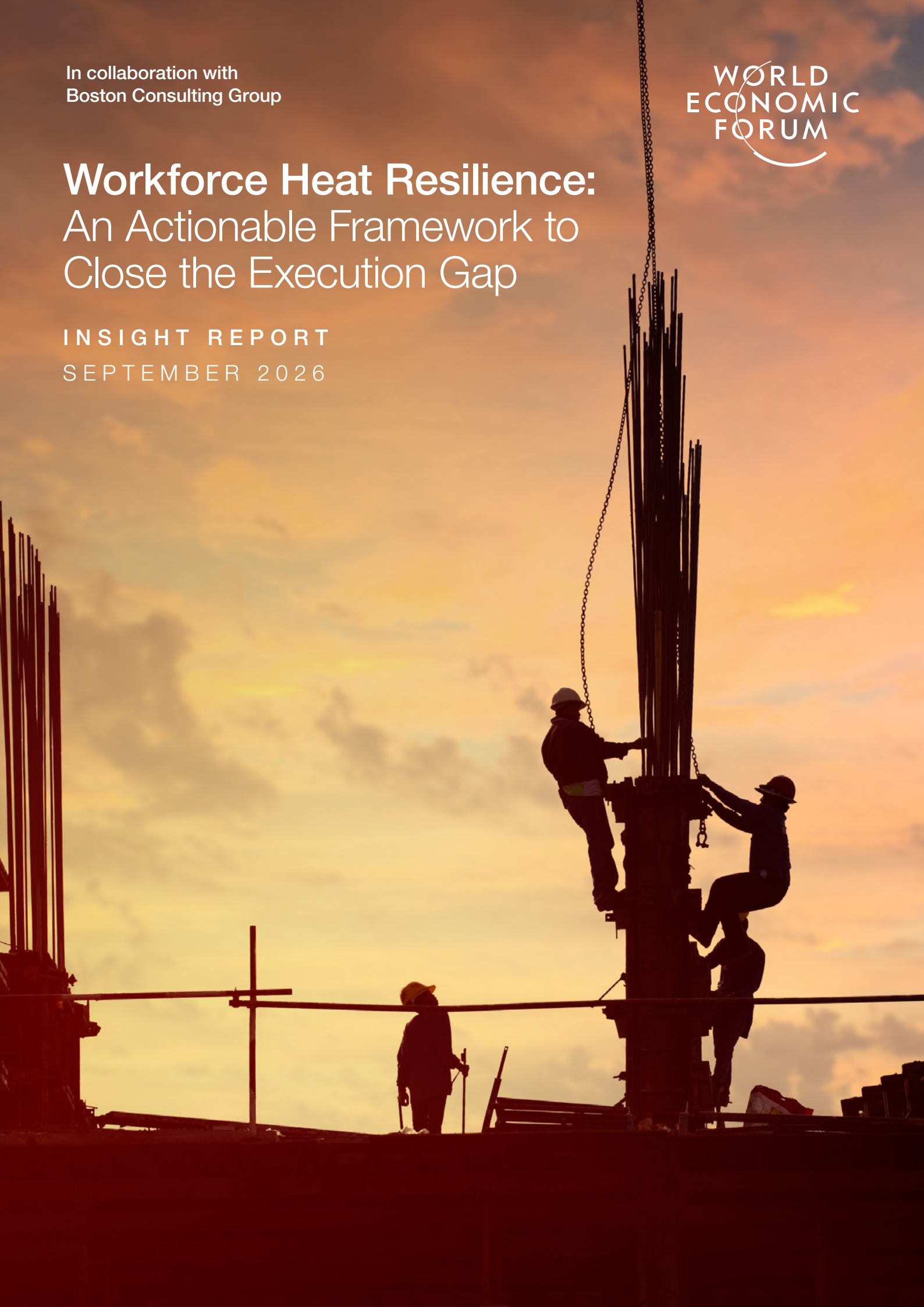
In collaboration with
Boston Consulting Group

WORLD ECONOMIC FORUM

Workforce Heat Resilience: An Actionable Framework to Close the Execution Gap

INSIGHT REPORT

SEPTEMBER 2026



Images: Getty Images

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Foreword

Sebastian Buckup
Managing Director,
World Economic Forum

Elizabeth Millman Hardin
Managing Director & Partner,
Boston Consulting Group

The health of the workforce is fundamental to the health of the economy. As extreme heat becomes an increasingly persistent feature of the global climate, rising temperatures are placing greater strain on the people who grow our food, build our infrastructure, manufacture products and deliver essential goods and services. When heat compromises the health of the workforce, it also compromises the productivity that relies on worker health.

For many years, extreme heat has been treated as an occupational health and safety issue, limited to certain regions and seasons. That framing no longer holds. As heat exposure intensifies across geographies and industries, heat has become a business risk as much as a human one, shaping productivity, operational continuity and long-term resilience. The costs are already visible: in June 2026, a single week of extreme heat cost the UK an estimated 24 million working hours and £1.15 billion in lost output.[1]

Yet, despite growing awareness, action remains limited. Many organizations understand that extreme heat poses material risks to their workforce and operations. Translating that awareness into action is harder and represents an execution gap.

This report, developed in collaboration with Boston Consulting Group, supports businesses in closing the execution gap. It provides a practical framework to help leaders assess where extreme heat risks are greatest across value chains, which interventions will deliver value and how to embed resilience into daily operations. It is complemented by a Workforce Heat Resilience Solutions Repository that allows businesses to filter interventions suited to their context.

Protecting workers from extreme heat is not only a risk mitigation cost in a warming economy, it is a condition for long-term business success. Organizations that build workforce heat resilience into how they operate will be the ones that keep performing, and keep their people safe, in the years ahead.

Executive summary

Workforce heat risk is already affecting worker health and eroding value for companies, yet few have started to act and generate gains.

Extreme heat is widely recognised as a major and growing risk to human health and economic stability.[2] Today, over 2.4 billion workers are exposed to excessive heat, resulting in at least 22 million injuries and 18,000 deaths annually. Without significant action to address workforce heat risk, rising temperatures could lead to productivity losses of $2.4 trillion by 2030.[3]

Risks arising from extreme heat are most material for sectors characterized by outdoor and poorly ventilated indoor environments. In food and agriculture, companies report double-digit productivity declines during high-heat periods.[4] A logistics company in China observed more than a 20% increase in food delivery delays during heatwaves due to higher order volumes, location variability and utilization of individual couriers.[5] Similar pressures affect manufacturing, construction, mining and any operation involving sustained physical exertion or limited climate control.

These impacts cascade across value chains. Upstream, they increase volatility in supply quality, cost and timeliness, while downstream, they shift demand patterns and create pressure for product and service performance.

Heat risk is not confined to the workplace or select geographies. Even in predominantly office-based industries, workers in regions such as Europe face sustained heat exposure during commutes and at home that disrupts sleep, impedes recovery and compounds physical strain. Built environment studies show that construction workers often arrive at sites dehydrated, reducing labour capacity before the workday begins.[6]

Despite growing awareness of these issues, action is lagging. Across all major geographies and sectors, around 50% of companies have not yet begun a systematic assessment of how extreme heat affects both workforces engaged in direct operations and those across their value chains, while only about 28% have piloted or scaled up any interventions.[7]

The value of a proactive approach

Initiatives such as work-rest cycles, shade and hydration reduce heat-induced illness and absenteeism while stabilizing productivity.[8] In Latin America, one food and agriculture company's heat stress management programme generated 60% return on investment.[9] For organizations taking action, non-financial gains – including stronger talent retention and pipelines, reduced legal exposure and improved reputation – amplify the business case.

A proactive approach allows companies to run low-cost pilots and scale up with confidence. Early movers lock in productivity gains and avoid compounding losses from repeated exposure, while getting ahead of regulations emerging across markets. Meanwhile, providers of heat resilience solutions, from parametric insurance to AI-enabled warning systems, benefit from new markets and growing demand.

An actionable framework for leaders

To effectively address workforce heat risk, leaders must answer three critical questions:

1. How big and where is my company's problem with extreme heat?
2. Which solutions should my company implement?
3. How should my company approach execution?

Given the impact on individual workers and the rising cost of inaction, protecting workforces from extreme heat is both a risk management and strategic business imperative. Companies that close the execution gap protect their people – their most valuable asset – and position themselves for long-term success in a warming world.

1 The business imperative for action

Tackling the impact of heat on workforces improves worker well-being, while strengthening near-term business performance and long-term resilience.

Extreme heat contributes to at least 22 million injuries and 18,000 fatalities each year.

Extreme heat has become a structural operating condition for workers and businesses worldwide. The past 11 years (2015-2025) were the hottest on record, with 2023-2025 at the top of this list.[10] Between May 2024 and May 2025, nearly half the global population experienced at least 30 additional days that were hotter than 90% of historical, local temperatures from 1991-2020.[11]

The significance of these trends extends beyond rising temperatures. As highlighted in the Forum's 2025 report, *Building Economic Resilience to the Health Impacts of Climate Change*,[12] extreme heat is emerging as a critical factor at the intersection of climate risk, workforce health and economic performance. Each year, over 2.4 billion workers face excessive heat exposure, contributing to at least 22 million injuries and 18,000 fatalities, according to the International Labour Organization (ILO).[13] Without significant mitigation, heat stress is projected by the ILO to reduce global GDP by $2.4 trillion in 2030.[14] For businesses, these effects are increasingly visible through reduced workforce effectiveness, operational instability and mounting strain across value chains.

Despite its growing importance, extreme heat lacks a harmonized global protocol for managing risks based on local and worker contexts. Reviews of biometeorological indices reveal that most countries emphasise maximum temperature in their definitions, but place less attention on other factors that can constitute life-threatening conditions. Additionally, northern latitudes tend to use lower thresholds to trigger action compared to southern counterparts.[15]

This report defines extreme heat as a wet-bulb globe temperature (WBGT) at or above 25°C, the point at which work capacity begins to decline for physically demanding labour (see Box 1).

