Climate Change, Heatwave,Effects, Sustainability Issues and SDGs

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SCOPE

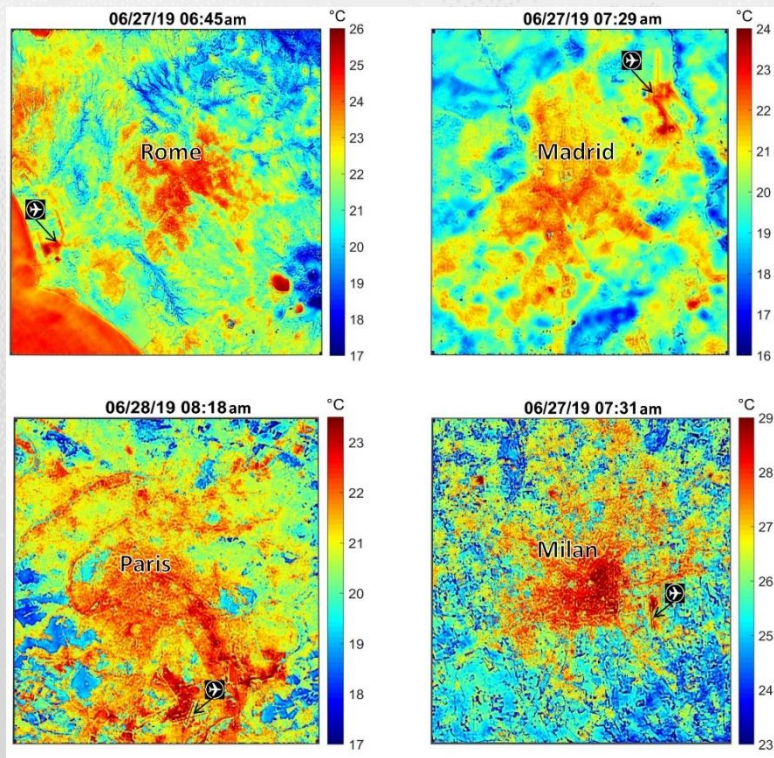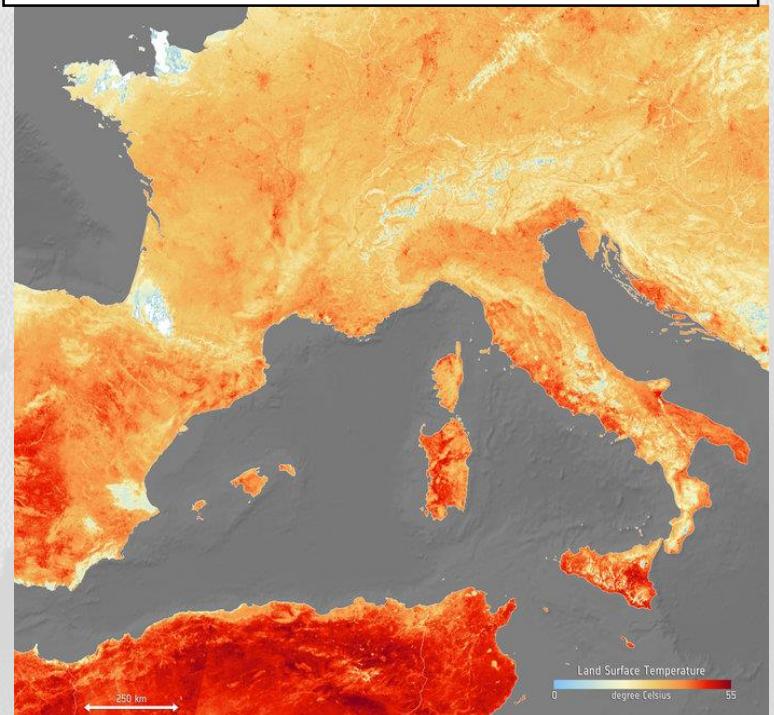|	
01 Introduction	Surface Measurement **05**
02 Heatwave Issues	Sustainability **06**
03 Issues: The Urban Climate.	Resilient City **07**
04 UHI	SDGs **08**

Heatwave Issues

Europe-Above 104 Fahrenheit (40C)

European Space Agency
26 June
The nations worst hit by the unusually hot weather were Spain, France, Germany, Italy and Poland

NASA's ECOSTRESS
Rome, Paris, Madrid and Milan
Morning 27 and 28 June
Above 104 Fahrenheit (40 degrees Celsius)

Source:https://www.geospatialworld.net/blogs/europe-heat-wave-sets-maps-on-fire/

France 7 July 2019

The spike of temperatures from northern africa hit Europe and force France to declare emergency for the first time, when temperatures reached 45.8 degrees celsius
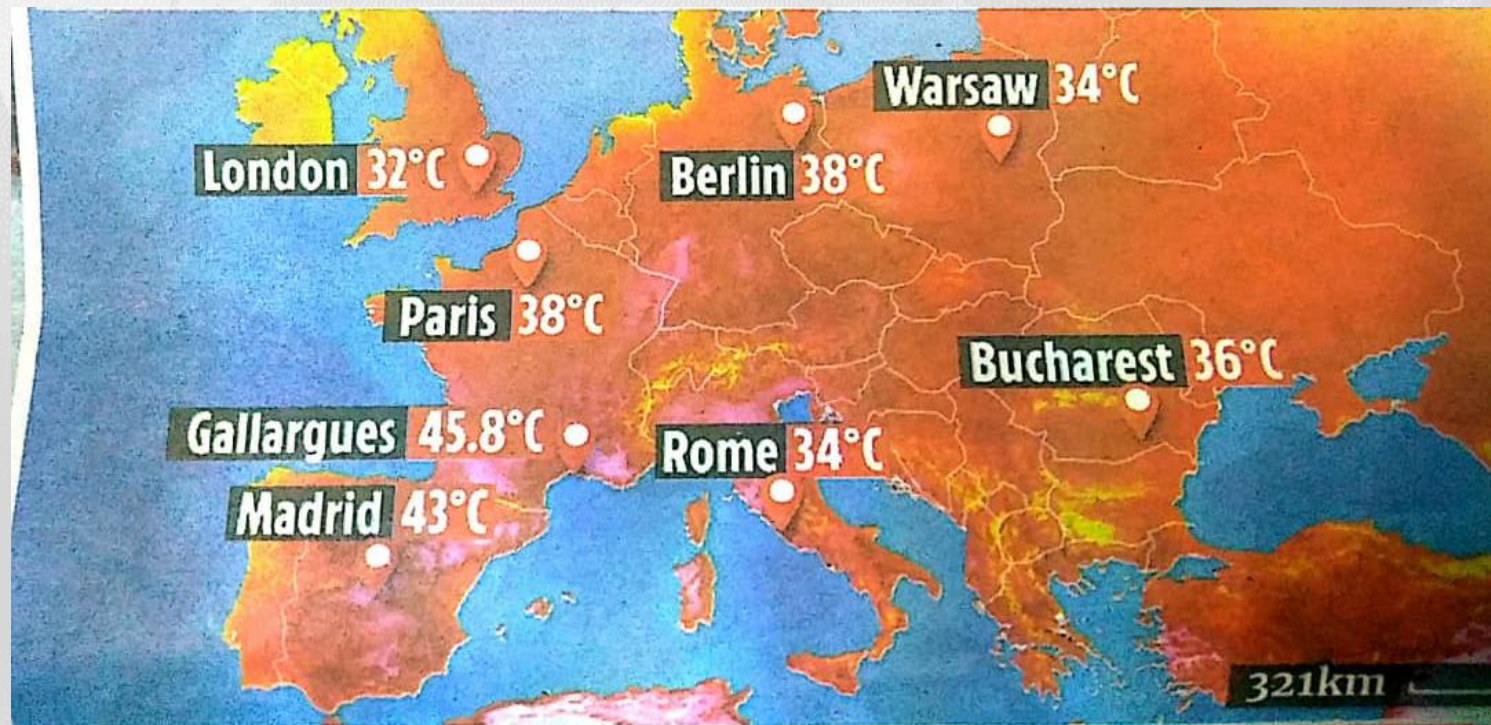
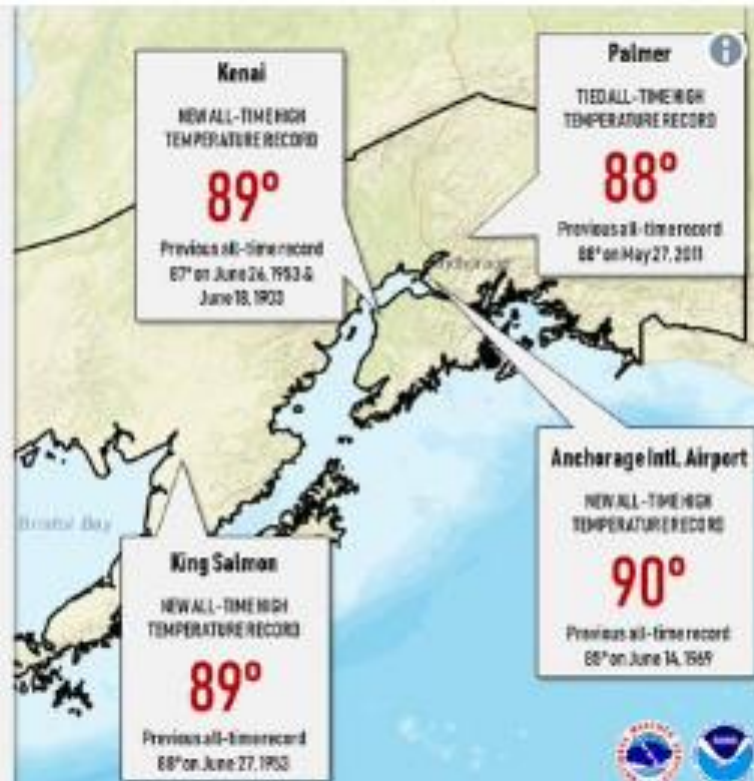# **Anchorage,Alaska-**Temperatures reached 90F (32C)

