

Rotterdam Smart City and Quality of Life

Useful examples for your own city in in water, energy, densification, greening and using city data



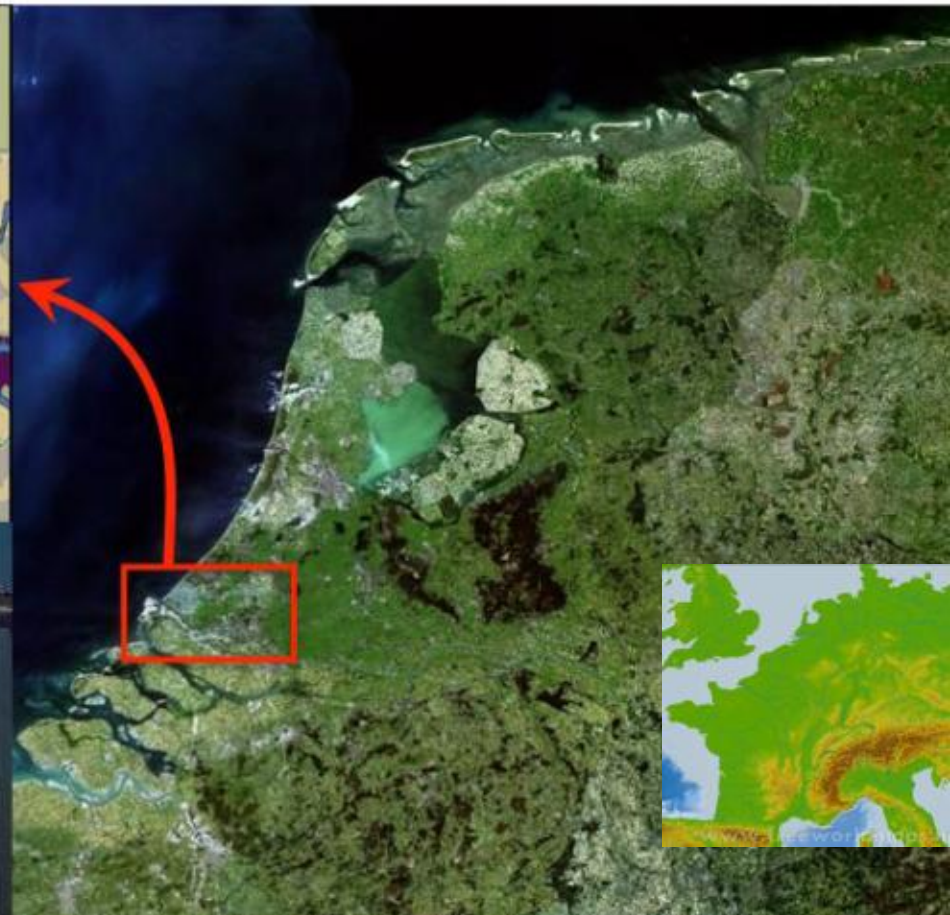
Rotterdam

City

Area : 320 km²
Inhabitants: 618.000
Nationalities: 175
Municipal Budget: 4,2 billion Euro's
Sewer system 3000 km

Port

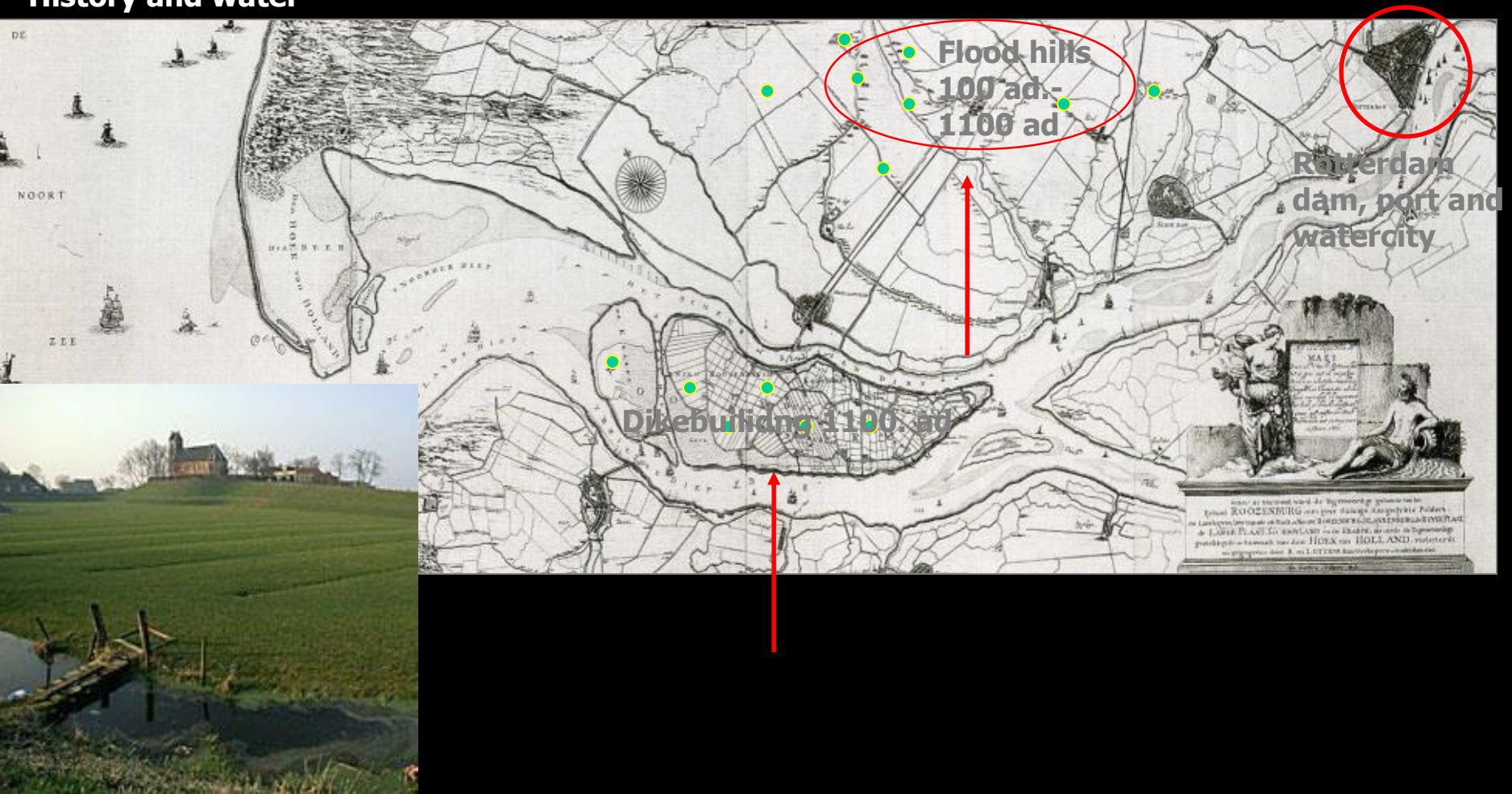
Area: 105 km² (50 km² commercial sites)
Length of port area: 40 km.
Direct employment: over 70,000 jobs
Goods throughput: over 400 million tonnes of goods per annum
Shipping: 33,000 sea-going+110,000 inland vessels / yr

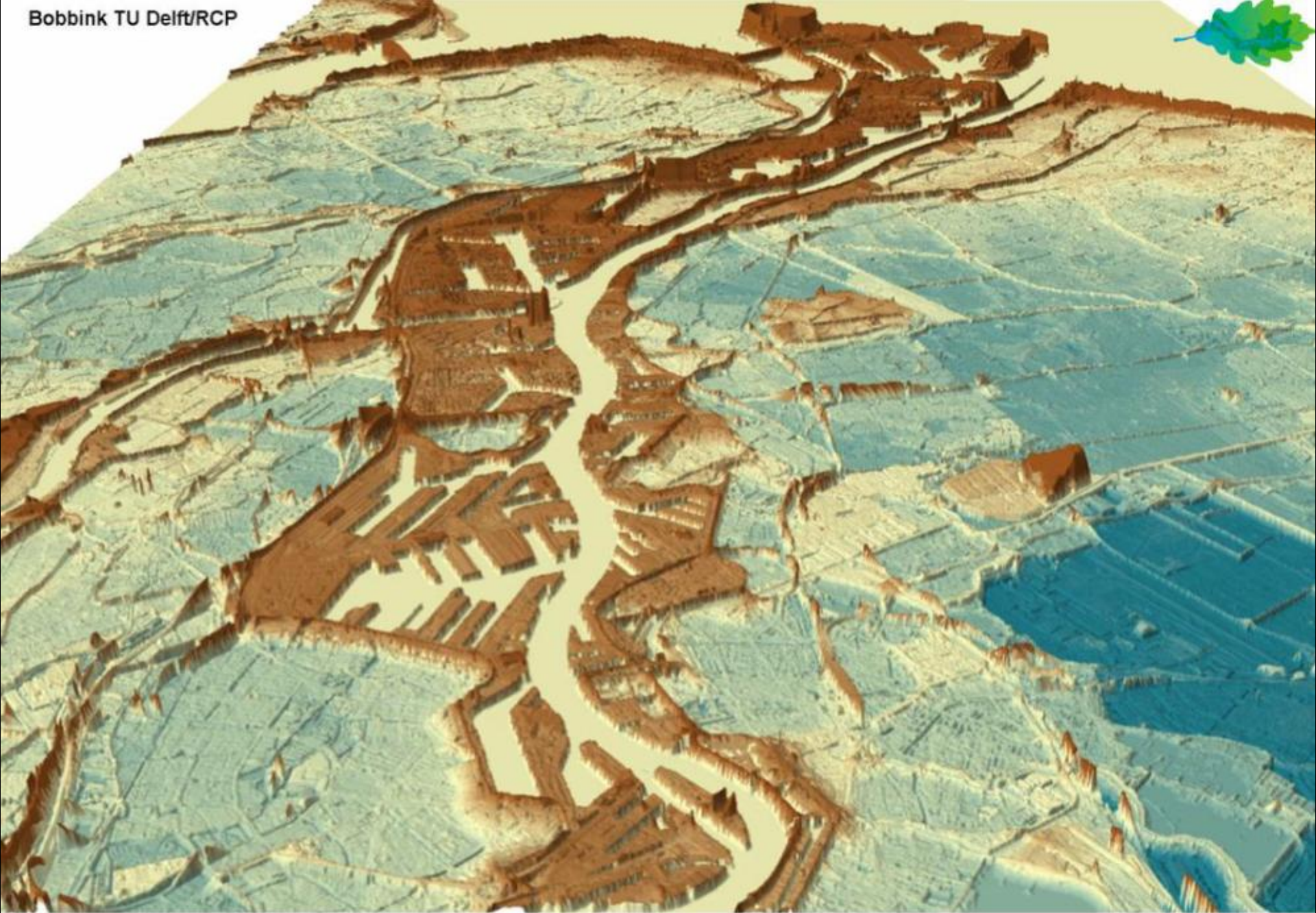


Part 1. Water

Innovative solutions start with understanding the system

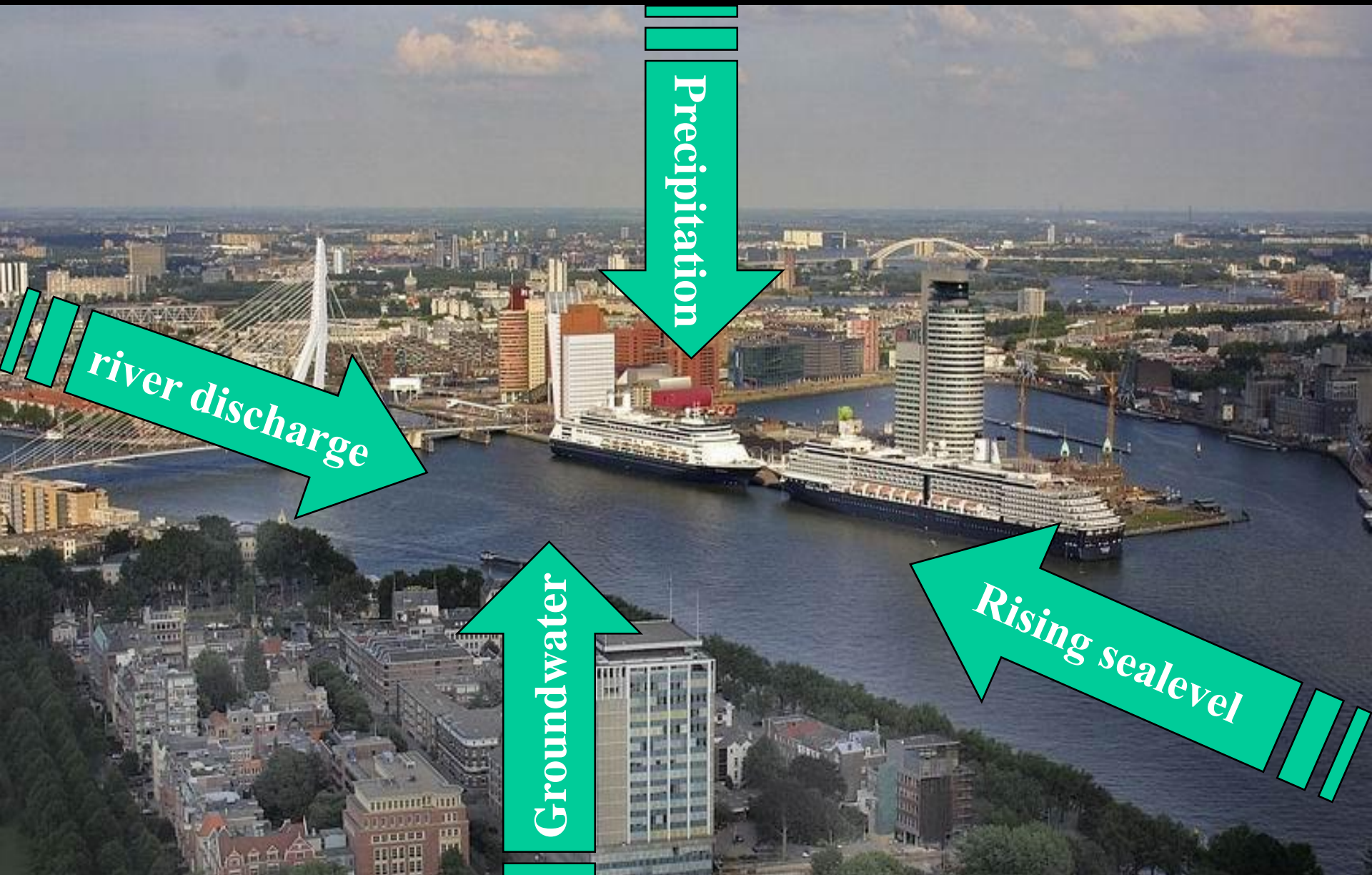
History and water





Topo map: above (brown) and below (blue) sea level

Water in Rotterdam



Challenges related to climate change and more



Flooding



Water quality



Excessive rain fall



Levee subsidence (drought)



Inundated cellars



Heat waves

Other challenges: Urbanization and Landuse , Air quality, Salination, Public health, Biodiversity, Recreation etc

Sea and safety



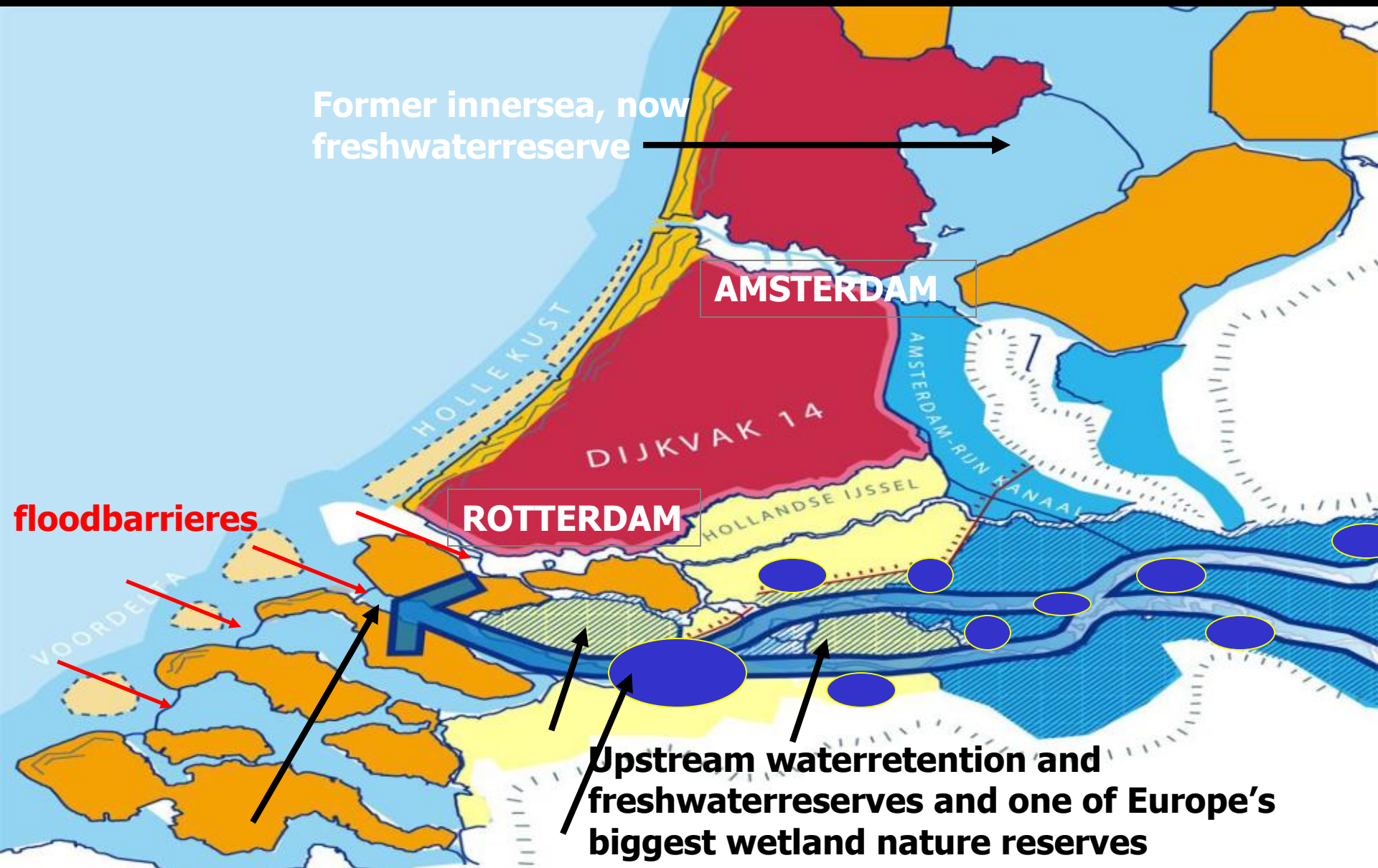
Dunes (natural and artificially induced)

Dikes

Technical solutions i.e. Storm surge barriers

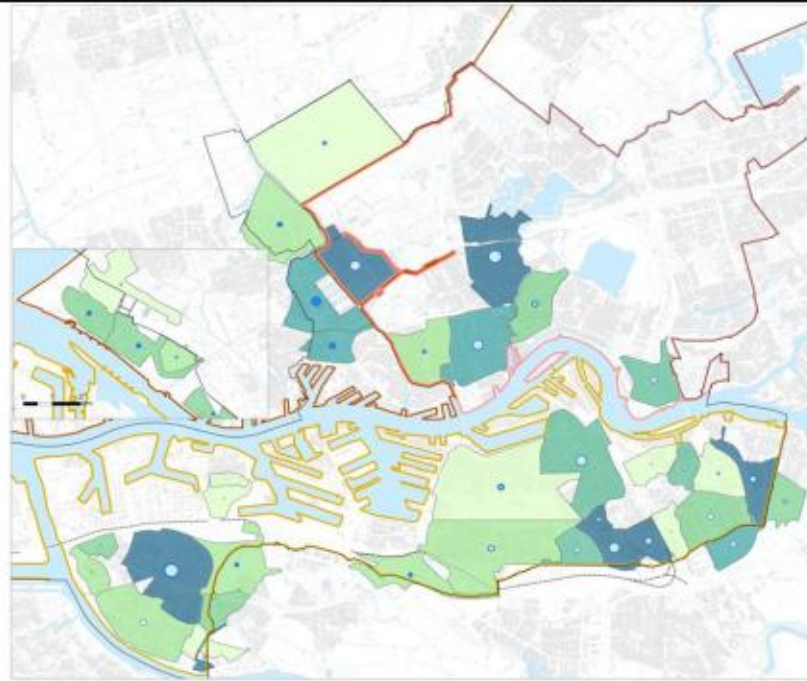


Rivers and safety

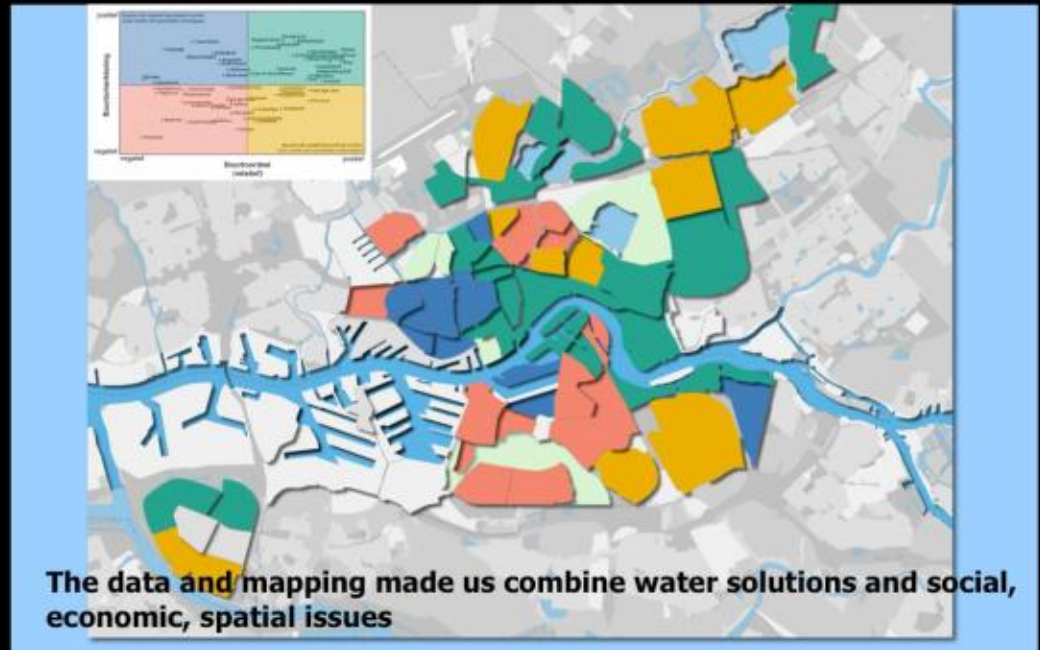


What about precipitation and water in the city

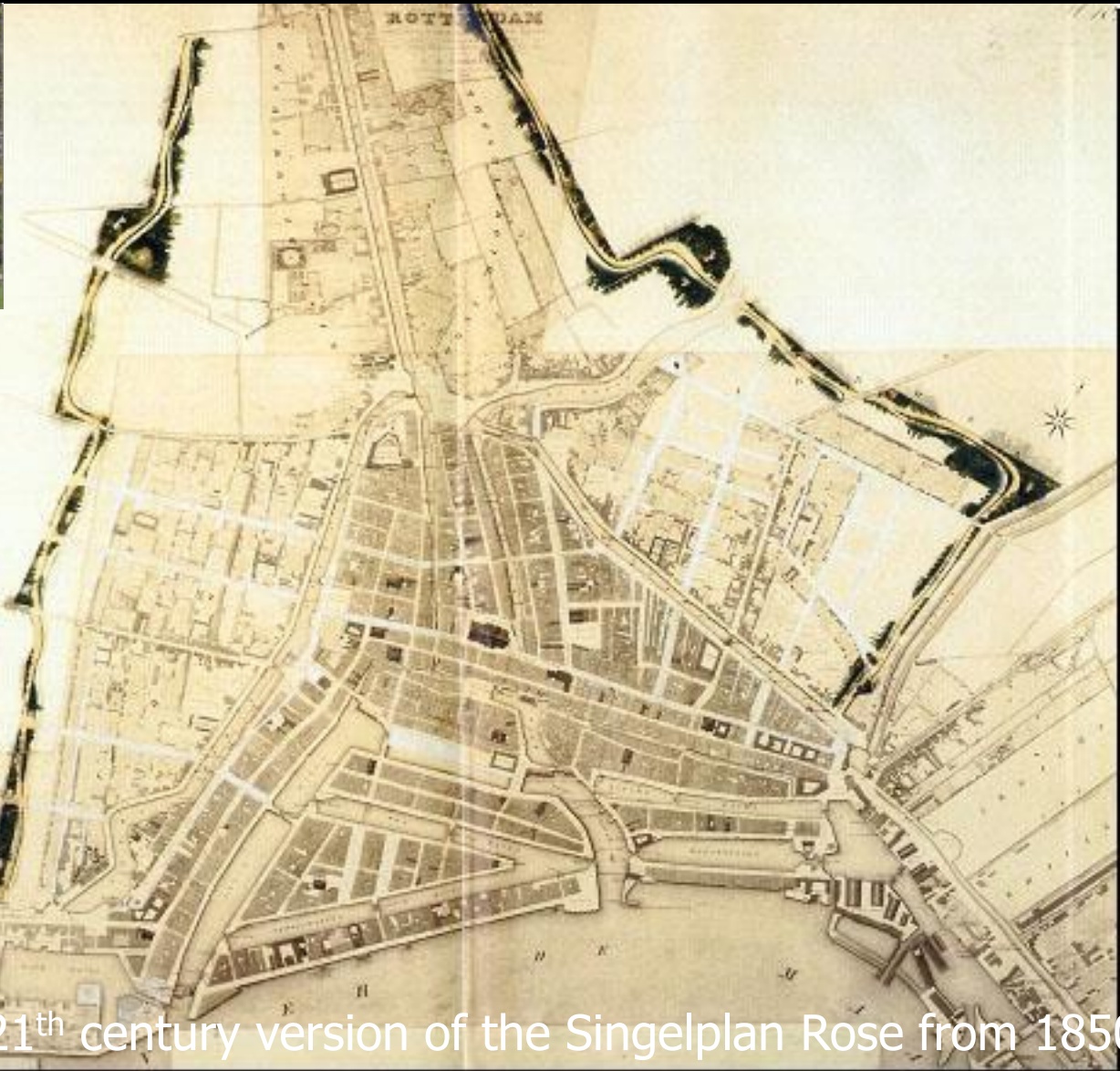
1. Water: Precipitation, storage capacity per district



