

# HEAT WAVES

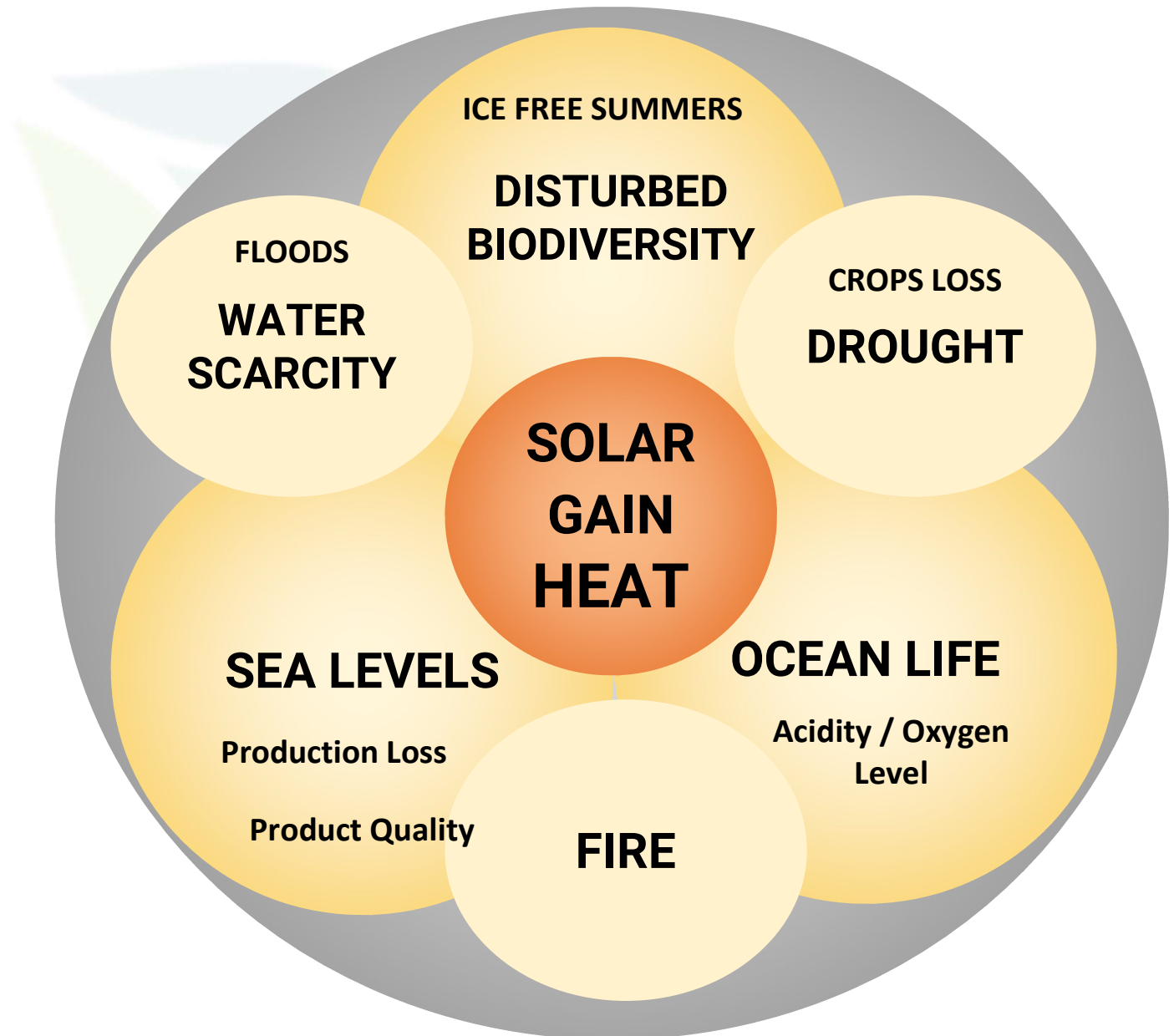
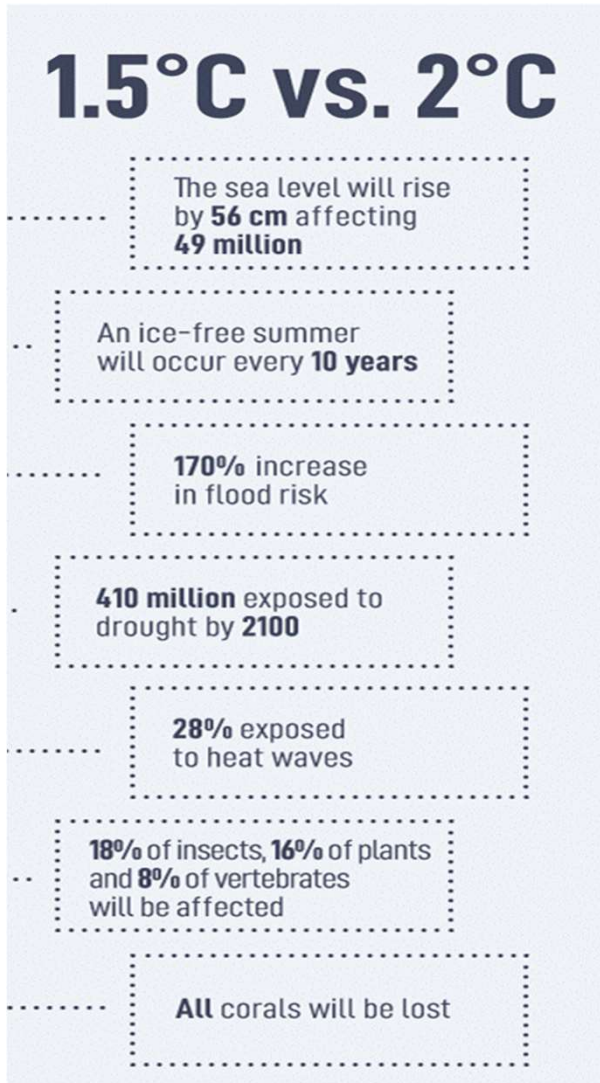
## KILLER IN DISGUISE



