



NIPPON PAINT



SolaReflect
SolaReflect Si
SolarCool SS678



SolaReflect Roof-Seal
Waterproofing
SolaReflect CoolRoof



SolaReflect CoolFloor

COOL-TEC

TECHNOLOGICALLY ADVANCED COOL COATINGS
FOR WALLS, ROOFS AND FLOORS

ABOUT NIPPON PAINT



No. 1

Paints and coatings brand in Asia



No. 1

Paints and coatings brand in Singapore



No. 4

Paints and coatings brand in the world



121

Manufacturing facilities worldwide



28

Countries and regions in which we operate



29,000+

Staff worldwide

CORPORATE MILESTONES

1881

Mr Moteki Jujiro establishes Nippon Paint, Japan's first paint manufacturing facility, in Tokyo

1962

A joint venture between Nippon Paint Holdings and a Singapore-based partner, the NIPSEA Group is formed

The NIPSEA Group opens Singapore's first paint manufacturing facility and expands rapidly throughout the region

2011

The NIPSEA Group opens NIPSEA Technologies: a regional centre for research and development, based in Singapore

2021

The NIPSEA Group acquires Selleys, an iconic Australian brand of sealants, adhesives and fillers, furthering its mission to become a total solutions provider for the home improvement and construction industry

With a view to integrating its global operations, Nippon Paint Holdings acquires the NIPSEA Group

The NIPSEA Group becomes an integral part of Asia's No. 1 paint brand while continuing to manage individual offices including Nippon Paint Singapore

INNOVATIVE PRODUCTS

Nippon Paint Singapore has developed and launched a series of innovative first-in-market paints and coatings, including:

2006

Healthcare series: **EvoMedico** for interior walls, **EvoGloss** for wood and metal, and **EvoGreen** for exterior walls

2007

Bio-Glaze, an addition to the healthcare series

2008

COOL-TEC SolaReflect, a cool paint for exterior walls

2010

Odour-less All-in-1, a near-zero-VOC interior paint

Aqua PU, featuring water-based single-pack PUD technology for walls, wood and metal

2013

COOL-TEC SolaReflect Si, an acrylic-silicone version of COOL-TEC SolaReflect

VirusGuard, an anti-viral paint effective against HFMD and H1N1

2015

COOL-TEC SolaReflect Roof-Seal Waterproofing, a waterproofing membrane under cool coatings

2016

Aqua WoodGuard, a water-based wood varnish for decking

MozzieGuard, an anti-aedes mosquito paint for interior walls

2017

COOL-TEC SolaReflect CoolFloor, a cool paint for exterior paved surfaces and roads

2020

VirusGuard, an anti-viral paint effective against human coronaviruses and feline calicivirus

Improving Thermal Comfort with Nippon Paint COOL-TEC Cool Coatings



The market leader in innovative functional paints and coatings, Nippon Paint Singapore has built its reputation on anticipating and fulfilling market needs. The launch of COOL-TEC, the first and only range of cool coatings that has been proven to reduce outdoor air temperatures in Singapore, secures its position at the very forefront of technological innovation.

Heat emissions from high-density built environments are progressively reducing outdoor thermal comfort, limiting physical activity, adversely impacting human health and threatening biodiversity. Cool coatings are one of the few proven methods to reduce surface temperatures and thus improve outdoor thermal comfort.

In independent trials, that involved residential and industrial estates, the extensive application of Nippon Paint COOL-TEC cool coatings on the roofs and walls of multiple buildings and roads within a residential estate showed a collective reduction of overall outdoor air temperature by up to 2.49°C.

It is no coincidence that COOL-TEC cool coatings are aligned with the specific recommendations of the Singapore Green Plan 2030, which cites cool paints as a way of helping build a resilient future for our nation – and ultimately, our world. The urgency of the need for climate action cannot be overstated.

Join the forward-thinking architects, property developers and building owners who are choosing Nippon Paint COOL-TEC cool coatings and taking the heat off Singapore, and beyond, one surface at a time.

*Based on the results of a third-party comparative study that investigated the effects of COOL-TEC cool coatings on roofs, exterior walls and floors on lowering surface temperatures of buildings and lowering ambient (outdoor air) temperatures.

