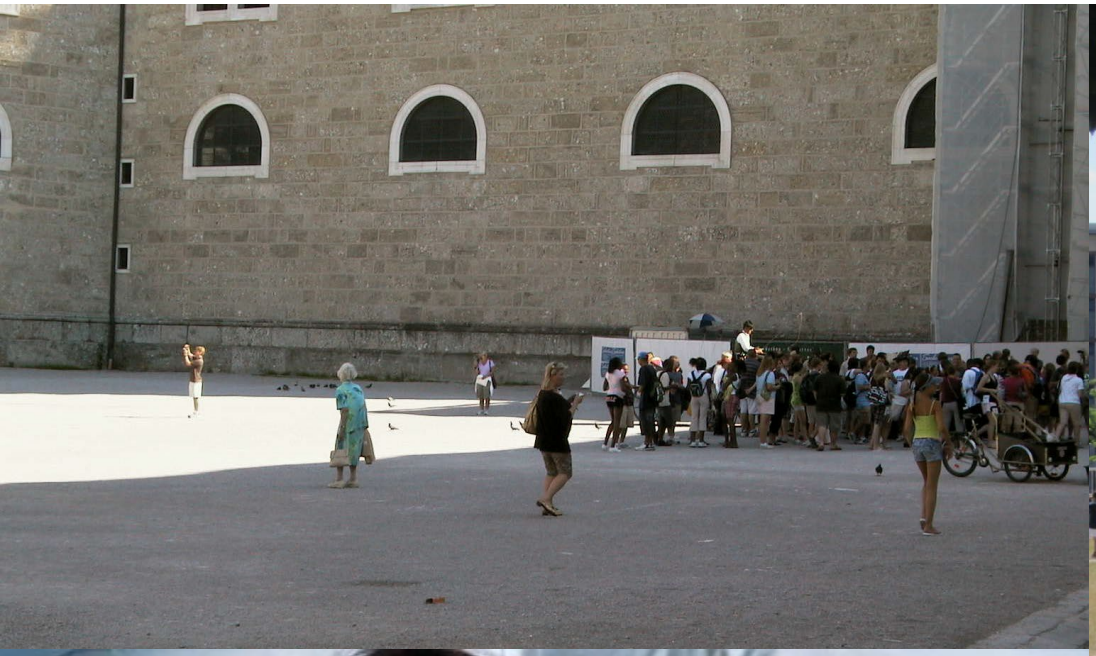
Hoe hou je de buitenruimte voldoende koel?

Bestens bekend van de afgelopen dagen...



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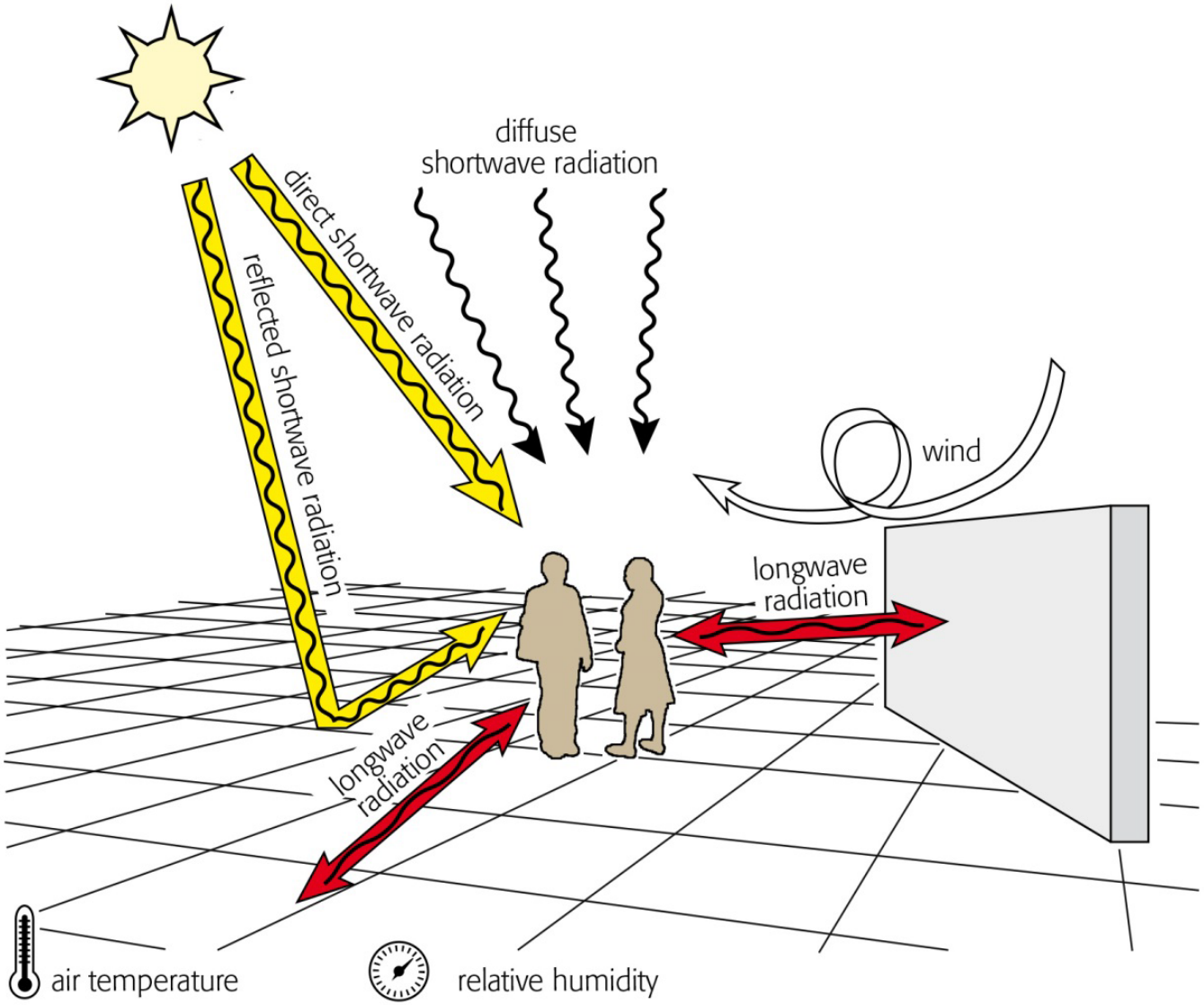
Menselijke temperatuurbeleving



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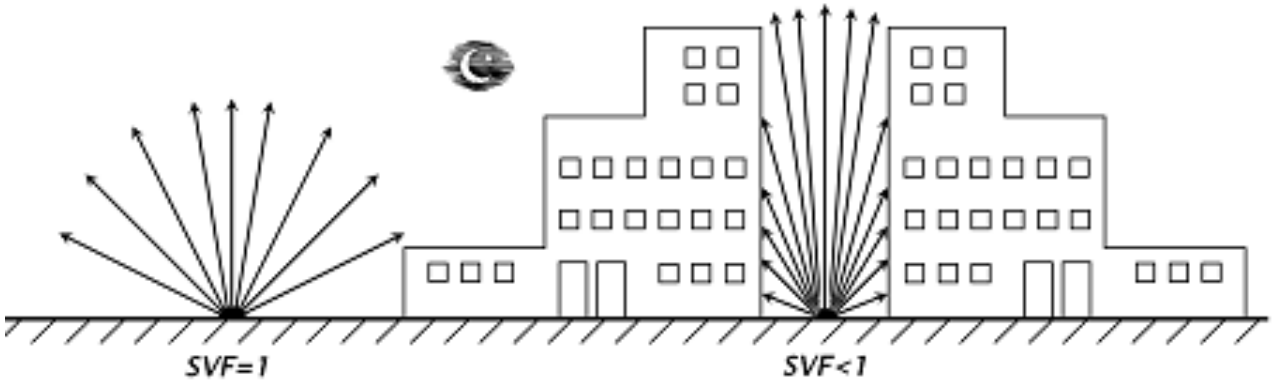
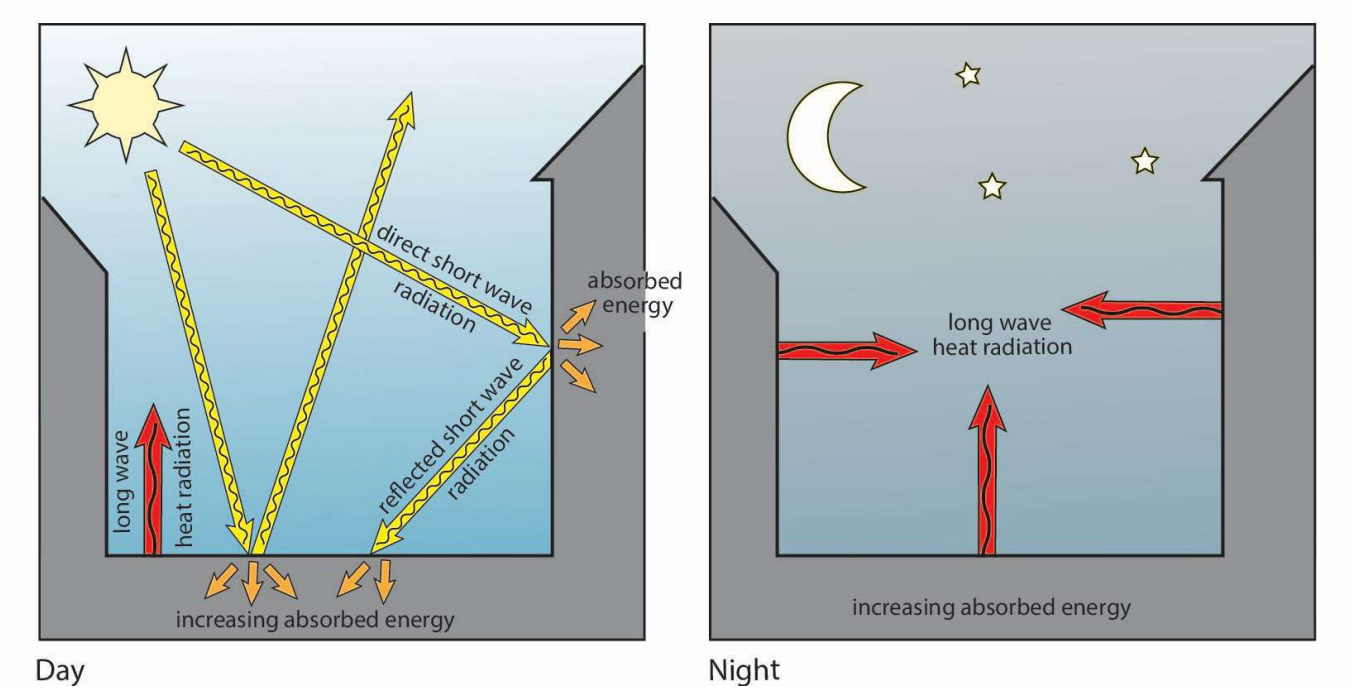
Kort- en langgolvige straling



