



South African  
Fenestration & Insulation  
Energy Rating Authority

Administered by AAAMSA  
Country Representative of NFRC



# COOL ROOF CONFERENCE 2 MAY 2013

Presented by: Hans A. Schefferlie – Executive Director AAAMSA Group



Independant  
Product Testing by  
SANAS Accredited  
Laboratory



Competent  
Person  
(Glazing)

**Fenestration**

**Glazing  
Materials**

**Thermal  
Insulation**

**Ceiling &  
Partitioning**



# Affiliations

The AAAMSA Group represents the following industry forums:

- ▶ MBSA Master Builders South Africa
- ▶ JBCC Joint Building Contracts Committee
- ▶ SABS South African Bureau of Standards
- ▶ SECC Specialist Engineering Contractors Committee
- ▶ CETA Construction Education and Training Authority
- ▶ CIDB Construction Industry Development Board
- ▶ BOBS Botswana Bureau of Standards



# Energy Efficiency Interventions in RSA

- ▶ The first Energy Efficiency Strategy of South Africa was launched by the Department of Minerals and Energy In March 2002.
- ▶ Industry is supportive of our Governments initiative to introduce Energy Efficiency Regulations in SA.
- ▶ In 2006 the AAAMSA Group established the South African Fenestration and Insulation Energy Rating Association (SAFIERA) to support its drive to promote energy efficiency in the building industry.





# History of Rotatable Guarded Hot Box

- ▶ 2006 : Establishment of SAFIERA
- ▶ 2007 : Building of the RGHB commences
- ▶ 2008 : May – NFRC Accreditation
- ▶ 2008 : November – Official launch with US DoE
- ▶ 2009 : SANAS Accreditation
  
- ▶ 2009 – 2013: Testing to date
  - 58 RGHB (Fenestration, Walls & Roofs)
  - 124 Mechanical Testing of Fenestration
  - 103 Insulation Products & Systems

# Accreditation

## Rotatable Guarded Hot Box



- ▶ Awarded full accreditation by the National Fenestration Rating Council of America (NFRC) and first test facility to achieve NFRC accreditation as a Test Laboratory outside of North America.



- ▶ Accredited as an SANS/ISO-17025 Test Laboratory by SANAS (the South African National Accreditation System). The established capabilities enable us to perform the evaluation and energy rating of a new generation of energy-efficient building systems.



# RSA's first Rotatable Guarded Hot Box (RGHB)



# Pictorial Timeline – 2008

## NFRC Accreditation





# Pictorial Timeline – 2008 Official Launch

Honorary guests:  
Bipin Shah (NFRC) & Thomas Sperl (US DOE)



# Pictorial Timeline – 2009 SANAS Accreditation



# NFRC & SAFIERA

- ▶ SAFIERA is the Country representative of the National Fenestration Rating Council (NFRC) of America in South Africa.
- ▶ SAFIERA's primary goal is to determine and register, amongst other, the heat transmission values of fenestration, in particular, and other elements of the building envelope in general and to provide an independent, accurate, and reliable energy performance rating system based in NFRC methodology.





# US DoE Delegation 15 January 2012

## Deputy Secretary Daniel Poneman





# Energy Efficiency Regulations

- ▶ The Energy Efficiency Regulations were promulgated in September 2011 and became effective in November 2011
- ▶ Industry's involvement and commitment have resulted in improved fenestration systems.