BOX 1 What is extreme heat?

Established occupational heat standards place the onset of declining work capacity for physically demanding labour at a wet-bulb globe temperature (WBGT) of around 25°C.[16] This metric considers ambient temperature, humidity, solar radiation and wind levels. Widely varying conditions can produce the same WBGT: for example, a dry 36°C (97°F) day in the shade or a far milder 26°C (79°F) day in humid, sunny conditions.*

This report applies the WBGT threshold as its definition of extreme heat, although personal and physiological variables can shift the point at which any individual experiences heat stress. As this threshold is routinely crossed in many regions for extended periods, recommended measures are intended to help companies manage existing workforce heat impacts, not only future risk.

Note: * Illustrative values, calculated with standard WBGT formulas.

The health burden of extreme heat on workers includes acute medical events (e.g. heat stroke, acute kidney injury), acceleration of chronic illness (e.g. chronic kidney disease, cardiovascular disease, mental health issues) and impaired cognitive and physical performance. Since many of these effects develop gradually and reduce work capacity long before they manifest as recordable incidents, extreme heat impacts are often underestimated. These impacts are not confined to a company's direct workforce. They surface across the entire value chain, from workers who provide key operating inputs to customers of resilience solutions (see Box 2).

BOX 2 Workforce groups affected by extreme heat

Upstream workforces

Workforces of value chain partners, including suppliers, contract manufacturers and logistics companies

Direct workforces

Company employees, including frontline staff (e.g. factory or field workers) and corporate office staff

Downstream workforces

Corporate customers seeking heat-resilient solutions for their workforces and individuals looking for products and services to protect their own health

Heat stress on upstream workforces can drive volatility in supply quality, cost and delivery reliability, with disruptions that are difficult to predict and absorb. For direct workforces, the costs are already measurable, for example:

- A 12% productivity decline during high-heat periods at one food and agriculture company.
- A 30% reduction in workload during summer months at a mining company.
- Increased turnover and interim hiring costs in manufacturing across heat-exposed regions.[17]

In downstream workforces, a growing need for products and services that function in extreme heat, while supporting health, is reshaping demand patterns: 75% of downstream-focused companies report demand shifts and 63% face heightened performance expectations from customers seeking heat-resilient solutions.

Companies taking action are already seeing measurable returns:[18]

- A logistics company in the Middle East reduced workplace incidents by 50% after introducing hydration breaks.
- A South Asian manufacturer measured a 40% decrease in sick leave after installing heat-reflective glass.
- A manufacturer with global operations brought down absenteeism by 25% over four years through roof adaptation and tree planting.

Together, these examples highlight how basic interventions, consistently applied, generate meaningful improvements in worker well-being and drive metrics that matter to operations and finance teams.

> **We ask ourselves: How are we taking care of the most important asset in our construction business – our people? A cornerstone of our safety and community culture is our commitment to supporting our people, so they can bring their very best, every single day.**
>
> Julia Gisewite, Chief Sustainability Officer, Turner

The case for action, however, is not driven solely by business performance. Regulatory requirements are enforced in many jurisdictions, including China, Costa Rica, Gulf Cooperation Council states, Japan and Spain. Elsewhere, momentum is building, with new legislation in the US, support for binding standards in Europe and calls for stronger protections from international labour bodies. Companies moving ahead of these requirements reduce compliance risk and gain influence in standard-setting.

Beyond regulation, early movers report stronger talent retention in heat-exposed roles, improved supplier relationships built on shared commitments and a growing commercial advantage as customers and partners increasingly factor heat resilience into procurement and investment decisions.

The costs of inaction and the benefits of increasing resilience are material today and will only increase in the future. Each season of unaddressed exposure adds to the cumulative health burden on workers, operational losses absorbed by businesses and the gap between early movers and later adopters.

2 Closing the execution gap: a framework for resilience

Fewer than one in three companies have workforce heat resilience initiatives today; the Workforce Heat Resilience Roadmap can help them accelerate action.

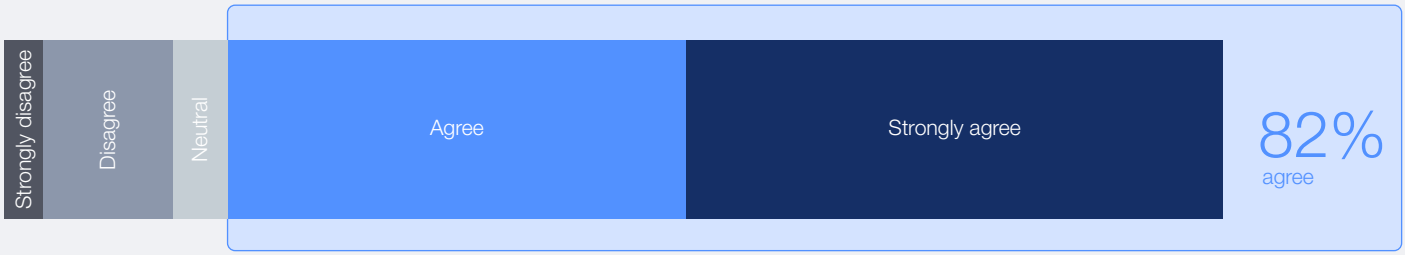
Fewer than 1 in 3 companies have workforce heat resilience initiatives today.

Despite growing recognition of workforce heat risks, many leaders struggle to answer three questions needed to move from awareness to action:

1. How big and where is my company's problem with extreme heat?
2. Which solutions should my company implement?
3. How should my company approach execution?

In a survey commissioned specially for this report, responses from 40 senior leaders from all major global regions, representing the top companies by revenue across 10 sectors, show over 80% agreeing that extreme heat is an urgent and major risk for their workforce groups (see Figure 1 and Appendix for methodology).

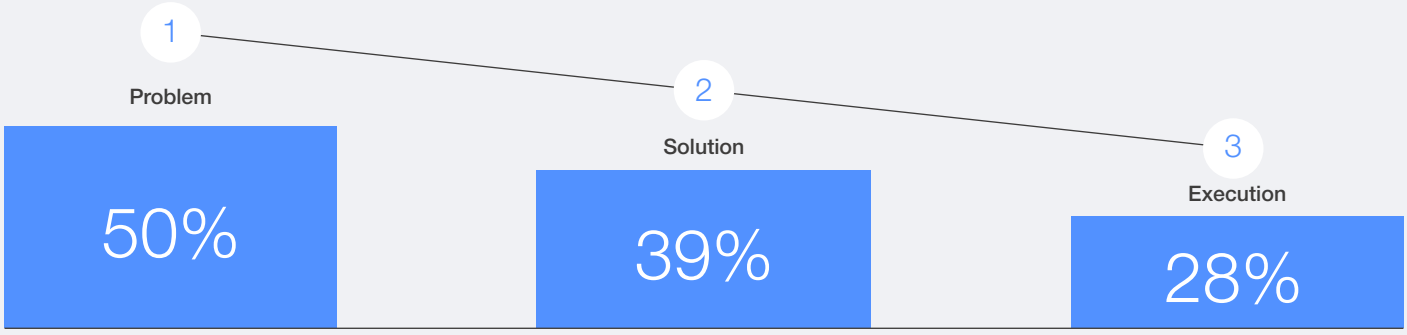
FIGURE 1 **Perceptions of extreme heat urgency across all sectors and workforce groups**



Source: BCG workforce heat resilience survey, 2026.

Yet only one in two companies are actively investigating their workforce heat risks and fewer than one in three are implementing and scaling up interventions (see Figure 2).

FIGURE 2 **Company maturity in workforce heat resilience across all sectors and workforce groups**



~50% of organizations have not begun a systematic assessment of their workforce heat risks

Progress stalls at solution design: only 39% of organizations advance to planning, indicating barriers to translating awareness into action

Execution remains the weakest stage, with just 28% of organizations implementing solutions despite broad awareness of heat risks

Source: BCG workforce heat resilience survey, 2026.

~75%

of surveyed business leaders report difficulty translating workforce heat risk into financial terms.

Three interconnected challenges widen the execution gap:

1. **Quantification difficulty**: Approximately 75% of respondents report difficulty translating workforce heat risk into financial terms, reflecting genuine complexity in attributing performance losses to heat vs. other factors.

2. **Technical and/or financial constraints**: Around 35% of respondents cite limited resources or expertise as a barrier. While many interventions are low-cost and straightforward to pilot, not all organizations have built up the capabilities needed for context-specific design and implementation.

3. **Lack of topical ownership**: Within organizations, heat risk spans human resources (HR), environmental health and safety (EHS) / occupational health and safety (OHS), sustainability, procurement and commercial functions. Without a single function coordinating execution – and clearly accountable for it – progress can stall.

