

REASONS TO ADAPT TO URBAN HEAT (IN THE NETHERLANDS)

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CREATING TOMORROW



HEATWAVE, THE NETHERLANDS

30TH JUNE – 5TH JULY 2015



HEATWAVE, THE NETHERLANDS

4TH JULY 2015 – TOUR DE FRANCE IN UTRECHT



THE PROBLEM



Dutch Delta Programme: *By 2050 the Netherlands must be as much climate-proof and water-robust as is possible.*

However, at the local (municipal) level, climate adaptation is not always obvious.

Local governments struggle with defining **the urgency of heat stress** and finding good arguments for the need to adapt to rising temperatures in urban environments.



<http://english.deltacommissaris.nl/delta-programme>

THE SOLUTION?

An **overview of arguments and facts** that support the need to adapt to urban heat.

Based on a literature study

- Scientific papers and reports
- Climate adaptation strategies

...for the Netherlands, in Europe and outside Europe

Discussion with urban planners and professionals

REASONS AND FACTS IN THE NETHERLANDS

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DUTCH DELTA PROGRAMME



Built-up areas may be seriously disrupted by heat-stress in the future due to rising temperatures and the urban heat island effect.

Severe impacts are:

- Comfort and liveability of cities
- Heat-related disease and mortality
- Hospital admissions
- Sleep quality
- Labour productivity

ROTTERDAM AND THE HAGUE

Further impacts:

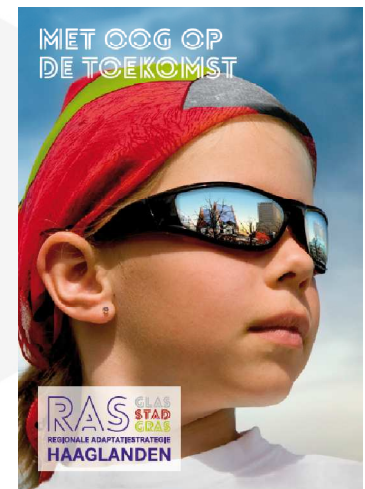
- Comfort in buildings
- Energy- and water demand
- Flora and fauna
- Water quality
- Infrastructure
- Utilities, ICT networks and data centres

Positive consequences:

- Recreation near lakes and along the coast
- Use of outdoor spaces



ROTTERDAM CLIMATE INITIATIVE
Climate Proof



HEAT-RELATED MORTALITY IN NL

- Mortality increases by 12% during a heat wave day ~ 40 extra deaths per day (Huynen et al., 2011)
- Heat wave in 2003 resulted in 1400 – 2200 excess deaths (Garssen et al., 2005)
- About 1000 people died due to the heat wave of 2006 (UNISDR, 2007).



Top 10 Natural disasters by number of deaths for 2006 (Source: UNISDR, 2007)

Top 10

Natural disasters by number of deaths - 2006

Earthquake, May	Indonesia	5778
Typhoon Durian, December	Philippines	1399
Landslide, February	Philippines	1112
Heat wave, July	Netherlands	1000
Heat wave, July	Belgium	940
Typhoon Bilis, July	China, P Rep	820
Tsunami, July	Indonesia	802
Cold Wave, January	Ukraine	801
Flash Flood, August	Ethiopia	498
Typhoon Samoai, August	China, P Rep	373

REASONS IN EUROPE

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EEA, 2012 - URBAN ADAPTATION TO CLIMATE CHANGE IN EUROPE



Why are heatwaves an important challenge? In Europe, of those natural disasters occurring in recent decades, heatwaves have caused the most human fatalities.

Hazard type	Recorded events	Number of fatalities
Storm	155	729
Extreme temperature events	101	77 551
Forest fires	35	191
Drought	8	0
Flood	213	1 126
Snow avalanche	8	130
Landslide	9	212
Earthquake	46	18 864
Volcano	1	0
Oil spills	9	n/a
Industrial accidents	339	169
Toxic spills	4	n/a
Total	928	98 972

Overview of the major natural hazards in Europe between 1998 and 2009 (EEA, 2010).

In total, more than 70 000 excess deaths during the hot summer of 2003, and about 3000 in heat waves of 2006 and 2007.

EEA, 2012 - IMPACTS OF HEAT

- Mortality
- Human health
- Wellbeing
- Water supply
- Economy and infrastructure
- Changes in patterns of vector-borne diseases

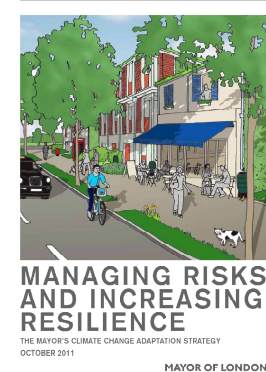


LONDON

The risk of overheating has only recently been recognized and is therefore relatively poorly understood and managed. Mapping overheating risk is more difficult than flood risk, as vulnerability varies from location-to-location, building-to-building and person-to person.