Source: lecture material Bert van Hove, Wageningen University



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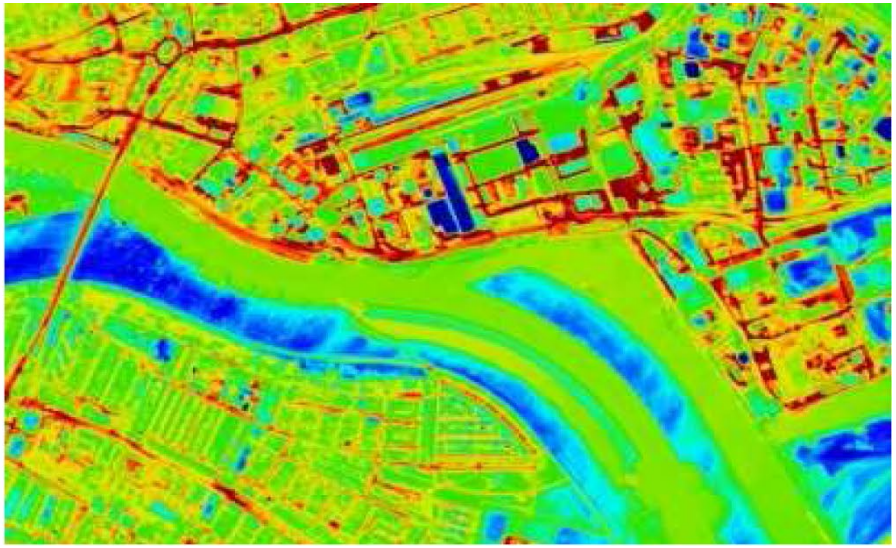
Oppervlaktetemperatuur

Source: Kassel University



Source: Future Cities- Arnhem

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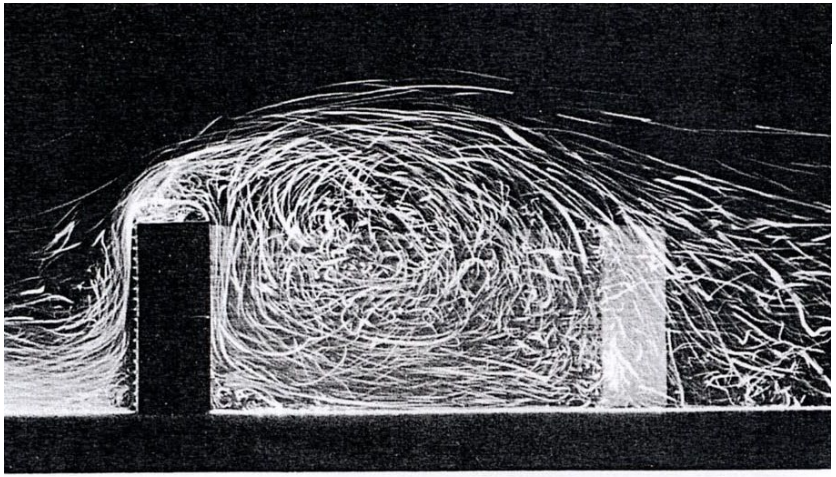
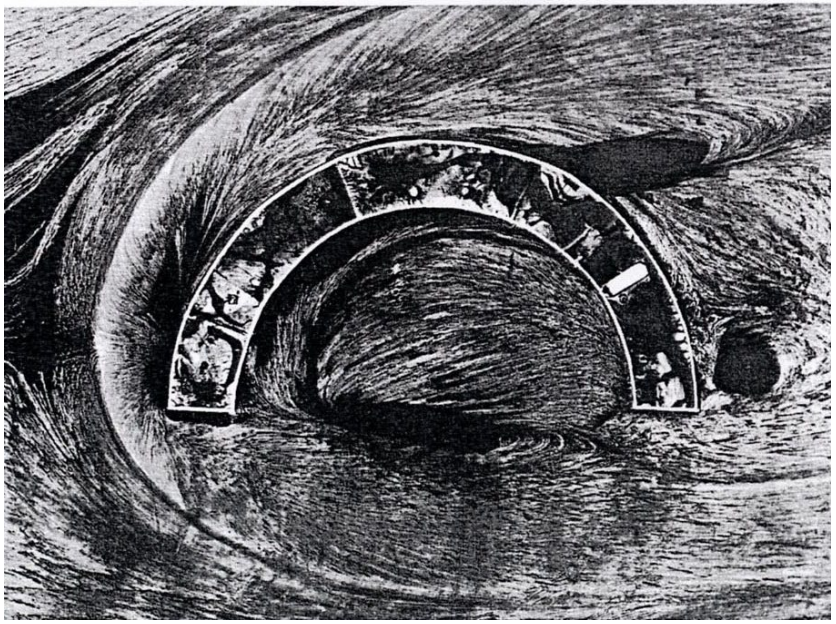
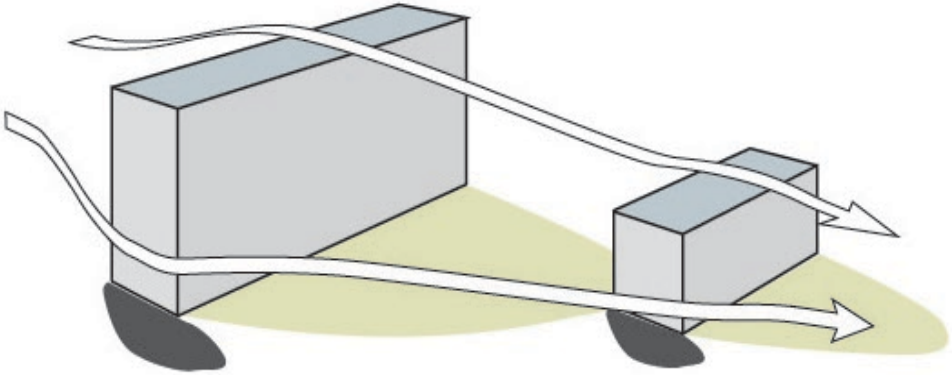
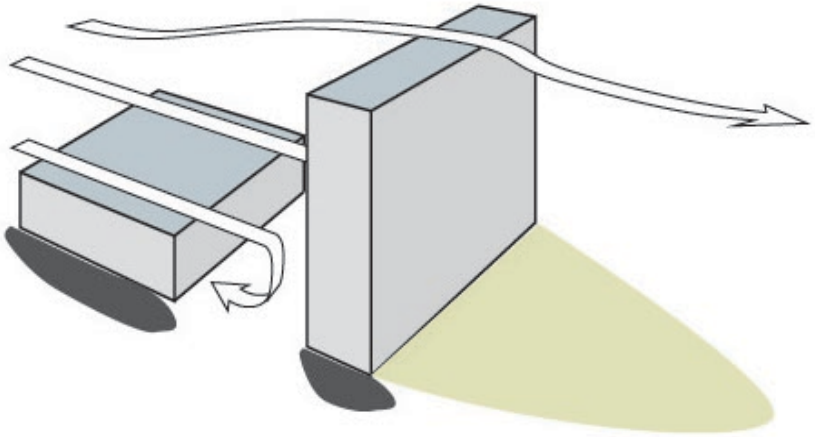
Wind patronen in de gebouwde omgeving





Source: Schmalz, 1977





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Klimatoop concept










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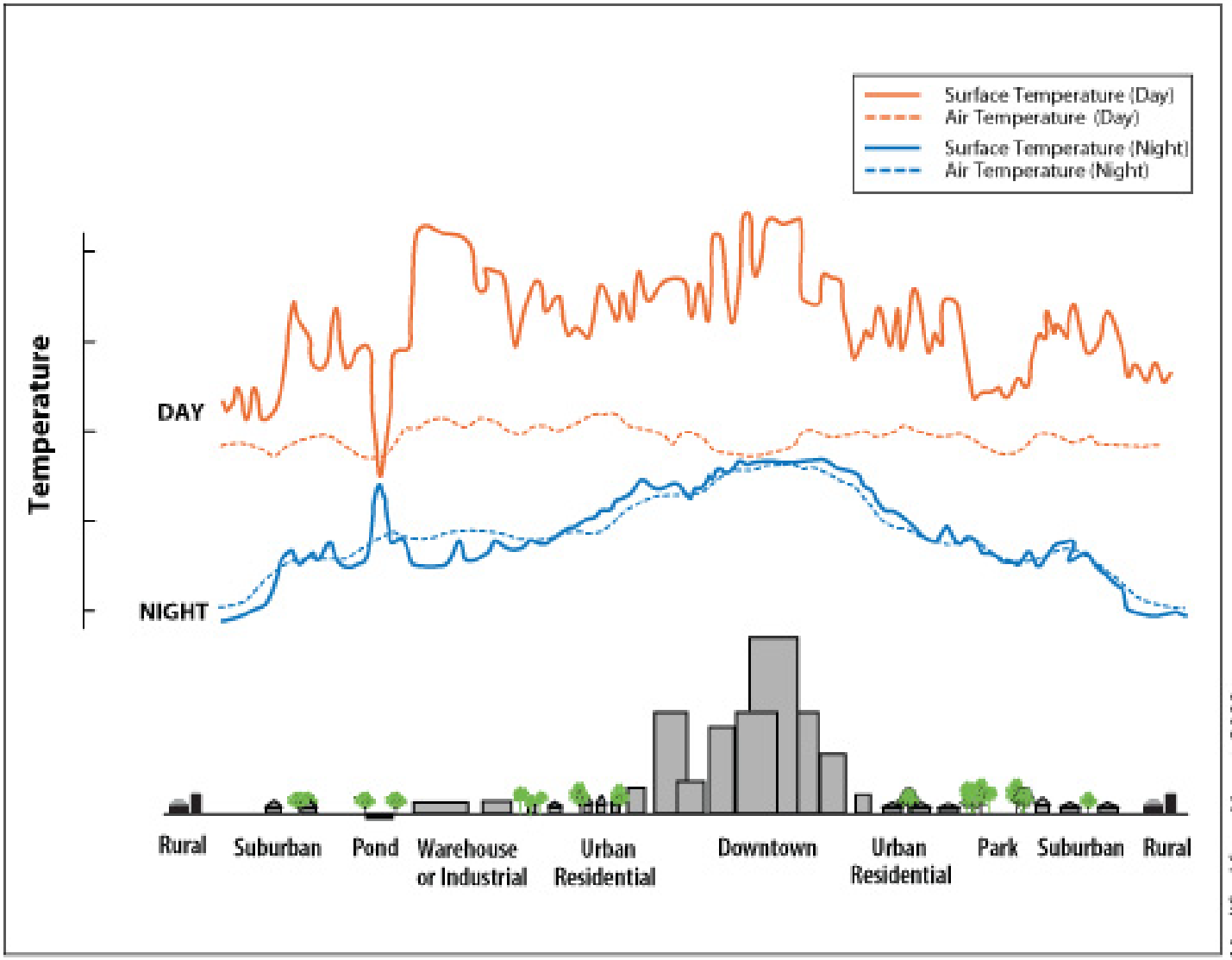
Temperaturen in de stad



