

Fair cooling now

A snapshot report for
funders, investors,
campaigners and
policymakers

Contents



Fair cooling is within our reach - 2

Introduction, from Ashden CEO Harriet Lamb

Cooling and coronavirus - 6

Building momentum is more important than ever.

Ambition and collaboration - 8

The new approaches that will unlock cooling

Outstanding cooling solutions - 10

Tradition and nature are key ingredients

Case study - EOnsult - 12

Cool accomodation for Egyptian farm workers

Case study - Medellin Green Corridors - 14

Greenery cools a city

Case study - Ecozen - 18

Solar-powered cold chain innovation

Case study - Vietnam Red Cross - 20

Financial innovation boosts heatwave response

Case study - cBalance - 22

Guiding tomorrow's architects and engineers

In depth: Ahmedabad Heat Action Plan - 24

World-leading cooling collaboration

Funding a cooler future - 32

The Fair Cooling Fund, from K-CEP and Ashden

Fair cooling is within our reach

HARRIET LAMB

ASHDEN CEO

Rising global temperatures put all of us in danger – but one billion people living without access to cooling face the greatest threat. They are farmworkers sweltering under a midday sun, and families trapped in unventilated homes. They are hawkers and food-sellers on teeming urban streets, and patients smothered by the dead air in clinics and hospitals. They live different lives, but are united in their experience of sickening, inescapable heat.

This report is a snapshot of fair cooling innovation serving some of those one billion – projects providing cooling through better buildings, urban greening and emergency planning. What makes these cooling solutions fair? They are affordable and accessible to the most vulnerable, unlike conventional air conditioning, which is expensive and further drives global heating. Residential air conditioning alone is set to account for an increase of over 0.5C in global temperatures by 2100.

Fair cooling improves lives. It saves lives. But it is only reaching a fraction of those who need it.

The solutions in this report, and others like them, urgently need finance and political backing at scale. Improvements to air conditioning alone will never fully solve the global cooling challenge – the climate breakdown will continue, and the poorest will be further punished.

Fair cooling is a moral and practical necessity. While the world's poorest people did not create the climate emergency, they suffer most from its effects. Investment in fair cooling can go some way to redressing this injustice. Failure to act now will only bring more pain tomorrow – without decisive action, the health and social costs of heat stress, not to mention spoiled food and medicine, will spiral dramatically.

Through examples of frontline action, this report illustrates four key points that should guide funders, investors, campaigners and policymakers tackling the cooling challenge:

- The world must back a portfolio of cooling approaches – mechanised (such as improved air conditioning) and non-mechanised.
- Drawing on local culture, natural resources and participatory approaches creates context-appropriate cooling.
- Frontline fair cooling solutions are built on a platform of solid local data. They are enhanced by rigorous planning and a strategic approach.
- We must balance immediate action with preparation for an ever-hotter world.

The report concludes with a detailed look at a world-leading heat action plan implemented in Ahmedabad, India, that shows best practice in many of these areas.

While advances in sustainable cooling technology are vital, there is an equal or greater need for new thinking – ideas and approaches that can drive the systemic adoption of fair cooling at scale around the world. Solutions that adopt a user-centred approach, drawing on the experiences of the most marginalised, hold the greatest potential.

Cooling and coronavirus

Today's fair cooling pioneers are battling to endure coronavirus. Small businesses in particular have seen their cash flow threatened, and urgently need grants and soft loans. But the crisis could mark a turning point.

As the pandemic rages, campaigners and communities have called for green investment to stimulate economies and create a sustainable future. Governments have responded with multi-billion pound green recovery plans, promising major spending in areas such as buildings and transport. But cooling remains in the shadows – a review of over 350 national green stimulus packages by the Economist Intelligence Unit, shared on 3 July 2020, found that not one tackled cooling.

Widespread support for a green recovery offers a unique chance to ratchet up fair cooling efforts. But that opportunity will not last for ever – and it comes at a point in history when construction is booming (and demand for air conditioning rocketing) in developing countries.