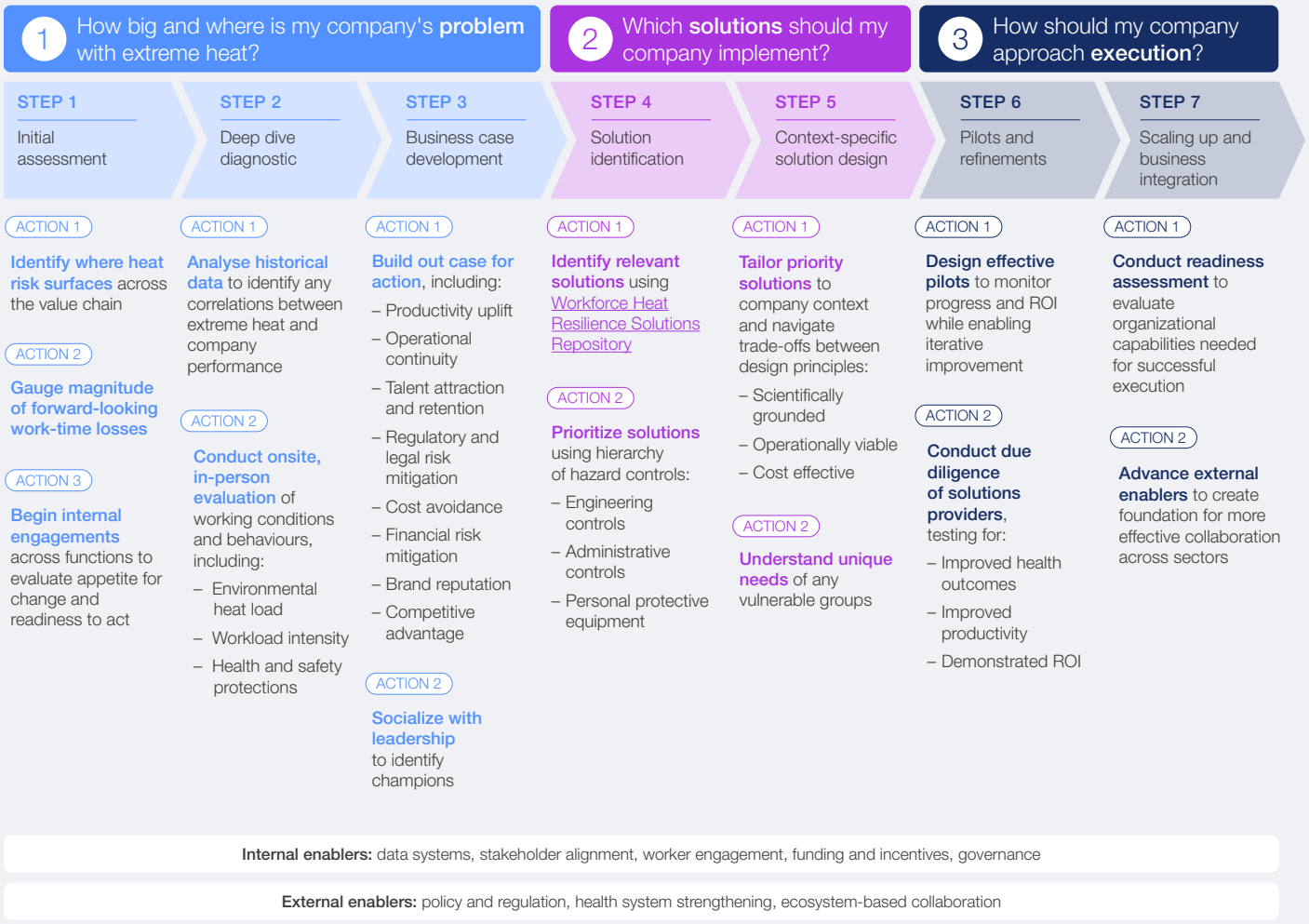
To accelerate action, leaders can follow the Workforce Heat Resilience Roadmap (see Figure 3), a practical set of activities designed to answer each of the three critical questions. The steps are defined deliberately:

1. Build a credible business case.

2. Design solutions suited to the operating context.

3. Create the conditions needed to pilot, scale up and sustain effective interventions.

FIGURE 3 **Workforce Heat Resilience Roadmap**



Source: Co-developed by the World Economic Forum and BCG with input from partners (see Acknowledgements).

3 How big and where is my company's problem with extreme heat?

Companies that begin quantifying their workforce heat risk can quickly build the foundation for a compelling business case.

Workforce heat risk is easy to underestimate until comprehensively assessed. The following activities can help companies map exposure and build a business case grounded in data. This chapter presents Steps 1-3 of the Workforce Heat Resilience Roadmap:

Step 1: Initial assessment

Step 2: Deep dive diagnostic

Step 3: Business case development

STEP 1

Initial assessment

Key actions	Example outputs
1. Identify where heat risk surfaces across the value chain	List of relevant workforce heat impacts across upstream, direct and downstream operations Understanding of where to gather data and which stakeholders to engage
2. Gauge magnitude of forward-looking work-time losses	High-level financial estimates and geographic breakdowns of heat-driven work-time losses
3. Begin internal engagements across functions to evaluate readiness to act	Stakeholder map of potential champions, sceptics and cross-functional collaborators Clear view of evidence to gather and questions to resolve in order to strengthen the business case

ACTION 1

Identify where heat risk surfaces across the value chain

When environmental heat load exceeds the body's capacity to maintain a safe core temperature, workers experience a range of health impacts:

- **Cognitive and physical impairment:** A 2025 nationwide analysis of US Occupational Safety and Health Administration (OSHA) injury data found that a heat index of 100-110°F (38-43°C) raises the odds of workplace injury by 10-20% across nearly all major industries.[19]
- **Acute heat illnesses:** These can include visible and severe events such as heatstroke, which may result in disorientation and collapse. However, for every recorded case, many less severe or unreported cases of heat exhaustion and other heat-related illness go undetected.
- **Chronic illness:** In hot conditions, each additional 1°C (1.8°F) of heat exposure is associated with a 0.5-2.1% increase in cardiovascular morbidity and mortality[20] and a 3% increase in kidney-related mortality.[21] High temperatures are also linked to heightened psychological distress and worsening of existing mental health issues.

These impacts extend beyond the workplace, creating ripple effects that influence work performance and broader economic outcomes. A recent UK study found that poor sleep in uncooled homes is a consistent drag on next-day productivity, making up an estimated 5-10% of the total productivity loss that adaptation to heat could prevent.[22]

Many heat impacts are invisible or underreported, manifesting as operational pressures across value chains (see Table 1). Leaders who rely solely on heat-related incident reports will underestimate the true scale of the problem.

> A heat index of 100-110°F (38-43°C) raises the odds of workplace injury by 10-20% across nearly all major industries.

TABLE 1 | **Operational pressures driven by workforce heat impacts**

Workforce group	Operational pressures	Example
Upstream	Higher costs in supply chain, contract manufacturing and/or logistics	When an intense heatwave struck India in May 2024, reductions in working hours hampered production volumes even as input and freight costs rose, resulting in pass-through costs for customers[23]
	Decrease in output quantity and/or quality	Among farmworkers in California's Central Valley, an increase in heat index from 95°F to 100°F (35°C to 38°C) was observed to reduce agricultural productivity by 4-8%[24]
	Supplier and/or contractor delays	An Indian manufacturer reported worker productivity falling to around 80% during extreme heat, as exhaustion and more frequent breaks delayed dispatch[25]
	Higher scrutiny of supplier exposure and working conditions	Through the ILO-IFC* Better Work initiative, global apparel brands, governments and factory owners are collaborating to address supplier working conditions, including heat exposure[26]
Direct	Productivity losses	A food and agriculture company measured a 12% productivity decline during high-heat alerts[27]
	Health and safety incidents	A 2025 US analysis estimated ~31,500 heat-attributable workplace injuries in 2023 alone[28]
	Healthcare and insurance costs	A US healthcare payer/provider observed heat-related pharmaceutical claims among its employee population rising during hotter periods[29]
	Legal and regulatory liability	California's Cal/OSHA** issued a $276,425 citation in December 2024 against a small landscape contractor for violating heat illness prevention rules[30]
	Worker turnover	Anecdotal evidence across industries, including food and agriculture, manufacturing, and supply chain and transport, revealed employees and contract workers opting to leave their jobs rather than endure hot conditions[31]
	Worker demands	UPS agreed to purchase air-conditioned vehicles and retrofit existing vehicles and cargo bays, following engagement with its workforce[32]
Downstream	Heightened performance expectations	Nike's Aero-FIT line was designed to enhance sweating efficiency of athletes performing in extreme conditions[33]
	Demand shifts among existing products and services	India's air conditioner market reached a record 14 million units sold in 2024 amid extreme heatwaves, with May 2024 seeing a 30-40% year-on-year volume increase,[34] a trend that underscores the need for energy-efficient, low-carbon solutions
	Demand for new solutions	Wearable sensors are seeing growing adoption across construction, oil and gas, mining and other high-heat industries, with multiple research programmes validating their use for early heat-strain detection[35]

Notes: * ILO-IFC = International Labour Organization and International Finance Corporation; ** Cal/OSHA = California's Division of Occupational Safety and Health.

> **A food and agriculture company measured a 12% productivity decline during high-heat alerts.**

ACTION 2

Gauge magnitude of forward-looking work-time losses

For sectors in which direct workforces face higher levels of heat risk (see Table 2), productivity losses are among the largest financial impacts, arising from heat-related absences and lower on-the-job output.

Work-time loss, the productive hours lost when heat reduces or halts work, is one of the most directly measurable of these, making it a good starting point for any company-specific business case.

TABLE 2 **Direct workforce risk profiles across sectors**

Sector	Risk level	Risk profile
Food & agriculture		Outdoor/manual work; seasonal exposure peaks
Built environment		Outdoor construction work; sustained exertion
Mining & metals		High physical exertion, PPE burden, remote/high-heat sites
Supply chain & transport		Outdoor logistics; high mobility and disruption sensitivity
Energy		Field-based work; upstream extraction and infrastructure exposure
Fashion & apparel		Labour-intensive supply chains; mixed exposure for direct workforces
Manufacturing		Facility-based work; impact varies by process, ventilation and PPE
Automotive, aviation & aerospace		Mixed environments; impact varies by shop-floor conditions and PPE
Health & healthcare		Clinical and field staff exposed in non-climate-controlled care settings
Insurance		Mainly office-based workforce; field claims adjusters most exposed
Media, communications & technology		Field repair crews exposed during outage response; office-based workforce minimally affected

Source: World Economic Forum.

Risk level Low Medium High

Across illustrative examples of companies with different workforce sizes and geographies, heat-driven work-time losses may amount to roughly 5-7% of earnings in 2027.

While past heat costs can be estimated from company data, future projections require drawing on climate model data. One way companies can estimate the financial impacts of heat-driven work-time losses is by using daily, location-based WBGT projections under a forward-looking climate scenario, such as Shared Socioeconomic Pathway (SSP) 2-4.5,[36] and company inputs like workforce size, location, annual cost of operations and profit margin (see Appendix for methodology).