Quality of life data per district

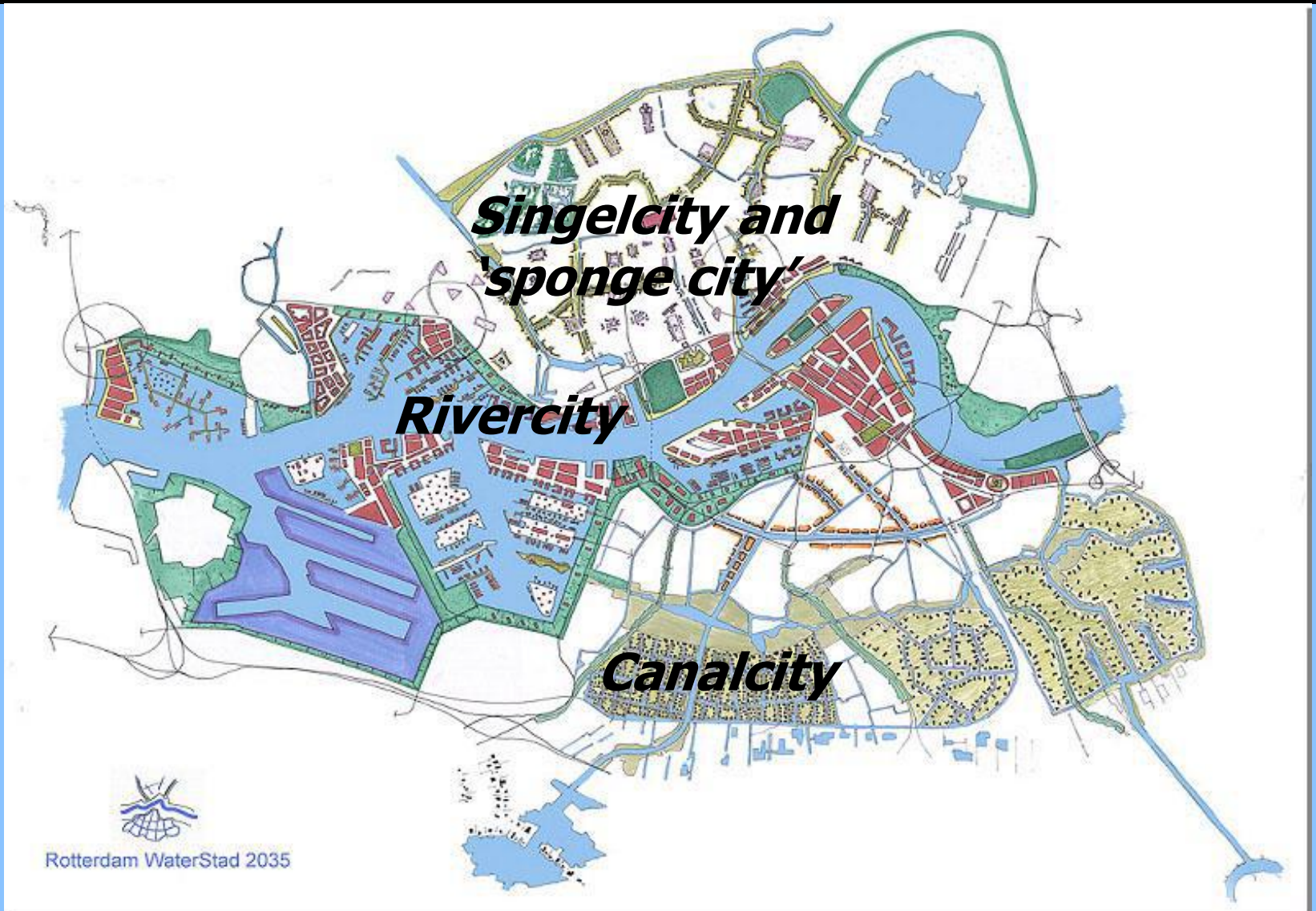


Singelplan as an example ?



What is the 21st century version of the Singelplan Rose from 1850's ?

From stand alone solutions to overall strategy (2005)



Water solutions good housing + public space + water transport

This lead to Rotterdam climate change adaptation strategy (RAS)



1. Robust system now: maintain en strenghten
2. Adaptation: make use of the public space
3. Cooperation and joining up
4. Added value for environment, society, economy and ecology



Combining technical and green approach, small and large scale



Robust and resilient



Sewerage + watersquare



Protection and moving in tune



Dikes + adaptive building en design



Delta works, small scale projects



Storm surge barriers + 'Remove tile, plant greening'



Technology and nature



Pumping + green banks design with nature



Implementation and innovations



watersquares

**Waterliving Urban
Agriculture and good
housing + canals for
transport**



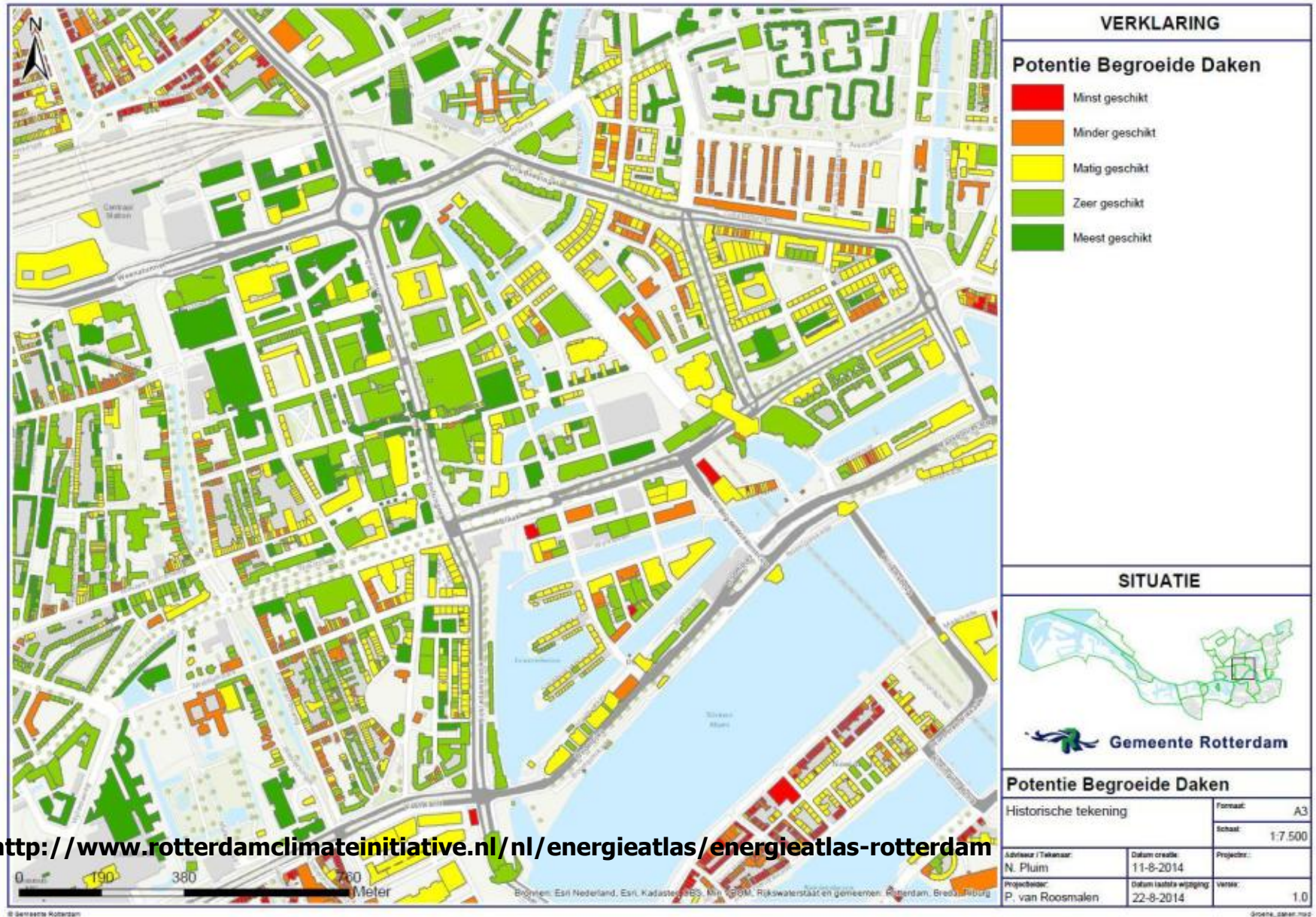
**green/water roofs sponge
buildings**



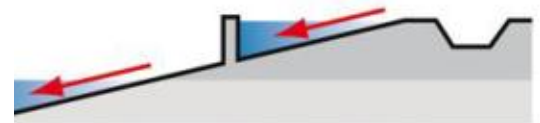
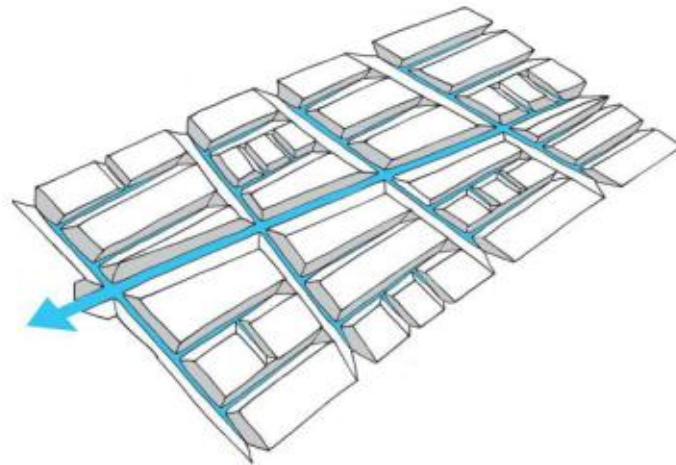
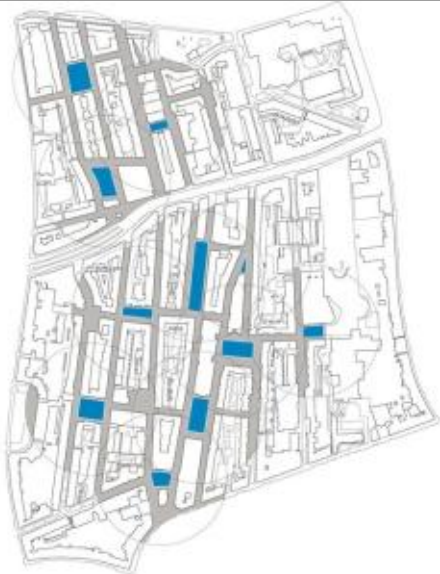
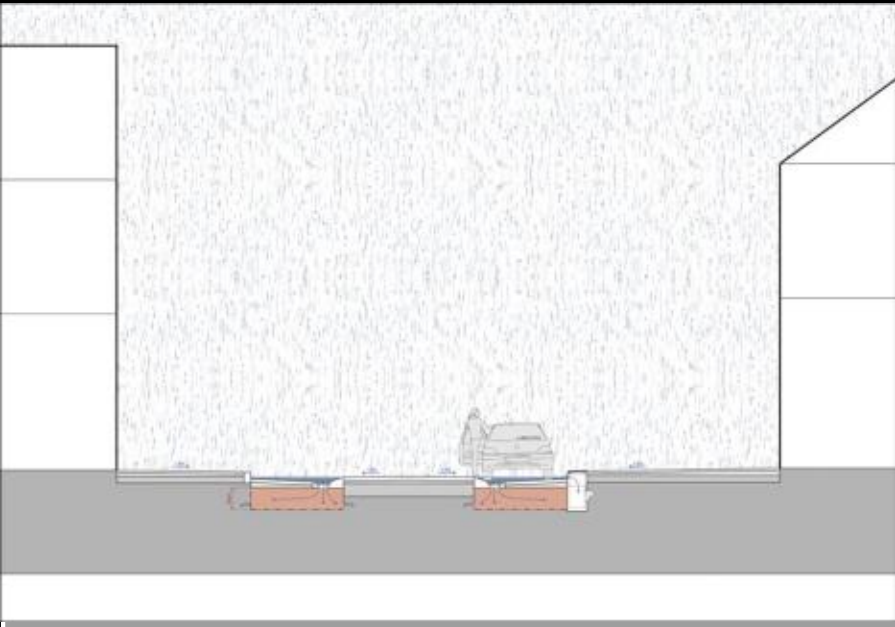
Community involvement: green roofs program



Roof Scan for green roofs or pv potential



Water squares, topography decides what solution goes where



Watersquare finished in nov 2012



Watersquare finished in nov 2012



Watersquare finished in nov 2012



Trappen te gebruiken als tribune voor rij- lessen Zadkine

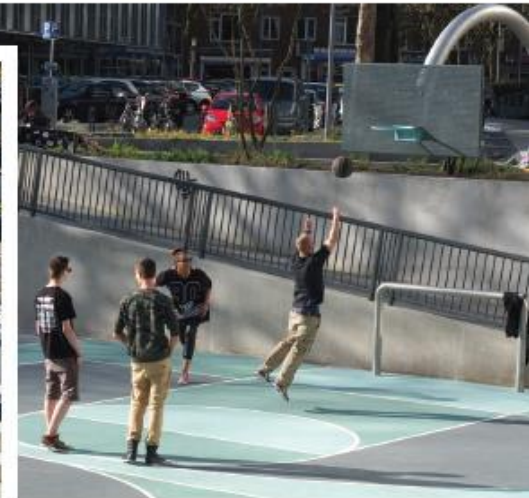
Water Square now



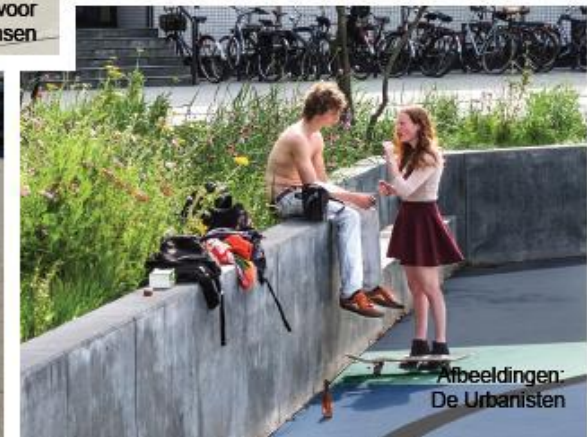
Daily Use



Veelzijdig gebruik bassin #2 voor
samenkomst van mensen



Grote bassin ingericht op actief gebruik
door verschillende groepen



Afbeeldingen:
De Urbanisten



...temporarily storm water storage



Urban Floodplain



Water storage Kleinpolderplein



Water storage Kruisplein

MuseumPark Underground Parking + waterstorage for sewage overflow 10.000 m³ = 2.6 million gallon



Protection and moving in: A dike, with shops below and a roof garden to link the waterfront very active neighborhood involvement



Scale up towards a climate adaptive delta city with measures for different parts of the city

- Which **measures** where ?
- Which **stakeholders**?
- What **extra values** do these measures create
- Who **profits** from this?



Compact city



Neighborhoods



Suburbs



Areas in urban floodplain



Ports



Waterfronts



Scaling up: ZOHO, our first climate proof city district!



WORKSHOP

Climate Resilient Zomerhofkwartier



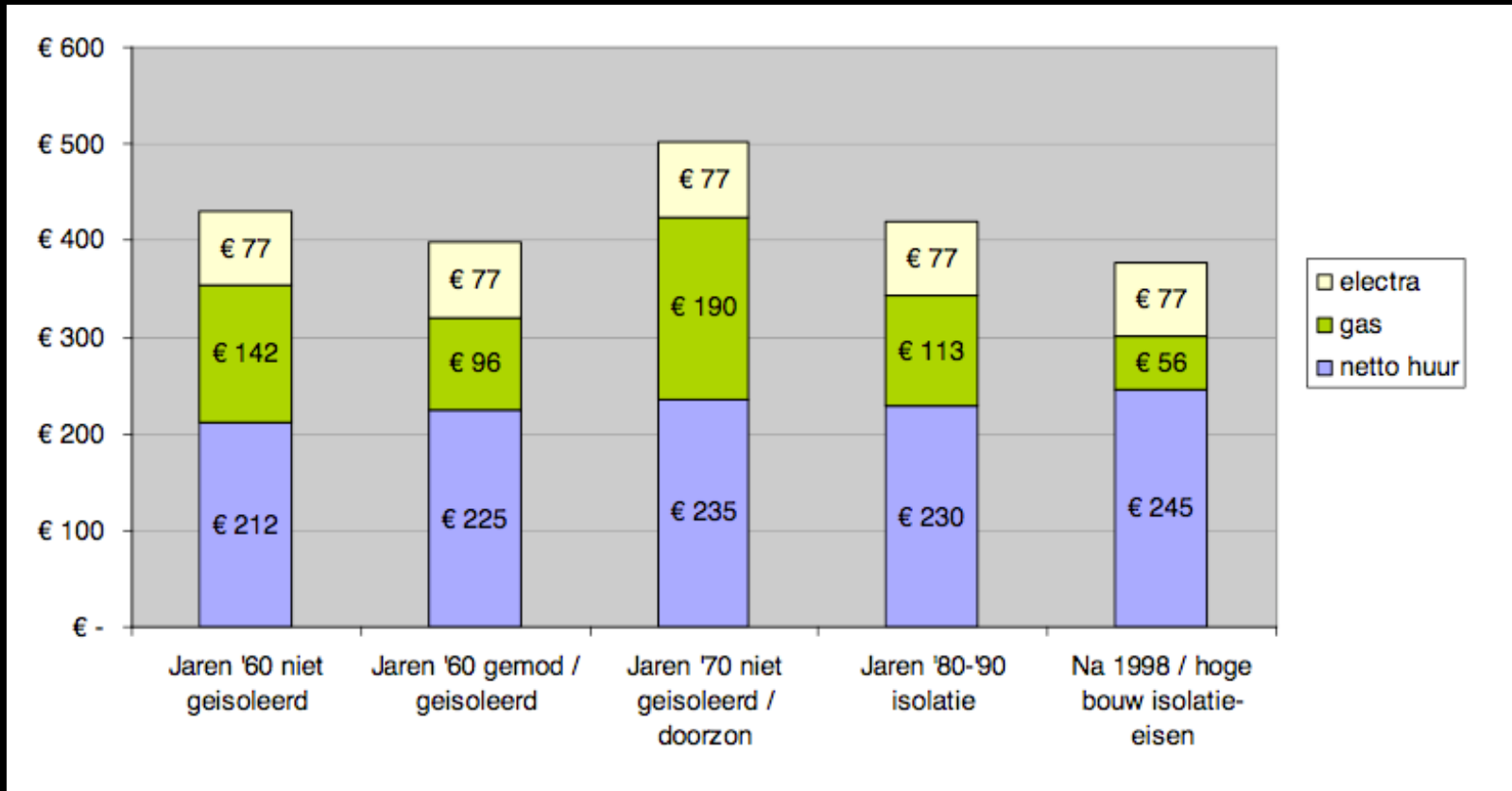
Programmatic Approach on District Level

Building a green framework and programmatic clusters for and with the neighbourhood



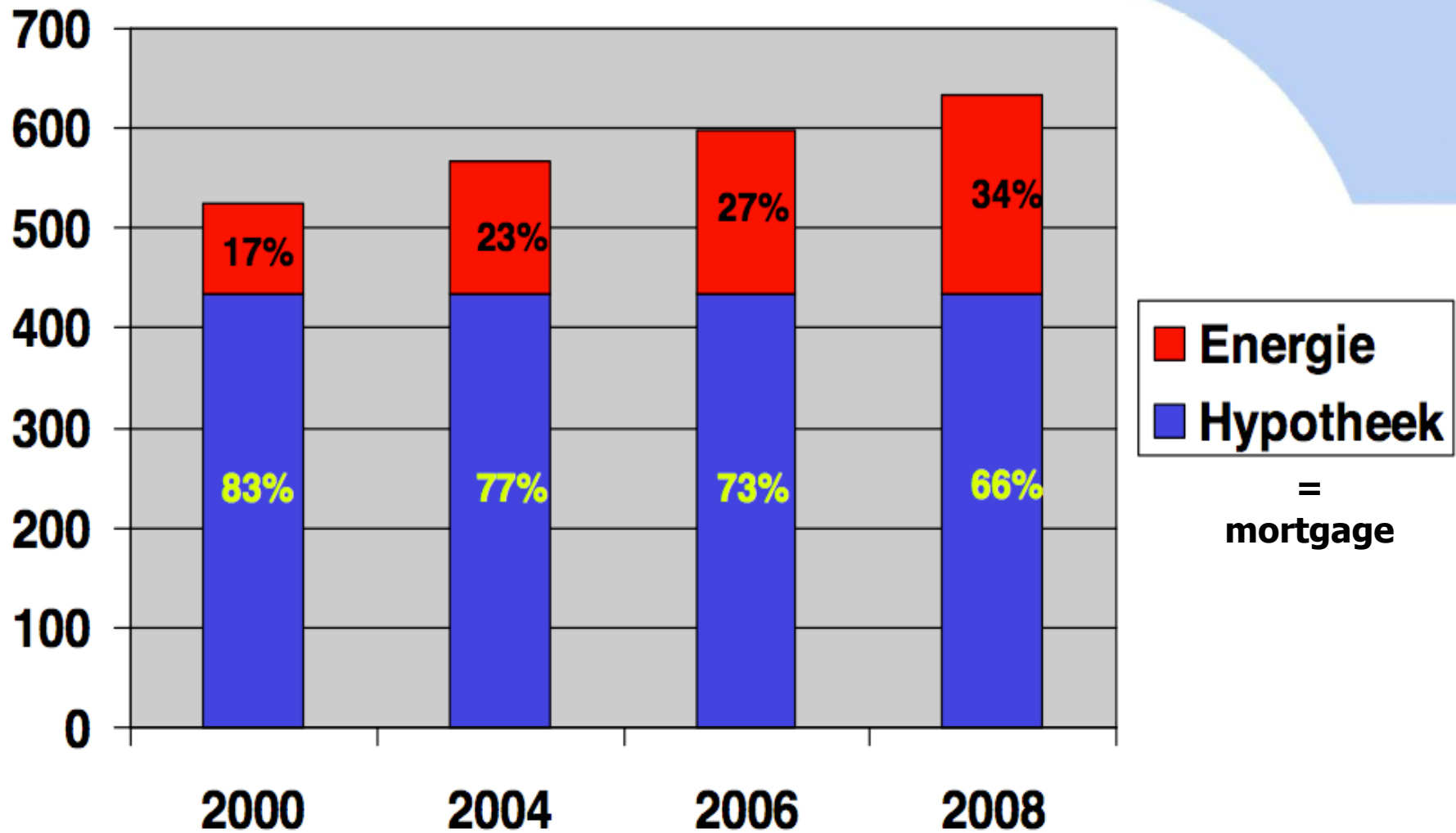
Why not have this approach for Energy?

