

STATE STRATEGIES TO USE SMART SURFACES TO PURSUE SUMMER COOLING, PROTECT WORKERS, STRENGTHEN THE ECONOMY, AND IMPROVE QUALITY OF LIFE OF ALL CITIZENS AND VISITORS

Smart Surfaces provide a cost-effective way to increase cities' resilience by mitigating extreme heat and stormwater flooding. Smart Surfaces include green infrastructure (trees, rain gardens, urban meadows, green roofs), reflective (cool) roofs, walls, and pavements, porous and permeable pavements, solar PV, and combinations of these surfaces.

The case for deploying Smart Surfaces widely and in an integrated way is overwhelmingly clear. Extreme heat endangers the public and hurts the economy. Extreme heat events increase healthcare costs and can overwhelm emergency responders. Especially for vulnerable populations (elderly, children, student athletes, health-compromised), extreme heat can be a matter of life and death. Outdoor workers are more stressed and less productive when temperatures soar, and their error rates increase. Tourism suffers when visitors avoid traveling to cities because of concerns about heat discomfort and risk.

The actions described below are designed to offer a menu of options to capitalize on Smart Surfaces. They should be customized to suit the unique opportunities and challenges of a particular jurisdiction by considering where some of these actions are already taking place and could be supported or expanded on, and whether there are other steps not described here that could be added. For example, in addition to the steps in the model that follows, states could consider even more far reaching actions enacting state laws that require local governments to incentivize (and not block) rooftop solar; limiting homeowners' associations' ability to impede smart surfaces; and preempting local governments from enforcing mowing and weed control rules that prevent urban meadows

Anyone using this model for action should adjust its structure and provisions as needed to be consistent with applicable law and regulation, including separating these provisions into separate bills as needed and updating terms like the "State," the "Department of Transportation," the "Authority Having Jurisdiction," and the "Legislature" with appropriate equivalents. This model is an educational resource produced through independent, academic legal and policy research. It is not specific to any jurisdiction. It should be viewed as a starting point for legislators, policymakers, and interested stakeholders. No party should act or rely on any information contained in this paper without first seeking the advice of an attorney.

For more information and resources on Smart Surfaces, or to request no-cost help to maximize the benefits of Smart Surfaces in a particular setting, visit smartsurfacescoalition.org or reach out through our [Policy Help Desk](#).

AN ACT TO USE SMART SURFACES TO PURSUE SUMMER COOLING, PROTECT
WORKERS, STRENGTHEN THE ECONOMY, AND IMPROVE QUALITY OF LIFE OF
ALL CITIZENS AND VISITORS

SECTION 1: Findings. The [LEGISLATURE] finds all of the following:

- (a) Smart Surfaces—including highly reflective roofs and walls, porous and reflective pavements, solar photovoltaics, rooftop solar, solar canopies, rain gardens and bioswales, green roofs, urban meadows, and trees—are proven, cost-effective strategies that help cities manage extreme heat and stormwater events, greatly reducing costs and risks of excess heat, smog, and flooding, and making cities more livable, comfortable, and safe;
- (b) Smart Surfaces, are broadly beneficial to the the state’s economy, livability, and quality of life;
- (c) Specifically, Smart Surfaces address extreme heat that poses an imminent and significant threat to public health and welfare by increasing emergency room visits, hospitalizations, and even premature death, endangering student athletes, and impacting sectors of the economy that benefit from summer tourism;
- (d) Many Smart Surfaces also address extreme rainfall events that strain the local governments’ capacity to comply with state and federal regulatory requirements for clean water, that make it difficult and costly to manage stormwater, that risk overwhelming cities’ water treatment capacities, and that create dangerous flooding conditions;
- (e) The costs of responding to the effects of extreme weather events expose the the state to significant financial risk and can impair [STATE]’s rate of economic growth;
- (f) These challenges are projected to become worse as climate change increases the frequency and severity of extreme weather events and raises peak summer temperatures;
- (g) reducing those costs and risks, Smart Surfaces will help protect the state while also protecting cities’ credit ratings, increase outdoor workers’ productivity while reducing error rates, lessening the health impacts of extreme heat, and reducing emergency room admissions during heat events; and
- (h) Pursuing an integrated and comprehensive set of Smart Surfaces will serve the health and welfare of the state’s residents and visitors, create high-quality jobs, address the needs of vulnerable populations, and help deliver on [STATE]’s climate action goals.

SECTION 2: Studies.

- (a) The [DEPARTMENT OF TRANSPORTATION] shall initiate a study examining options for using photocatalytic and other cool pavement treatments for state roads, including state-maintained highways in urban areas, studying those treatments’ costs and benefits over their whole lifecycle, and studying the health and economic benefits available from expected reductions in air pollution.

- (b) The [DEPARTMENT OF TRANSPORTATION] will commence a study of where and how it can convert vacant lands owned and underutilized mowed grass areas owned or controlled by the state in or near urban areas to create urban meadows, including identifying specific areas that may be appropriate for urban meadows and calculating the aggregate total of such areas within the state, determining which native plants should be selected, assessing what signage is appropriate to effectively communicate meadows' purpose and effect, and estimating the benefits and costs of urban meadows in the state.
- (c) The [DEPARTMENT OF TRANSPORTATION] shall report the results of the studies required under this section to the [LEGISLATURE] no later than [DATE].

SECTION 3. Smart surfaces infrastructure policy.

