Towards a more resilient Rotterdam

Using the transilience approach

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Gemeente Rotterdam
Stadsontwikkeling

MUSIC
mitigation in urban areas

Investing in Opportunities
INTERREG IVB

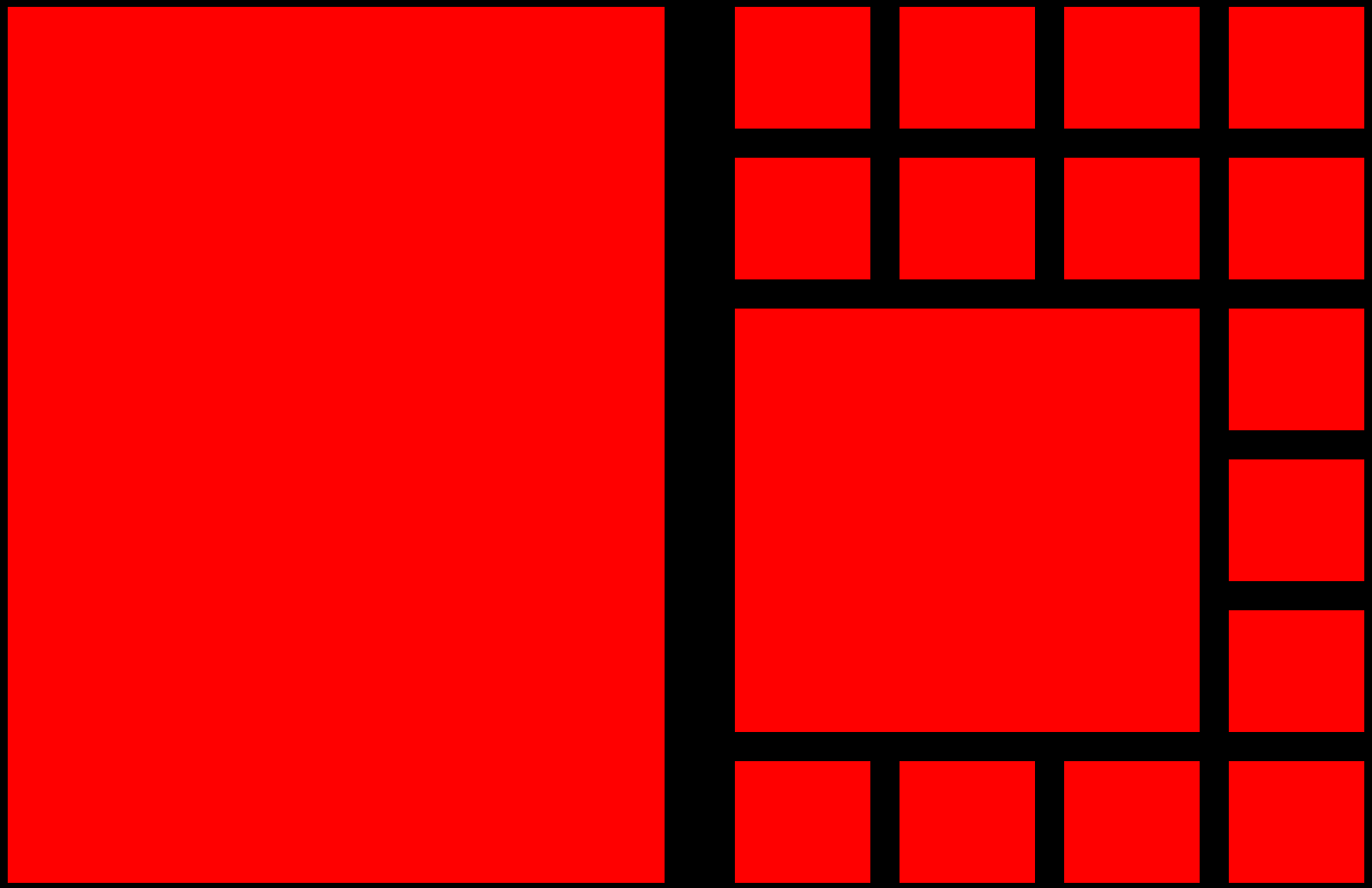
Resilient cities conference Bonn, ICLEI, 31th of May 2013

- ***a resilient city is not just a city that deals with floods, drought, and heat stress but is also a city that (at least for basic %) can count on local structures and local potentials for food, energy, water, materials etc…***

- **Citizens have basic needs (provided in cities) clean air, drinking water, food, shelter, resources, transport and energy in a safe environment ……..also were is it possible to make a living and lead a healthy and happy a life. >> Quality of Life**