Global energy demand from air conditioners is expected to triple by 2050. We are at a crossroads in the global cooling challenge. Building momentum behind fair cooling is more important than ever.

Ambition and collaboration

As its exclusion from global green recovery plans suggests, cooling is a neglected part of the climate sector. Through this report we aim to shed light on exciting developments in this area, and encourage the sector to engage more deeply with the cooling challenge. But action by climate-focused organisations is not nearly enough.

The organisations identified – and many others like them – urgently need finance and radical policy reform. As a bare minimum, funders, investors and policymakers must commit to the cooling challenge with the same energy they address more high-profile climate and development issues.

Beyond this, there is an urgent need for collaboration. The organisations profiled are delivering striking benefits beyond saving lives and protecting the health of the vulnerable. These include supporting rural livelihoods, creating liveable cities, promoting equality and enhancing biodiversity.

Recognition of the wider benefits of cooling should unlock new cross-sector partnerships and funding streams. This approach is fundamental to raising the profile and impact of fair cooling in the years ahead.

Fair cooling: who benefits?

Sustainable Energy for All's [Chilling Prospects](#) report identifies 1.045 billion people at 'high risk' because they do not have access to sustainable cooling. 680 million live in cities, and 365 million in rural areas.

Rural residents at high risk are likely to be subsistence farmers who work in fields in high temperatures, lack fans at home and have no access to an intact cold chain to store food. Their local health centres will probably struggle to store vaccines at the right temperatures.

City residents are more likely to have access to electricity and a refrigerator. But their food may still spoil because of power supply problems, and many live in poor-quality, crowded housing that leaves them vulnerable to heat. They must also cope with the urban heat island effect, which raises temperatures in densely populated areas.



City gardeners create cooling green corridors in the Colombian city of Medellin

Outstanding cooling solutions

Passive cooling solutions – those that use shade, ventilation and other means to control temperatures with little or no energy consumption – are the bedrock of fair cooling. They are generally low-cost and viable for the almost one billion people living without access to reliable energy. Many countries boast a rich heritage in this method of cooling, but it has generally been supplanted by mechanised solutions such as air conditioning – which create harmful emissions and are too expensive for many.

As well as looking to the past, fair cooling innovators draw on natural cooling solutions, employing the power of water and vegetation to keep people comfortable. Cooling approaches sympathetic to local traditions or the local environment are more likely to be context-appropriate, a key quality of any climate intervention. They are also more likely to deliver crucial co-benefits – such as job opportunities, community resilience and social equality.



Farmers with no access to cold chain risk losing income from spoiling food and produce

Case study - EONsult

These co-benefits are demonstrated by the work of EONsult, a woman-led architecture firm in Egypt. EONsult are the designers of Bahareya Village, an accommodation complex for agricultural workers at an organic tea plantation in the country's Western Desert. Around the world, accommodation for farm workers is often extremely basic. EONsult create higher-quality buildings with benefits for employers and staff.

EONsult's 'green village', commissioned by the company Royal Herbs, draws heavily on passive design. Roofs have been covered in heat-reflecting tiles, while light-coloured paint and materials have been used to achieve the same effect. Features such as a wall built from construction waste add shading. Wall thickness has been designed to control heat, and the grouping of structures close together creates cooling wind corridors. Indoor temperatures have been kept between 19 and 26 degrees without any need to use air conditioning.

Sustainability is a key feature of the village, which also includes renewable energy generation through solar panels and technology to minimise water use. The project has employed local labour and local materials where possible.

In doing so, it has created a network of local suppliers and contractors in the region where it did not exist previously – effectively building an ecosystem of sustainable resources and craftspeople from scratch. Some have already tendered for other work with EONsult. This approach has also served to improve community relations, in an area where the presence of large farms is sometimes resented by local people.

The scheme's participatory approach saw EONsult take on board the views of the local community. One example of sensitivity to the local environment is the scheme's use of Shee Babounich (Mugwort), a plant known locally as a natural way to repel insects and snakes. This feature gives building users the confidence to ventilate rooms by opening windows when needed.