4 July –Warmest day on record statewide (at least in the last 100 years)

Spain

Madrid- 3 July 2019

Spain recorded its highest temperature ever in July 2017, when the thermometer in Córdoba soared to 46.9ºC

A group of people wait in the shade in Seville during the heatwave

Kuwait 14 June 2019

- Recorded highest temperature in the world 52.2 degrees Celsius in the shadows and 63 degrees Celsius under direct sunlight

- *Source : https://www.gqindia.com/get-smart/content/heatwave-2019-kuwait-records-63-degrees-celsius-temperatures-uae-weather-saudi-arabia-hottest-places-in-the-world-right-now*

Britain

HOTTEST summer start in **60 YEARS** as **30C** forecast THIS WEEKEND..
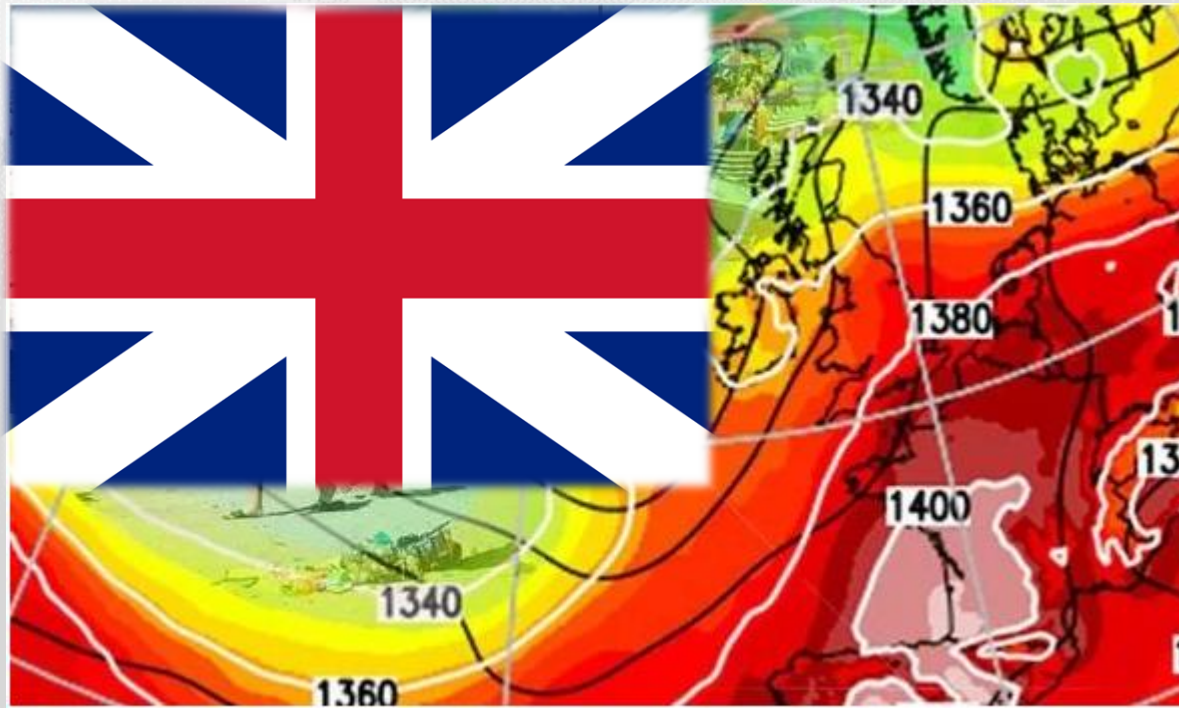
UK weather forecast: Britain is set to bake in a 30C heatwave (Image: GETTY / NETWEATHER)

a sweltering tropical blast sends the mercury rocketing to 30C (86F)