### IPCC report 2021 key point

Hot extremes & heat waves are now frequent and more

# RIISING TEMPERATURE TRENDS !



# Women bear the brunt of deadly Heat Waves Indoors & outdoors

Area	Gender	Employment and related activities	Unpaid domestic work
Rural	Male	69.7%	29.2%
	Female	22.5%	93.2%
Urban	Male	73%	22.5%
	Female	19.9%	88.8%
Total	Male	70.7%	27%
	Female	21.7%	91.8%

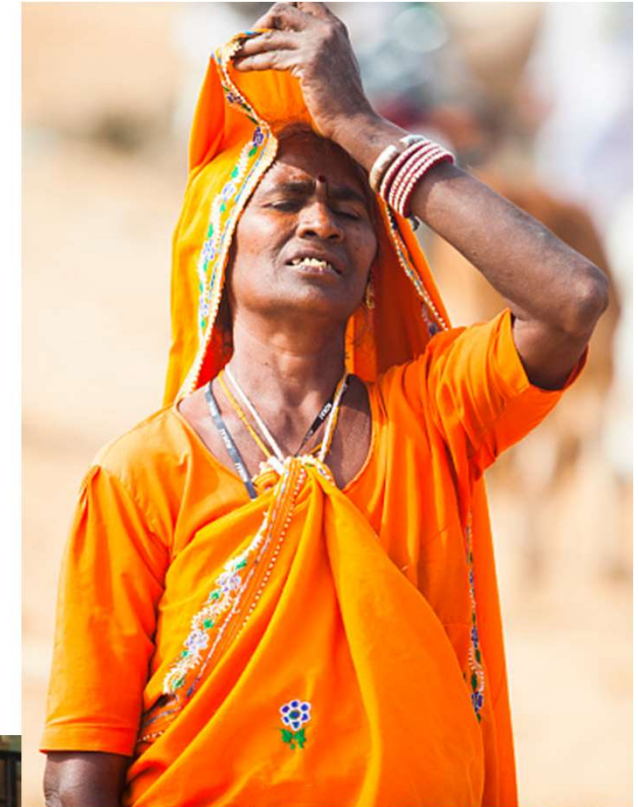
65% of women are home-based workers with dual responsibility.



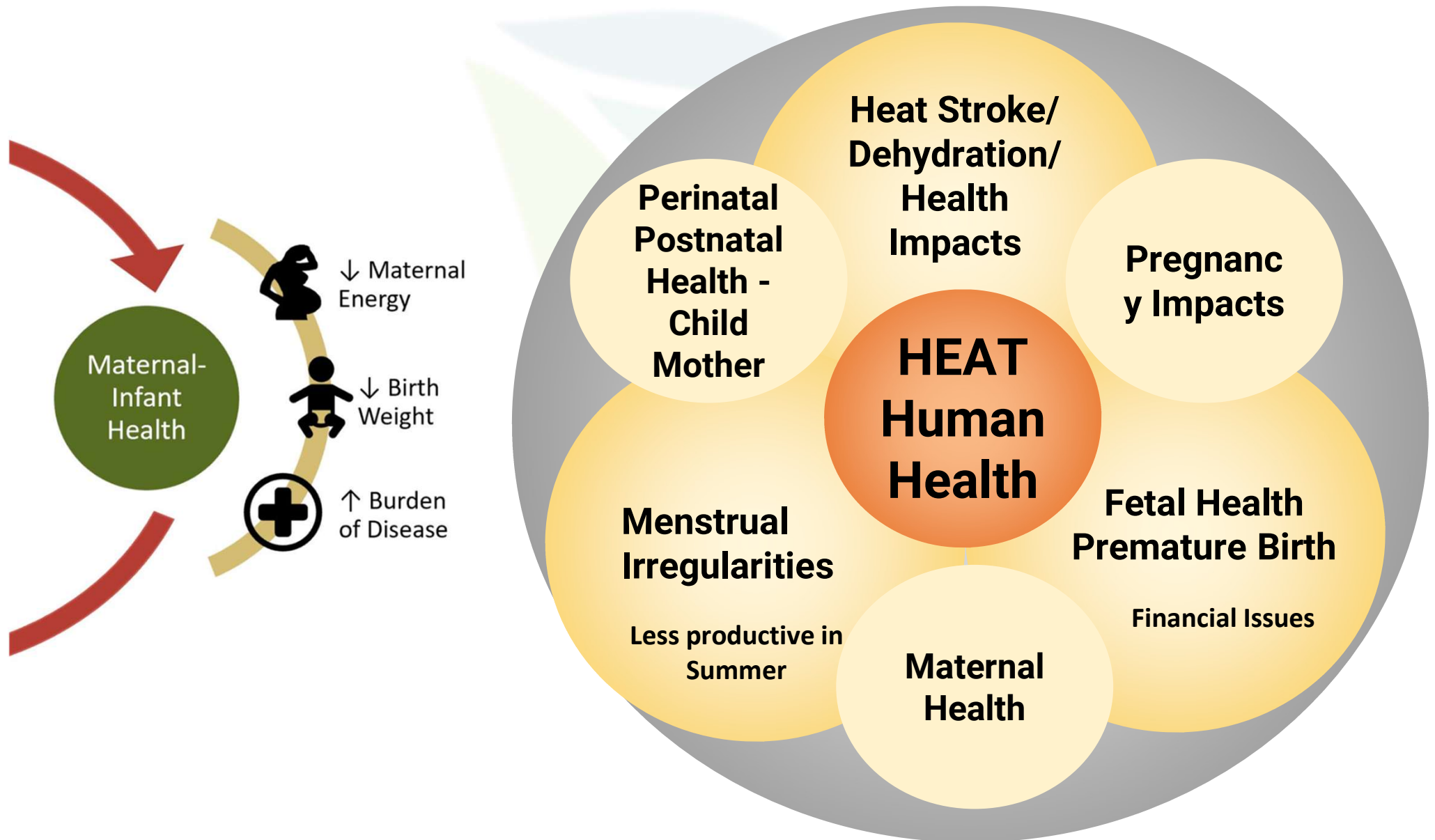
## Building Surface Heats up to 70 Deg C

