iFOREST | INTERNATIONAL FORUM FOR ENVIRONMENT, SUSTAINABILITY & TECHNOLOGY

SIDE EVENT

COP29 Baku Azerbaijan

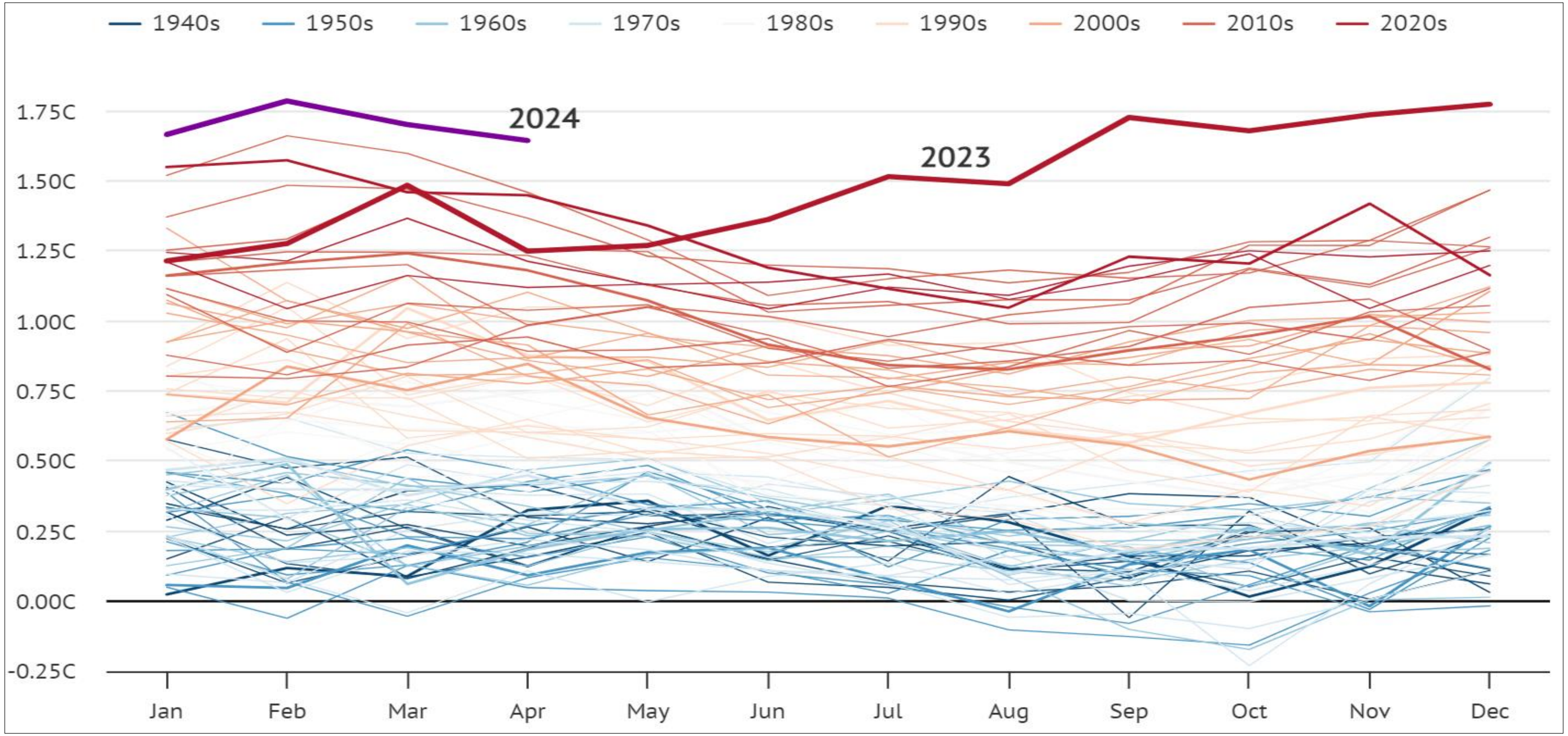
INTEGRATED HEAT AND COOLING ACTION PLAN FOR CITIES

Twenty-ninth Conference of the Parties (COP29) to the UNFCCC

Wednesday, 20th November 2024 | 13:45 to 14:45

G-24, Regional Climate Foundations (RCF) Pavilion, Blue Zone, Baku, Azerbaijan

Facing the Heat

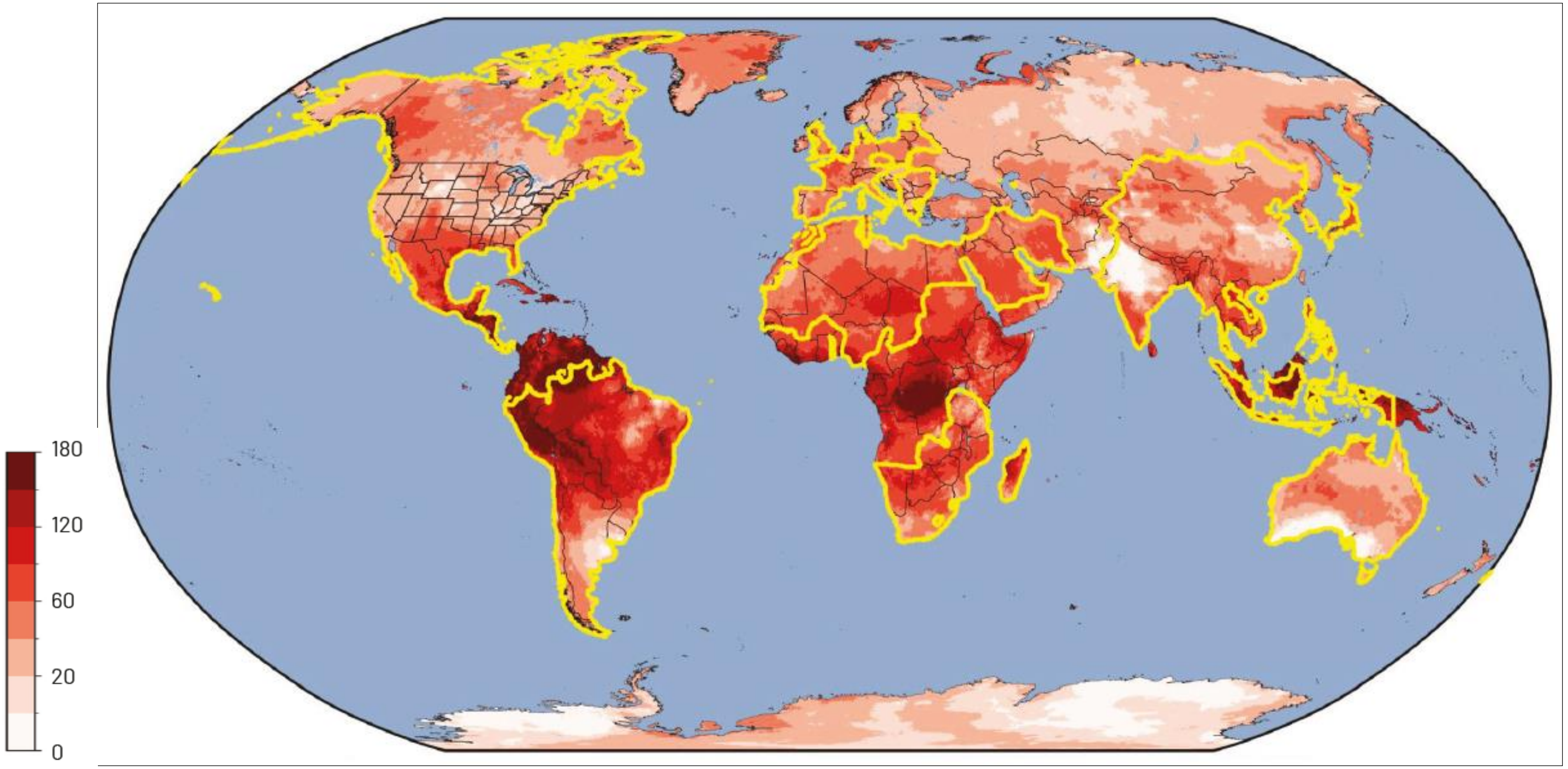


Annual trend in monthly global average near surface temperatures above the pre-industrial baseline

Source: Adopted from State of the Climate article by Carbon Brief, 2024

Facing the Heat

Between May 2023 to May 2024, over 6.3 billion people experienced at least **31 extreme heat days**.

