Experiences from building innovation communities

Kees van Deelen

Climate-KIC Innovation Festival, 22 October 2013, Wroclaw

Building Innovation Communities

- Dutch National Research Program Knowledge for Climate
- Climate change adaptation
  - Finding the balance between mitigation and adaptation
  - Climate adaptation business opportunities
- Experiences from shaping the ecosystem in the Dutch CLC

Knowledge for Climate (2008-2014)

Knowledge for Climate is the Netherland's research program on adaptation to climate change

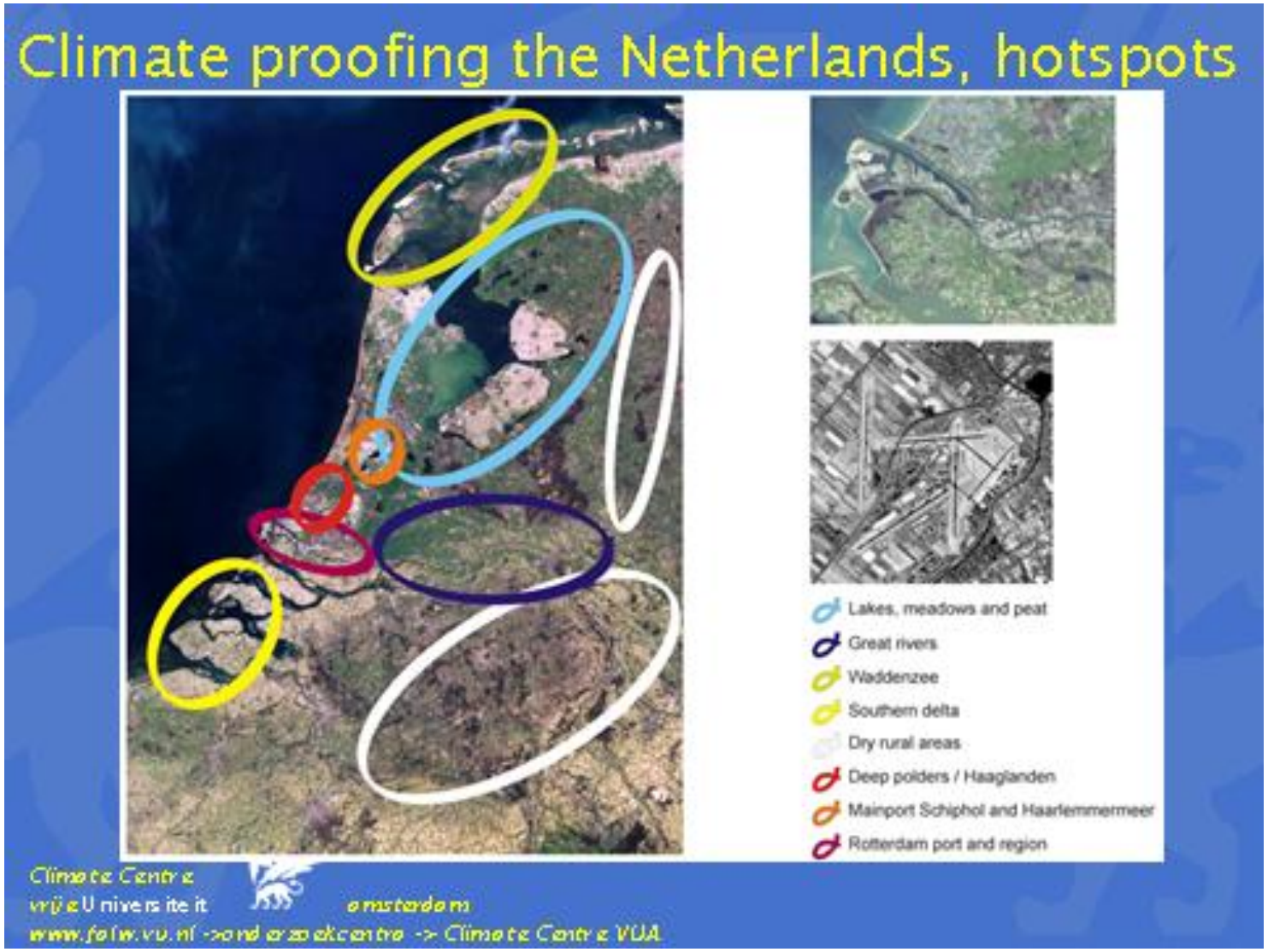
Close co-operation between national and local authorities, business community, civil community and institutes for (applied) scientific research