### Buildings Remains Heated up Till Midnight !

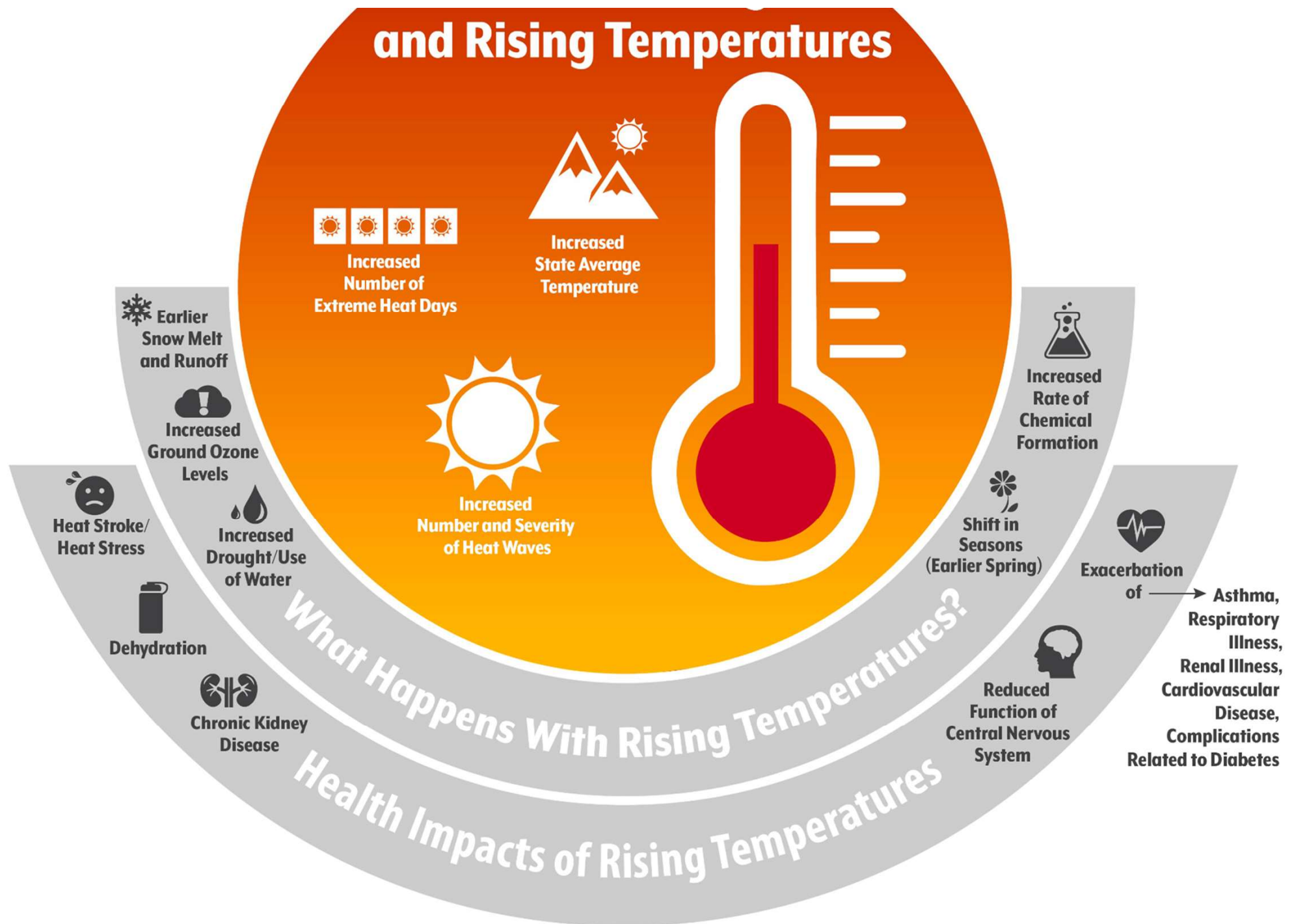
- 43% reports loss of cash incomes,
- 41% reports reduced productivity.
- 60% workload increased by 2 hrs
- 80% reports health issues
- 70% face family quarrels due to frustration, insomnia, heat distress
- Indian heavy clothing, creates mess
- Reduced water intake to avoid toilet trips, takes toll on health.
- Mortality rate is higher in females
- Symptoms of heat illness & heat injury during pregnancy
- Preterm labour due to uterine contractility
- Malnutrition due to loss of appetite