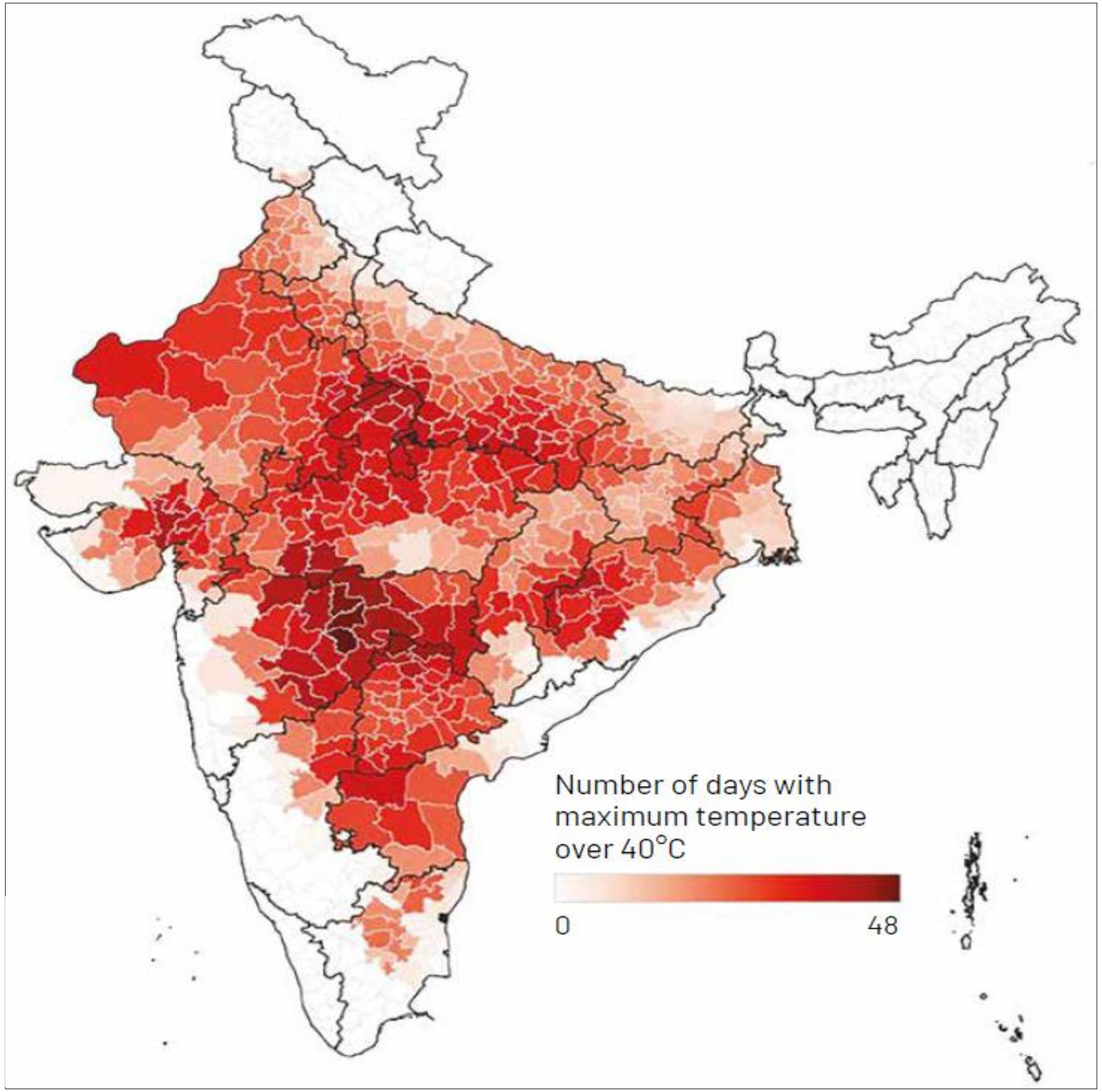


Number of increased extreme heat days across the world in 2023

Source: Adopted from Climate Change and the Escalation of Global Extreme Heat by the World Weather Attribution, the Red Cross Red Crescent Climate Centre, and Climate Central, 2024.

Unprecedented Heat Extreme in India in 2024

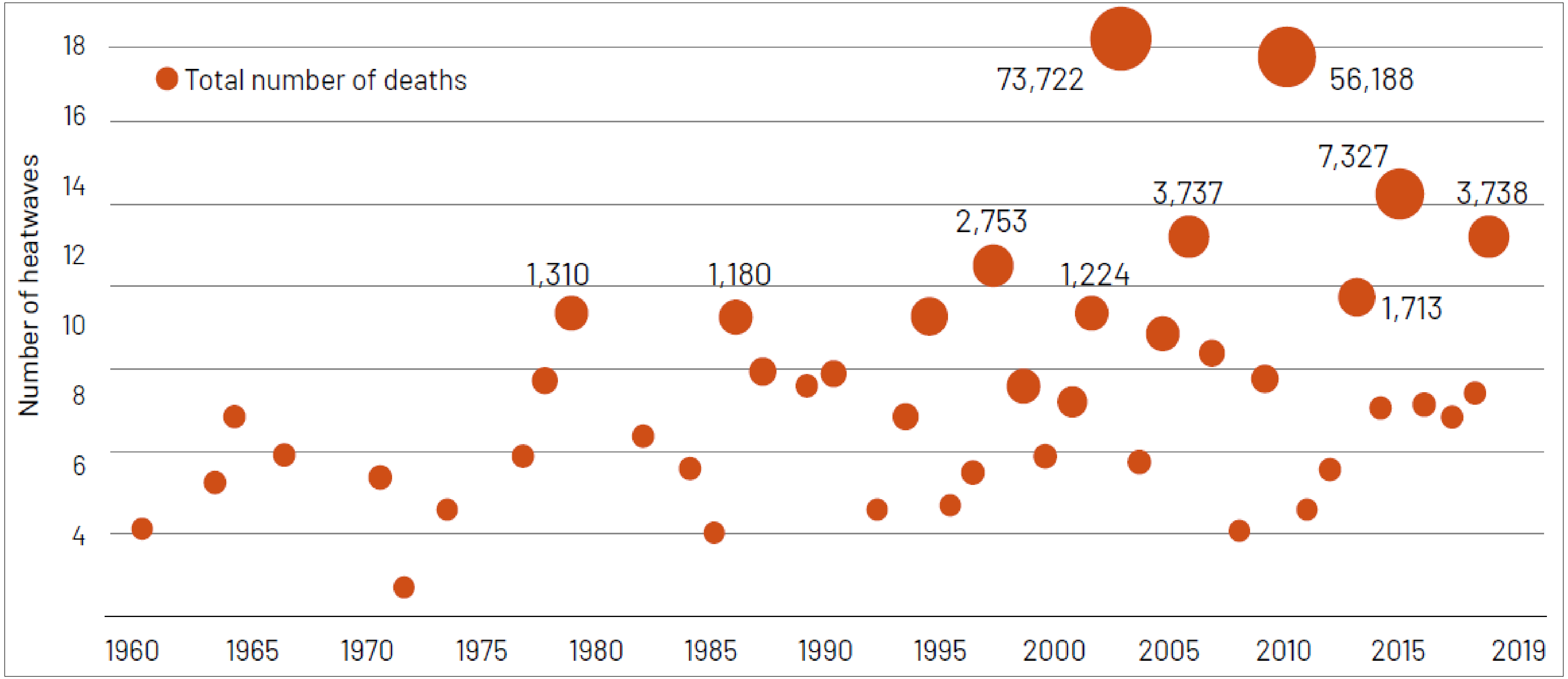
- During April-July 2024, temperatures reached 50°C, with a night-time low of 37°C – the highest ever recorded in India.
- During April and May, >500 of the 741 districts in India reported a daily maximum temperature of 40°C at least once.
- At least 40,000 people suffered heatstroke and >100 dead.