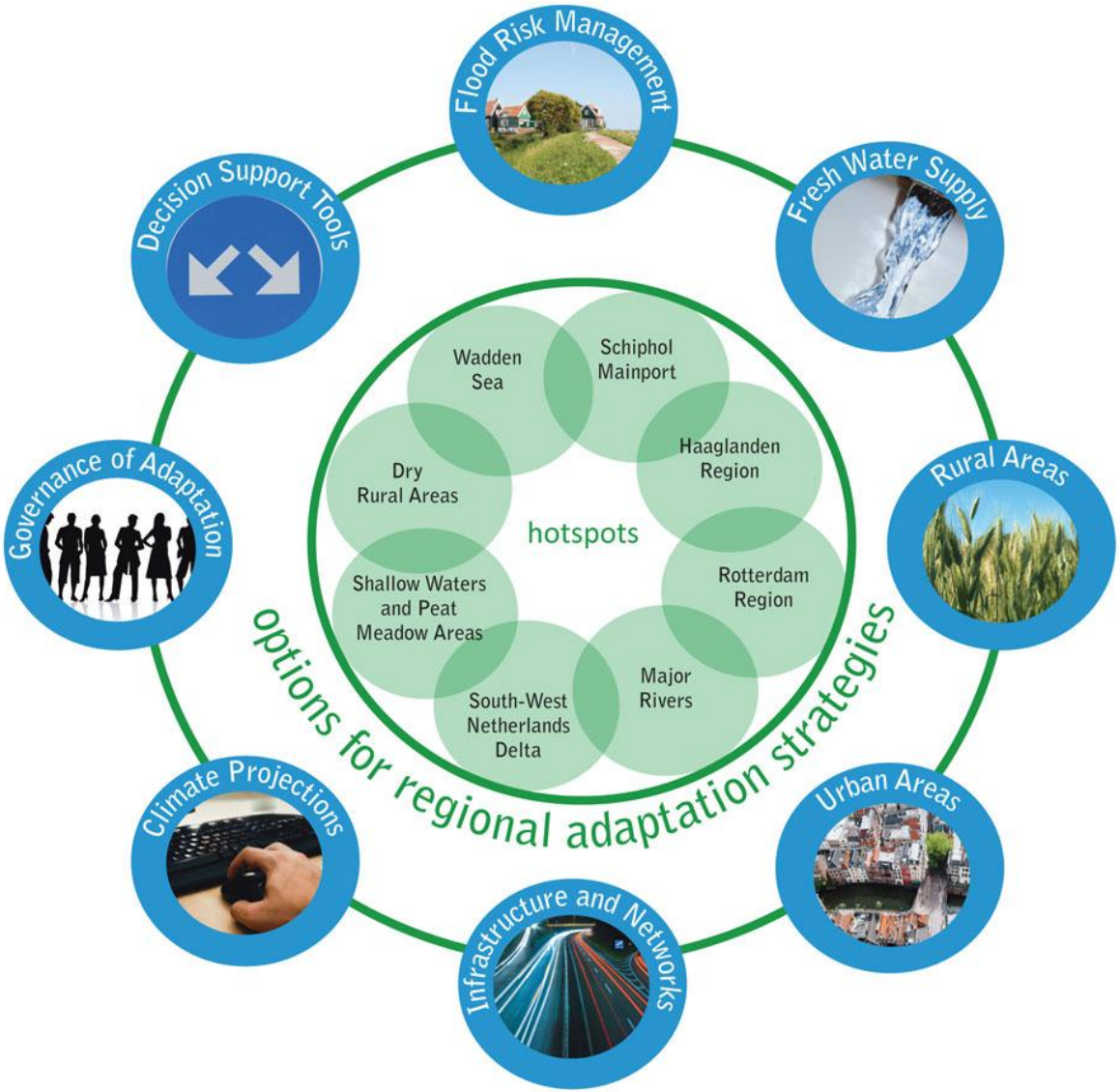
Funding of 50 million Euros from the Dutch Economic Structure Enhancing Fund (FES)

Through co-financing of participants and stakeholders the total budget of the research program is appr. 90 million Euros

Co-creation between science and policy

Knowledge for Climate





Knowledge for Climate

Knowledge for Climate

8 hotspots
&
8 themes

Features and experiences from KfC

Balances scientific excellence and societal impact

- 50 PhD's, 20 postdocs
- > 100 peer reviewed scientific papers till mid 2013
- Strong knowledge co-creation between science and policy
- Adaptation Strategies for 8 regions supported by scientific insights and breakthroughs

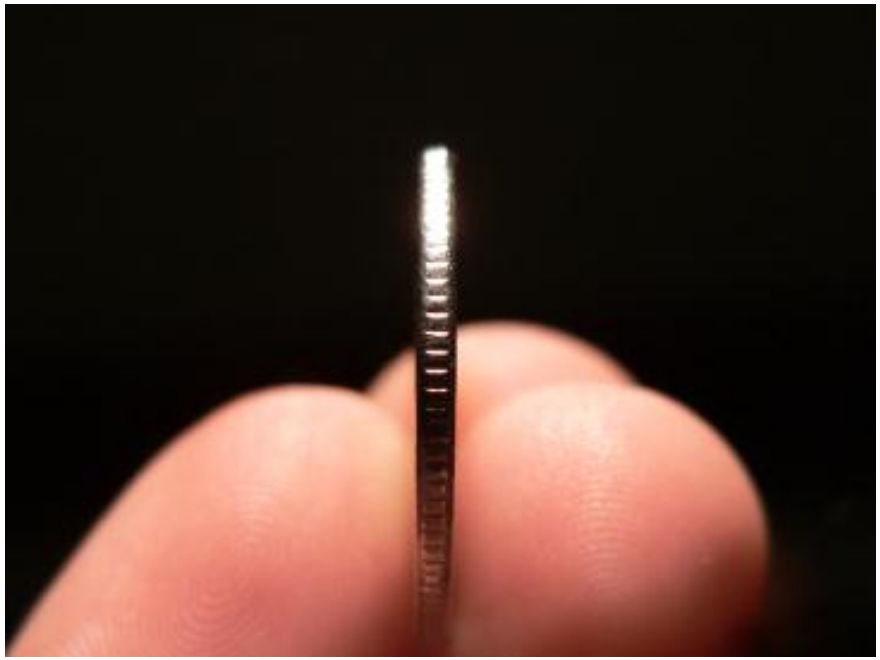
Bridging the gap between science and policy is a real challenge!

Valorization/commercialization of knowledge.

KfC and Climate KIC jointly

Mitigation versus Adaptation

Two sides of the same coin



In every plausible scenario there will be a huge need for adaptation to climate change

Climate change adaptation

Examples of climate change impacts:

- Rising sea levels
- Extreme high/low levels in rivers
- Extreme rainfall
- Drought
- Heat waves and extreme temperatures
- Ocean acidification
- Increased incidence of (epidemic) diseases/plagues

Extreme weather events are of all ages,

however due to climate change both the probability of occurrence of extreme events and the effects/impacts are likely to increase substantially.