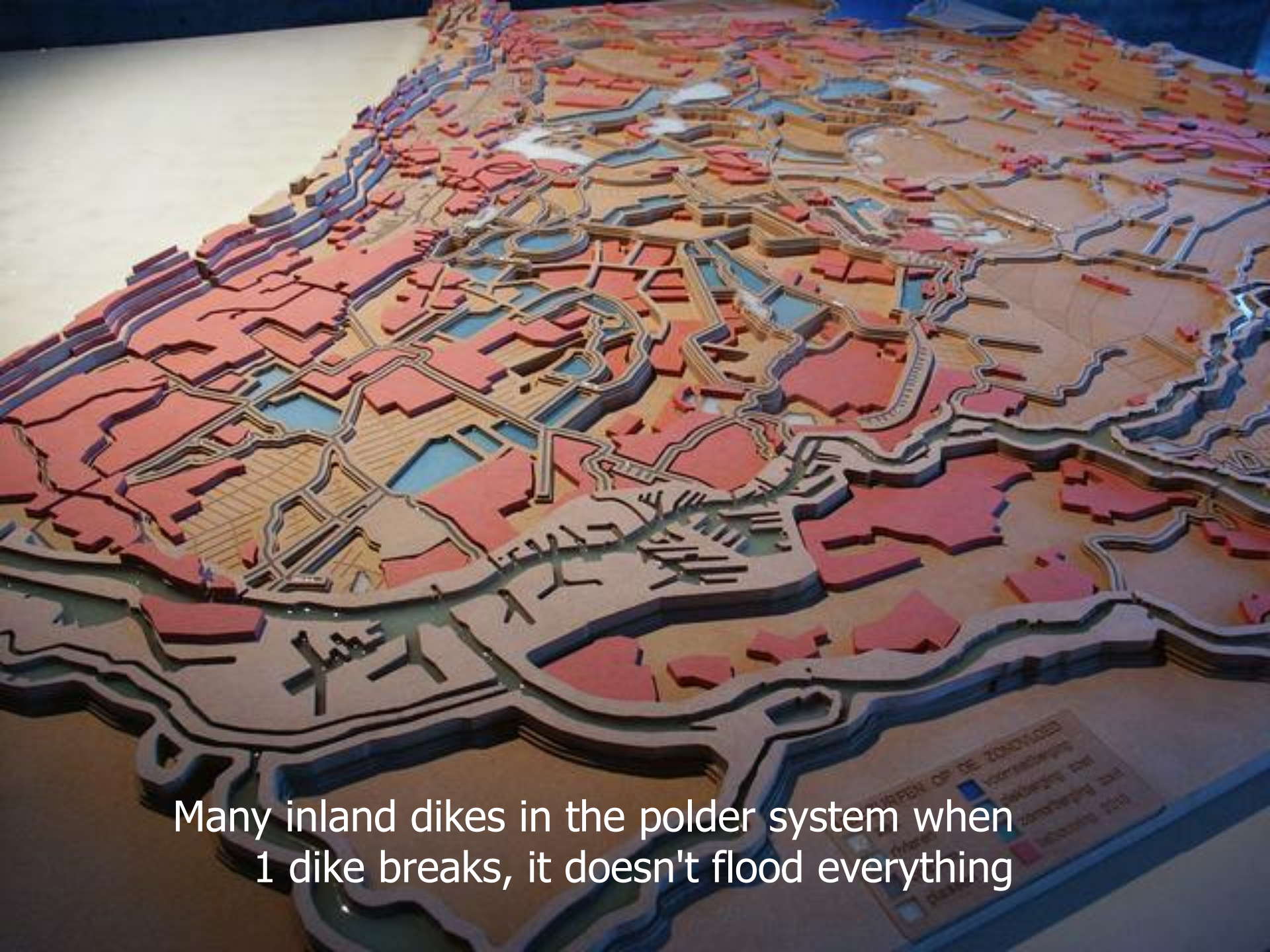
- **As a local government we would like to develop more resilience and facilitate stakeholders and grass roots initiatives who deal with these issues. Long term vision needs to be translated to actions which result in advantages for citizens**

When centralised urban systems fail modular or decentral systems have to do the job