# Heat Waves - Toll on Women / Human Health



# These are all Consequences & Symptoms of HEAT .....



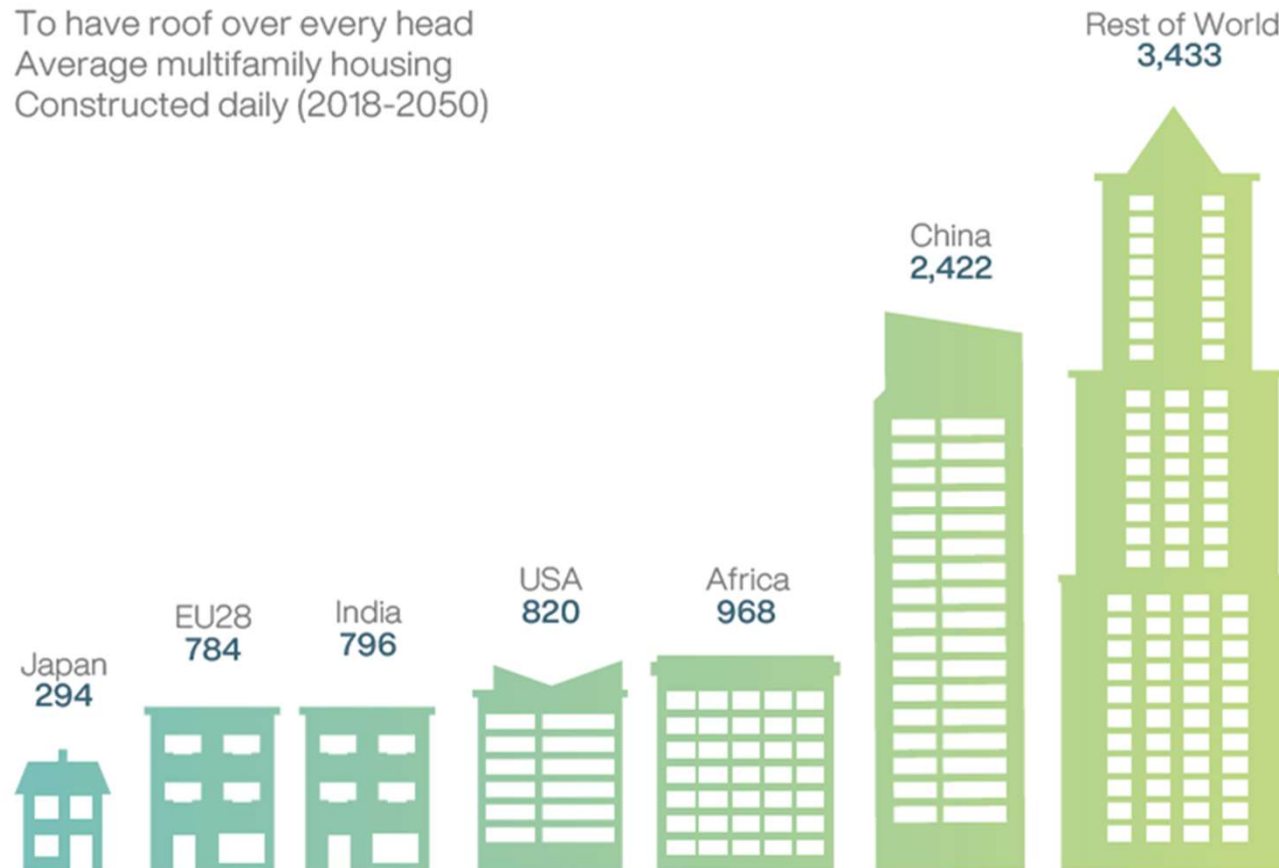
**WHERE ARE THE ROOTS FOR THE  
PROBLEM ?**

**HEAT GENERATION !!**

# URBANIZATION & CONCRETE JUNGLES

Every day, at least **200,000** people pack their bags and move to the big city. By **2050** almost **70%** of the world's population will live in cities - that's about **7 billion** people.

To have roof over every head  
Average multifamily housing  
Constructed daily (2018-2050)





**METAL STRUCTURES  
WAREHOUSES & LOGISTIC CENTRES  
MANUFACTURING INDUSTRIAL PARKS**



**Industrialization  
Like This !**





# URBANIZATION METAL & CONCRETE JUNGLES

SOLAR DOMINANT CLIMATE

An aerial photograph of a densely packed urban area. The majority of the buildings have bright blue corrugated metal roofs, creating a mosaic-like pattern. Some buildings have grey or white roofs. There are some green trees and a few roads visible between the buildings. A river or canal is visible on the right side of the image.

# Like This!

TEMPERATURE OF CEMENT / STONE

SURFACES RISES TO **60 – 70 °C!**

TEMPERATURE OF METAL SHEETS

RISES TO **70 – 80 °C!**



# WHAT'S THE WAY OUT ?

INSULATION ?  
SOLAR GENERATION?  
ENERGY EFFICIENT EQUIPMENTS?  
PLANTATION?

OR

**REDUCE HEATING OF THE BUILT STRUCTURES  
ROOFS & WALLS ROADS?**

LESS HEAT GENERATED TO BE TRANSMITTED INDOORS ?  
LESS HEAT EMITTED IN ATMOSPHERE ?