Examples of extreme meteorological events since 2000 (World Bank report "Turn down the heat")

Region (Year)	Meteorological Record-breaking Event	Confidence in attribution to climate change	Impact, costs
England and Wales (2000)	Wettest autumn on record since 1766. Several short-term rainfall records[2]	Medium based on[3–5]	~£1.3 billion[3]
Europe (2003)	hottest summer in at least 500 years[6]	High based on[7,8]	Death toll exceeding 70,000[9]
England and Wales (2007)	May to July wettest since records began in 1766[10]	Medium based on[3,4]	Major flooding causing ~£3 billion damage
Southern Europe (2007)	Hottest summer on record in Greece since 1891[11]	Medium based on[8,12–14]	Devastating wildfires
Eastern Mediterranean, Middle-East (2008)	Driest winter since 1902 (see Fig. 20)	High based on[15]	Substantial damage to cereal production[16]
Victoria (Aus) (2009)	Heat wave, many station temperature records (32–154 years of data)[17]	Medium based on[8,14]	Worst bushfires on record, 173 deaths, 3,500 houses destroyed[17]
Western Russia (2010)	Hottest summer since 1500[18]	Medium based on[8,13,14,19]	500 wildfires around Moscow, crop failure of ~25%, death toll ~55,000, ~US$15B economic losses[18]
Pakistan (2010)	Rainfall records[20]	Low to Medium based on[21,22]	Worst flooding in its history, nearly 3000 deaths, affected 20M people[23].
Colombia (2010)	Heaviest rains since records started in 1969[26]	Low to Medium based on[21]	47 deaths, 80 missing[26]
Western Amazon (2010)	Drought, record low water level in Rio Negro[27]	Low[27]	Area with significantly increased tree mortality spanning3.2 million km[27]
Western Europe (2011)	Hottest and driest spring on record in France since 1880[28]	Medium based on[8,14,29]	French grain harvest down by 12%
4 US states (TX, OK, NM, LA) (2011)	Record-breaking summer heat and drought since 1880[30,31]	High based on[13,14,31,32]	Wildfires burning 3 million acres (preliminary impact of $6 to $8 billion)[33]
Continental U.S. (2012)	July warmest month on record since 1895[34] and severe drought conditions	Medium based on[13,14,32]	Abrupt global food price increase due to crop losses[35]

Examples of extreme meteorological events since 2000 (World Bank report "Turn down the heat")

Region (Year)	Meteorological Record-breaking Event	Confidence in attribution to climate change	Impact, costs
England and Wales (2000)	Wettest autumn on record since 1766. Several short-term rainfall records[2]	Medium based on[3-5]	~£1.3 billion[3]
Europe (2003)	hottest summer in at least 500 years[6]	based on[7,8]	Death toll exceeding 70,000[9]
England and Wales (2007)	May to July wettest since records began in	based on[3,4]	Major flooding causing ~£3 billion damage
Southern Europe (2007)	Hottest summ		wildfires
Eastern Mediter-ranean, Middle-East (2008)	Driest winter si		al damage to cereal production[16]
Victoria (Aus) (2009)	Heat wave, many years of data)[17]		ushfires on record, 173 deaths, 3,500 s destroyed[17]
Western Russia (2010)	Hottest summe		res around Moscow, crop failure ath toll ~55,000, ~US$15B eco-
Pakistan (2010)	Rainfa		s history, nearly 3000 people[23].
Colombia (2010)	Heavie		ssing[26]
Western Amazon (2010)	Drought, record low wa		rea with significantly increased tree mortality spanning3.2 million km[27]
Western Europe (2011)	Hottest and driest spring o 1880[28]		French grain harvest down by 12%
4 US states (TX, OK, NM, LA) (2011)	Record-breaking summer he 1880[30,31]		Wildfires burning 3 million acres (preliminary impact of $6 to $8 billion)[33]
Continental U.S. (2012)	July warmest month on record 895[34] and severe drought conditions	Medium base ,32	Abrupt global food price increase due to crop losses[35]

Full scope of damages has not been assessed to data but recent studies estimate costs may rise to > 3% of global GDP by 2030.

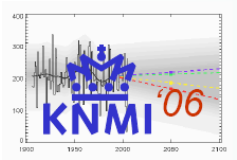
Climate change adaptation: local effects, local solutions!

Urbanized areas are in particular vulnerable to the effects of climate change!

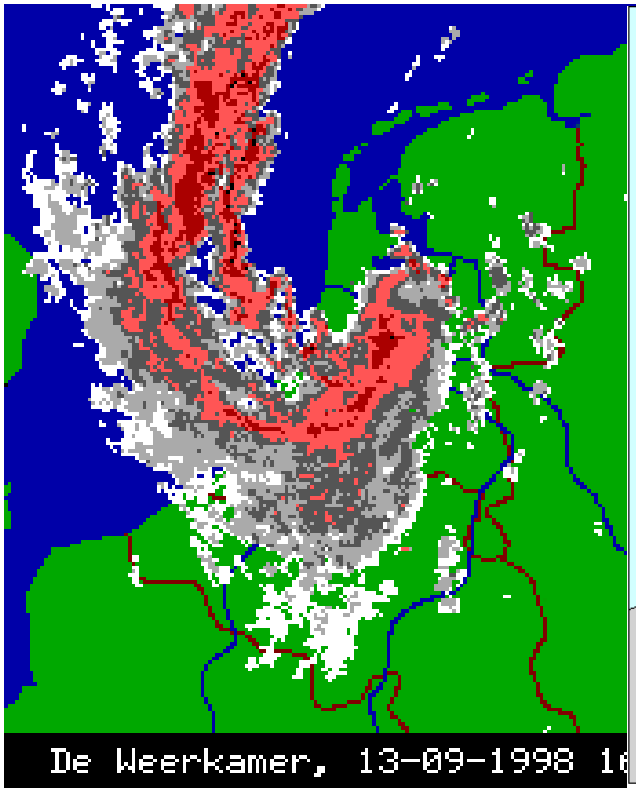
Vulnerable roads are completely damaged for a longer period of time.	This results in traffic chaos on the rest of the road infrastructure network

