



# Advancement Plan Feedback Response

## Commercial Replacement and Attachment Window Solutions (CRAWS)

This document provides a comprehensive list of comments received from both the public and the Market Transformation Advisory Board (MTAB) on the draft Commercial Replacement and Attachment Window Solutions Market Transformation Initiative (MTI) Advancement Plan and CalMTA's response to those comments. The draft Advancement Plan was posted to the CPUC's PDA website for comment from June 19 - July 11, 2024. [Updated Advancement Plans will be posted on the CalMTA website.](#)

Source	Feedback Provided	CalMTA Response
Public (David Maikowski, 3E Nano)	California did not mandate double-pane glass in commercial new construction until the year 2000. This MT idea will seek to address the many commercial buildings that still contain single-pane glass windows. The initial target market for this MT idea will be the municipal university school and hospital buildings (MUSH) market with an emphasis on the installation of CSW to buildings in underserved communities. What is the reason for choosing these verticals and this demographic for the MT focus?	All commercial buildings are in scope, but the initial focus is on owner-occupied buildings due to a potential stronger business case, tolerance for longer payback periods and current challenges in the commercial real estate (CRE) market. This is now made more explicit in the Executive Summary and throughout the document.
	Should the increased benefit of acoustic shielding (noise reduction) be added to the list vs. single pane?	Noise reduction is listed as a non-energy benefit in the Executive Summary and in Section 3.
	Add "Ease of installation due to light weighting options for CSWs (thin glass, polymers, etc.)" to benefits?	Agreed. We have added a statement addressing lightweight options in Section 3.
Public (Mike DeWein, Energy Solutions)	Efficiency First should be prioritized as part of the Electrification promotion component. (1) When included as part of comprehensive envelope improvements window upgrades always have a better payback. (2) When moving thermal loads to electrical sources those upgrades to ASHP and such result in right-sized lower cost HVAC equipment leading to a better and more cost-effective project overall. (3) If thermal loads aren't optimized in the building at the time of upgrade to electric thermal equipment the initial efficiency and	Agreed. These points are described in the Executive Summary and throughout the document.

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	<p>appurtenant energy and climate savings can be lost or reduced when the building later has envelope improvements because the equipment then is oversized for the new loads. (4) Infiltration losses will also be improved if evaluated with the rest of the envelope improvements taking into account what is gained with new windows or secondary/inset windows.</p>	
<p>Public (Kyle Booth, Energy Solutions)</p>	<p>The stated target market of the plan is municipal, university, school, and hospital buildings. Why limit the market to those four building types?</p> <p>The report points to building performance standards and it is unclear how existing CA Energy Code (Title 24 Part 6) factors into this as it has a performance path for Non-Residential buildings. The CA Energy Code could be another potential leverage point for the plan that is not explicitly called out yet.</p>	<p>The "total" market includes all commercial, but the initial "target" market is MUSH as those are owner-occupied and CRE is currently not a conducive environment for CSW, CalMTA believes, without Building Performance Standards. This is now made more explicit in the Executive Summary and throughout the document.</p> <p>While BPS would be the highest priority opportunity for this MTI, we agree that there is potential to leverage CA Title 24 Part 6 and will explore options around the building envelope alteration requirements during the next stage of the program.</p>
<p>Public (John Loyer, Somfy Systems of North America)</p>	<p>We would urge CalMTA to include automated solar shading in the scope of this plan for market transformation. As automated shading is now recognized in the Commercial chapter of the 2024 IECC and was just passed unanimously by the standing ASHRAE Committee for inclusion in the update to ASHRAE 90.1 and as there is currently an effort to include automated shading in the CA Energy Commission's compliance software for both the residential and commercial we feel it would be remiss for CalMTA to not expand the scope of the plan at this critical juncture for the industry and in consideration of automated shading's ability to mitigate solar heat gain and thus further reduce HVAC loads.</p>	<p>We have considered solar shading but we will review again in the next research phase for potential future inclusion. Although we can accurately model energy performance for an automated schedule, the ability for the occupant to override the schedule can create a mismatch between modeled and actual energy performance.</p>
<p>Public (Brad Begin, Alpen)</p>	<p>Our company has been producing high performance fenestration products for more than 40 years and is among the leading innovators</p>	<p>Noted, with thanks.</p>