Worsening Urban Heat Island (UHI) Effect in Singapore

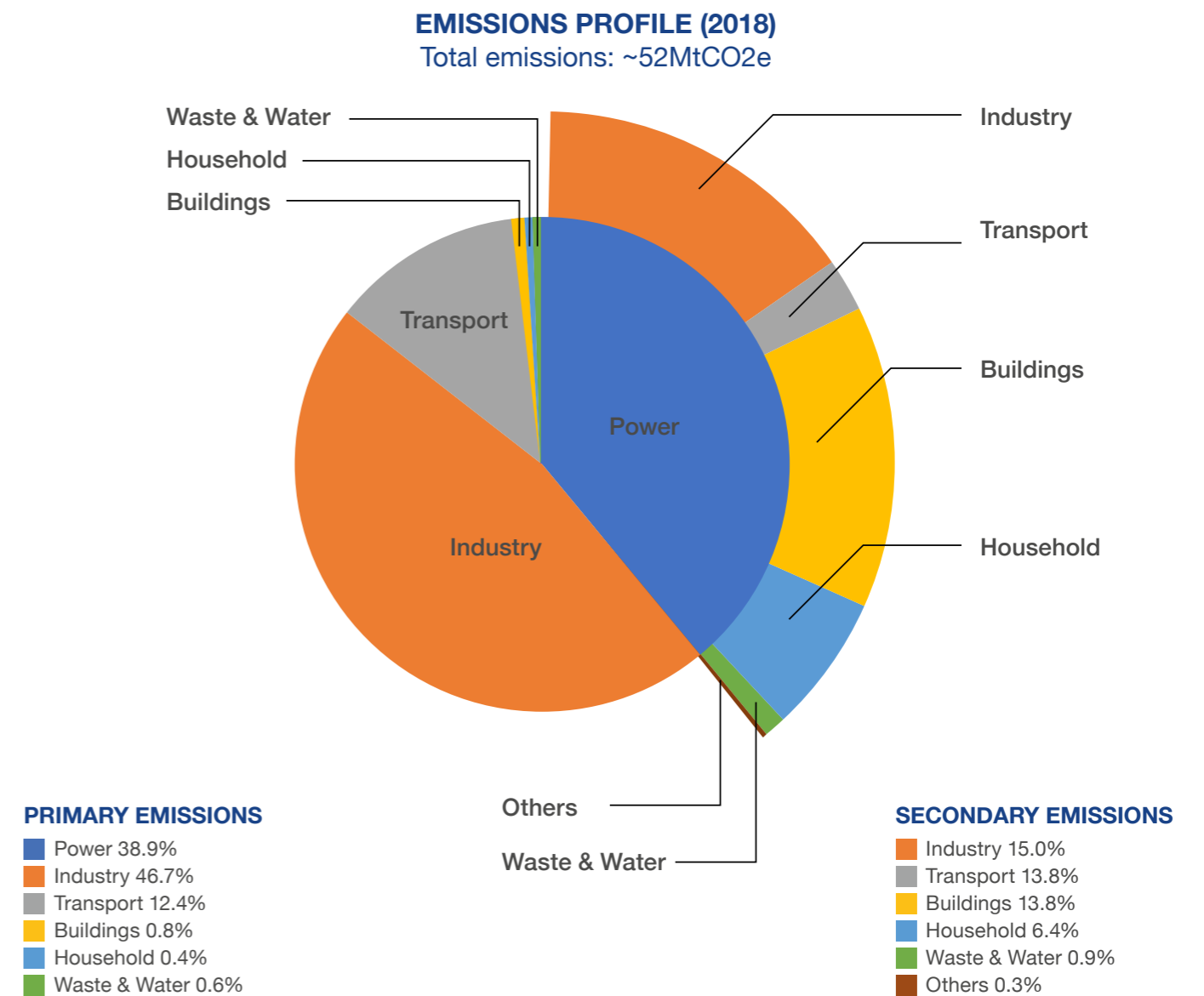
Singapore is sweltering under the urban heat island (UHI) effect, a phenomenon seen in densely built-up and populous cities around the world. It is particularly pronounced in Singapore due to our warm tropical climate, dense built environment, prolific industry, and the vast amount of heat generated by carbon emissions from electrical appliances, mechanical equipment and vehicles. It is further compounded by the inescapable effects of climate change.

	DAILY TEMPERATURE	FREQUENCY OF WARM DAYS AND NIGHTS	SEA LEVEL RISE
OBSERVED CHANGES IN SINGAPORE'S CLIMATE	<p>From 1972 to 2014, annual average temperature has increased from 26.6°C to 27.7°C.</p> <p>Annual average temperature</p> <p>2014 27.7°C 1972 26.6°C</p>	<p>From 1972, the number of warm days and nights have increased, and the number of cool nights have decreased.</p>	<p>Annual sea levels in the Straits of Singapore rose at the rate of 1.2mm to 1.7mm/year in the period 1975 to 2009.</p> <p>1975-2009 1.2mm-1.7mm/yr</p>
FUTURE CLIMATE PROJECTIONS FOR SINGAPORE	<p>Changes in daily mean temperatures are projected to increase 1.4°C to 4.6°C by end-century (2070 to 2099) with respect to the baseline period 1980 to 2009.</p> <p>End-century 1.4°C-4.6°C</p>	<p>More warm days and warm nights for February to September throughout the 21st century.</p>	<p>End-century (2070-2099) mean sea-level rise projections relative to baseline period ranges from 0.25m to 0.76m. Changes in extreme sea levels for the Singapore region over the 21st Century are likely to be dominated by the regional time-mean sea level rise, with only small future changes to the storm surge and wave components.</p> <p>2070-2099 --- 0.25m-0.76m</p>

If left unchecked, an ongoing increase in annual temperatures, combined with our high humidity, will pose a serious threat to human health. The incidence of heat stroke and heat-related deaths will rise, especially among the sick and elderly. Our reliance on air conditioners will increase along with our carbon footprint, and physical activity will be increasingly confined to indoor venues.

