

Cool Cars Performance-based Option Workshop



California Air Resources Board
El Monte, CA
September 17, 2009



Overview



- Objective: Discuss the most effective way to craft the “Cool Cars” performance-based option and associated procedures
- Agenda
 - Background
 - Cool Cars Regulation
 - Outcome from the Board Hearing
 - Performance-based Option Overview
 - Participant Presentations
 - Kick-off Discussion

Cool Cars Regulation

Background

- Assembly Bill 32, passed in 2006, directs ARB to reduce California's greenhouse gas (GHG) emissions
- Lowering the heat gain of cars parked in the sun reduces the use of air conditioners thereby reducing GHG emissions
- Measure originally focused on use of reflective paints and was identified as an AB 32 Early Action

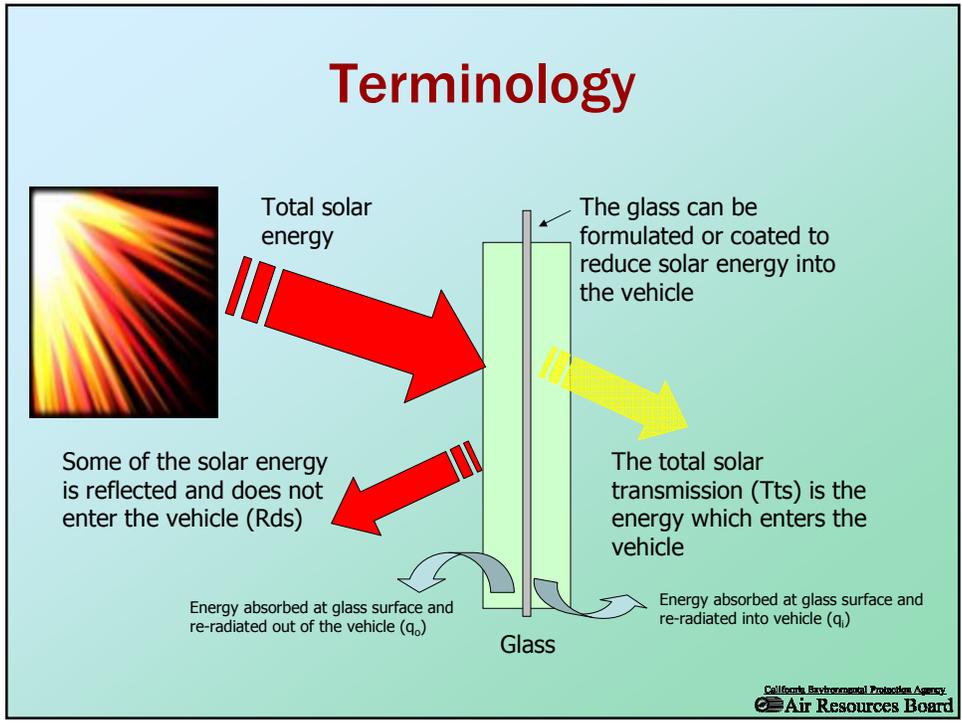


Cool Cars Regulation

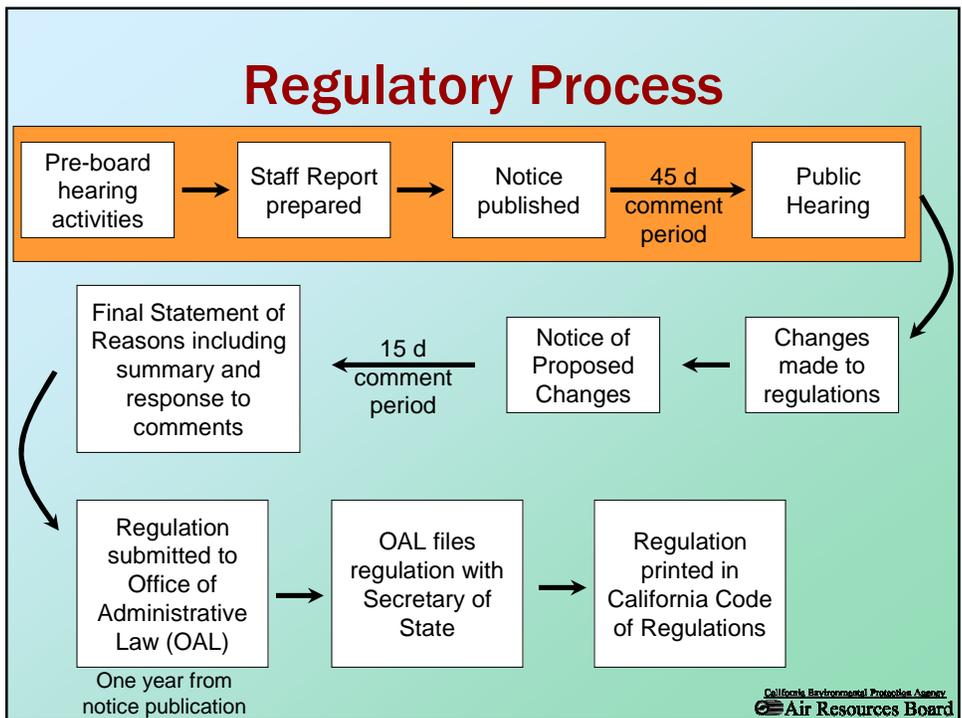
Background

- During rule development, glazing requirements were added and the paint requirement was dropped
- Solar Absorbing Glass
 - Can be used on laminated or tempered
 - Glass is formulated by addition of iron that limits the solar energy into the vehicle
- Infrared Reflective Glass
 - Best performance for limiting solar energy into the vehicle
 - Currently requires window to be laminated

Terminology



Regulatory Process

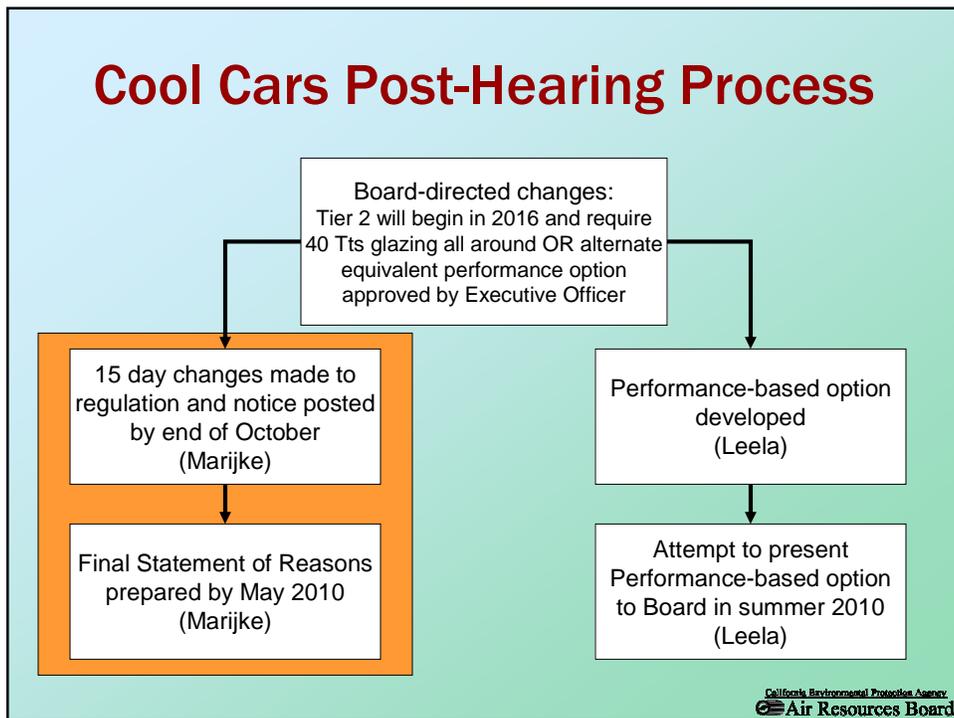
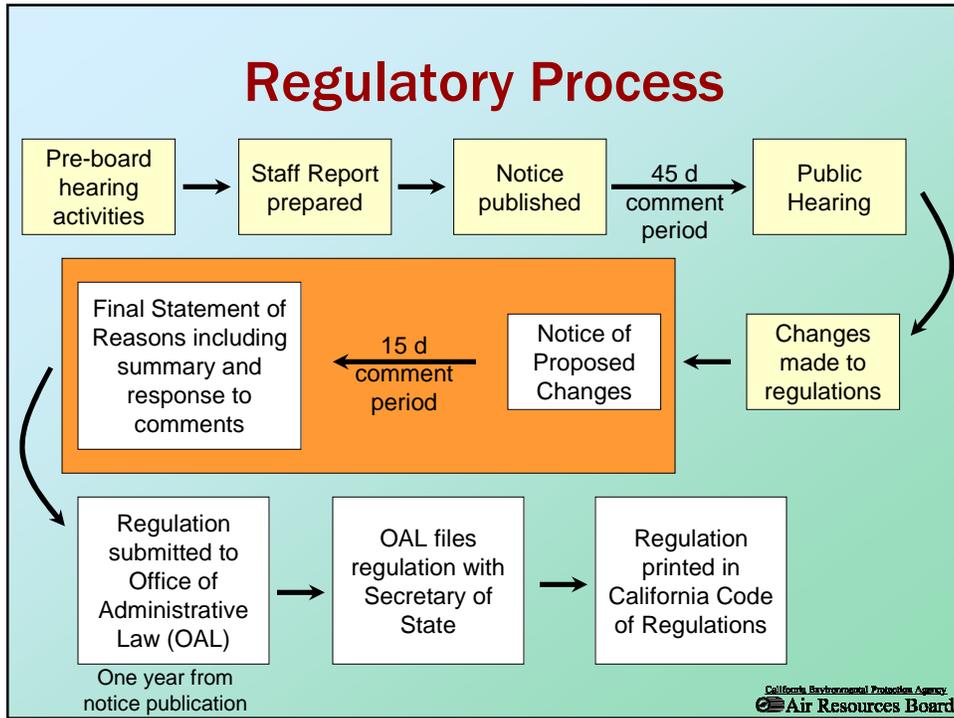