Case study - Medellin Green Corridors

The power of vegetation also drives cooling innovation in Colombia. After enduring years of high crime and violence, the city of Medellín faces a new threat – rising temperatures. The city authority's response brings people together, planting vegetation to create a better environment for everyone.

Through planting vegetation, Medellín's Green Corridors project shades cyclists and pedestrians, cools built up areas and cleans the air along busy roads. The city's botanical gardens train people from disadvantaged backgrounds to become city gardeners and planting technicians. Temperatures have fallen by two or three degrees Celsius in places, with bigger reductions expected in the future.

City authorities have created green corridors along 18 roads and 12 waterways. The project aims to create a more beautiful city, lower temperatures, increase biodiversity and cut air pollution. Cooling is created by more shading, reduction in heat radiated by solid surfaces such as roads, and water evaporating from plants.

Since the programme started the botanical gardens have trained 75 new gardeners. This has helped people who are most vulnerable, displaced by the armed conflict or from poorer rural communities to find work. The apprenticeship scheme gives them workplace training as well as a qualification.

Tree cover in cities is key to mitigating the urban heat island effect. But for this intervention to be effective at a city-wide level, authorities must have solid data. Kampala Capital City Authority in Uganda has done extensive work to map its trees using satellite imaging and other tools.

As well as guiding the planting of further trees, this approach supports the maintenance of existing trees – and protects them from illegal development. The project has included a public directory of the city's tree types, encouraging every corner of society to make use of this precious natural resource.



Neglected corners of Medellin have been turned into thriving urban parks

Better health and action on poverty



Low-cost housing can put communities at risk of heat stress

Case study - Ecozen

India loses more than 18% of its fruit and vegetable every year due to lack of quality infrastructure and cold storage facilities. This presents a food security issue, especially for those living in poverty, and exacerbates environmental degradation. Cold storage facilities are a key solution to reducing waste and increasing income for farmers. However, cooling is currently only available for 10% of perishables in India, leaving 370 million tonnes of produce at risk.

Cold chain innovators Ecozen are tackling this problem. Their Ecofrost product is a portable solar powered cold room which enables farmers to store post-harvest produce at optimum temperatures. This maximises its shelf-life and enables the farmer to supply quality produce to the local market at the right time, as well as sell it at markets further away, ensuring better returns. The systems are used mainly by horticulture farmers to store fruits, vegetables and flowers.

The system can maintain temperatures from 4°C to 10°C for up to 30 hours. Where available, Ecofrost can also be powered by mains electricity. The thermal storage technology used in Ecofrost is more efficient than chemical batteries and Ecozen has developed its own condensing unit which allows the systems to work even in early mornings and late evenings.



Sustainable cold storage from Ecozen helps farmers raise their incomes

Case study - Vietnam Red Cross

In a world of rising temperatures and increasing climate unpredictability, preparation is crucial. One project embracing this challenge is a joint initiative by the Vietnam Red Cross and German Red Cross, which uses an innovative funding system to quickly open temporary cooling centres for vulnerable people when heatwaves strike.

Piloted in four wards of Hanoi in 2019, in 2020 the scheme is scaling up to 22 of the most at-risks wards in Hanoi and Danang. Neighbourhoods have been selected by combining surveys and demographic data about local residents with satellite imagery that shows concentrations of extreme heat. The project managers surveyed vulnerable local people before the centres opened for the first time, and found that during heatwaves only 7% coped by staying in a cool place, and 76% could not recognise the signs of heat-related illnesses.

The project hinges on forecast-based financing – a Red Cross mechanism to mobilise resources in anticipation of a natural disaster, allowing preparation and early action. If weather data reaches agreed thresholds or ‘triggers,’ funds are automatically released and planned activities corresponding with the level of expected damage are carried out.

In the case of the cooling initiative, these include the deployment of the cooling centres – tents that make use of fans and evaporative cooling equipment (selected with a view to minimising energy use), resulting in temperatures 7-10C lower than outdoors. Six days before temperatures spike, the location for the centres is decided and material is moved into the area. Three days before, volunteers that will staff the service in each location set up the tents.