Source: lecture material Bert van Hove, Wageningen University

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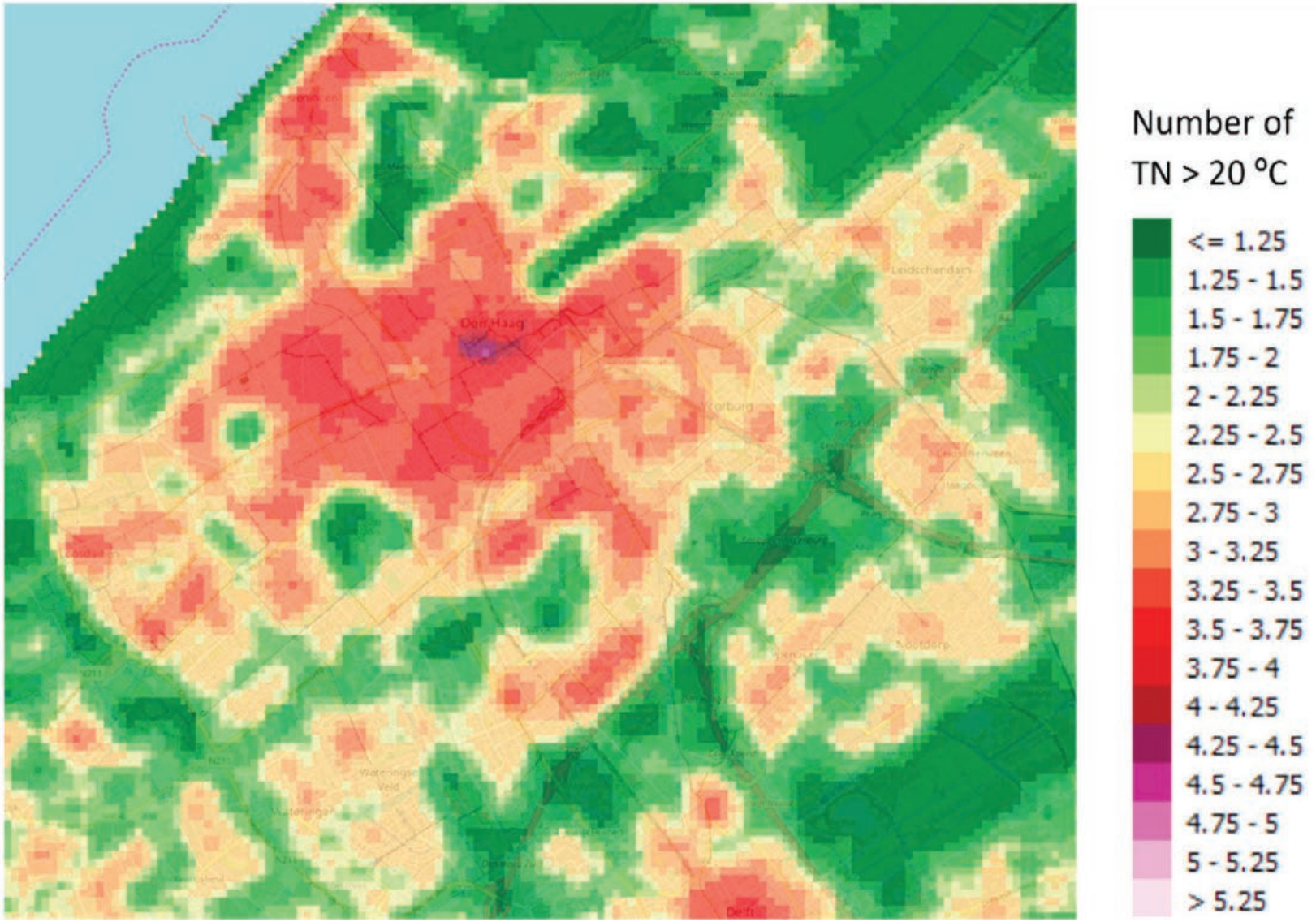
Urban heat islands



Source: Koopmans et al., Wageningen University

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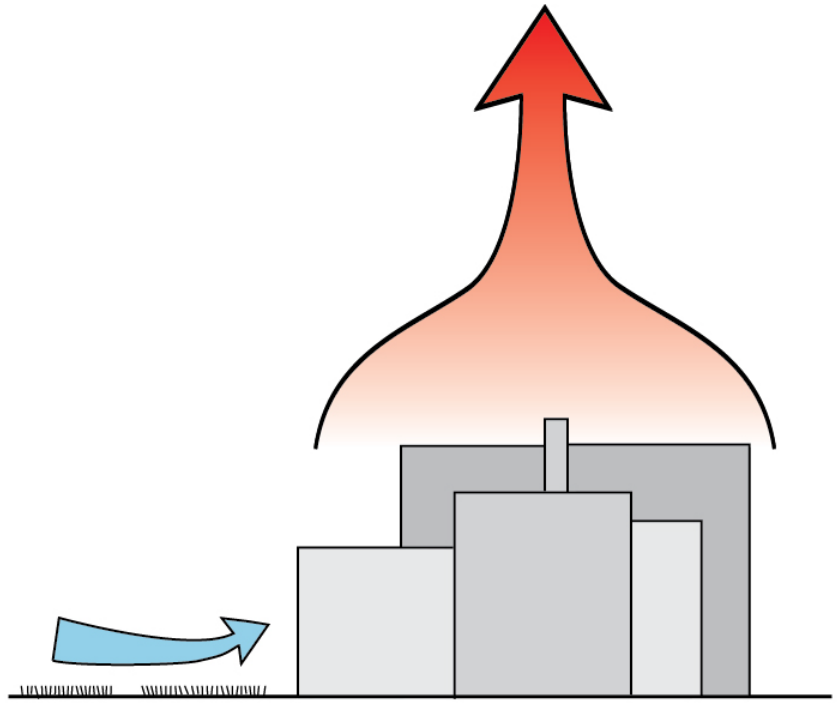
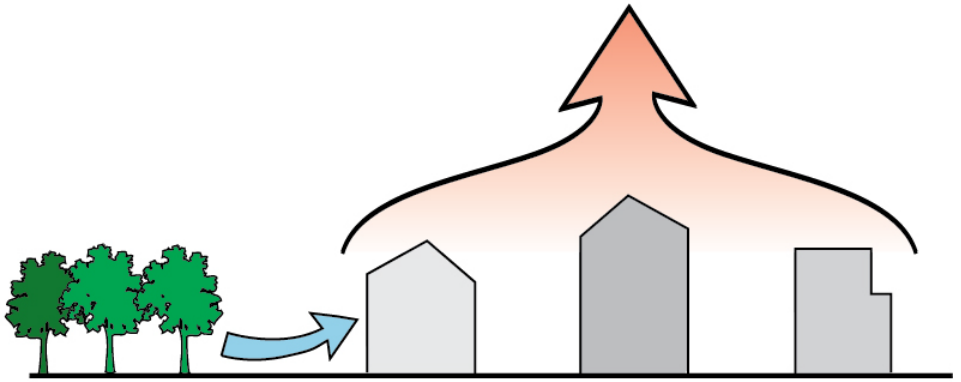
Lokale windsystemen door temperatuurverschillen





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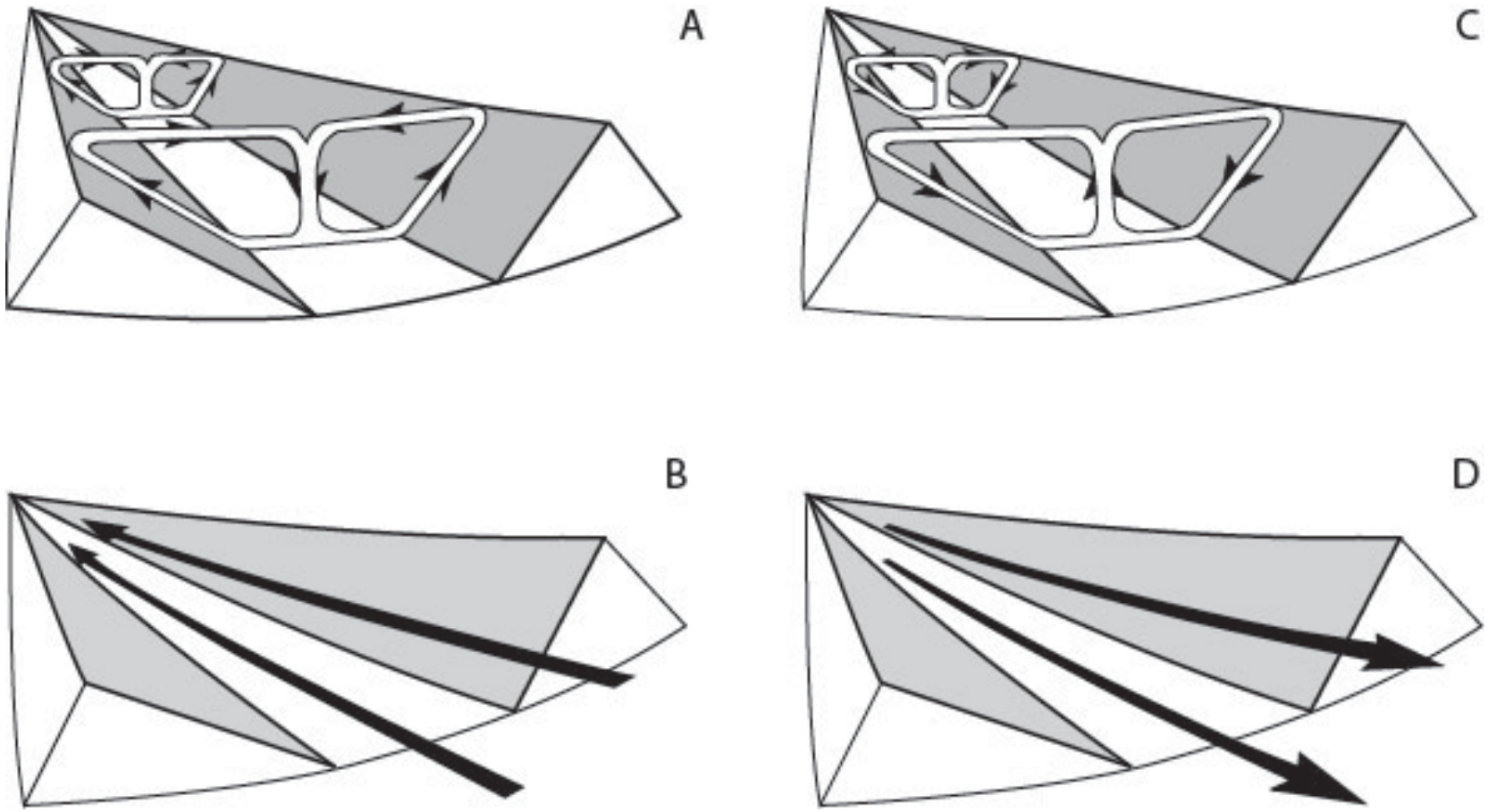
Dalwindsystemen