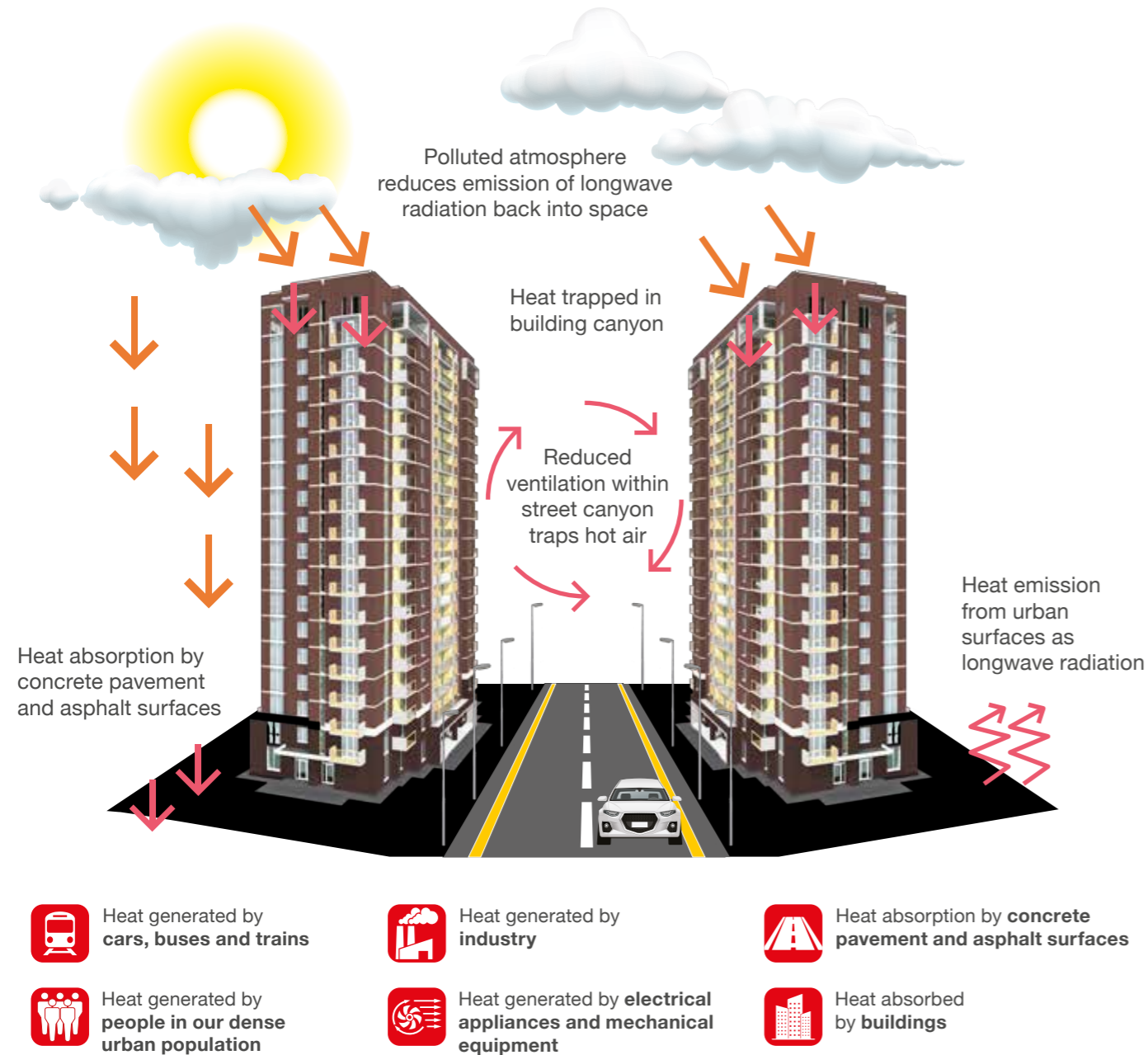
Source: <https://www.nccs.gov.sg/singapores-climate-action/impact-of-climate-change-in-singapore/>

As the results of a 2018 study* show, buildings come a close second to industry in terms of the secondary emissions they generate. These emissions are a major source of the UHI effect that adversely affects the thermal comfort of local communities. While it requires a long-term strategy and systemic change to address the problem of primary emissions from industry, the problem of secondary thermal emissions from buildings can be easily and readily addressed with the application of cool coatings.



*<https://www.nccs.gov.sg/singapores-climate-action/singapore-emissions-profile/>

Thermal Effects of Urban Canyon Structures



The UHI effect, caused by secondary emissions from buildings and other sources, is exacerbated by the numerous urban canyons – the relatively narrow spaces between adjacent multi-storey buildings, in our dense built environment.

Urban canyons are typically hotter than open spaces due to the compromised airflow in the narrow corridors between their buildings. The heat trapped in buildings' surfaces and surrounding roads elevates outdoor temperatures to uncomfortably and even dangerously high levels during the day. The uncomfortable temperatures persist into the evening, as the heat retained by urban canyons is slowly released.