Illustrative results from this kind of analysis underscore the financial stakes of workforce heat risk (see Table 3). Across illustrative examples of companies with different workforce sizes and geographies, heat-driven work-time losses may amount to roughly 5-7% of earnings in 2027. Actual outcomes will depend on how each sector evolves, including through automation and other innovations that could materially reduce exposure. Although the percentage impacts appear similar across examples, workers often bear these losses directly, making the consequences for livelihoods disproportionately greater than for organizations.

Comparing results across geographies allows organizations to prioritize action where heat-driven losses are greatest. Figure 4 shows results for another illustrative company profile modelled on a multinational with 45,000 heat-exposed employees generating $20 per worker per day, spread evenly across Bangladesh, Viet Nam and India. Of $35 million in total projected annual work-time losses in 2050, assuming today's workforce and physical job intensity, Bangladesh alone accounts for almost 40%, reflecting the heat and high humidity of its low-lying geography.

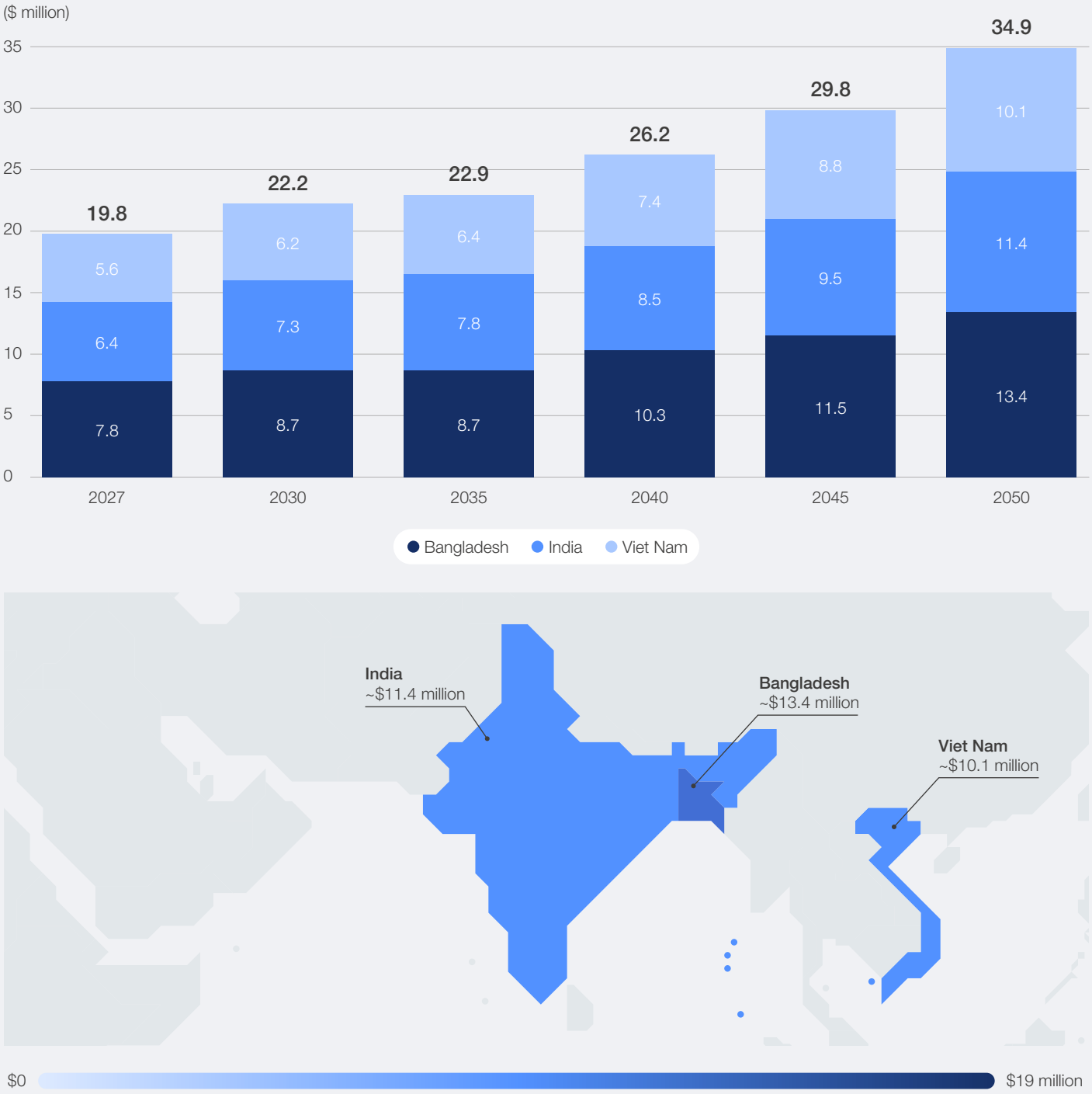
Upstream, a similar analysis can give leaders a directional sense of how much procurement spend and supply chain risk may be exposed to heat-driven work-time losses that are passed through suppliers, logistics partners and contract manufacturers.

TABLE 3 **Modelled work-time loss impacts under SSP2-4.5 (illustrative company profiles)[1]**

	Mean annual impact 2027		Mean annual impact 2035		Mean annual impact 2050	
Illustrative company profile	**$**	**% of earnings**	**$**	**% of earnings**	**$**	**% of earnings**
Supply chain and transport company with ~300,000 exposed employees in the US[37]	~$584 million	~5%[2]	~$806 million	~6%	~$1.13 billion	~6%
Fashion and apparel company with ~10,000 exposed employees in Bangladesh[38]	~$8.0 million	~7%[3]	~$8.9 million	~7%	~$13.7 million	~8%
Food and agriculture smallholdings with ~3 exposed workers in Indonesia[39]	~$250	~7%[4]	~$300	~8%	~$500	~9%

1. 2050 figures assume workforce size, composition and labour intensity remain at today's levels; they do not account for automation or other sectoral changes that could significantly alter exposure.
2. Earnings defined as EBITDA, based on publicly available sector benchmarks.
3. Earnings defined as export earnings, based on Bangladesh apparel export benchmarks scaled to a company with ~10,000 exposed employees.
4. Earnings defined as smallholder income, based on World Bank income benchmarks.

FIGURE 4 **Modelled work-time loss impacts for illustrative Asian regional company with 45,000 heat-exposed workers spread evenly across three countries ($ million)**



Note: Countries not labelled are not included in this estimate.

ACTION 3

Begin internal engagements

Most organizations have not yet designated a topical owner for extreme heat resilience, leaving management of workforce heat risks fragmented across functions. Stakeholder engagement across HR, EHS/OHS, operations, sustainability, procurement, finance and commercial can uncover the data and experience that already exist within the organization, point to gaps in capability and knowledge that will need to be addressed and highlight leaders whose support will be critical to move the work forward. This engagement lays the groundwork for subsequent necessary cross-functional collaboration.

STEP 2 | Deep dive diagnostic

Key actions	Example outputs
1. Analyse historical data to identify correlations between extreme heat and company performance	Quantified links between past extreme heat periods and business outcomes Shortlist of business metrics sensitive to heat, informing where to focus interventions and data to track during pilots
2. Conduct onsite, in-person evaluation of working conditions and behaviours	First-hand account of how heat affects workers List of gaps in heat protections, grounded in direct observation

ACTION 1

Analyse historical data

Historical data analysis can help leaders identify patterns that are difficult to detect in day-to-day work. Combining operational data with location-specific heat records enables leaders to identify where heat-related pressures concentrate across geographies, roles, workforce groups and seasons. Descriptive trends, site-by-site comparisons and statistical analysis linking past heat exposure to metrics such as productivity, injury rates, quality issues, overtime and turnover can strengthen the business case. Leaders without easily accessible internal data can still engage in historical analysis, as directional patterns can be drawn from publicly available weather, labour and health datasets.

ACTION 2

Conduct onsite, in-person evaluation of working conditions

While desk work can help gauge the magnitude of extreme heat impacts, on-the-ground observation reveals their true nature. Job descriptions systematically fail to capture the full demands of a role under heat stress because they describe tasks rather than the combination of environmental heat load, metabolic heat production and heat dissipation capacity that determines actual exposure.[40] In practice, these three factors interact in ways that can only be understood by watching workers perform their roles in real conditions, ideally during periods of peak heat when risks are most pronounced.

> **Mechanized work in agriculture seems like it would be less intense than manual labour until you're in the field, in the heat, watching teams of workers run after machines.**
>
> Ilana Weiss, Chief Operating Officer, La Isla Network

The most important source of insight is often the workers themselves. Direct conversations, conducted with care and in workers' own language, reveal the practical realities of heat exposure that observation alone cannot reveal (see Case Study 1).

CASE STUDY 1:

Mahindra Group – worker engagement across archetypes

Mahindra Group, an Indian multinational group with 320,000+ employees in 100+ countries, operates primarily across the automotive, farm equipment and services sectors. The Group has taken significant steps to integrate climate adaptation into its core business strategy. Knowing that working conditions and exposure duration vary across workers, it emphasises the need for solutions tailored to different archetypes:

1. **Outdoor workers** – such as farmers, security guards, delivery drivers, road crews and utility technicians – who have the highest exposure.
2. **Indoor workers** – such as factory, warehouse and kitchen staff – who are exposed when operating in non-air-conditioned, enclosed environments.
3. **Mobile field workers** – such as those in construction, logistics, sales and collection – who have a mixed exposure profile as they move between settings over the course of the day.

To better understand the experiences and needs of each archetype, Mahindra Group conducted 40+ interviews with workers and stakeholders across functions and sites. Equipped with firsthand insights, the Group is addressing heat risk through a multi-layered approach including governance, audits, heat action plans and protective solutions. It is currently piloting multiple solutions categories in parallel:

- Site infrastructure (e.g. reflective coatings, rooftop insulation, cooling and ventilation).
- Blue-green infrastructure (e.g. onsite tree cover and water features).
- Updates to operating procedures for heat management (e.g. shift timing, mobile hydration stations).
- Wearables (e.g. personal protective equipment).

Source: Mahindra Group.