Non resistant

Resistant

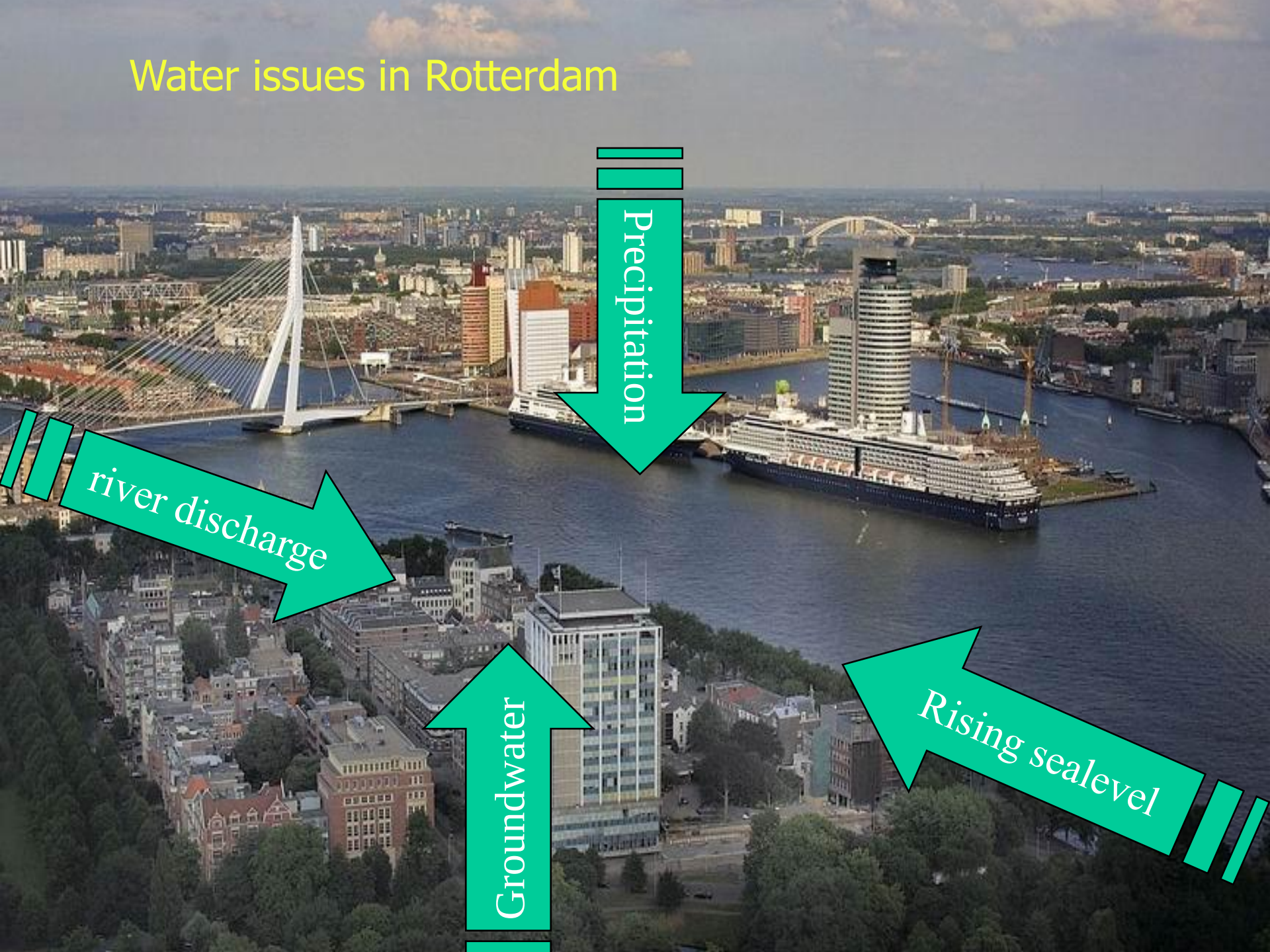


Many inland dikes in the polder system when
1 dike breaks, it doesn't flood everything

Two examples

1. Rainwater flooding / Flood resistence

Water issues in Rotterdam



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National level: Sea and safety

