



Asphalt Roofing
Manufacturers Association

*TAPPI Building and Industrial Mat Meeting
April 24, 2009*

Asphalt Roofing Manufacturers Association

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Vice President, R&D
GAF Building Materials Corporation**



What is ARMA?

- **North American trade organization.**
- **Founded in 1915**
- **Represents over 95% of asphalt roofing manufacturers.**
 - **25 Manufacturing companies**
 - **35 Associate Members - suppliers to the industry.**



ARMA Vision:

To be a progressive association committed to the long term sustainability of the asphalt roofing industry.



What are ARMA's goals?:

- To promote and further the sale and use of bituminous-based roofing products.
- To defend and protect the asphalt roofing industry from actions that may restrict the sale of certain bituminous-based roofing products.
- To provide liaison with others having an influence on the industry (i.e., other associations, building code agencies, etc.).
- To serve as a voice for the industry, presenting collective positions on issues of concern.



ARMA Member Company Products:

- **Steep Slope Products**
 - **Asphalt Shingles**
 - Laminated Shingles
 - Strip Shingles
 - Architectural Shingles
 - **Roll Products**
 - Underlayments
 - Mineral surfaced rolled roofing
 - Specialty products





Steep Slope ARMA Members:

- **Atlas Roofing Corporation**
- **Building Products of Canada**
- **CertainTeed Corp.**
- **GAF-Elk Corp.**
- **IKO Production Inc.**
- **Owens Corning**
- **PABCO Roofing Products**
- **Polyglass USA, Inc.**
- **TAMKO Roofing Products, Inc.**
- **W.R. Grace**



ARMA Member Company Products:

- **Low Slope Products**
 - **Built up roofing**
 - Ply sheets
 - Base sheets
 - Cap Sheets
 - **Modified bitumen**
 - APP modified
 - SBS modified





Low Slope ARMA Members:

- Atlas Roofing Corporation
- CertainTeed Corp.
- Firestone Building Products Co.
- GAF Materials Corp.
- Henry Co.
- IKO Production Inc.
- Johns Manville Corp.
- Owens Corning/Trumbull
- Performance Roof Systems
- Polyglass USA, Inc.
- RGM Products, Inc.
- Siplast Incorporated
- Soprema, Inc.
- TAMKO Roofing Products
- Tarco



ARMA Organizational Structure:

- **Four standing committees**
 - Steep Slope
 - Low Slope
 - Health, Safety and Environmental
 - Communications
- **Numerous Task Groups**
- **Oversight**
 - ARMA Board of Directors
 - ARMA Executive Committee



ARMA Strategy:

- **Defensive – prevent factors that would negatively impact our businesses.**
 - Asphalt fumes.
 - Building Code changes.
 - Unsubstantiated energy saving enhancements.
- **Product/System Research**
 - Accelerated aging.
 - Insulated decks.
 - Ventilation



Threats to Asphalt Roofing Products:

- **Health issues - fumes**
- **Gravel ballast issue.**
- **Recover shingle issue.**
- **New relaxed ventilation requirements.**
- **Hail issue.**



ARMA Task Groups:

- Codes Steering Group (CSG)
- Cool Roof Steering Group (CRSG)
- Reflectance Certification Task Force (RCTF)
- High Wind Task Force
- ARMA-NRCA Quality Control Task Force.
- Steep Slope Ventilation Task Force
- Steep Slope Sustainability Task Force
- Low Slope Sustainability Task Force