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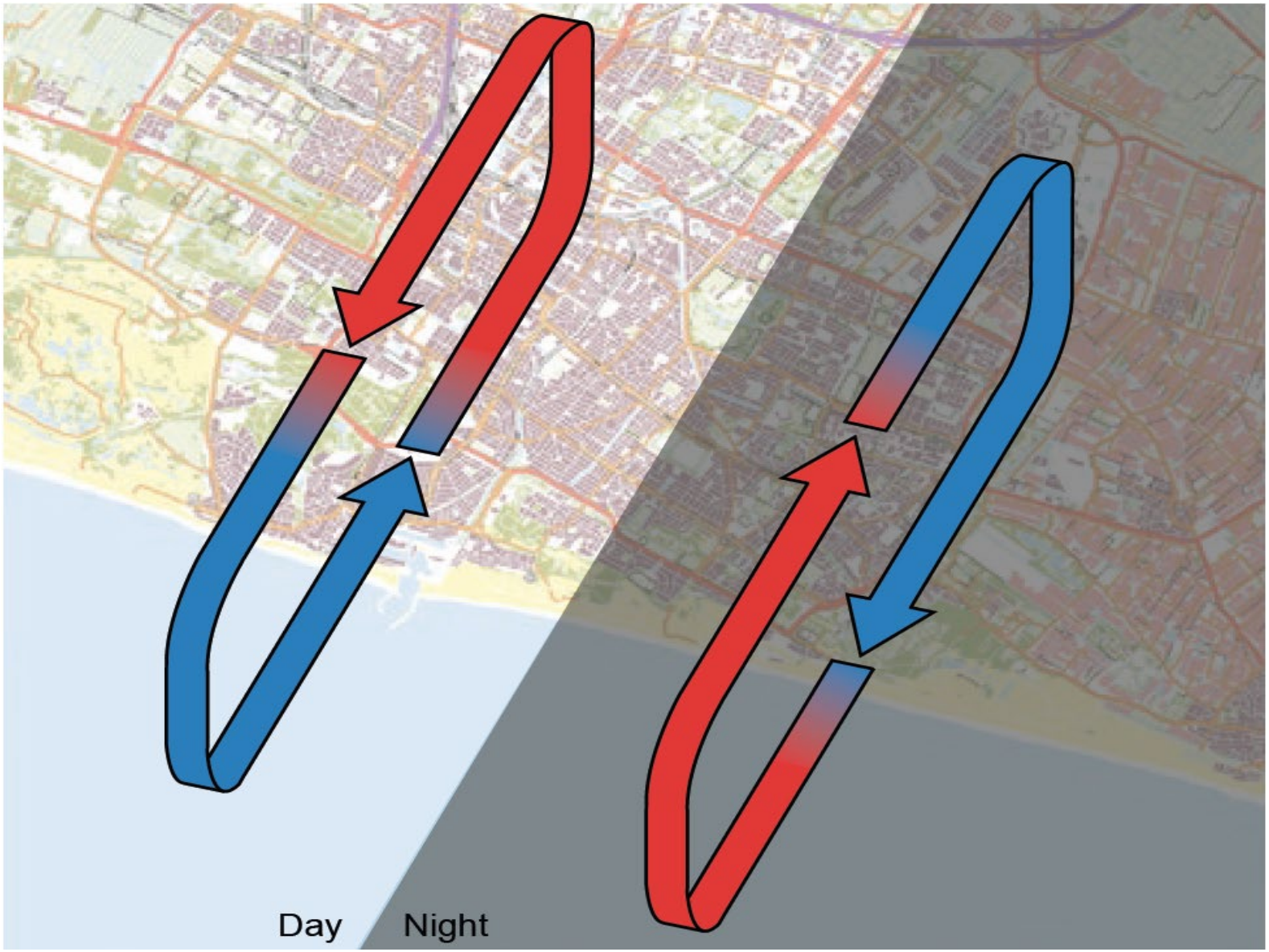
Kustwindsystemen



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Voordat je gaat ontwerpen: begrijp de plek!

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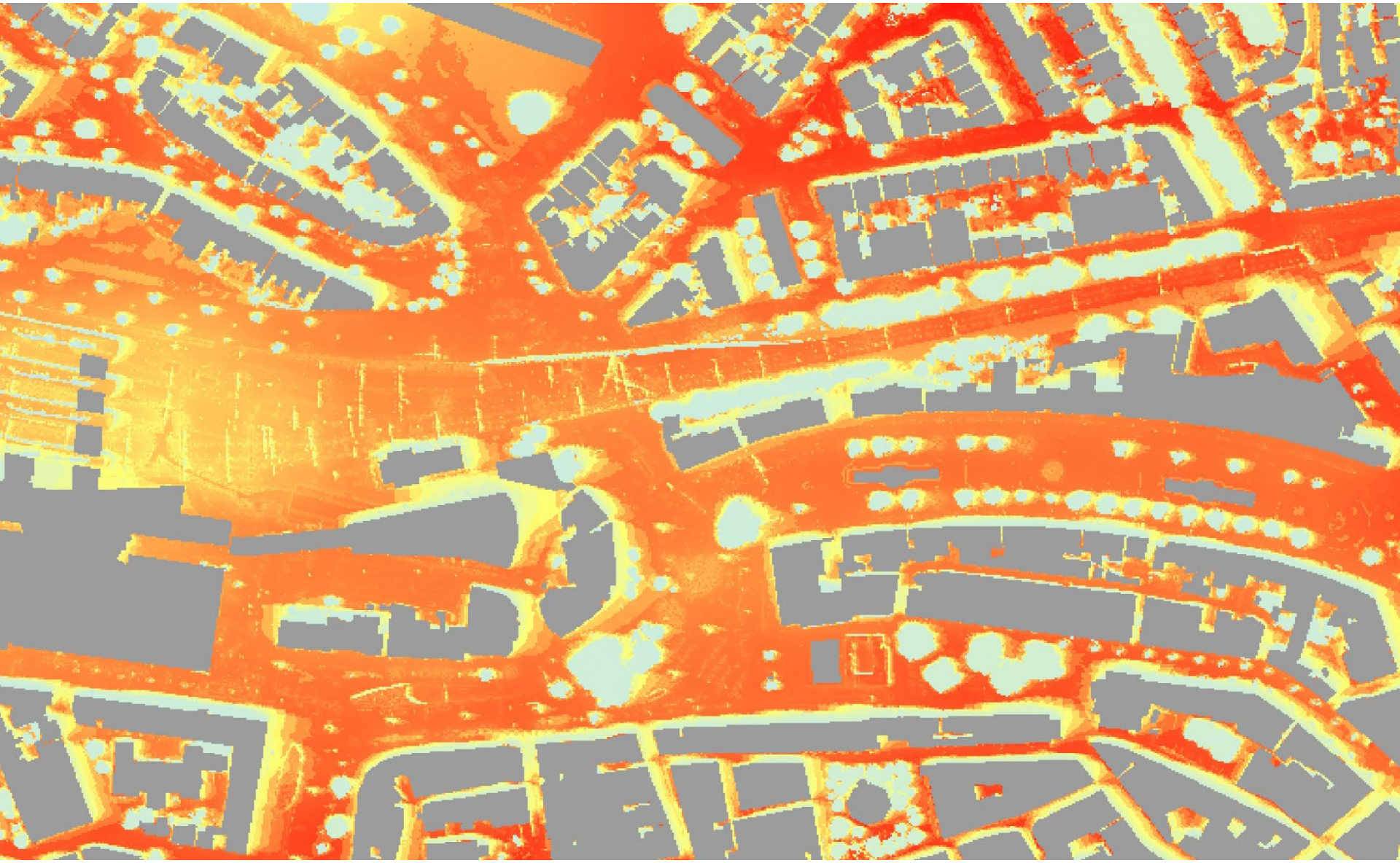
Expert simulatie: voorbeeld PET



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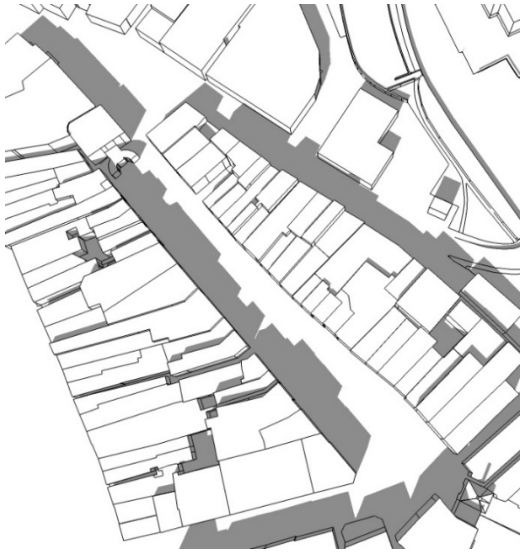
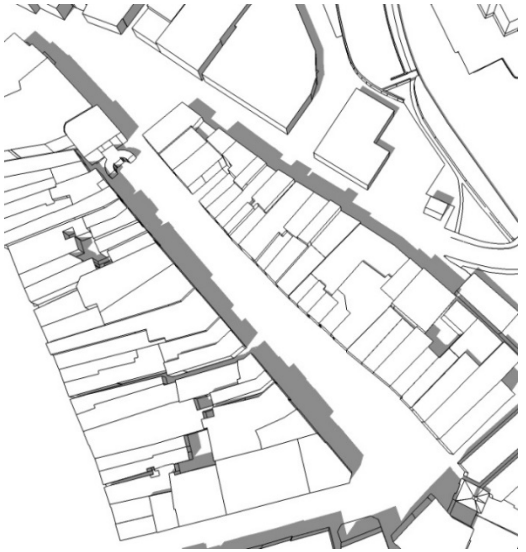
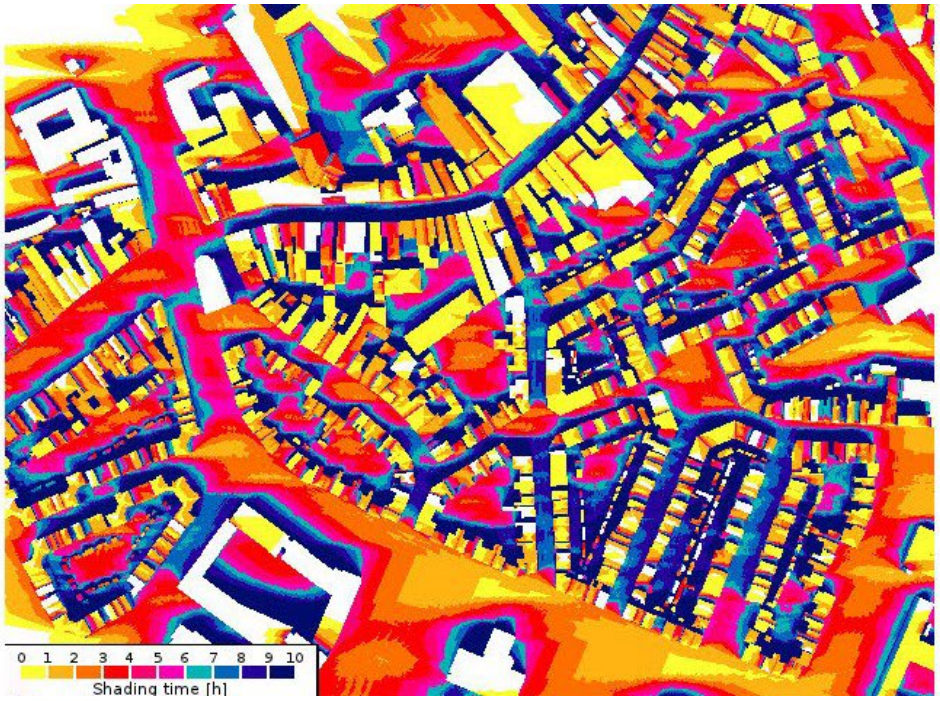
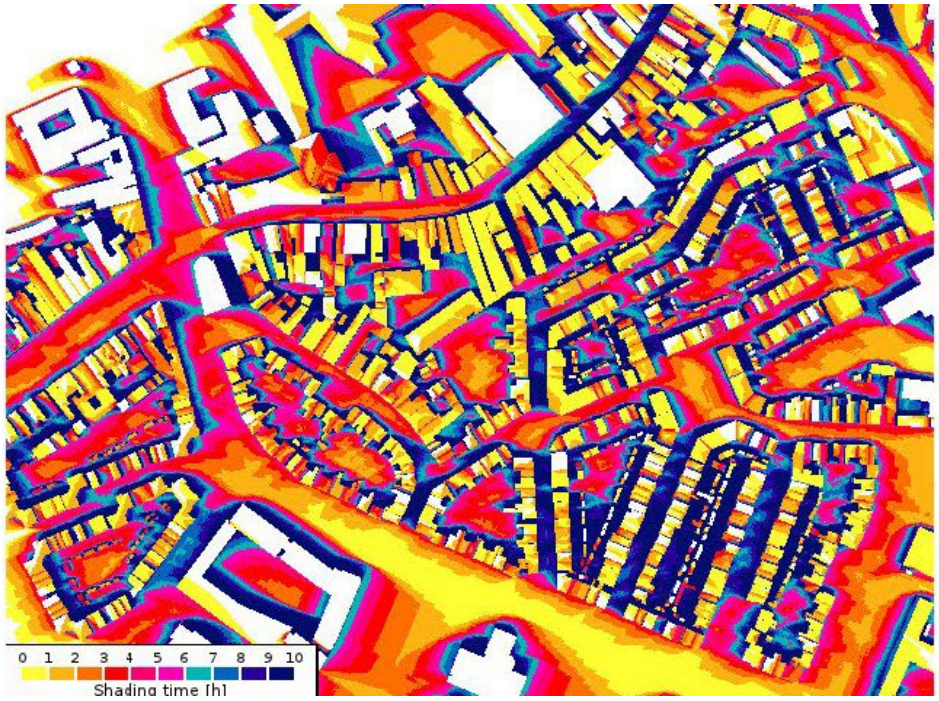
Analyse met 3D Vector software