Additional impacts:

- Increase in social inequality
- Increase in fire-risk of greenspaces



Number of excess deaths in England and Wales during 2003 heatwave in August is > 2000.

COPENHAGEN

More and heavier downpours and higher sea levels are the primary climate challenges.

Copenhagen very rarely presents periods of prolonged heat waves.

Impacts of heat:

- Quality of life
- Expenditure on energy consumption and health care



REASONS OUTSIDE EUROPE

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EPA 2008 – REDUCING URBAN HEAT ISLANDS

Why do we care?

1. Increased **energy consumption**
2. Elevated emissions of **air pollutants** and **greenhouse gases**
3. **Human health** and **comfort**
4. **Water quality.**

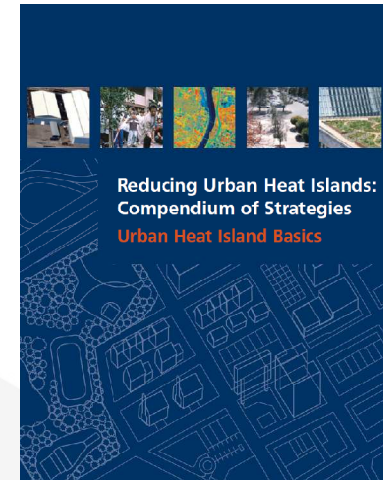
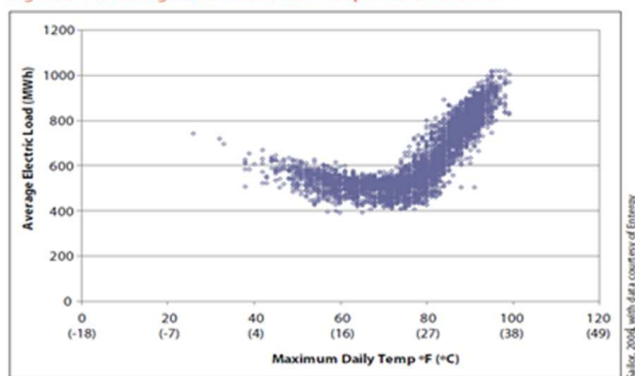


Figure 8: Increasing Power Loads with Temperature Increases¹⁴



Peak urban electricity demand increases about 3% for each °C in summertime temperature.

Excessive heat exposure contributed to over 8,000 extra deaths between 1979 to 1999 in the US, exceeding the number from hurricanes, lightning, tornadoes, floods, and earthquakes combined.

VANCOUVER

Relevant impacts:

- Health and safety of vulnerable populations
- Water supply
- Vectors for disease and respiratory illness



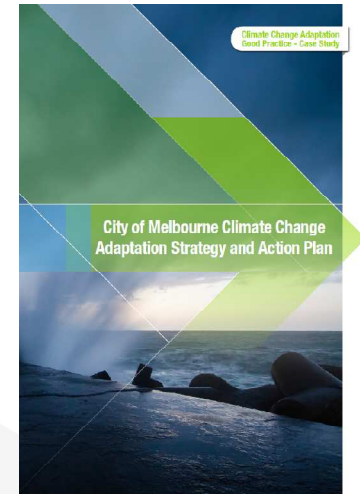
The heat wave of 2009 caused about 122 excess deaths in Vancouver and many emergency room visits.



MELBOURNE

The major heat risks:

- Heat stress related death and illness
- Stranded passengers as trains are delayed or cancelled in hot weather
- Energy blackouts
- Violence and anti-social behavior causing public nuisance and hospital admissions
- Maintenance costs of assets and infrastructure



From 1900 to 2011, 4555 deaths were attributed to extreme heat in Australia; more than the total of deaths from all other natural hazards (Coates et al., 2014).

Natural hazard	Deaths 1900–2011	% total natural hazard deaths 1900–2011
Extreme heat	4,555	55.2
Flood	1,221	14.8
Tropical cyclone	1,285	15.6
Bush/grassfire	866	10.5
Lightning	85	1
Landslide	88	1.1
Wind storm	68	0.8
Tomado	42	0.5
Hail storm	16	0.2
Earthquake	16	0.2
Rain storm	14	0.2

CONCLUSIONS

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AN OVERVIEW OF REASONS & FACTS....

Is this helpful to get
the message across?

RECOMMENDATIONS IN BRINGING THE MESSAGE

- Focus on **local impacts**
- Couple the message to **recent events** or hazards
- Learn from adaptation strategies of **cities in warmer climates**
- Couple climate adaptation to **other political ambitions**
- ...