Energy costs rental homes the Netherlands



i. Straathof senternovem, 2008

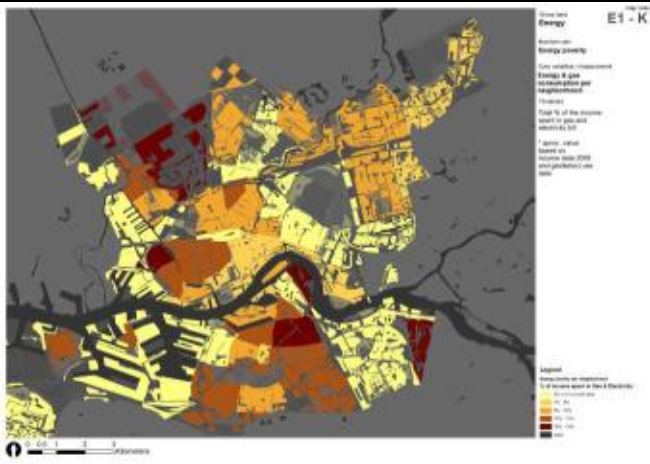
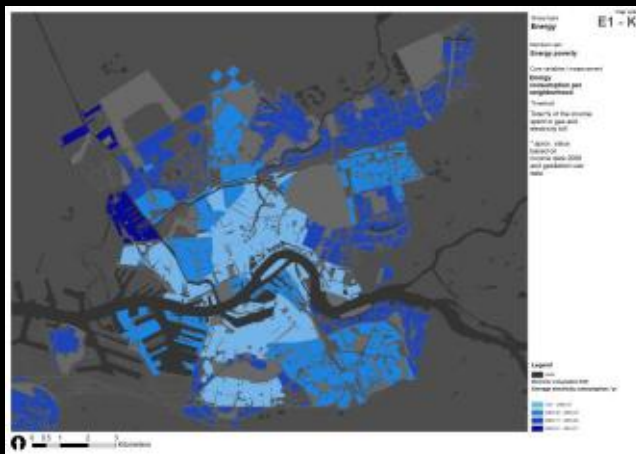
Energy costs home owners



i. Straathof senternovem, 2008

High energy use, low income, energy too expensive

Possible solutions: smart meters, insulation, own production, lower rent, green loans



Since 2005-2007 Energy and Climate Initiatives Worldwide

CO2 reduction and renewable energy supply

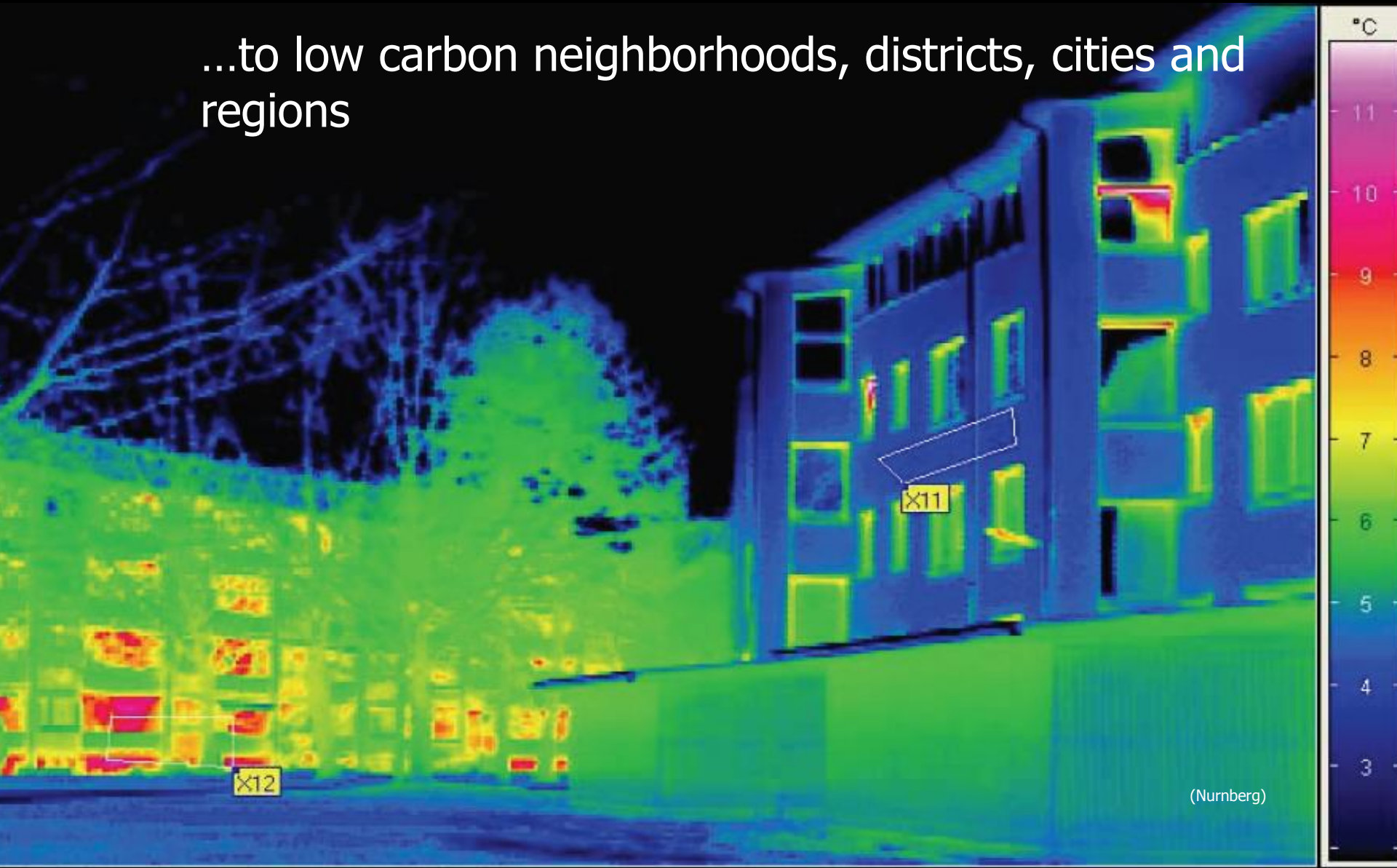
From list of solutions to a spatial inclusive strategy for Energy transition and improving Quality of life

Residential & services	Transport	Behaviour	Innovation	Industry & food
<ul style="list-style-type: none"> •deals with corporations •Public lighting •Compulsory use of district heating •Fiscal incentives •Local laws 	<ul style="list-style-type: none"> •public transport, cycling •Renewable energy •Parking fees •vehicles and ships 	<ul style="list-style-type: none"> •All public vehicles co2 free •All public buildings co2 free •Campagne •Incentives 	<ul style="list-style-type: none"> •innovation fund •Knowledge cluster of new techniques •Research connections with universities to implement 	<ul style="list-style-type: none"> •Carbon captivity storage •Deals with companies to filter •Biofuel •CO2 to greenhouses •Quai electricity

.... to a vision ...from there, a tailor-made plan for our specific situations, neighborhoods!

Challenge still about how to scale up

...to low carbon neighborhoods, districts, cities and regions

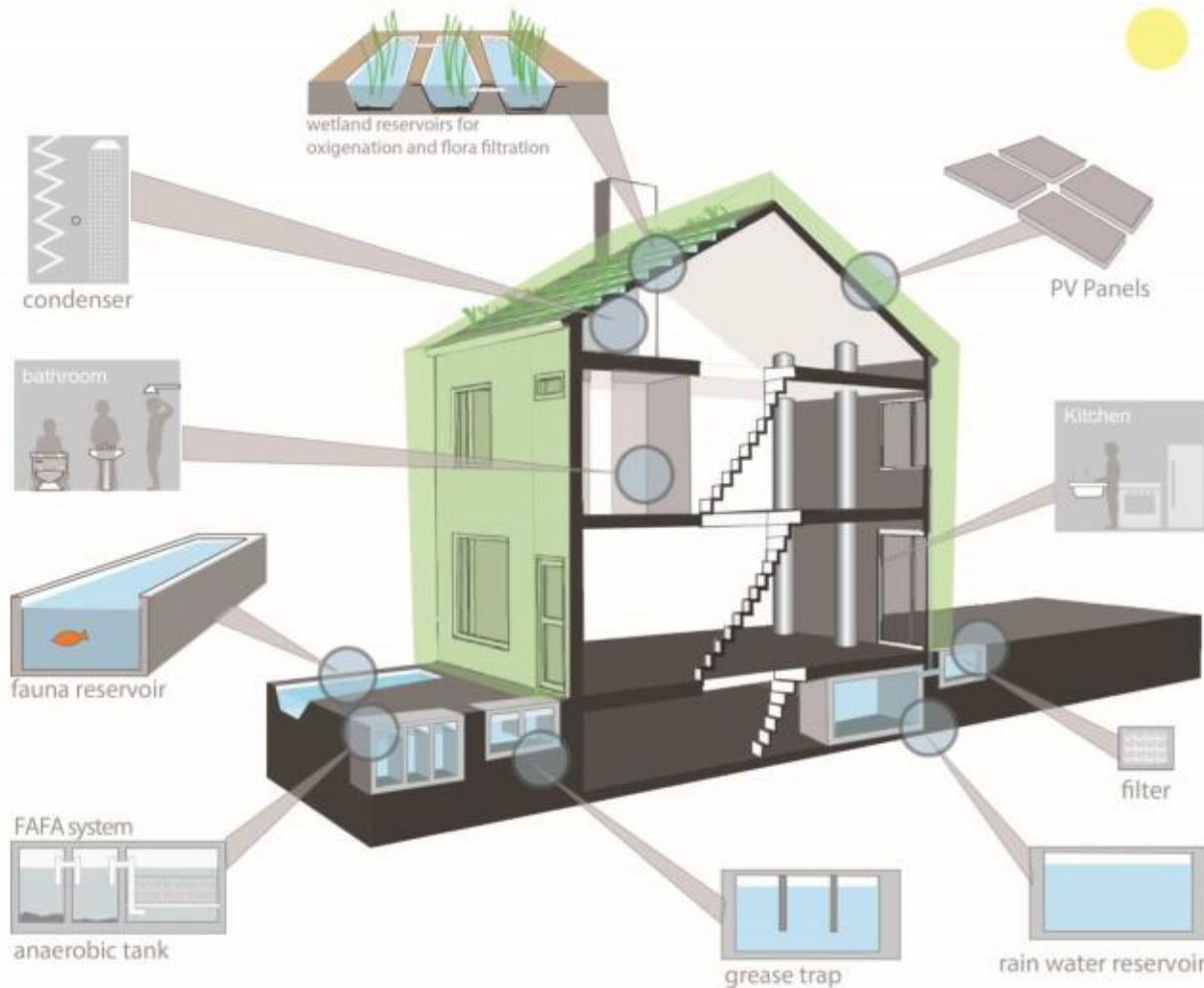


Solar Decathlon 2014:

Scaling up in number: decarbon existing housing stock: 1.5 million in NL alone
much more all over Europe



Relevant theme: energetic refurbishment



FACTS...

- * OUR JOB IS TO TAKE OUR HOMES TO A SUSTAINABLE FUTURE...
- * WE WILL RETROFIT ON DIFFERENT SCALES
 - URBAN SCALE
 - INDIVIDUAL HOMES
 - BUILDING PARTS
- * WE WILL DEVELOP A SET OF TOOLS TO RETROFIT
- * WE WILL DEVELOP A PLATFORM FOR TOOLS
- * WE ARE 1 OF 20 COMPETING TEAMS ACROSS THE GLOBE
- * OUR HOUSE WILL BE SEEN BY 300.000 VISITORS

Prêt-à-Loger



Nico Tillie – **Green Building Festival**, Toronto 2nd of October 2014

Architectural section drawing of a two-story house. The drawing shows the interior layout, including a living area with a sofa, a dining area with a table and chairs, and a bedroom with a bed. The roof is shown with a green roof structure. The drawing includes dimensions for height and length, and a section line L-80/290.

What it looks like



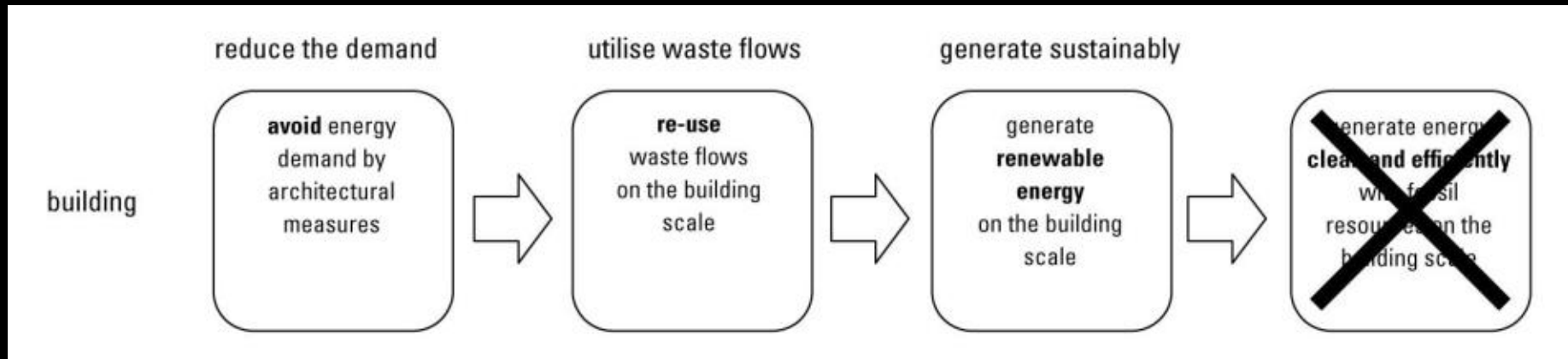
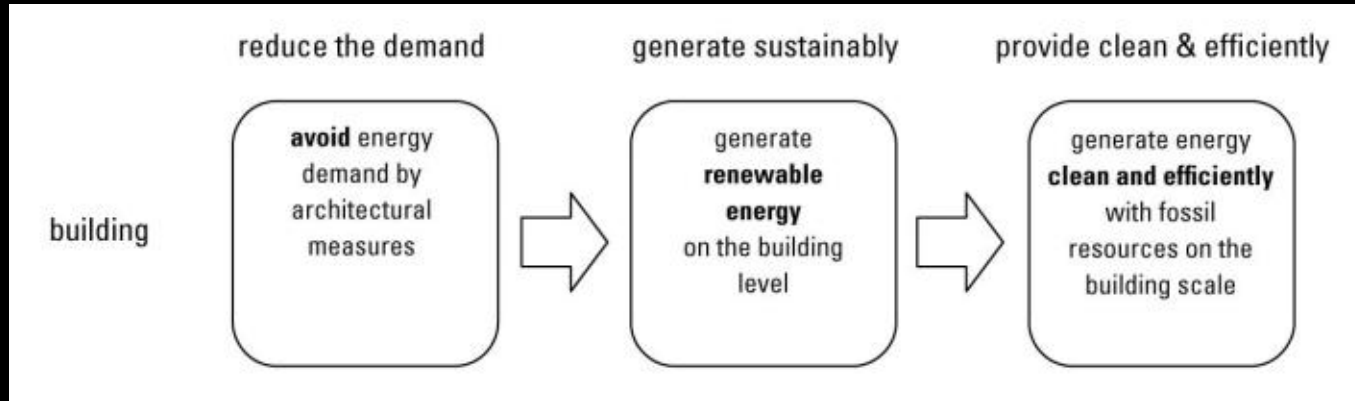
2 x gold, 2 x silver, overall 3rd at 3 of 1000 points from no. 1



Andy van den Dobbелsteen and his Pret A loger team from TU Delft

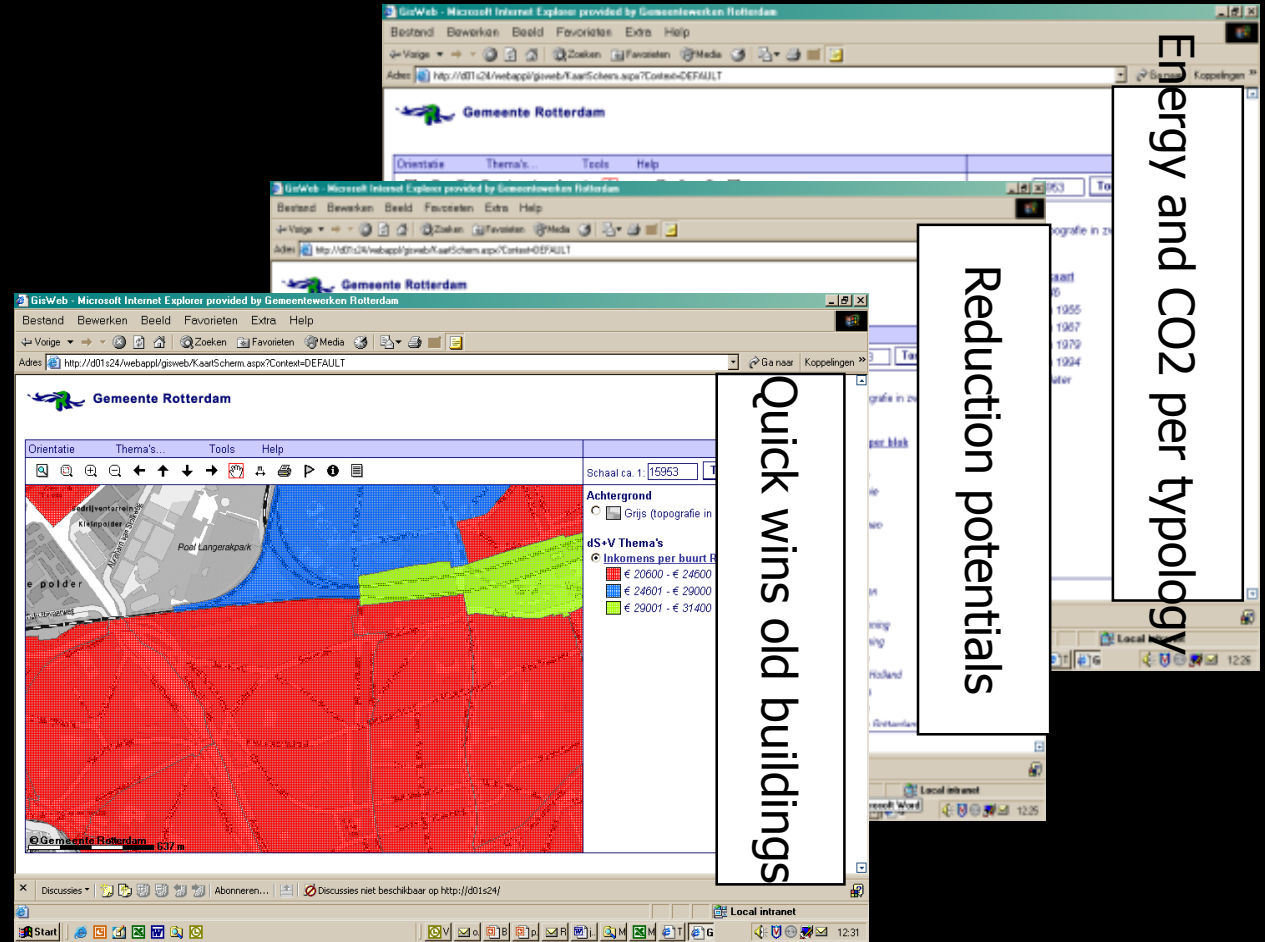
Scaling up in Approach: energy as a 'layer' in urban planning!

From 'Trias energetica' to new stepped strategy

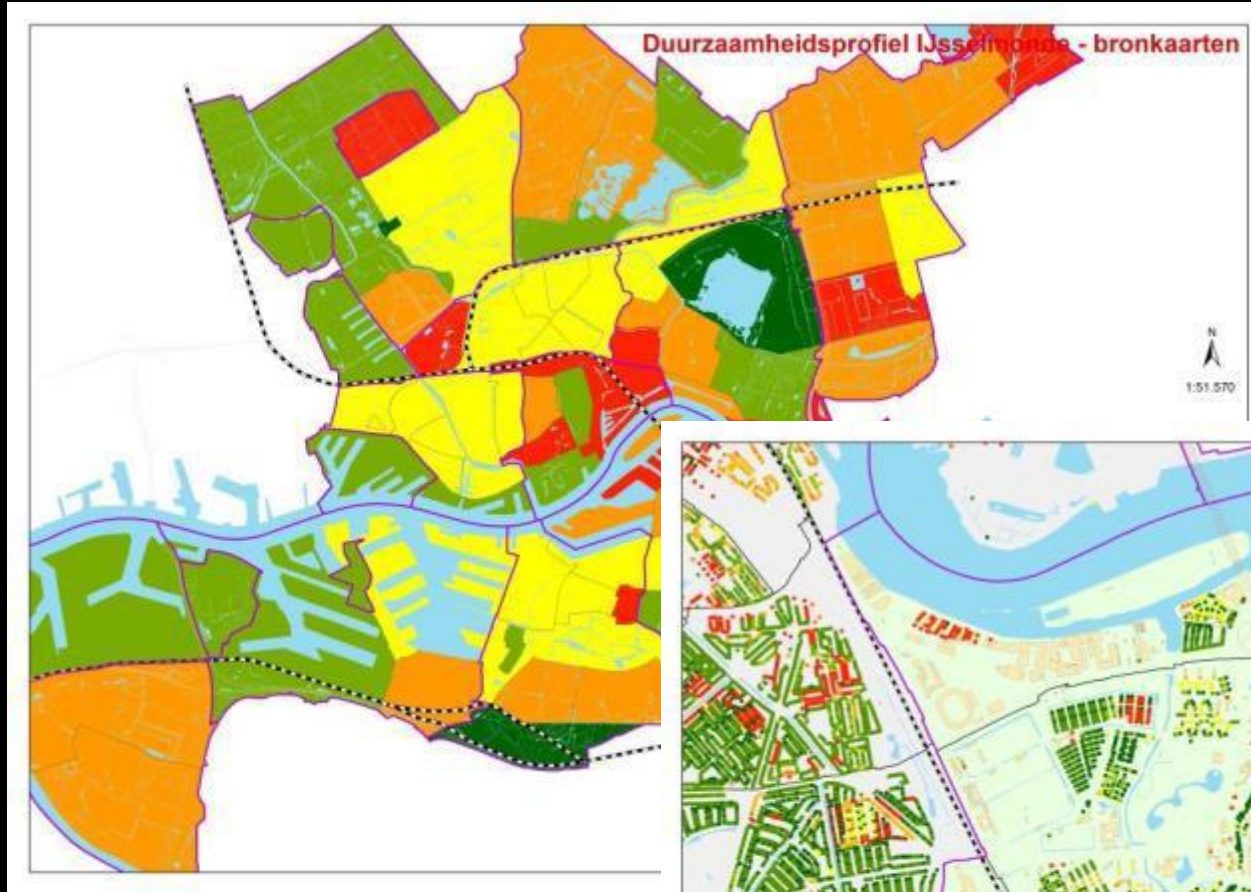


Prof. Andy Van den Dobbelsteen TU Delft

1. reduction of demand



Types of result – savings potential maps are easier to read than 10 excel sheets

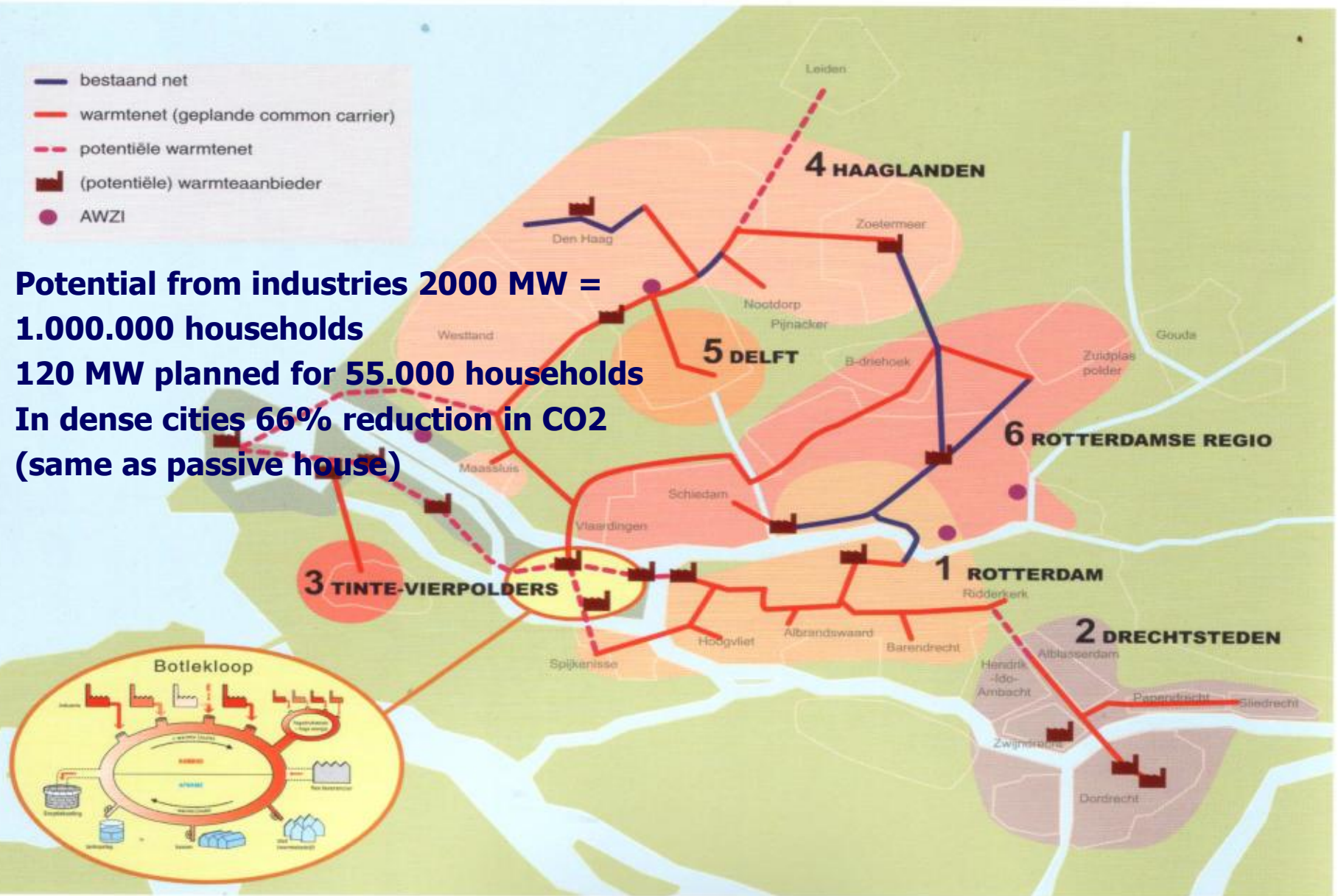


2. Exchange waste flows

District heating networks

- bestaand net
- warmtenet (geplande common carrier)
- - - potentiële warmtenet
- (potentiële) warmteaanbieder
- AWZI

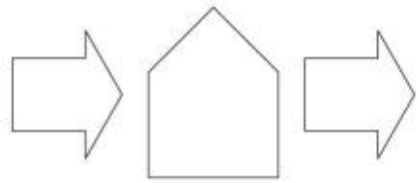
- Potential from industries 2000 MW = 1.000.000 households
- 120 MW planned for 55.000 households
- In dense cities 66% reduction in CO2 (same as passive house)



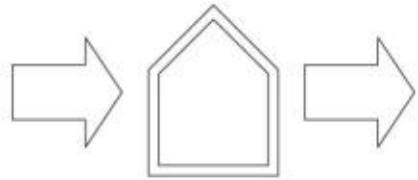
The New Stepped Strategy

By: A. Van den Dobbelsteen

...and upscaling

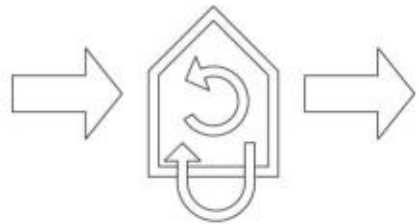


00 standard building



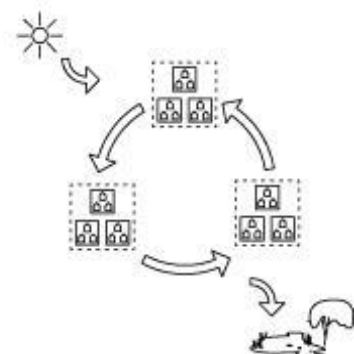
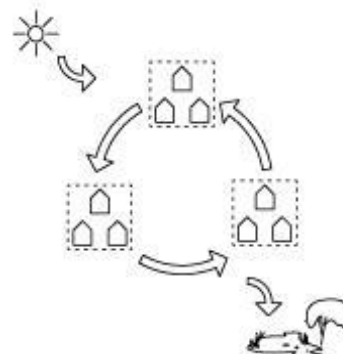
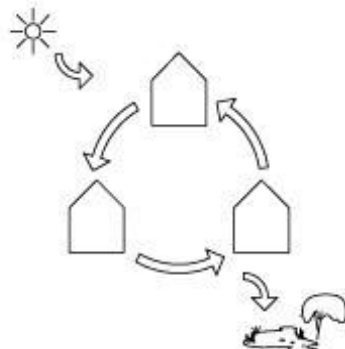
01 reduce consumption

— passive, smart and bioclimatic design

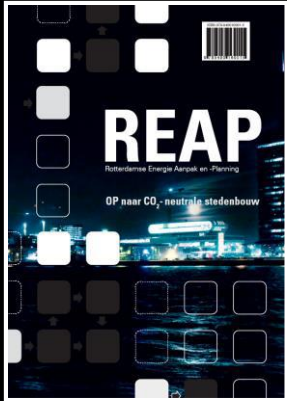


02 reuse waste energy streams

— waste heat, waste water, waste material
— in closed or connected cycles



Exchange of Energy waste flows in REAP



1 m² of super market can heat 7 m² of apartment
1 m² of green house can heat 4 m² of apartment and produce food!!

