



# Urban adaptation to Climate Change

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**TU Delft** Delft University of Technology  
Challenge the future



- Climate adaptation measures and neighbourhood typologies
- A case study in The Hague
- An exploration study for a new measure

2008



geoservice.pbl.nl

Local and wide spread effects

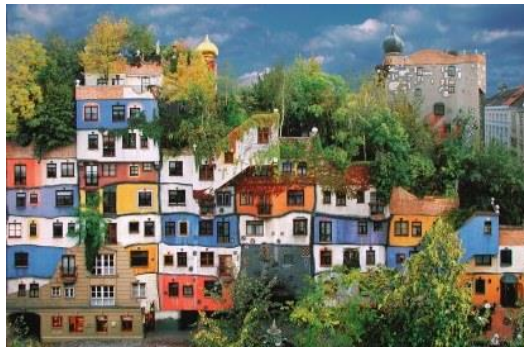
## Where do you need a cooling effect?

Local: Tmrt and wind



Bus stop, Barcelona

Wide spread: Ta and Relative Humidity



Hundertwasserhaus, Wien

1600 IJden Gochtingerdel, Amsterdam

1930 Rivierwijk, Utrecht

1960 Buitenveldert, Amsterdam

1880 Agnietapark, Delft

1930 Amsterdam Zuid

2000 Spensburg, Den Haag

1900 Surphoutpark, Amsterdam

1930 Heesterbuurt, Den Haag

1995 GNL Arenin, Amsterdam

1920 Spangen, Rotterdam

1950 Pondsrecht, Rotterdam

2000 Stadstuinen, Rotterdam

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Typology		Microclimate category			neighbourhood 1	neighbourhood 2	neighbourhood 3
		height	urban block	green			
Garden cities low-rise	'45-'55	low	open	moderate to much green	Couperusbuurt <i>Amsterdam</i> jaren 60	?	
Garden town	'10-'30		closed	moderate to much green	Tuindorp, <i>Utrecht</i>	Tuindorp Nieuwendam, <i>Amsterdam</i>	?
Residential neighbourhood	'30-'40			little green	Ondiep <i>Utrecht</i>	Transvaal <i>Den Haag</i>	Rivierwijk <i>Utrecht</i>
Vinex	'90-'05			moderate green	Leidsche Rijn, <i>Utrecht</i> 1997 - present	?	
Cauliflower neighbourhood	'75-'80		strokes	little to moderate green	Lunetten <i>Utrecht</i>	Ommoord-Zuid <i>Rotterdam</i>	Zevenkamp <i>Rotterdam</i>
			grid				
		middle-high	open				
Historical inner city	before 1910		closed	little green	Centrum <i>Utrecht</i>	Bergpolder-Zuid <i>Rotterdam</i>	Zuidwal, grotemarktstraat, <i>Den Haag</i>
			strokes				
Garden cities high-rise	'50-'60	high	open	moderate to much green	Overvecht <i>Utrecht</i>	Kanaleniland <i>Utrecht</i>	Schiebroek Zuid <i>Rotterdam</i> jaren 60
			closed				
			strokes				
			grid				
		high-rise	open				
			closed				
			strokes				
High-rise city centre	'60-present		grid	little green	Stationsgebied, <i>Den Haag</i>	Lijnbaan <i>Rotterdam</i> jaren 80	
		Industrial area			Binckhorst, <i>Den Haag</i>	Zichtenburg, <i>Den Haag</i>	