Number of days with maximum temperature over 40°C

Source: Adopted by Down To Earth, 2024

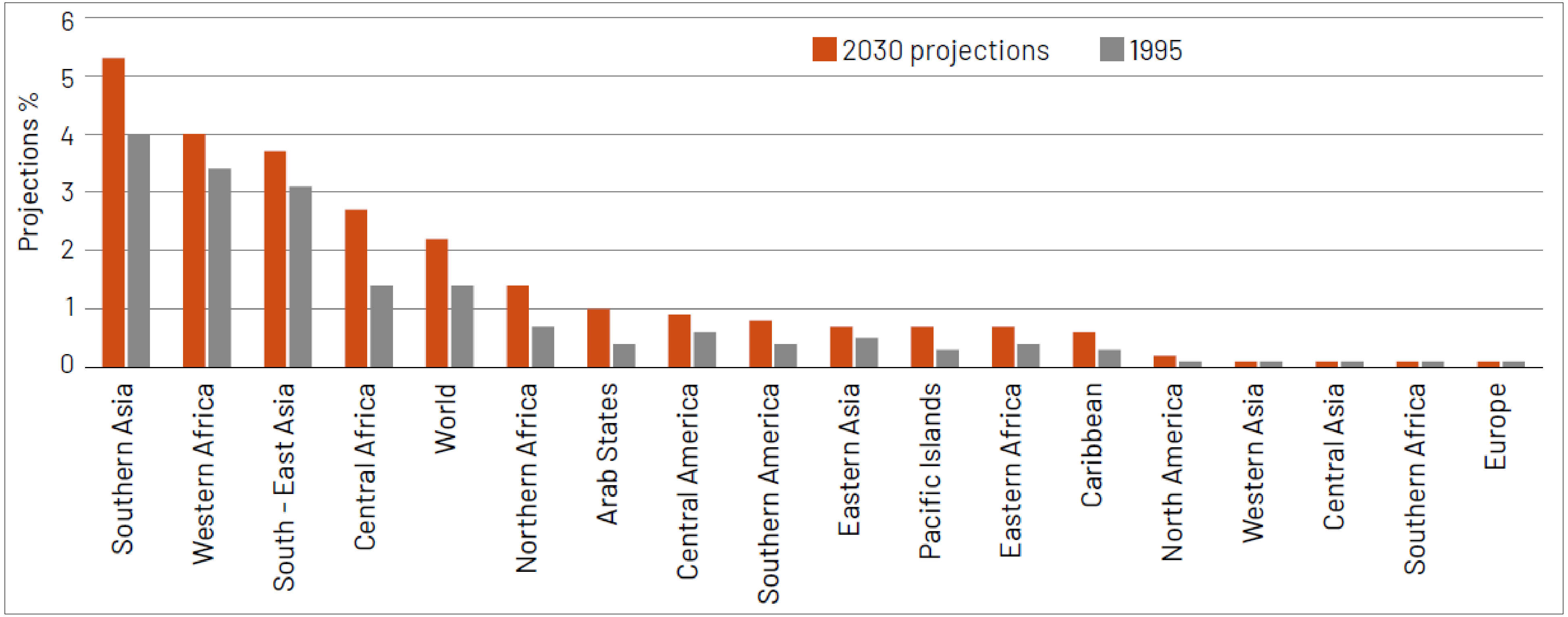
Escalating Impact of Heat Waves



Total number of heat wave days and deaths from 1960 to 2019

Source: Adopted from Extreme Heat: Preparing for the Heatwaves of the Future by the United Nations Office for the Coordination of Humanitarian Affairs, the International Federation of Red Cross and Red Crescent Societies, and the Red Cross Red Crescent Climate Centre, 2022

Escalating Impact of Heat Waves

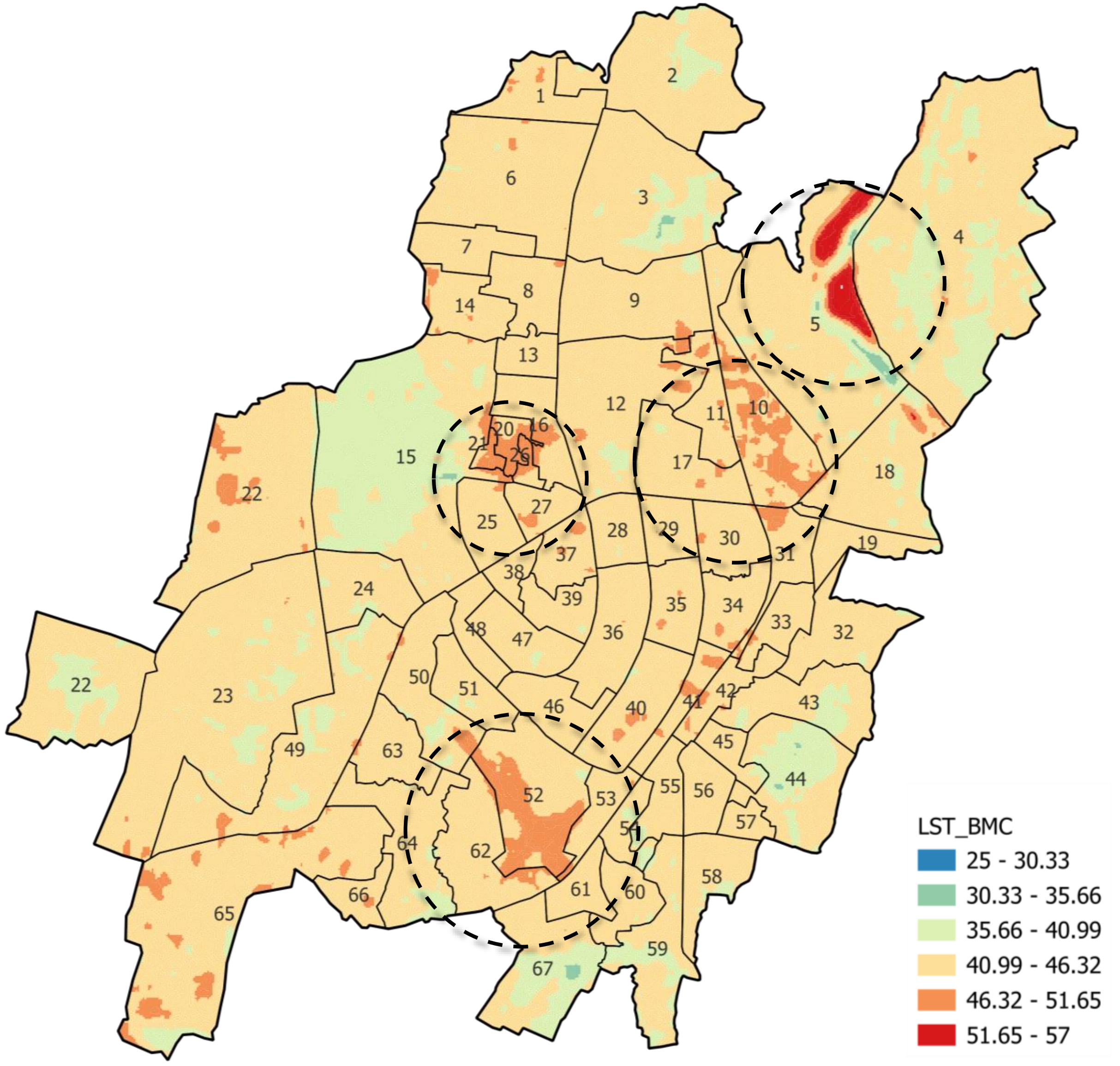


Working hours lost to heat stress (by subregion)