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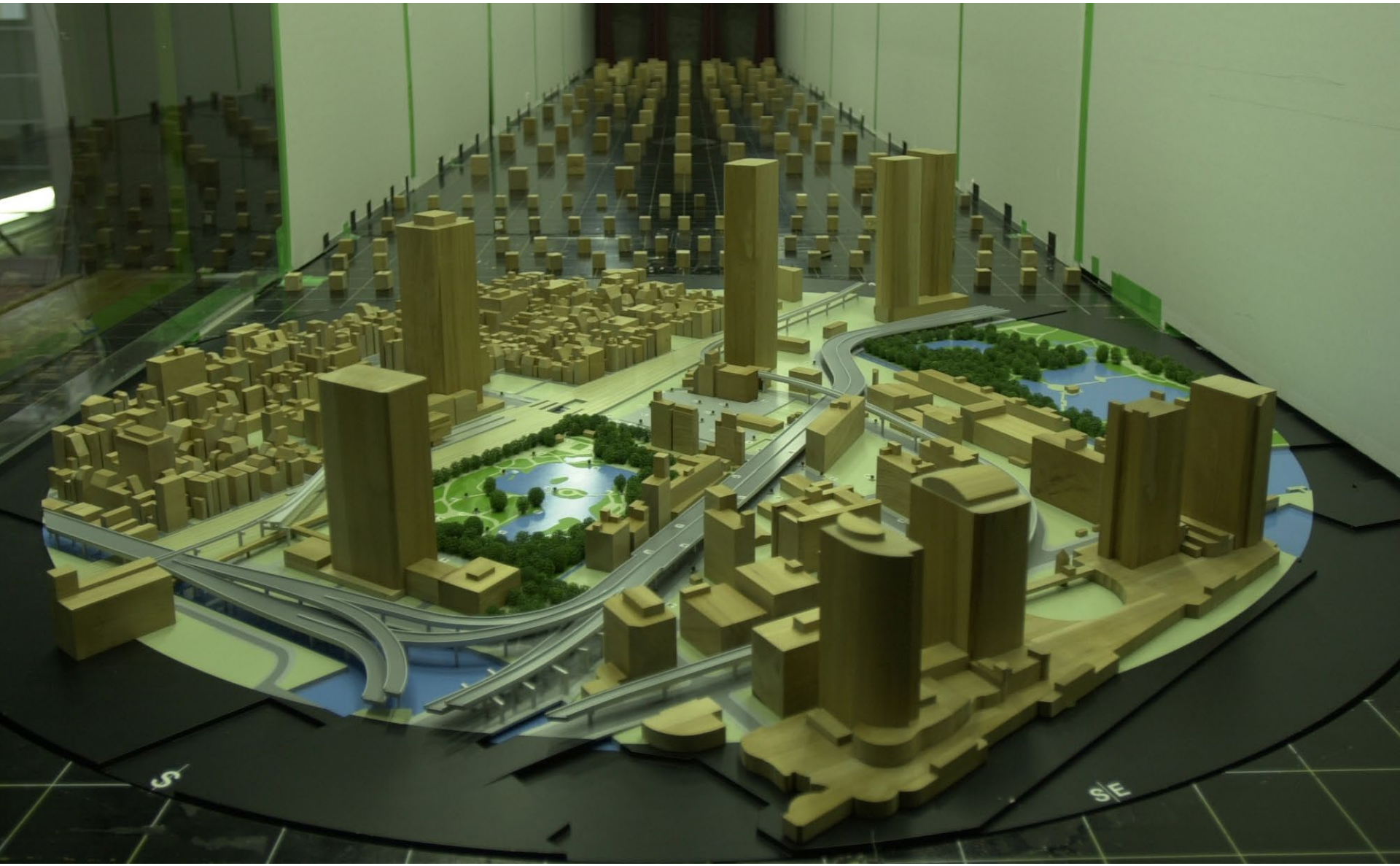
Wind tunnel analyses



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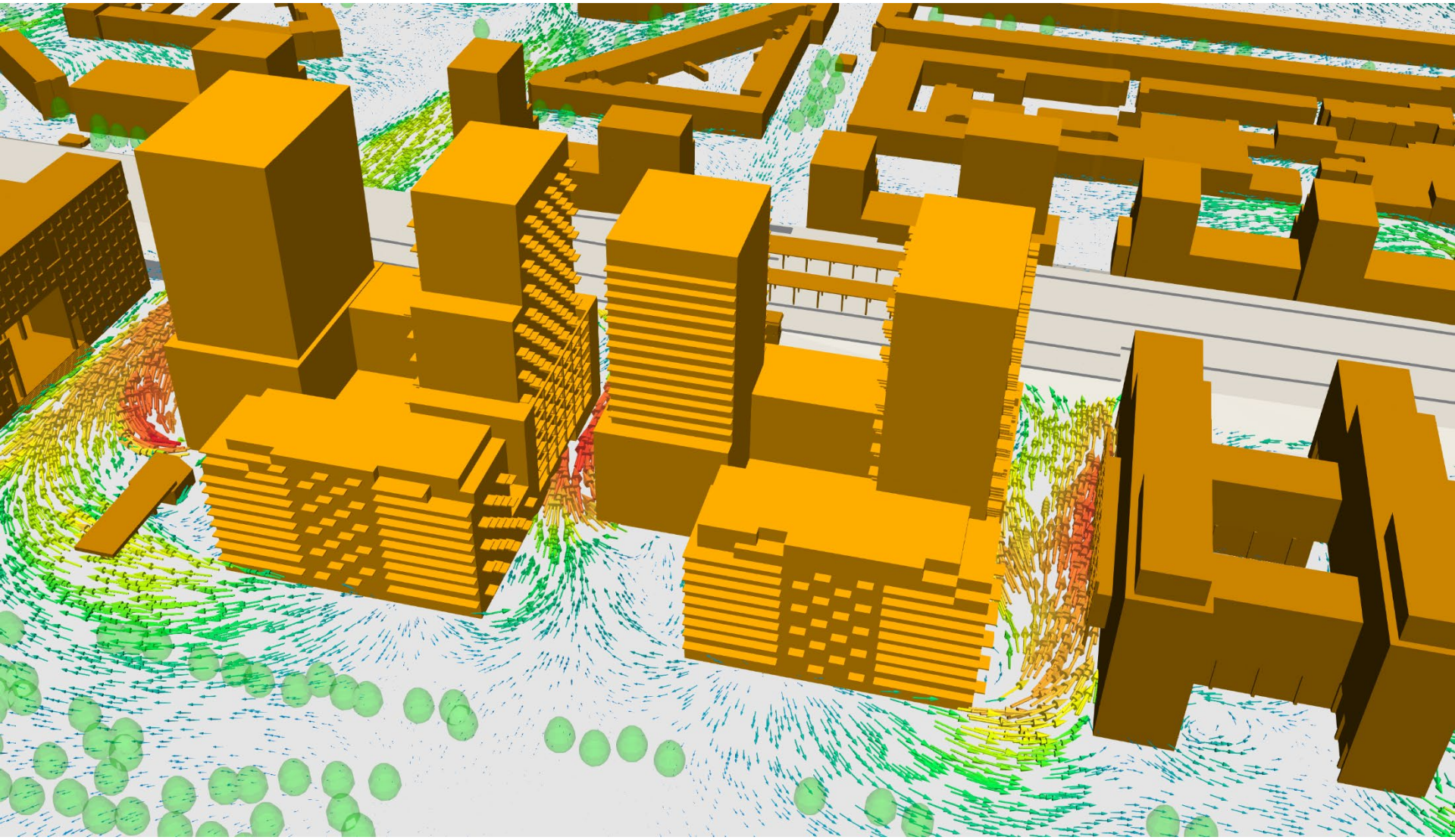
Wind simulaties



Source: Peutz, 2023

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Simpele experimenten

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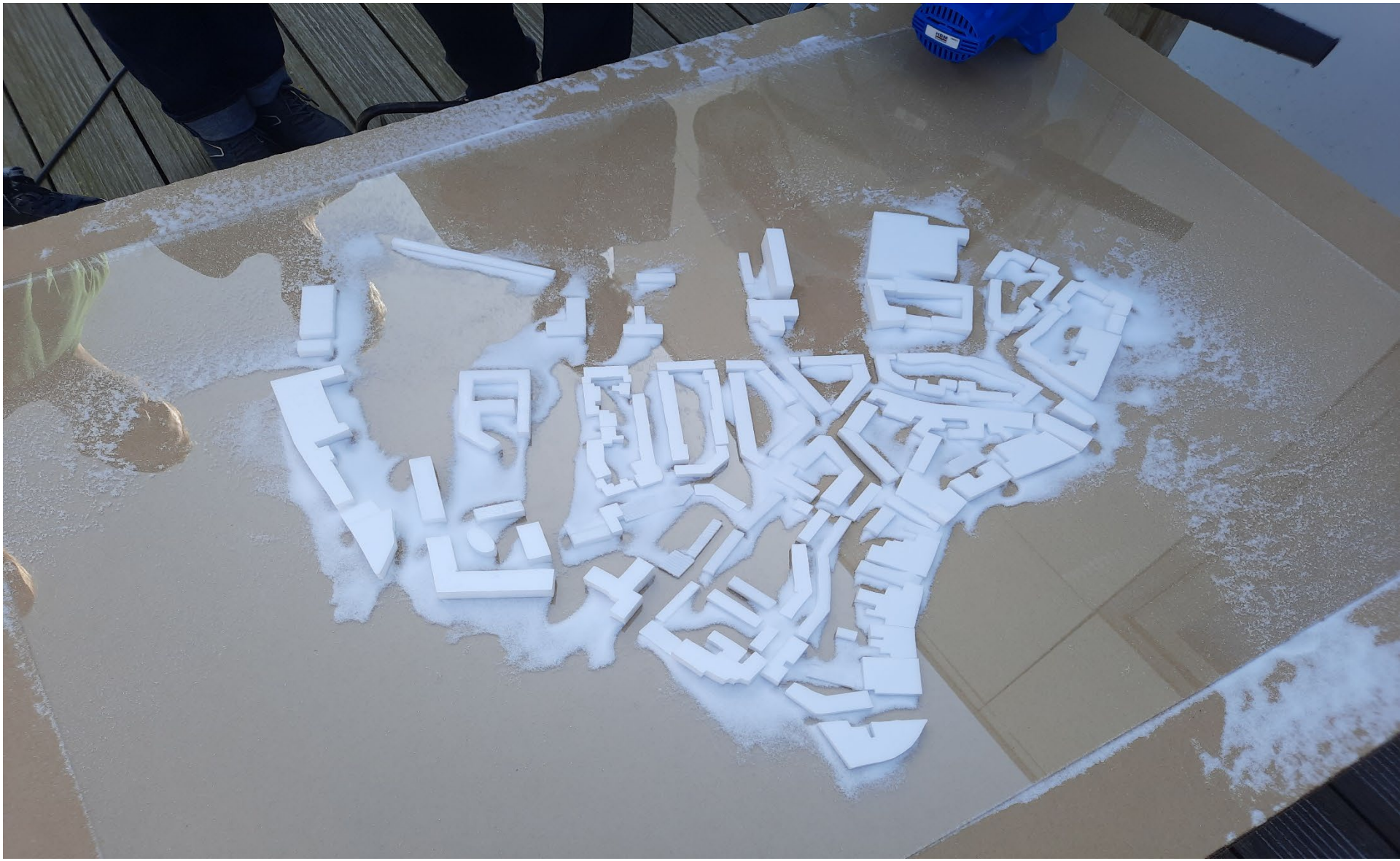
Simpele experimenten