1 June 2019
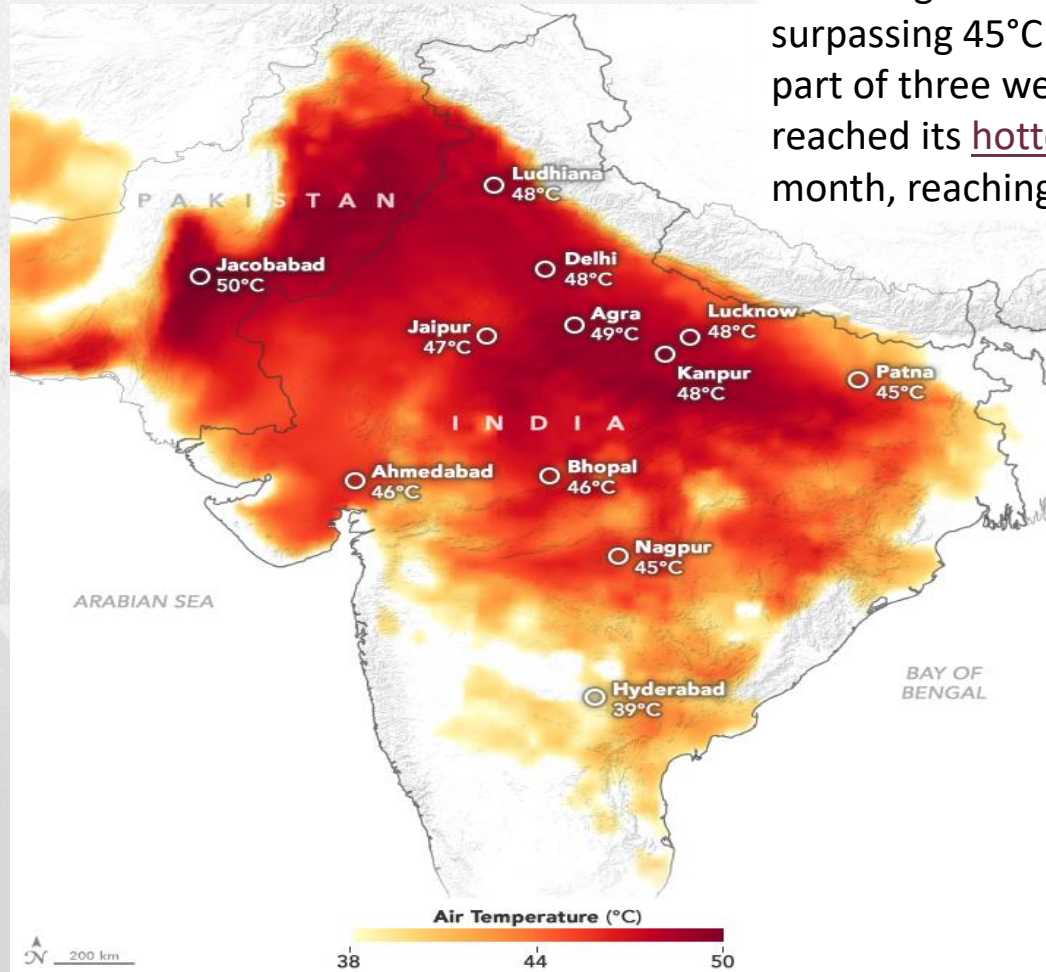
India

10 June 2019

In early June 2019, an intense heatwave scorched northern India. Some regions experienced temperatures surpassing 45°C (113°F) for the better part of three weeks. On June 10, Delhi reached its hottest day on record for the month, reaching 48°C (118°F).

Source:https://earthobservatory.nasa.gov/images/145167/heatwave-in-india

map was derived from the Goddard Earth Observing System (GEOS) model

Japan

city of Kumagaya in Saitama outside Tokyo set a new national heat record, with temperatures hitting 41.1 degrees Celsius

A man wipes the sweat from his face in the scorching heat in Tokyo

Source:https://www.scmp.com/news/asia/east-asia/article/2156589/japans-deadly-heatwave-now-classified-natural-disaster

Heatwave Effects

Livestock

Wildfire

Human Life

Agriculture and crops

Infrastructure

Melting Ice

Water

Dry bed of a lake covered with **dead fish** on the outskirts of Chennai,India- 9 June 2019(northern state of Rajasthan rising to over 50 deg C.)

Weatherwatch: melting Arctic ice brings US heatwaves – 10 June 2019

Sea ice in the Hudson Strait. Arctic ice has shrunk drastically in the last 40 years..

Heat wave in india to cause massive crop loss

Drought

Approximately 300 people have died in the past month as a result of the deadly drought and heat wave in India. A large portion of the nation is undergoing extreme droughts and record-breaking temperatures, with the two hottest months of the year yet to ensue.

Source: https://borgenproject.org/drought-and-heat-wave-in-india-to-cause-massive-crop-loss/

Four

At least four people died during the be...
incl...
Cor...
die...

An...
per...

Japan heatwave declared natural disaster as death toll mounts

in 2003. As
e taking no chances.

Three people have died after getting into difficulty while attempting to cool off. Spencer Hurst, 15, died on Tuesday evening after failing to resurface when swimming in a lake near Walsall. On Monday, another teenage boy drowned in a reservoir outside Rochdale, Greater Manchester, and a woman in her 80s died after being pulled from the sea at East Wittering beach in West Sussex.

Thegurdian.com 21 Jun 17

< Share

Ind

**Soaring
50C in s**

g a raging heatwave which led to the

Amrit Dhillon *in Delhi*
Mon 17 Jun 2019 12.23 BST

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< 296

re than 100 hospitalised in the
ve been majorly reported from

thegurdian.com
17 Jun 2019

LOSS OF LIFE

GETTY IMAGES

The public are being advised to take every precaution to avoid the extreme heat

day.in
e 2019

n Saturday, triggering a raging

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Japan's weather agency has declared a heatwave sweeping the country a natural disaster, with at least 65 deaths recorded in the past week.

An agency spokesman warned that "unprecedented levels of heat" were being seen in some areas.

More than 22,000 people have been taken to hospital with heat stroke, nearly half of them elderly, officials say.

On Monday, the city of Kumagaya reported a temperature of 41.1C (106F), the highest ever recorded in Japan.

d that 27 people died due to
different hospitals," he said.

d from the region while
extreme... ...s both

heatwave...

Wildfires are burning across nearly 4,000 hectares
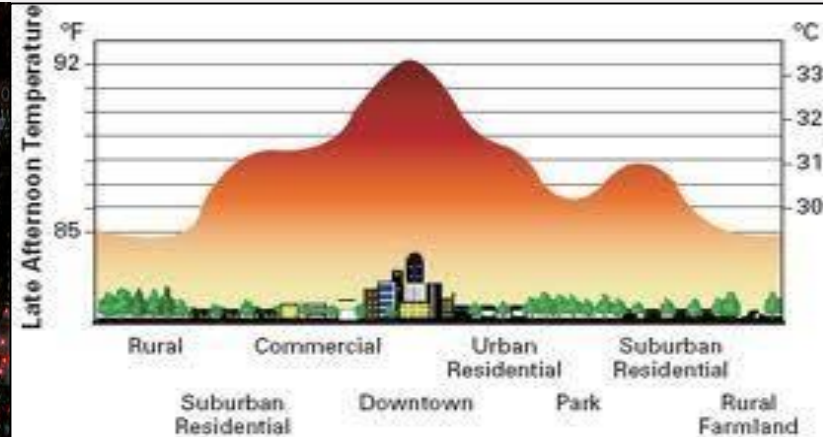in Catalonia in north-eastern Spain – 28 June 2019

EUROPEAN HEATWAVE
WILDFIRES BURN ACROSS SPAIN
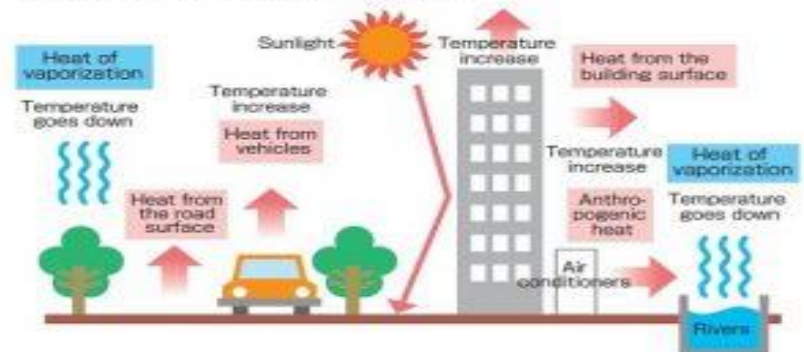
Urban Island Heat
Facts

Why knowing UHI is important?

01 — It may compromise Human Health and Comfort

1. Increased daytime temperatures, reduced nighttime cooling, and higher air pollution levels associated with urban heat islands can affect human health by contributing to general discomfort, respiratory difficulties, heat cramps and exhaustion, non-fatal heat stroke, and heat-related mortality.

2. Heat islands can also exacerbate the impact of heat waves, which are periods of abnormally hot, and often humid, weather. Sensitive populations, such as children, older adults, and those with existing health conditions, are at particular risk from these events.

02 — Impaired Water Quality

1. High pavement and rooftop surface temperatures can heat storm water runoff. Tests have shown that pavements that are 100ºF (38° C) can elevate initial rainwater temperature from roughly 70ºF (21ºC) to over 95ºF (35ºC).4 This heated storm water generally becomes runoff, which drains into storm sewers and raises water temperatures as it is released into streams, rivers, ponds, and lakes.

