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California Air Resources Board
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ELECTRONIC FILING VIA CARB WEBSITE

Applied Materials is pleased to support CARB's regulation of auto windows in the Cool Cars proceeding with a recommendation to go further than the staff proposal. Applied Materials is a California-based company that employs approximately 14,600 people throughout the world. Applied Materials is an industry leader in the supply of nanomanufacturing capital equipment. Applied Materials nanomanufacturing equipment has provided cost reduction solutions to drive down the price of computer and memory chips, LCD flat screens for TVs, computer monitor screens, and smart phone screens. Now our Energy & Environmental Solutions group is increasing the cost savings and environmental benefits from energy efficient coated glass and driving down the cost to generate solar power.

In this AB 32 *early action* proceeding, CARB has the unusual opportunity to ensure that AB 32 is implemented in a rigorous manner that fully pays customers back in return for their investment in technologies that have been proven in the architectural field over decades. Of the seventy-plus measures identified in the Scoping Plan, this proceeding presents some of the lowest of the "low-hanging fruit" relating to reducing greenhouse (GHG) emissions.¹

In response to concerns from the auto industry, the regulation proposed by your staff has already been significantly relaxed from what was initially proposed, including but not limited to the extension of time periods for compliance and the deletion of Cool Paints requirements. While CARB staff must be commended on their work in this new area of environmental regulation, Applied Materials nevertheless believes that only one alternative considered by staff genuinely complies with AB 32:

A standard of 40% or less Tts applied to all glazing commencing with Model Year 2014 vehicles.

The necessary starting point for the Board's analysis must be AB 32 itself. AB 32 mandates regulations that achieve the "maximum technologically feasible and

¹ This does not even begin to address the significant safety, noise, and security benefits of laminated glass, which by itself has driven adoptions in many vehicles in the North American market.

cost-effective” reductions in greenhouse gas emissions. Cal. Health & Safety Code § 38560. *AB 32 will not be as effective as intended unless its regulations actually implement the standards imposed by the bill.*

THE “MAXIMUM TECHNOLOGICALLY FEASIBLE” GHG REDUCTIONS

As evidenced by the regulatory alternatives considered by staff in the Initial Statement of Reasons, the maximum GHG reductions are achieved by the “Tts of 40%, all-around” alternative (the “40% Tts all-around” standard). ISOR, p. 9, Table 1. As staff have estimated it, this alternative yields a benefit of 1.34 MMT of CO₂ per year in 2040, compared to 1.18 MMT of CO₂ per year in 2040 provided via staff’s proposed alternative. There can be no question as to which of these alternatives yields the maximum GHG reductions. Moreover, for reasons discussed further below, we believe these emissions benefits are actually conservative and underestimate the actual reductions that would be achieved by the 40% Tts all-around alternative.

Under AB 32, the question then shifts to whether these reductions are “technologically feasible.” Applied Materials sold its first glass coater in the late 1970’s and has been a market leader in supplying glass coating equipment solutions for the past three decades. Today the mass production of energy efficient low emissivity (“Low-E”) coatings is predominately utilized in architectural markets. Applied Materials has over 178 coater & major upgrades installed with production capacity of greater than 450 million square meters per year. These coaters are located around the globe and serve the worldwide construction market. This market has grown in part due to the government regulations driving energy conservation, the same logic being applied here in the “Cool Cars” proceeding. Over 30 years of supplying glass coaters for the Low-E market amply demonstrates the feasibility of this proven coating technology. Moreover, at least three major auto glass manufacturers have now stated in this proceeding that they can supply auto glass meeting the 40% Tts all-around standard for model year 2014.

Neither the staff proposal nor what appears to be the automakers’ proposal captures the maximum available GHG reductions and consequently neither proposal can be considered to achieve the “maximum technologically feasible” GHG reductions. By contrast, the 40% Tts all-around standard is both technologically feasible and will capture the maximum GHG reductions.

“COST-EFFECTIVE” GHG REDUCTIONS

There is a specific statutory meaning of “cost-effective” in the command that AB 32 regulations must implement the “maximum technologically feasible and cost-effective” GHG reductions. AB 32 defines “cost-effective” and “cost effectiveness” as “the cost per unit of reduced emissions of greenhouse gases adjusted for its global warming potential.” Cal. Health & Safety Code § 38505(d). The cost-effectiveness factor, therefore, does not invite a Federal Reserve-like inquiry into the state of the nation’s economy, but rather requires a sober determination comparing the cost of reducing GHGs in this proceeding against the costs of reducing GHGs through the numerous other Scoping Plan measures. All of the alternatives addressed in the ISOR are “cost-effective,” because each pays the consumer back completely within the lifetime of the vehicle, making the net cost of reducing GHGs negative. In contrast, the majority of Scoping Plan measures will require positive costs to reduce GHG emissions.