The users of the centres are mostly outdoor workers such as builders and street vendors, although 20% of visitors to the pilot centres were older people. At the centres, volunteers offer first aid and advice, and can call ambulances for more serious cases. Extensive surveys and focus groups were used to design the service. Another benefit has been wider awareness of the dangers of cooling, and steps to prevent it – the project has been extensively covered by local media, both online and on television.

The team behind the initiative note that the impact of heatwaves is generally underestimated by the humanitarian sector, compared to other hazards, but should be viewed as a natural disaster. And they stress the importance of collaboration with scientific agencies in delivering heat stress response.



Older people are a target group for this Red Cross Programme

Case study - cBalance

The worst effects of heat stress lie ahead, but it is already a deadly threat. Among those most at risk are homeless people and those displaced by conflict and natural disaster, as well as people living in poor-quality housing. In many parts of the world these people are extremely vulnerable to heat stress during warm months, then face the opposite problem of extreme cold in other parts of the year.

One response is offered by Billion Bricks. The company's WeatherHYDE all-weather tent has a reversible skin, allowing it to trap warmth in winter and minimise heat in hotter months. The organisation has worked with NGOs to quickly deploy the tents to areas most in need.

However, the need for short term-solutions is far outweighed by the need for systemic, structural change. This includes addressing the huge influence of the air conditioning industry, which can easily squeeze out more sustainable alternatives.

Social enterprise cBalance tackles this problem through its Fairconditioning programme, which helps Indian colleges and universities educate students better on passive design of buildings and sustainable cooling, with the goal of avoiding air conditioning being seen as the default solution to heat. The programme integrates climate responsive ways of thinking and designing throughout the entire 5-year curricula of university architecture and mechanical engineering programmes. This approach contrasts with one of adding separate courses about sustainability and climate change, which has been tried unsuccessfully by many grant-funded aid programs.

cBalance is working with eight universities and 24 colleges, training lecturers and teachers, and ultimately influencing 2,400 graduates in relevant topics per year. The first batch of graduates that have been involved with Fairconditioning throughout their courses will graduate in 2022. In explaining the importance of reaching future architects and engineers, cBalance cite predictions that of the buildings that will exist in India in 2030, only 30% have been built already. In the same time frame, they predict room air conditioning units in the country will balloon from 32 million to 225 million.

cBalance say their programme deconstructs “the hegemonic idea of air conditioning-as-default... [which is] born and then recklessly reproduced in a critical-thinking vacuum.” The programme works to permanently alter curricula and share teaching aids, manuals and access to learning platforms.



cBalance work with students to tackle the 'air-conditioning- as-default' approach

In depth: Ahmedabad Heat Action Plan

Many of the hallmarks of successful fair cooling work come together in the Ahmedabad Heat Action Plan – winner of the 2020 Ashden Award for Cool Cities. The plan was created in 2013, after a heatwave killed more than 1,300 people in a single month in the Indian city.

The plan was jointly developed by the Natural Resources Defense Council (NRDC), the Ahmedabad Municipal Corporation, and the Indian Institute of Public Health – Gandhinagar (IIPH-G). The plan has been shown to prevent 1,100 deaths every year, and has been replicated in dozens of other places across the country.

It is an exemplar of how joint action can effectively tackle heatwaves in cities for the most vulnerable – mortality rates on the hottest days dropped by 27% after the plan was implemented.

Refined every year, the plan helps city authorities use a range of tools to let those most at risk of heat-related illness know that danger is imminent – and helps them cope when it arrives. It also covers steps to supply water to the public, tree-planting, and work to lower indoor temperatures by painting roofs white. Its development has demanded cross-departmental coordination between public health agencies and the Indian Meteorological Department, leading to a stronger, coordinated response to heat stress at city, state and national level.

The plan was designed with the help of vulnerable people including outdoor construction and industrial workers, street vendors, women, children, and senior citizens. They are actively involved in refining it every year through surveys and workshops.