SUPERMARKT



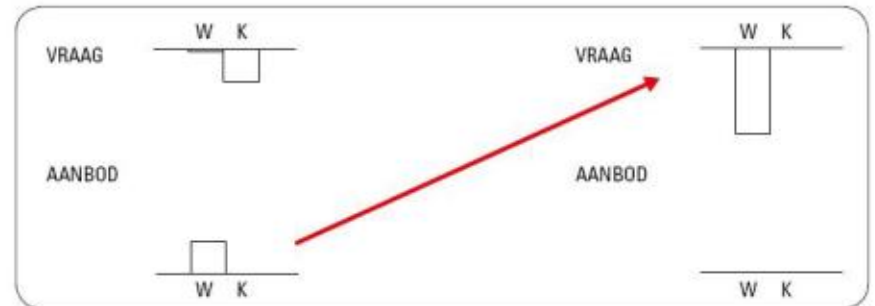
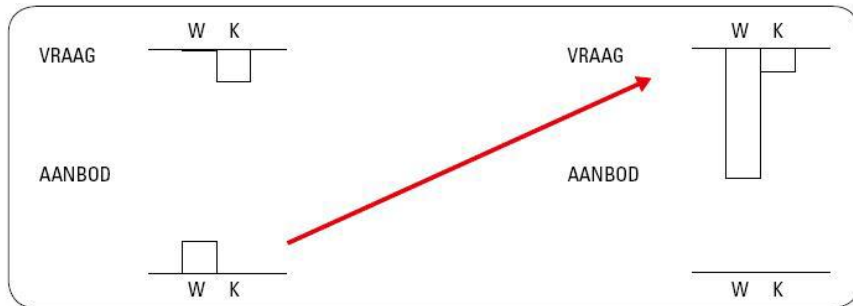
WONEN



IJSBAAN



ZWEMBAD



URBAN METABOLISM

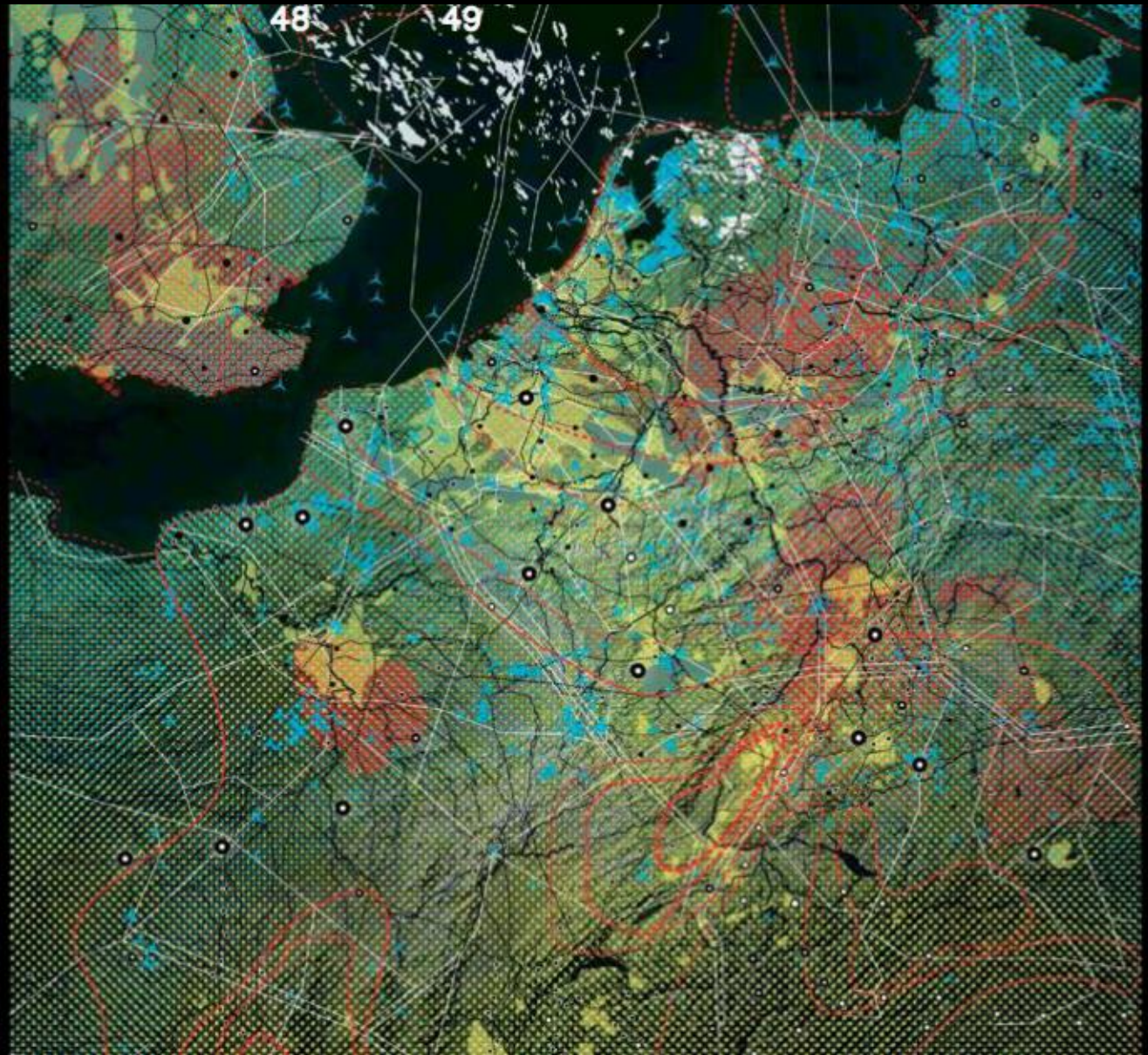
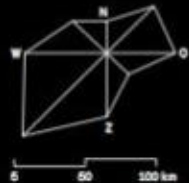
Gemeente Rotterdam – IABR –
FABRIC – JCFO – TNO

sustainable development of Rotterdam



LEGEND

- European HOTspots heat surplus and demand
 - Geothermal resources
 - Light pollution
 - Coal
 - Gas
 - Oil or gas pipeline
 - Wind turbine park
 - Wind energy (potential)
 - Powerplants
 - Global irradiation
- 1600 kWh/m²–1000 kWh/m²



Source: European Commission, 2008. Adapted from the European Commission, 2008.

Energy-region



LEGEND

- Powerplants
- Heat source
- Powerline
- CO₂ emitters
- Pipeline
- Windmills

- Cretaceous aquifers, about 2 km. deep, 50% chance: 5 to <15 MW
- Trias aquifers, about 4 km. deep, 50% chance: 10 to > 20 MW

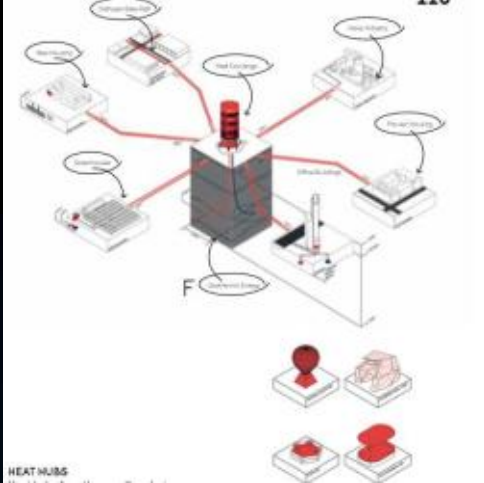
- 1 Maasvlakte, 80 MW, E.ON
- 2 Maasvlakte, 1062 MW, E.ON
- 3 AVR-Bottlek, 124 MW.
- 4 Rijnmond Energy, 820 MW.
- 5 Galileistraat, 209 MW, E.ON
- 6 Roca, 269 MW, E.ON.

- 7 Pergen, 300MW.
- 8 Enecogen, 830 MW.
- 9 Centrale Rotterdam, 300MW.

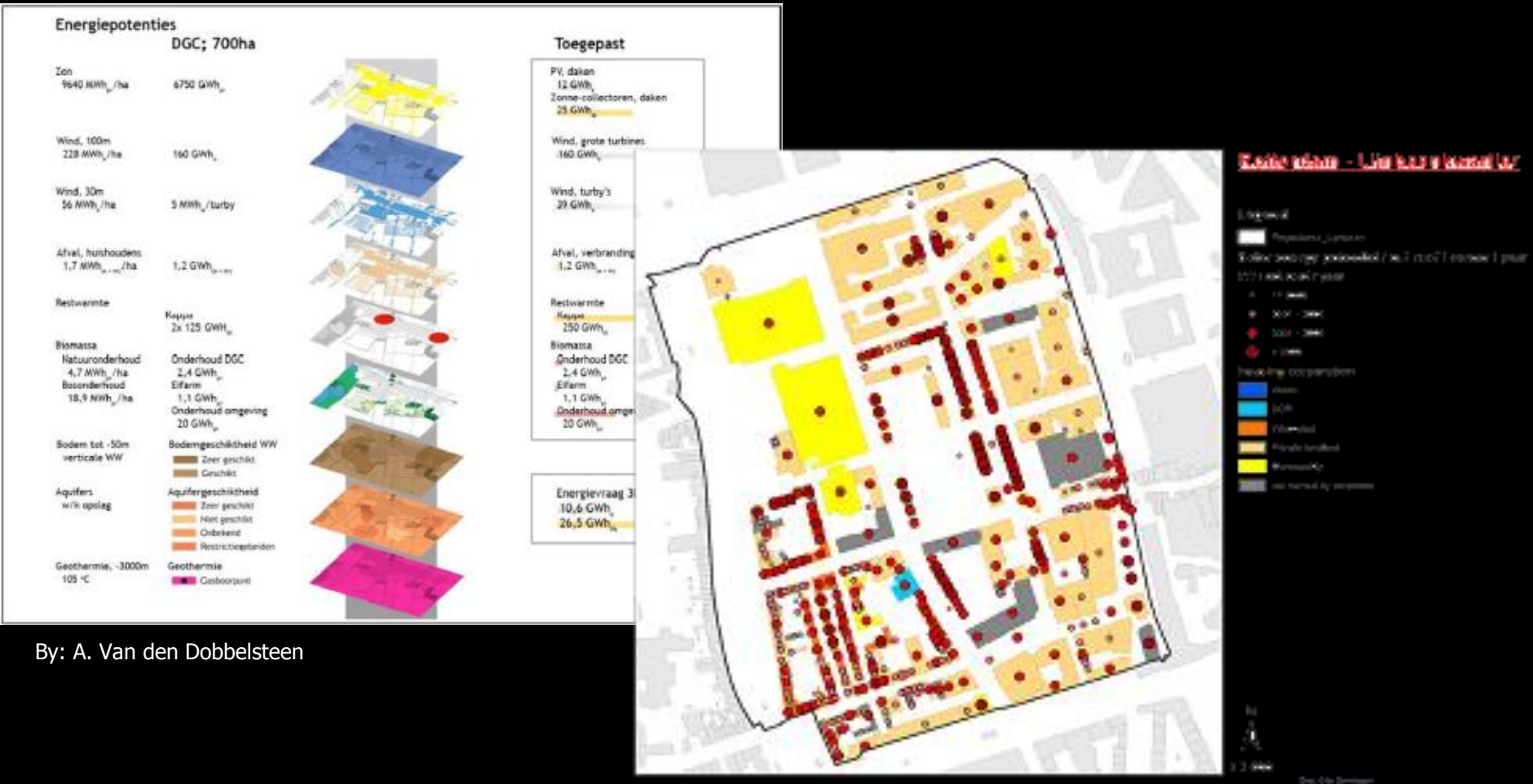


Rotterdam, Area of Rotterdam, NMA, 2014. Map of Rotterdam, NMA, 2014. Map of Rotterdam, NMA, 2014.

Energy-city



3. Renewable Production: Energy potential maps



By: A. Van den Dobbelsteen

Energy Atlas Rotterdam online
Amsterdam Energy atlas also available.

Basic information

Future



3000 dwellings:

Elektricity:

10,5 GWh_e

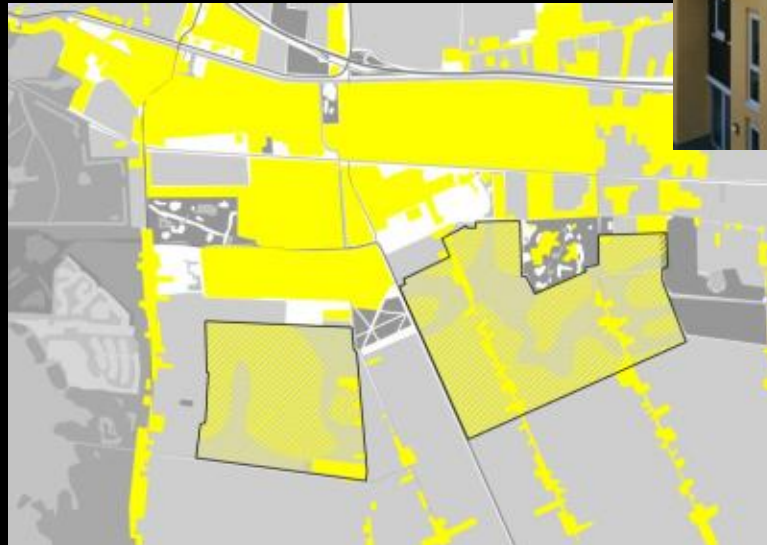
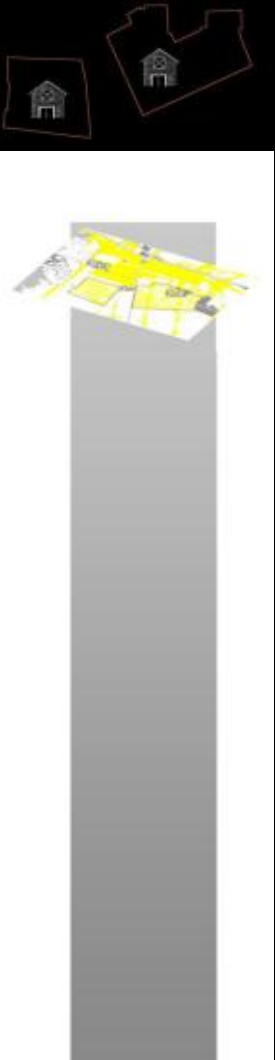
Heating:

26,5 GWh_{th} (aeq)

*From: Prof. Andy van den Dobbelsteen ,
Delft University of Technology*

Energy potentials

sun



Per house 40 m² pv
or solar collectors

DGC: PV on roofs: 12 GWh_e
DGC: SC on roofs: 35 GWh_{th}

Energy potentials

Electricity from wind 100 m (8 m/s)



10,5 GWh_e

26,5 GWh_{th}

6750 GWh_{pr}

12 GWh_e

35 GWh_{th}



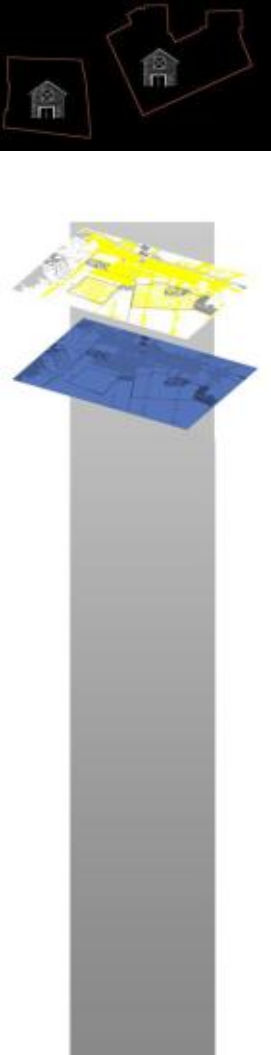
large turbines : 0.23 GWh_e/ha

DGC:

0-160 GWh_e

Energy potentials

Electricity from wind at 30 m (5 m/s)

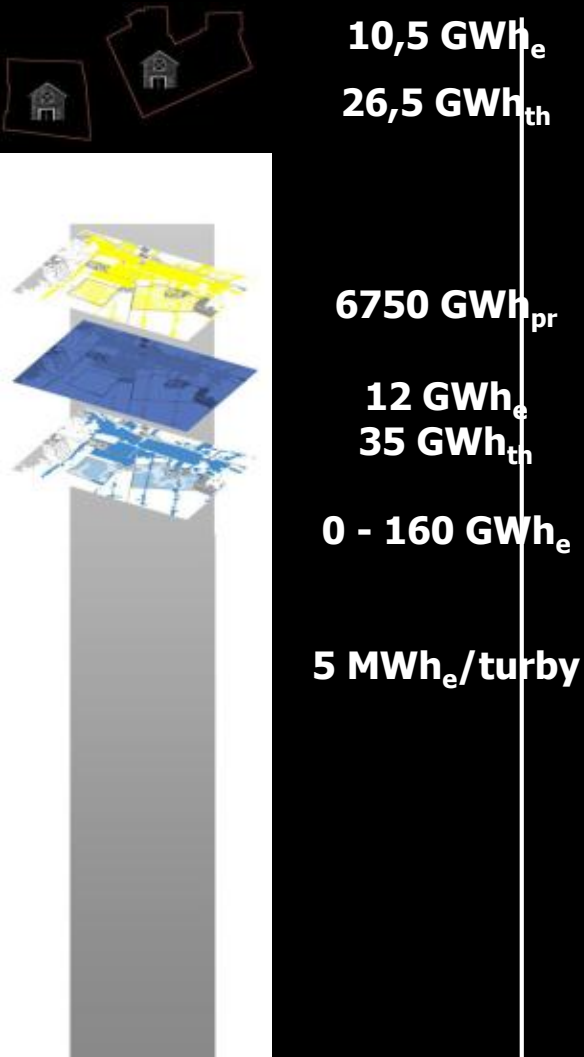


Wind at 30m:

Per Turby: 5 MWh_e
(DGC: 56 GWh_e)

Energy potentials

Energy from waste



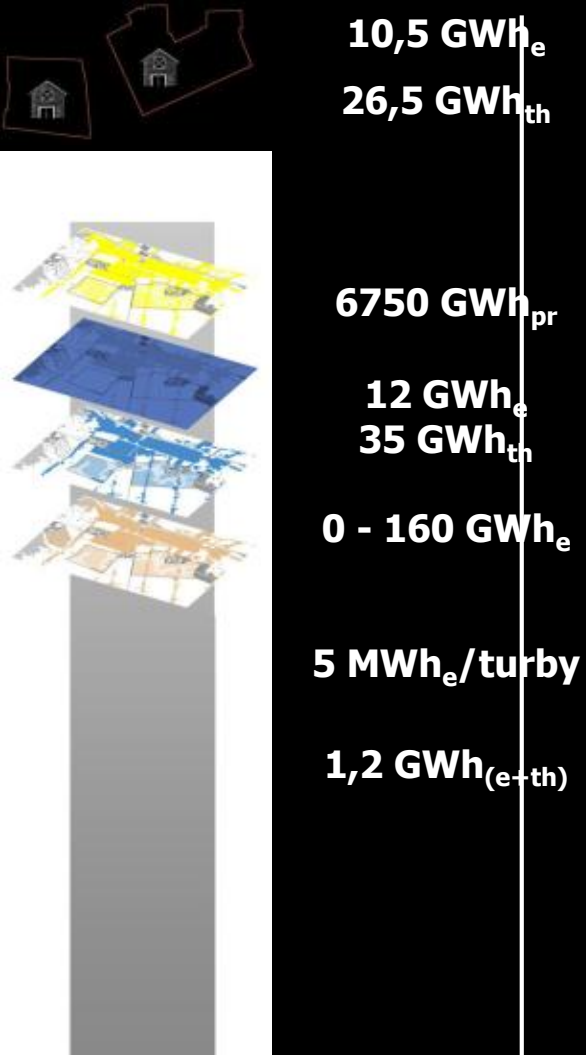
Per household: 0,57 ton → 326 kWh_e + 59 kWh_{th}

DGC:

1,2 GWh_(e+th)

Energy potentials

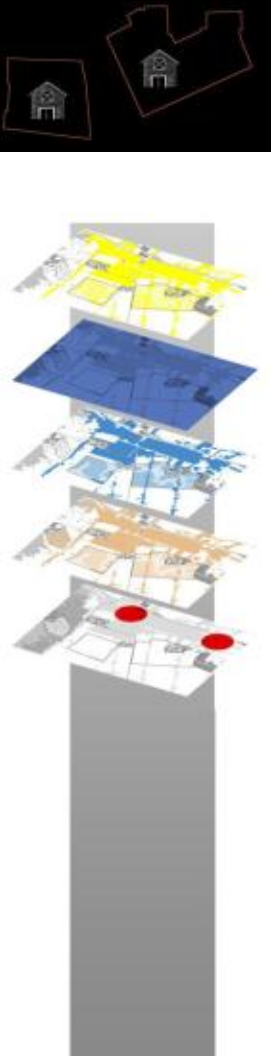
waste heat



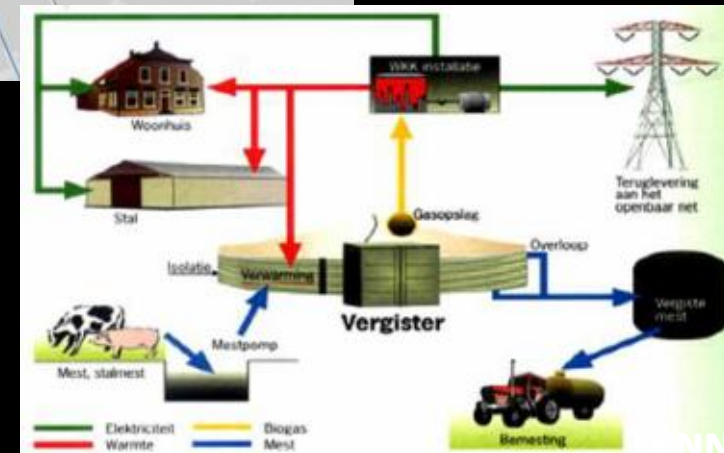
Cardboard factories: 2 x 125 GWh_{th}

Energy potentials

biomass

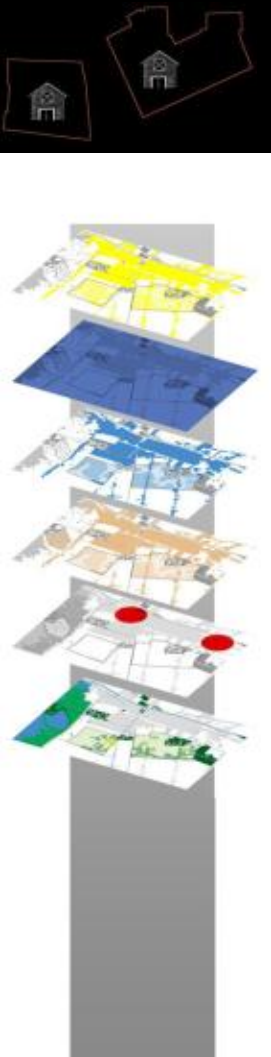


biogas
Chicken farms:
129.000 m³ (Ae)
1.1 GWh_{Ae}



Energy potentials

Biomass



Biomassa-incineration:

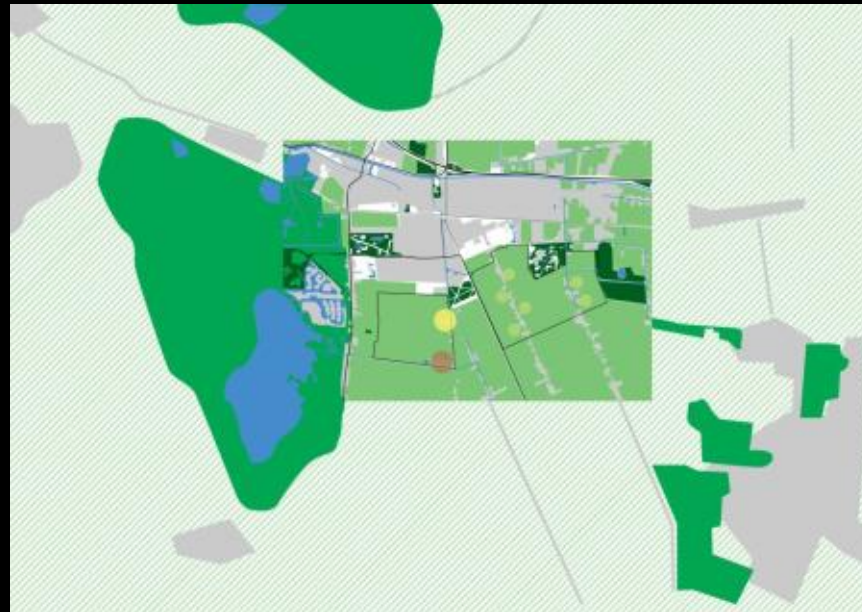
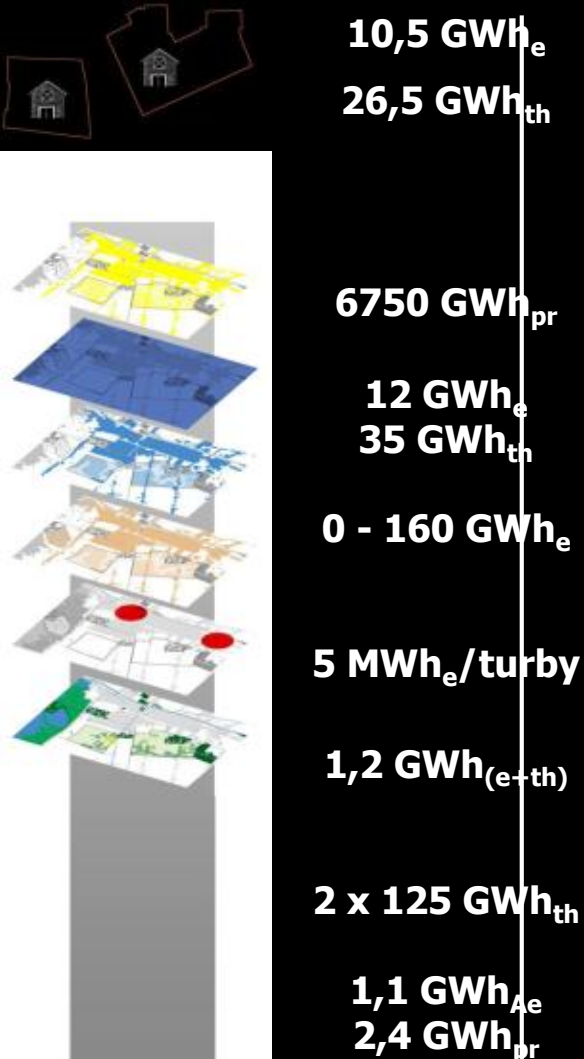
from maintenance of parks: 4.7 MWh_{pr}/ha

and gardens: 18,9 MWh_{pr}/ha

→ DGC: 2,4 GWh_{pr}

Energy potentials

biomass



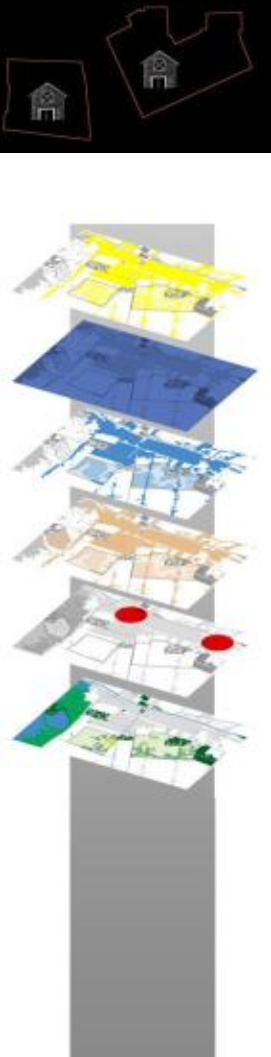
Biomassa-verbrandingsinstallatie:

Nature and woodland maintenance:

→ DGC: 20 GWh_{pr}

Energy potentials

Soil to 50 m. heatexchangers



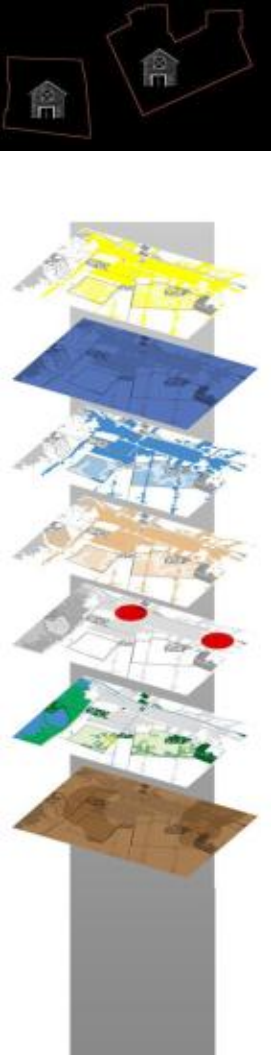
zeer geschikt



geschikt

Energy potentials

soil (50-500m): aquifers for heat cold storage



10,5 GWh_e

26,5 GWh_{th}

6750 GWh_{pr}

12 GWh_e

35 GWh_{th}

0 - 160 GWh_e

5 MWh_e/turby

1,2 GWh_(e+th)

2 x 125 GWh_{th}

1,1 GWh_{Ac}

2,4 - 20 GWh_{pr}

z.g.

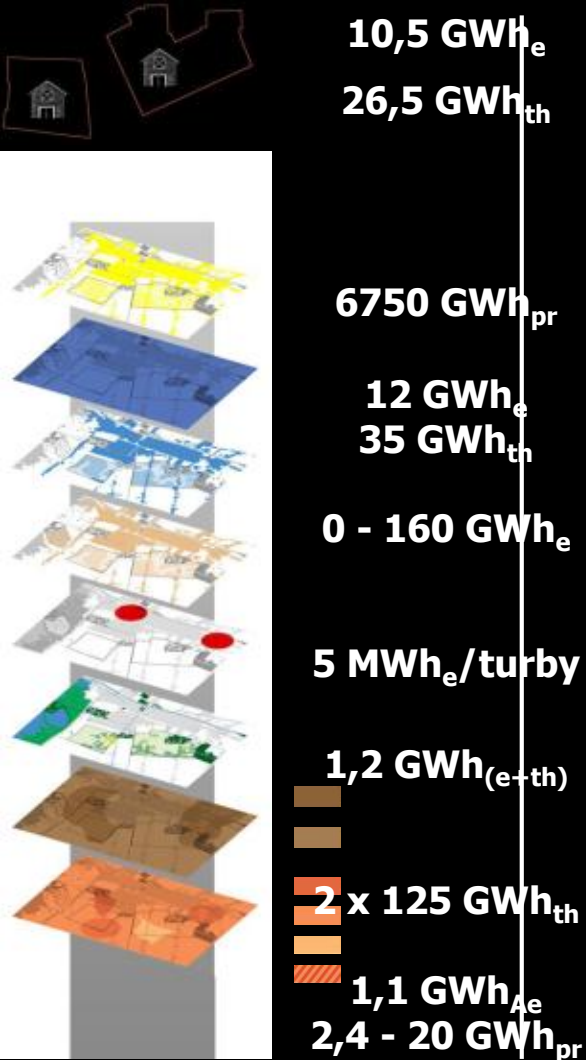
g.



Very good
good
Not good
Restricted areas

Energy potentials

Soil(3000m): geothermal

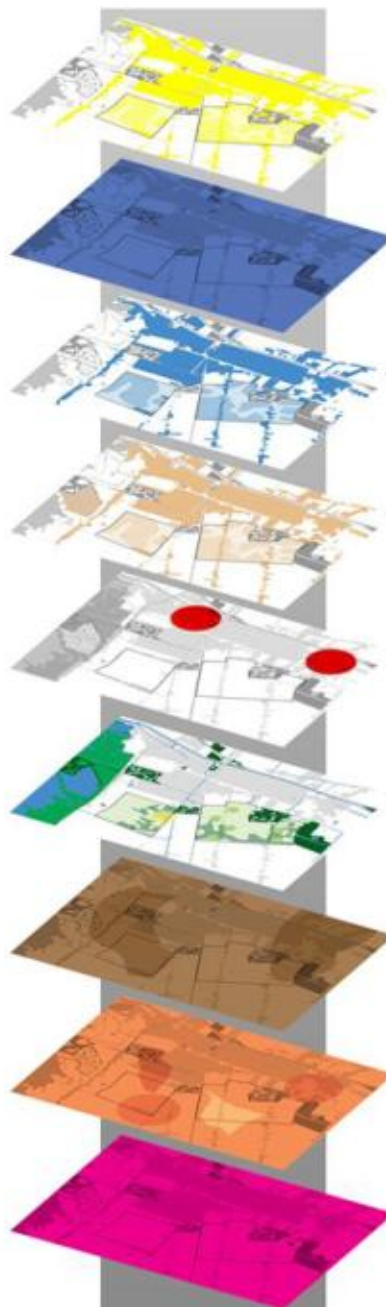


Temperature at 3000m: 105 °C

Energiepotenties

DGC; 700ha

Zon	
9640 MWh _{pr} /ha	6750 GWh _{pr}
Wind, 100m	
228 MWh _e /ha	160 GWh _e
Wind, 30m	
56 MWh _e /ha	5 MWh _e /turby
Afval, huishoudens	
1,7 MWh _(e + th) /ha	1,2 GWh _(e + th)
Restwarmte	
	Kappa
	2x 125 GWh _{th}
Biomassa	
Natuuronderhoud	Onderhoud DGC
4,7 MWh _{pr} /ha	2,4 GWh _{pr}
Bosonderhoud	Eifarm
18,9 MWh _{pr} /ha	1,1 GWh _{pr}
	Onderhoud omgeving
	20 GWh _{pr}
Bodem tot -50m	Bodemgeschiktheid WW
verticale WW	<div></div> Zeer geschikt <div></div> Geschikt
Aquifers	Aquifergeschiktheid
w/k opslag	<div></div> Zeer geschikt <div></div> Niet geschikt <div></div> Onbekend <div></div> Restrictiegebieden
Geothermie, -3000m	Geothermie
105 °C	<div></div> Gasboorpunt



Toegepast

PV, daken
12 GWh_e
Zonne-collectoren, daken
25 GWh_{th}

Wind, grote turbines
160 GWh_e

Wind, turby's
39 GWh_e

Afval, verbranding
1,2 GWh_(e + th)

Restwarmte
Kappa
250 GWh_{th}

Biomassa
Onderhoud DGC
2,4 GWh_{pr}
Eifarm
1,1 GWh_{pr}
Onderhoud omgeving
20 GWh_{pr}

Energievraag 3000 hh:
10,6 GWh_e
26,5 GWh_{th}

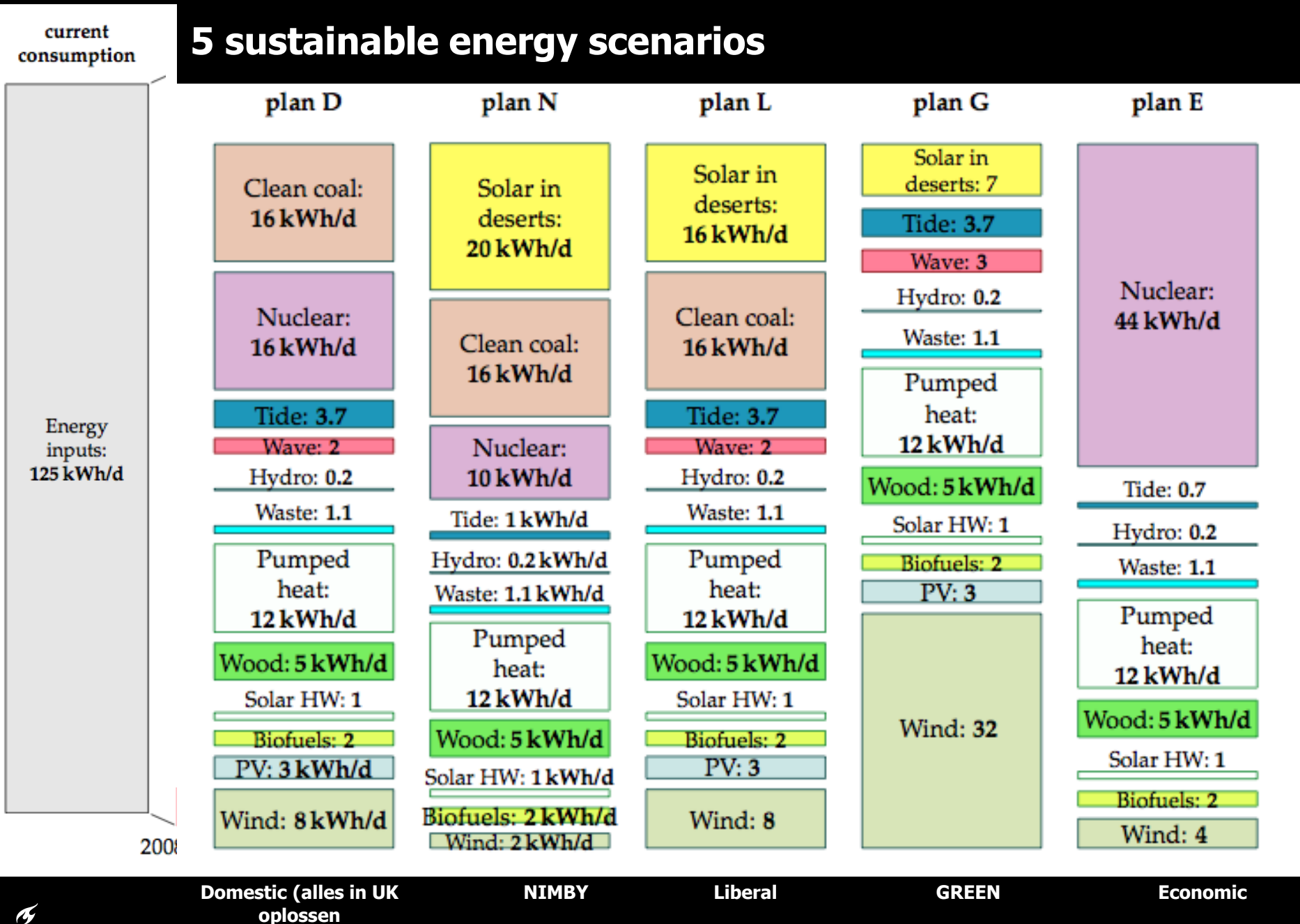
Energy = Space, so we need to plan with it also spatially

POWER PER UNIT LAND OR WATER AREA	
Wind	2 W/m ²
Offshore wind	3 W/m ²
Tidal pools	3 W/m ²
Tidal stream	6 W/m ²
Solar PV panels	5–20 W/m ²
Plants	0.5 W/m ²
Rain-water (highlands)	0.24 W/m ²
Hydroelectric facility	11 W/m ²
Geothermal	0.017 W/m ²
Solar chimney	0.1 W/m ²
Ocean thermal	5 W/m ²
Concentrating solar power (desert)	15 W/m²

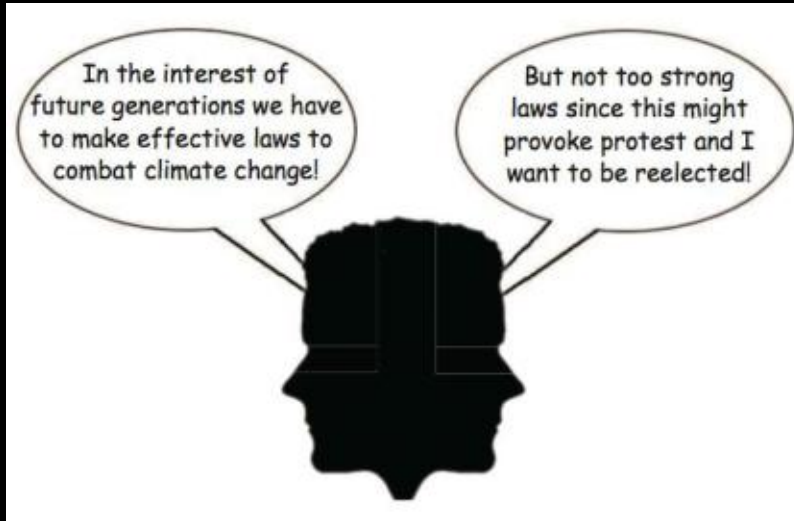
Table 4. Renewable facilities have to be country-sized because all renewables are so diffuse. This table lists the power per unit land-area or sea-area offered by a number of renewables.

uit David Mackay, energy
without hotair

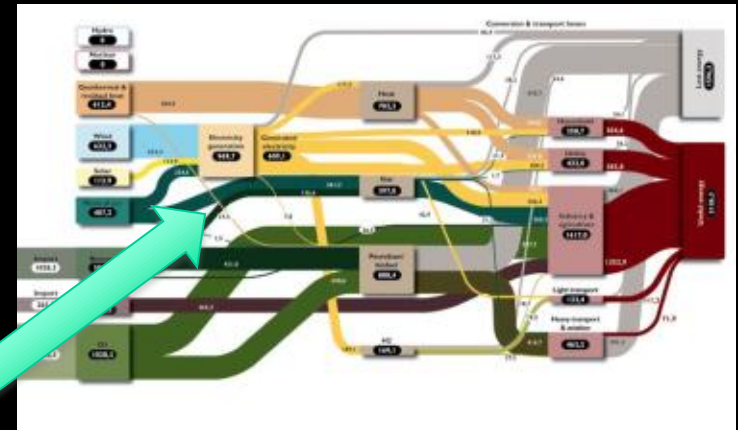
5 sustainable energy scenarios



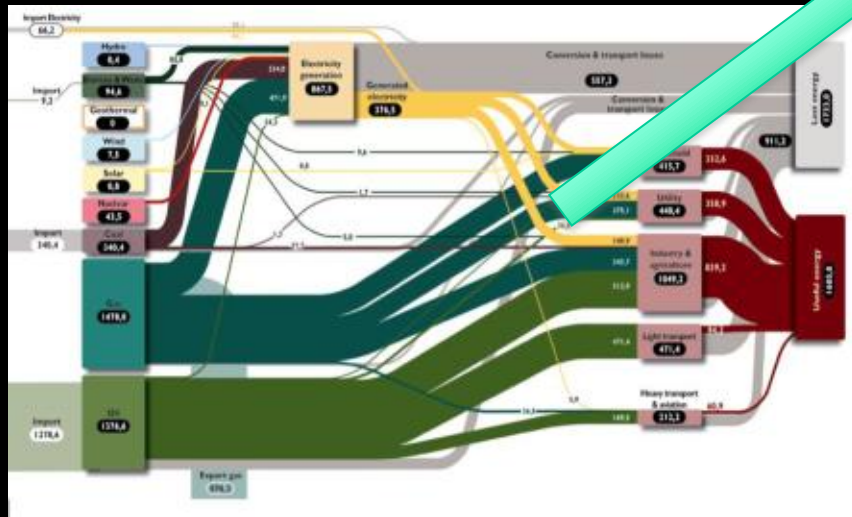
4. Energy scenarios for existing Cities/



And that while we have energy transitions as a task ahead of us.

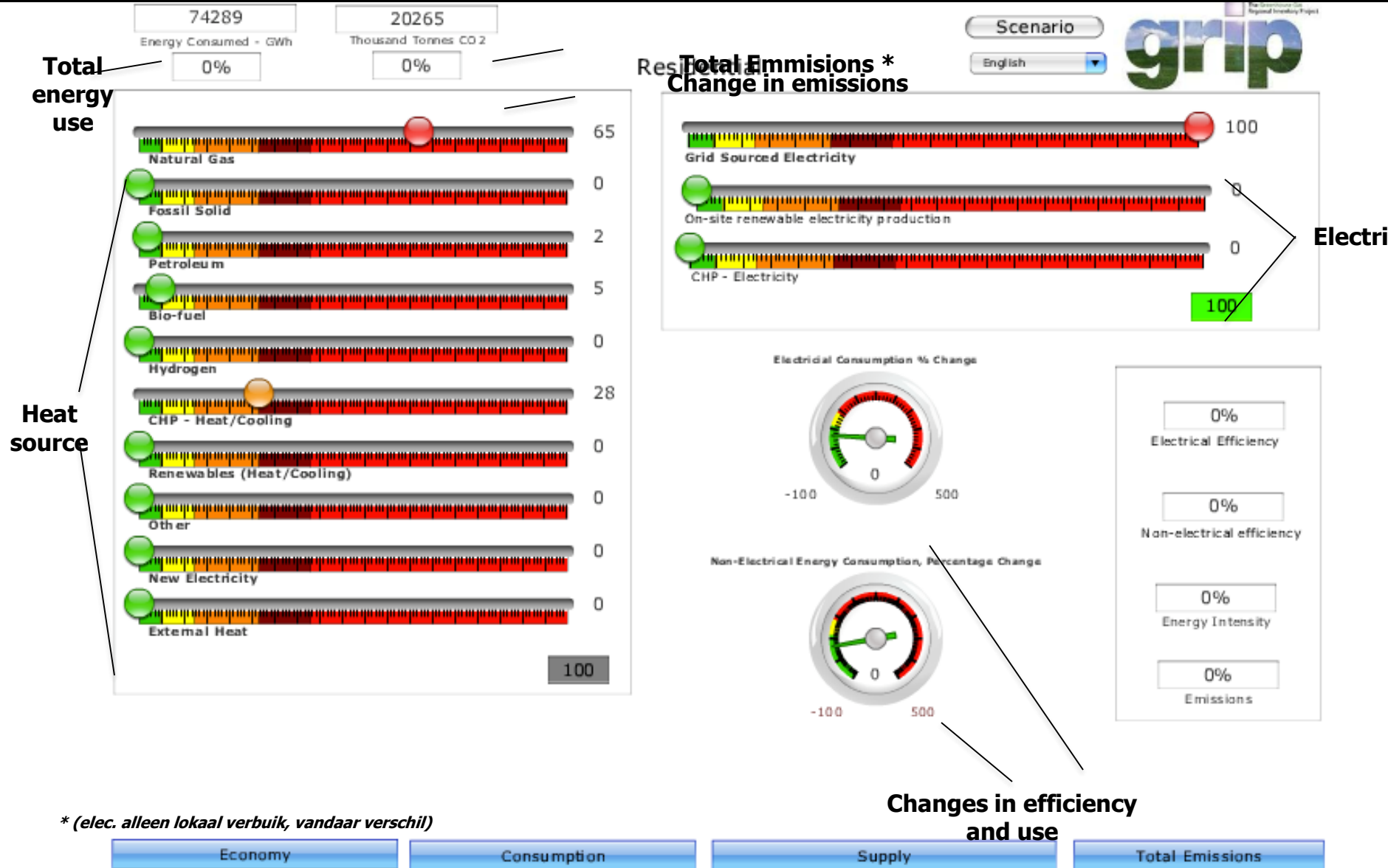


possible future mix



current energy mix

Scenariotool GRIP



Economy/demografy consumption and supply see direct CO2 effects Low carbon !!



Energie scenario tools is fed by 'all the previous' and discussion from SH

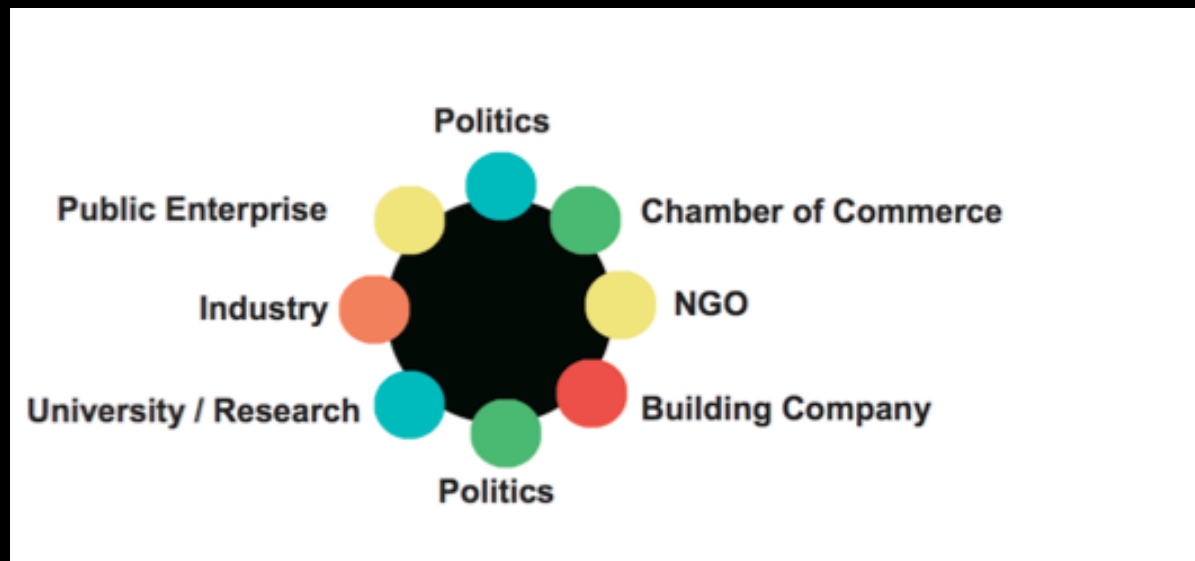


Figure metrex euco2 project

Having these results we can then use GIS for optimal locations where DH and all other solutions (might) go

Warmtevisie gemeente Rotterdam

Legenda

Concessiehouder

Eneco

Nuon

Overheersend woningtype (>2/3)

WT_portiekwoning

WT_galerijwoning

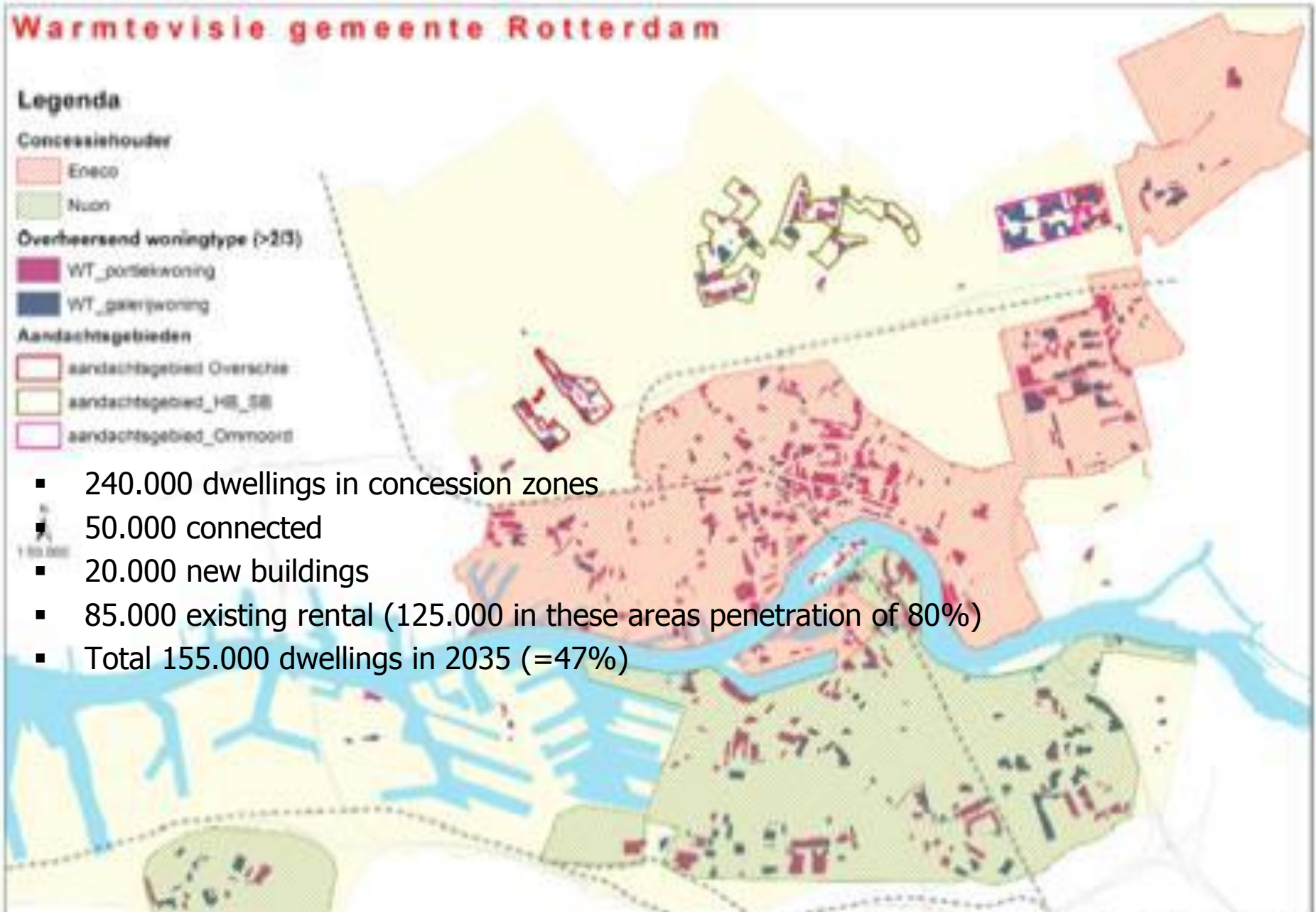
Aandachtsgebieden

aandachtsgebied Overschie

aandachtsgebied_HB_SB

aandachtsgebied_Ommoord

- 240.000 dwellings in concession zones
- 50.000 connected
- 20.000 new buildings
- 85.000 existing rental (125.000 in these areas penetration of 80%)
- Total 155.000 dwellings in 2035 (=47%)



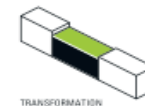
Part 3. Densification & Greening

see for pdf on internet at Rotterdam 'people make the innercity'

Densification plus Green = sustainable city ?
5000 trees, 80 ha of routes and green, 30.000 people?