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Planning op de grotere schaal

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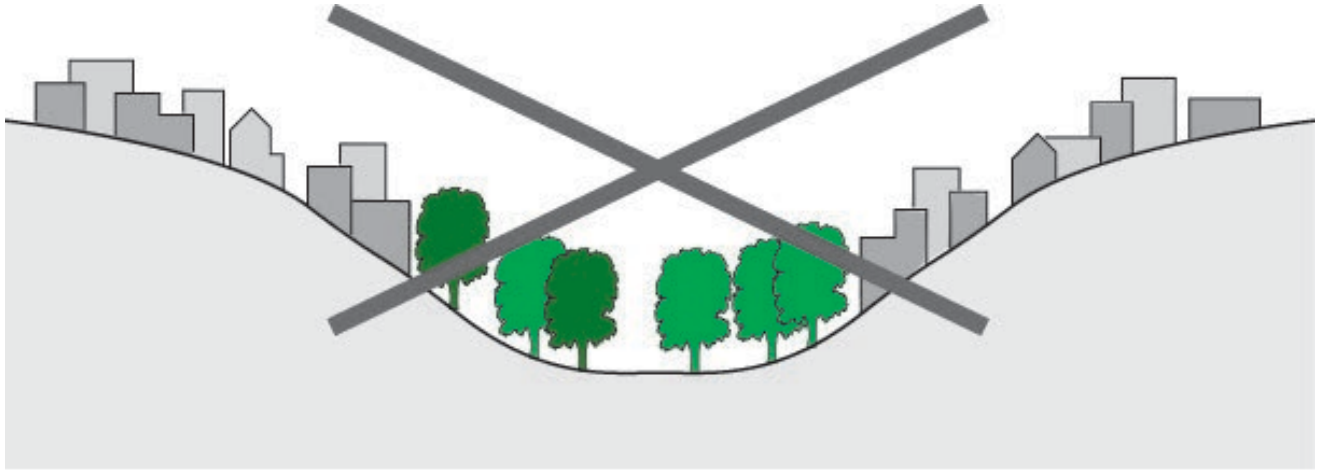
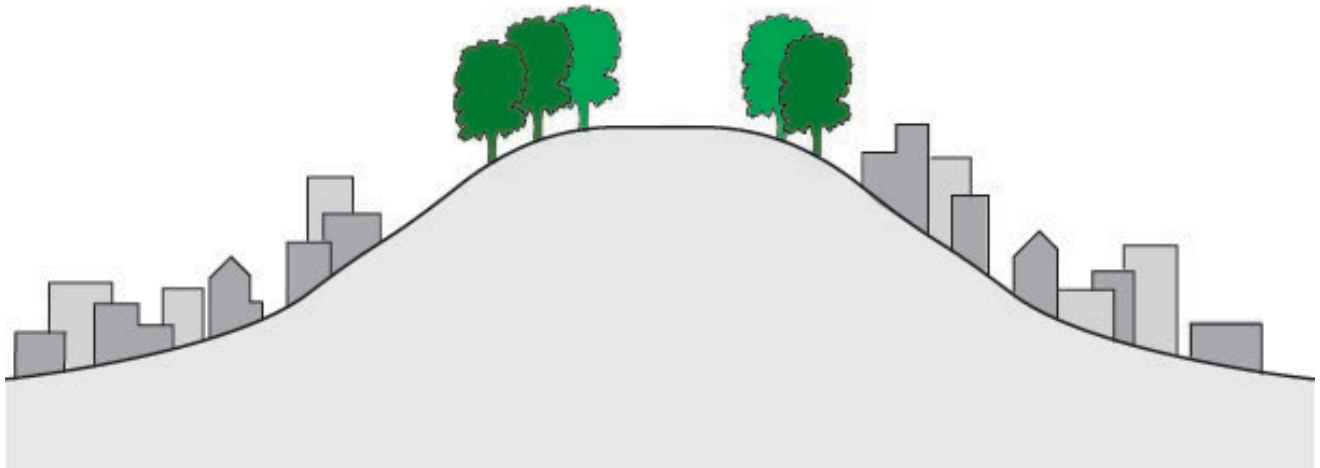
Dalwinden op de goede plek laten ontstaan





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Dalwinden toelaten

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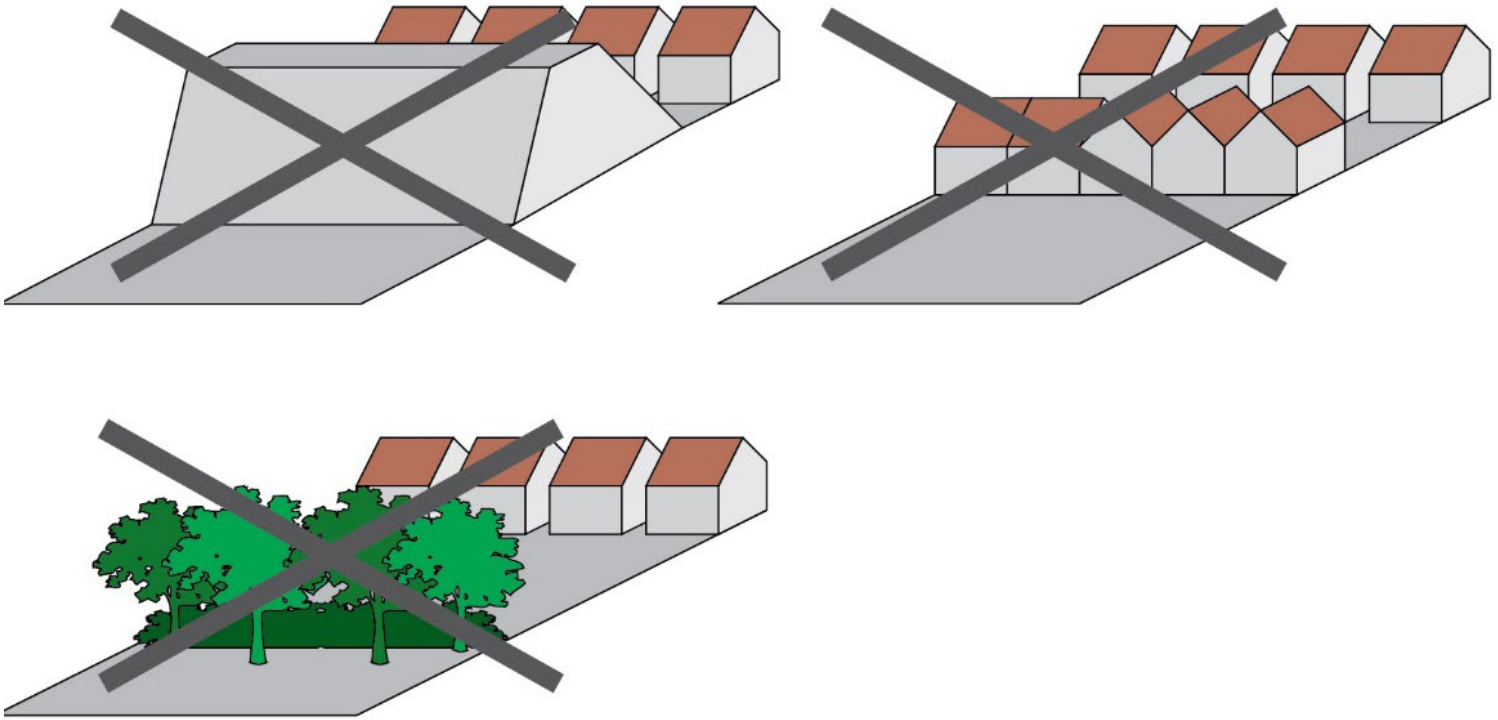
Ventilatieruimte tussen koel en warm gebied open houden



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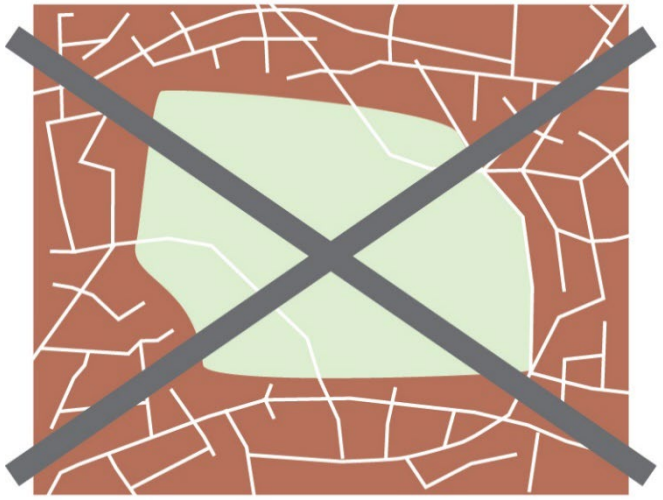
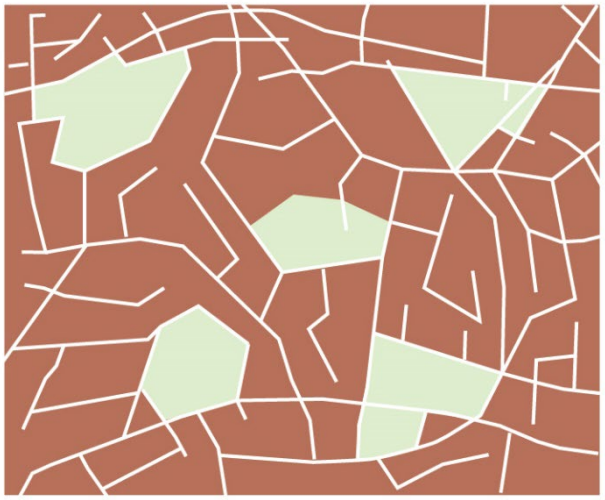
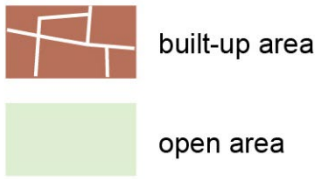
Ventilatie dmv raakvlakken van open en bebouwd gebied