THE ISOR UNDERESTIMATES THE GHG BENEFITS OF THE 40% TTS ALL-AROUND ALTERNATIVE

Staff’s Initial Statement of Reasons, including appendices, represents an impressive and admirable first effort by staff to regulate in this new area on an AB 32 early action item. Applied Materials believes that staff have presented the low end of the range of GHG reduction benefits that would occur from the 40% Tts all-around standard:

- The staff estimate does not account for any GHG benefits that accrue during the actual operation of the vehicle, instead focusing only on soak temperature reduction. The all-around 40% Tts alternative will more greatly reduce cabin temperature during actual operation of the vehicle than the other standards and consequently will reduce emissions further than the alternatives.
- The sensation of heat from the sun to the driver through the sidelites is an important determinant for the driver turning on the air conditioning. *This heat sensation is reduced most by the application of the 40% Tts all-around standard.* However, the staff proposal would allow the sidelites to meet only the 60% Tts standard.
- According to research published after the regulation was distributed for 45-day review, the 40% Tts all-around standard has an *enhanced effect in plug-in hybrid vehicles.* The test showed that use of glass meeting the 40% Tts standard in the windshield and backlite positions increased utility factor-

weighted fuel economy from 36.8 to 42.9 miles per gallon. This enhanced effect in the plug-in hybrid context was not modeled by CARB staff.

- CARB staff's modeling depends in part on assuming that 50% of energy enters through the windshield, with the remaining 50% of energy entering through the backlite and sidelites. This number however likely underestimates the actual number for aerodynamically styled cars with sloped backlites and bowed-out sidelites. More aerodynamic designs are expected in the future due in part to the increased CAFE standards expected for model year 2016.
- The new CAFE standards will also reduce the current proportion of SUVs in use. SUVs are able to use privacy glass behind the "B" pillar, which mutes the effect of 40% Tts glazing in that location. In addition, SUVs also have more vertical backlites and sidelites. Consequently, when CARB staff modeled the effect of the proposed regulation in these vehicles, the benefit attained by the 40% Tts all-around standard was reduced, but would be greater should SUVs become less of a proportion of the universe of vehicles.
- Use of the 40% Tts all-around standard would capture all of the potential GHG benefits that can be attained by advanced glazing, eliminating any concerns about modeling imperfections.
- Specifying the same performance standard for all of these locations makes common sense, and scale will bring down price significantly, as it has in every other sector where coated glass has been employed.

AB 32 CO-BENEFITS

AB 32 encourages CARB to consider the co-benefits of regulations designed to reduce GHG emissions "to the extent feasible." Cal. Health & Safety Code § 38562(b). Because the 40% Tts all-around standard would be met at least initially by the use of laminated glass, the co-benefits its application are significant:

- Application of the 40% Tts all-around standard would increase overall societal benefits in several ways.
- Criteria pollutants associated with GHG pollution would be reduced, and these reductions would be concentrated in areas with the most cars—not uncoincidentally, the same areas most in need of criteria pollutant reductions. This would complement efforts to achieve and maintain federal and state air quality standards and help reduce toxic air contaminant emissions pursuant to Cal. Health & Safety Code § 38562(b)(4).
- Security of vehicles would be improved by reducing smash-and-grab thefts through sidelites and backlites.

- Noise would be reduced, improving the driving experience.
- Safety would be enhanced: testing by the National Highway Traffic Safety Administration (NHTSA) has shown that vehicles equipped with both side laminated glass and side curtain air bags provide better occupant retention during vehicle rollover than vehicles equipped with air bags alone.
- The enhanced emission reductions yielded by the 40% Tts all-around standard would occur in the transportation sector, in furtherance of AB 32's preference for GHG reductions in the sectors that contribute most to GHG emissions. Cal. Health & Safety Code § 38562(b)(9).

CONCERNS EXPRESSED BY THE AUTO INDUSTRY

The auto industry has voiced some concerns about the implementation of the 40% Tts all-around standard.