- Walkability
- childfriendly
- Energy advantages
- Cycling
- Public transport
- More program, economic input
- Lively streets
- Cleaner air and water
- Less heat island effect

**DENSIFICATION + GREEN =
SUSTAINABLE CITY**
7 DENSIFICATION STRATEGIES



People in the city had already started so we just mapped it



Klushuizen / DIY houses Rotterdam

36

DENSIFICATION STRATEGY 07

DO-IT-YOURSELF



De bestaande woonvoorraad niet vergeten vraagt om een verdichtingsstrategie die omgang weet te vinden met een bestand aan te kleine, bouwtechnisch matig en slecht geïsoleerde woningen in vooral de negentiende-eeuwse ring binnen de binnenstad. Hierbij gaat het niet om verdichting in vierkante meters maar het geschikt maken van bouwblokken voor meer inwoners. Waar de te kleine woningen op de huidige woonmarkt alleen aantrekkelijk zijn als studio's en maisonnettes, kan juist het vrijgeven van samengestelde kavels als kluswoning ervoor zorgen dat grotere woningen voor gezinnen tot stand kunnen komen.

De bestaande stedelijke structuur in de oude stadswijken wordt benut in economische en sociale zin, alsmede de bestaande groenstructuur en speelruimten. Woonconsument en cooperatie investeren samen in de verbouwkosten. Uitermate geschikt voor jonge stellen en gezinnen die een wooncarrière willen maken in een bestaande woning. Tevens biedt de aanwezigheid van bestaande scholen en levendigheid van de binnenstad een aantrekkelijk woonmilieu.

IN PROGRESS

?SHALL WE ADD ALL HOUSING COOPERATIONS FROM 19TH CENTURY?



1	XXXX
2	XXXX
3	XXXX
4	XXXX
5	XXXX
6	XXXX
7	XXXX
8	XXXX
9	XXXX
10	XXXX

POTENTIAL MAP 2040 & infographics of +houses/district



Zwaerdecroonstraat



Wallas block met geweldige binnentuin

**But if you densify...
more green qualities needed 7 green strategies!!**



GLAMOROUS GRE

Parking lot becomes green public space



Urban farming: what does the 'garden city' of the 21st look like reusing phosphorus, producing biogas, social cohesion etc.



Childfriendly city 'woonerf revival ?' sidewalks go on for kids, special circulation for cars, public transport and bikes in all suburbs since 1980's

GREEN STRATEGY 05

PLAYGROUNDS

Kinderen zijn de toekomst van de stad

Hoe ben je zelf opgegroeid en wat waren jouw belangrijkste herinneringen? Met vriendelijke netjes buiten ravotten op het plein, klimmen in een boom, bloemen en bessen plukken kan ook in Een kindvriendelijke buitenruimte is essentieel voor een wervend en compleet woonmilieu in de kindvriendelijkheid heeft meer om het lijf heeft dan een aantal speelplekken te realiseren; het gaat om de ing van de openbare ruimte. Brede stoepen, langzaam verkeer routes en drempelruimten (engels: zones) spelen daarin een belangrijke rol. Brede stoepen bieden een informele ruimte voor spel. De zijn overgangsgebieden tussen het privédomein en de openbare ruimte, waar kinderen beschut er spelen. Daarnaast zijn ook specifieke voorzieningen voor allerlei doelgroepen nodig. Om de adolescenten een goede uitlaatklep te geven is er bijvoorbeeld het internationaal gewaardeerde skatepark aan de kleinsten en allerkleinsten is er het speelplein op 't Landje en zijn er de openbare sportvelden op werplein aan de rand van het centrum. Sport, spel en groen zijn bijzonder belangrijk voor de het vitale en gezonde kinderen. In de speelplekkenstrategie wil de gemeente bases voor kinderen maken spelaanleidingen en voldoende zitgelegenheid. In combinatie met de verschillende leefmilieus, om ken en voorzieningen die eigen zijn aan een binnenstad wordt het centrum zo een waar eldorado voor kinderen.

Kinderen zorgen voor levendigheid op straat en voor sociale contacten tussen alles en iedereen zijn de dragers van de nieuwe stedelijkheid. Quote Larry Beasley maart 2008

IN PROGRESS

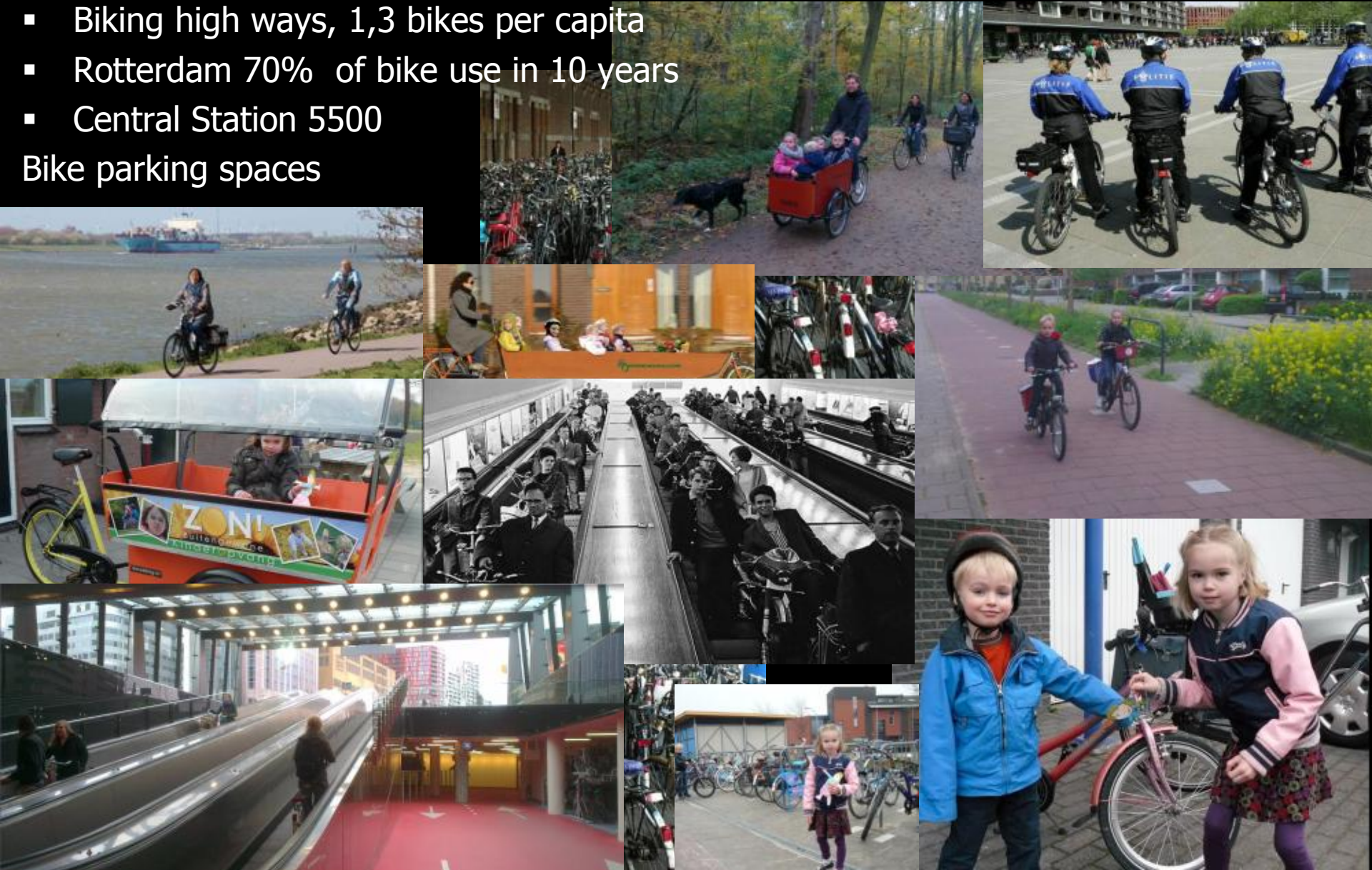


play wilderness

Green network with more walking and biking

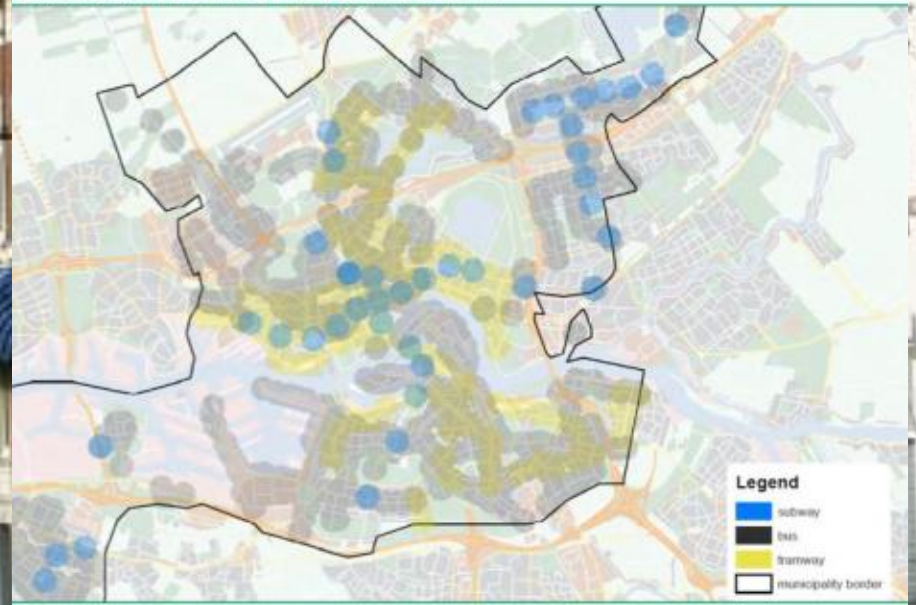
- Biking high ways, 1,3 bikes per capita
- Rotterdam 70% of bike use in 10 years
- Central Station 5500

Bike parking spaces





Areas in Rotterdam within 300 metres of public transport



public transport 300 m from every home...and use grass!

Integrated planning with green

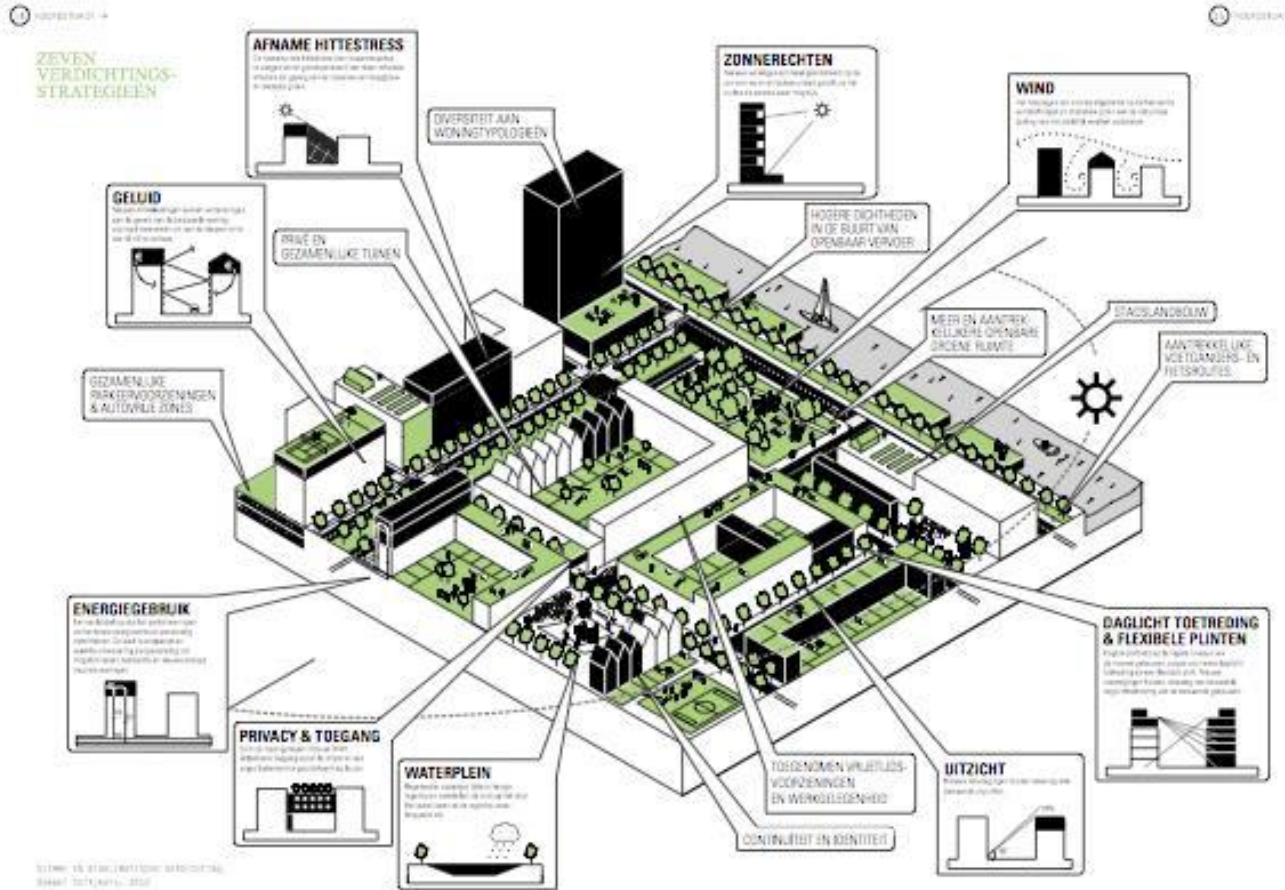


Figure 3.4. The Urban Green Structure

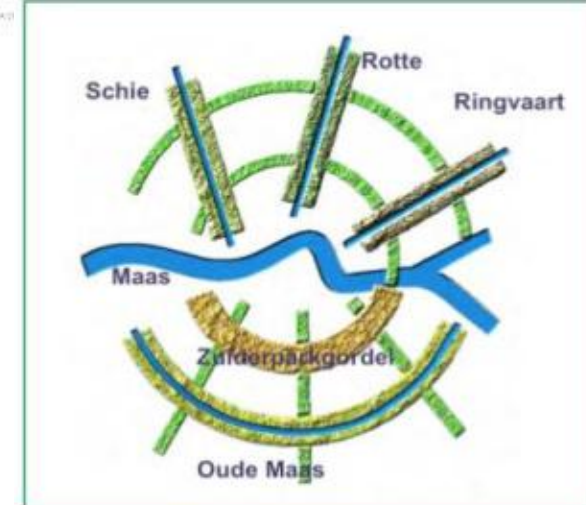


Image DoepelStribjkers architects

...in neighborhoods for heatisland, watergardens, wind, solar rights etc

Assessment 30.000 inhabitants + 141 ha green

Healthy Life expectancy increased with two years

Quality of Life increases mainly by introducing a green/blue network and smart transport



Question is how does Rotterdam compare to other cities?

Part 4. Using City data

comparing cities & city rankings

- Many rankings, standardization needed
- Feedback on your score
- standardized 3rd party verified data
- Indicator evolution
- Weighing black box
- Resilience, adaptation capacity
- Governance
- Use of local potentials (renewables)
- Indirect impacts of consumption elsewhere..so footprint

City	Country	Rating	City	Country	Rating	City	Country	2009
1 Melbourne	Australia	97.5	1 Vienna	Austria	108.6	1 Munich	Germany	(24)
2 Vienna	Austria	97.4	2 Zurich	Switzerland	108	2 Copenhagen	Denmark	(32)
3 Vancouver	Canada	97.3	3 Geneva	Switzerland	107.9	3 Zurich	Switzerland	(31)
4 Toronto	Canada	97.2	4 Auckland	New Zealand	107.4	4 Tokyo	Japan	(33)
5 Calgary	Canada	96.6	5 Vancouver	Canada	107.4	5 Helsinki	Finland	(35)
6 Sydney	Australia	96.1	6 Düsseldorf	Germany	107.2	6 Stockholm	Sweden	(36)
7 Helsinki	Finland	96.0	7 Frankfurt	Germany	107	7 Paris	France	(38)
8 Perth	Australia	95.9	8 Munich	Germany	107	8 Vienna	Austria	(37)
9 Adelaide	Australia	95.9	9 Bern	Switzerland	106.5	9 Melbourne	Australia	(39)
10 Auckland	New Zealand	95.7	10 Sydney	Australia	106.3	10 Madrid	Spain	(12)



It is about improving. How do we perform, monitor, target actions and improve?



If you can't measure it, you can't manage it



NEED FOR STANDARDS, INDICATORS 'FRAMEWORK' !

**Global
Cities
Institute**

Global City
Indicators
Facility

SINCE 2008

MEMBERS - 255 CITIES ACROSS 82 COUNTRIES

studies





ISO 37120

Sustainable development of communities

Indicators for city services and quality of life

First edition
2014-05-15

The first ISO Standard
on
Global City Indicators



Manage

and make informed decisions through data analysis



Benchmark

and target



Leverage Funding

with senior levels of government



Plan

and establish new frameworks for sustainable urban development



Evaluate

the impact of infrastructure projects on the overall performance of a city



WCCD

**WORLD COUNCIL
ON CITY DATA**



**STANDARDIZED
DATA**

**DATA
INSPIRED
GOALS**

**DATA
INFORMED
TARGETS**

**DATA
DRIVEN
RESULTS**

SMART

SUSTAINABLE

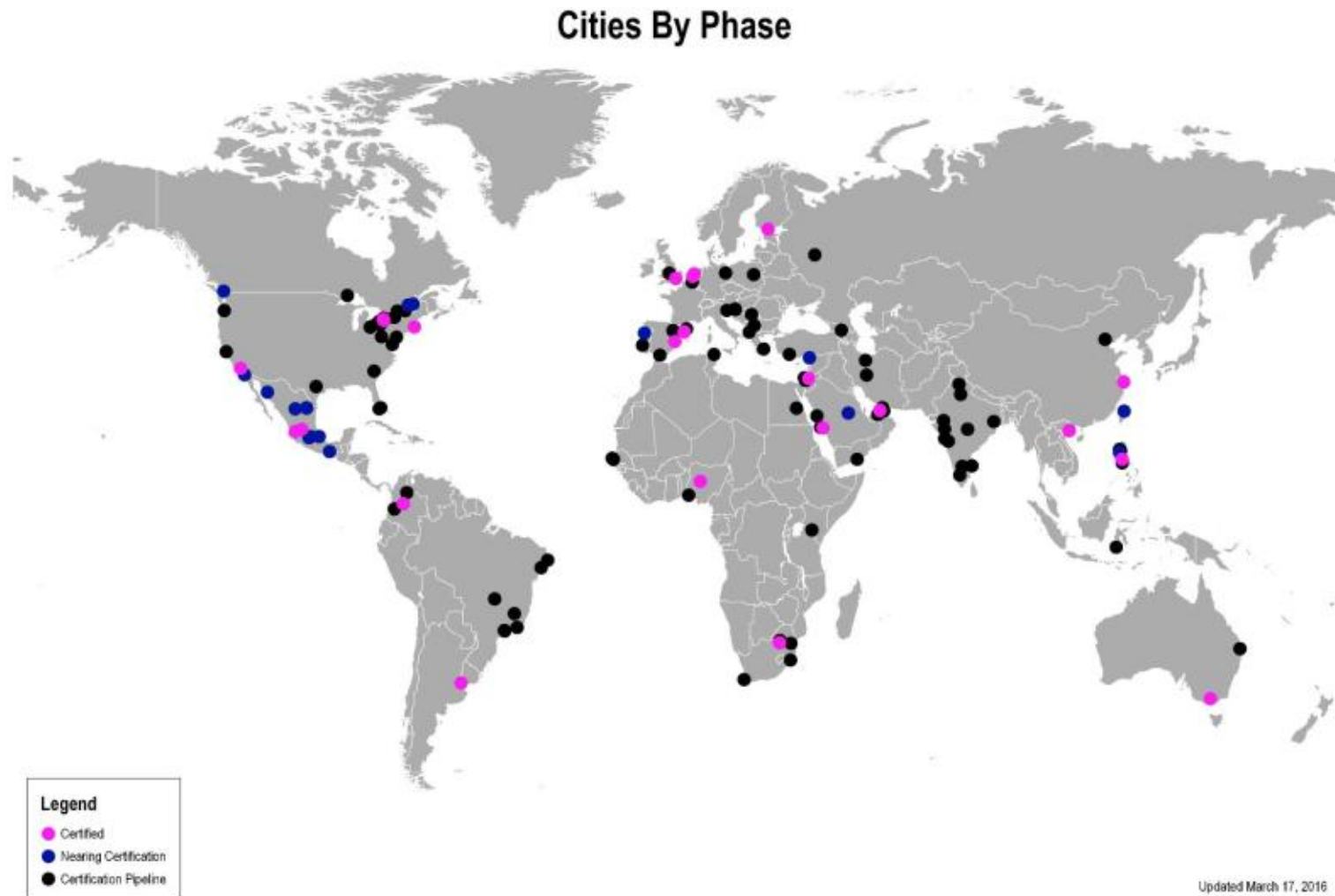
FUTURE FOR CITIES

RESILIENT

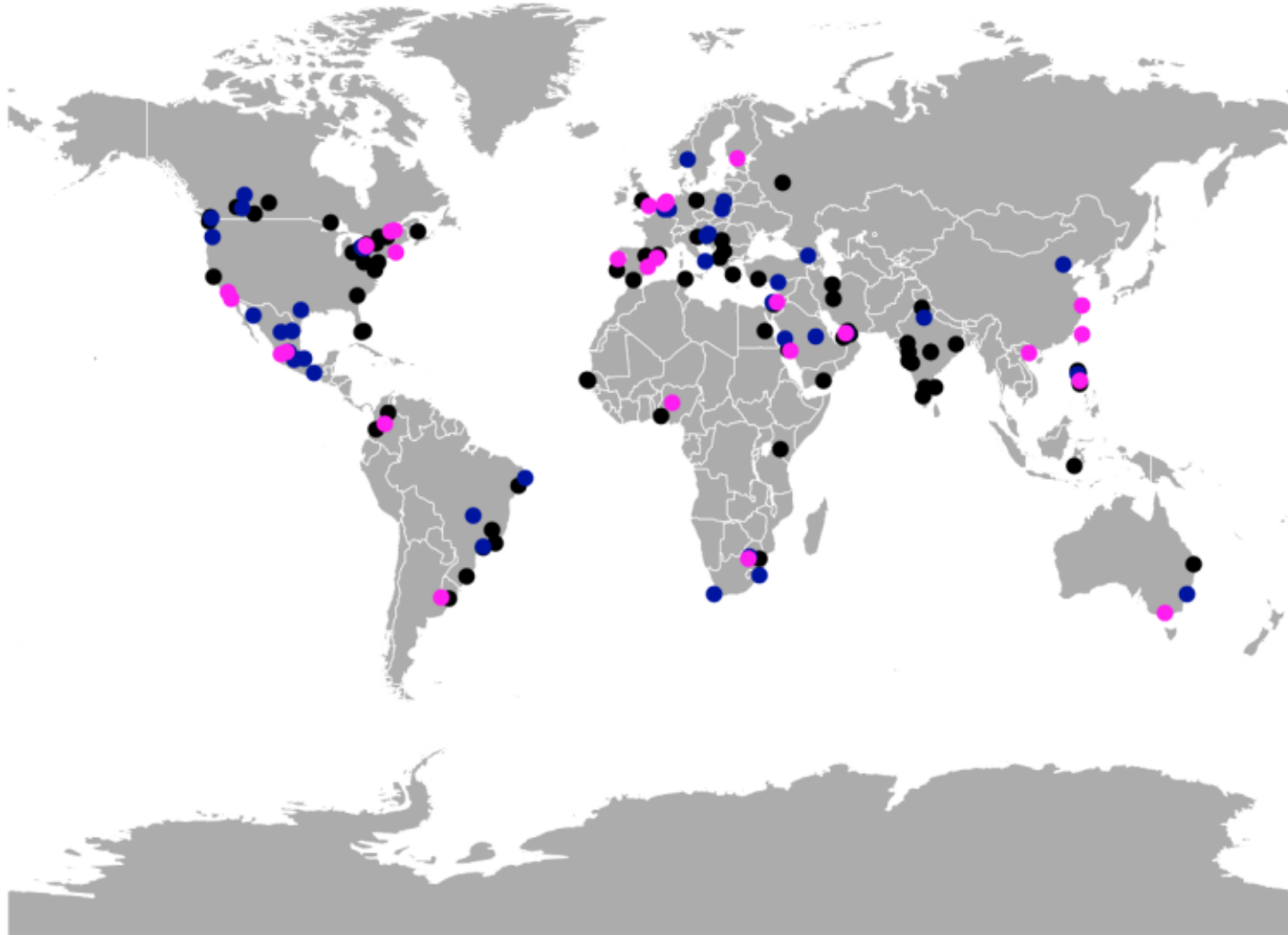
PROSPEROUS



20 FOUNDATION CITIES, NOW 40 - 100 BY DUBAI SUMMIT



FULL CERTIFICATION PIPELINE



Pink = Certified under ISO 37120

Blue = In certification process

Black = Ongoing conversation around certification

WCCD certification levels are based on the number of indicators reported by the city. The WCCD offers a wide range of certification levels.