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High Performance Products Inc.	<p>in the space. California has been one of the nation's leaders in demand for and developments of products in this space during that entire time beginning with the critical commercialization of low emissivity coatings on film even preceding its use on glass now ubiquitous in the industry today with Southwall Industries innovative work in the late 70s and 80s in the Bay area. There has never been more exciting momentum around the use on new technologies to solve the challenges of climate change as outlined in this plan as exist today. Our company has been a leader in the deployment of high performance secondary windows over the last 4 to 5 years in highly effective early deployment projects across the country but including in California. The use of new technologies like CSW and VIG technology represent an extraordinary opportunity to radically transform the massive challenge represented by the lower performing primary window technology in the built environment and we highly endorse the plan proposed by CAL-MTA to expand the deployment of these technology solutions. It is vital and important and critical to not only the opportunities presented in California but the oversized role the state has in leading nationwide development activities that have disproportionately followed the state's leadership on such issues for decades.</p>	
MTAB (Fred Gordon, Evaluation Professional)	<p>The list of barriers did not include the fact that it's simpler, faster, and more profitable for HVAC contractors to specify a larger HVAC system rather than coordinate with a windows firm to put in windows first. It may be more expensive in the long run, but customers tend to rely on contractors for proposals and all the work goes to the HVAC firm.</p>	<p>We agree with this comment. We are updating the Advancement plan to include added narrative in Section 4.3 related to HVAC contractor barriers.</p>
	<p>Historic buildings also make sense due to restrictions on altering the façade. Hospitality? I'm not sure why. There are many segments of hospitality with different customer approaches and financial management systems. Are we thinking about a specific niche? Is it more than the historic hotels?</p>	<p>Hospitality has proactively shown interest in earlier pilot programs but the reasoning needs to be researched in this next phase. Thermal comfort and noise were the two primary benefits expressed in pilots conducted by the Northwest Energy Efficiency Alliance (NEEA). For the</p>

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		CEC pilot in Palm Springs, the value proposition is not yet clear.
	<p>I generally support the effort for the initially targeted markets, but I am unsure how far this push can go beyond the initially targeted markets. I suppose a lot depends on how much financial support utilities and the government will provide for customers, but also, for many small and medium buildings, whether we can get customers to go to a more complicated and time consuming process when they just want a new HVAC system</p>	<p>We agree with this comment. Interventions for overcoming this type of barrier is what the next phase of the MTI will explore.</p>
	<p>I like the idea of adding secondary window treatments to the initiative for a few reasons. The VIG technology's validation, manufacture in the US, and its price has a ways to go. Secondary window treatments present a fallback option. Also, many MUSH customers have limited capital and might be more likely to go with a less expensive option, even if the benefits are not as permanent. There is a small but established vendor base for secondary windows. There is more case study data. In general, this sounds like a longer-term potential for superior performance with VIGs and a shorter term opportunity to impact the market with secondary window. While ultimate efficiency is important, getting going in the market so that window treatments can impact near term HVAC conversions is more important.</p>	<p>We agree that there are fewer barriers with CSW and this is why we added this product tier to the MTI.</p>
<p>I do worry about the reticence of design engineers, where they are employed, and HVAC contractors where they are not, to downsize HVAC systems in response to efficiency improvements. I've seen a lot of resistance in both new building and replacement markets. Decreases, for example, in lighting load over the past 30 years have been striking, but I'm not sure these have impacted the culture and rules of thumb for system design other than in higher class, green designed buildings, which is a kind of boutique market. I would welcome evidence that the practice of downsizing equipment in</p>	<p>We agree with this comment. Interventions for overcoming this barrier is important and will be explored in the next phase of the MTI.</p>	

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	<p>response to reduced loads is moving faster than I think it is in the broader market, or a plan to move it along.</p>	
	<p>Section 4.1 - "precedent" should be "precedence"</p>	<p>Thank you. This edit has been made.</p>
	<p>Is VIG really "market ready"? If true I wonder what this term really means. Is the price market-ready? Is there mass production with consistent quality control for product accessible in the US that can readily be expanded as demand increases? The discussion of barriers on page 12 would seem to contradict this.</p>	<p>There is market-ready VIG today via LuxWall which has manufacturing in the US and is expanding manufacturing in Michigan via a DOE grant. Other IGU manufacturers such as Cardinal offer VIG but demand has been extremely low. Prices remain high, particularly compared to alternatives such as CSW. So, in that sense, you are correct. With respect to price, VIG really is not market ready. The next phase of the MTI will investigate interventions to help overcome the price barrier.</p>
	<p>We talk about NEBs being fully quantified. I wonder if this is a more technical and difficult goal than we need. I think the barrier is often that the NEBs are not embraced or considered in capital planning. Even if they were quantified, in a capital-limited building maintenance or investment environment, would they be factored in? Is there an accountability chain leading to building improvement decisionmakers regarding embracing these benefits? This can be addressed, I think, only be reorienting decision makers toward these values, and them providing access to more capital. This is where Federal programs funding DEI retrofits help. To provide an example, I think the comfort benefits are widely understood, just not employed in decision making. I don't think it's because they aren't monetized; it's because they aren't considered. To provide a parallel example, "customer appeal" is considered in many retail environments where it can't be quantified, especially in advance. But it's a key element of the design value set. How can we identify where NEBs align with the key customer values, and emphasize those that do?</p>	<p>We will leverage existing research on quantification of NEBs to create estimates of financial benefits for CSW based upon modeling or pilot data acquired during the next phase. This is being clarified in the Advancement Plan in Section 4.3.</p>