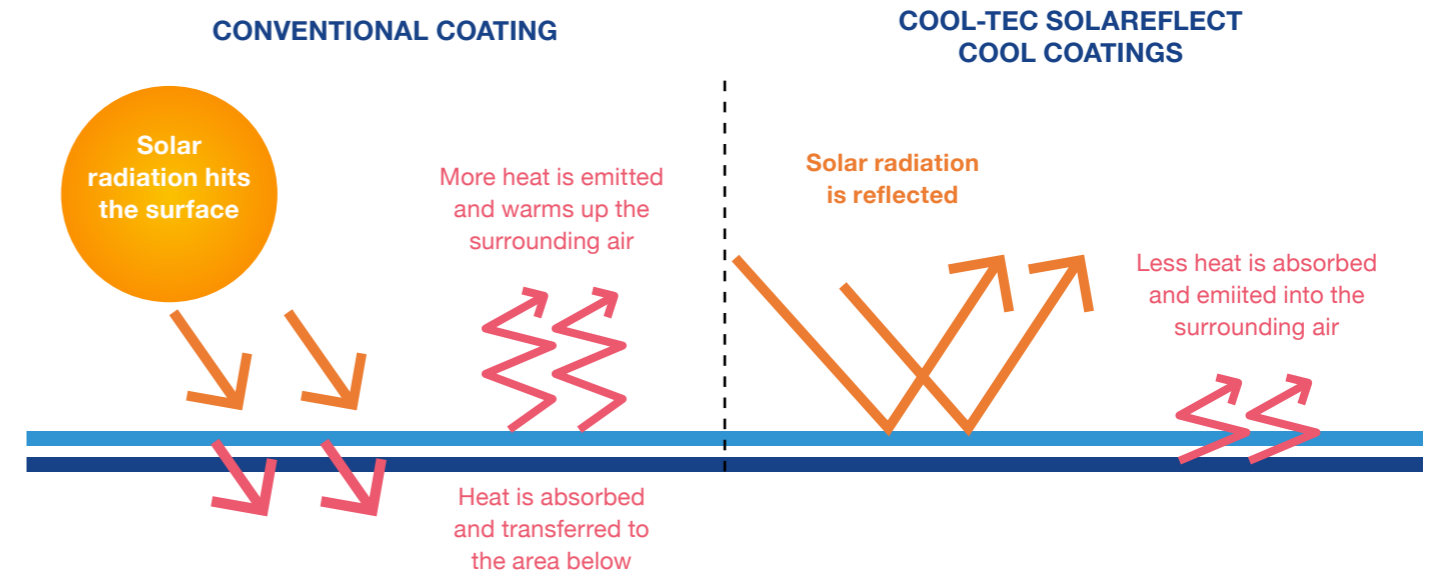
Just as the negative impact of the UHI effect is particularly pronounced in urban canyons, so is the positive impact of cool coatings when applied to the surfaces of the buildings that flank them.

Clearly it is not viable to structurally alter buildings or change the map of our city. But with the widespread adoption of COOL-TEC cool coatings, it is possible to bring a cool change to the residents and pedestrians who live in and around urban canyons, and create a more welcoming, inclusive, healthier and sustainable society.

How COOL-TEC Cool Coatings Work on Buildings' Surfaces

To appreciate the effects of COOL-TEC cool coatings on buildings' surfaces, it is helpful to examine the behaviour of solar radiation when it comes into contact with a surface coated with a conventional coating.

Behaviour of Solar Radiation on a Building Surface



When solar radiation comes into contact with a conventionally coated surface, the majority of it is absorbed, heating up both the surface itself and the interior of the building. However, when solar radiation hits surfaces coated with COOL-TEC cool coatings, the majority of it is reflected back into space, minimising heat absorption through the building surface and preventing heat retention in the building's interior.

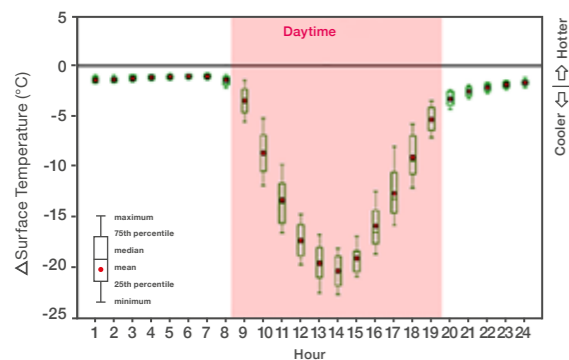
Independent Study on the Impact of Cool Coatings

The third-party comparative study that produced the data cited in this brochure employed rigorous scientific methods and thermal imaging equipment to determine the intensity of infrared radiation emitted from heat on buildings' surfaces, with and without cool coatings.

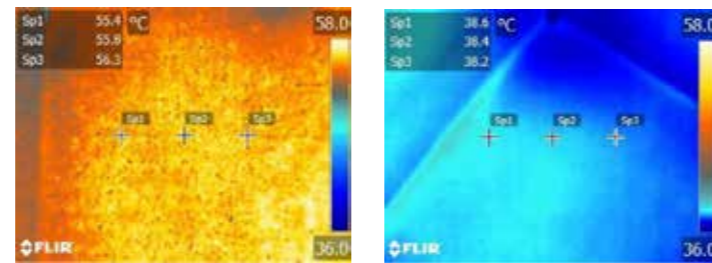
To measure the infrared radiation emitted from heat, thermal imaging equipment is used to diagnose the building condition and convert the reading into a visible image. Warmer components or regions will show up as reds, oranges and yellows, while cooler parts will typically be shown as purples and blues (green usually indicates areas that are roughly at room temperature).