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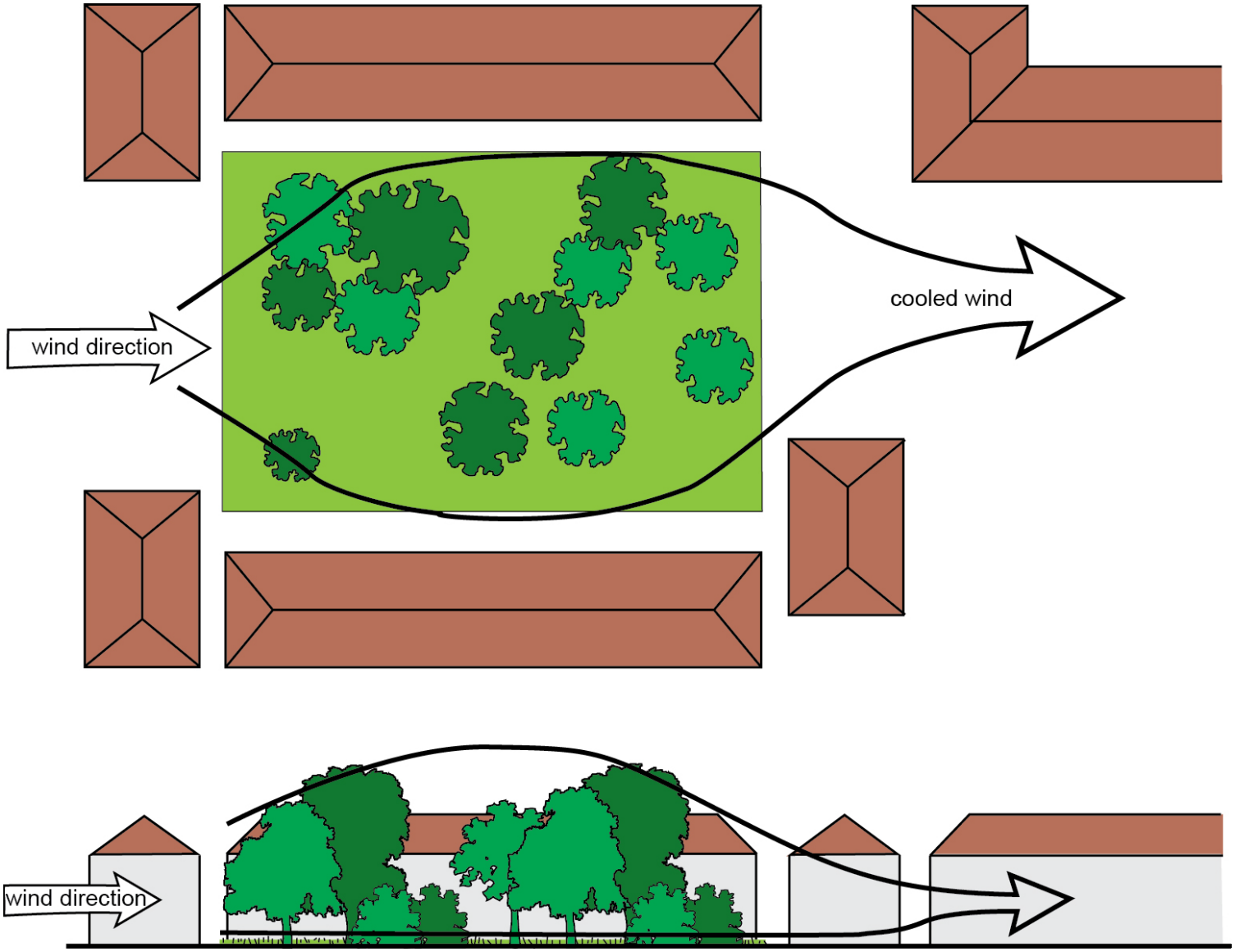
Ventilatie uit koele parken naar bebouwde omgeving



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Urban climate analysis Stuttgart

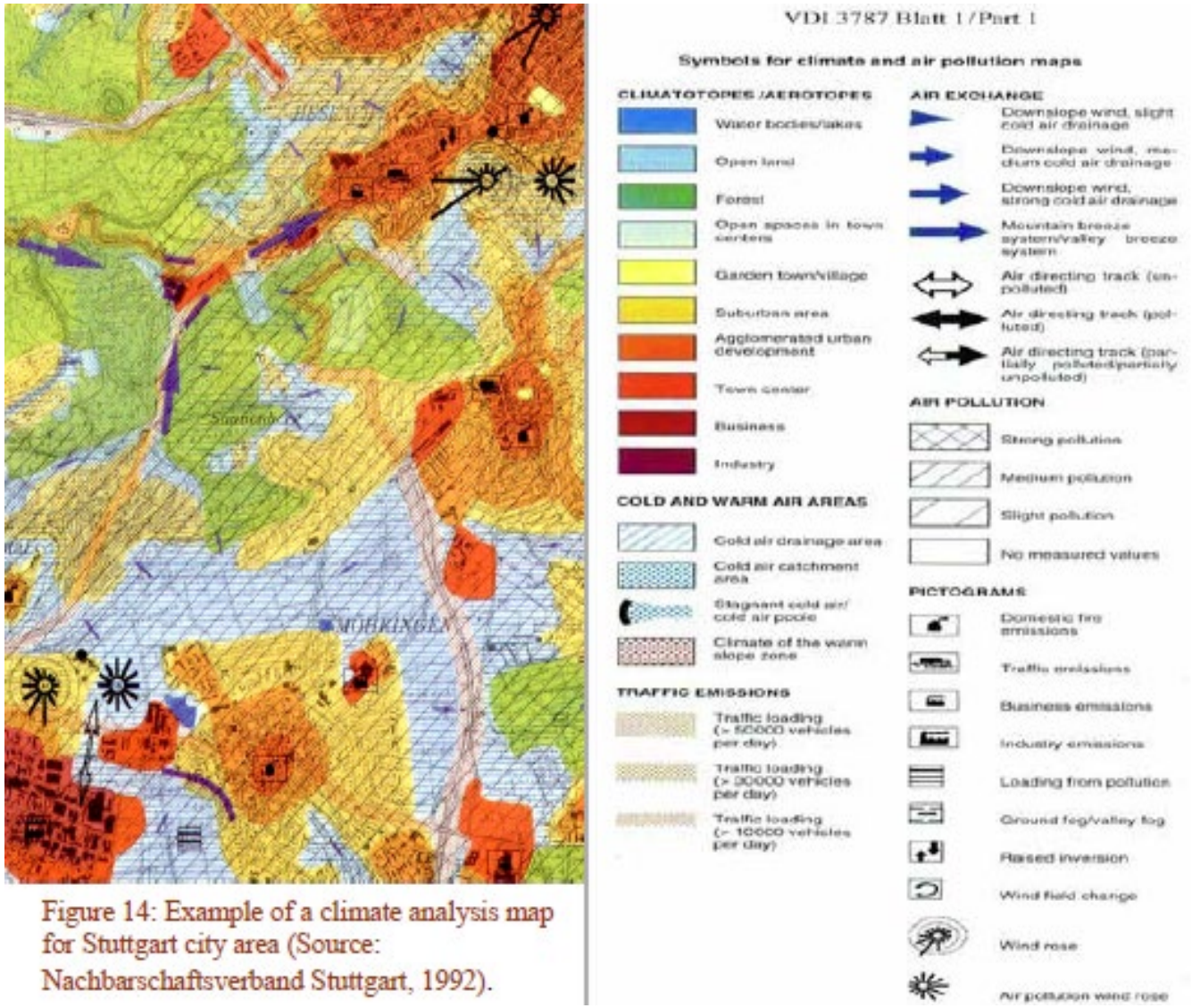

Figure 14: Example of a climate analysis map for Stuttgart city area (Source: Nachbarschaftsverband Stuttgart, 1992).

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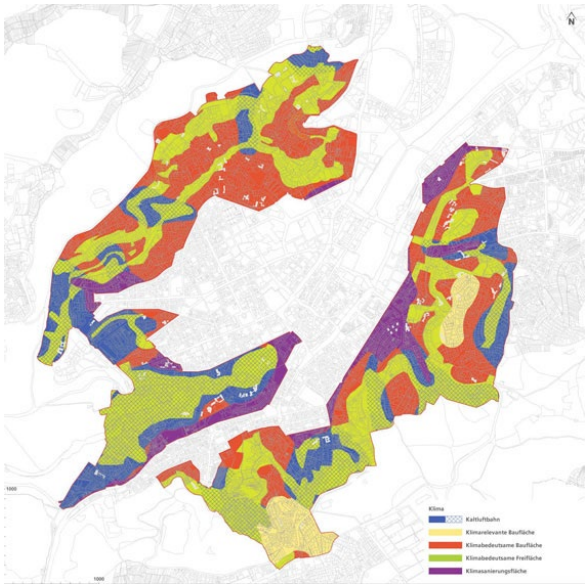
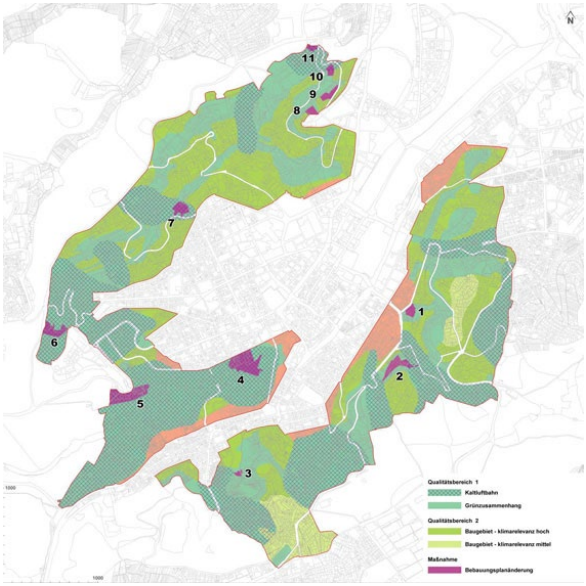
Adaptation in urban planning, Stuttgart