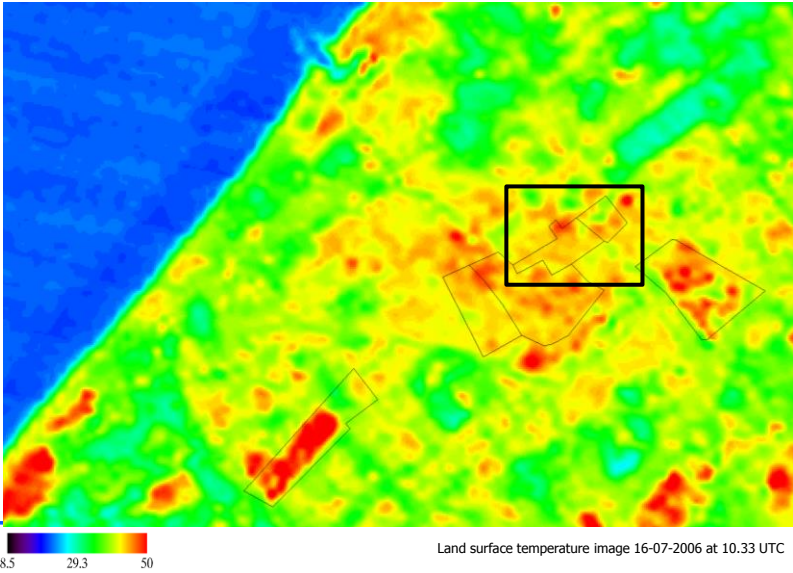
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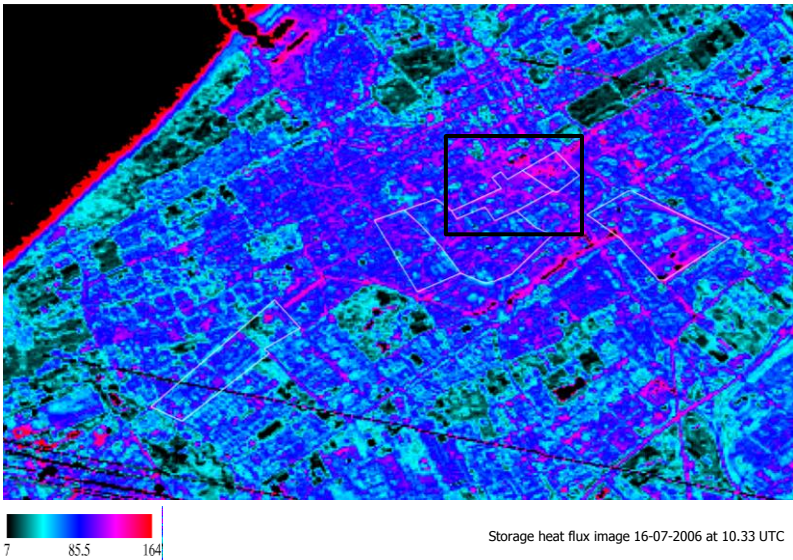
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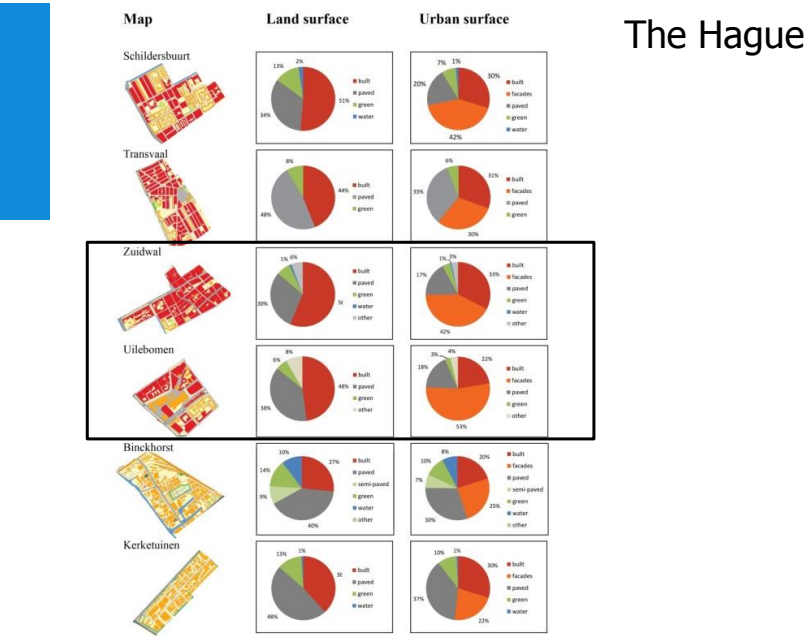