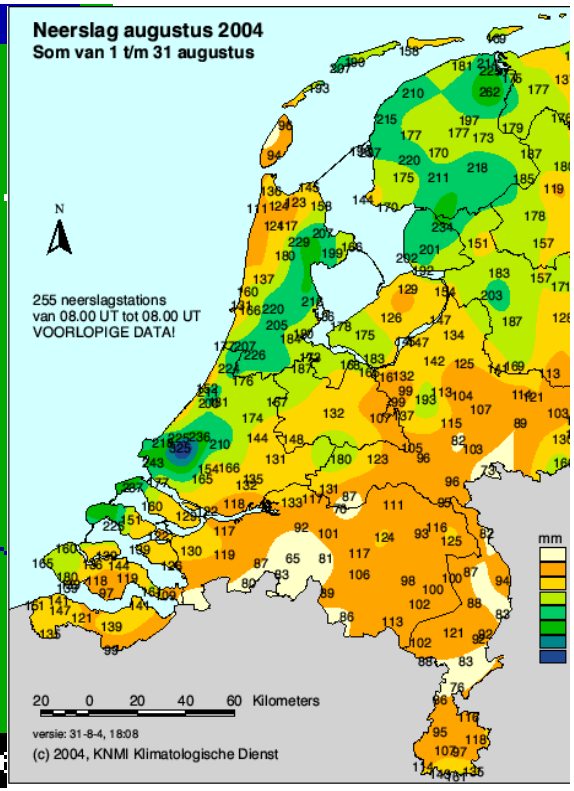
Challenge: Tailoring climate information for scenario planning and adaptation to climate change at a local/regional scale

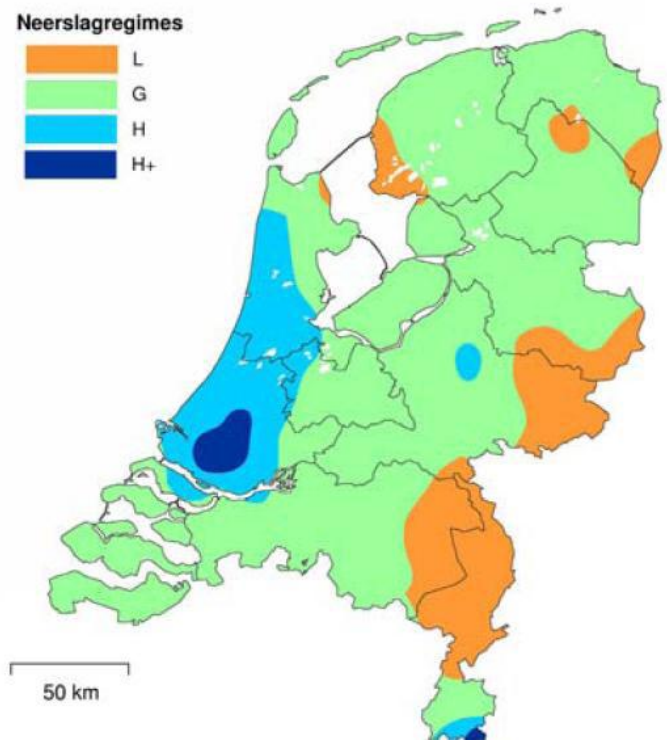
The KNMI'06 climate scenarios: change in 2050 relative to 1990



		G	G+	W	W+
Global temperature rise		+1°C	+1°C	+2°C	+2°C
Change in air circulation patterns		no	yes	no	yes
Winter [3]	average temperature	+0.9°C	+1.1°C	+1.8°C	+2.3°C
	coldest winter day per year	+1.0°C	+1.5°C	+2.1°C	+2.9°C
	average precipitation amount	+4%	+7%	+7%	+14%
	number of wet days (≥ 0.1 mm)	0%	+1%	0%	+2%
	10-day precipitation sum exceeded once in 10 years	+4%	+6%	+8%	+12%
	maximum average daily wind speed per year	0%	+2%	-1%	+4%
Summer [3]	average temperature	+0.9°C	+1.4°C	+1.7°C	+2.8°C
	warmest summer day per year	+1.0°C	+1.9°C	+2.1°C	+3.8°C
	average precipitation amount	+3%	-10%	+6%	-19%
	number of wet days (≥ 0.1 mm)	-2%	-10%	-3%	-19%
	daily precipitation sum exceeded once in 10 years	+13%	+5%	+27%	+10%
	potential evaporation	+3%	+8%	+7%	+15%
Sea level	absolute increase	15-25 cm	15-25 cm	20-35 cm	20-35 cm