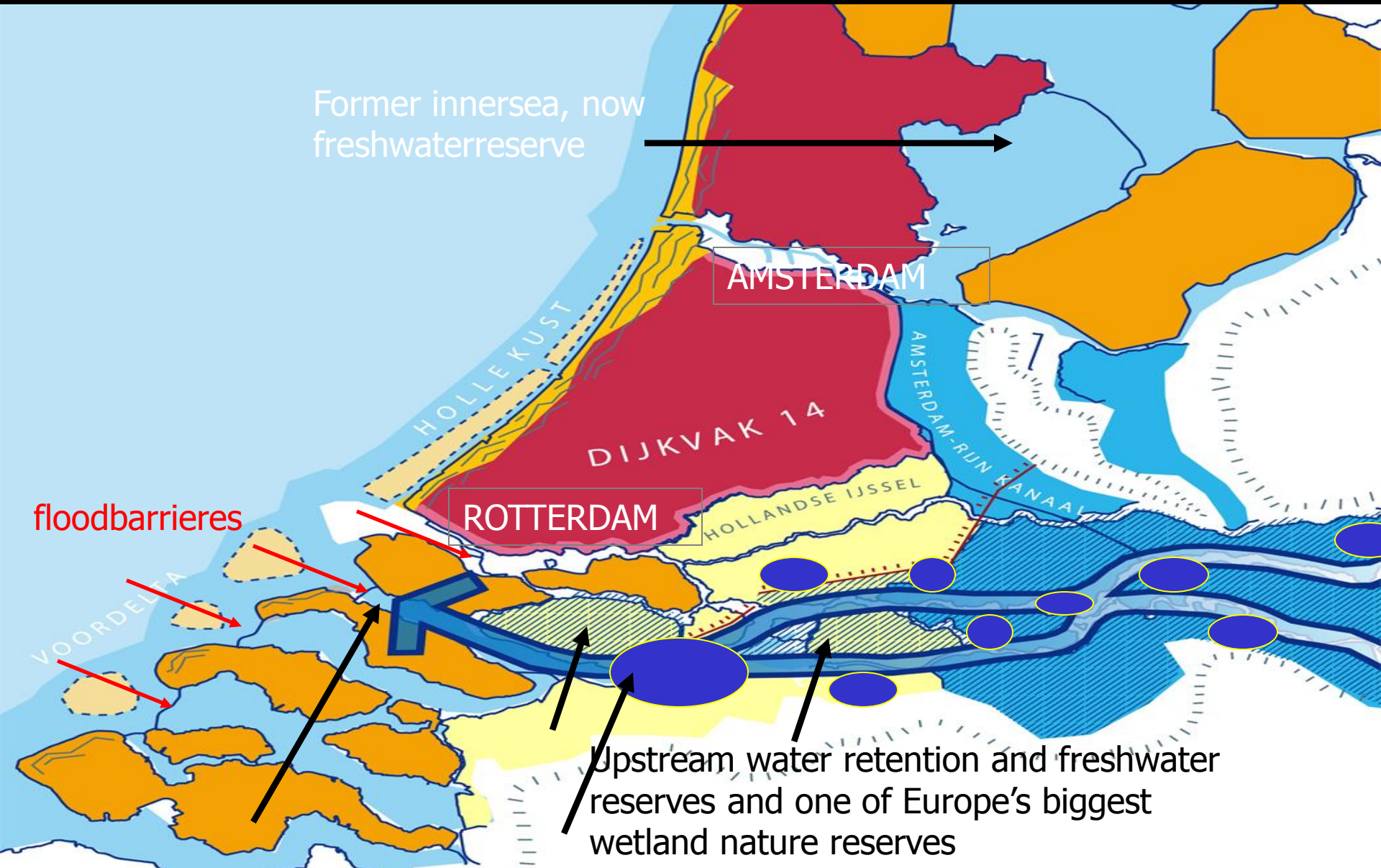
Dunes (natural and artificially induced)