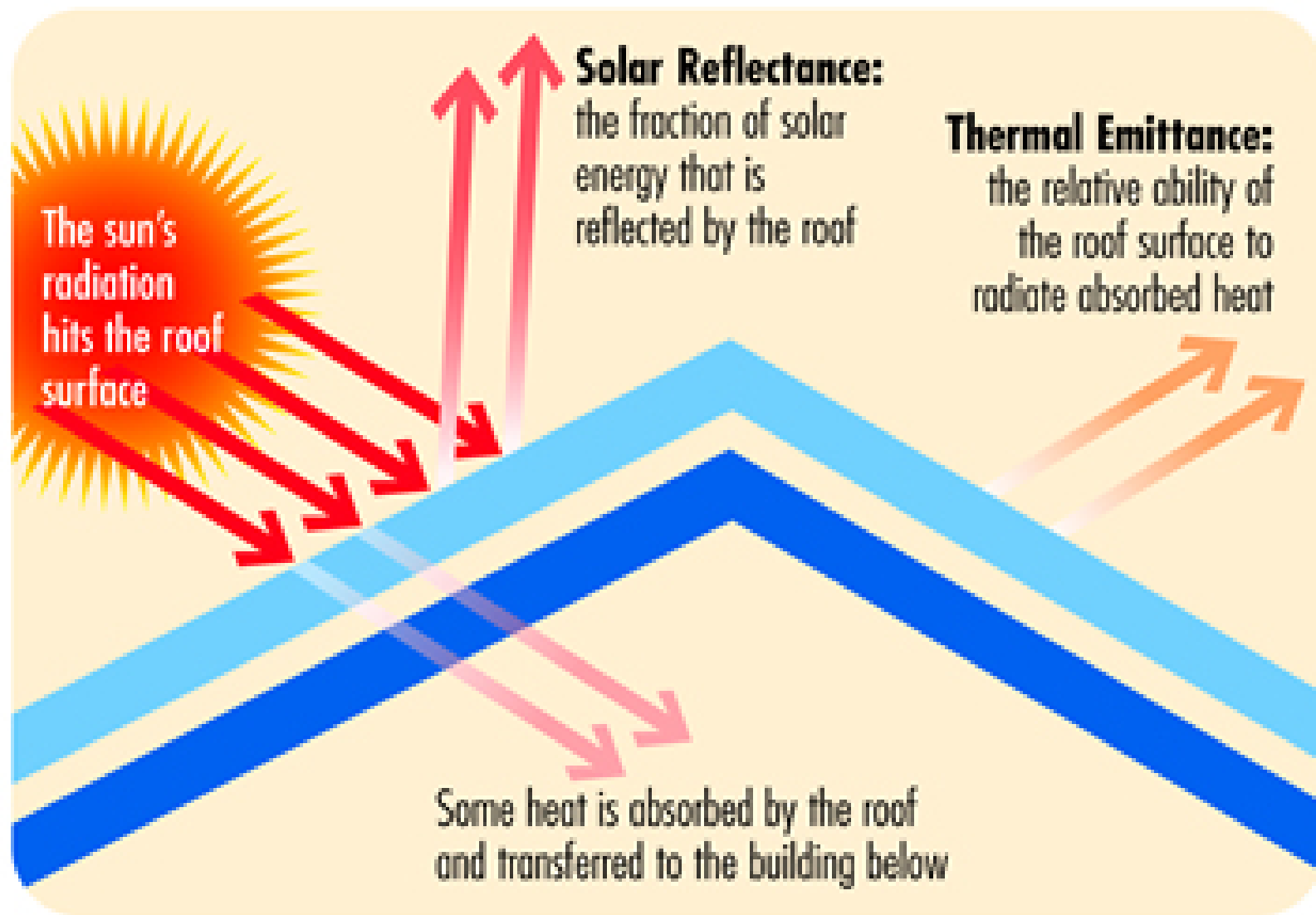
ARMA Cool Roofing Challenges/Opportunities:

- **Driving Forces**
 - Energy savings.
 - Save the earth (global warming).
 - Emotional and political pressure
 - It's **GREEN!**
- **Venues**
 - California Title 24
 - California Assembly Bill 32.
 - ASHRAE 90.1 and 189.1
 - LEED



Cool Roofing Technical Basics:

- **Increasing solar reflectance**
 - Reduces solar heat gain
 - Lowers roof temperatures
- **High Thermal Emittance**
 - Facilitates radiative cooling.
 - Lowers roof temperatures
- **Lowering roof temperature reduces**
 - Building cooling electricity use
 - Peak power demand
 - Ambient air temperature