2. Water temperature affects all aspects of aquatic life, especially the metabolism and reproduction of many aquatic species. Rapid temperature changes in aquatic ecosystems resulting from warm storm water runoff can be particularly stressful, even fatal to aquatic life.

03 — Increased Energy Consumption

1. Elevated summertime temperatures in cities increase energy demand for cooling. Research shows that electricity demand for cooling increases 1.5–2.0% for every 1°F (0.6°C) increase in air temperatures, starting from 68 to 77°F (20 to 25°C), suggesting that 5–10% of community-wide demand for electricity is used to compensate for the heat island effect

2. Urban heat islands increase overall electricity demand, as well as peak demand, which generally occurs on hot summer weekday afternoons, when offices and homes are running cooling systems, lights, and appliances. During extreme heat events, which are exacerbated by urban heat islands, the resulting demand for cooling can overload systems and require a utility to institute controlled, rolling brownouts or blackouts to avoid power outages.

UHI, is a metropolitan area?

An urban heat island, or UHI, is a metropolitan area that's a lot warmer than the rural areas surrounding it. Heat is created by energy from all the people, cars, buses, and trains in big cities like New York, Paris, and London. Urban heat islands are created in areas like these: places that have lots of activity and lots of people.

There are many reasons for UHIs. When houses, shops, and industrial buildings are constructed close together, it can create a UHI. Building materials are usually very good at insulating, or holding in heat. This insulation makes the areas around buildings warmer.

"Waste heat" also contributes to a UHI. People and their tools, such as cars and factories, are always burning off energy, whether they're jogging, driving, or just living their day-to-day lives. The energy people burn off usually escapes in the form of heat. And if there are a lot of people in one area, that's a lot of heat. Increased Energy Consumption

Urban areas are densely populated, meaning there are a lot of people in a small space. Urban areas are also densely constructed, meaning buildings are constructed very close together. When there is no more room for an urban area to expand, engineers build upward, creating skyscrapers. All this construction means waste heat—and heat that escapes insulation has nowhere to go. It lingers in and between buildings in the UHI.

Rural to City
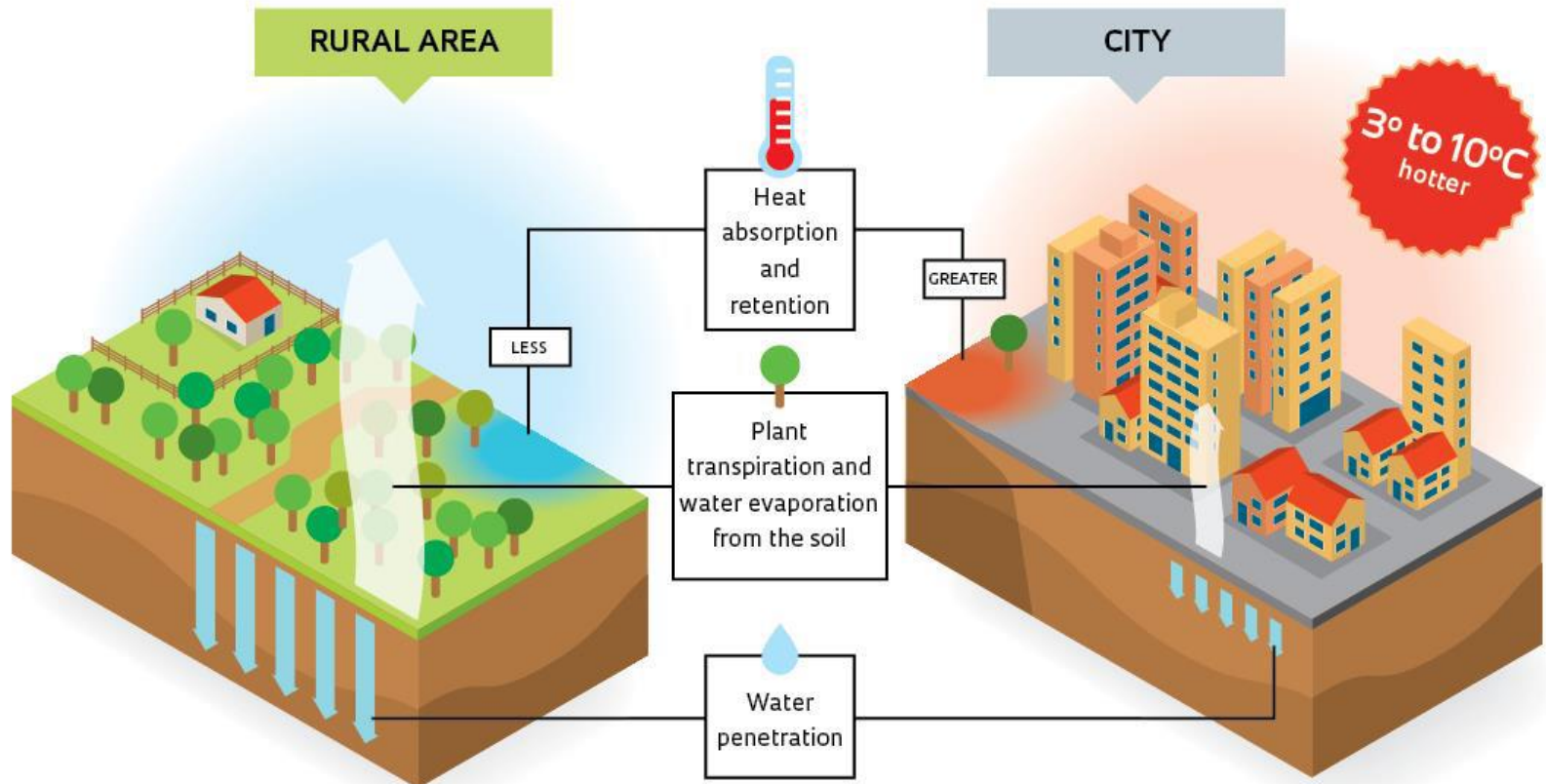
Mapping the UHI
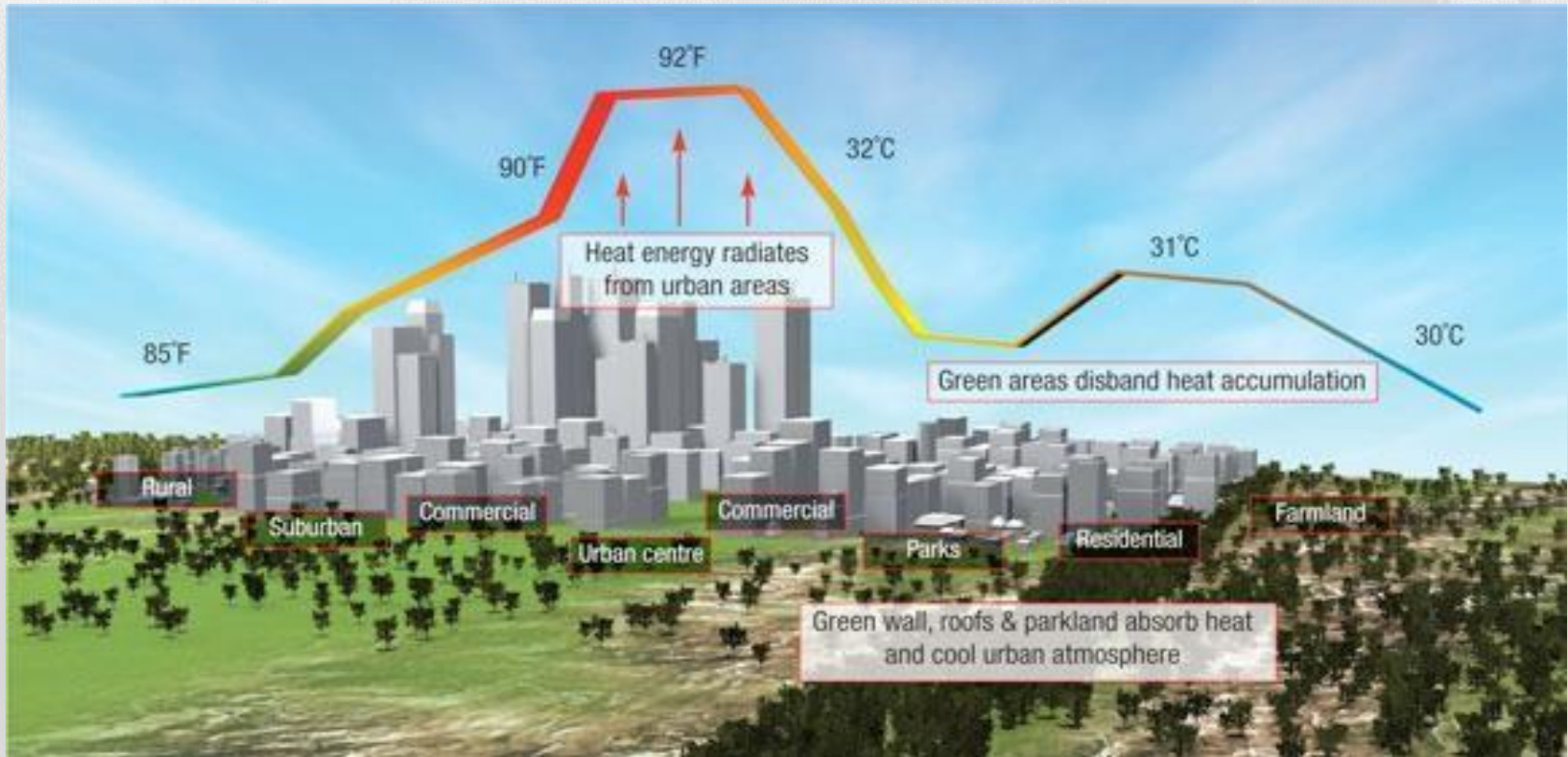
Surface Measurements