By 2030, >2% of total working hours worldwide will be lost annually due to heat stress; >5% in Southern Asia and Western Africa.

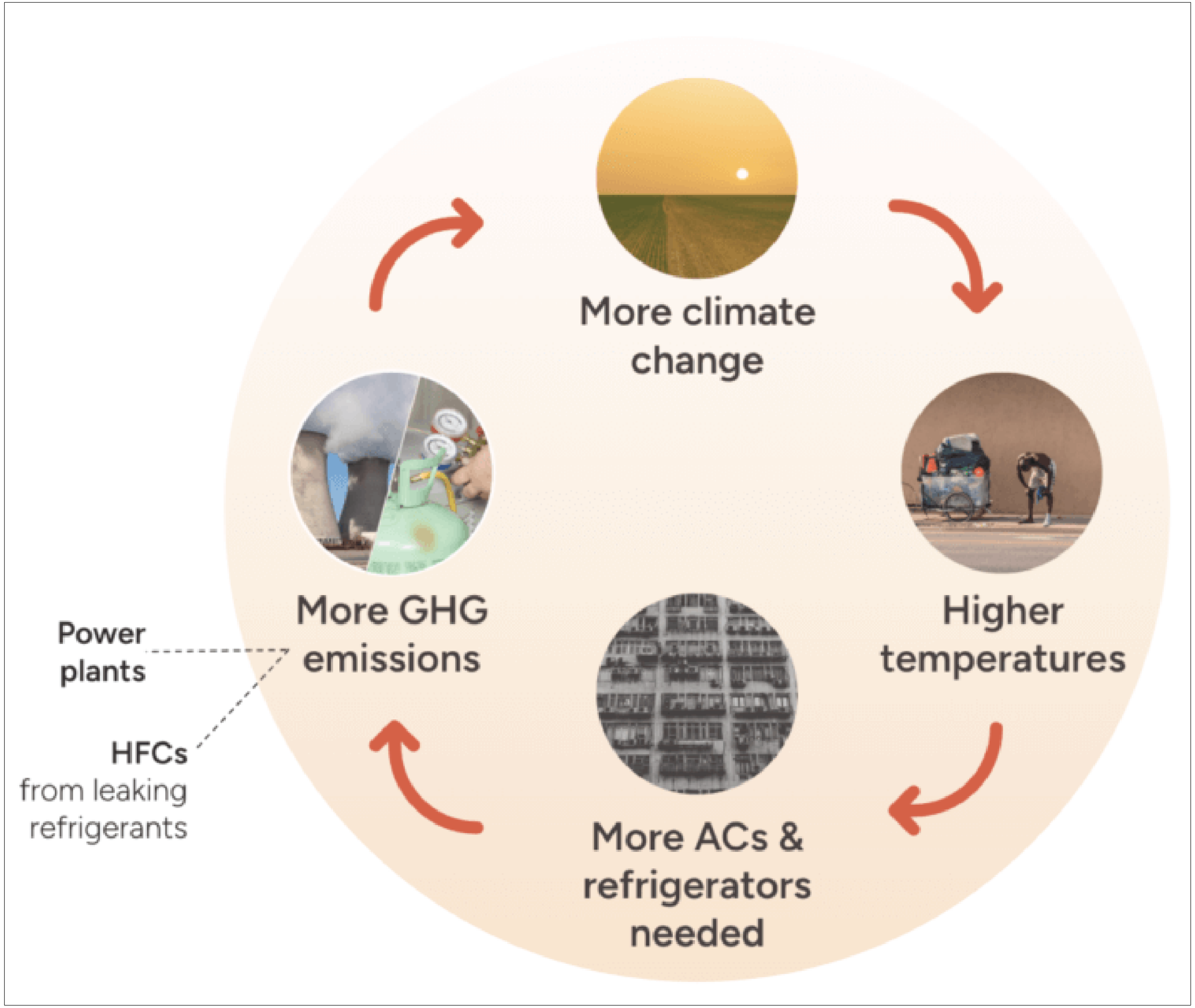
Cities on the Brink

Urban heat island (UHI) can lead to temperature increases by up to 8°C – indicative research on Indian cities.