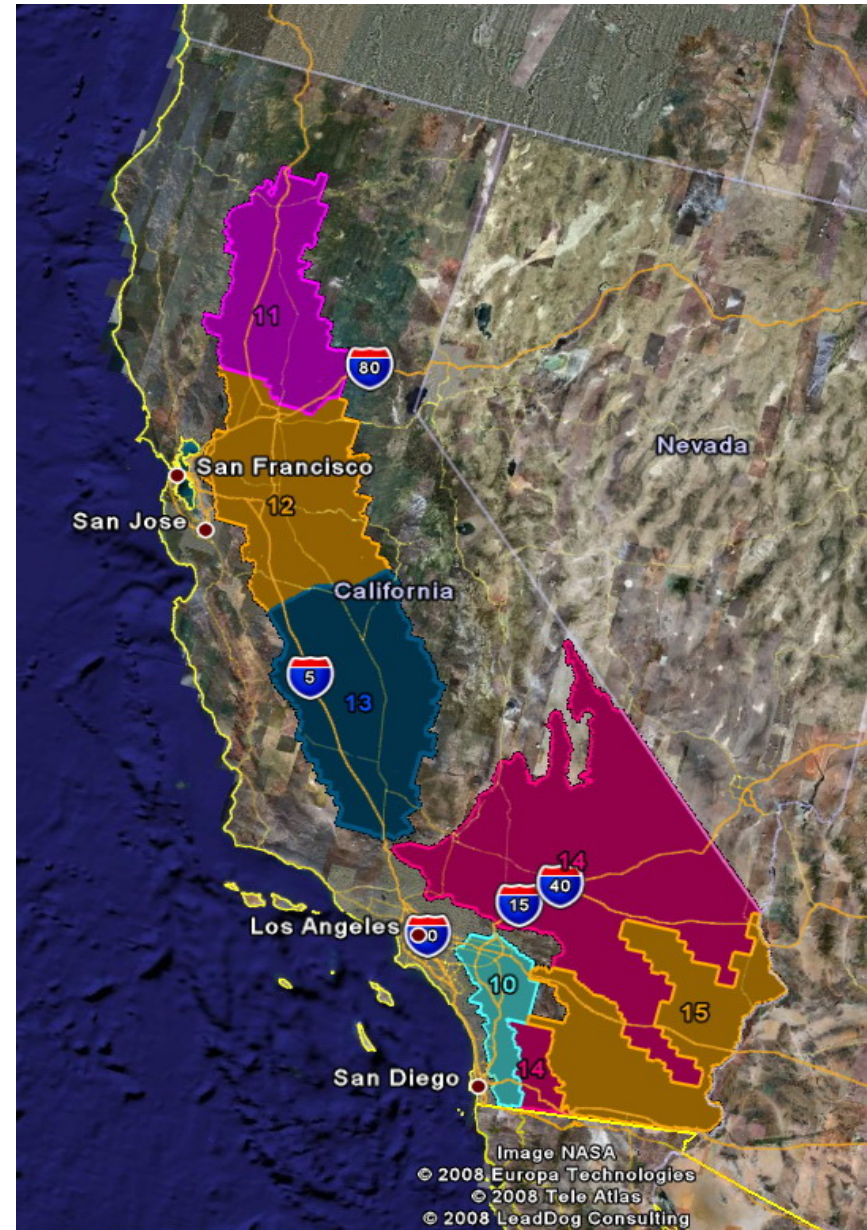
What is Title 24?

- **Title 24, Part 6 of the California Energy Code is entitled “Building Energy Efficiency Standards for Residential and Non-residential Buildings.”**
- **Established in 1978 in response to a legislative mandate to reduce energy consumption in the state.**
- **Renewed/modified approximately every three years.**
- **The 2005 revision incorporated requirements for low slope roofing.**
- **The 2008 revision will incorporate requirements for steep slope roofing.**



California Title 24:

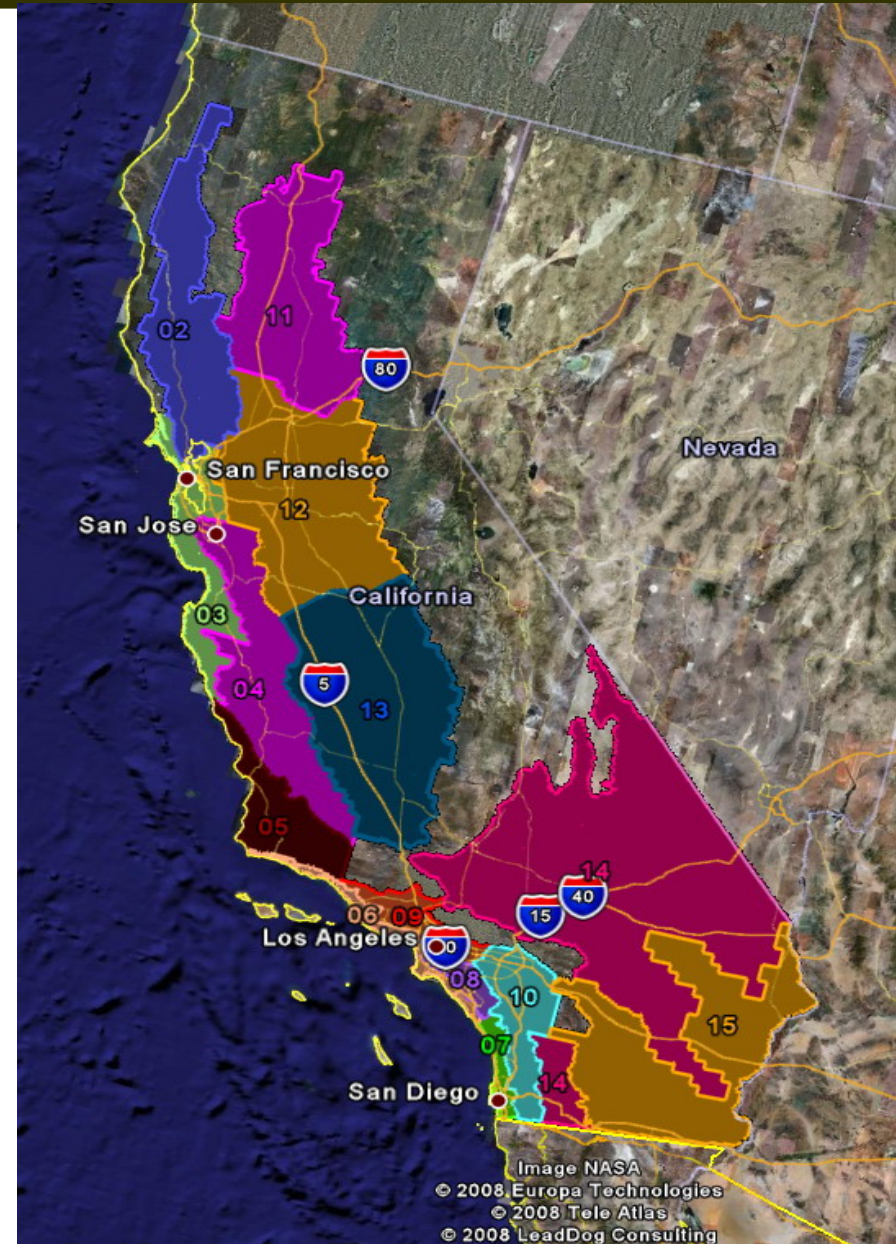
- Mandates steep slope residential solar reflectance and thermal emittance minimums for certain regions
 - $SR \geq 0.20$
 - $TE \geq 0.75$
 - $SRI > 16$
- ARMA worked with California to reach this compromise.





California Title 24:

- Mandates low slope commercial solar reflectance and thermal emittance minimums for certain regions
 - $SR \geq 0.70$
 - $TE \geq 0.75$
 - $SRI > 64$





Why is Title 24 important?

- **Requires shingles to use special expensive granules.**
- **Requires BUR/Mod. Bit. systems to be coated regularly.**
- **Can impact competitive position relative to other roofing types such as metal and tile.**
- **Likely the first in a number of steps to increase the energy efficiency of building materials in California and elsewhere.**
- **Other areas of the country are following.**



California AB 32: The Global Warming Solutions Act

- **The law in California.**
- **Shift from energy saving to environmental protection.**
- **Global Cooling: Increasing World-Wide Urban Albedos to offset CO2 emissions.**
- **Driven by work done at Lawrence Berkeley National Lab – Hashem Akbari.**
- **Based on what appears to be “fuzzy” math.**
- **Total impact on asphalt roofing is undefined but is likely a step beyond Title 24.**



California AB 32: The Global Warming Solutions Act - Goals

- **2010: Emissions at 2000 levels, 11% below business as usual. Reduction of 60 million tons**
- **2020: Emissions at 1990 levels, 28% below business as usual. Reduction of 173 million tons**
- **2050 Emissions at 80% below 1990 levels.**
- **Including the following sectors:**
 - **Agriculture**
 - **Energy**
 - **Forests**
 - **Transportation**
 - **Land Use**
 - **Oil and Gas Refining**
 - **Manufacturing**
 - **Waste Management**