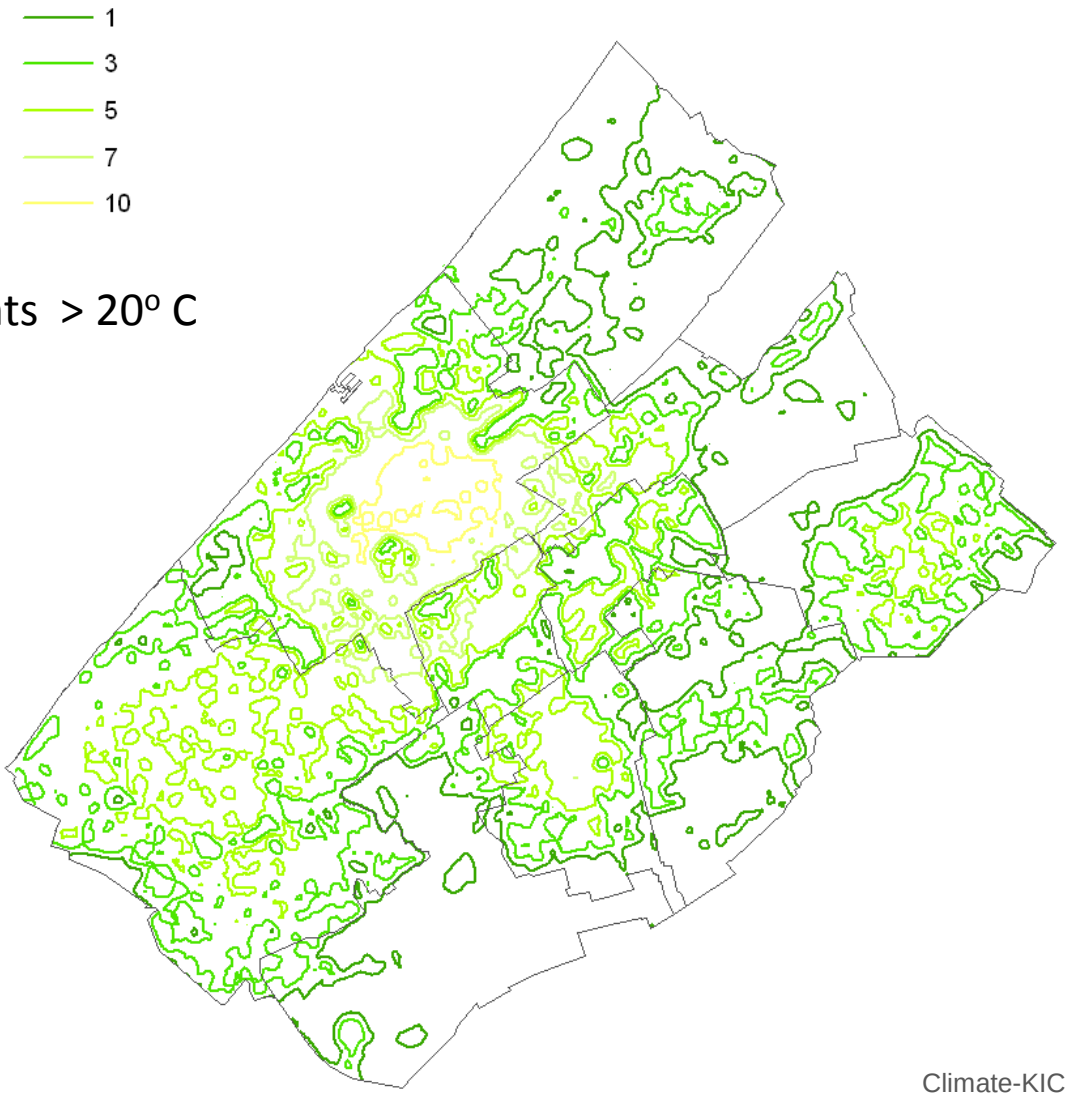


september1998 **augustus 2004** **klimaat**

Knowledge for Climate

Possible heat scenarios for Haaglanden region

Knowledge for Climate



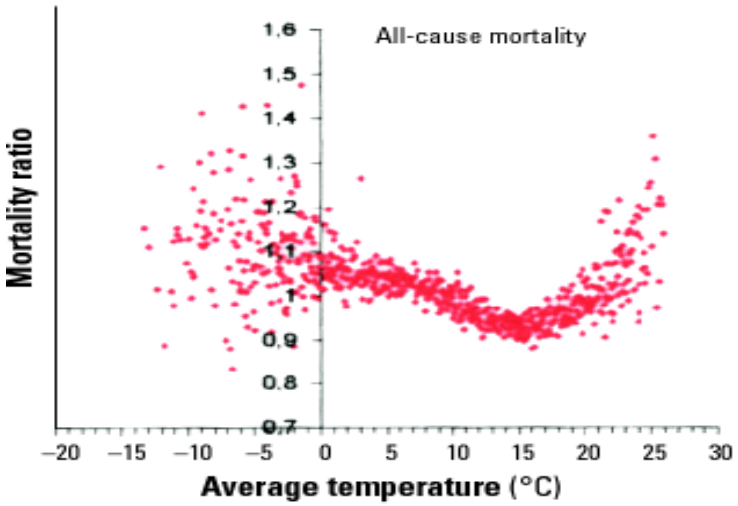
Indication number of nights > 20° C in current climate

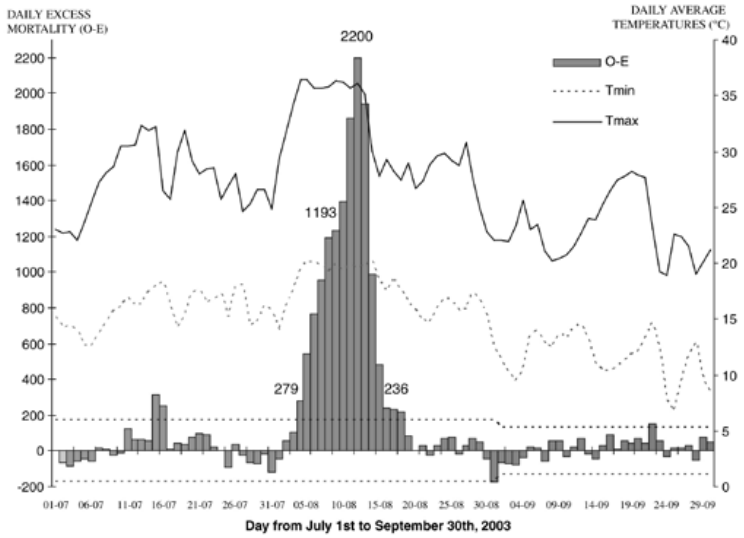

Knowledge
for Climate

Urban heat

Heat stress -> overheating

- Poorer living quality
- Adverse health effects
- Excess mortality
- Decrease in productivity





Examples/opportunities for climate adaptation in urban areas

Flood protection

- Broad (super) dikes/”unbreachable “dikes
- Storm surge barriers, levees
- Local-scale flood adaptation measures to protect critical infrastructure
- Adaptive building (flood proof houses and buildings)
- “Room for the river”

Urban heat, flooding, drought

- Urban design (green/blue in the city, water retention/storage)
- Building design/retrofitting (green roofs, green/intelligent facades

Cities are taking action to become more climate resilient

New York City Council Approves Urban Resiliency Measures

SEPTEMBER 25, 2013 BY T. CAINE 0 COMMENTS

In less than a year since its devastating run-in with Hurricane Sandy, the City of New York is already adopting new measures geared towards higher levels of urban resiliency. Yesterday, the City Council approved the first batch of proposals from the Building Resiliency Task Force, marking the first step for updating codes that leave the city better equipped for future storm events.