“No-one should be dying from extreme heat”

Anjali Jaiswal, Founding Director of the NRDC India Climate and Energy Program, highlights the impact of extreme heat in Ahmedabad. She says: “During a workshop with city and health experts, one paediatrician recounted her experience in 2010, where temperatures skyrocketed to 43°C . A lot of the doctors had taken vacation because it was so hot. The hospital had the baby unit on the top floor, and it had a black tar roof. She told us about babies dying, the mortality spiking. We were all moved by that.

“I visited that hospital myself later on. Within three months of her sharing that story with us and our team recommending improvements, the hospital had changed the roof [to a new material], the neo-natal unit was moved to the bottom floor, and many other changes were made. “No-one should be dying from extreme heat. It is entirely preventable from a scientific perspective.”

Ms Jaiswal adds that partnerships are key to the success of the initiative. Efforts have ranged from educating private sector employers about the dangers of heat stress, to helping local ambulance crews show parents of new-born babies how to protect their child. Local faith groups were encouraged to distribute water.

Political engagement with every level of governance is crucial, those running the programme argue. Ms Jaiswal says: “Our battles with this issue are the same as all the battles in climate change – it’s about political will.”

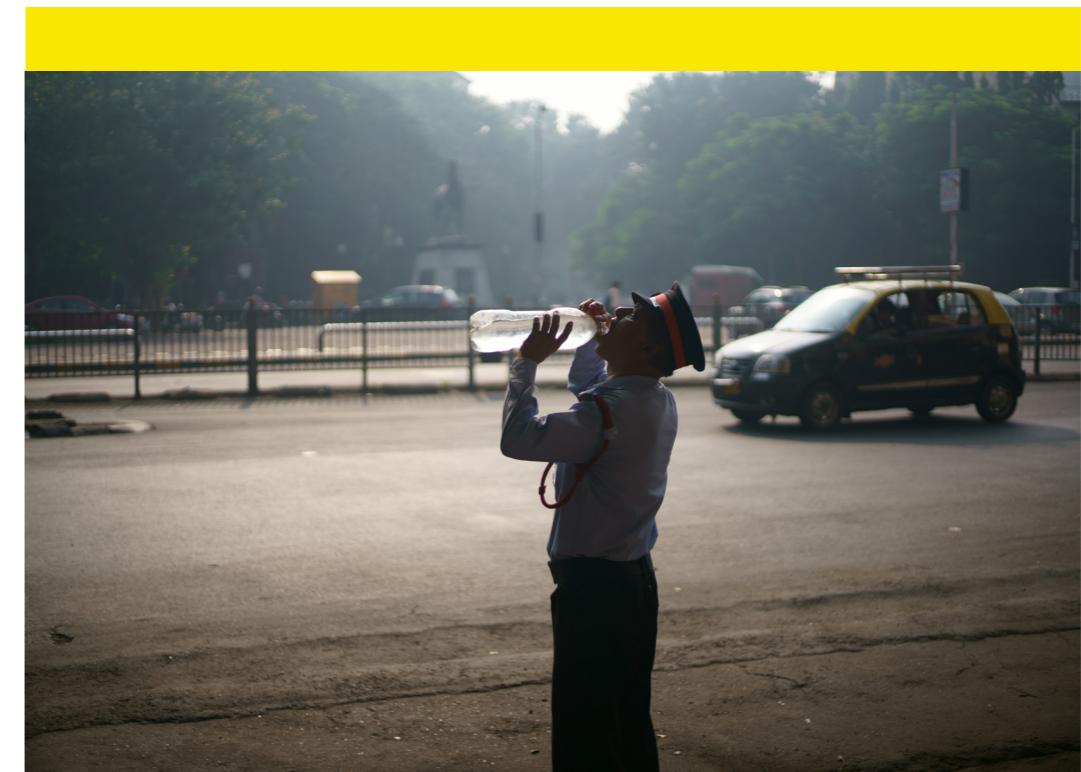
“This work started because we analysed the data from 2010. When we showed it to the city authorities, they started taking action. Our data showed that even in a hot city where it is assumed people are ‘acclimatised’, deaths are high. We continue to gather data to show effectiveness. In the past, because there was no property damage, heatwaves weren’t considered a disaster.”