Roof

The coated roof's surface temperature achieved up to 22°C reduction at midday when the temperature is usually the hottest.

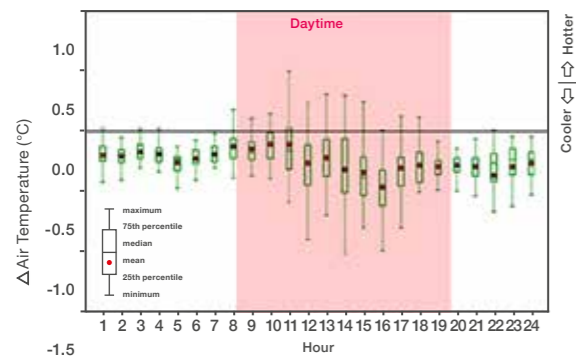


Concrete Slab Roof
(Typically found in HDB estates)

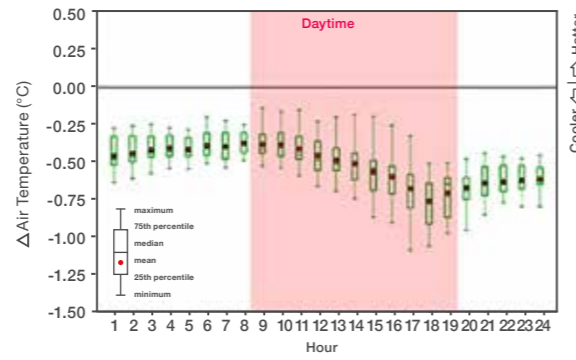


Thermographic images showing temperature variation on roof surface

The air temperature measured at the building's rooftop and top floor corridor also showed a reduction, indicating improved thermal comfort.



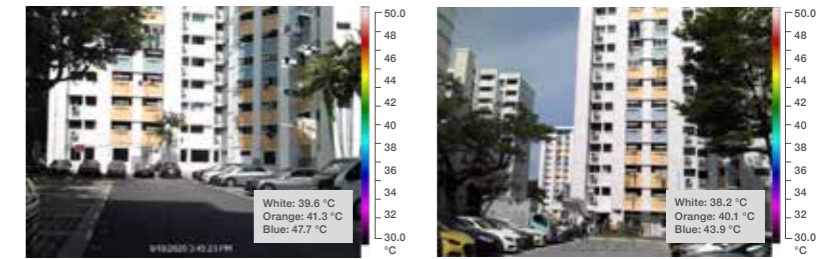
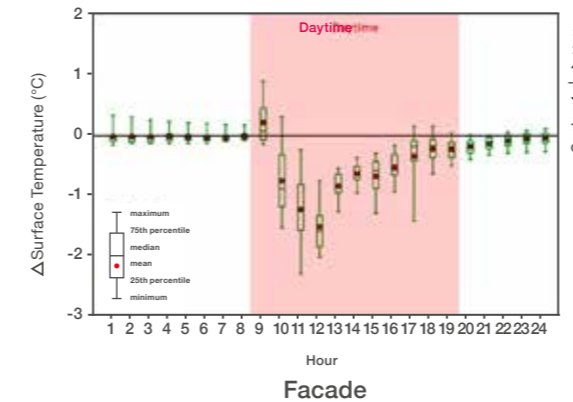
Rooftop



Top Floor Corridor

Facade

The coated exterior's surface temperature achieved up to 2°C reduction at midday when the temperature is usually the hottest.



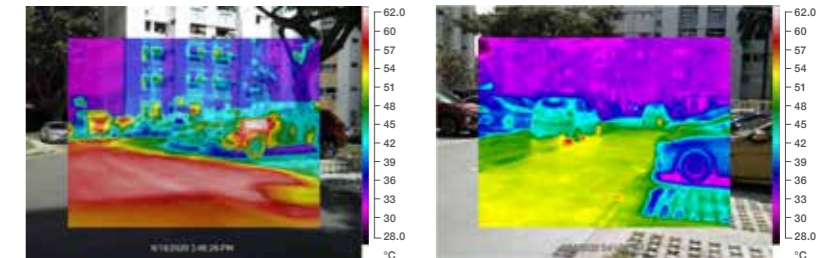
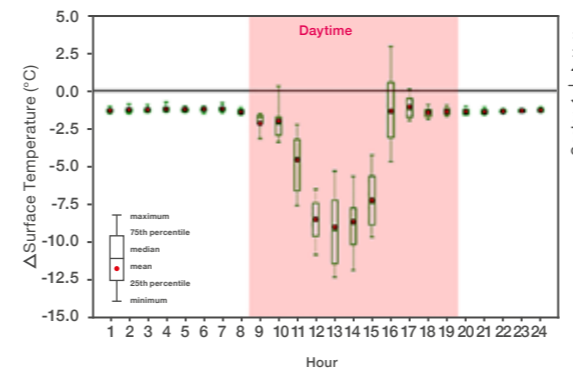
Conventional Coating

COOL-TEC SolaReflect SI

Thermographic images showing temperature variation on exterior building facade

Carpark

The coated driveway's surface temperature achieved up to 12°C reduction at midday when the temperature is usually the hottest.