# Pictorial Timeline RGHB Testing 2009 – 2013

## Fenestration



# SAFIERA Energy Rating Certificate & Label

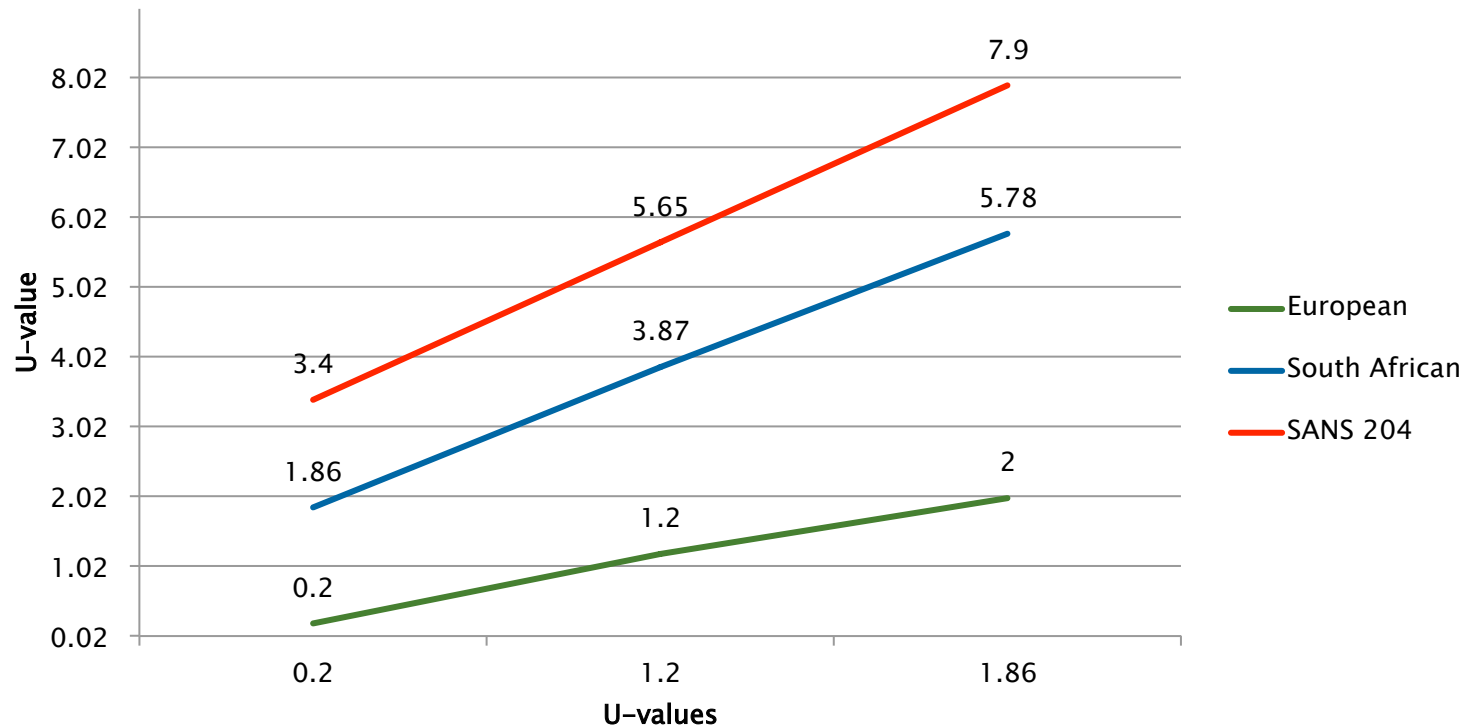
  South African Fenestration & Insulation Energy Rating Association	<b>Hulamin Building Systems</b>	
	Technal Turn & Tilt	
	<b>ENERGY PERFORMANCE RATINGS</b>	
	U-Value (W/m <sup>2</sup> .K)	Solar Heat Gain Coefficient
	<b>3.87</b>	<b>0.54</b>
	<b>ADDITIONAL PERFORMANCE RATINGS</b>	
	Air Infiltration	Visible Transmittance
<b>0.67 l/m<sup>2</sup>/s</b>	<b>0.58</b>	
<b>MECHANICAL PROPERTIES</b>		
Category	Design Wind load	
<b>A4</b>	<b>2000Pa</b>	
The Manufacturer stipulates that these ratings conform to applicable SAFIERA procedures for determining whole product performance. SAFIERA ratings are determined for a fixed set of environmental conditions and a specific product size. SAFIERA does not recommend any product and does not warrant the suitability of any product for any specific use. Consult manufacturer's literature for other product performance information.		