Dikes

Technical solutions i.e. Floodbarriers

Gemeente Rotterdam
dS+V

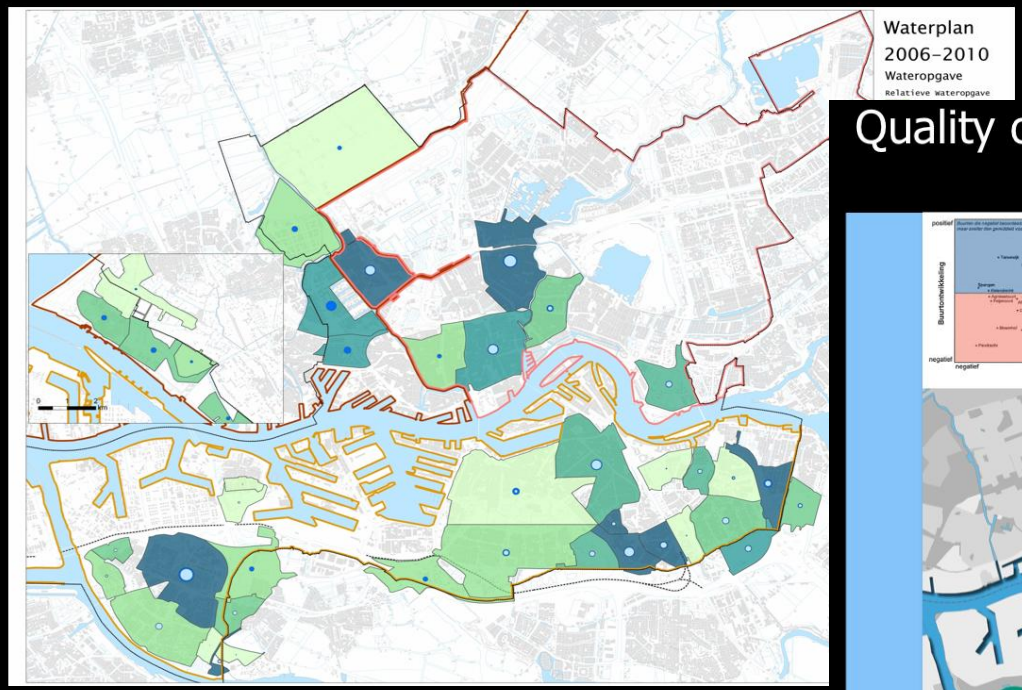
National level: Rivers and safety



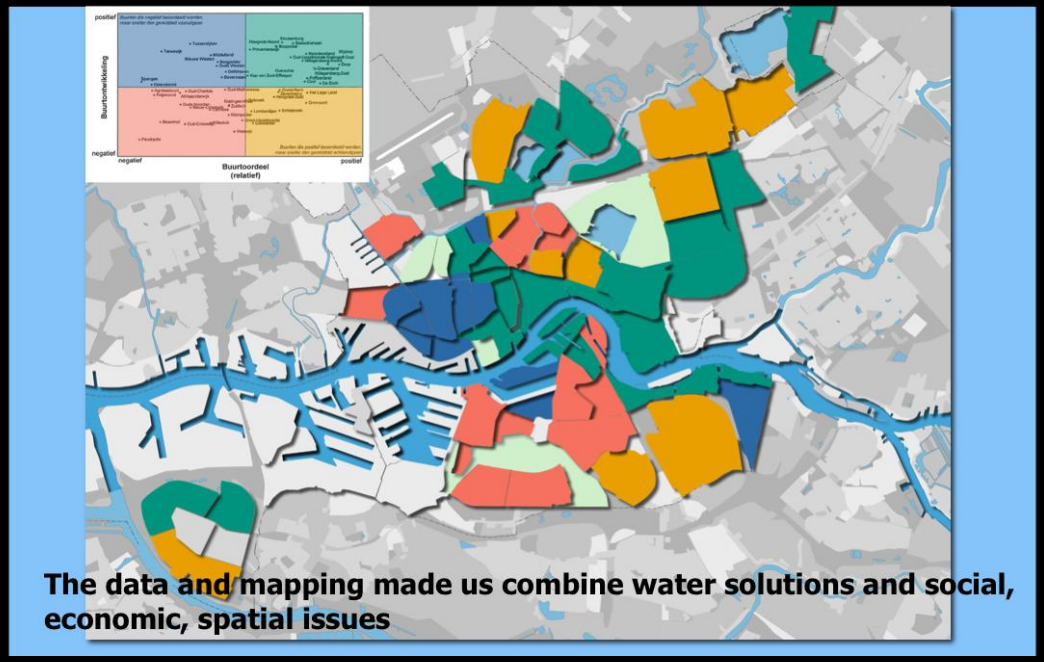
But what to do locally with resilience to stormwater flooding in densily built areas

using and comparing the data at local level often is the first step to turn a problem into an opportunity or asset like here

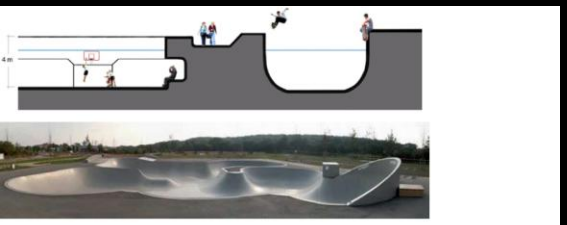
1.Water: Precipitation, storage capacity per district