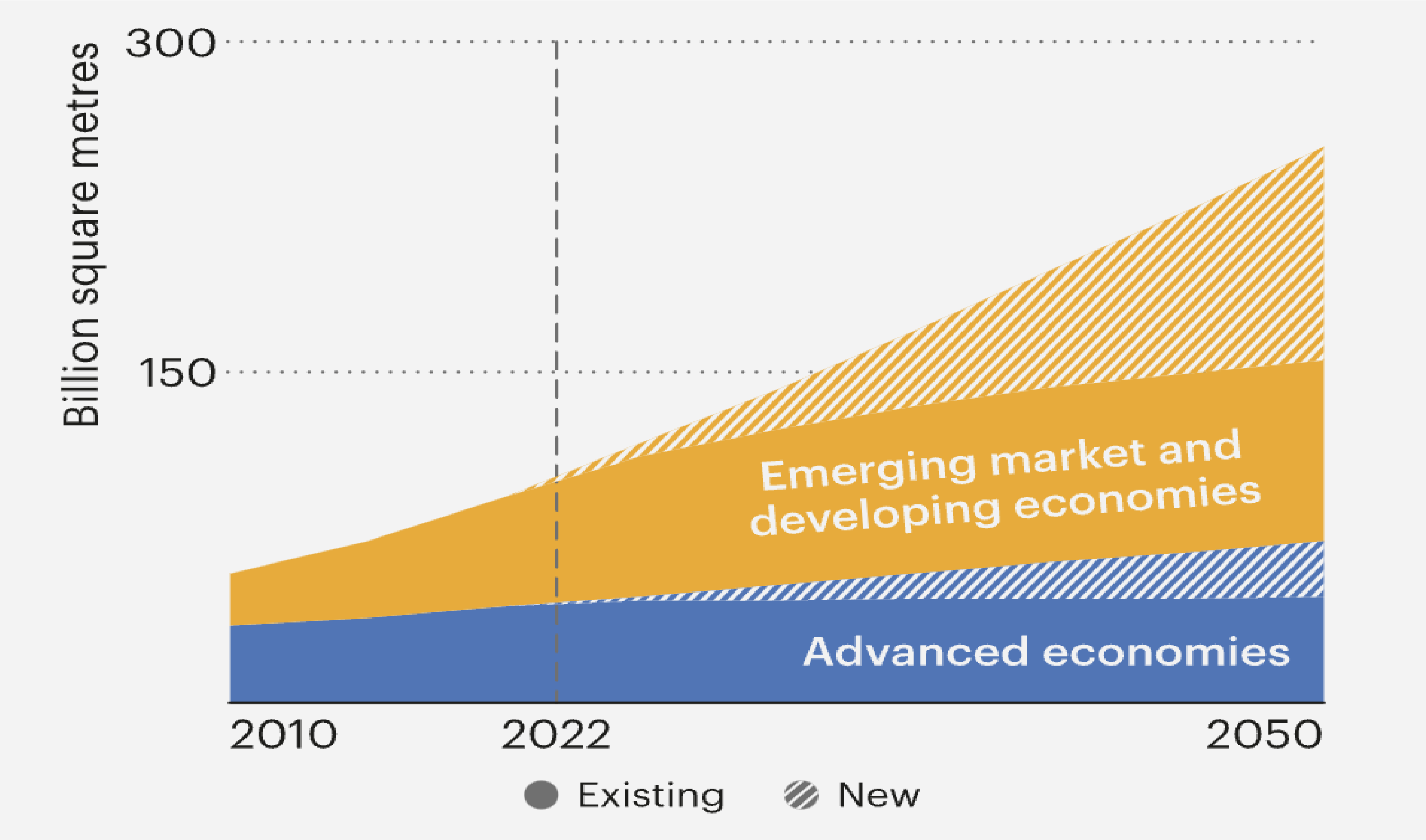


Heat hotspots for the city of Bhubaneswar, Odisha

Vicious Heating and Cooling Cycle



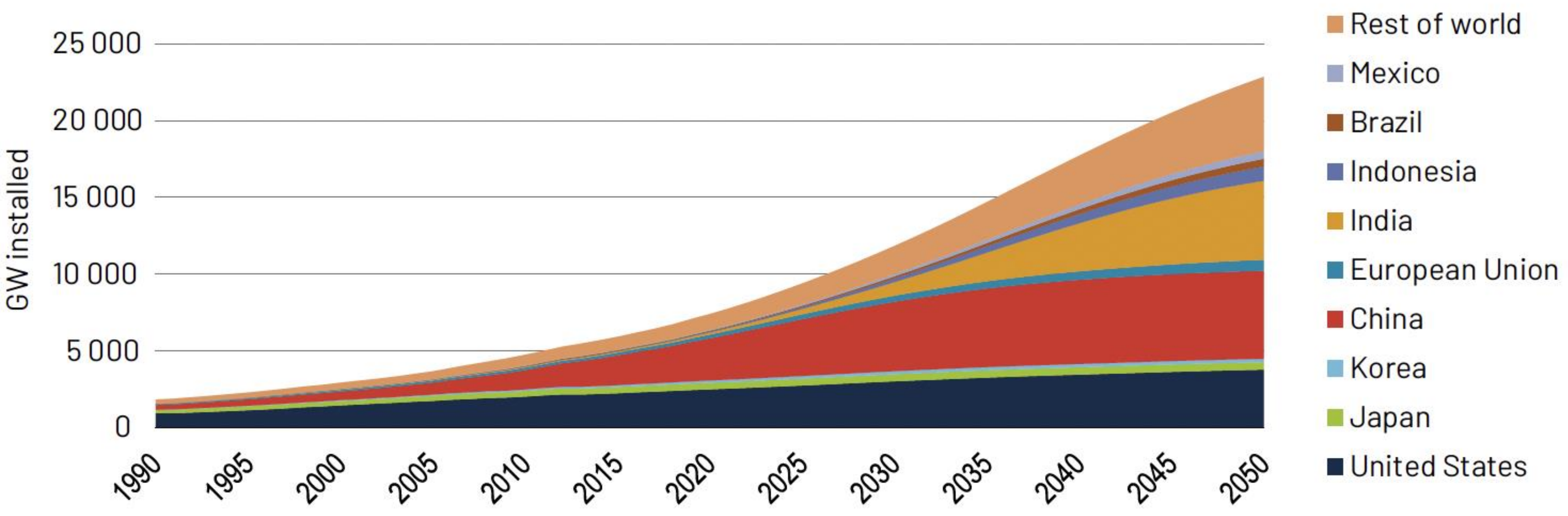
Increasing Cooling Demands



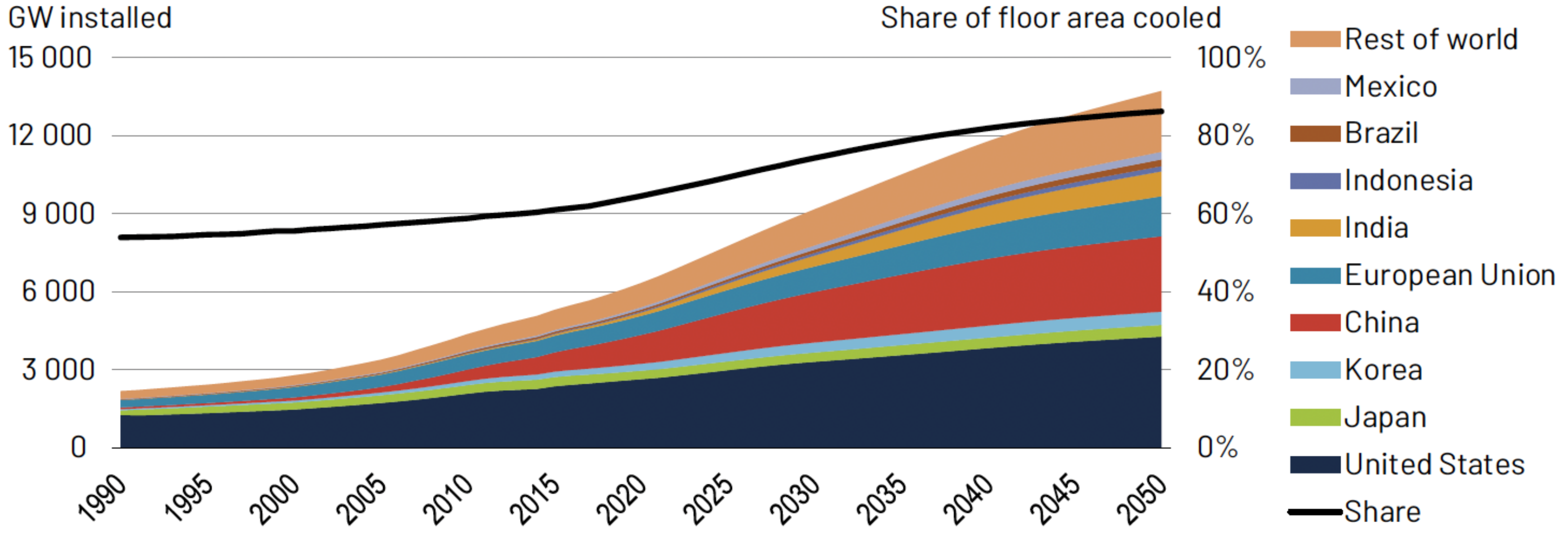
IEA Report – Net Zero Roadmap: A Global Pathway to Keep the 1.5 °C Goal in Reach

The cooling challenge

- Space-cooling requirement in the residential sector to increase fourfold from 6,200 GW in 2016 to >23,000 GW in 2050.
- The requirement in the commercial sector to increase from 5,500 GW to >14,000 GW.