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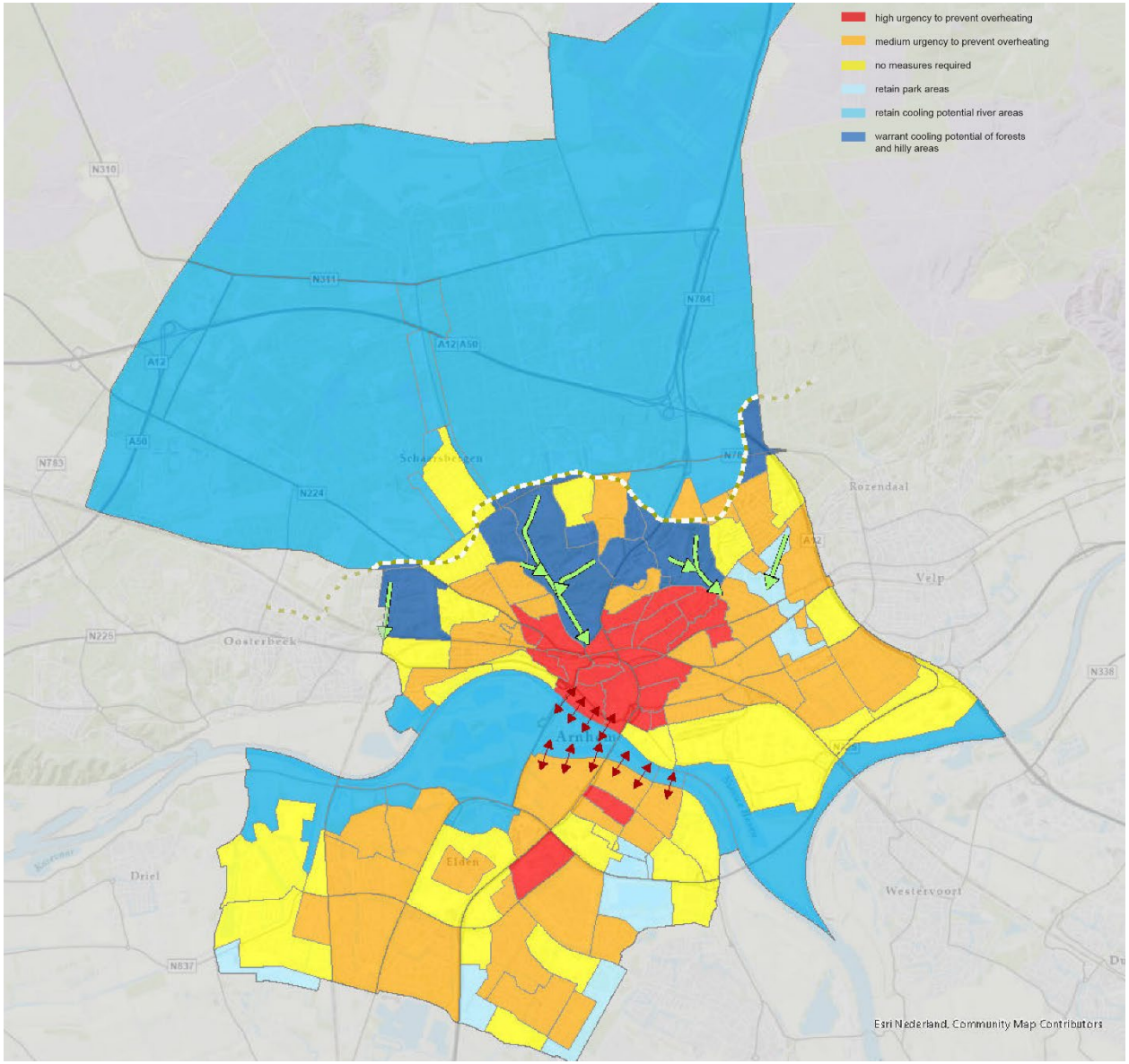
Adaptation in urban planning, Arnhem



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Ontwerpen op de kleinere schaal

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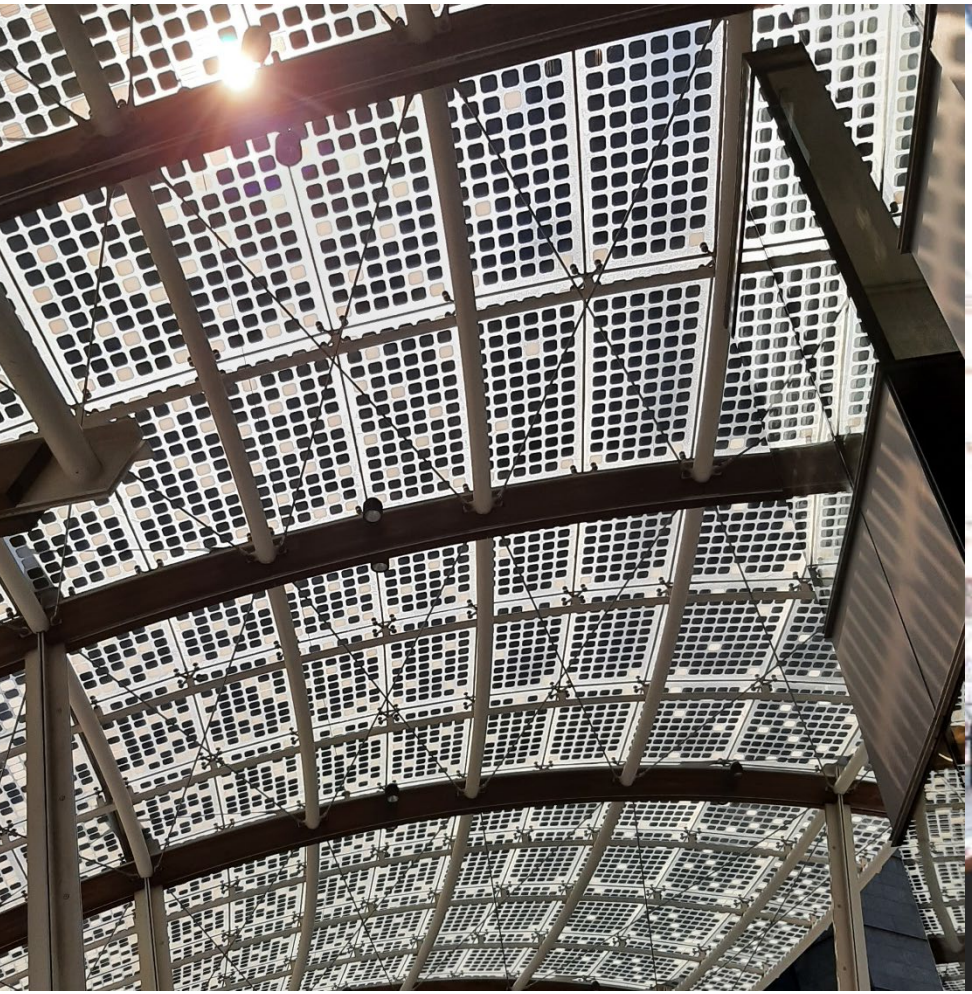
Schaduw creeren: vaste elementen



Effecten: directe kortgolvige straling wordt volledig (voor 100%) opgevangen, alleen gereflecteerde kortgolvige straling is voelbaar; langgolvige straling kan worden vastgehouden; zonne-energie kan worden benut.

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Schaduw creeren: flexibele elementen

Effecten: directe kortgolvige straling wordt tot 100% tegengehouden, alleen gereflecteerde kortgolvige straling is voelbaar; langgolvige straling kan worden uitgezonden.

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Materialen die minder energie opslaan en uitstralen

Effecten: de lage thermische massa van hout voorkomt opwarming van het gebouw en de omgeving; goede isolatie is nodig om de binnentemperatuur te reguleren.

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Minder energie opslaan en uitstralen

Effecten: de oppervlaktetemperatuur kan tot 30 °C worden verlaagd, de luchttemperatuur bij groene gevel kan op ca. een halve meter afstand met 3 tot 4 °C worden verlaagd

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Schaduw en verdampingskoeling genereren

Effecten: directe kortgolvige straling geabsorbeerd en gereflecteerd door planten; straling die onder de plant verminderd wordt: tussen 50 en 70%

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Schaduw en verdampingskoeling genereren

Effecten: directe kortgolvige straling geabsorbeerd en gereflecteerd door planten; straling die onder de plant verminderd wordt: tussen 50 en 70%

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Koelen met verdamping

Effecten: afhankelijk van de grootte van de fonteinen en de mate van verspreiding van de waterdeeltjes kan de afkoeling van de luchttemperatuur oplopen tot 5 °C.

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Koelen met verdamping

Effecten: de oppervlaktetemperatuur kan met ten minste 15 °C worden verlaagd ten opzichte van asfalt; verdamping door planten verlaagt de luchttemperatuur met maximaal 3 °C.

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Koelen met verdamping

Effecten: de oppervlaktetemperatuur kan met maximaal 10 °C worden verlaagd; de luchttemperatuur wordt slechts in zeer geringe mate beïnvloed.

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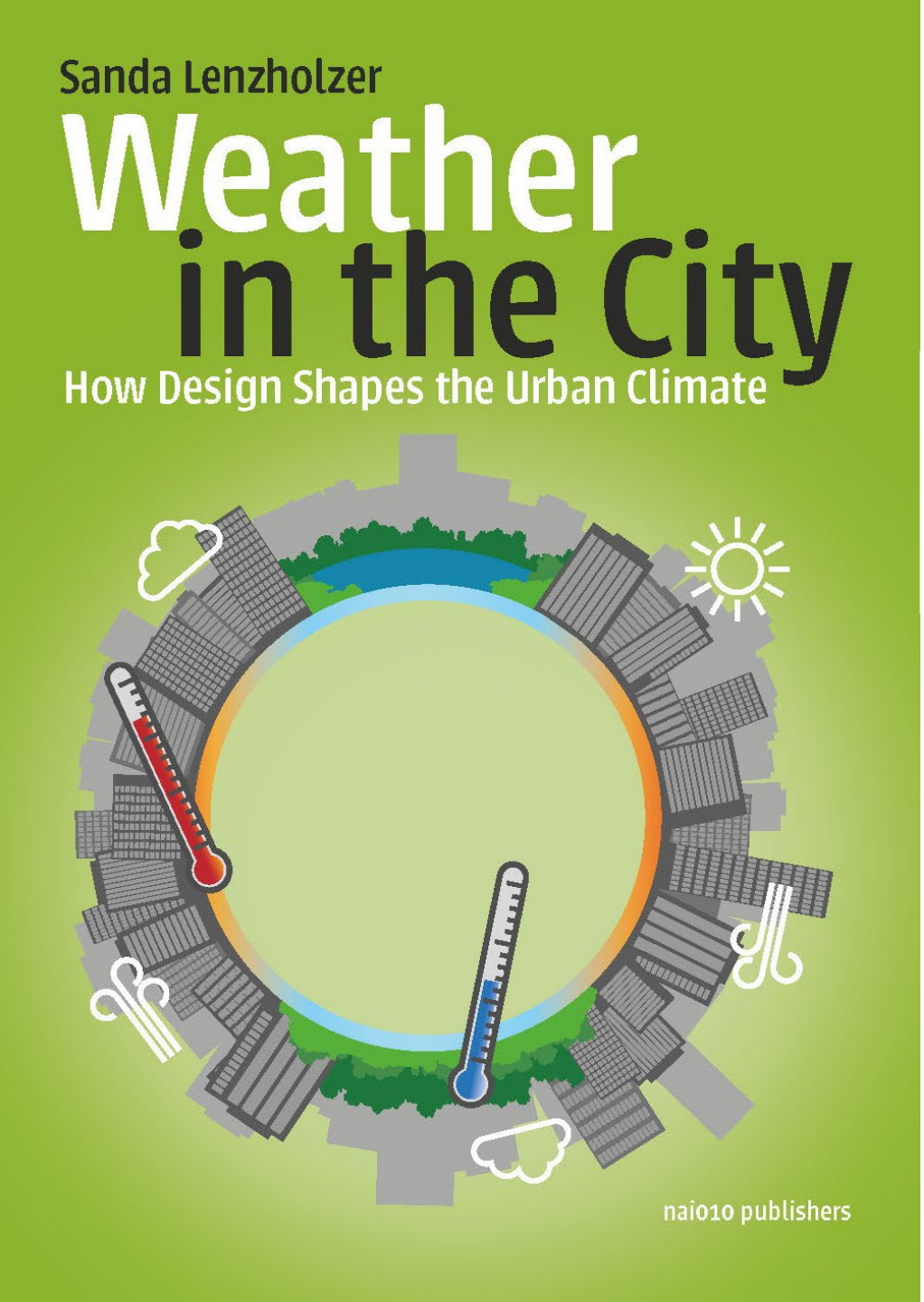

Meer weten?

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