# The Hague Hotspots

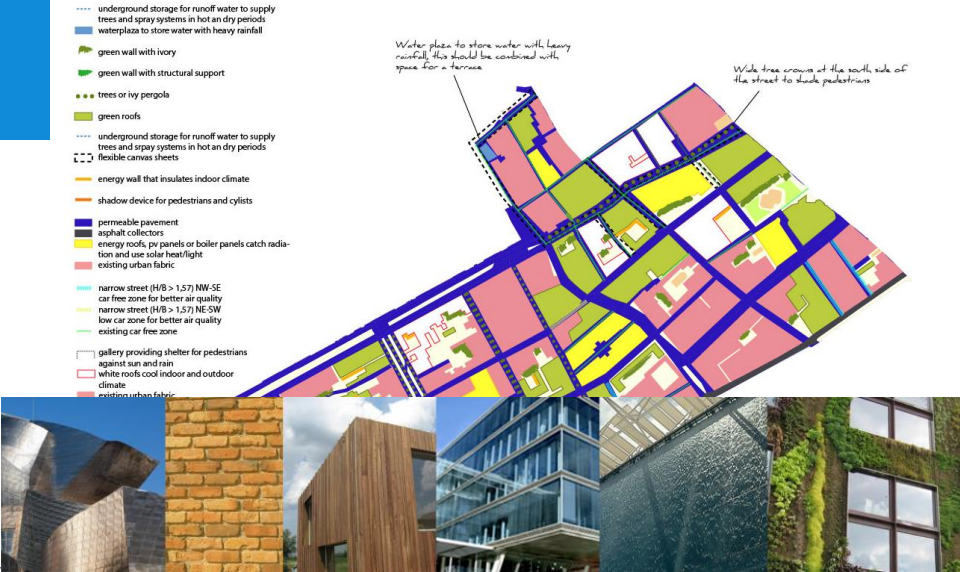


# The Hague Hotspots





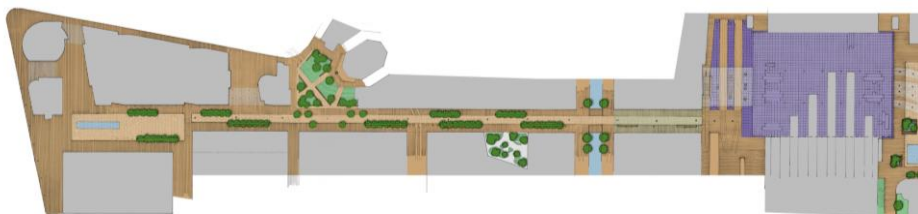
## The Hague - Zuidwal



## Zuidwal – Grote Marktstraat



## The Hague - Station area





## The Hague - Station area - Spuiplein



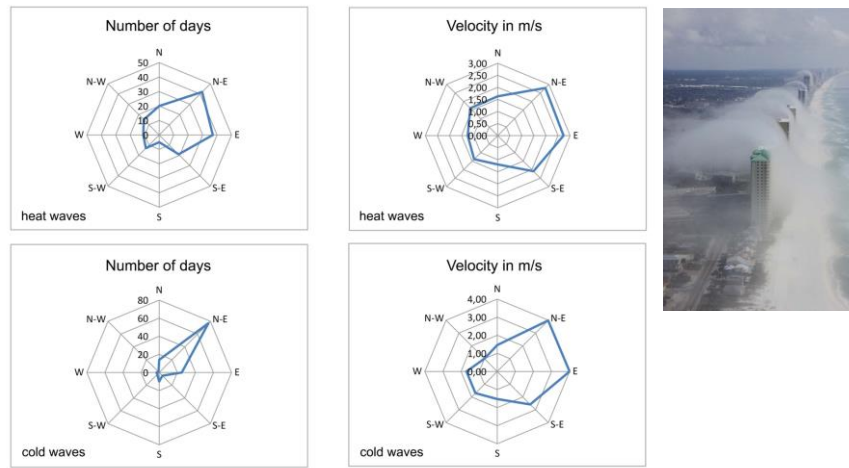
## The Hague - Station area



Wind Dam, Chetswood architects

EWICON, TU Delft

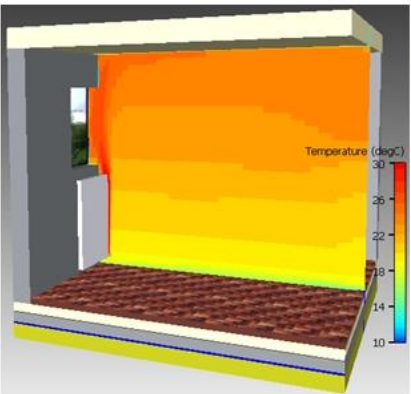
# How can we use the cooling effect of wind in the Netherlands?



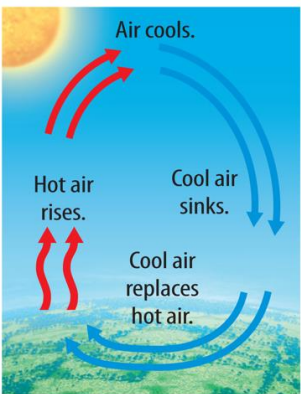
Wind rose giving the number of days (left) and the average wind speed (right) per cardinal direction during heat waves (above) and cold waves (below) between 1950 and 2011, based on KNMI data.