# CAN SURFACES BE COOLED TO MITIGATE UHI IMPACTS

Cool Surfaces to  
REDUCE



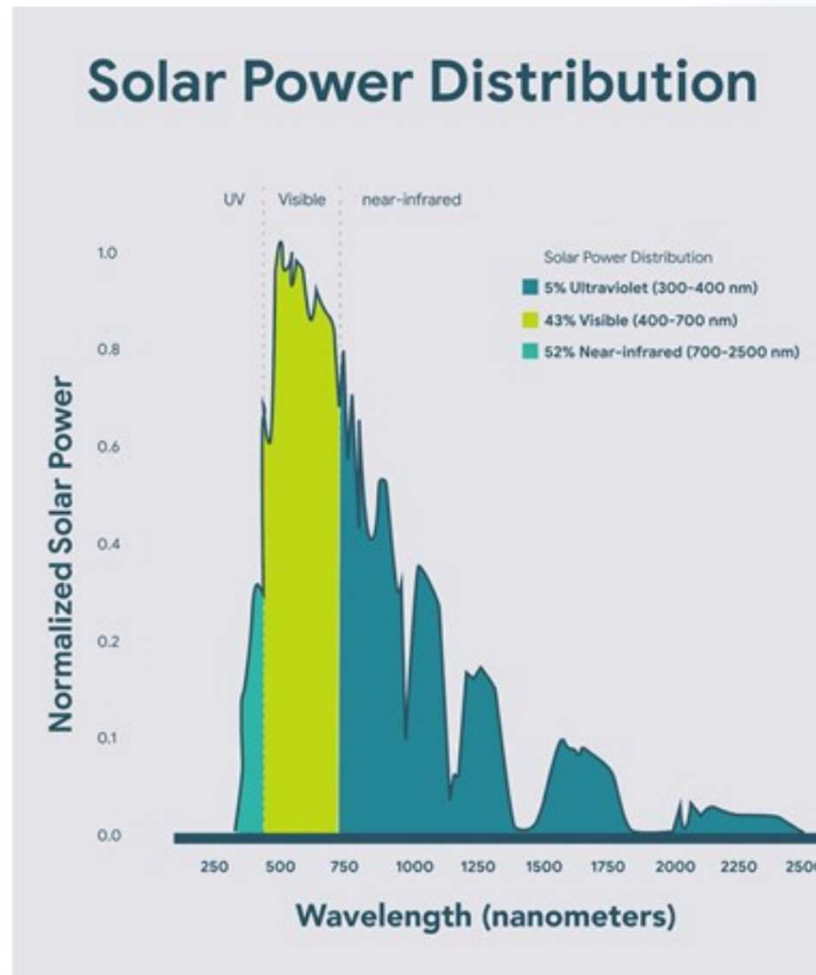
IMPACTS

**CAN WE REDUCE HEATING OF THE BUILT STRUCTURES?**



# COOL SURFACES BASICS

## SOLAR POWER DISTRIBUTION

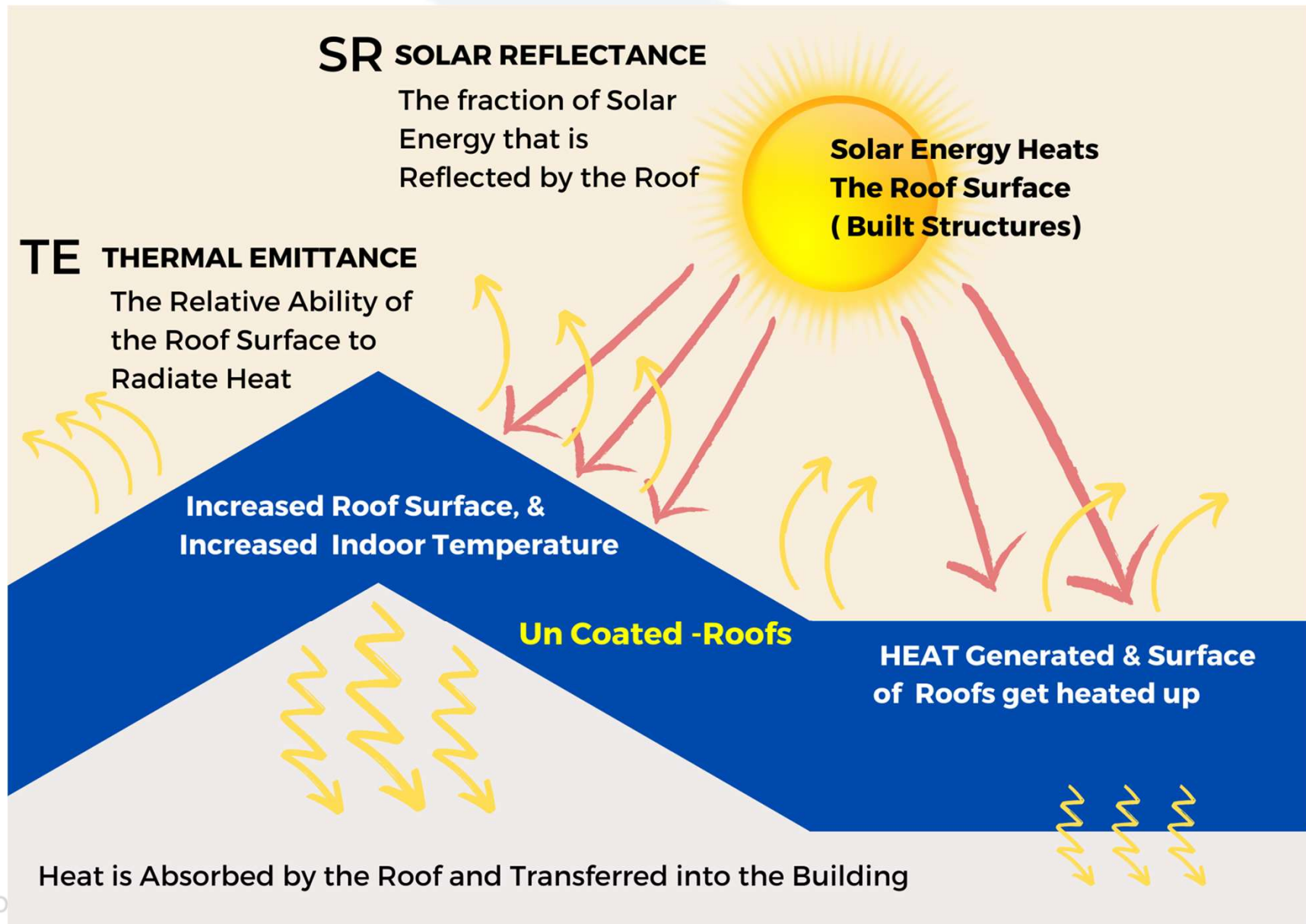


**UV Rays**  
**Visible Rays**  
**IR Radiations**

IR RADIATIONS FROM SUN CONVERTS INTO HEAT ENERGY - EVERYTHING UNDER SUN GETS HEATED UP - SURFACE TEMP IS EXTREMELY INCREASED ( MORE THAN AIR TEMP)