Interference with electronic devices. The issue of metallized windshields and aftermarket window films interfering with electronic devices internal to the vehicle has been known and understood since the mid-1980's.² Early in the rulemaking, staff heard this concern and very capably addressed the issue through the generous allowance of deletion zones. Nevertheless, the Alliance of Automobile Manufacturers (the "Alliance") advances the theory that the 40% Tts all-around standard will interfere with devices including cell phones, automatic toll paying devices (EZ Pass, etc.), and GPS units. *The Alliance does not and cannot address how the deletion zones allowed under the staff proposal do not remedy the issue satisfactorily.* See Appendix A.³ Nor does the Alliance address how long-in-use technical workarounds (including exterior tags for FasTrak and external antennas for GPS (which are highly superior in any event)) are not sufficient to address the issue. This use of deletion zones is already a best management practice that has been in use both in Europe and North America for many years, providing a known space to locate radio tags, GPS units, and a place where cell phone signals can easily exit and enter the car.

² See <http://www.tollroadsnews.com/node/1995>.

³ The State of Illinois shows methods of resolving the signal issues when transponders are not mounted in the proper location. The location is dependent on the deletion zone that has been integrated into the windshield. This same deletion zone also addresses and applies to cell phone signals and the other GPS issues that have been highlighted. Here is what the State of Illinois suggests to **cure any problem with Mercedes models from over a decade ago:**

All Models 98-01: Centered below rearview mirror. Half of the transponder should be in the tinting and the other half out."

Note that in its letter of June 23, 2009, in excerpting a part of the Bay Area FasTrak website, the Alliance cites mostly pre-2002 vehicles when deletion zones were not as widely in use. Nevertheless, as the excerpt from the FasTrak website clearly indicates, exterior tags for these vehicles completely resolve any issues.

Under the staff proposal, it is the glass makers, not the automakers, who face the primary design challenges of ensuring that the glass does not interfere with electronic devices. Glass manufacturers providing glass to the Audi A8 and Mercedes S-Class have already addressed and overcome potential obstacles. Needless to say, the drivers of these vehicles would not be very satisfied if electronics could not be used inside them.

Macroeconomic costs. Throughout this rulemaking, there has been a repeating theme that the national economic recession somehow requires a less stringent rule. This logic simply does not follow, and the converse may very well be true. If this was true would we be willing to also sacrifice the energy efficiency of buildings that Low-E technology has proven to achieve for over a decade? One of the predominant responses to the recession has been to encourage investments in green technologies, like the ones that would be implemented through the 40% Tts all-around alternative. This standard has the potential to benefit California businesses and expand the use green technologies. Of course, there are economic gains that will come from the extra money placed in consumers' pockets. In any event, it is likely that the regulation will come into effect when the country has moved beyond the current recession. But if not, the extra dollars that the 40% Tts all-around alternative adds to a household budget can be considered stimulus funding for the economy.

Capacity to coat. There have been assertions that there is not enough worldwide capacity to coat enough glass to meet the needs of the California auto market, should the 40% Tts all-around standard be adopted. This assertion is untrue. Coaters have been used in the architectural glass market for decades, and the amount of glass used in architectural applications dwarfs the automotive glass market. Overall, the auto industry consumes less than 10% of the worldwide flat glass demand. Assuming North American auto sales were to be equal to those of 2006, this would equate to approximately 7.6 million autos. If the average auto uses a range of 3 to 4 square meters of glass, the total would be a range of 22.8 million square meters to 30.4 million square meters of glass. This is approximately 8% of current overall worldwide coater capacity, which would expand if necessary to support the expanding auto market..

Capacity of glassmakers to integrate coating technology. A similar assertion has been made that there are not enough glassmakers that can employ coating

technology. However, five of the nine glass makers that serve the automotive market already employ coaters that serve the EU auto market for solar reflective glass. Extending the compliance deadline once again (the initial draft rule specified 2012 as the first compliance year) will delay the benefits of this “early action” in contravention of AB 32 and will further delay the slow ripple effect of Cool Cars into the California car universe. The 2014 time horizon provides the appropriate amount of time for new glass coating suppliers to enter the market to support the “Cool Cars” proceeding.

CONCLUSION

Implementation of the 40% Tts all-around standard is the best choice in this proceeding. Consumers will receive increased comfort, safety, and security, while being paid back for their investment every step of the way. The benefits of the 40% Tts all-around standard will be especially significant in California’s hot and urban areas, which will only get hotter and denser in the coming years. Meanwhile, the cost of reducing GHG emissions in this proceeding is far less than that in other Scoping Plan measures. The implementation of the 40% Tts all-around alternative would capture the greatest GHG reductions with a proven and technologically feasible solution at a positive payback to the consumer; it fulfills the complete mandate and intent of AB 32. CARB should take this moment to once again lead the country in the right direction and seize this opportunity to simultaneously help consumers, the environment, and California’s economy.

Sincerely,



James Robson
Vice President, Glass and Web Coating Products

Attachment: Appendix A