STEP 3 | Business case development

Key actions	Example outputs
1. Build out the case for action	Company-specific narrative spanning relevant value and cost drivers
2. Socialize with leadership to identify champions	Mandate from executive-level champion to advance to solution design Cross-functional alignment on scale and urgency of the problem

ACTION 1

Build out the case for action

Beyond directional work-time losses, a compelling business case for action should address the full range of value drivers and cost considerations that interventions can affect (see Table 4 for details and Case Study 2 for an example).

TABLE 4

Key benefits and costs for business case development

	Workforce lens	Business case elements
Value drivers	All	**Licence to operate:** Acceptance of company's business practices by key stakeholders
		Brand reputation & stakeholder trust: Increased trust and desire to engage (e.g. buy from, invest in, work for) business
		Worker health & well-being: Reduced heat-related illness, injury and long-term health impacts across the workforce
	Upstream	**Cost management:** Mitigation of pass-through costs from upstream partners grappling with workforce heat risks
		Operational continuity: Prevention of disruptions that affect direct and downstream operations
		Reduced redundancy costs: Lower need for safety stock, alternative sourcing options and extended lead times
		Transparency: Ability to respond to increasing customer and investor scrutiny of upstream worker conditions
	Direct	**Productivity uplift:** Improvements in output rates and work quality; reduction in backfilling and overtime
		Direct cost avoidance: Reduction in medical expenses, workers' compensation claims and insurance premiums
		Legal & regulatory risk mitigation: Decrease in legal exposure and compliance with emerging regulations
		Talent attraction & retention: Stronger value proposition for employees and contractors; reduced workforce turnover
		Labour relations: Improved worker-management trust; fewer workplace grievances
	Downstream	**Revenue protection:** Ability to adapt to demand shifts and protect market share
		Customer resilience: More resilient downstream workforces, sustaining the businesses that depend on them
		Market growth: Capture of new customer segments and market opportunities
Costs	All	**Ongoing asset costs:** New cost categories and/or assets needed to maintain resilience initiatives
		Ongoing administrative costs: New roles and/or dedication of existing roles to focus on heat resilience efforts
		One-time setup costs: Upfront expenditures required to launch interventions
		One-time rollout disruptions: Operational impacts during initial rollout of pilots and interventions

> **The success of Bayer's workforce heat resilience interventions revealed a scalable opportunity: extending proven solutions to smallholder farmers, a critical segment of our value chain. By investing in the resilience of those who help feed the world, we strengthen both livelihoods and the long-term sustainability of agricultural value chains.**
>
> Chitkala Kalidas, Senior Vice President and Global Head, Sustainability, Safety, Health and Environment, Bayer; Executive Director and Head, Bayer Foundation

CASE STUDY 2:

Bayer – building the business case for action across the value chain

Bayer is a global life sciences company with a portfolio spanning crop science, pharmaceuticals and consumer health. It has taken a systematic approach to managing heat risk for thousands of exposed workers across 300+ active sites worldwide, anchored in several business case elements, including:

- **Operational continuity:** Standardized heat-risk management mitigates a leading source of delays and disruption; in North America, Bayer achieved a 20% decrease in heat-related incidents from 2019 to 2025, a meaningful result given low baseline frequency of such events and one that supports reliable, cost-effective delivery on customer commitments.
- **Direct cost avoidance:** Preventing heat-related incidents reduces medical expenses, workers' compensation claims and lost-time costs across a large workforce; Bayer has estimated approximately $3,000 in avoided costs from preventing a single heat-related compensation claim.
- **Productivity uplift:** Heat-resilience measures help workers stay safe and maintain strong performance in demanding environments; Bayer is aware of studies from the US National Institute for Occupational Safety and Health (NIOSH) and the ILO showing that unmanaged heat stress can reduce worker productivity by 5-20%[41] and expects its comprehensive heat prevention measures to mitigate such losses.
- **Labour relations:** Proactive heat management builds trust and supports a productive, stable working environment; through an Arizona-based wearable study, Bayer used worker-centred data to identify opportunities to strengthen heat stress prevention, enhance hydration education and reinforce work-rest practices, demonstrating a commitment to continuously improving worker protection.

Beyond its direct workforce, Bayer is exploring how it can support downstream workforce resilience through a scalable and replicable model. Its initial focus on smallholders in India, who represent some of the most vulnerable workers, is underscored by additional business case elements:

- **Stakeholder trust:** With Heat Action Plans across 23 Indian states still maturing[42] and existing agri-input guidance focused on crop rather than worker heat resilience, Bayer can fill a critical gap, establishing smallholder trust and credibility as a private-sector partner in India's broader heat resilience agenda.
- **Customer resilience:** With heat-related deaths in India projected to rise to roughly 100,000 per year by 2050 and farm workers among the most exposed, protecting the health of these workers is an increasingly important investment in labour continuity and agricultural value-chain resilience.[43]

Source: Bayer.

ACTION 2

Socialize with leadership

Equipped with a business case, leaders are ready to pursue alignment across their organizations. A natural first step is to re-engage the leaders who showed the most enthusiasm, sharing early findings and translating them into terms relevant to each function, while returning to sceptics to address outstanding concerns with evidence.

From there, the priority is identifying an executive-level champion with the right combination of authority, credibility and conviction to argue the case for change and set a clear mandate for the layers below. In some early-mover organizations, securing board-level visibility has proven equally important, opening doors to resources, accountability mechanisms and strategic framing that would otherwise remain out of reach. Others have found that peer coalitions help sustain momentum by reducing dependence on an individual leader.

4 Which solutions should my company implement?

Navigating a fragmented solutions landscape requires deliberate prioritization, context-specific design and reliable partnerships with solution providers.

Leaders looking to implement solutions must navigate a wide landscape of foundational and innovative options. The following activities can help them focus on those best suited to their context. This chapter presents Steps 4 and 5 of the Workforce Heat Resilience Roadmap:

Step 4: Solution identification

Step 5: Context-specific solution design

STEP 4

Solution identification

Key actions	Example outputs
1. Identify relevant solutions	Shortlist of context-relevant interventions Understanding of maturity, cost and implementation considerations for select solutions, anchored in real-world case studies
2. Prioritize solutions using hierarchy of hazard controls	Prioritized list of high-potential interventions based on their ability to reduce heat exposure and requirements for behavioural change

ACTION 1

Identify relevant solutions

The effectiveness of any heat resilience intervention depends heavily on where and how work is done. Misting units that provide meaningful cooling in dry heat can worsen conditions in high humidity. Climate, job type and work environment all shape which solutions will hold up in practice and which will not.

The Workforce Heat Resilience Solutions Repository enables leaders to filter 30+ available interventions across these dimensions, identifying the options most relevant to their operating context, alongside each intervention's control type, maturity, cost and implementation requirements (see Figure 5). Control type refers to an intervention's place in the hierarchy of hazard controls – the framework for prioritizing solutions by how reliably they reduce risk (see Figure 6).

Notably, different interventions target different drivers of heat strain, making it critical to match solutions to the specific sources of risk facing a workforce (see Box 3 and Case Study 3).

Understanding these drivers can reveal opportunities to capture multiple health and safety benefits through a single measure.

BOX 3

Drivers of heat strain

Environmental heat load: heat absorbed from external surroundings.

Metabolic heat production: heat generated internally through physical activity.

Heat dissipation capacity: ability to shed excess heat through sweating, airflow and other cooling mechanisms, given attire and PPE.

CASE STUDY 3:

JINGDONG Logistics – protecting frontline workers through extreme heat

JINGDONG Logistics, a leading technology-driven supply chain solutions and logistics services provider, matched a set of interventions to the specific ways heat affects its frontline workers, who face a high environmental heat load:

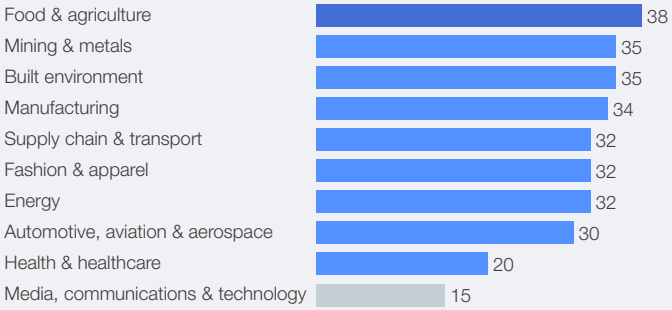
- **Heat-prevention and cooling supplies:** At delivery stations, sorting centres and other outdoor work sites, ice popsicles, cold drinks and other heat-prevention items are kept in stock. "Cooling packs", containing cooling sleeves, sun hats and medication, are provided to drivers and couriers.
- **Risk identification and response:** For scenarios such as extreme high-temperature operations, JINGDONG Logistics conducts risk identification and tiered control. For example, wheel-hub temperature sensors are installed on all trailer vehicles to prevent self-ignition in hot weather.
- **Health and safety training:** "Heat Stress Relief Group Counselling Camps" help employees manage the stress of working in high temperatures. JINGDONG Logistics also provides training on heatstroke prevention and first-aid procedures.
- **Income protection:** JD.com invested over RMB 100 million (~$15 million)[44] in a summer protection plan for its full-time JD NOW riders providing on-demand delivery. A heat subsidy runs from April to October, with amounts set dynamically by regional temperature. During extreme weather, deliveries are suspended with safeguards in place to balance driver safety and income stability.

Source: JINGDONG Logistics.

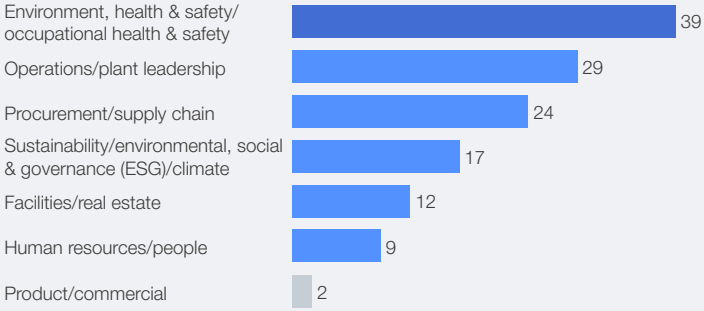
FIGURE 5 | **Examples of workforce heat resilience solutions**

Company characteristics

Which sector do you operate in?