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	<p>Energy Costs Continue to Rise. This is a good three year bet as the transmission system is reconfigured and integrated with storage to address intermittent generation, higher peak loads, and wildfire prevention. However, is this a good ten year bet? Renewable and storage costs are forecast to decline, and the grid may be rapidly evolving toward a model that is less reliant on expansion due to batteries. Efficiency proposals since the 1970's have been predicated on higher rates, and this hasn't always happened. I'm no expert on the future of California rates, but it seems a bit blithe.</p>	<p>This is a good point that our team will consider. In the near term we do see energy costs increasing and will re-evaluate if that forecast changes.</p>
	<p>Possible Market Progress Indicators. These seem to be about right for markets where retrofits are being designed, not merely contracted. So they seem good for the first few years of the program, but then it gets pretty vague to me. Should there be progress indicators to identify, as the HVAC market evolves to respond to climate concerns, Federal money, etc., which decisions are being made in a deliberative framework, and what owner and building types, even if they're decarbonizing, are doing it in a condensed process that is highly reliant on HVAC contractors are resistant to the indicated tools?</p>	<p>Section 6.2 of the Advancement Plan is updated to include market research questions related to perceptions and preferences of building owners and managers calculation of cost savings with different HVAC systems (specifically with and without Heat Pump HVAC).</p>
	<p>Linking broad market acceptance to new financing makes me nervous. This may be a good tool for portions of the MUSH market with large facilities, but alternative financing has had limited success in the last 40 years in other markets. I am once more wondering whether this plan is really building toward success in the broader market or just towards a smaller MUSH market program. Also, Energy Service contractors tend to have fairly expensive business structures that require short payback for success. As a result, for example, they have had limit purchase even in the MUSH market for Oregon. Can windows work with their financial model? Perhaps where MUSH projects have large Federal and state contributions, the consequent payback on the remaining costs can attract Energy Service Contractors.</p>	<p>These are valid questions that the MTI will explore in this next phase, specifically around development of a viable business model for ESCOs when windows and HVAC can be combined. Also, the arrival of BPS creates a different environment than previously existed where upgrades are only done when they make financial sense. Now, building owners will be compelled to find the least expensive pathway to achieving and EUl or GHG target, which will likely involve projects that didn't pencil out financially in the past.</p>

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	<p>Isn't the whole idea of a building performance standard to make it a performance standard for the entire building? Unless its mislabeled, it makes sense to developed streamlined modeling and payback analysis tools within BPS compliance paths, but to recognize that these are a component of whole building performance analysis. This may just be some clarification of the wording, but this reads like these might be a preferred option. Which sounds not like BPS.</p>	<p>Section 5 of the Advancement Plan has been updated to emphasize the whole building performance approach, and gaps in our understanding of how building owners and property managers will make decisions between HVAC and envelope given whole building performance standards.</p>
	<p>I didn't see a plan to describe sizing practices for different types of HVAC replacement transactions, and assess the scale of load reduction that might lead to resizing, and what barriers there are to considering resizing. It might be appropriate to study this in a way that differentiates transactions with different design patterns with more or less involvement of A/E firms. Maybe this is what the vague statements about "supply side barriers" means. I think this is a pivotal, known problem and may merit more focused attention.</p>	<p>We are updating Section 6.2 of the Advancement Plan to include additional market research questions related to identifying barriers to HVAC downsizing.</p>
	<p>No mention of interviewing HVAC contractors at all. I'm assuming that many or most customers, if contemplating an HVAC replacement, unless they're already thinking about a more comprehensive job, and many won't, will start there. I think it's great thinking about how some MUSH customers will be more oriented toward designing their solutions and that may lead to a comprehensive path. But you need to explore the dominant competing paradigm too.</p>	<p>We envision this MTI will need to work upstream with the building owners, A/E firms, and energy modelers who are defining optimal retrofit pathways. We believe these market actors will have significant influence over sizing practices of HVAC contractor practices.</p>