# Create temperature differences to generate airflow

Small scale



Large scale





## The 'Walkie Talkie'



## Create temperature differences to generate airflow

Black Pearl House Rotterdam  
Sofia Rodrigues



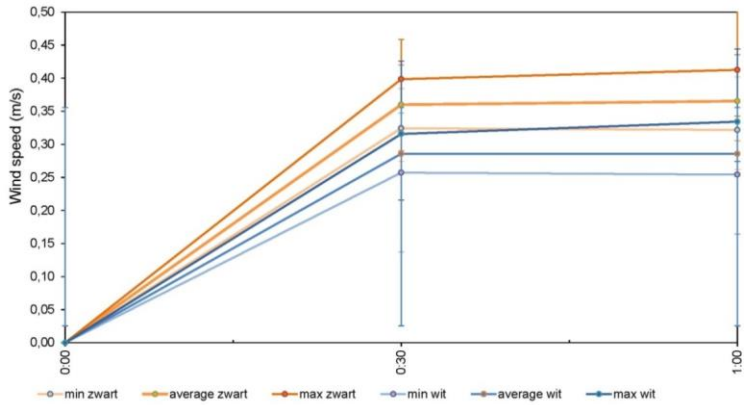
Effects of façade colour on air flow



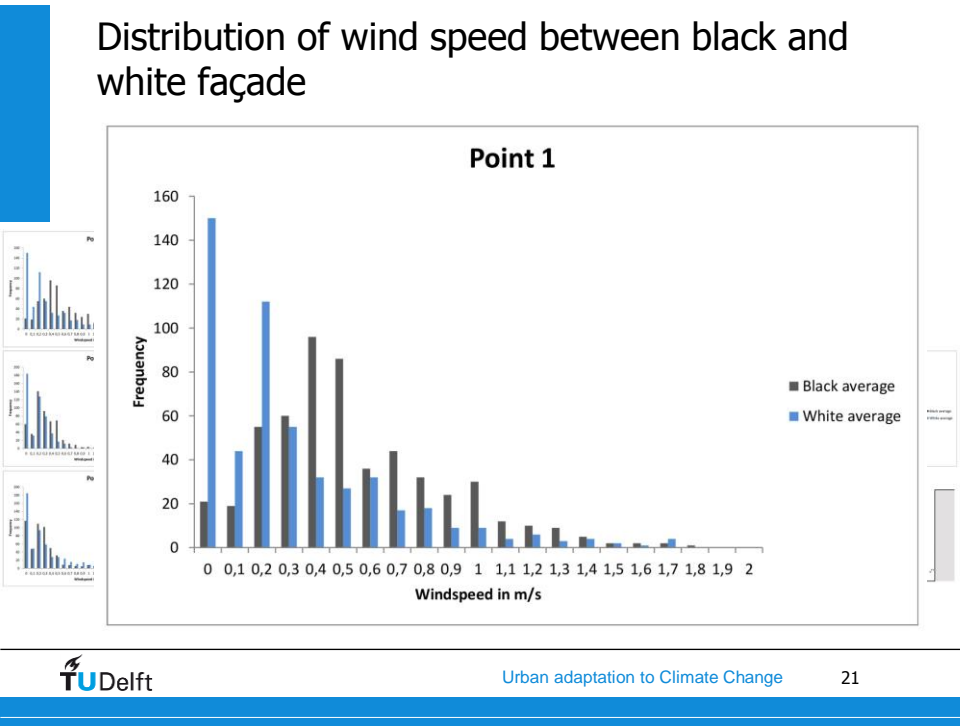
Aluminium  