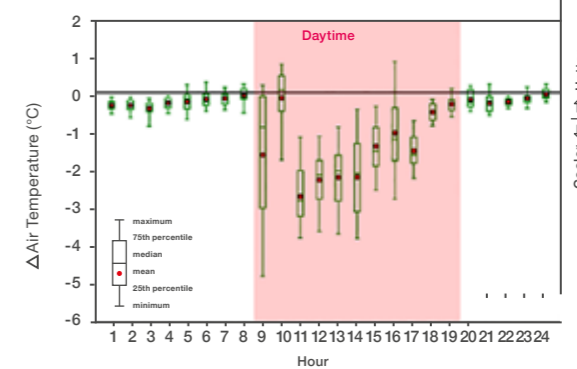
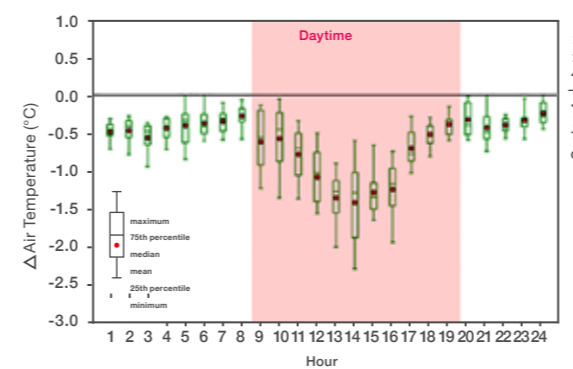
Uncoated Surface

COOL-TEC SolaReflect CoolFloor

Thermographic images showing temperature variation on driveway**

**The independent case study specifically examines the cooling effects of cool coatings on exterior environment temperature. Factors such as road surface, slip resistance, motorist speed, and the current condition of asphalt surfaces do not form part of the study.

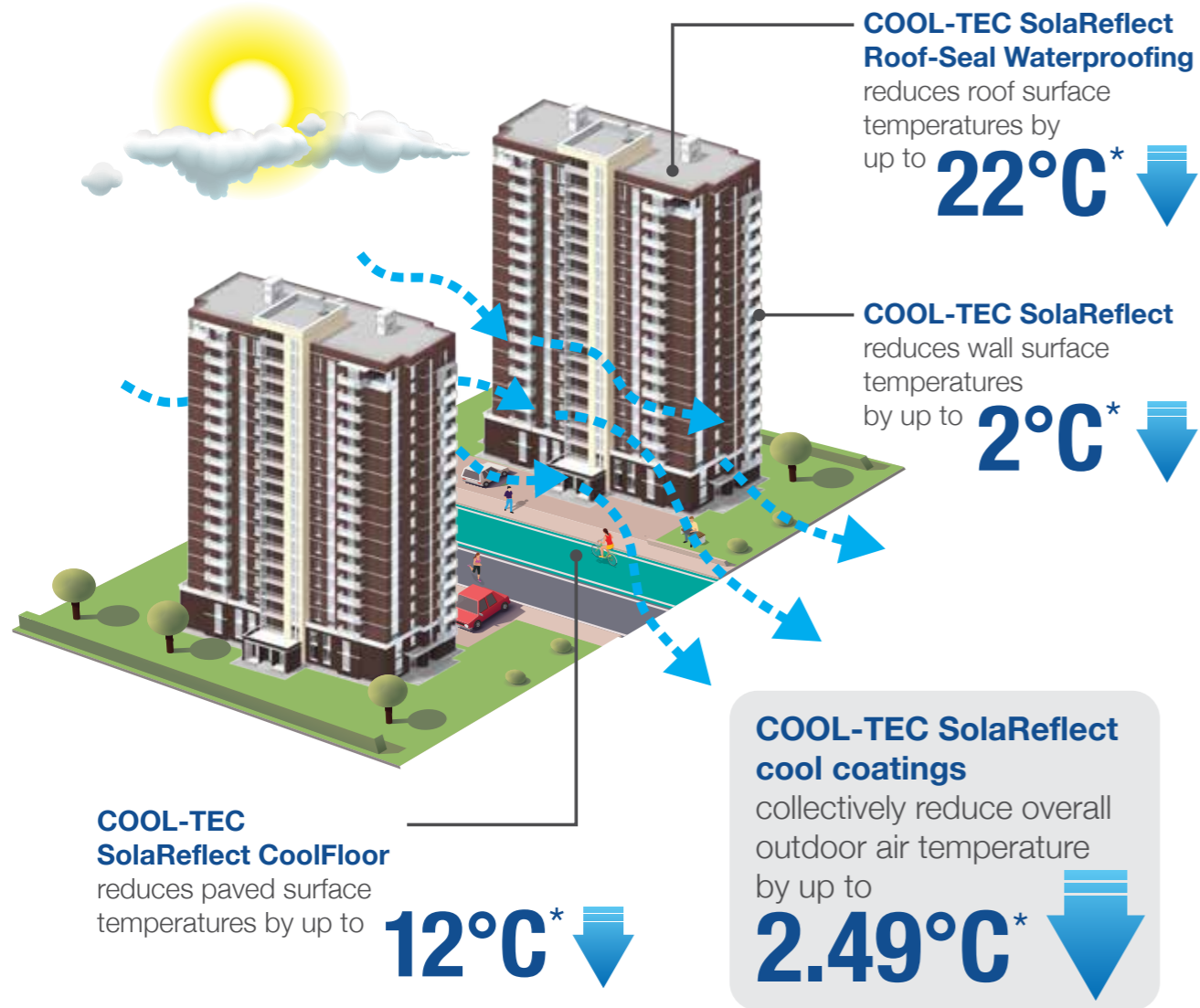
The air temperature measured also showed a reduction, indicating improved thermal comfort for pedestrians.