Akbari's Numbers¹

- **Using cool roofs and cool pavements in urban areas, on the average, can increase the albedo of the urban areas by 0.1.**
- **An increase of 0.1 in urban albedo can cool the Earth by about 0.01K.**
- **This cooling can compensate for 0.2 years of the world's CO₂ emissions; a saving of 10 Gt CO₂, valued at \$100B.**
- **Cool roofs also save air conditioning energy use at about \$10B per year; \$600B over the next 60 years.**

¹ Akbari, Menon and Rosenfeld, "Global Cooling: Increasing World-wide Urban Albedos to Offset CO₂"



ARMA Position

- “ARMA views roof surface reflectance as but one component of the Whole Building Envelope Approach as an appropriate regulatory policy and design principle for energy conservation, mitigation of urban heat islands, and improved air quality. *The Whole Building Envelope Approach is the best option for designing and optimizing performance-based, proven and cost effective commercial and residential buildings. It allows flexibility and consumer choice in the selection of roof systems.*”



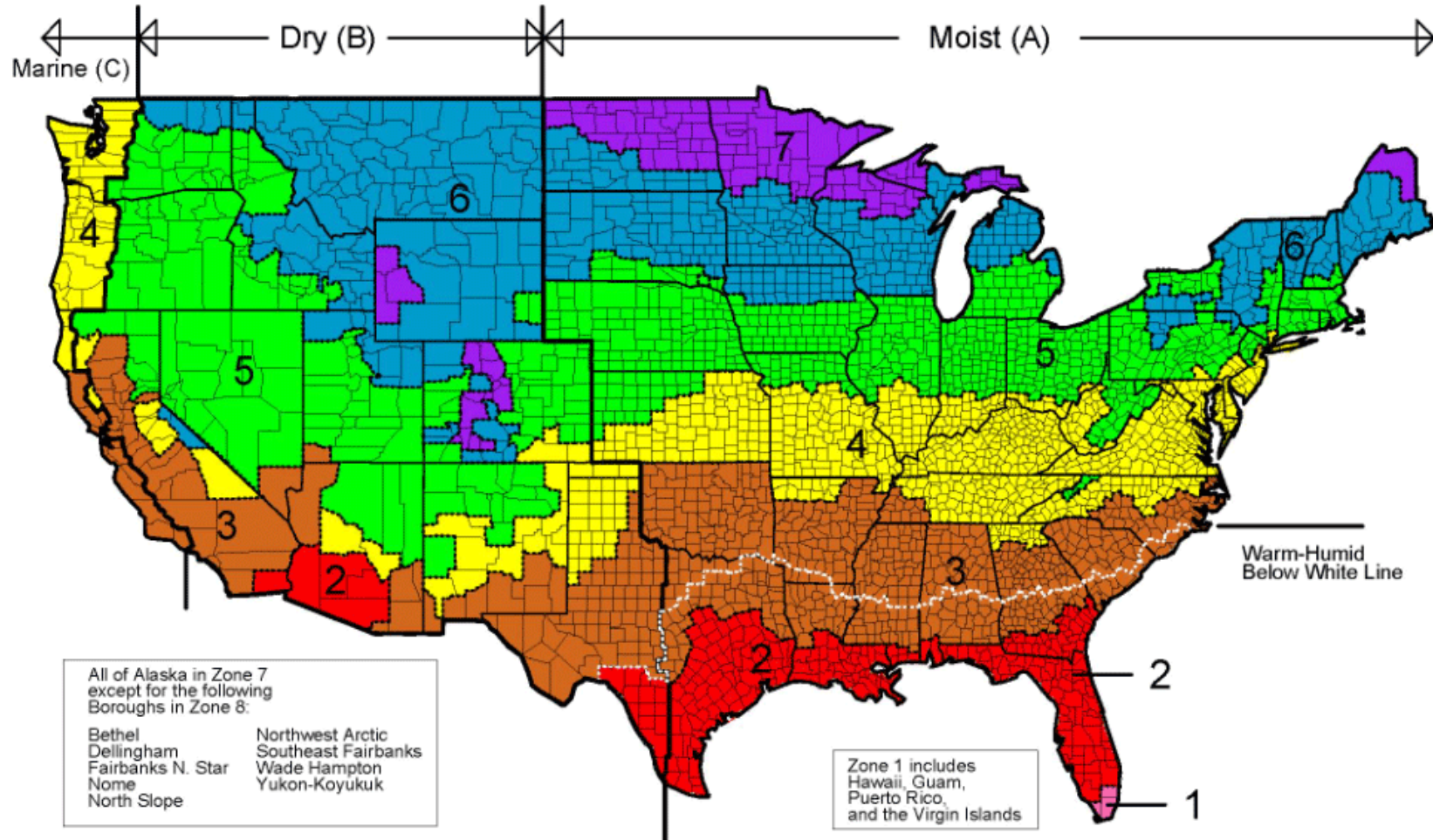
California AB 32: Who are the players?