The satellite image at left is an example of a surface-based measurement that records energy reflected and emitted from the land, including roofs, pavements, vegetation, bare ground, and water.
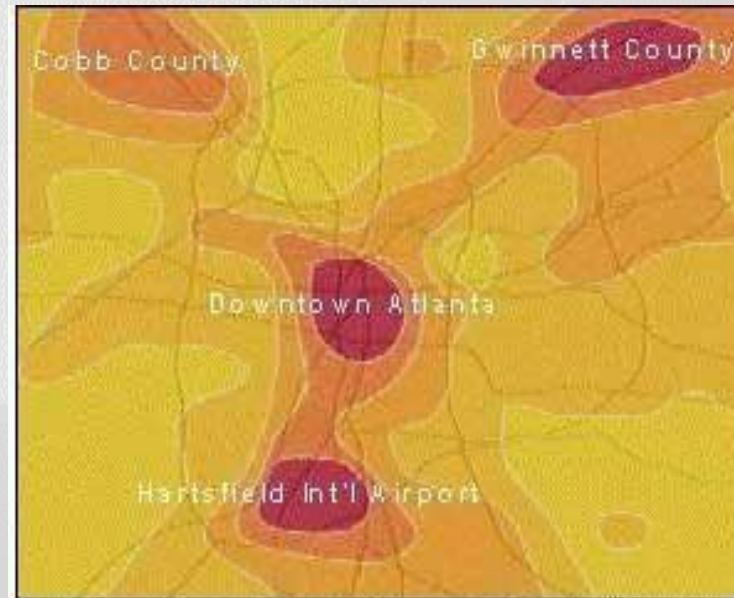
Landsat satellite image of multi-nodal heat island in Atlanta, GA. Darker tones denote higher temperatures.

Source:https://19january2017snapshot.epa.gov/heat-islands/measuring-heat-islands_.html#surface

SUSTAINABILITY

RESILIENT CITY

What is Resilient City?

What is a resilient city?

A 'Resilient City' is prepared to absorb and recover from any shock or stress while maintaining its essential functions, structures, and identity as well as adapting and thriving in the face of continual change. Building resilience requires identifying and assessing hazard risks, reducing vulnerability and exposure, and lastly, increasing resistance, adaptive capacity, and emergency preparedness.

Source: https://resilientcities2019.iclei.org/

Governance
- Clear leadership and management
- Strategic and integrated approaches are taken by leaders
- Public sector has the right skills
- Government is open and transparent

Economy
- A diverse number of industries
- A dynamic economy to generate growth
- Conditions allow innovation to take place
- People have access to employment, education, services, skills training

Environment
- Ecosystem is sound and diverse
- Infrastructure can meet basic needs
- Adequate natural resources are available
- Coherent policy towards land use

Society
- Society is inclusive and cohesive
- Citizens' networks in communities are active
- Neighbourhood is safe
- Citizens enjoy healthy lives

4 AREAS THAT DRIVE RESILIENCE

Source:https://www.oecd.org/cfe/regional-policy/resilient-cities.htm

Developing City Resilience Strategy

Phase 1

City's focus is to gather data, engage the community and stakeholders, understand how the city is already functioning, and create a preliminary work plan outlining where the city will focus and why.

Phase 2

City turns these diagnostics and assessments into actionable initiatives and projects. Exploring and analyzing each focus area, the city can evaluate its opportunities, and initiate workshops and closer study of areas such as financing or risk modeling.

Phase 3

Final step is to implement the city's Resilience Strategy. The strategy serves as a guide, articulating the city's priorities and the specific initiatives to reach them in both the near and long-term.
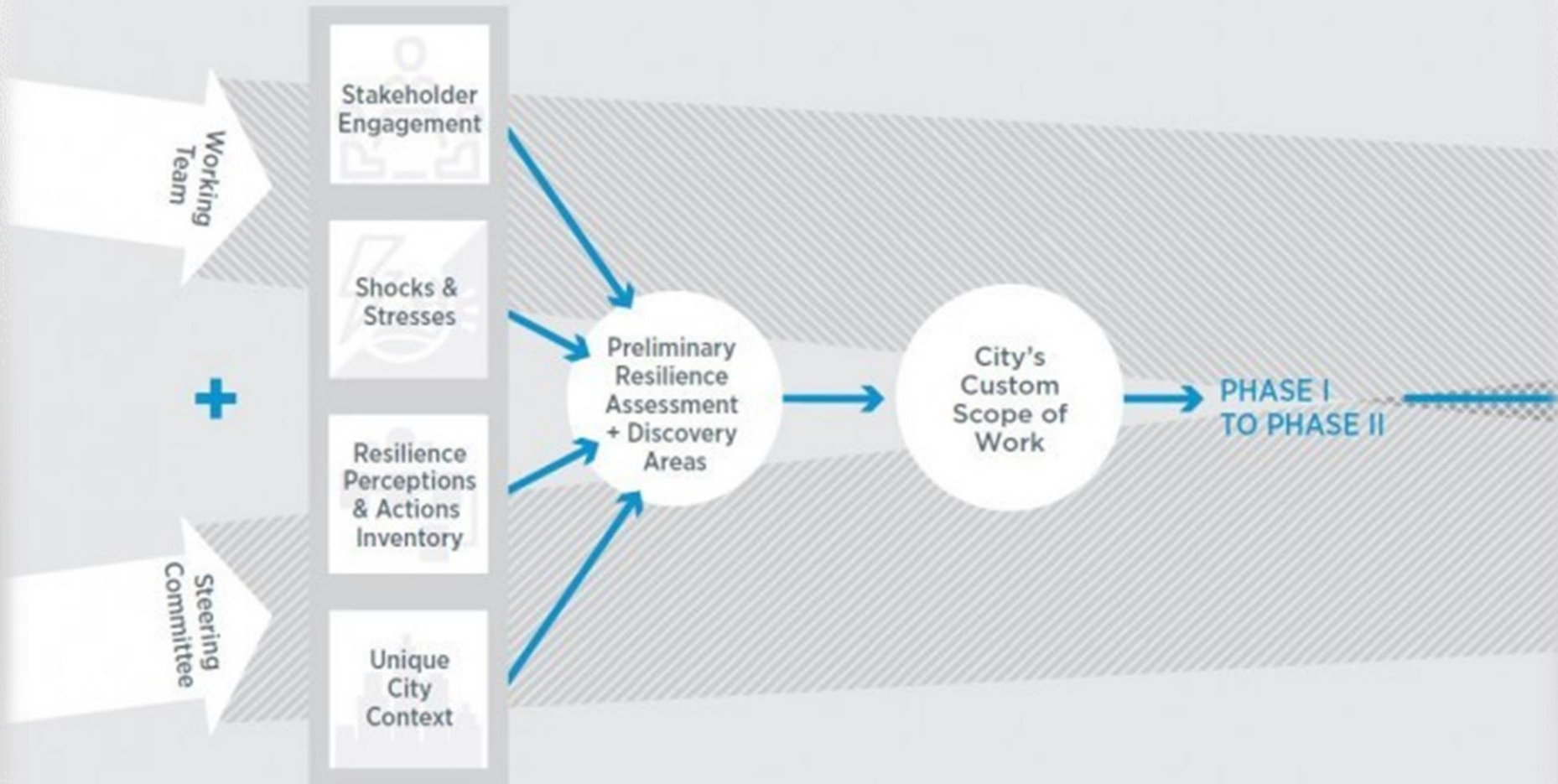
Phase 1