Increase in residential cooling capacity by country/region

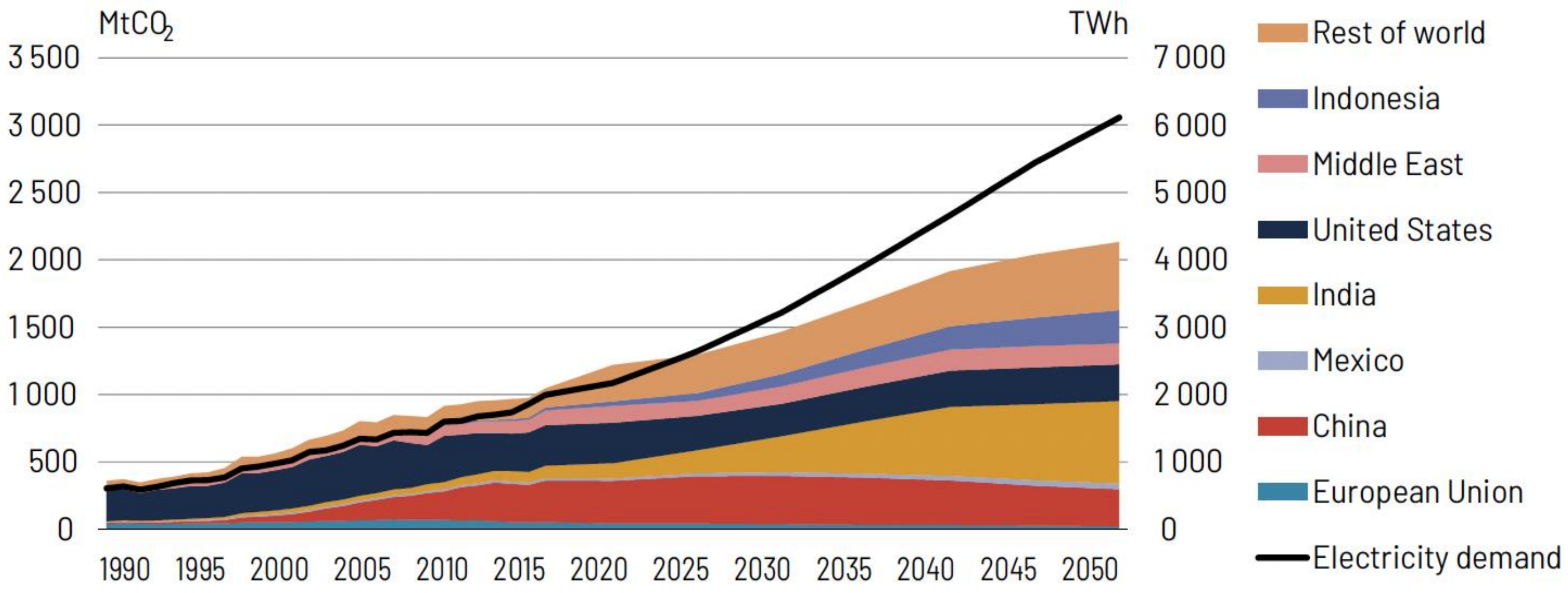


Increase in commercial cooling capacity by country/region

Source: Adopted from The Future of Cooling by International Energy Agency, 2018

The cooling challenge

- Electricity demand to increase to >6,000 TWh
- Emissions expected to double from 1,135 Mt in 2016 to 2,070 Mt in 2050

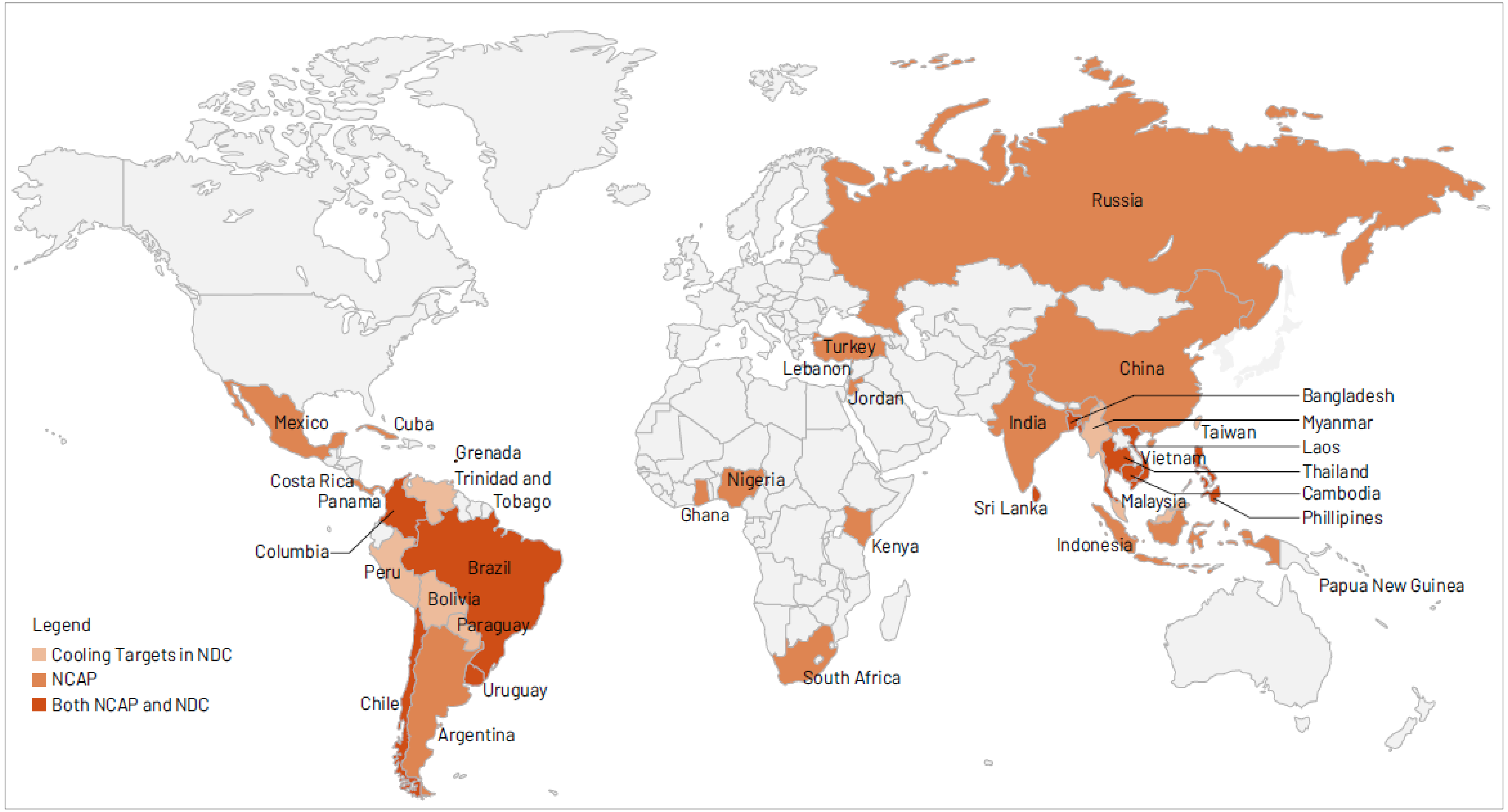


Increase in electricity demand and CO2 emissions from space cooling by country/region

Source: Adopted from The Future of Cooling by International Energy Agency, 2018

National Cooling Action Plans

- Long-term strategies for achieving sustainable cooling objectives at the national level.
- 39 countries are at different stages of NCAP development.
- Several countries integrating cooling into their NDCs.



Countries which have developed the NCAP

Source: iFOREST analysis

Heat Action Plans

- Sub-national/city-level plans to establish a framework for preparing for, responding to, recovering from, and learning from heat waves.
- **At least 700 cities worldwide have developed HAPs.**
- No internationally approved framework for HAPs.