painted white



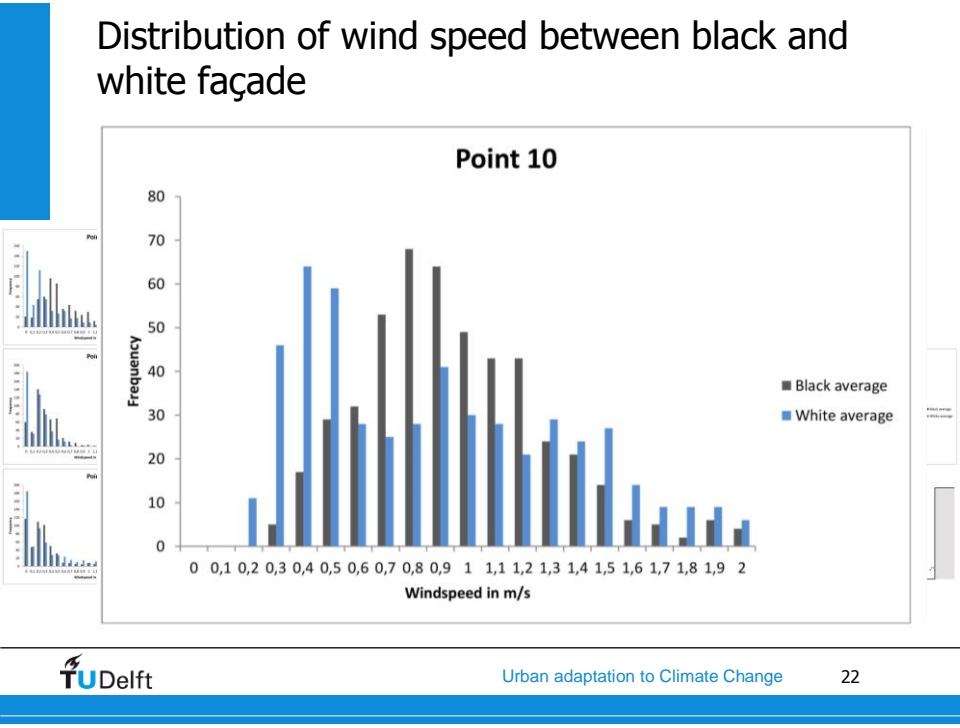
Aluminium  
painted black



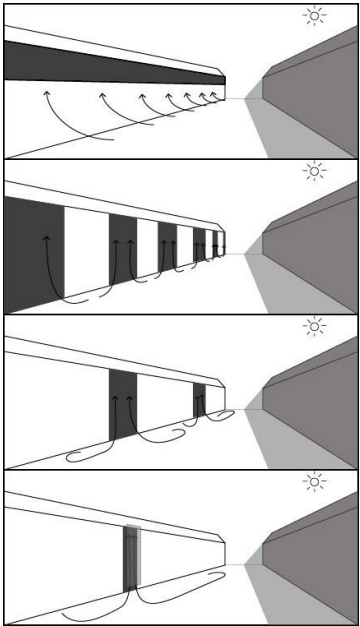
Distribution of wind speed between black and white façade



Distribution of wind speed between black and white façade







Benthemplein, Rotterdam



Bellamyplein, Rotterdam



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