Last October, Hurricane Sandy came ashore on the coast off New Jersey and tore its way across the New York Harbor. The Category 3 storm left a heavy wake costing an estimate $25 billion in damages to New York and New Jersey. The ill-prepared infrastructure buckled in numerous places. Subway lines and transit tunnels flooded. Power systems were submerged to leave hundreds of thousands of residents (this one included) without power for days. In the months that followed, the quick consensus was that the city was unprepared for what nature had to throw at it, leaving it vulnerable to subsequent storms that some scientists believe will only be more likely due to climate change.

Urban Times recently reported that a study was conducted by Arup, RPA and Siemens of the vulnerabilities in the New York City electrical grid and mitigation measures as part of a larger

And they want the best in the world they can get

Natalie Righton
Verslaggever bij De Volkskrant

19 SEPTEMBER 2013 INTERVIEW INTERNATIONAAL WATER

Flooding? “Let’s bring in the Dutch”, Interview with Henk Ovink

Dutch water management expert advises the American Secretary how to defend New York and New Jersey against rising waters

Bron: De Volkskrant, September 9, 2013

“Set a couple of Dutchmen up on land with a high risk of flooding and what do they do? Exactly – they build dikes. But what do Americans do? Those who can afford it build houses on stilts. The rest have to fend for themselves.”

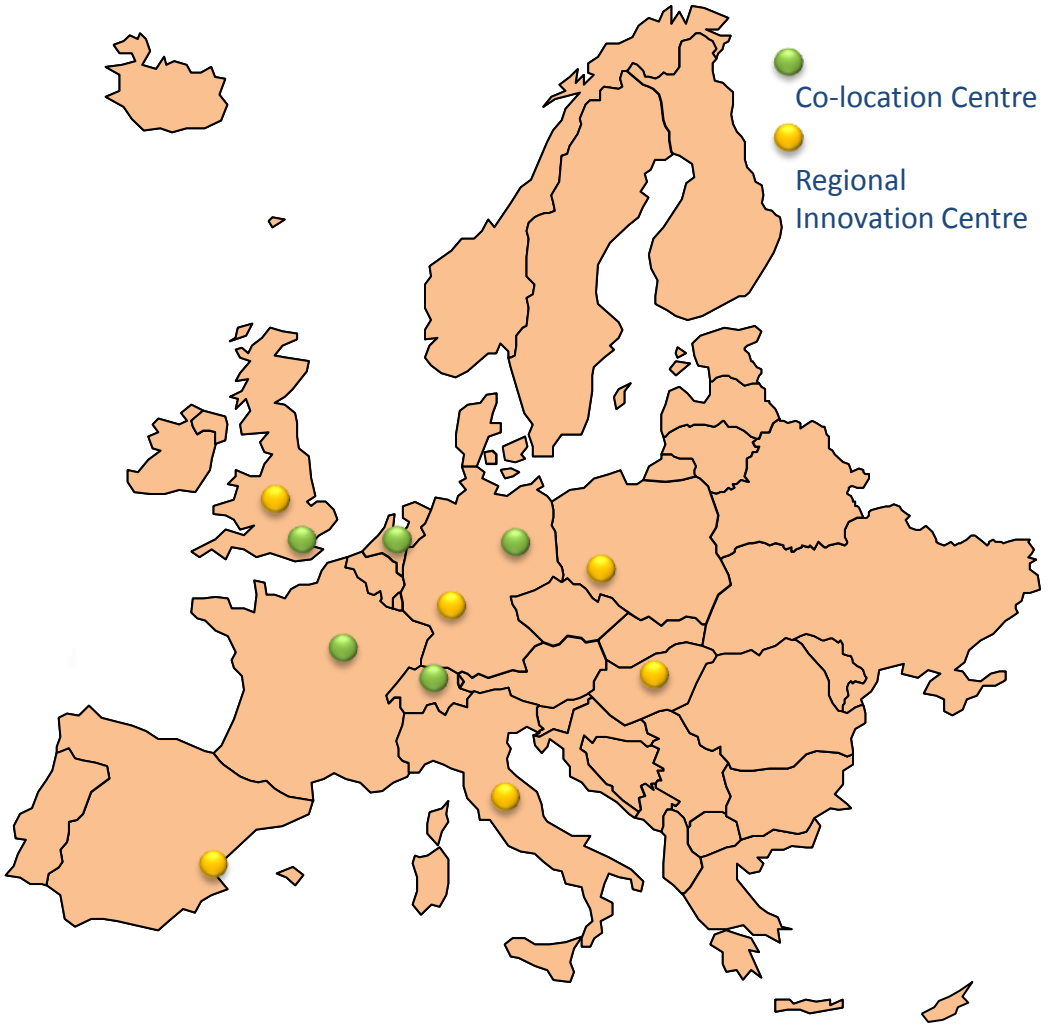
In a nutshell, this is the dilemma that Henk Ovink (45) comes up against in the US. The Dutch civil servant and water management expert has been on loan to the American government since April, after Hurricane Sandy wreaked havoc on the eastern coast in late 2012 and put large parts of New York and New Jersey under water. At a conference in New York today and tomorrow Ovink and the Dutch Minister of Infrastructure and Environment, Melanie Schultz, will be

Climate-KIC's innovation pyramid is designed to take a lead

- Climate adaptation measures mostly have a strong "spatial dimension".
- And hence the public sector (local, regional, national) is a major stakeholder.
- However they don't have the capabilities nor the (financial) resources to tackle the problem.
- And therefore investments by/cooperation with the private sector in PP-arrangements is required.
- In Climate-KIC we can develop new innovations, demonstrate them in test fields and implement them through our CLC's and RIC's.