Countries that have developed national or city-level HAP

Source: iFOREST analysis

INTERNATIONAL FORUM FOR ENVIRONMENT, SUSTAINABILITY & TECHNOLOGY

iFOREST

Disconnect between HAP and NCAP

1. **HAPs:** Only focusing on heat management and protecting people from extreme heat, overlooking sustainable cooling solutions and measures to reduce heat within urban areas and buildings.

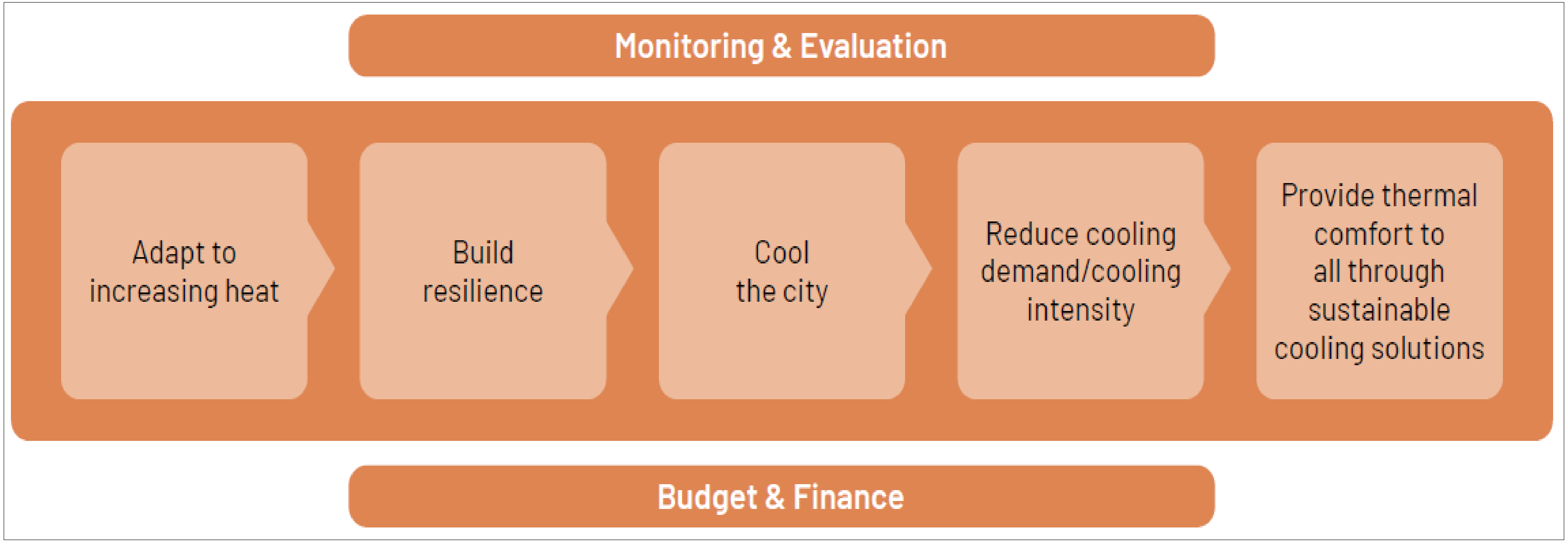
2. **NCAPs:** Promote sustainable cooling, but overlook the essential aspect of reducing heat, which is critical in reducing cities' growing cooling demand.

3. **Spatial and policy disconnect:** While HAPs are essentially implementable at the city level, NCAPs are country-level strategies.

A framework for Integrated Heat and Cooling Action Plan (IHCAP) at the city-level can overcome these existing gaps & inefficiencies and address the dual challenge of increasing heat and cooling demand.

Proposed framework for IHCAP

Five Pillars of IHCAP



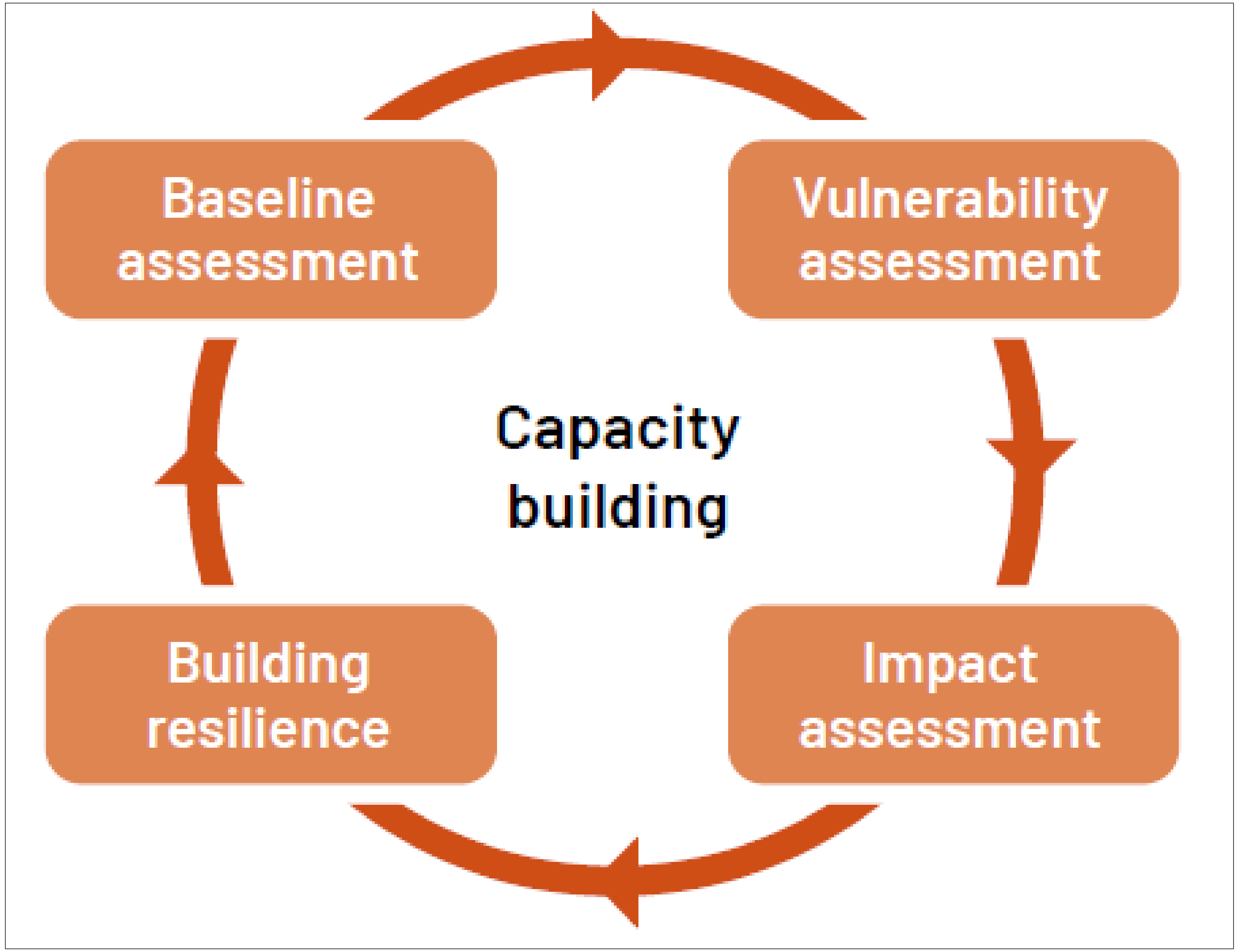
iFOREST
INTERNATIONAL FORUM FOR ENVIRONMENT, SUSTAINABILITY & TECHNOLOGY

1. Adapt to increasing heat

Key components related to extreme heat adaptation

- Early warning system
- Regulate timing
- Preparing key sectors
- Inter-agency coordination
- Communication plan
- Public awareness and community outreach

2. Building resilience



3. Cool the city

Developing strategies to reduce the UHI effect and urban hotspots. Emphasis is placed on heat-minimising planning, using thermally favourable materials, and expanding nature-based spaces.

