ET Summit 2024

Presented by

ETCC
ENERGY TRANSITION
COORDINATING COUNCIL

Commercial Replacement and Attachment Window Solutions

A CalMTA Market Transformation Initiative

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CalMTA

Meet CalMTA

- CPUC created a Market Transformation Framework via decision in late 2022
- $310M investment over eight years
- Responsibilities transition to a nonprofit
- Administered by Resource Innovations with support of other expert firms
- CalMTA develops and manages market transformation initiatives (MTIs) with input from a 9-member advisory Board

MT programs under development

Room Heat Pumps

Induction Cooking

Efficient Rooftop Units (ERTUs)

Foodservice Water Heating Systems

Commercial Replacement & Attachment Window Solutions

Residential Heat Pump Water Heating

MTI Development/Deployment Process

We Are Here

PHASE I Concept Development

STAGES 1 & 2

Identify & Score Ideas

Advancement Plan

Do we commit resources to develop top ideas?

PHASE II Program Development

STAGES 3 & 4

Strategy Development & Testing

MTI Plan

Do we deploy this MT Initiative in the market?

PHASE III Market Deployment

STAGES 5 & 6

Market Deployment & Long-Term Monitoring

Market Progress Reports

Is this market transformed?

Current challenge

- Although windows comprise ~15% of a building's exterior surface, they account for HVAC losses of ~40%, or ~12% of a typical building's overall energy use*
- Approximately 2.8 million commercial buildings in CA have SPWs
- The impact of poorly performing windows – even in mild climates – is not widely understood; as California drives towards electrification, this low awareness may impede decarbonization efforts and result in permanently forfeited TSB

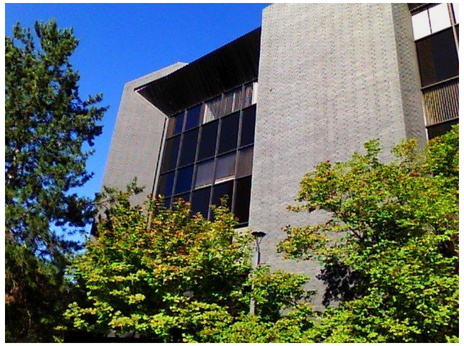
* NEEA Commercial Secondary Window Field Test Report

- Pop Quiz!

Thermal Comfort:

Vancouver, WA
9/2/20 @ 8:00 am

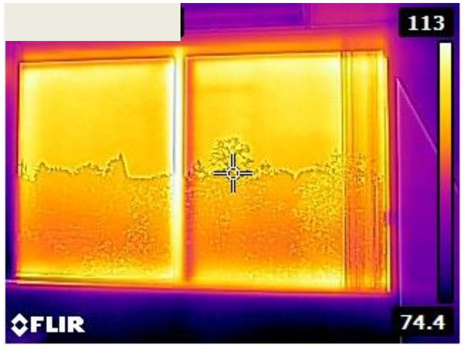
Outside Ambient Temp: **63º F**



Exterior Window Surface Temp?

125º F

(+ 62º F)



Interior Window Surface Temp:

107º F

(+ 44º F)

Solutions: Product definition

Vacuum-Insulated Glass (VIG) units, designed to replace existing SPWs while retaining use of the existing frame, are comprised of two glass panes separated by spacers and hermetically sealed around the edges

- Vacuum drawn on the void space between glass panes results in R-10 to R-15 insulating value of the glass unit (R-5 to R-10 for complete installed assembly)

Commercial Secondary Windows attach to interior or exterior of an existing window, creating an insulating air pocket between the new and existing panes

- Can have one or more panes and low-E coatings; multiple panes can have insulating gases or a vacuum between the two CSW panes, creating additional insulating value

Both products can be installed without disrupting occupants with VIG ~50% lower cost and CSW 75-90% lower cost than a full window replacement