ISO 37120



**WORLD COUNCIL
ON CITY DATA**

ISO 37120



**WORLD COUNCIL
ON CITY DATA**

ISO 37120



**WORLD COUNCIL
ON CITY DATA**

ISO 37120



**WORLD COUNCIL
ON CITY DATA**

ISO 37120



**WORLD COUNCIL
ON CITY DATA**

ASPIRATIONAL	BRONZE	SILVER	GOLD	PLATINUM
30-45 Core Indicators	46-59 Indicators (46 Core + 0-13 Supporting)	60-75 Indicators (46 Core + 14-29 Supporting)	76-90 Indicators (46 Core + 30-44 Supporting)	91-100 Indicators (46 Core + 45-54 Supporting)



WCCD

ISO 37120

WORLD COUNCIL ON CITY DATA

**WELCOMING CITIES OF ALL SIZES
TO BECOME ISO 37120 CERTIFIED**

0 – 250,000

250,000 – 500,000

500,000 – 750,000

750,000 – 1,000,000

1,000,000 – 5,000,000

5,000,000 – 10,000,000

10,000,000 +

OPEN DATA PLATFORM



[HOME](#) [ABOUT](#) [DATA PORTAL](#) [GLOBAL CITIES REGISTRY™](#) [JOIN US](#) [CITIES PORTAL](#) [PARTNERS](#) [CONNECT WITH THE WCCD](#)

WCCD
ISO 37120

World Council on City Data
Created by Cities for Cities

**THE FIRST ISO
CERTIFIED CITY DATA**
#dataforcities

WWW.DATAFORCITIES.ORG



WCCD

ISO 37120

KNOW YOUR CITY



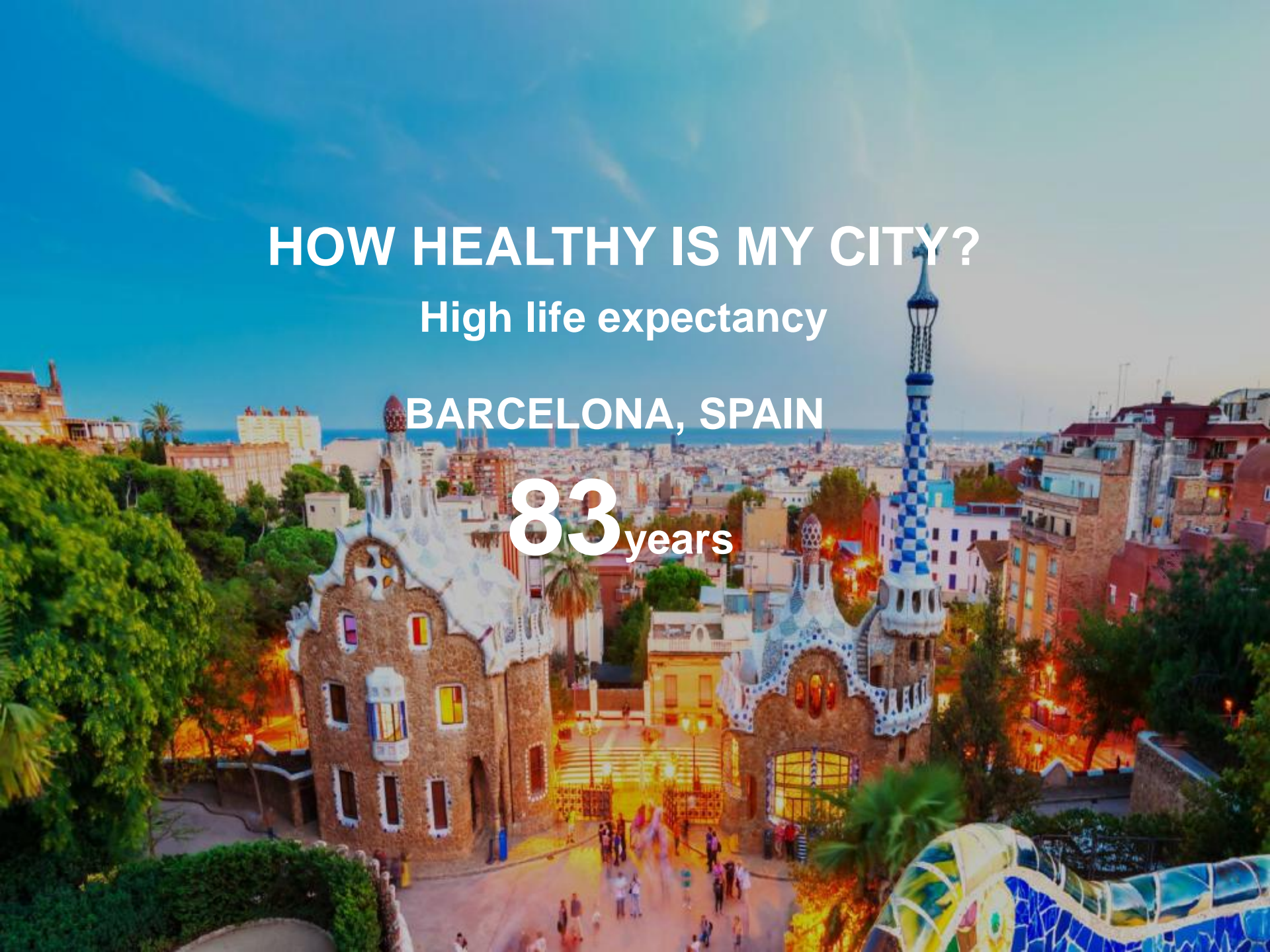
TO ANSWER QUESTIONS LIKE ...

HOW HEALTHY IS MY CITY?

High life expectancy

BARCELONA, SPAIN

83 years



HOW GREEN IS MY CITY?

High area of green space

HELSINKI, FINLAND

1,489

Hectares per 100,000



HOW DO PEOPLE MOVE AROUND MY CITY?

High kilometers of bike lanes

ROTTERDAM, NETHERLANDS

102 km

per 100,000 population



HOW DO PEOPLE MOVE AROUND MY CITY?

High percentage of commuters using alternative transportation

LONDON, UNITED KINGDOM

74%

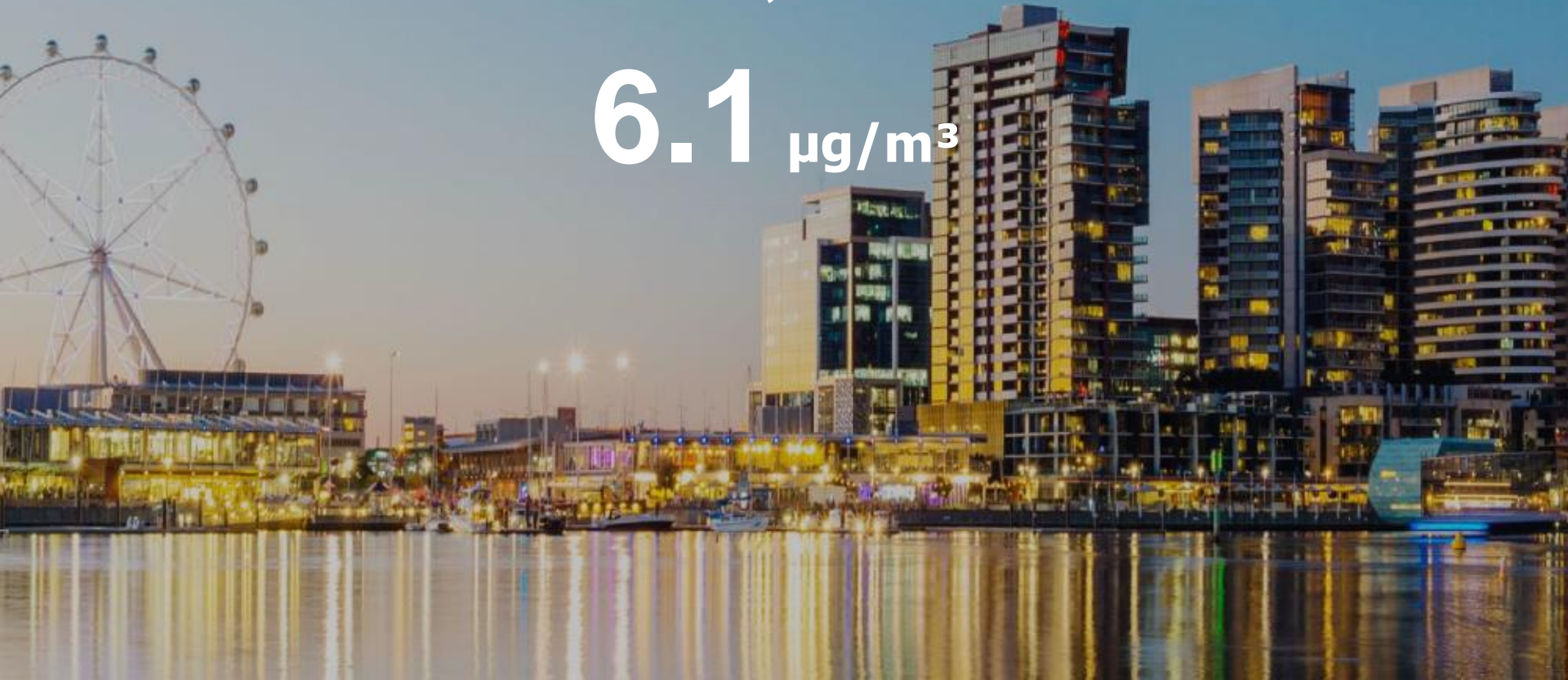


HOW CLEAN IS MY AIR?

Low PM2.5 concentration

MELBOURNE, AUSTRALIA

6.1 $\mu\text{g}/\text{m}^3$





WCCD

ISO 37120

CITY DATA FOR ALL



**EXPLORING THE WCCD
OPEN DATA PORTAL :
ANALYTICS AND GRAPHING**



ISO 37120 - 100 INDICATORS ACROSS 17 THEMES



Economy



Governance



Telecommunications



Education



Health



Transportation



Energy



Recreation



Urban
Planning



Environment



Safety



Wastewater



Finance



Shelter



Water &
Sanitation



Fire & Emergency
Response



Solid Waste

ANALYTICS, EXPLORING RELATIONS WITH 100 DATA POINTS

LIFE EXPECTANCY

PM2.5 CONCENTRATION

PM10 CONCENTRATION

GHG EMISSIONS

NO2 CONCENTRATION

SO2 CONCENTRATION

O3 CONCENTRATION

NOISE POLLUTION

CHANGE IN NATIVE SPECIES



LIFE EXPECTANCY

IN-PATIENT HOSPITAL BEDS

NUMBER OF PHYSICIANS

UNDER AGE 5 MORTALITY RATE

NUMBER OF NURSES/MIDWIVES

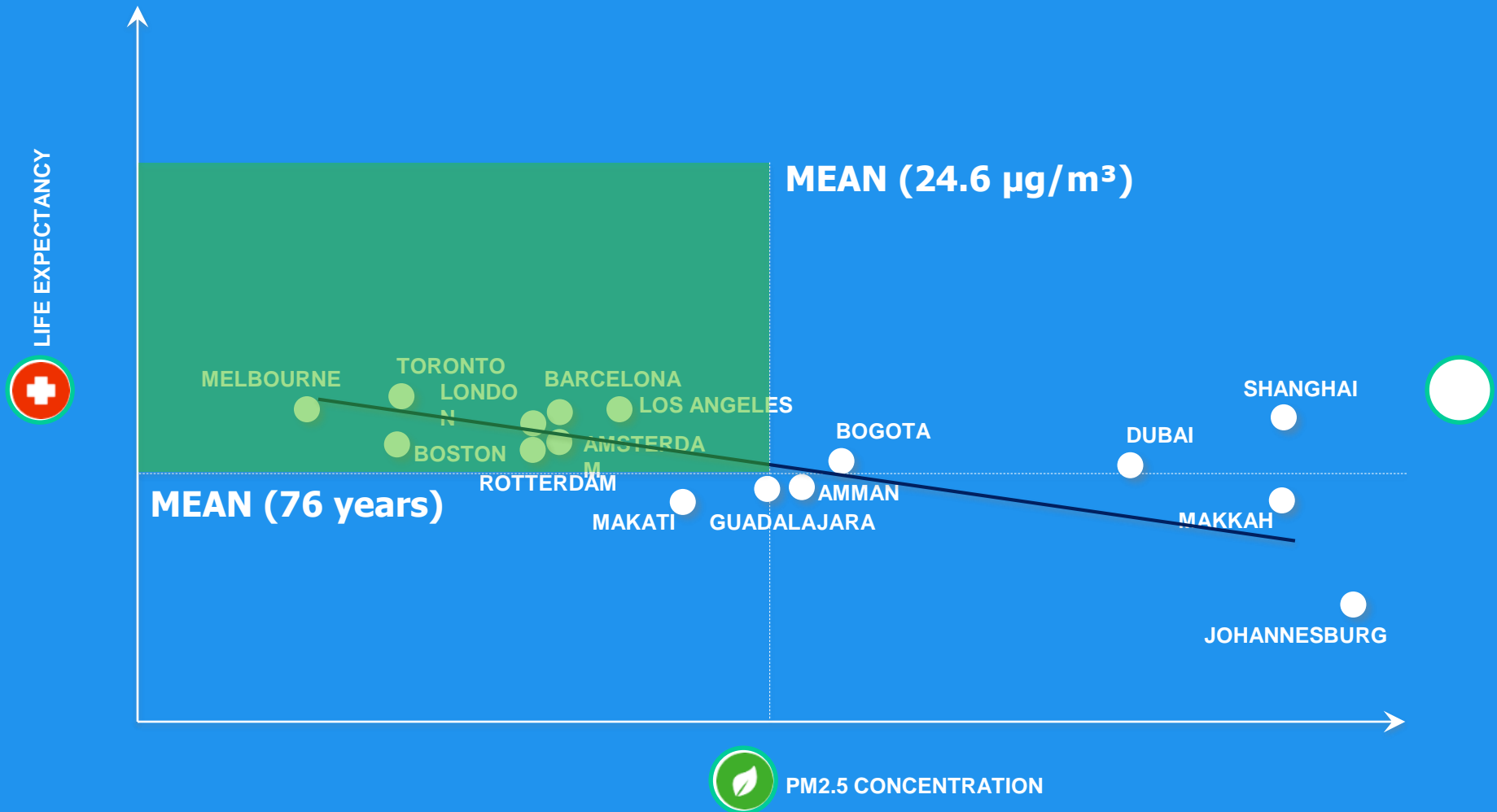
NUMBER OF MENTAL HEALTH

SUICIDE RATE



PM2.5 CONCENTRATION

ANALYTICS, EXPLORING RELATIONS WITH 100 DATA POINTS



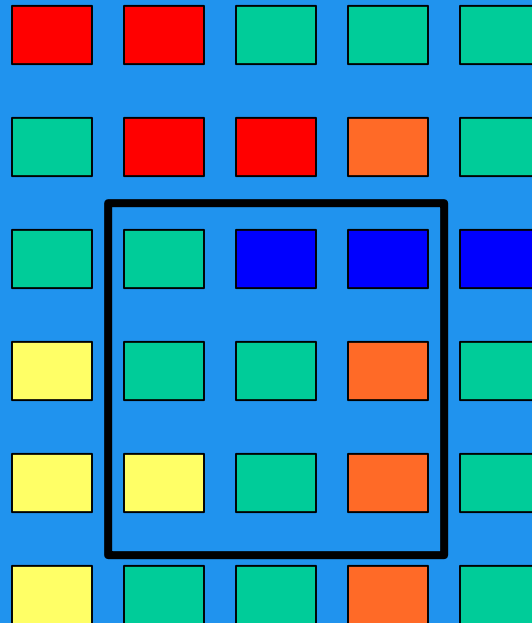
Local data in 'Smart City Planner'

Local Social Index
Local Health index
Local Safety index

For Politicians



For developers



*Core is 3rd party
verified data to compare
to other cities / rest is
local*

Hackaton with Open
Data for CleanWeb in
Rotterdam

For innovation

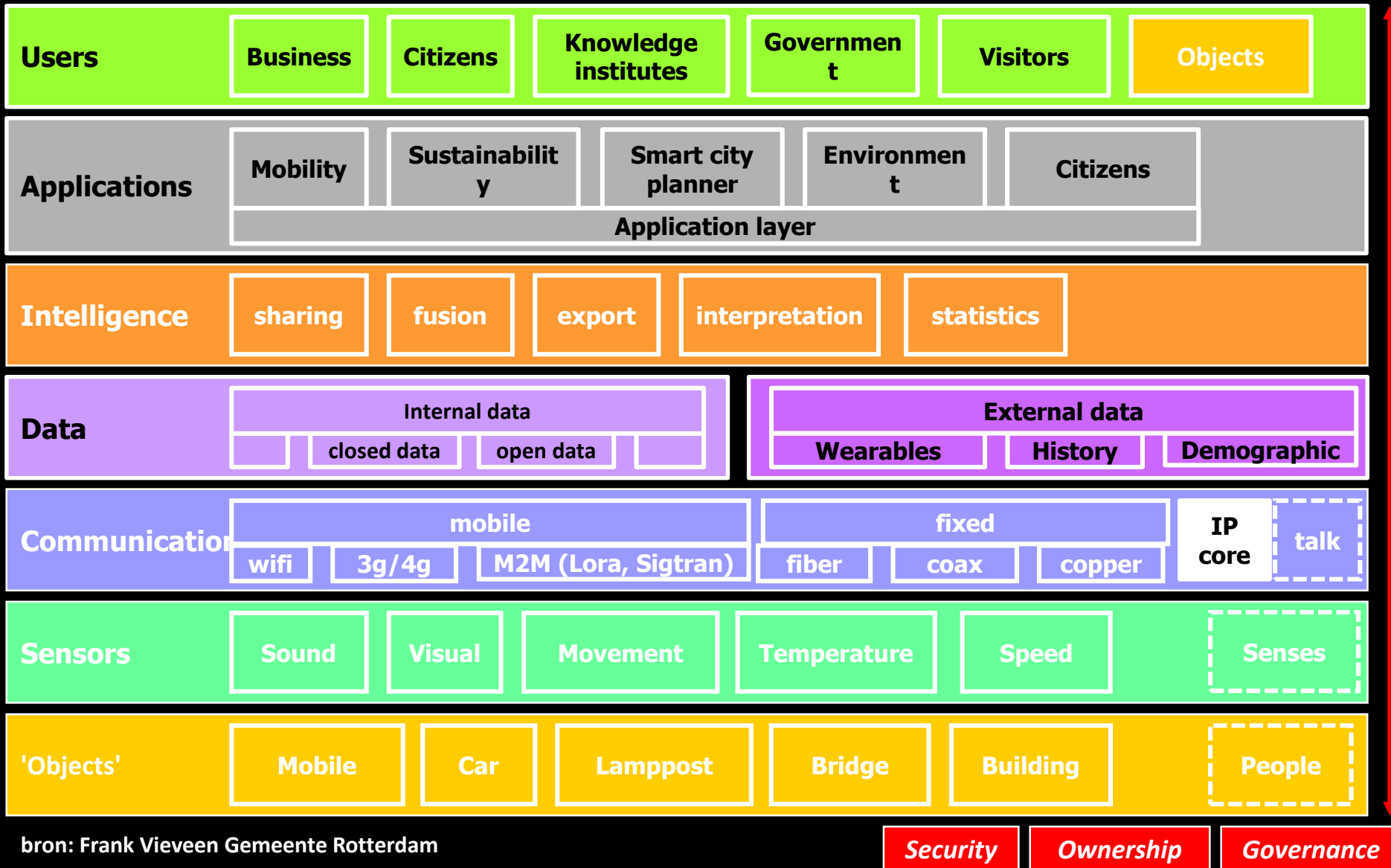
City	Country	Rating
1 Vienna	Austria	108.6
2 Zurich	Switzerland	108
3 Geneva	Switzerland	107.9
4 Auckland	New Zealand	107.4
Vancouver	Canada	107.4
6 Düsseldorf	Germany	107.2
7 Frankfurt	Germany	107
Munich	Germany	107
9 Bern	Switzerland	106.5
10 Sydney	Australia	106.3

For investors expats



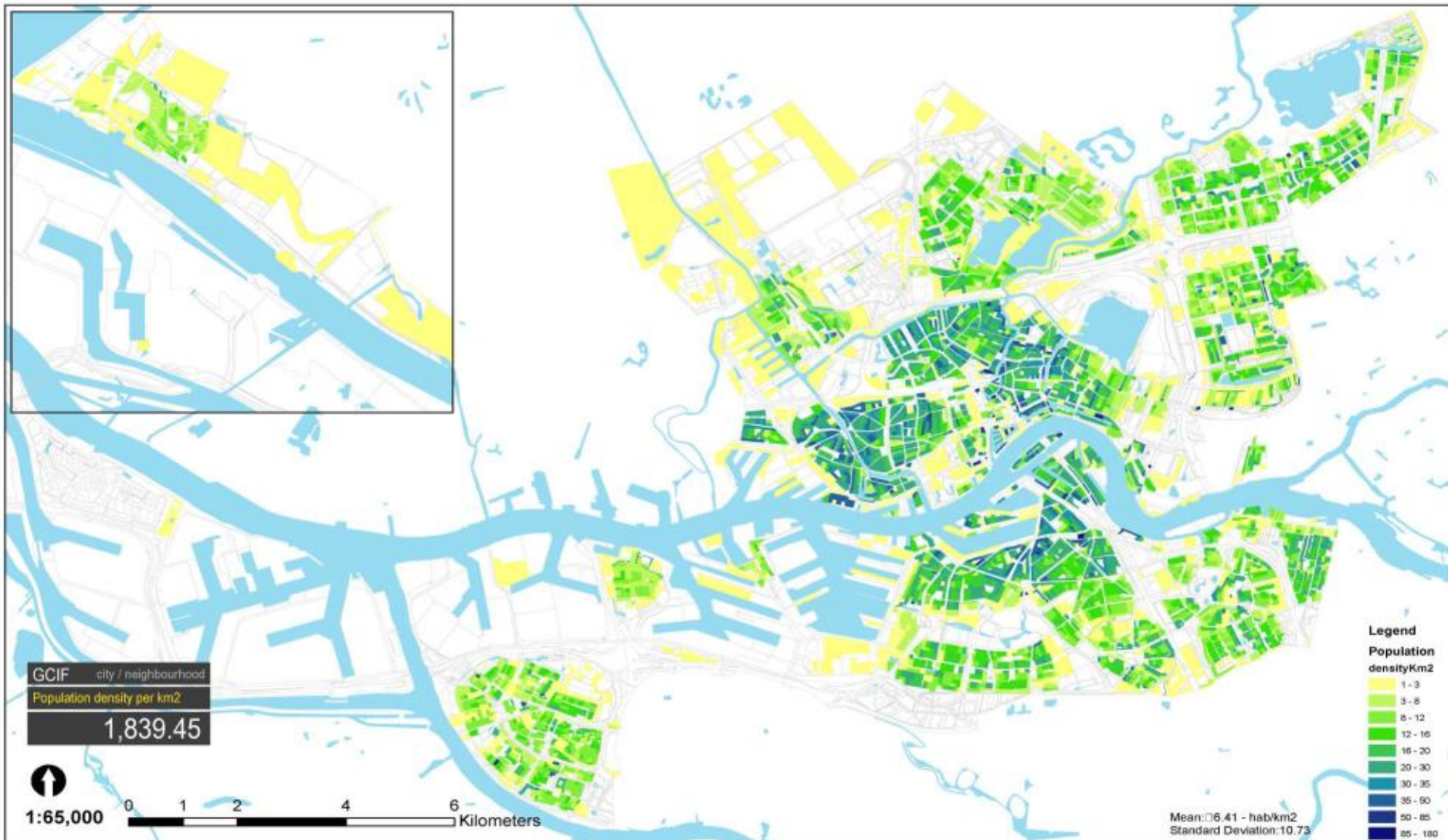
*For people
neighborhoods*

Example Rotterdam: Smart City architecture and iso37120



bron: Frank Veeven Gemeente Rotterdam

Makes mapping easier. A map is easier to read than many excell sheets



GCIF Indicators

Urban Planning, Shelter and Environmen - Population density per Km2

Gemeente Rotterdam
dS+V, afd. Ruimtelijke Ordening
trainee: Raed Gindeya M.