- **Promoting cool surfaces:** This involves a shift towards using reflective urban surfaces for building rooftops and pavements.
- **Integrating blue-green infrastructure:** Land use planning to integrate vegetation and water bodies into the urban fabric to mitigate the UHI effect and reduce local and ambient temperature.
- **Including nature into the urban fabric:** It is important to incentivise policies and community initiatives to introduce nature into the urban fabric through various means such as urban farming, urban greening initiatives, installing vertical greens, and so on.
- **Improve Urban Geometries:** Future developments to take into consideration wind circulation and avoid heat trapping zones.

4. Reduce cooling demand

Focus on improving buildings' thermal performance and reducing their need for mechanical cooling, as well as decreasing their overall energy consumption and emissions footprint, through the **use of thermally efficient building design and construction and promoting passive cooling techniques**.

- **Mandatory building energy codes are the key policy mechanism for thermally efficient design and construction in buildings.**

5. Providing thermal comfort through sustainable cooling solutions

Providing cooling through the most appropriate and efficient cooling system that deliver the required cooling with the least amount of energy and emissions. It also entails strategies for efficient operations and optimizing user behaviour.

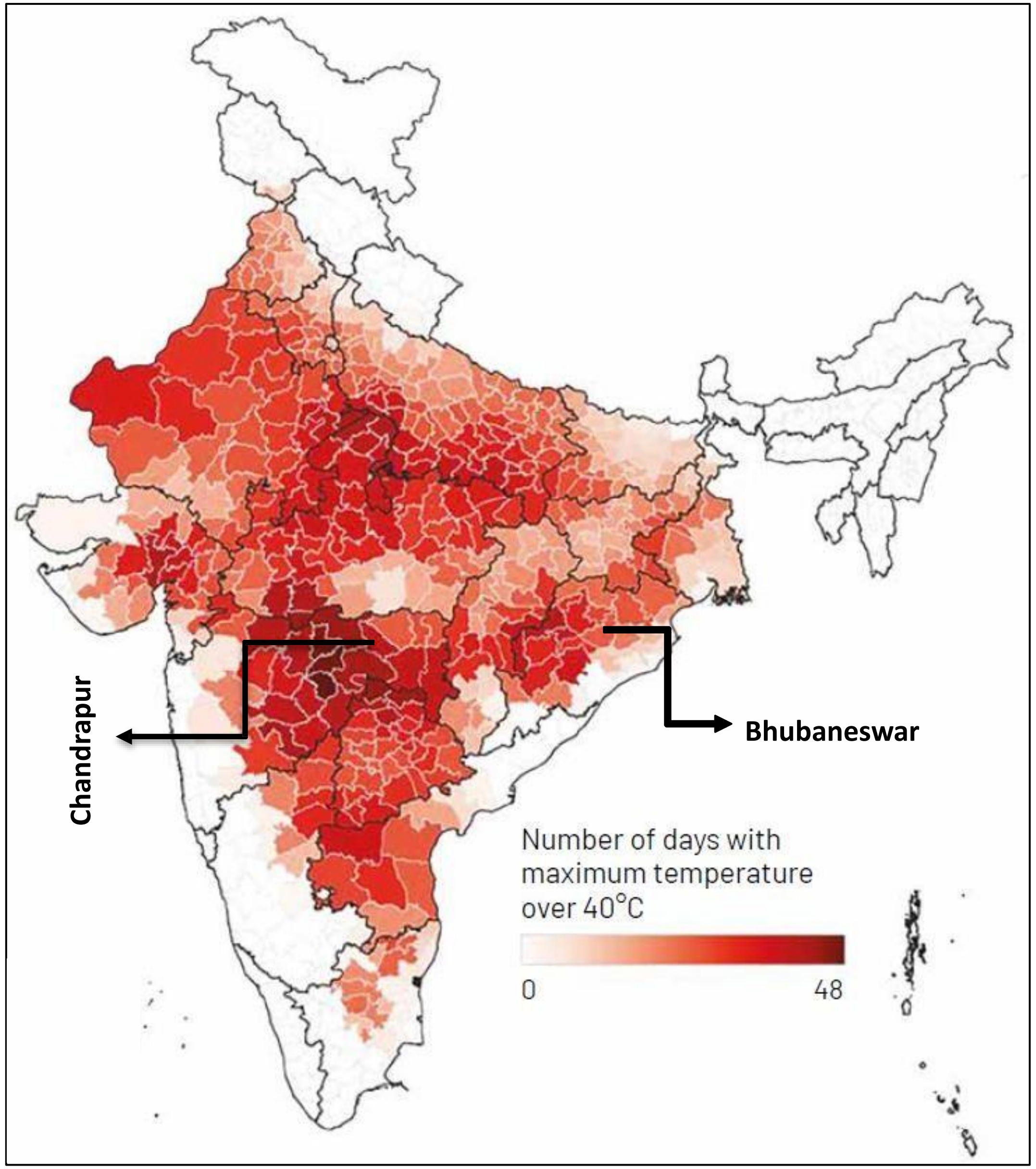
- **Develop incentives to promote energy-efficient and not-in-kind cooling technologies.**
- **Promotion of centralised cooling systems:** Centralised systems offer improved efficiency and easier maintenance and are a viable option for large office buildings, commercial complexes, and industrial facilities. As the scale expands, **district cooling** also becomes a sustainable choice.
- **User adaptations and behaviour changes:** Encouraging energy-saving habits and adopting technologies like controllers and sensors can significantly lower energy consumption.
- **Capacity-building in the service sector:** Proper maintenance and servicing of cooling equipment can help reduce the environmental impact associated with refrigerant leakage during servicing.

Pilot Project

Launched in 2024 in 2 cities in India

1. High temperature: Chandrapur, Maharashtra

2. High temperature & humidly: Bhubaneshwar, Odisha



Conclusion

- Cooling demand is and will increase exponentially in cities, and so will electricity demand from fossil fuel assets to meet cooling loads.
- Just by reducing HFCs & enhancing energy efficiency of RACHP will not be sufficient to meet 1.5 OC target.
- An integrated approach bringing HAP & CAP at city level promises far higher reduction in cooling loads, refrigeration demand and energy requirements. It also enhances heat resilience, thereby saving lives.
- Promotion of an integrated heat and cooling action plan at city level will fulfil the objectives of the Kigali amendments and climate mitigation.

Download Policy Brief

https://iforest.global/wp-content/uploads/2024/07/OEWG46-Policy-Brief.pdf

iFOREST International Forum for Environment, Sustainability & Technology

SIDE EVENT

COP29 Baku Azerbaijan

INTEGRATED HEAT AND COOLING ACTION PLAN FOR CITIES

Twenty-ninth Conference of the Parties (COP29) to the UNFCCC

Wednesday, 20th November 2024 | 13:45 to 14:45

G-24, Regional Climate Foundations (RCF) Delegation Pavillion
Blue Zone, Baku, Azerbaijan

PANEL SPEAKERS

Mr Nithi Nesadurai
Director and Regional Coordinator of CANSEA

Mr Pramod Kumar Singh
Senior Director – Research & Programmes, AEEE

Mr Sanjay Seth
Senior Director, Sustainable Infrastructure Programme, TERI and Vice President & Chief Executive Officer, GRIHA Council

Ms Victoria Santos
Energy and Industry Manager, iCS

MODERATOR

Ms Mandvi Singh
Director – iFOREST