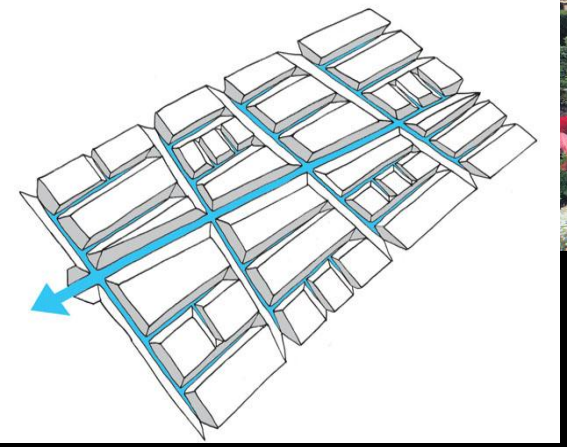


Quality of life data per district



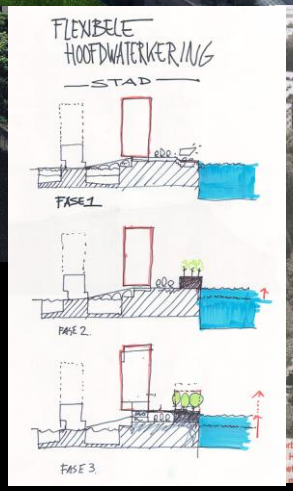
Sponge City, the city as a forest! Building resilience by storing and releasing water slowly and combine it with other functions





Watersquares, storage and good public space

Water living, watersolution, urban agriculture and good housing

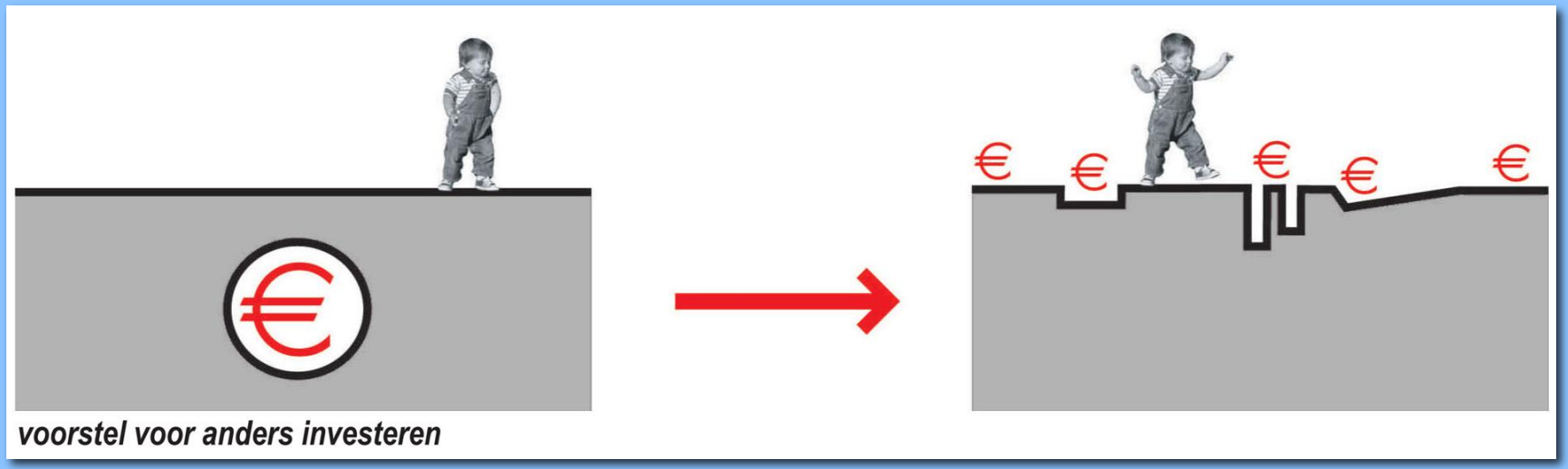


green/water roofs sponge buildings

Watersquares

urbanisten, Rotterdam)