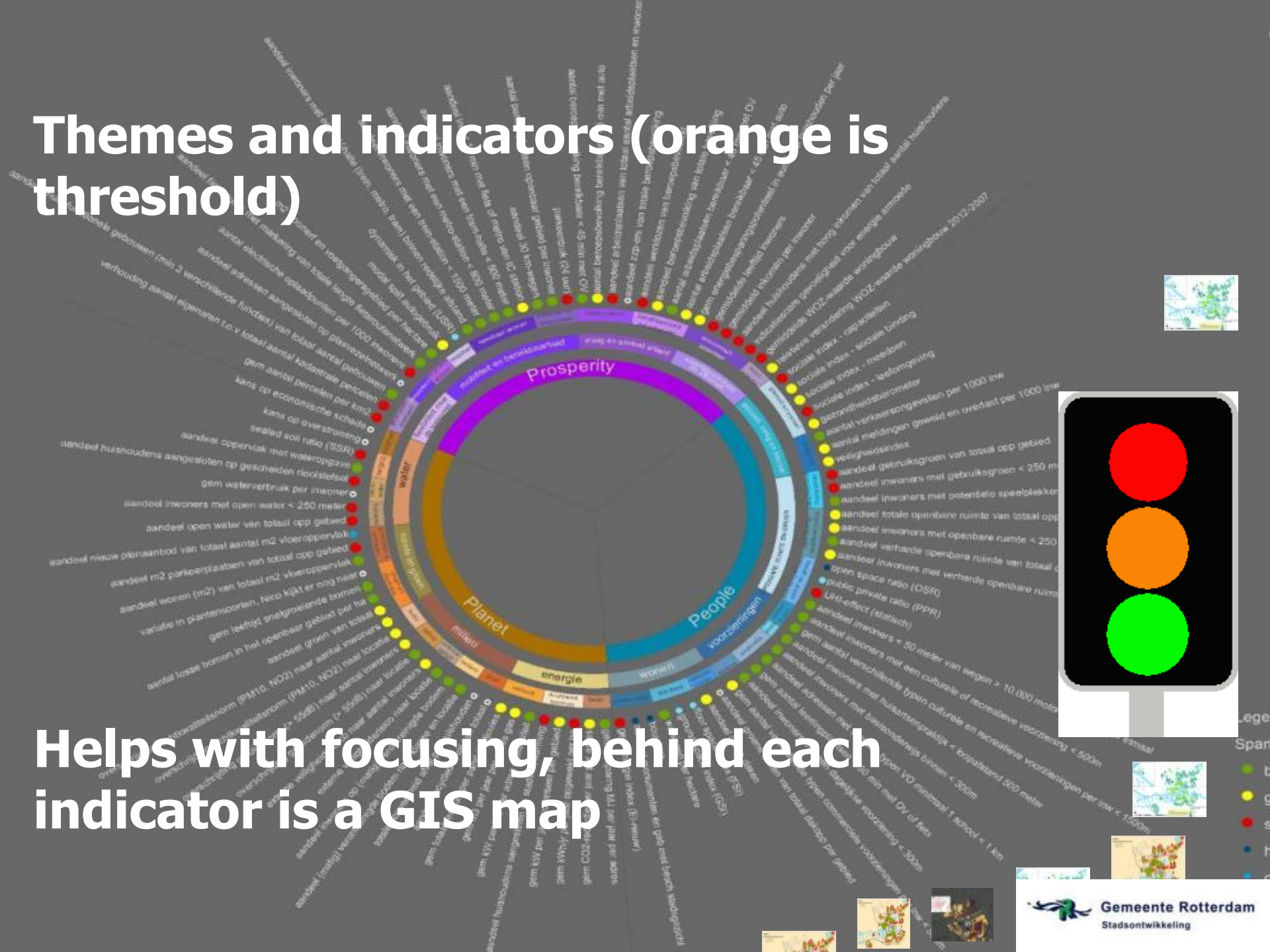
Themes and indicators (orange is threshold)

Helps with focusing, behind each indicator is a GIS map

Gemeente Rotterdam
Stadsontwikkeling

Themes and indicators (orange is threshold)

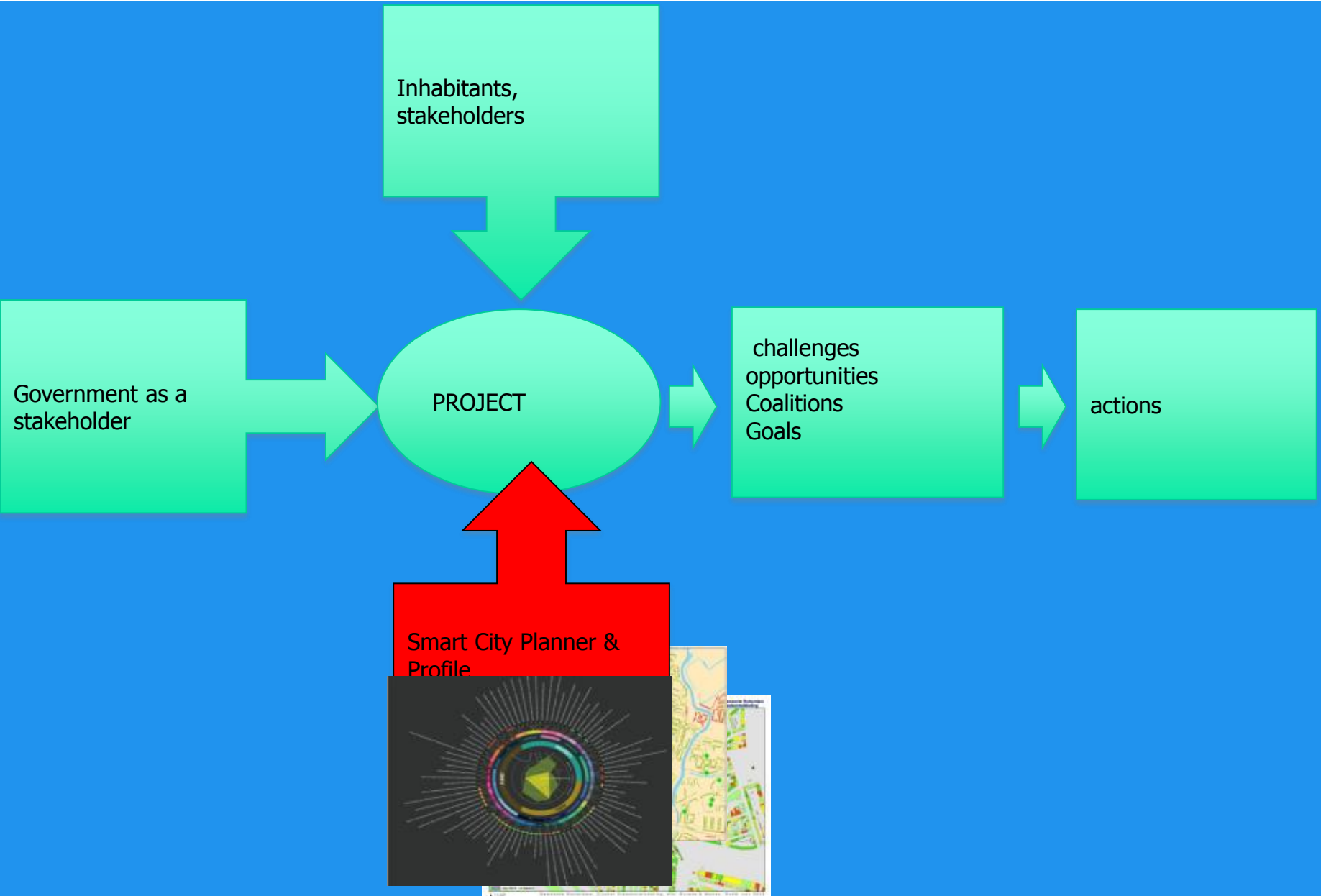
Helps with focusing, behind each indicator is a GIS map



**For whole city and for all 90
neighborhood**



Facilitate the transition, Use 'smart city planner'

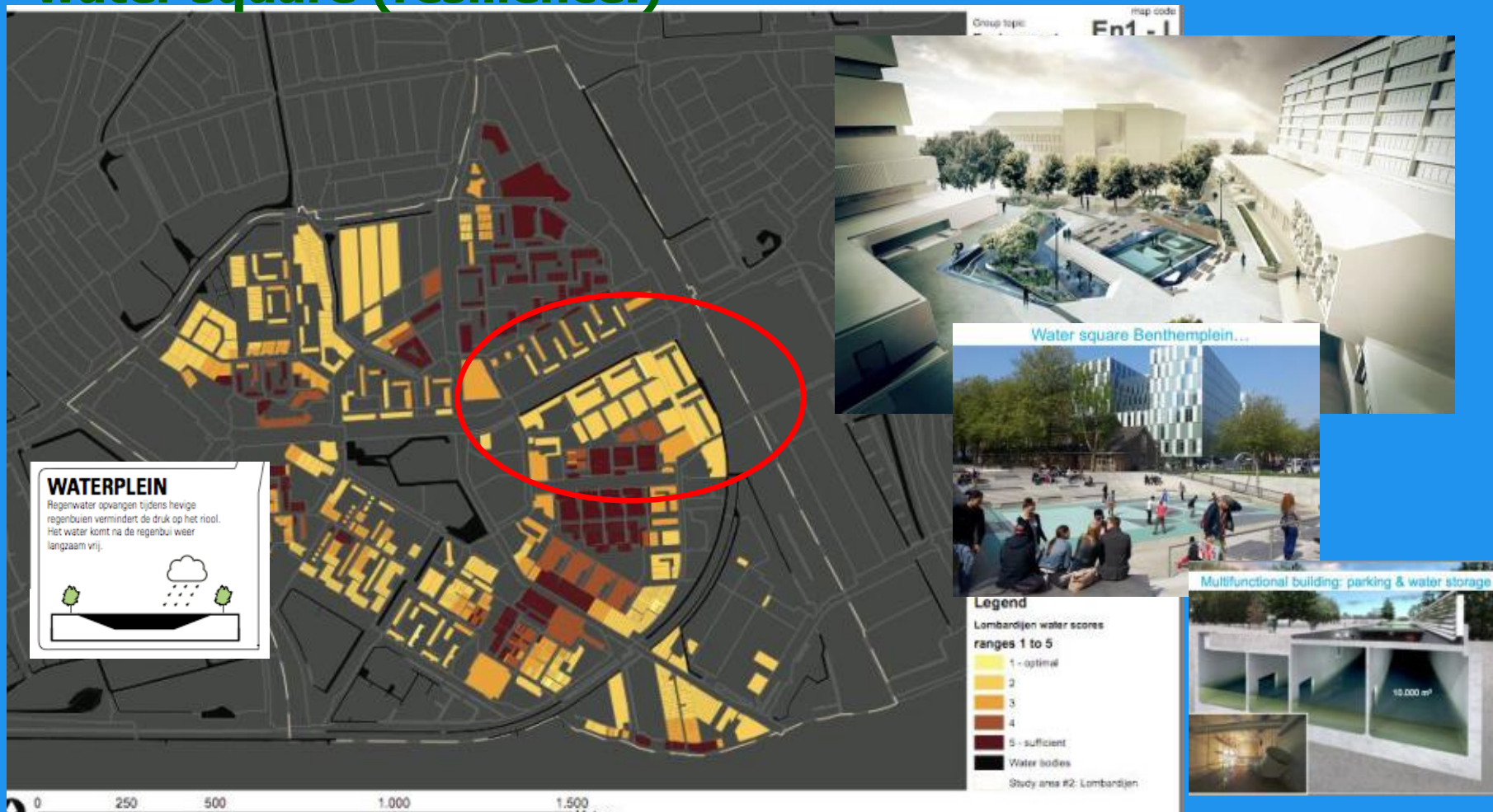


Put open, objective data on the table

Example of red scores can be

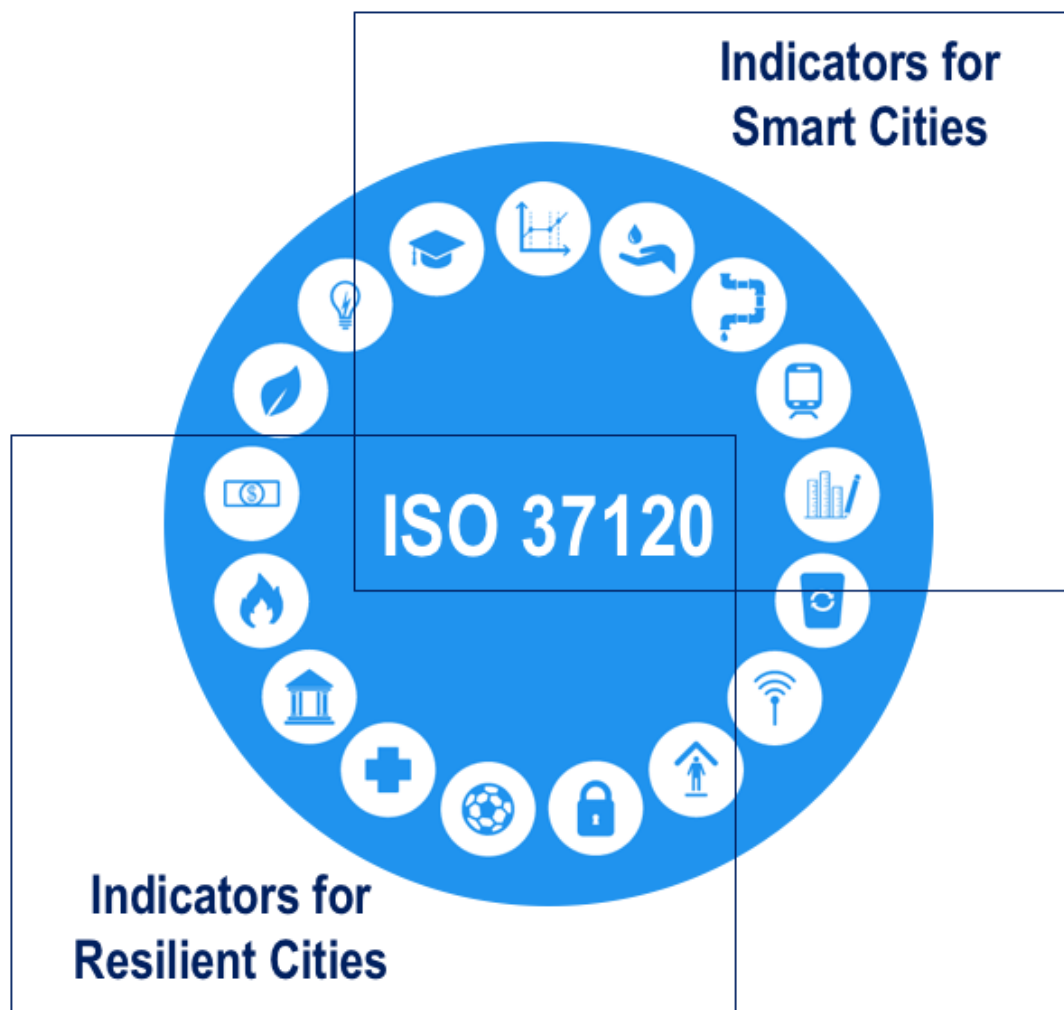
Waterproblems, recreation shortage, poor public space

Possible solution : RainGain monitor (smart) watergarden, water square (resilience!)



This leads back to the basic indicators in the standard37120

ISO FAMILY OF STANDARDS



WCCD

WORLD COUNCIL
ON CITY DATA

@wccitydata

WORKING WITH GLOBAL PARTNERS TO BUILD ANALYTICS AND TOOLS FOR EVIDENCE BASED DECISION MAKING



SIEMENS

PHILIPS

CITYNET



Cities Alliance
Cities Without Slums



@wccitydata

EXPANDING THE CITY NETWORK WITH GLOBAL PARTNERSHIPS



- Partnership with Executive Council of Dubai
- Regional Cities Meeting – Dec 2015
- Hosting the WCCD Global Cities Summit Dec 2016



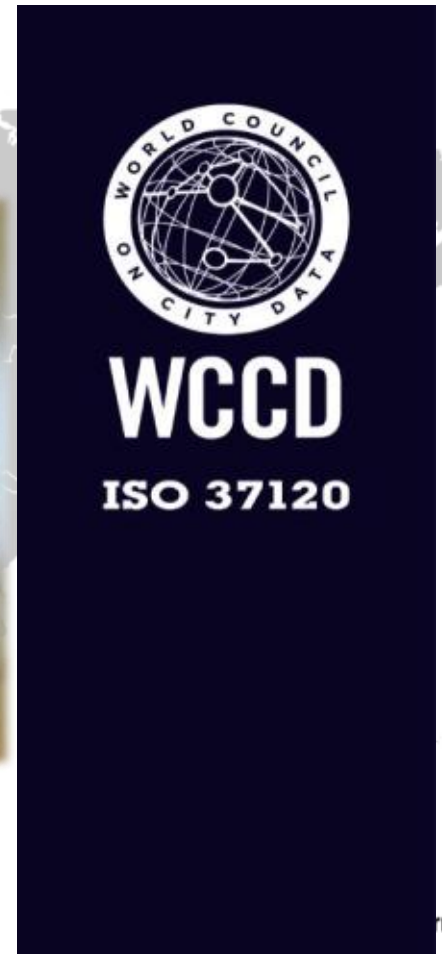
- MOU signed with Smart Cities Joint Lab – MOHURD, China
- Shanghai, Beijing and smart cities pilot
- ISO 37120 being adopted by Standards Association of China



- WCCD Office in Beijing (MOHURD)
- Mission to India in December 2015
- Smart Cities Initiative in India



- Agreement with National Government of Mexico
- Pilot cities

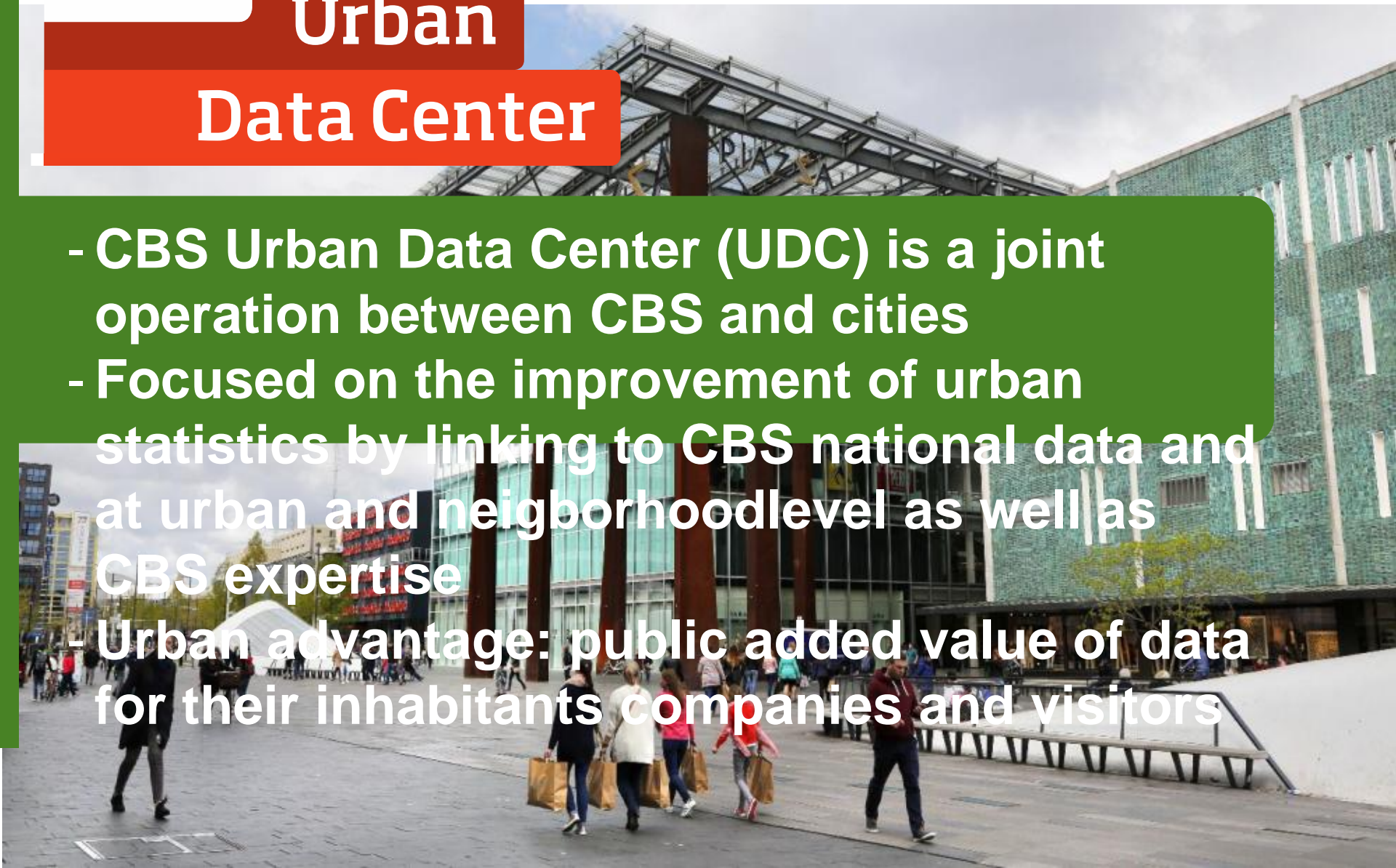


**WCCD and Dutch National
Statistics Office as partners**



Urban Data Center

- CBS Urban Data Center (UDC) is a joint operation between CBS and cities
- Focused on the improvement of urban statistics by linking to CBS national data and at urban and neighborhood level as well as CBS expertise
- Urban advantage: public added value of data for their inhabitants companies and visitors



- Poverty monitor for Eindhoven
- Job
- Mobility and healthy innercity
- ISO-certification for Eindhoven, many data provided by



CBS

Urban

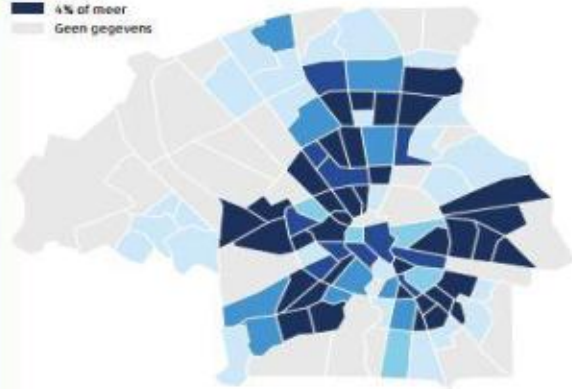
Data Center



EINDHOVEN

Percentage huishoudens met een langdurig laag inkomen per buurt in Eindhoven, 2013

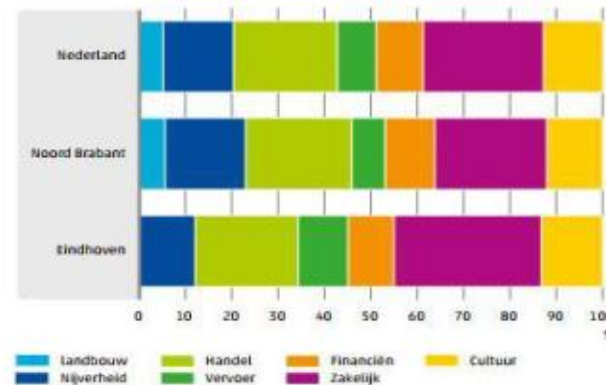
Minder dan 1,5%
1,5 tot 2%
2 tot 3%
3 tot 4%
4% of meer
Geen gegevens



90% passagiers luchthaven
Eindhoven vliegt binnen EU

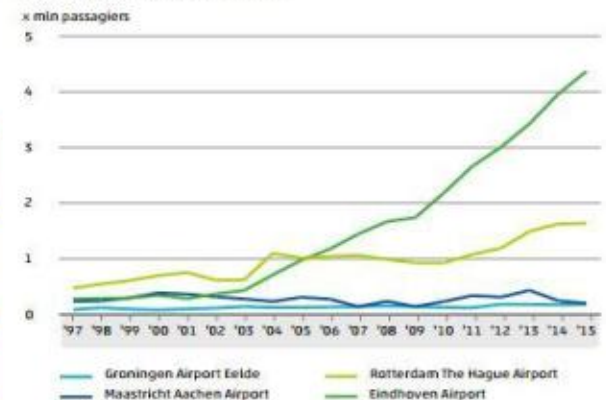


Bedrijfsvestigingen naar activiteit, 2015



Factsheet
Eindhoven

Passagiersvervoer luchthavens Eindhoven, Rotterdam, Groningen en Maastricht



9,7 duizend eenpersoonshuishoudens komen er in de jaren 2017-2040 bij in Eindhoven volgens de huishoudensprognose van PBL/CBS



64,5% van landoppervlakte Eindhoven is bebouwd of er liggen wegen. Dit is het hoogste % in Noord-Brabant.





Urban Data Center



GLOBAL CITIES SUMMIT DUBAI MARCH 2017



A photograph of two young children riding bicycles on a red brick path. The child in the foreground is wearing a dark jacket and a red hat. The child behind them is also wearing a dark jacket. They are riding past a large brick building with many windows. There are yellow flowers in the foreground and trees in the background.

**Thank you for your
attention!**

***n.m.j.d.tillie@tudelft.nl
nico.tillie@globalcities.ca
Twitter: @nicotillie72***