 South African Fenestration & Insulation Energy Rating Association	 <b>SAFIERA</b> ENERGY RATING CERTIFICATE																						
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Country Representative	Applicant:																						
Postal Address: P O Box 7861 Halfway House 1685	Applicant: Hulamin Building Systems P O Box 75734 Midrand 2011																						
Tel: (011) 805-5002 Fax: (011) 805-5033	<b>Product Information:</b> Frame material: Aluminium Product name: Technal Turn & Tilt Dimensions: 1200 wide x 1500 high Drawing #: W2 Glass: Double glazing 6 + 12 + 6 Glass type: 6mm clear float inside & outside Air Space: Dehydrated air																						
Administered by	<b>Testing Protocol</b> Thermal Transmittance: ASTM C 1199-97    NFCR 102-2004 Mechanical Properties: SANS 613:2009 Computer Simulation: NFCR 100:2004, NFCR 200:2004, NFCR 500:2004																						
 AAAMSA Group	<b>Certification Authority:</b> Thermal Testing Facility: TTL Report # RGH8 09-001 Date: 27 May 2009																						
	Mechanical Testing Facility: TTL Report #: D0742 Date: 1 September 2009																						
	Computer Simulator: Peter Lyons & Associates Report #: PLA-0904-03 Date: 20 May 2009																						
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	Note: This certificate is not transferable and applies only to the test unit provided for testing by the applicant. Fenestration manufacturers must individually test their workmanship in respect of the mechanical performance of the manufactured product.																						