Universal Thermal Climate Index (UTCI)# for Pedestrian

#Universal Thermal Climate Index (UTCI) is a bioclimatic index for describing the physiological comfort of the human body under specific meteorological conditions such as ambient temperature, humidity, wind and radiation etc that affects our physiological reaction to the surrounding environment.

Collective Results of the Impact of Cool Coatings on a Community



Up to 2.49°C reduction in outdoor air temperatures facilitated by COOL-TEC cool coatings would have numerous positive repercussions for the whole community.



In 2015, at the Conference of the Parties (COP), every country, including Singapore, agreed to work together to limit global warming to well below 2°C and aim for 1.5°C, to tackle climate change under The Paris Agreement. Petteri Taalas, the World Meteorological Organization Secretary-General said that the 1.5°C figure is not some random statistics but rather an indicator of the point at which climate impacts will become increasingly harmful for people and indeed the entire planet.

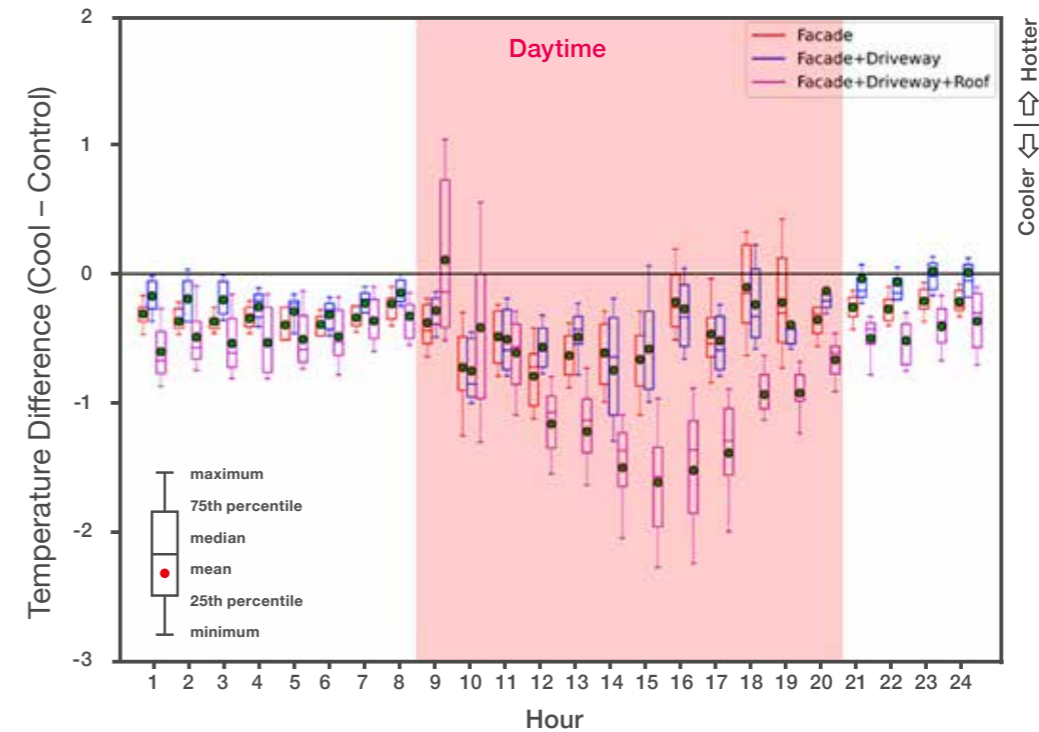
To support and achieve The Paris Agreement, Singapore Green Plan 2030 was set out to advance the nation's sustainable development, which includes the use of cool coatings to keep Singapore cool. For Nippon Paint COOL-TEC SolaReflect cool coatings to achieve up to 2.49°C outdoor air temperature reduction by coating the existing facade of 2 buildings is commendable because it does not involve structural change in facade or complex application nor subsequent maintenance.

https://www.researchgate.net/publication/257172082_Thermal_comfort_in_outdoor_urban_spaces_in_Singapore#:~:text=Thermal%20comfort%20perceptions%20and%20preferences,outdoor%20urban%20spaces%20in%20Singapore

Street Canyon Air Temperature

The extensive application of Nippon Paint COOL-TEC cool coatings to the roofs and walls of multiple buildings and roads within an estate in the independent study has shown a collective reduction of overall outdoor air temperature by up to 2.49°C*.

