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Cool Roof Market

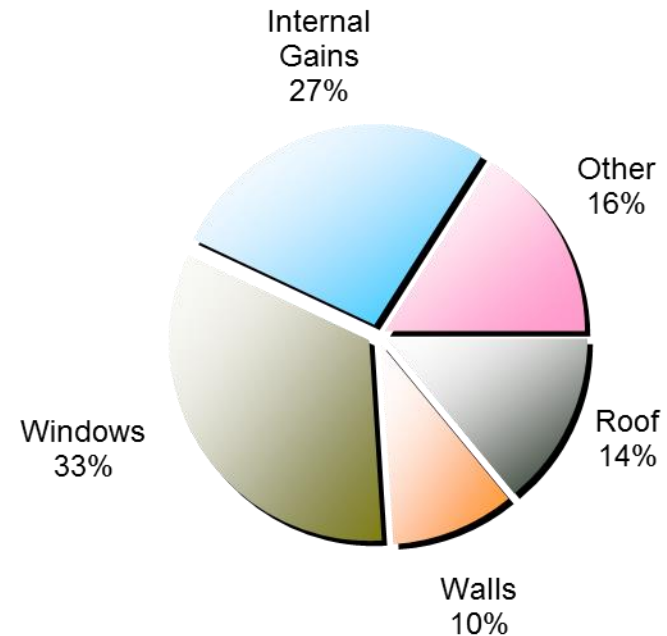
Global drive to reduce energy consumption

- The EU want to keep global warming below 2°C compared to pre-industrial levels
 - Developed Countries will have to reduce their greenhouse gas emissions by 80-95% by 2050 compared to 1990
 - The EU has pledged to cut its greenhouse gas emissions by 20% and achieve 20% of its energy supply from renewables by 2020
 - A target of 30% reduction could be imposed if other measures are not met
- EU member states are jointly responsible for limiting their emissions
 - They can take stronger action together than is possible individually!
- It is the responsibility of organisations like ECRC to help stakeholders understand how technology from industry can help meet the targets set

Reducing cooling loads can help reduce energy consumption

- Buildings account for 40% of primary energy consumption in International Energy Agency member countries*
- Energy is primarily consumed by heating, ventilation and air-conditioning**
- Increasing the solar reflectance index of a roof from 0.20 to 0.55 could yield, annual cooling energy saving of 5.02kWh/m² across the USA, this could reduce CO₂ emissions by 3.02kg/m²**

Factors contributing to the cooling load of a building*



*International Energy Agency, 28 member countries

**Potential benefits of cool roofs on commercial buildings: conserving energy, saving money, and reducing emission of greenhouse gases and air pollutants; Ronnen Levinson and Hashem Akbari; 14 March 2009

The potential benefits of cool roofing

- Cooler buildings
 - Increased interior comfort levels
 - Energy savings and reduced energy costs because of reduced air-conditioning
- Diminished peak demand effects on the power grid*
- Increased life expectancy of the roof system**
- Mitigation of the urban heat island effect***



*Potential benefits of cool roofs on commercial buildings: conserving energy, saving money, and reducing emission of greenhouse gases and air pollutants; Ronnen Levinson and Hashem Akbari; 14 March 2009

**European Cool Roof Council

***Cooling the cities – A review of reflective and green roof mitigation technologies to fight heat island and improve comfort in urban environments; Mat Santamouris; July 2012

Globally there is increasing recognition for cool roofs

Globally different agencies are promoting the benefits of cool roofing:

- Global cool cities alliance
 - www.globalcoolcities.org
- New York City Cool Roof Ordinance
 - www.nyc.gov.uk/coolroofs
- Cool Roof Rating Council USA
 - www.coolroofs.org
- European Cool Roof Rating Council
 - www.coolroofcouncil.eu

The screenshot displays the Global Cool Cities Alliance website. At the top left is the logo for the Global Cool Cities Alliance. Below it is a navigation menu with links: Home, About Us, Resources In the News, Q&A, and Contact Us. The main content area features a large image of a city with a blue overlay box containing the text: "What is Global Cool Cities Alliance? The Global Cool Cities Alliance is dedicated to increasing the solar reflectance of our buildings and pavements as a low- or no-cost way to fight the effects of climate change and to promote cool cities and buildings." To the right of the image is a sidebar with the heading "About GCCA" and text describing the organization's mission. Below this is a "Key Initiatives" section with a link to a fact sheet.

Global policies, standards and agencies

Europe

- AFNOR standard minimum solar reflectance of 30% for facade coatings (Article 59.1)
- European Cool Roof Council promoting the benefits of cool roofing
- In the UK (BREEAM) certification standards on ecological quality and sustainability include cool materials as a heat island mitigation strategy

BREEAM[®]



AFAQ **AFNOR**
CERTIFICATION

Global policies, standards and agencies

North America

- The U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) rating system included cool materials in LEED 2009 version
 - To receive Sustainable Sites Credit 7.2 Heat Island Effect-Roof, >75% of roof surface area must use materials with Solar Reflective Index (SRI) of at least 78
 - This criterion can also be met by installing a vegetated roof for at least 50% of the roof area, or installing a high albedo and vegetated roof in combination
- In California Title 24 standards from 2014 recommend cool roofs to help building owners save ~30% on energy bills
- ENERGY STAR suggest that qualified roof products can help reduce the amount of air conditioning needed in buildings, and can reduce peak cooling demand by 10-15 percent



Global policies, standards and agencies

Asia

- Japan has issued standard JIS K 5 675 for cool roofs
 - $L^* \leq 40$ near infrared reflectance ≥ 40
 - $40 < L^* < 80$ near infrared reflectance $\geq L^*$ value
 - $L^* \geq 80$ near infrared reflectance ≥ 80

- China has issued a new standard JG/T 235-2014

Serial number	Items		Index		
			$L^* \leq 40$	$40 < L^* < 80$	$L^* \geq 80$
1	Total Solar Reflectance, $TSR \geq$		0.25	0.40	0.65
2	Near Infrared Reflectance, $NIR \geq$		0.40	$L^*/100$	0.80
3	Hemispherical Emittance, \geq		0.85	0.85	0.85
4	TSR Change Rate after Staining, \leq		--	15%	20%
5	TSR Change rate after Aging, \leq		5%		
6	Simulation Insulation	Standard black plate	7	10	12
	Temperature Difference $^{\circ}C$	Same L^* value plate	Agreed		

Industry is providing reflective solutions

- Companies across the supplychain are innovating to provide cool roof solutions useful for both new build and retrofit



- Easy to apply roof coatings in highly reflective white or colors
- Prepainted metal coatings for steel and aluminium roofing systems
- Light colored waterproof roofing membranes
- Roof refurbishment products for all manner of roofing types