Phase 2 & 3
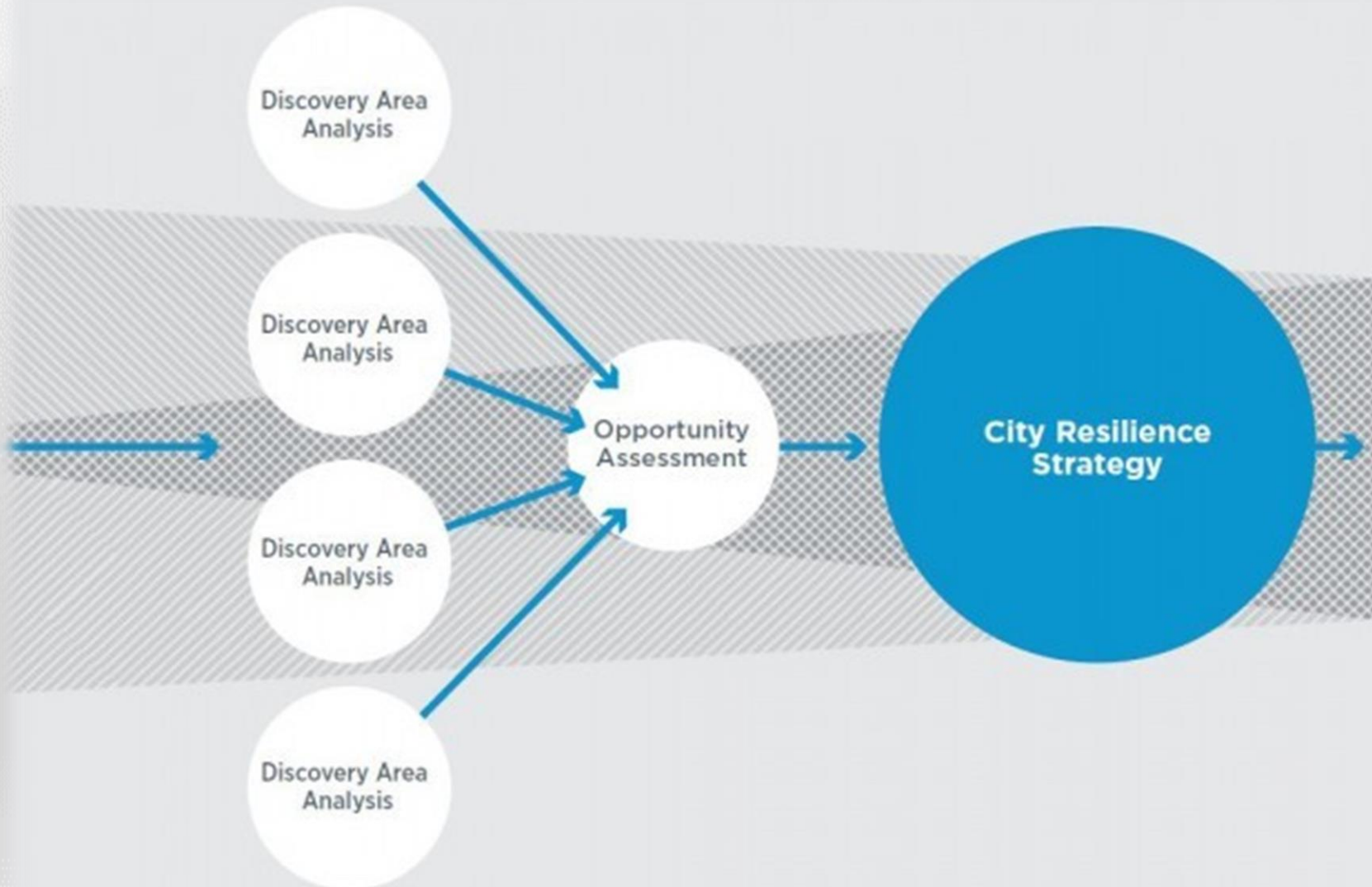
7 Qualities of Resilient Cities Demonstrated
to withstand, respond to, and adapt more readily to shocks and stresses.

Integrated
bring together a range of distinct systems and institutions

Reflective
using past experience to inform future decisions

Resourceful
recognizing alternative ways to use resources

Inclusive
prioritize broad consultation to create a sense of shared ownership in decision making

Robust
well-conceived, constructed, and managed systems

Flexible
willingness and ability to adopt alternative strategies in response to changing circumstances

Redundant
spare capacity purposively created to accommodate disruption

7
1
2
3
4
5
6

Source: http://www.100resilientcities.org/

Resilience Stories and Strategies

BANGKOK THAILAND(ASIA)

10 million residents within 1,500 square kilometers. Nearly half the population comes from other provinces and countries, seeking better opportunities, and many are considered poor and vulnerable. In 2011, Bangkok experienced a severe flood with estimated damages of $45 billion to global supply chain, out of which only $10 billion were insured. This sparked the development of a manual for flood management that includes lessons for resilience building.

Source:http://www.100resilientcities.org/cities/bangkok/

Bangkok Resilient Strategy

Released: February 16, 2017

01 – INCREASING QUALITY OF LIFE	02 – REDUCING RISK AND INCREASING ADAPTATION	03 – DRIVING A STRONG AND COMPETITIVE ECONOMY
• Health and wellbeing for all city residents, now and into the future • Safe, accessible and convenient transportation network • Environmentally friendly urbanization.	• Improving resilience to floods • Increasing public and community-driven action on awareness, preparedness and adaptation; and • Stronger institutional capacity and regulation.	• Facilitating city and community-based economy; and • Expanding tourism, service industry and hospitality.