The team has made heavy use of ambulance callout statistics and the city’s ‘all-cause’ mortality figures (the total number of deaths, regardless of cause). But better information on hospital admissions and more specific ‘cause of death’ data would enable an improved response.

Prof Mavlankar also argues for a greater recognition of environmental health in government structures, saying that responsibility for cooling often falls between separate health and environment departments.

The power of data

Solid data is the bedrock of the initiative, reports Professor Dileep Mavlankar, Director of the Indian Institute of Public Health Gandhinagar – although there are still important gaps to be filled.



Ahmedabad has seen deaths from heat stress plummet, thanks to the city's heat action plan

Community inspiration

Community engagement is aided by pro-active communications work, ensuring stories appear in local-language media as soon as a heatwave approaches, with a focus on practical steps people can take to stay safe. The highly visible nature of the interventions – which include providing water booths at bus stations, and keeping parks open into the evenings so people can make use of the shade they offer – also drive a mindset shift that extreme heat needs a society-wide response.

Experiencing solutions is vital, explains Prima Madan, lead for energy efficiency and cooling at the NRDC India Program. She says: “We visited one of the slums that had cool roofs installed by Mahila Housing Trust – a local NGO group in Ahmedabad.

We visited a lady who is a tailor and works inside a shed with a tin roof. She said before it was painted, it was impossible to be indoors during the afternoons (between one and four) in the summer. But now she could be inside, complete her day’s work, and meet her production targets. She saw the difference within a few weeks of the roof being painted.

“The first time the roof was painted, the work was funded by a development partner – but next year, her husband did it himself because the family had seen the value. This woman is a leader in her community and has inspired others to do the same with their roofs.”

New cities, new challenges

The impact of the heat action plan now extends well beyond Ahmedabad. With the support of the national government, tailored heat action plans have been created in 23 Indian states. The success of the model, shared through a toolkit created by NRDC and its partners and other outreach efforts, has also influenced the creation of plans outside India.

NRDC and IIPH-G are also stepping up their support to other states over the next five years to identify the data needed to develop local ‘thresholds’ e.g. pinpointing temperatures that once reached, local action is triggered.

The cool roofs programme will also be a key priority over the next five years, and NRDC is working with local cooperatives to expand its work to other states, ensuring people living in informal settlements are not left behind.



Following Ahmedabad's success, heat action plans have been drafted in cities across India

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The Fair Cooling Fund

Fair cooling is the future – but it isn't spreading fast enough. That's why Ashden, K-CEP and ClimateWorks Foundation have launched the Fair Cooling Fund, an ambitious project scaling up the impact of frontline fair cooling solutions.

The fund is supporting eight organisations that either provide fair cooling or are beginning work in this area. The cohort includes organisations tackling cooling for food and medicines, as well as some helping vulnerable people stay cool.

Cohort members will share over £600,000 in grant capital, funded by K-CEP, as well as tailored development support and global networking opportunities. This will give them a platform to tackle a new challenge, or to experiment with new ways of working – and so bring fair cooling to more of the people who need it.

Those taking part include businesses, NGOs and city authorities. All are committed to working closely with the vulnerable communities most at risk from heat stress. At the heart of the project is a co-operative, collaborative approach – innovators are learning from each other and inspiring change beyond their own organisation.

For more information about the fund, contact FairCoolingFund@Ashden.org. Or search 'Ashden Fair Cooling Fund'.

As well as supporting fair cooling pioneers, the fund is raising the profile of cooling issues with policymakers, investors and other crucial audiences. Ashden believes a challenge this huge demands local, national and international action.

It also demands collaboration across specialisms – climate activists and funders must join forces with experts in urban planning, public health, humanitarian response, and many other areas. Cooling organisations report that falling 'between sectors' is a significant barrier to funding and support.

Rising heat is easily overlooked by those in power, but for communities across the globe it is an inescapable fact of life. A truly effective response must be rooted in their views and experiences. And while steps to manage the impact of spiralling temperatures are vital, there is only one certain solution to the fair cooling challenge – the creation of a fair, sustainable, low-carbon world.

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