✓ Expand interest across utilities and industry professionals.

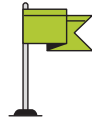
Indow Utility Opportunity Assessment



TECHNOLOGY CATEGORY

Whole Buildings

Press-fit interior window inserts



ETP PRIORITIES

ENERGY SAVINGS

Reduces consumption by > 10%.

DECARBONIZATION

Reduces electricity and gas consumption from heating/cooling equipment.

C&S ALIGNMENT

Improves single-pane insulation to R1.68 (84% of double-pane).



KNOWLEDGE INDEXES

TECHNICAL PERFORMANCE

High

MARKET KNOWLEDGE

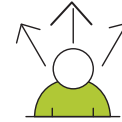
High

PROGRAM INTERVENTION

Medium

UTILITY VALUE

- Cost-effective home retrofit.
- Widely applicable.
- Addresses hard-to-reach customers.



OPPORTUNITIES

CRITICAL ETP ACTIONS

- Socialize within SCE.
- Socialize with other IOUs.
- Field test in CA.

LEVERAGE POINTS

- Demo with TVA through EPRI Incubate energy.
- Wide media coverage.
- Received several industry/innovation awards.

REALIZE COMPANY GOALS

- Field demonstrations of new product line.
- Engage new dealers on ecommerce site.
- Expand manufacturing capabilities.
- Validate savings as prescriptive measures.



BARRIERS

GAPS TO FILL

- New product addresses cost and complexity of first-gen inserts.
- Field demo revealed more widespread window compatibility issues in certain markets.

IN PROGRESS

- Piloting new product line and scaling-up manufacturing.
- launching ecommerce platform and engaging new dealers.



NEXT STEPS

COMPANY

1. Complete new product pilot testing.
2. Launch ecommerce site.
3. Engage new dealers.

UTILITY

1. Validate savings and cost-effectiveness in territory/climate.
2. Determine prevalence of incompatible windows in building stock.
3. begin rollout in customer programs.



TED is a process where innovative technologies are selected for assessment and review based on the technology application, team strength, and alignment with the Technology Priority Maps, to fulfill the California decarbonization challenge.

FOR MORE INFORMATION

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