KYOTO JAPAN(ASIA)

Today, Kyoto city faces a variety of resilience challenges such as more frequent and intense natural disasters along with a declining and aging population which results in fewer citizens able to support the economy and local communities

Source:http://www.100resilientcities.org/cities/kyoto/

ROTTERDAM, THE NETHERLANDS(EUROPE)

Rotterdam's efforts are still being undertaken with an eye towards the flood of 1953, which killed almost 2,000 people and caused widespread property damage. It was an event that underscored the destructive power of the sea, and spurred the modern flood management industry in the country.

Rotterdam, with 80% of its land below sea level, aims to be 100 percent climate-proof by 2025.

Rotterdam's Strategy

1 **2** **3** **4** **5** **6** **7**

PORT CITY BUILT ON CLEAN AND RELIABLE ENERGY

The energy infrastructure provides for an efficient and sustainable energy supply in port and city

NEXT-LEVEL CLIMATE ADAPTATION

Build on current strategy by understanding cascading benefits and sophisticated risk knowledge

A NETWORKCITY

Residents, public and private organizations, businesses and knowledge institutions will determine the resilience of the city together.

A BALANCED SOCIETY

Strong citizens respect each other and are continuously developing themselves

CYBER PORT CITY

Increase resilience to cyber-threats at the city and port

21ST CENTURY READY INFRASTRUCTURE

Develop a more robust and resilient underground infrastructure as a physical basis for a resilient Rotterdam

ANCHORING RESILIENCE IN THE CITY

Develop an innovation and integration agenda to embed resilience thinking

Released Date: April 1, 2016

LONDON'S UK (EUROPE)

The desirability of crowded London has led to soaring real estate costs and a dramatic lack of affordable housing. This resulted in a spike in overcrowded homes and homelessness, and has contributed to air pollution difficulties. London has also been the target of terrorist attacks.

Strategies executed by City Leaders includes:

1. Increase the supply of affordable homes and facilitate access to housing resources
2. The city's decades of experience confronting violent terrorism have honed the skills of its police and security services to keep citizens safe and prevent most attacks
3. Spent the last several years developing green spaces, devising the world's largest congestion pricing traffic scheme, and mandating strict emissions codes in confronting poor air quality and pollution
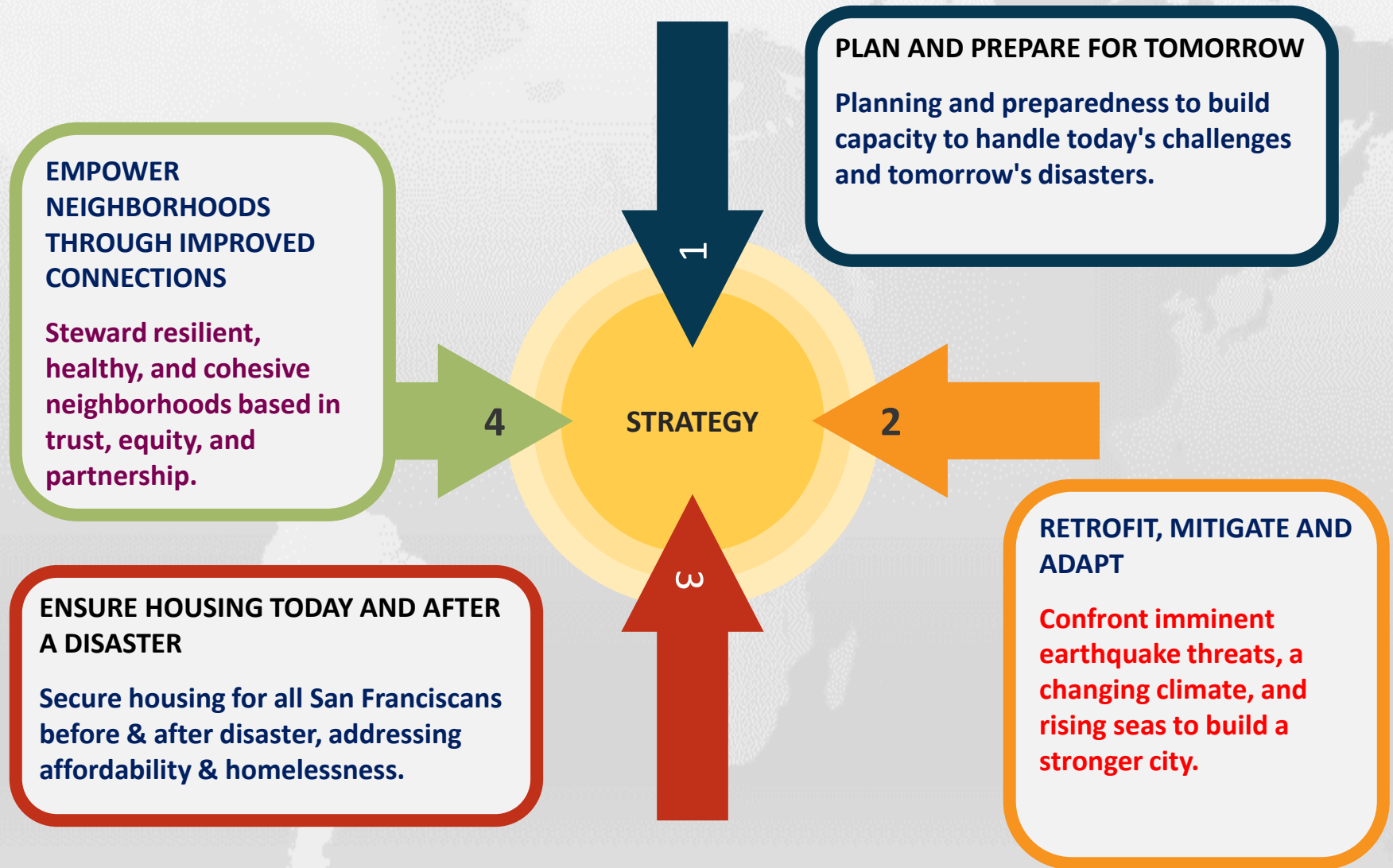
SAN FRANCISCO, US(NORTH AMERICA)

A major hub for tourism, technology and finance, San Francisco is working to prepare its residents and its buildings for earthquakes and fires.
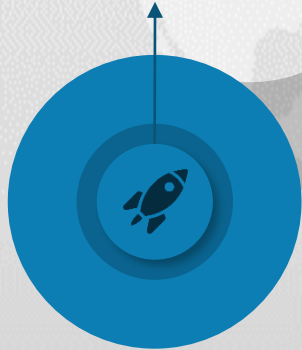
SYDNEY AUSTRALIA (OCEANIA)

Sydney experiencing a range of chronic stresses such as a lack of housing affordability, transport congestion and chronic illness that are impacting people's everyday lives. The city regularly responds to a range of shock events such as extreme heat, storms and flooding or bushfires and cyber attacks.
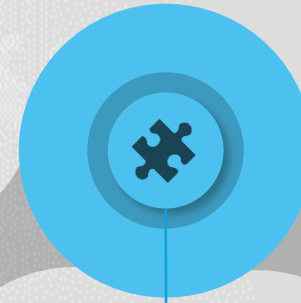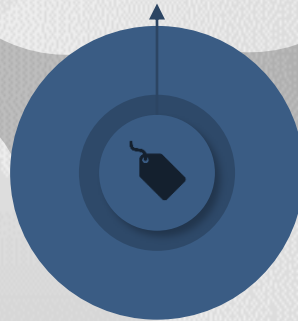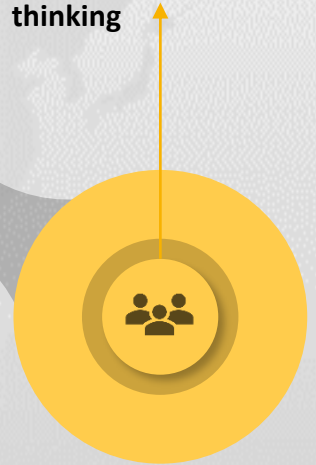
IMPORTANT ISSUES FACING CITIES ACCORDING TO MAYORS

1. Economic Development (75% of speeches)

Economic development is once again the most discussed topic in mayors' addresses. Mayors touted the many gains in business and job growth in their cities. More and more cities are making it easier for entrepreneurs to start or grow a business. And, still a growing number of cities are working to unleash the creative potential of small-scale manufacturing and the maker movement—an ever growing group ranging from hobbyists and tinkerers to independent inventors and designers.