# Thermal Transmittance Improvement in SA Fenestration Systems

## European vs. South African U-values

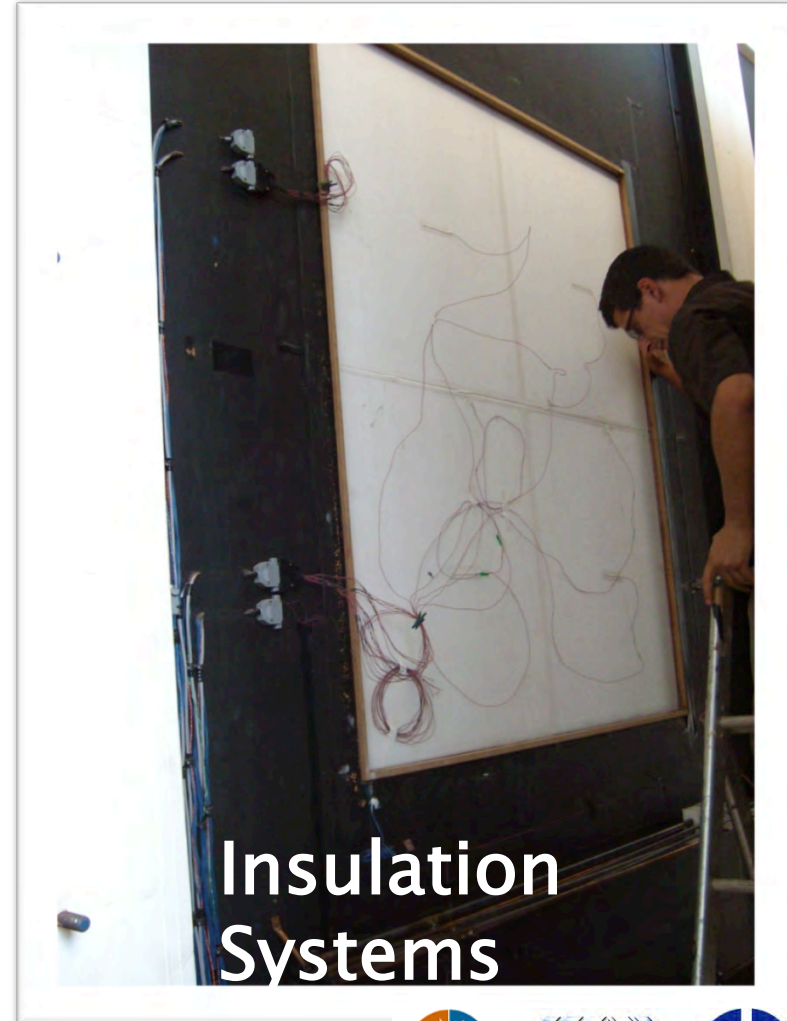




# Pictorial Timeline

## RGHB Testing 2009 – 2013

### Roof Systems



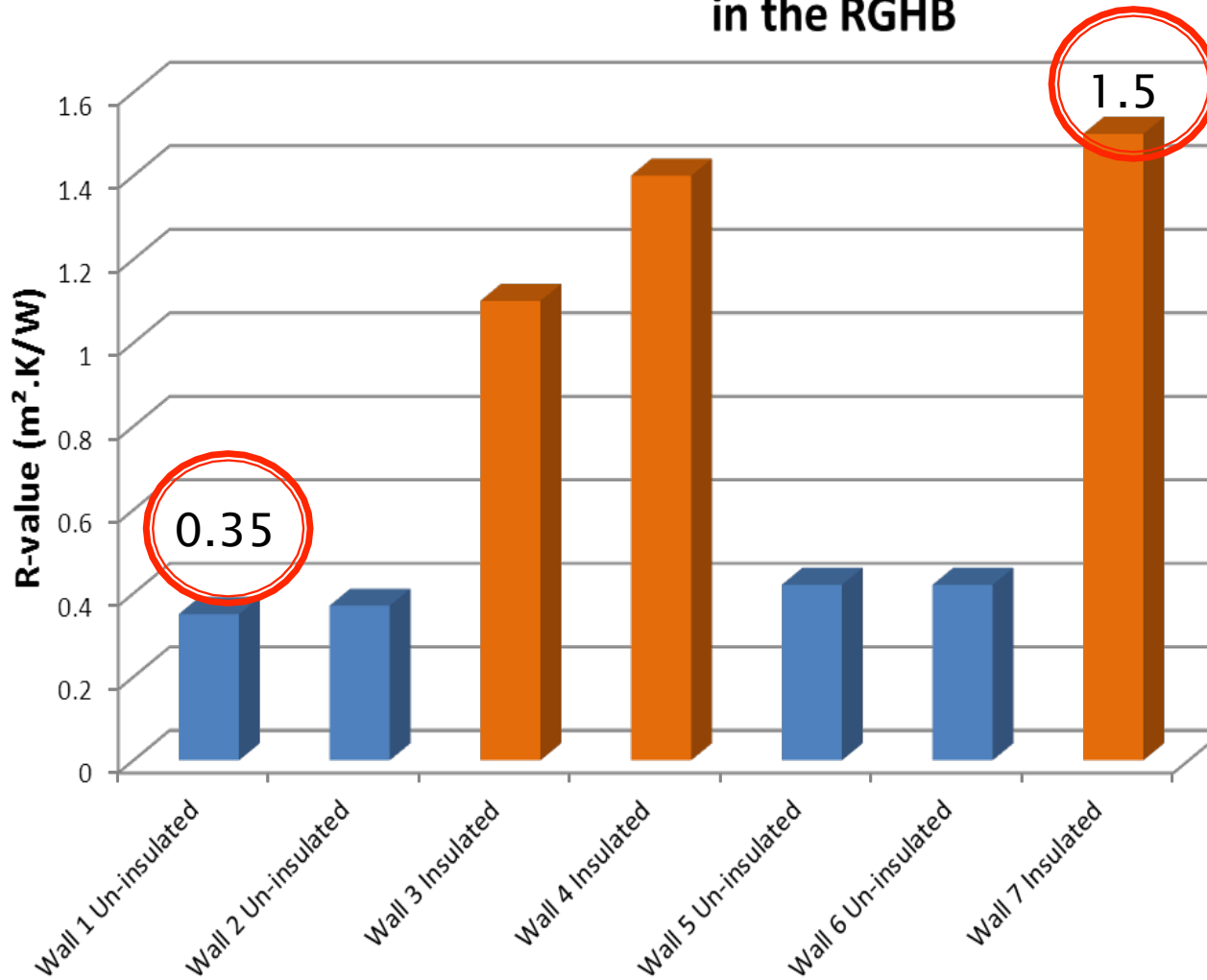
# Pictorial Timeline

## RGHB Testing 2009 – 2013

### Wall Systems



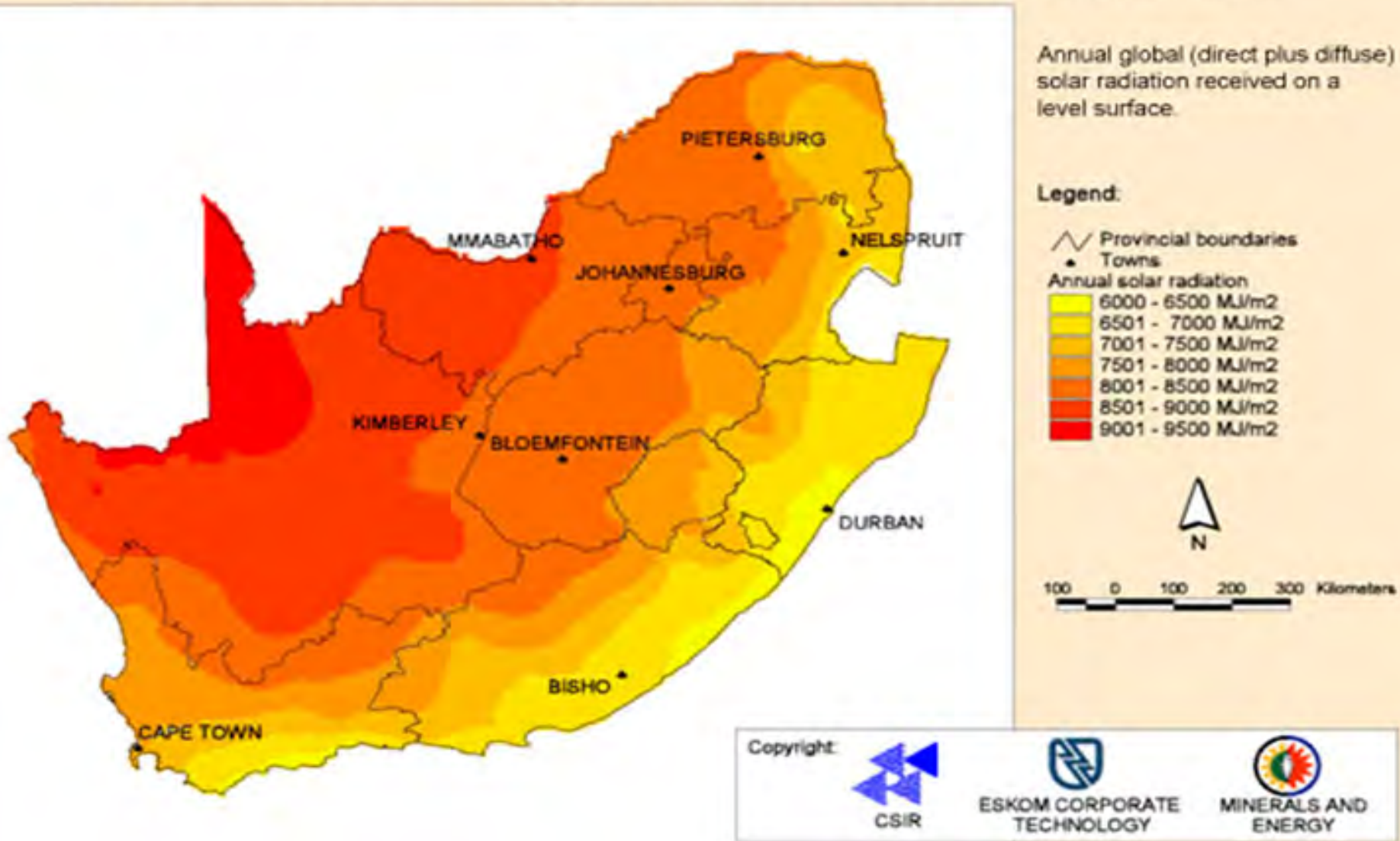
# Example of Thermal Resistance of Typical Wall Systems Tested in the RGHB





# Why Cool Roofs is RSA

## South African Renewable Energy Resource Database - Annual Solar Radiation





# Understanding Cool Roofs

- ▶ Environmental factors such as sunshine, clouds, humidity and wind speed all impact the building envelope causing a temperature change. The first line of defence for a building is the material selection and placement in the building envelope.
- ▶ Highly infrared emissive and solar reflective roofing surfaces can help save money in air-conditioning cost because less heat is transferred into the building. Increased insulation can also mitigate this heat transfer. This translates into less cooling to keep people comfortable.

# The role of Reflectivity & Emissivity in Cool Roofs

## Reflectivity

Solar reflectivity (or reflectance) is the fraction of the solar energy that is reflected by the surface (i.e., roofing membrane) back to the sky. White membranes have the highest solar reflectivity, while black have the lowest.