Target market

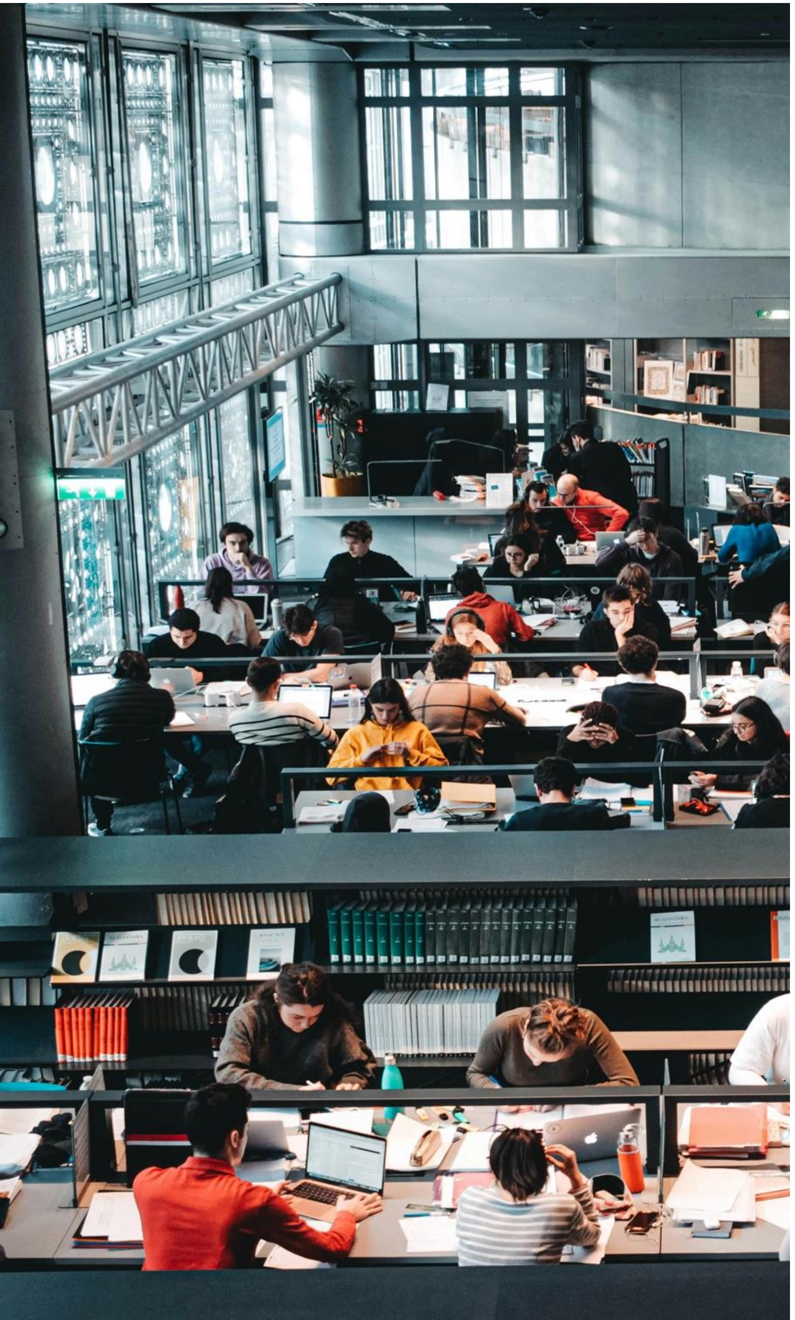
- Existing commercial buildings built before 2000 that still have SPWs
- Initially, CalMTA will focus on submarkets within the commercial building market, including the MUSH market (municipal, universities, schools and healthcare): these are owner-occupied buildings where the owners typically pay for utilities
- ESJ Listening Session for CRAWS: strong interest in window upgrades for schools

Recent market events

- Manufacturers are pursuing product innovations (CSW that utilize VIG), manufacturing innovations (mobile, on-site manufacturing to reduce costs)
- DOE launched $2M secondary glazing innovation prize
- Increasing focus by DOE, RMI, NYSERDA, architects, etc. on “envelope first” strategies for optimizing building decarb and BPS compliance
- Major update to ASHRAE 55 for evaluating occupant comfort in existing buildings
- NY LL97 driving ConEd CSW project pipeline

Preliminary MT theory

IF	THEN
we drive awareness of real-world energy and non-energy impacts of SPWs	we will dispel the myth that windows don't matter in mild climates and we'll increase market commitment to exploring solutions
we develop a cohesive strategy for addressing envelope and HVAC concurrently, aligned with building life-cycle management strategies	we will bring down the capital and incremental costs of electrification
we bring down the capital costs of envelope upgrades	we will be able to leverage ESCOs for financing mechanisms
we do all of these	we will have a compelling value proposition for "envelope first" strategies for building owners required to comply with CA BPS



Vision for the future: 2045

Over 25% of the existing commercial building sector’s square footage that currently has SPWs will utilize new technologies in support of California's plans to achieve carbon neutrality by 2045.

Leverage points

- California Building Performance Standards Hubs
- Quantification of non-energy benefits (NEBs)
- Emerging “envelope first” building decarbonization strategies
- DOE initiatives: Building Envelope Campaign, Partnership for Advanced Window Solutions, $2M Secondary Glazing Systems Innovation Prize
- Supply chain engagement, advanced manufacturing capabilities
- ESCOs
- Ratings agencies (AERC, NFRC) and ENERGY STAR

Diffusion and Lastingness Mechanisms

- BPS mandates will drive owners to reduce energy unit impacts and emissions: buildings with SPWs are likely to require and/or benefit from window upgrades prior to HVAC upgrades
- Rising temps and increasing extreme weather events will elevate the value of window upgrades for maintaining thermal comfort
- Increasing occurrence of Demand Response (DR) events to manage peak load will elevate the value of improved resiliency

Next Steps….

Tech assessment priorities

- Quantification of:
  - Energy and non-energy impacts in CA climate zones
  - Non-energy benefits
  - Peak load, resiliency and flexible grid impacts
- Evaluate product performance and durability
- Investigate factors influencing product and installation costs

Market research priorities

1. Characterize baseline market conditions including VIG and CSW market share
2. Demand-side & supply-side market characterization
3. Cost/benefit analysis and financing options
4. Document regulatory and policy landscape
5. Develop market baseline forecast

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Draft Commercial Replacement & Attachment Window Solutions Advancement Plan

This draft Advancement Plan summarizes available information for a proposed Market Transformation Initiative (MTI), called Commercial Replacement & Attachment Window Solutions. It describes the scope of work for research, testing,...

Advancement Plan available at:

www.calmta.org/resources-and-reports/

Thank you!

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resource innovations