2. Public Safety (mentioned in 70% of speeches)

Public safety is always a top priority of city leaders. Mayors see the alleviation of crime and keeping community members safe as one of the most critical components of their jobs. Many mayors reported an uptick in crime within their cities and this trend, noticeable across the country, was particularly alarming for homicide. However, even though the short-term homicide trend is pointed in the wrong direction, crime is still at the lowest point in decades.

IMPORTANT ISSUES FACING CITIES ACCORDING TO MAYORS

3. Budgets (mentioned in 52% of speeches)

Mayors noted the relative strength of their cities' finances. Many cities are returning to pre-recession levels of fiscal health, and numerous mayors are committed to raising the level of service their cities' provide without raising taxes. Fiscal discipline continues to be a primary goal for leaders as they chart the path forward.

4. Infrastructure (mentioned in 48% of speeches)

From bike paths to sewer systems, infrastructure is a wide ranging topic that receives top billing in Mayoral addresses year after year. The lead crisis in Flint demonstrated the vast effect infrastructure decisions can have on the lives of our most vulnerable residents. Mayors are also taking steps across the board to improve health outcomes by linking elements of infrastructure to public health. Our city leaders also stressed the importance of active and safe transportation to the vitality of their cities.

Source:https://www.100resilientcities.org/the-10-most-important-issues-facing-cities-according-to-their-mayors/

SDGs

What You can do to reduce Heat Island

Small little things that may bring big changes

3) Installing cool mainly reflective roofs

4) Using cool pavements (either reflective or permeable),

2) Installing green roofs

Many communities are taking action to REDUCE URBAN HEAT ISLANDS using 5 MAIN STRATEGIES:

5) utilizing smart growth practices

1) Increasing tree and vegetative cover

Reduce Heat Islands

1)Install cool roofs

2)Use energy-efficient appliances andequipment

3)Check on your friends, family, and neighbors

Cool (or reflective) roofs help to reflect sunlight and heat away from your home, reducing roof temperatures. This allows for your home to stay cooler, reducing the amount of air conditioning needed during hot days. According to a study conducted in California[1],cool roofs can provide annual energy savings of almost 50 cents per square foot. Such energy savings can also result in better air quality in your community and fewer greenhouse gases emitted to the atmosphere.

Using efficient appliances and equipment in your home can help to lighten the load on the electric grid during heat waves, thus ensuring a more reliable supply of electricity to your community. When purchasing products, look for EPA's ENERGY _STAR label to help you make the most energy-efficient decision. You can find the ENERGY STAR label on more than 60 kinds of products, including appliances, lighting, heating and cooling equipment, electronics, and office equipment. Replacing your old appliances and equipment with ENERGY STAR-qualified products can also help save you money.

Heat waves can be dangerous for people's health and safety, particularly for the elderly, young, sick, and poor. Checking on your friends, family, and neighbors during hot days and making sure they have access to air conditioning or cooling centers will help to prevent heat-related illnesses and death.

TIPS TO HELP REDUCE THE ISLAND HEAT EFFECT AND IMPROVE YOUR COMMUNITY'S RESILIENCE TO HEAT WAVES.

Increase shade around your home

Planting trees and other vegetation lowers surface and air temperatures by providing shade and cooling through evapotranspiration. Trees and vegetation that directly shade your home can decrease the need for air conditioning, making your home more comfortable and reducing your energy bill.

Install green roofs

Green roofs provide shade and remove heat from the air through evapotranspiration, reducing temperatures of the roof surface and the surrounding air. Green roofs absorb heat and act as insulators for your home, reducing energy needed to provide cooling and heating (which decreases your energy bill), improving indoor comfort, and lowering heat stress associated with heat waves.

Install cool roofs

Cool (or reflective) roofs help to reflect sunlight and heat away from your home, reducing roof temperatures. This allows for your home to stay cooler, reducing the amount of air conditioning needed during hot days. According to a study conducted in California[1],cool roofs can provide annual energy savings of almost 50 cents per square foot.

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INITIATIVES

Increase shade around your home

Plant more tree

Install green roofs

Use energy-efficient appliances and equipment

Check on your friends, family, and neighbors

Stay indoors

Drink a lot of water

Wear light colour clothing

Do not wear dark/ black colour clothing

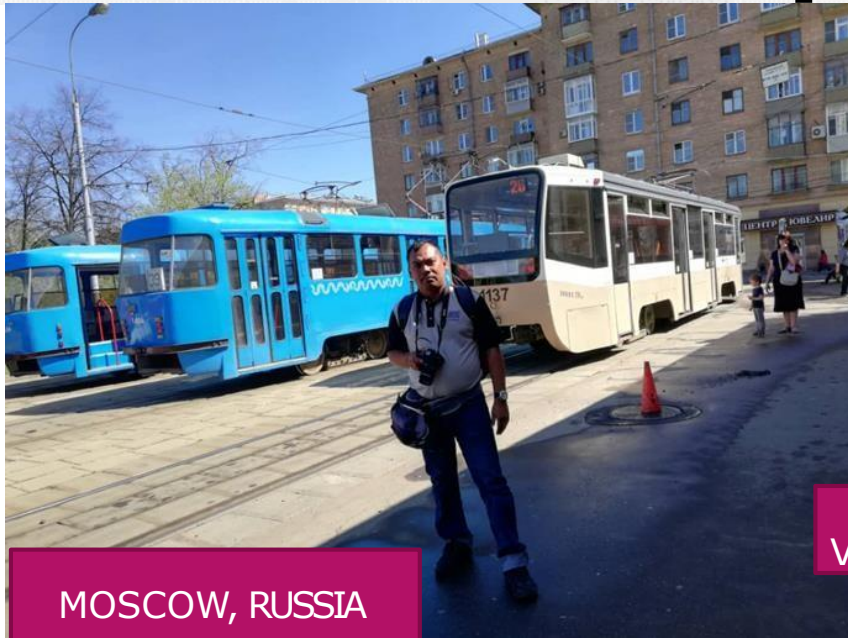Use public transport

Use construction material that absorbed less heat

ECO
ndscape

Public Transport : Tram

MOSCOW, RUSSIA

VIENNA, AUSTRIA

Istanbul, Turkey

AMSTERDAM, NETHERLANDS

Many communities have taken steps to reduce urban heat island. Voluntary initiatives include demonstration projects, incentive programs, urban forestry efforts, weatherization programs, outreach and education, and awards to recognize and encourage heat island reduction activities.

Policy initiatives include procurement, resolutions, tree and landscape ordinances, comprehensive plans and design guidelines, zoning codes, green building standards, building codes, and air quality standards.

SDGs
Your Contribution :
Urban/University/Village/School/Community

Collect from community

The 4R Plan
REDUCE REUSE RECYCLE RECOVER

Low Carbon Behavior and Low Carbon Innitiative

Collaboration with CSR from Industry – Eco Programme

Implementation to School and Eco School Community Engangement to Poor Community.

Layout, Design and plan –green programme

Recycle material

SDGs :Big Future Vision

Java Map, Indonesia

If you want to walk fast, walk alone. But if you want to walk far, walk together.

Ratan Tata

Sekian, terima kasih.

Mhi InternationalGeographer