Which function are you in?



Intervention characteristics

Type of control		Work environment		Maturity		Upfront cost		Ongoing cost		Implementation effort	
Administrative	21	Outdoor	36	Low	7	Low	20	Low	18	Low	7
Engineering	14	Indoor	33	Medium	18	Medium	11	Medium	16	Moderate	14
Personal protective equipment	5			High	15	High	9	High	6	High	19

Interventions list

Intervention/Description	Type of control	Maturity	Upfront cost	Ongoing cost	Effort
7-14 day acclimatization ramp for seasonal, new & returning workers At the start of any period with hot weather (e.g. a hot season) or after >1 week away, ramp up duration/intensity over 7-14 days; apply stricter limits for new workers and during heat waves.	Administrative	High	Low	Low	Moderate
Adjusted line speed during heat alerts Temporarily reduce conveyor, processing, assembly or other paced-work speed during extreme heat days to lower metabolic strain and enable safer pacing.	Administrative	Medium	Low	Low	Moderate
Agrivoltaic systems (solar panels for energy & shade) Install elevated solar panel systems over agricultural or outdoor work areas to generate energy while providing shade and reducing heat exposure.	Engineering	Medium	High	Medium	High

ACTION 2

Prioritize solutions

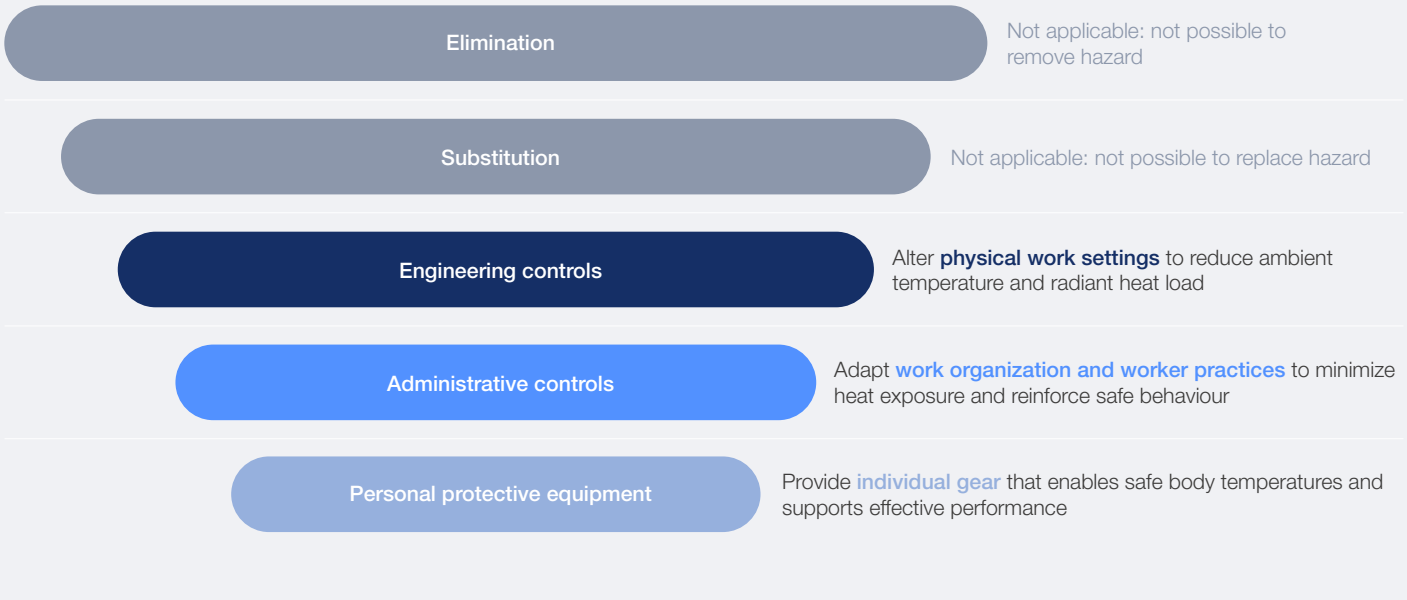
The hierarchy of hazard controls, developed by the US National Institute for Occupational Safety and Health (NIOSH), serves as a useful framework for prioritizing relevant solutions (see Figure 6). Its central principle is that reducing worker risk exposure is more reliable than depending on consistent individual behaviour to manage impacts.[45]

While mitigation efforts are essential to limiting the long-term severity of extreme heat, they cannot fully eliminate near-term risk. For workers facing hot conditions today, the most immediate and reliable types of interventions available are as follows:

- **Engineering controls** – such as low-carbon cooling centres, hydration stations, ventilation systems and mechanization of heat-intensive tasks – reduce heat exposure at the environmental level.
- **Administrative controls** – such as work-rest cycles, flexible scheduling, hydration protocols and parametric heat insurance – reduce exposure through operational planning.
- **Personal protective equipment** (PPE) – such as cooling vests, wearable monitoring devices and improved workwear – provides an additional layer of protection, but should not be treated as a substitute for systemic controls.

No single intervention can address all three drivers of heat strain outlined in Box 3. Therefore, meaningful protection requires multiple, reinforcing measures working together (see Case Study 4).

FIGURE 6 **Hierarchy of hazard controls applied to extreme heat**



CASE STUDY 4:

People's Courage International – heat relief interventions and financial protection for informal workers

People's Courage International (PCI), a US-based non-profit engaging informal workers across South Asia, Southeast Asia and East Africa, combines interventions that provide heat relief, such as hydration stations, cooling centres and insulated housing, with parametric climate insurance that reduces income shocks when extreme heat disrupts work.

In 2026, PCI operated 20 cooling centres across major metro areas, locating them near construction sites, road intersections and labour *nakas* (informal gathering points where day-wage workers seek jobs). The centres provide space to rest and cool down, as well as drinking water, oral rehydration salts, phone charging and heat-risk information. Some operate from rooms and others from open or semi-sheltered spaces, aiming to reach workers where they naturally gather. PCI also uses signage and QR codes to direct workers to the nearest centre and indicate which services are available. Early uptake has been strong: PCI reports more than 88,000 visits across centres, with daily footfall reaching as high as 1,841 per centre.

Since cooling centres can reduce exposure but cannot fully eliminate it, PCI – through a local partner – is helping build the market for parametric climate insurance. In 2026, it supported around 17,000 informal workers across multiple insurers, including products covering extreme heat, excess rainfall and severe air quality risks. Corporate partners subsidised the premiums for the majority of the 17,000 workers covered by the policy. PCI reported that around 11,500 workers are eligible to receive payouts during the summer season. Payouts are calibrated to basic needs: about INR 1,000-3,000 per payout, enough to cover roughly 5-6 days of minimum sustenance needs at INR 250-300 per day, with potential year-round coverage of up to INR 9,000.

Source: People's Courage International.

Credit: People's Courage International, Bangladesh.

STEP 5 | Context-specific solution design

Key actions	Example outputs
1. Tailor priority solutions to company context and navigate trade-offs	Solution designs grounded in the best available evidence on human physiology Clear plan to drive worker adoption and operational integration Evaluation of upfront investment vs. long-term gains
2. Understand unique needs of vulnerable groups	Assessment of which workers face elevated risk from heat exposure Adjustments to solutions to account for heterogeneous needs

ACTION 1

Tailor priority solutions to company context

Effective solutions balance three design principles:

- **Scientifically grounded:** aligned with the best available evidence on environmental conditions and human physiology.
- **Operationally viable:** feasible to set up, maintain and enforce, given the realities of the operating environment.
- **Cost-effective:** able to generate gains in health, productivity and financial outcomes that outweigh upfront costs and operational disruptions.

Solutions work best when they are based on the science of how the body responds to heat. Acclimatization, which builds tolerance by increasing heat exposure gradually over 10-14 days rather than all at once, is one of the most evidence-backed interventions available, yet it remains underutilized and the cost is steep: 80% of worker heat-related illnesses occur within the first four days on the job.[46] Leaders can close this and similar gaps by building heat literacy among groups involved in pilot design, ensuring they understand physiological differences between options, not just operational and financial trade-offs.

Operational viability depends on whether an intervention reduces the burden on workers or adds to it. Mobile hydration stations that bring water directly to workers, rather than relying on them to seek it out, drive strong adoption through design rather than individual discipline. By optimizing around worker experience, leaders can reduce friction points around solution access, proximity and ease of use. Where effective local solutions already exist, leaders can adapt and scale them up rather than starting from scratch. They can also leverage trusted intermediaries (e.g. peer leaders, supervisors, healthcare professionals) to maximize likelihood of sustained use.

While operational viability drives adoption, cost-effectiveness enables scale. Because the economics of interventions vary across operating environments, solutions that are highly effective in one setting may not be viable in another. Embedding healthcare professionals within working teams, for example, has delivered strong outcomes in some South American settings but may be prohibitively expensive in regions with higher labour costs.

Leaders should therefore tailor investments to local conditions and worker behaviour (see Case Study 5), while building business cases that capture the full value of improved productivity, health and retention. Mapping each intervention against existing metrics (e.g. injury rates, absenteeism, turnover and output) provides a practical starting point.

> 80% of worker heat-related illnesses occur within the first four days on the job. Leaders can close this and similar gaps by building heat literacy among groups involved in pilot design.

CASE STUDY 5:

Turner – designing interventions that work in context

Turner, one of the largest construction firms in the US, collaborated with La Isla Network, a non-profit providing data-driven occupational health research and advisory services, to understand how heat affects construction workers and which interventions can be successfully integrated into day-to-day operations.