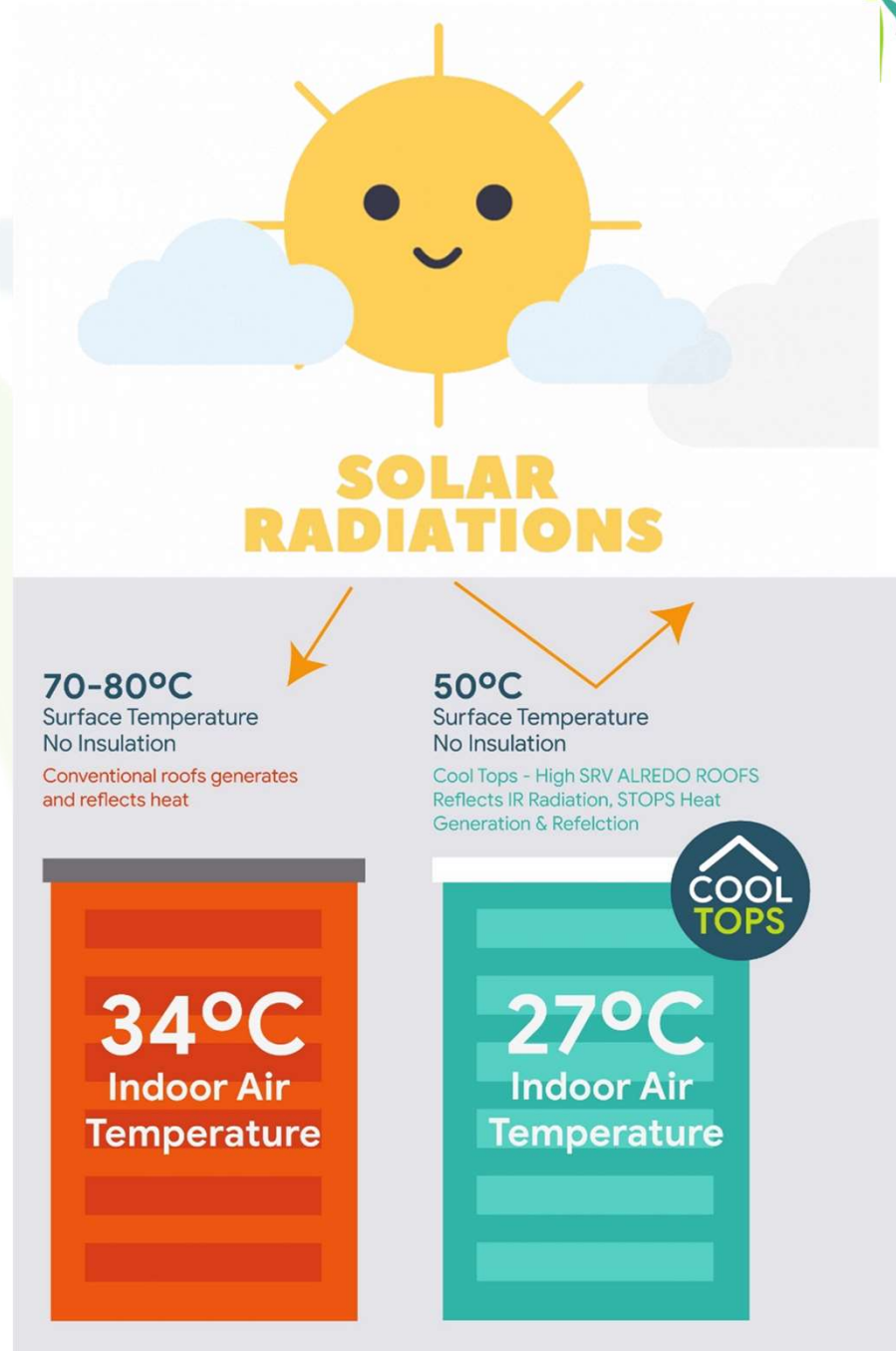
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# HOW STRUCTURES GET HEATED UP?



# SOLAR INSULATION HIGH SRI COOL SURFACES

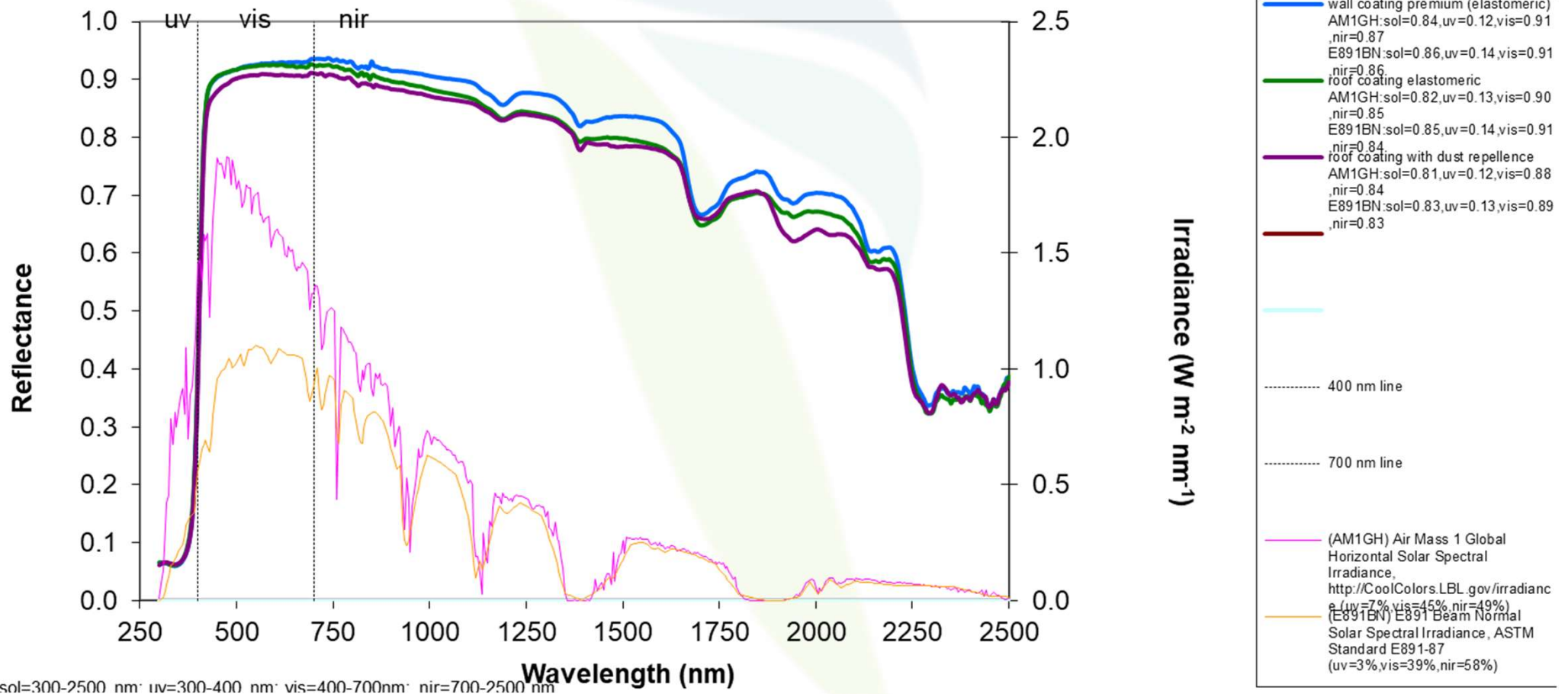
NIR Reflection Technology &  
Nanotechnology