Building innovation communities through ecosystems

Climate-KIC is about developing ecosystems at various scales



Ecosystem Dutch Co-location

20+ partners with good balance of private, public, academic and research partners

Private

Schiphol Amsterdam Airport

DSM BRIGHT SCIENCE. BRIGHTER LIVING.

ARCADIS Infrastructure · Water · Environment · Buildings

KLM Royal Dutch Airlines

Public

provincie :: Utrecht

Stadshavens Rotterdam

Academic

TU Delft Delft University of Technology

Universiteit Utrecht

WAGENINGEN UNIVERSITY WAGENINGEN UR

Applied Research

Deltares Enabling Delta Life

TNO innovation for life

Reducing Carbon Emissions in the Aviation Sector

Innovation project: Renewable jet fuel

Development of new value chains for structural use of renewable jet fuel

Feedstock Production

Feedstock Logistics

Bio Jet Fuel Production

Bio Jet Fuel Trading

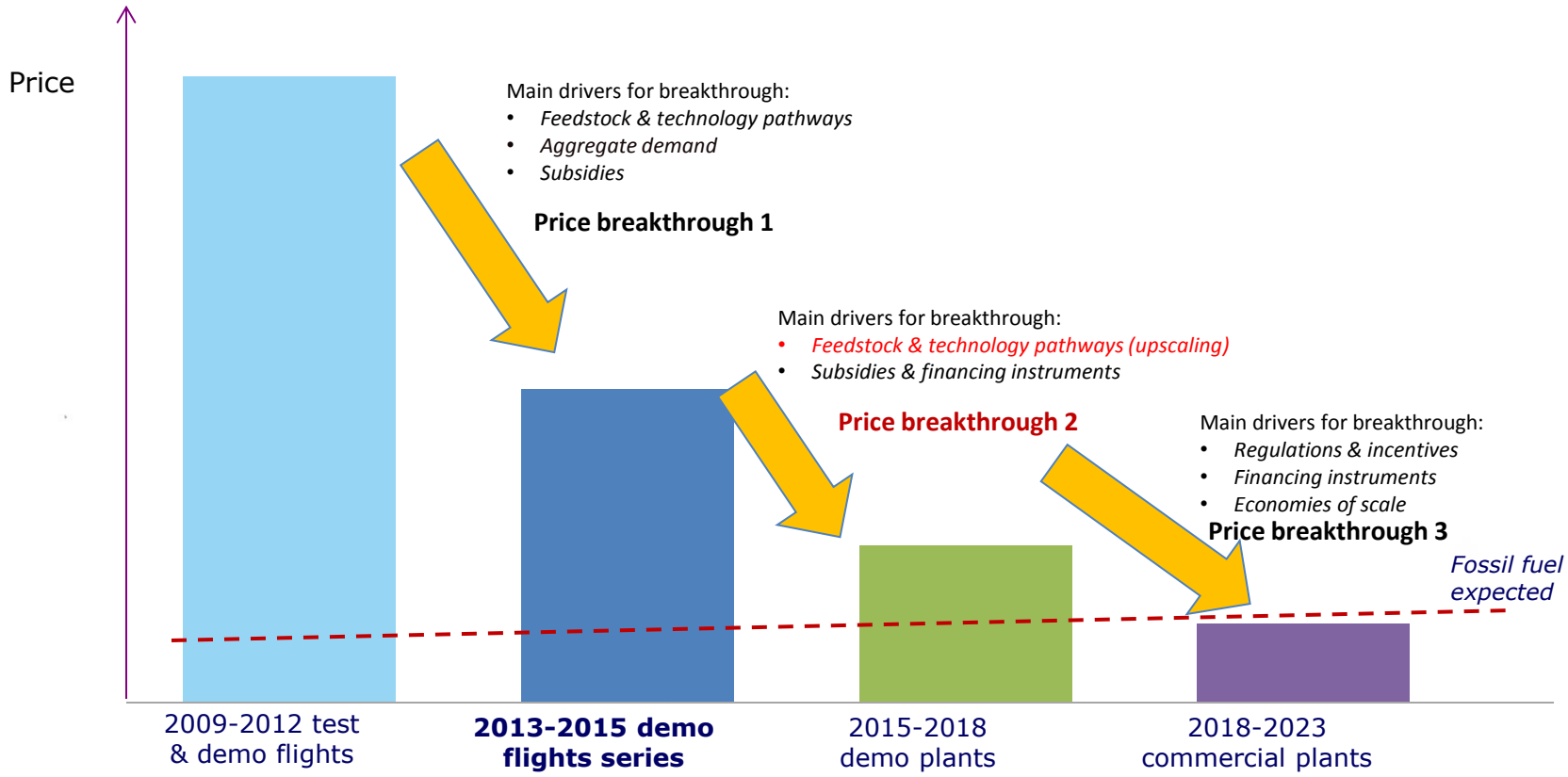
Bio Jet Fuel Logistics

Bio Jet Fuel End Users

Schiphol Amsterdam Airport
KLM Royal Dutch Airlines
Universiteit Utrecht
DSM BRIGHT SCIENCE. BRIGHTER LIVING.
SkyNRG Sky Energy | The Fuel Future
Imperial College London