- **AB 32 Implementation Group**
 - Coalition over 100 members mostly organizations and a few large and small businesses.
 - Mission to be a constructive voice in the process to meet AB32 while maintaining competitiveness and protecting the interest of consumers and workers.
- **Developer Cool Community Group**
 - Coalition formed and directed by CARB.
 - The group includes developers, manufacturers, utilities, regulators, Oakridge and Lawrence Berkeley Lab.
 - Dedicated to increasing the number of cool roof, cool coating, and cool pavement projects in the state of California without altering the project cost structure.



ASHRAE 90.1 Energy Standard for Buildings Except Low-rise Residential

- **Addition of Title 24 requirements.**
 - **Initial solar reflectance:**
 - **Steep Slope – 0.25**
 - **Low Slope – 0.70**
 - **Initial Thermal Emittance**
 - **Steep Slope – 0.85**
 - **Low Slope – 0.75**
- **Climate zones 1-5 (95% of U.S.)**





ASHRAE 90.1 Energy Standard for Buildings Except Low-rise Residential

- **ARMA approach to demonstrate lack of cost effectiveness.**
- **Alternatives suggested – higher insulation levels.**
- **The debate is continuing.**
- **Compromise to limit application to climate zones 1 and 2 only.**
- **Low rise residential buildings (most homes) not currently in play.**



ASHRAE 189.1 Commercial Green Building Standard

“The purpose of this standard is to provide minimum requirements for the design of high-performance, green buildings to:

- **Balance environmental responsibility, resource efficiency, occupant comfort and well being, and community sensitivity, and**
- **Support the goal of the development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”**



ASHRAE 189.1 Commercial Green Building Standard

- **Being “fast tracked”.**
- **Does not require economic justification.**
- **“Voluntary” standard.**
- **Can be adopted by the building codes.**
- **Roofs under Site Sustainability section:**
 - **SRI of 78 for low slope.**
 - **SRI of 29 or Energy Star for steep slope.**
- **Not low-rise residential.**



LEED

- **Leadership in Energy and Environmental Design.**
- **Sponsored by the U.S. Green Building Council (USGBC).**
- **Created to:**
 - **Define “green building”**
 - **Promote integrated whole-building design**
 - **Recognize environmental leadership**
 - **Stimulate green competition**
 - **Raise consumer awareness of green benefits**
 - **Transform the building market.**



LEED Credit

- **LEED Certifications**
 - **Platinum 52-69 points.**
 - **Gold: 39-51 points**
 - **Silver: 33-38 points**
 - **Certified: 26-32 points**
- **1 credit for cool roofing**
 - **SRI of 29 for steep slope roofing**
 - **SRI of 78 for low slope roofing**
- **SRI is Solar Reflectivity Index**





LEED Credit - SRI

- Based on moderate wind velocity (2-6 m/sec).
- Computation based on aged solar reflectance and thermal emittance per ASTM D 1980-01 and LBNL.
- $SRI = 123.97 - 141.35X + 9.655X^2$
 - where:
 - $X = (a - 0.029e)(8.797 + h) / (9.5205e + h)$
 - $a =$ solar absorptance = $1 - TSR$
 - $e =$ emittance
 - $h =$ convective coefficient



Cool Roof Initiatives Going Forward

- **Title 24 – next revision in 2011.**
- **ASHRAE – continuing discussion and debate.**
- **AB 32 - ?**
- **Factors:**
 - **Current economic distress MAY slow progress on these programs.**
 - **New administration in Washington may push these programs ahead more aggressively at the Federal level.**



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Questions?