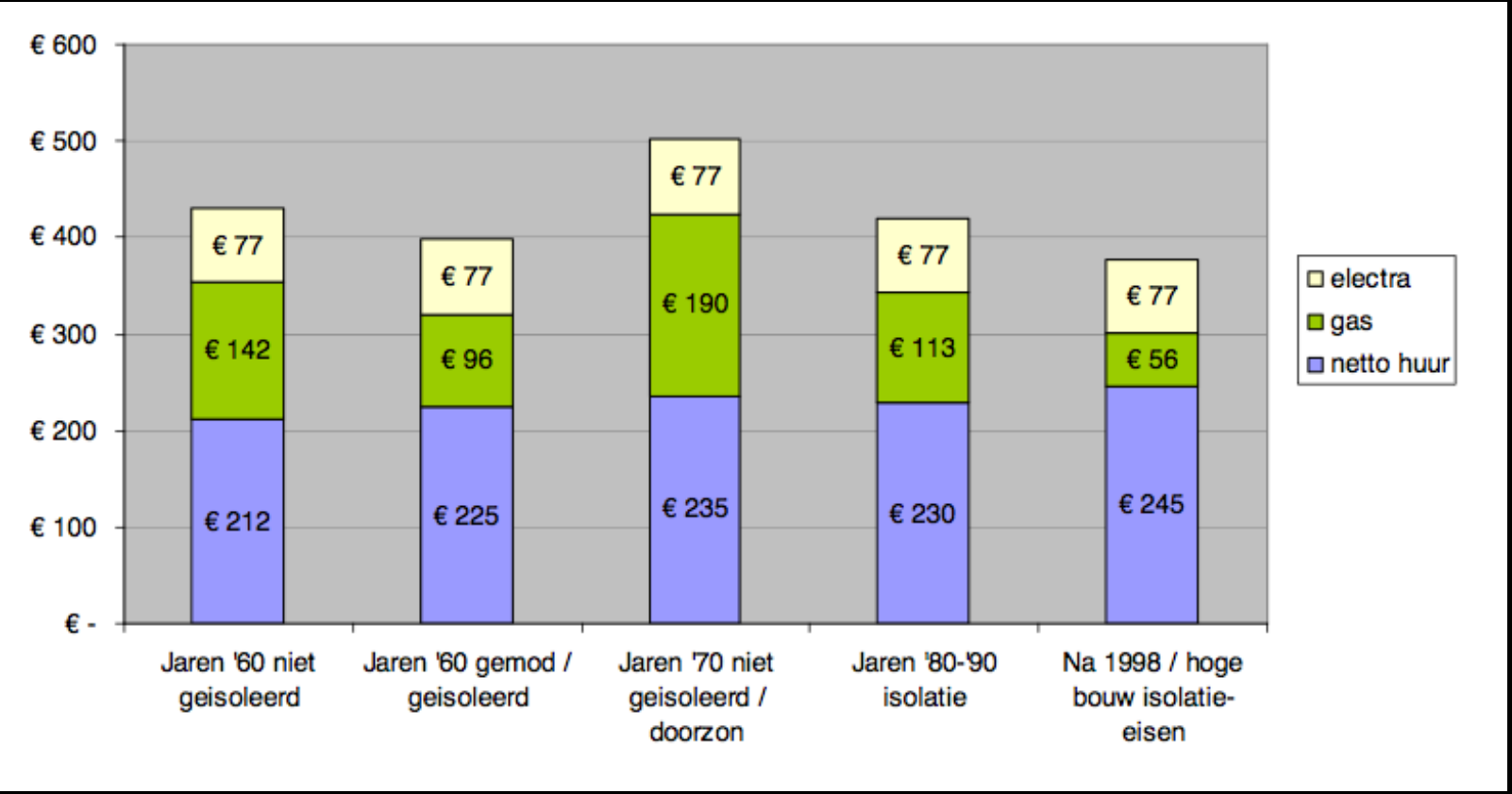
Different way of investing money and at the same time introducing more resilience and Quality of Life