This work represents a multi-study, multi-year initiative being conducted by members of Turner, La Isla Network, the University of New Mexico, Indiana University and Liberty Mutual Insurance. The work is also being sponsored by Turner, Flatiron Construction, Chubb, Liberty Mutual, McGriff and Zurich Insurance, with additional funding support from the Center for Construction Research and Training, National Institute for Occupational Safety and Health, and National Institute of Diabetes and Digestive and Kidney Diseases.

The study team established a scientific baseline for understanding when, where and why heat strain occurs, creating the evidence needed to evaluate the effectiveness of different solutions. They started with a 33-person, one-day pilot study in 2023 that tracked core body temperatures of workers in Kansas City who spent at least 25% of the workday outside of climate-controlled settings (e.g. roofers, concrete workers, carpenters): 43% of participants experienced core body temperatures greater than 38°C (100.4°F) and many arrived at work dehydrated. A 2024 follow-on study with 200 workers in the Midwest scaled up this work to a larger and more varied workforce, tracking core temperature, heart rate and other vitals on the job.

Building on this foundation, the study team is now examining how these measures perform in real operating conditions, using wearables to evaluate effectiveness of interventions such as pop-up shade tents, air-conditioned cooling stations and lunch tents, and electrolyte popsicles. Operational practices such as adjusting work schedules and sequencing to avoid peak heat, promoting hydration and acclimatization, and reinforcing workers' heat stress awareness are also being refined based on the ongoing programme. Rather than asking whether heat mitigation works, the research is identifying which combinations of interventions are most effective for different worker populations and project environments, and how they can be most successfully integrated into day-to-day operations. The findings will help Turner continue strengthening its heat management programme through evidence-based refinement and continuous improvement.

Sources: Turner, Liberty Mutual, La Isla Network.

ACTION 2

Understand unique needs of vulnerable groups

Vulnerability to heat varies significantly by age, pregnancy status, underlying health conditions, acclimatization level and type of work performed. Accounting for the full diversity of vulnerable groups in solution design improves effectiveness and helps ensure that interventions reach the workers who need them most. Practical accommodations include translating protocols into local languages, using visual instructions where literacy is limited and routing guidance through community leaders or peer networks that vulnerable workers already trust (see Case Study 6).

> **"Most climate material is written for the formally educated, so for our members, who are poor women with little or no schooling, it does not land. That is why we built a climate school that puts science into language our members understand and use daily.**
>
> Mansi Shah, Senior Coordinator, SEWA

CASE STUDY 6:

SEWA – co-designing heat resilience with women workers in the informal economy

The Self-Employed Women's Association (SEWA), India's largest national trade union of poor women in the informal economy with over 3.7 million members across more than 125 trades, has been a pioneer in addressing how extreme heat affects vulnerable workers. Its mutually reinforcing efforts include:

- **Direct protection:** SEWA's Parametric Climate Insurance Programme covers over 250,000 informal sector women workers and delivered parametric heat insurance and cash assistance to over 47,000 women in 2024.
- **Community-led behaviour change:** through its Building Cleaner Skies campaign, SEWA trains trusted community members to translate heat and climate risks into the languages, household routines and trade-specific realities of fellow workers and to support them as they incorporate adaptation into their lives.
- **Evidence generation:** SEWA is partnering with academic researchers to generate evidence on how heat affects women workers in the informal economy. Its recent work with Harvard has surfaced how much conventional weather readings understate women's real exposure. One analysis found that in low-income homes, the indoor heat index can run as much as 10°C (18°F) above outdoor readings, with consequences for sleep, recovery and longer-term health.[47]

Together, these efforts demonstrate the power of solutions co-designed and co-delivered with the people they are intended to protect.

Source: SEWA, Harvard University.

> **In low-income homes, the indoor heat index can run as much as 10°C (18°F) above outdoor readings, with consequences for sleep, recovery and longer-term health.**

5 How should my company approach execution?

Turning interventions into sustained, large-scale programmes depends on organizational capabilities to pilot, adapt and embed solutions across sites.

The most carefully designed interventions will not deliver results without effective execution. The following activities can help companies run pilots that generate real-world evidence, conduct due diligence on solutions providers and build organizational conditions needed for scaling up. This chapter presents Steps 6 and 7 of the Workforce Heat Resilience Roadmap:

- Step 6: Pilots and refinements
- Step 7: Scaling up and business integration

STEP 6

Pilots and refinements

Key actions	Example outputs
1. Design effective pilots	Time-bound, real-world tests evaluated across health and business metrics Additional evidence to substantiate the business case for action
2. Conduct due diligence of solutions providers	Clear basis for selection of solution providers Structured assessments of each prospective provider's track record re: health, productivity and ROI outcomes

ACTION 1

Design effective pilots

While organizations should leverage historical company data to build their business case, leading companies move quickly from analysis to field experimentation, iterating and refining based on real-world experience. Their objective is not to perfect solutions before acting, but to generate sufficient evidence to scale up with confidence.

Robust evaluation of pilots is critical for ensuring that isolated successes can become scalable, investable programmes. In practice, this means establishing a clear evaluation methodology before the pilot begins: defined success metrics tied to the business case, a comparison group or credible counterfactual against which results can be judged, and a sample size and duration sufficient to distinguish real impact from normal variation or seasonal effects. Evaluation should track both health and business metrics, integrating pre- and post-intervention comparisons against environmental conditions (see Table 5 and Case Study 7). It should also incorporate appropriate safeguards for ethics, informed consent, privacy and data governance where applicable.

TABLE 5 **Metrics (and data sources) for assessing pilot outcomes via pre- and post-intervention analysis**

	Worker health	Business performance
Must-have	– **All-cause injury rates** (EHS) – **Heat-related illness rates** (EHS)	– **Absenteeism rates** (HR) – **Productivity rates** (Operations) – **Deployment cost** (Operations, Finance)
Nice-to-have	– **Behavioural indicators**, such as adherence to heat management protocols (supervisor logs) – **Physiological signals**, such as heart rate and core body temperature (wearables) – **Clinical indicators** from blood and urine, such as white blood cell count (medical testing) – **Perceptual signals**, such as thermal comfort (workers)	– **Quality/error rates** (Operations) – **Employee turnover** (HR) – **Healthcare utilization** (HR)

CASE STUDY 7:

Burjeel Holdings – piloting an anticipatory outreach model

After observing a rise in heat-related emergency room visits, Burjeel Holdings, a leading integrated healthcare provider in the Middle East, embedded heat illness into its clinical care pathways and developed an AI-enabled patient notification system to support a shift from reactive treatment to anticipatory care. Burjeel's voice-based AI health advisor alerted thousands of patients to upcoming extreme heat and provided personalized guidance on symptom management and when to seek care. In an initial pilot with a workforce cohort at a large UAE industrial employer, the system made 2,600 heat safety calls over seven days, achieving a 56% connect rate (share of outreach attempts where the patient engaged), a 43% call completion rate (share where the patient completed the full guidance call) and a 9.33/10 patient satisfaction score, with early evidence showing that timely guidance helped some patients avoid the need for emergency care. A second pilot extended the model beyond a single employer, deploying it during a major outdoor public event. Over five days, the system made 3,996 calls in three languages, reaching 857 workers and holding 343 substantive conversations about heat risk and protective steps. While extreme heat is Burjeel's first application of this model, the same infrastructure can extend to other climate-sensitive and chronic-care needs across the workforce.

Source: Burjeel Holdings.

Where possible, organizations should design pilots to generate evidence that extends beyond a single site or company. Partnering with academic institutions, public agencies and industry initiatives can build shared, intervention-level evidence needed to guide future investment decisions.

ACTION 2

Conduct due diligence of solutions providers

Not all interventions require an external provider, but for those that do, the choice of partner is critical for effective deployment. For example, some companies piloting cooling garments have found that the wrong product or vendor can turn this PPE into an additional insulation layer rather than reducing heat strain. Garment type, coverage area, cooling mechanism and rechargeability are among the features important to consider before selecting a solution provider.

The workforce heat resilience market spans a wide range of vendors, from established occupational health suppliers to early-stage technology companies offering AI-enabled products. Due diligence of providers should evaluate the strength of scientific validation of key features, the provider's track record in comparable operating settings, their ability to support localized deployment and workforce training and any environmental co-benefits.

Critically, vendors' products and services should be assessed against the three outcomes that pilots are designed to show:

1. Improved health outcomes
2. Improved productivity
3. Demonstrated return on investment

Notably, not all products or services will have accumulated the same depth of field validation, particularly across all dimensions. This is to be expected in an emerging space and should not automatically disqualify providers with strong underlying approaches. What matters is a provider's willingness to structure pilots around measurable performance outcomes, engage transparently with what is and is not yet proven and work collaboratively with clients towards tangible results. These remain the most reliable signals of maturity and commitment.

STEP 7 | Scaling up and business integration

Key actions	Example outputs
1. Conduct readiness assessment to evaluate organizational capabilities	Readiness assessment covering data systems, stakeholder alignment, worker engagement, funding and governance List of gaps to close before piloting and/or scaling up solutions
2. Advance external enablers	Clear view of opportunities to inform regulatory standards, strengthen health systems and/or engage in ecosystem-based collaboration

ACTION 1

Conduct readiness assessment to evaluate organizational capabilities

Before launching pilots, leaders should assess their organization across five dimensions (see Table 6):

- Data systems
- Stakeholder alignment
- Worker engagement
- Funding and incentives
- Governance

Without these foundations, early efforts will not generate compelling evidence, making it harder to build the case for scale.

For companies early in their resilience journeys, scaling up can take anywhere from a few months to over a year, depending on environmental conditions, business cycles and organizational complexity. The transition from pilot to scale requires not just replication of what worked in a specific site or context, but integration of heat resilience into the broader operating model, including standard operating procedures, management processes, training, performance systems and governance structures (see Case Study 8).