Cool Cars Regulatory Activities

- Workshops with stakeholders
 - Technology feasibility
 - Cost estimation
- Staff Report available
 - <http://www.arb.ca.gov/regact/2009/coolcars09/coolcars09.htm>
- Board hearing with public testimony occurred June 25, 2009
- Board approved regulation and directed staff to make several changes
 - Phase-in timing, Tts specifications, performance option
 - Aside from other minor clarifications, these are the only changes that may be made to the regulation

Board Hearing Outcome

Tier 1	Tts	Phase in
Windshield	50	25% in 2012, 50% in 2013, 100% in 2014
Sidelights	60	
Backlight	60	
Rooflight	30	
Tier 2 Option 1		
Windshield	40	100% in 2016
Sidelights	40	
Backlight	40	
Rooflight	30	
Tier 2 Option 2		
Combination of technologies that result in equivalent reduction in solar heat gain as Tier 2 Option 1		100% in 2016



Post Hearing Activities

15-day notice

- Will address the Board-directed changes made to the staff's initial recommendations
 - Tier 1 windshield phase-in increased from 2-3 years
 - Tier 2 delayed by 2 years and changed to 40 Tts all around glazing or equivalent performance-based option
- Tentative release end of October 2009
- Public will have 15 days to comment



Final regulation package must be filed/approved with Office of Administrative Law by May 2010

“Referenced to 4 mm”

- “Referenced to 4 mm”
 - Remove this phrase and substitute a linear approximation of Tts at given thickness less than 4 mm ($y=mx+b$)
- Labeling
 - Add after AS # a C [Tts]
 - Post-production label specifying for the consumer that the glass complies with ARB requirements.

“Equivalency” Language

- This suggested change was approved at the Board Hearing, and provides that if an OEM substitutes for a glazing approach that would typically require deletion windows one that does not, the compliant Tts can be slightly higher to achieve equivalent performance as would be achieved with the deletions overall.