**Reduces SURFACE  
TEMP by 15 – 20° C**

**Reduces INDOOR  
TEMP by 4 – 8° C**

# Spectral graph for PANACHE'S Products; tested by LBNL,US





# REFLECTIVE PAVEMENTS REDUCES UHI!



## Partnership

*Partnership is established to pursue scalable solutions to make roads a part of the urgent need for heat resilient communities*

**Washington, DC** – A group of more than 20 jurisdictions, non-profit organizations, and industry representatives has formed the Cool Roadways Partnership to accelerate the development and scaled deployment of pavements and pavement products that reduce surface and air temperatures and build resilience to rising heat. The participating jurisdictions, who together anticipate investing \$4.75 billion to add, maintain, or replace 70,000 lane-miles over the next 10 years, have issued a Request for Information seeking industry partners to collaboratively identify, develop, demonstrate, and deploy cool roadway solutions that can be incorporated into their regular paving operations. The Request for Information is available [here](#) and responses are being accepted through March 19, 2021.

“The Cool Roadways Partnership builds on the work we’ve done over the past four years in Los Angeles to pilot cool roadway products, to collaborate on innovation, and to help achieve our larger goal of cooling the city. NASA’s space instrumentation is now showing that our cool roadway installations are also reducing temperatures in the surrounding area. We are pleased to join the Partnership to help further the use and availability of these important solutions,” said Greg Spotts, Assistant Director and Chief Sustainability Officer for the Bureau of Street Services for the City of Los Angeles.

The need to protect people from rising temperatures is one of the crucial resilience and sustainability challenges of the 21st century. Heat has negative implications for nearly every aspect of our communities including health and well-being, air and water quality, infrastructure, energy use, and economic prosperity. The burdens of heat are borne disproportionately by low-income communities of color, making efforts to improve heat resilience a critical social justice and equity goal. Pavement makes up about a third of urban land surfaces but, unlike roofs, there is not a nationally scalable way to make it a heat mitigation solution.

“Cool roadways can reduce air temperatures by up to 7°F and that magnitude of cooling will have a substantial positive effect on the quality of life in our communities. Cool roadways have been shown to substantially extend roadway life, thus reducing road maintenance costs. In addition, cool roadways are often light in color and are better illuminated at night, enhancing visibility and

**GCCA –**  
GLOBAL COOL CITY ALLIANCE

# HI SRI COOL COATINGS KEEPS THE SURFACES COOL



**COOL ROOF COATINGS**



**COOL WALL PAINTS**



**COOL CYCLE TRACKS,  
PAVEMENTS , ROADS**







**SITE LOCATION:  
ASIAN PAINTS, MYSORE.**



# WARRANGAL SMART CITY – COOL ROOF PROJECT



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# COOL WRAP - SHIV NADAR UNIVERSITY



# ROADS & PAVEMENTS



# SAVINGS & SOLAR EFFICIENCY BY COOL ROOFS

Model	PPAM-Transparium	20 % Bifacial Effect
Max. Power [ $P_{max}$ ]	360W <sub>p</sub>	432W <sub>p</sub>
Open circuit Voltage [ $V_{oc}$ ]	52,1V	52,1V
Max. Pow. Voltage [ $V_{mpp}$ ]	41,9 V	41,9 V
Power Tolerance	-3%/+5 %	-3/+5 %
Module Efficiency	18.6%	22.3 %

Ref: IGBC HQ, Hyderabad

- Solar Cells – Optimum temp for efficient generation 35 to 38 Deg C.
- Heat Intensity of surrounded area and wind transmittance reduced.
- Degradation of the Solar Cells Reduced.
- Demand of Cooling reduced
- The incident absorption of reflected IR radiations increased.

Around **15 – 25% additional** bifacial gain can be expected for two reasons:

1.Installation of Bi-facial Solar modules at an elevation of 1.5 m.

1.Implementation of High SRI paint for higher yield from the back of bifacial solar PV modules.