TABLE 6 | **Readiness assessment of organizational capabilities**

	Nascent	Developing	Piloting	Scaling up	Embedded
Data systems	No systematic visibility into where heat risk concentrates; reliance on anecdotal or general weather data, not site- or role-level information	Initial site-level data collected (e.g. spot temperature readings); early mapping of exposed roles; understanding still uneven across sites	Basic monitoring and role-level visibility at a pilot site; ability to identify priority groups and set a baseline for measuring pilot outcomes	Generalized data processes at additional sites; early dashboards and learnings refining the approach before further rollout	Integrated, enterprise-wide monitoring of heat exposure (e.g. on-site sensors) and health, productivity and business outcomes; analytics track against baselines and feed an active business case
Stakeholder alignment	Treated as an EHS/OHS* or sustainability issue in isolation; limited engagement from operations, HR, risk or finance	Initial cross-functional conversations informing stakeholder mapping; pilot goals, roles and metrics not yet finalized	Pilot stakeholders (typically EHS/OHS, operations, HR) aligned on scope, metrics and ownership at the pilot site	Adapted model tested at additional sites; operations, EHS/OHS, HR, risk and finance working through ownership and integration; full alignment not yet reached	Sustained alignment across operations, EHS/OHS, HR, risk and finance; shared ownership for outcomes, integrated into how the business runs
Worker engagement	Little to no structured input from workers or supervisors; design driven top down	Informal input channels (e.g. ad hoc conversations, manager feedback); inconsistent and not yet shaping pilot design	Direct engagement with workers and supervisors at a pilot site (e.g. anonymous surveys, focus groups) to refine usability and design	Formalized engagement framework at additional sites; pilot results shared back with workers to build buy-in and feedback captured systematically to refine the approach before rollout	Embedded worker and supervisor feedback loops (e.g. routine check-ins, grievance channels) across all sites; actively driving behaviour change and continuous improvement
Funding and incentives	No identified budget or sponsor; unclear which function would fund or staff a pilot	Discretionary funding identified for a small pilot; links to broader budgets and future investment not yet defined	Contained pilot budget secured, with a clear sponsor and defined supporting teams and expertise	Recurring funding secured for additional sites; incentives being adjusted to recognise health and resilience outcomes, not yet enterprise-aligned	Long-term resourcing model in place: budget lines, internal expertise and incentives that sustain rollout and reward health outcomes alongside business KPIs
Governance	No clear owner at site level; protocol and intervention decisions made ad hoc	Site-level ownership identified; roles and decision rights across EHS/OHS, operations and other functions still ambiguous	Defined site-level roles for the pilot, including EHS/OHS positioned alongside operations, with authority to advance protocols and adapt interventions	Draft SOPs, training and performance-system updates at additional sites; learnings refining the materials before rollout	Heat protocols fully integrated into SOPs, management processes, training and performance systems enterprise-wide; clear ownership and decision rights across functions

Note: * EHS = environmental health and safety, OHS = occupational health and safety.

CASE STUDY 8:

Ingenio San Antonio – embedding resilience into the operating model

Ingenio San Antonio, a Nicaraguan sugar producer, worked with La Isla Network to provide sugarcane workers with access to cooling rest, hydration, and safe and sanitary restrooms. The programme delivered:

- Up to a 60% return on investment by year three ($1.60 per $1.00 invested).[48]
- 19% productivity gain among seed cane-cutters over five harvests, despite shorter workdays and more rest breaks.[49]
- 94% reduction in hospital-treated acute kidney injury over the programme's first three harvests.[50]

The programme's success depended not only on frontline protections but on embedding heat resilience into the company's operating model. Senior leadership support was critical: the Chief Executive Officer and management team established heat protocols as an organizational mandate, while occupational health and safety, human resources, supervisors and health promoters were elevated into the decision-making structures needed to manage trade-offs with production targets.

The company transitioned cane-cutters from contractor arrangements to direct payroll, strengthening worker engagement and enabling more consistent application of protocols. Pay incentives were restructured so that workers did not feel penalized for taking required rest breaks, while performance management routines reinforced compliance with hydration and shade requirements.

The case demonstrates that scaling up heat resilience requires governance, accountability and incentive structures to evolve alongside interventions. The International Labour Organization[51] has recognised La Isla Network's Adelante Initiative – the mature Ingenio San Antonio programme and the replicable model derived from it – as an exemplary workplace programme addressing heat stress prevention.

Source: Ingenio San Antonio.

ACTION 2

Advance external enablers

Companies that have made meaningful internal progress are increasingly well-positioned to work with external stakeholders in driving systemic change. The most advanced organizations are beginning to engage through:

- **Industry coalitions and multi-stakeholder platforms** that contribute operational insights for the development of practical, scalable regulatory standards.
- **Partnerships with healthcare payers and providers** that strengthen health systems, expanding prevention, early detection and treatment access for heat-related illness.
- **Ecosystem-based collaboration** that de-risks efforts and unlocks reach no single company has alone (e.g. public-private partnerships, pooled funding to subsidise parametric insurance).

One example is the Sustainable Action Alliance for Resilient Tomorrow (SAARTH), a coalition of 15 major Indian manufacturers and conglomerates that share localized climate-hazard data, adaptation tools and investment pools to drive faster progress across the industry.

Conclusion

Protecting workers from extreme heat is essential to building resilient, productive and competitive businesses.

Extreme heat is already an operating reality affecting businesses today through workforces across their value chains. As temperatures continue to rise, the costs of inaction will become increasingly visible through worker health impacts, reduced productivity and greater operational pressures.

The challenge is no longer one of awareness, but of execution. While many organizations recognise workforce heat risk as a material challenge, relatively few have systematically assessed their exposure, identified effective interventions or built the capabilities needed to implement and scale up solutions. The companies making the greatest progress are those that are treating heat resilience as a strategic business priority and are taking practical, evidence-based steps to increase it.

Although every organization's journey will be unique, three foundational actions are common across leading approaches:

- **Assess the scale and location of workforce heat risk** across both business and value chain.
- **Identify and prioritize the interventions best suited** to local climate and operating contexts.
- **Build the organizational capabilities** needed to pilot, scale up and embed resilience solutions into business operations.

This report provides a practical framework to support that journey. Organizations that embed workforce heat resilience into the way they manage their people, business and value chains will not simply be more resilient, they will define what productive, competitive businesses look like in a warmer world.

Appendix

Workforce heat resilience survey: methodology

The workforce heat resilience survey, conducted by BCG from January to March 2026, received responses from 40 senior leaders across all major global regions, representing top companies by revenue in 10 sectors (food and agriculture, built environment, logistics/supply chain, manufacturing, mining, energy, technology, healthcare, insurance, other). It was comprised of three optional sections, aligned to upstream, direct and downstream workforces, with respondents completing only those sections relevant to their company's operating model.

Estimating heat-driven work-time loss: methodology

This analysis projects heat-driven work-time loss and its financial impact for a given workforce from 2027-2050, under Shared Socioeconomic Pathway (SSP) 2-4.5, a 'middle-of-the-road' climate scenario that is used and assessed by the UN's Intergovernmental Panel on Climate Change (IPCC) and is widely taken to represent a future roughly consistent with current national climate policies.

The analysis draws on the following inputs:

Climate data:

- Daily, location-based WBGT projections for 2027-2050, drawn from the EU's Copernicus Climate Data Store's bias-adjusted heat stress indicator dataset, based on the source climate model GFDL-CM4, developed by the Geophysical Fluid Dynamics Laboratory at the US National Oceanic and Atmospheric Administration (NOAA).[52]
- GFDL-CM4 was selected as an advanced CMIP6-generation model, assessed in IPCC's Sixth Assessment Report (AR6, 2021-23) and mid-range in CMIP6 climate sensitivity, with a WBGT dataset available. Its methodology follows Schwingshackl et al. (2021).[53]
- Grid-cell WBGT is aggregated to subnational regions (Natural Earth boundaries, centroid-based assignment), then to country-level means.

Work-time loss function:

- WBGT exposure is translated into work-time loss using the Workplace Environmental Labor Loss (WELL) functions from Ioannou et al. (2025).[54]
- A conservative 25°C (~77°F) WBGT threshold is applied, below which no loss is assumed. The functions yield low, mean and high estimates.

This analysis does not consider financial drivers beyond heat-driven work-time loss or spillover effects of repeated exposure, such as heat encountered outside the workplace. Nor does it reflect automation, mechanization or other sectoral changes that could substantially raise or lower future exposure. Results are directional and should not replace more rigorous, company-specific analysis.

Contributors

World Economic Forum

Annika Green
Lead, Climate Resilience and Health

Rianne Leitner
Specialist, Climate Resilience

Eric White
Head, Climate Resilience

Boston Consulting Group

Giovanni Covazzi
Managing Director and Partner

Elizabeth Millman Hardin
Managing Director and Partner

Kevin Reyes
Associate

Simona Stancov
Project Leader

Nic Sukitsch
Managing Director and Partner

Elia Tziambazis
Managing Director and Partner

Anna Wu
Associate

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Jessica Clarke
Climate and Health Consultant, World Health Organization

Alan Dangour
Director, Climate and Health, Wellcome Trust

Geneviève Greer
Senior Research Manager, Wellcome Trust

Emma Iovoli
Lead for Medical Sustainability, Bayer

Nitya Khemka
Senior Advisor, Office of the President, PATH

Jason Lee
Director, Heat Resilience and Performance Centre, National University of Singapore

Clare Scully
Head of Operations, Lancet Countdown on Health and Climate Change

James Smallcombe
Senior Research Associate, Heat and Health Research Centre, University of Sydney

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Health in Climate

Heat and Health Research Centre, University of Sydney

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Production

Jean-Philippe Stanway
Designer

Jonathan Walter
Freelance Editor

Endnotes

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- Environmental heat load: heat absorbed from external surroundings.
- Metabolic heat production: heat generated internally through physical activity.
- Heat dissipation capacity: ability to shed excess heat through sweating, airflow and other cooling mechanisms, given attire and PPE.

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World Economic Forum
91–93 route de la Capite
CH-1223 Cologny/Geneva
Switzerland

Tel.: +41 (0) 22 869 1212
Fax: +41 (0) 22 786 2744
contact@weforum.org
www.weforum.org