## Emissivity

Infrared emissivity (or emittance) is a measure of the ability of a surface to shed some of its heat (in the form of infrared radiation) away from the surface (i.e., roofing membrane). High infrared emissivity helps keep surfaces cool. Metallic surfaces have a low infrared emissivity

# Cool Roofs & TIASA

## Thermal Insulation Association of Southern Africa



- ▶ Highly reflective and highly emissive products, such as the white membrane, combined with the proper amount of roof insulation, offers a system that significantly reduces heat gain into the building.

# Future for RSA

## ▶ Energy Rated Buildings

# THANK YOU



### AAAMSA GROUP PRODUCTS - WORKING TOGETHER FOR ENERGY EFFICIENT SYSTEMS

Increase your energy efficiency in the building envelope in the following areas:

1. Fenestration (includes glass & frame of windows and doors, whether Aluminium, Timber, Steel or uPVC)
2. Thermal Windows
3. Skylights
4. Roof Insulation
5. Wall Insulation
6. Floor Insulation
7. Radiant Barriers
8. Light Weight Wall Systems
9. Showers



Energy Efficiency Regulations SANS 10400-XA

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ENERGY EFFICIENT SYSTEMS FROM THE AAAMSA GROUP		
The building envelope provides the thermal barrier between the indoor and outdoor environment, and its elements are the key determinants of a building's energy requirements that result from the climate where it is located. The building envelope controls heat gain in summer and heat loss in winter.		
<p><b>1. FENESTRATION</b> Fenestration affects building energy use through four basic mechanisms - thermal heat transfers, solar heat gain, air leakage, and day-lighting. <a href="http://www.aaamsa.co.za">www.aaamsa.co.za</a> or <a href="http://www.safiera.co.za">www.safiera.co.za</a></p>	<p><b>4. ROOF INSULATION</b> Roofs and ceilings work in conjunction when it comes to insulation. Heat loss or gain from an un-insulated roof occurs through this area and can save on heating and cooling energy. <a href="http://www.tiasa.org.za">www.tiasa.org.za</a></p>	<p><b>7. RADIANT BARRIERS</b> Reflective Foil Insulation/Radiant Heat barrier is an effective barrier against radiant heat transfer in roofs. <a href="http://www.tiasa.org.za">www.tiasa.org.za</a></p>
<p><b>2. THERMAL WINDOWS</b> Window technology has evolved over the years choosing the right performance glazing (energy efficient glass) allows one to control how much heat enters or escapes from a building. <a href="http://www.sagga.co.za">www.sagga.co.za</a></p>	<p><b>5. WALL INSULATION</b> When a wall cavity is insulated, the internal thermal mass is protected from external temperature changes, and becomes highly effective at regulating temperatures within the building. <a href="http://www.epsasa.co.za">www.epsasa.co.za</a> or <a href="http://www.tiasa.org.za">www.tiasa.org.za</a></p>	<p><b>8. LIGHT WEIGHT WALL SYSTEMS</b> Light weight wall systems can serve many purposes in addition to dividing a room. Space heating and cooling can be controlled within a building and reduce energy cost. In addition the building costs can be reduced. <a href="http://www.aaamsa.co.za">www.aaamsa.co.za</a> or <a href="http://www.tpma.org.za">www.tpma.org.za</a></p>
<p><b>3. SKYLIGHTS</b> Skylights can serve as a means to admit solar radiation for natural lighting, referred to as day-lighting, and for heat gain to a space. <a href="http://www.aaamsa.co.za">www.aaamsa.co.za</a></p>	<p><b>6. FLOOR INSULATION</b> Heat loss also occurs through the floor. Insulation should be used on the edge and underside of concrete floor slabs. Ensure that this is advisable for the specific climatic region. <a href="http://www.epsasa.co.za">www.epsasa.co.za</a> or <a href="http://www.tiasa.org.za">www.tiasa.org.za</a></p>	<p><b>9. SHOWERS</b> A shower uses less water than bathing which means less work for your geyser. Switch to an energy and water saving shower head for more savings and ensure your shower enclosure is constructed from laminated or toughened glass. <a href="http://www.aaamsa.co.za">www.aaamsa.co.za</a></p>