# COOL ROOF BENEFITS: INDIVIDUAL BUILDINGS

In many climate zones, a cool roof can reduce the cooling load of the building, which can help:

**Provides REQUIRED OPTIMUM THERMAL COMFORT WITHOUT AC !**

- Lower utility bills – Save electricity / AC bills min by 24%
- Increase occupant Thermal comfort by 50%
- Achieve Sustainable Goals
- Increase Solar Efficiency by 10 to 15%
- Extend the life of HVAC equipment
- Better Indoor quality
- Production & Process Loss reduced
- Product Quality enhanced
- Life of construction
- Health benefits

Overall impacts may vary depending on climate zone, time of year, energy use patterns, and proper installation.



## COOL ROOF BENEFITS: COMMUNITIES

Cool roofs and the associated reduction of air conditioning use can help:

- Improve **grid stability** during peak times of day and peak seasons
- Improve **air quality**
- Reduce the **Urban Heat Island effect (UHI)** and associated public health risks from heat waves or increased building temperatures
- Reduce GHG emissions
- Improved mental health & health benefits

# COOL ROOF BENEFITS: GLOBAL

Globally, cool roofs can help:

## REDUCE CITY TEMPERATURE BY 2 TO 3 Deg C

- Address climate change by lowering CO<sub>2</sub> and other emissions associated with fossil fuel-generated electricity used for AC.
- Reduce smog formation.
- Helps to control heat pollution & air pollution.
- Raise the global albedo, thereby reducing the effect of global warming.



# Panache

Creating Cool Green Cities!





A PROUD FOUNDING MEMBER  
FOR CRRC WALL PROGRAM



## PANACHE OTHER ASSOCIATIONS



GREEN PRO / GRIHA / EPD – IN  
PROCESS / INDIAN GREEN BUILDING  
COUNCIL / CII

FEDERATION OF GUJARAT INDUSTRIES / VCCI / BNI,  
VESTA, VADODARA/WAREHOUSING ASSOCIATION OF  
INDIA/ ROTARY DIST 3060

# COVER PAGE OF ENTREPRENEUR MAGAZINE





# Business Magazine of Construction & Architecture Segment



BRAND ENTREPRENEUR

**Panache**  
Creating Cool Green Cities!  
Proud Founding Member for Wall Program of CRRC

**Neetu Jain**  
Managing Director  
Panache Greentech Solutions Pvt. Ltd.  
Authorized Educator CRRC.

Neetu Jain, Managing Director of Panache Greentech Solutions, is an CRRC authorized educator for India and also the Chairperson of IGBC Vadodra chapter. She is Management committee member for Federation of Gujarat industry. Accompanied with many awards in the past like Power of Idea Awards, IDAC, CIA awards, very recently she won The Real Woman Awards Season-03, nominated for category, GREEN BUILDING MATERIALS. As a Cool Surfaces & sustainability advocate she has been participating as speaker at various platform like Roof India, IGBC, FCI.

Panache Greentech Solution is the proud founding member of the CRRC Wall program of CRRC (US, initiative of Dept Of Energy US). Since 2011, Panache has converted itself into "Energy Efficient & Protective Building Enveloping" with its range of innovative products, systems & services to deliver "Cool Buildings Without AC". With strong back up & approach of inhouse research & development, Panache is pioneers in Solar Insulation - High SRI Roof & Wall Coatings with an eco-friendly, GreenPro & GREENA certified product range, with ISO certification in process. Catering to complete energy saving & protective building enveloping, Panache provides Thermal Insulation & Waterproofing solutions as well.

Our Vision is to create sustainable societies in the coming years, contributing to our long-term vision of "Creating Cool Green Cities". We wish to be poised high with a vision to be a Global Mark. Panache's sustainable development practices help grow in ways that adapt to the challenges posed by climate change, which will in turn help to protect important natural resources for ours and future generations.

Due to rapid urbanization, global temperature is on the rise. Development of infrastructure and concrete jungles due to urbanization contributes to the elevated surface temperatures up to 70°C high. The urban regions thus experience warmer air temperatures & which contributes to the increased UHI. The temperature of The Roofs, Walls, Roads, Buildings, Industrial sheds, tanks; all built structures (with less reflectivity & emissivity) exposed to Sun get elevated transmitting the heat indoors and emitting the heat of 60°C to 75°C in the atmosphere.

Adopting Cool Roofing System-Cool Tops & Cool non Roof areas can help in reducing the temperature at the surface itself, achieving high thermal comfort by reducing the indoor temperature by 4 to 6 degrees. The AC premises can reduce its electricity bills by 30%. An established research study claims, mass adoption of Cool Surfaces can reduce the city temperature by 2 to 3 Deg.C.

Every strategy adopted for energy efficiency reduces only the heat transmittance. Alone high SRI Cool Surfaces is the technology that acts on the root cause to reduce the heat generation and stops the heating of roof, walls, roads, cycletracks or any built structure. Panache's Cooling range are:

- Cool Tops - High SRI Cool Roof Coatings.
- Cool Wrap - Cooling Wall Paints
- Cool Top Xpress - Cool Roads, Cool Cycle track Coatings.

When applied wide spread Cool Tops can contribute to mitigate UHI impacts & offset the CO2 emissions to combat the climate change. Do join the journey of Panache & be part of the mission to create Cooler & Greener India.

**Panache**  
Creating Cool Green Cities!  
Proud Founding Member for Wall Program of CRRC

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CONSTRUCTION & ARCHITECTURE

APRIL - MAY 2023

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Creative Designers Architects

**Suresh Aggarwal**  
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**Sanjay Mehta**  
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Indus Property Systems



# The Real Woman Awards - Power Women in Construction Industry



# Panache Achievements



POWER OF IDEA AWARDS 2010

GREEN PRO CERTIFICATIONS



PARTICIPATIONS IN RESAERCH  
PROJECTS, DOE, US.

PARTICIPATIONS IN GSEP, US.



PARTICIPATION IN RESAERCH  
PROJECT, TARU, MNRE.



**NEETU JAIN**  
**CRRC EDUCATOR**

WORKING GROUP MEMBER  
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GRIHA CERTIFICATIONS



Join our journey to mitigate UHI Impacts

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