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Cities and Urbanization

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use. The adoption of porous bricks and porous concrete could lower pavement surface temperature by 12 and 20°C, respectively and the air temperature by up to 1°C.

Cities such as Singapore – and others that apply *climate resilient development principles* – are proactively reducing risks from heat islands and heatwaves. Their strategies for reducing heat impacts include more efficient physical infrastructure, such as district-level cooling that efficiently uses energy to mechanically cool large areas in cities; nature-based solutions, such as increasing the extent and density of green spaces in cities and on walls and roofs; and integrated, inclusive planning of urban stakeholders to ensure that vulnerable urban residents are protected. For this final point, *early warnings* from meteorological agencies might be tied to enhanced health infrastructure to ensure elderly or medically vulnerable people have access to medical treatment or shelter, and there may be work stoppages for outdoor construction workers when heatwaves occur.

## Sustainable cooling solutions

Using air conditioners and electric fans to stay cool accounts for *nearly 2* of the total electricity used in buildings around the world and energy consumption for cooling has more than tripled since 1990, with significant implications for electricity grids, especially during peak demand periods



# Early Warning from Meteorological Agencies

Singapore

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Reducing proactively

Building heat resili

National heat-health

3 GOOD HEALTH  
AND WELL-BEING11 SUSTAINABLE CITIES  
AND COMMUNITIES