Within 180 days of completing the reporting required under [SECTION 2], the [DEPARTMENT OF TRANSPORTATION] shall promulgate regulations and revise its guidance and policy to effect the following policy priorities to the maximum extent feasible:

- (a) Where cool pavement treatments are available at the same or lower initial cost than traditional asphalt sealant technologies, the department shall use the cool pavement alternative.
- (b) Where the lifecycle cost assessment of a cool pavement treatment indicates that it will be more cost-effective than a traditional asphalt sealant technology for the same project, the department shall implement the cool pavement option even if the initial cost is higher than that of a traditional treatment product.
- (c) In every instance in which the state is already coating bus lanes, bike lanes, or other relevant markings on asphalt surfaces, cool pavement treatments shall be used provided that they are cost-competitive on a first cost or lifecycle cost basis.
- (d) All state-funded projects shall be designed to minimize dark and impervious surfaces to the greatest extent possible, including:
 - (1) Where the State is considering installing pavers for sidewalks and streets, except where historic district requirements require specific styles of pavers, installing permeable pavers if there is both sufficient depth for the subsurface layers required and a lifecycle cost assessment reveals a positive benefit cost ratio for the permeable paving option.
 - (2) Adopting a policy of assessing green stormwater infrastructure options that can replace impervious surfaces whenever the State undertakes projects that propose to disturb a land area of two thousand five hundred square feet (2,500 ft²) or greater.

SECTION 4: Resiliency standards for state buildings. [Chapter #, Title #] is amended by adding a new section as follows:

Notwithstanding any other provisions of this chapter to the contrary, all new buildings built by any state agency, as well as buildings undergoing major renovations and projects that receive funding from the state, shall meet the following standards:

- (a) Roof coverings on steep-slope roofs (roof slope > 2:12) shall be constructed of materials that achieve, when tested in accordance with the ANSI/CRRC S100 (CRRC S100) standard the following ratings:
 - (1) for asphalt shingle roofing, either a minimum 3-year aged solar reflectance of 0.25 and a minimum 3-year aged thermal emittance of 0.75, or a minimum 3-year aged solar reflectance index of 23.
 - (2) for roofing of any other material, either a minimum 3-year aged solar reflectance of 0.40 and a minimum 3-year aged thermal emittance of 0.75, or a minimum 3-year aged solar reflectance index of 43.
- (b) Roof coverings on low-slope roofs (roof slope ≤ 2:12) shall be constructed of materials that achieve, when tested in accordance with the ANSI/CRRC S100 (CRRC S100) standard:
 - (1) a minimum 3-year aged solar reflectance of 0.70 and a minimum 3-year aged thermal emittance of 0.75; or
 - (2) a minimum solar reflectance index not less than 82.
- (c) The above-ground walls facing east, south, and west shall meet the following standards:
 - (1) An initial solar reflectance of 0.30 (when tested either in accordance with CRRC S100, ASTM C1549 with AM1.5GV output, ASTM E903 with the AM1.5GV output, or determined in accordance with generally accepted engineering standards), a minimum thermal emittance of 0.75 (when tested in accordance with CRRC S100, ASTM C835, C1371, E408, or determined in accordance with generally accepted engineering standards), and for the portion of the opaque wall that is glass spandrel area, a minimum solar reflectance of 0.29 (determined in accordance with NFRC 300 or ISO 9050).
- (d) All tree planting shall, to the maximum extent feasible, be targeted to maximize trees' capacity to reduce heat gain in an equitable way, including by prioritizing planting new trees in low-canopy areas and by placing those trees on the south, east, and west side of buildings wherever feasible.
- (e) Schoolyards at every school that receives funding from the state shall be designed to maximize student health and minimize dark and impervious surfaces and schoolyards' contribution to urban heat island, including by maximizing vegetated features such as rain gardens and bioswales and the planting of shade trees in all feasible locations, and

using reflective and permeable paving surfaces that reduce heat absorption in locations where green infrastructure is not possible and where paving is required.

SECTION 6: Cool roof codes.

[Chapter #, Title #] is amended by adding a new section as follows:

Notwithstanding any other provisions of this chapter, the [AUTHORITY HAVING JURISDICTION] shall as soon as practicable adopt those portions of the latest International Energy Conservation Code and ANSI/ASHRAE/IESNA Standard 90.1 available that relate to roofing materials' reflectance and thermal emittance. The [AUTHORITY HAVING JURISDICTION] may adopt such other parts of each updated edition of the IECC and ASHRAE Standard 90.1 as elsewhere provided by law.

The [AUTHORITY HAVING JURISDICTION] shall, no later than one year after the publication of revised or updated editions of the International Energy Conservation Code and the ANSI/ASHRAE/IESNA Standard 90.1 are published, adopt those portions of the updated IECC and ASHRAE Standard 90.1 that relate to roofing materials' reflectance and thermal emittance.

SECTION 7: Lifecycle Cost assessment.

[Chapter #, Title #] is amended by adding a new section as follows:

To the extent permissible under applicable law, all state agencies will assess the cost of new infrastructure projects on a whole lifecycle basis and, when selecting between alternative approaches, choose the option with the lowest lifecycle cost.

SECTION 8: Low carbon concrete.

[Chapter #, Title #] is amended by adding a new section as follows:

All concrete in State-funded projects shall be below the 50th percentile of carbon intensity among locally available products, as measured by the CarbonStar CO2e methodology.

SECTION 9: Declaration of policy

[Chapter #, Title #] is amended by adding a new section as follows:

It is the policy of this state that Smart Surfaces—including highly reflective roofs and walls, porous and reflective pavements, solar photovoltaics, rooftop solar, solar canopies, rain gardens and bioswales, green roofs, urban meadows, and trees—should be used wherever possible to help manage extreme heat and stormwater events, reduce costs and risks of excess heat, smog, and flooding, and to make the state more livable, comfortable, and safe.