Integrated value chain development should make a scenario with two price breakthroughs in the coming 5-8 years achievable

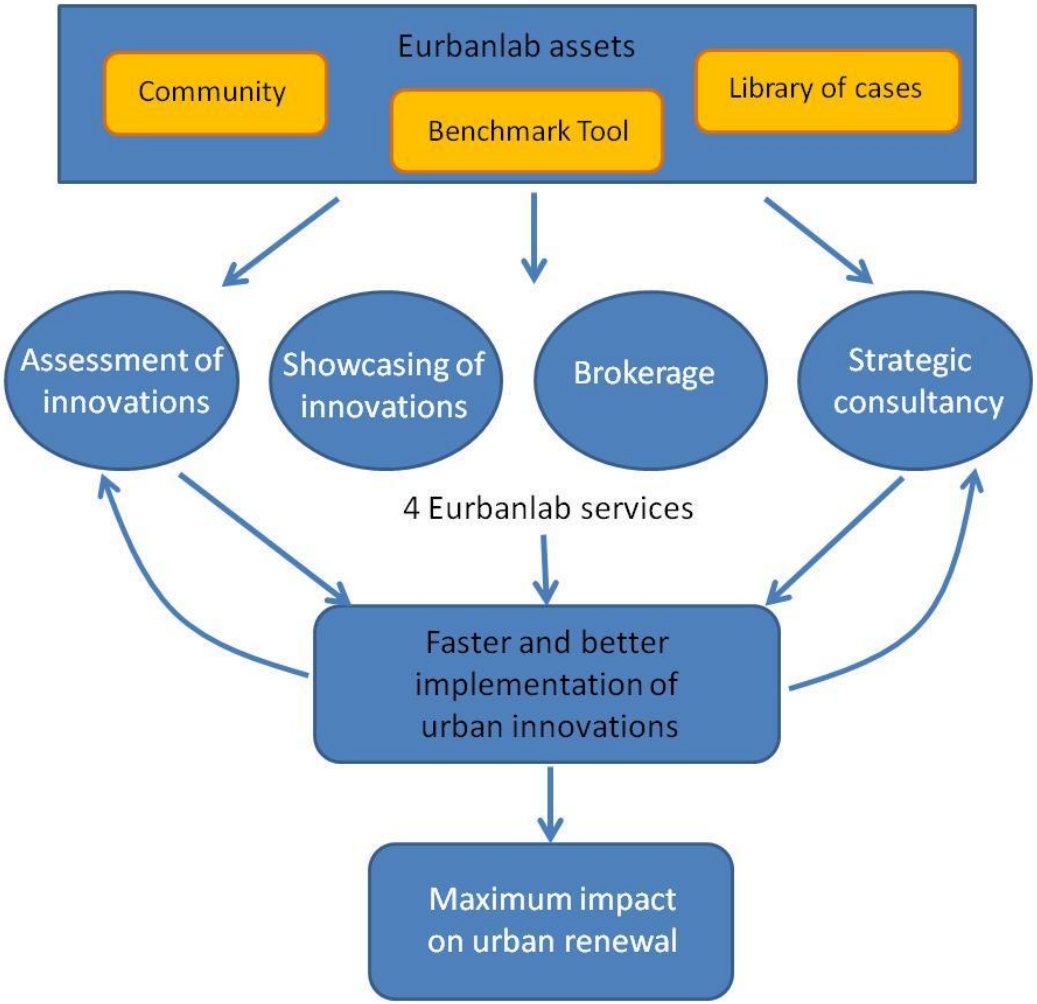
Scenario for potential price evolution biojet fuel (USD/ton)



- *Indicated prices are excl. potential subsidies*
- *Fossil fuel price December 2012 ca. $1,100/ton*

Eurbanlab assets and services

Eurbanlab
Accelerating urban innovations



Educating entrepreneurial PhD's

17 PhD's largely connected to innovation projects e.g.

- Accelerating the transition to low-carbon cities
- CaScading City Systems
- Meta Modeling of Sustainable Cities
- Food security and water availability
- Visualizing the future; tools for decision making on climate change adaptation

Symbiosis with incubators

- The vibrant Hub for startups and investors
- The professional window of universities towards industry
- Highway to commercialization
- Local role model for an Entrepreneurial culture in Europe

YES!Delft

utrechtinc.

StartLife
FOSTERING ENTREPRENEURSHIP

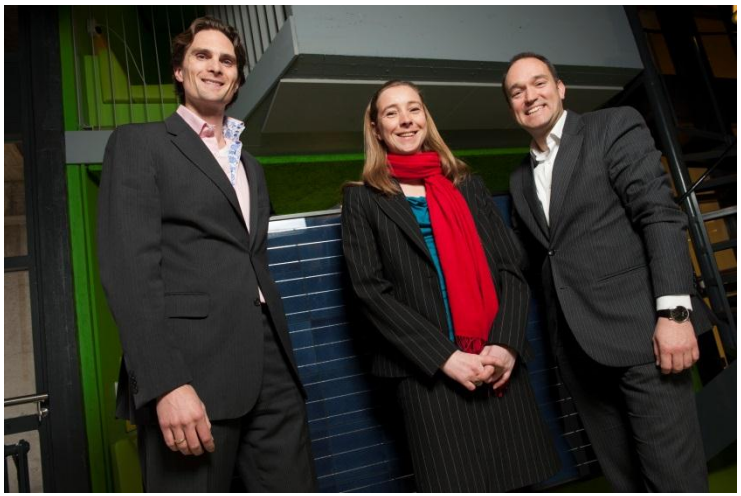
Solease

Solar energy made easy

Solar system lease for a monthly amount lower than the existing electricity bill.
People can save Euro's and CO2 but without the usual cost, hassle & risk

Climate-KIC partner as launching customer whose credibility led to 6 other clients!

Universiteit Utrecht



Climate-KIC