Deletion Clarifications

- Shade Band
- Black band
- Polka Dots

Performance Based Option



Development Process

- Today's workshop
- Development of working groups
- Attempt to go to the Board in summer 2010

Workshop Objectives

- Discuss equivalency metric
- Establish working groups
- Begin discussion of test procedure

Performance Based Option

Basic Overview

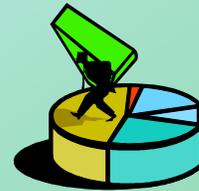
- Demonstrating 40% Tts glazing internal vehicle temperature equivalency
- Test two or three vehicles
 1. baseline (needed?)
 2. baseline + 40 Tts windows all around
 3. baseline + solar management technology package
- Temperature difference between 1 and 3 must be greater than or equal to difference between 1 and 2



Performance Based Option

Details to be Determined

- Test procedure
- Certification requirements
- Durability demonstration
- Enforcement



Need to establish workgroups to tackle these issues. Please sign up today!

Next: Participant Presentations

- Take a short break
- Have a few short presentations
 - 10 minutes or less per presentation
- Kick-off equivalency metric discussions



Equivalency Metric

- Temperature based
 - Stationary, parked car test
 - Moving vehicle test
- CO₂ based
 - SC03-type test measuring internal temperature and difference in CO₂ emissions to reach a “comfortable temperature”

Implications of a CO₂ metric

- Will still need to incorporate a temperature measure in order to demonstrate equivalence
 - What is a comfortable temperature?
 - What test cycle is used?
 - How does the test correlate to actual driving conditions?
- More complex test procedure needed
 - Complexity = time + \$\$\$
 - Need to have the procedure in place for MY 2016
- Pavley II is based on CO₂ and starts in 2016
 - Will need to subtract the CO₂ benefit of Cool Cars from the Pavley II baseline

Kick-off Discussion (time permitting)

Elements of a performance-based option

1. Test procedure
2. Certification requirements
3. Durability demonstration
4. Enforcement

Test Procedure

Methodology based on SAE 2007-01-1194

- Outdoor test
 - High solar load, light winds (< 2.5 m/s)
 - Ambient climate conditions measured
 - Vehicles oriented south and leveled to same tilt angle
 - Seats adjusted to same position
- Internal vehicle temperature testing procedure
 - Temperature measured at breath-air and foot level
 - Average of driver, passenger, left rear, and right rear positions (8)
 - Inherent temperature difference between cars measured with soak tests prior to installing solar control technologies
 - Test data recorded from 10:00-17:00 (sample frequency = 1 min.)
 - Thirty minute period with most consistent temperature differences used for temp. reduction calculation



Certification: Vehicle Selection

- Baseline vehicle
 - Should include standard technologies, including solar management technologies if on > 30% of vehicles
 - Same interior and exterior color, same rooflight configuration
- Number & types of vehicles to be tested
 - Representative vehicle from each major class
 - Classes same as fuel economy tests: cars based on interior passenger and cargo volumes, trucks defined by the gross vehicle weight rating (GVWR).
 - Total area/angle of each glazing position should be considered for establishing 40% Tts baseline



Certification Cont.

- Technology package with greater or equal heat gain reduction than 40 Tts all around submitted for approval
 - Retesting & approval needed at model redesign or change in solar management technology package
- Alternate cooling technologies must be independent of driver action

Durability & Enforcement

- Useful life of cooling technologies
 - Solar control windshields must be replaced with equivalent Tts windshields; what about paints, upholstery, or other technologies?
- OBD for electronics (e.g., solar-powered parked car ventilation)
- Labeling or identification
 - Glass will have labels, but what about alternate technologies?



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Additional Issues

- EMF attenuation considerations if 40 Tts all-around windows used instead of performance option
 - GPS (including monitoring ankle bracelets), cell phones, etc.
- Others?

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Staff Contacts

15 day Notice & Final Regulation Development

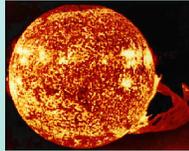
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Performance-Based Option

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Thank you!

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