STREET CANYON AIR TEMPERATURE (Mid-canyon height, 18m from ground)



Nippon Paint COOL-TEC cool coatings adopt a 'passive' cooling method, which uses no electricity and generates no greenhouse gas emissions.



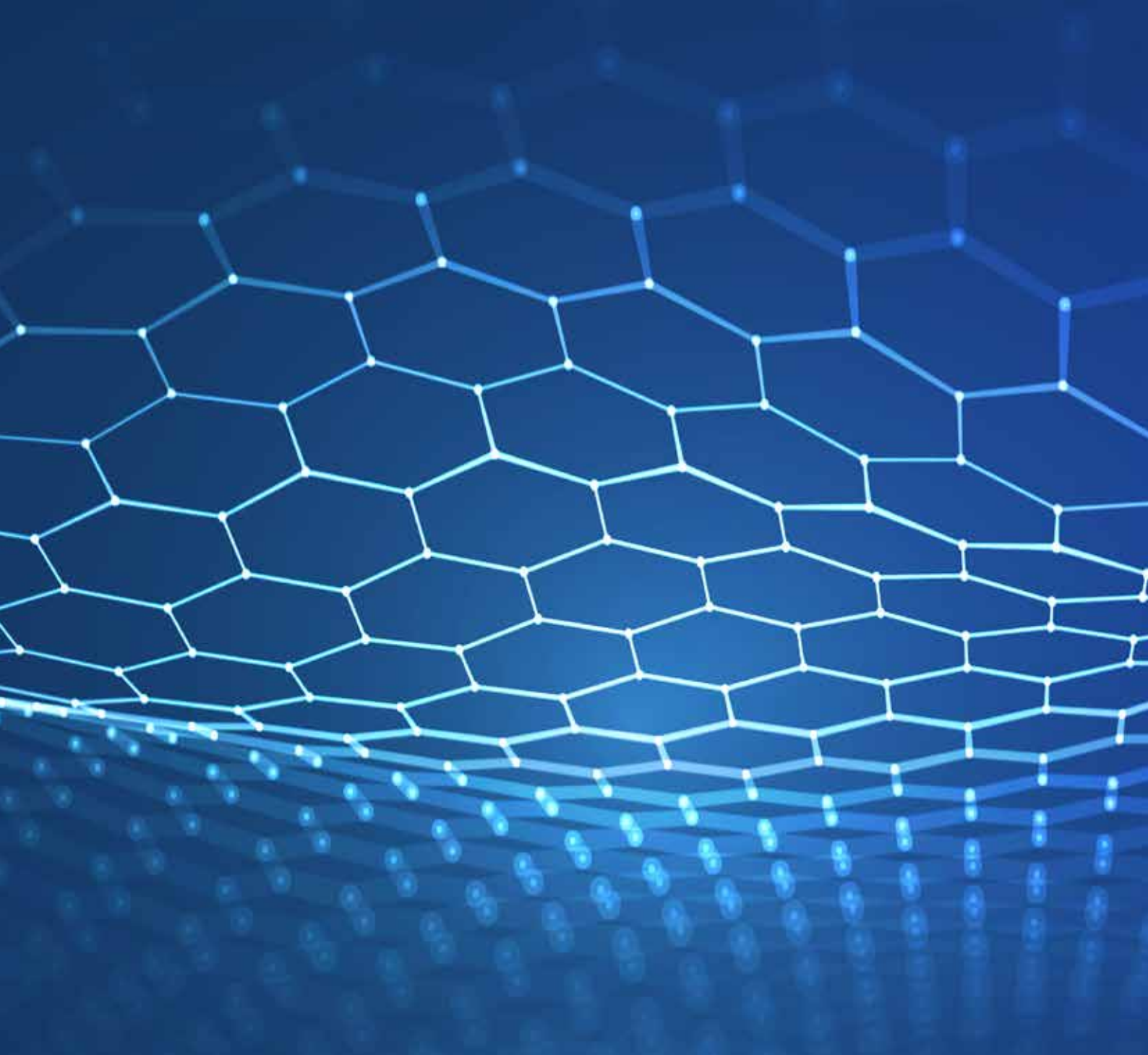
Among the many consequences of improved thermal comfort would be an increase in outdoor physical activities and social interaction between people of all ages, which would lead to subsequent gains in the physical, emotional and mental health of the nation. It would also enhance the appeal of cycling and greener commutes on public transport that require short walks, and create new business opportunities in entertainment, hospitality and tourism.



Needless to say, COOL-TEC cool coatings have the potential to not only make a positive impact on the lives of people, but also on the natural environment and the complex eco-systems that live within it and benefit humankind in countless ways.

As the hot topics of global warming and climate action are being endlessly discussed around the world, COOL-TEC cool coatings are a positive note in the ongoing conversation.

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