second example

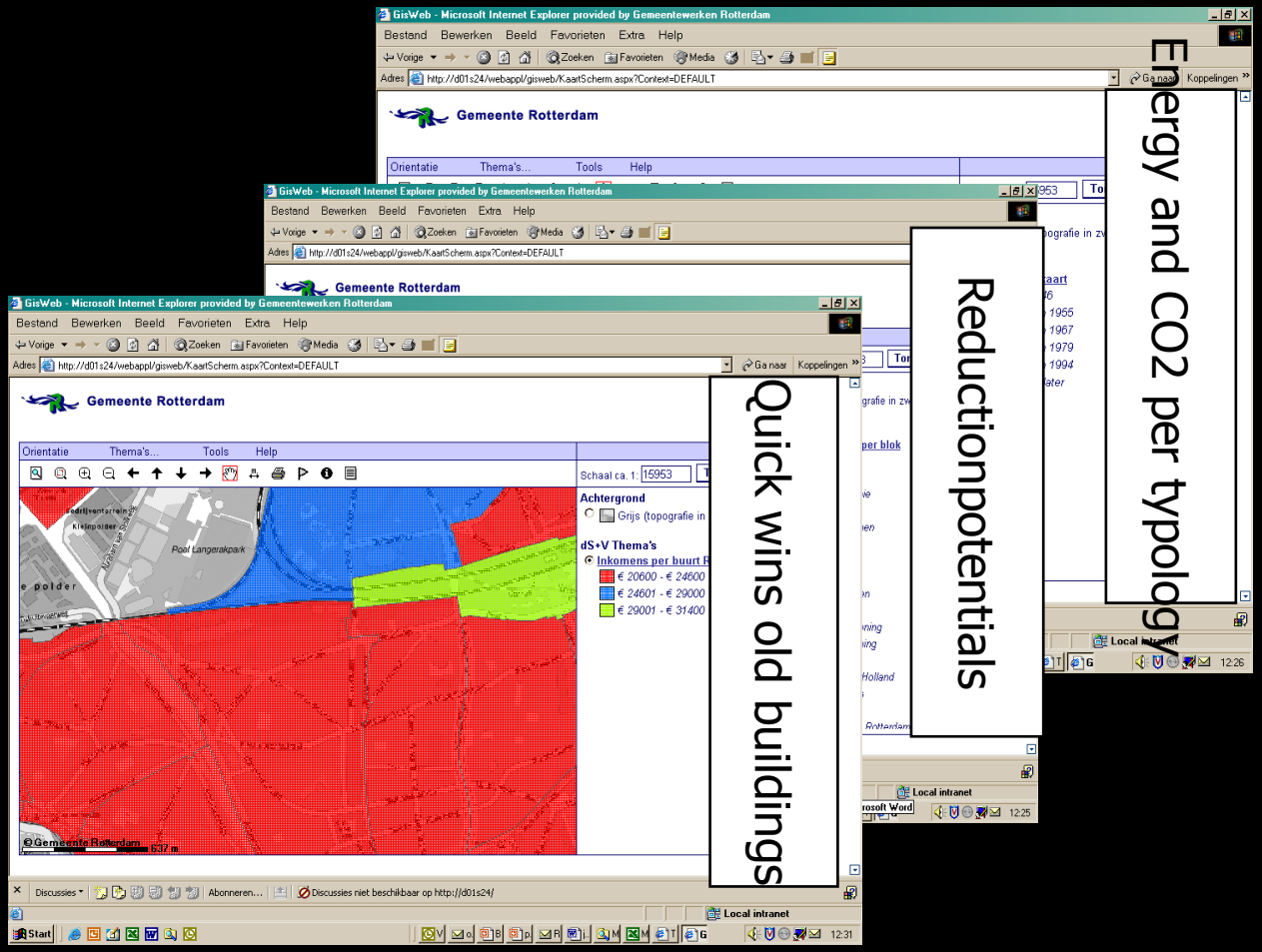
2. Energy poverty / Energy security

Energy costs rental homes Holland



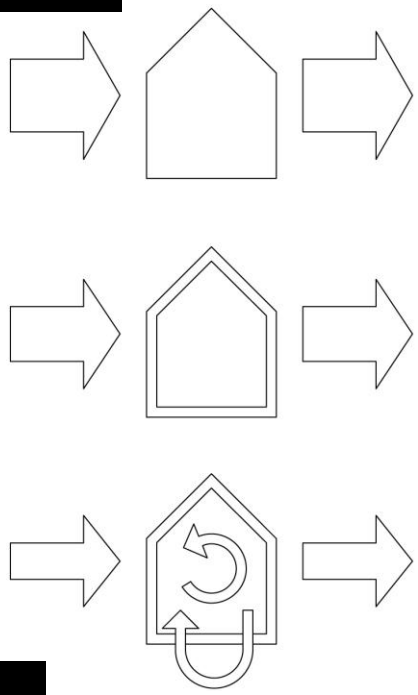
i. Straathof senternovem, 2008

1. reduction of demand



The New Three Steps Strategy

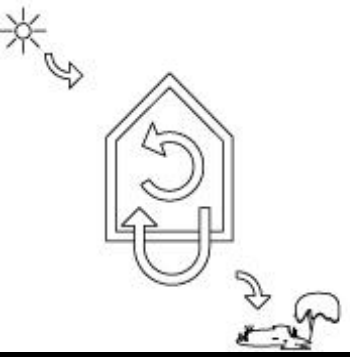
...and upscaling

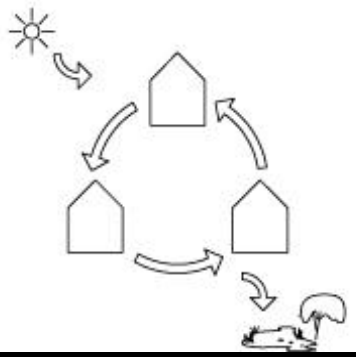


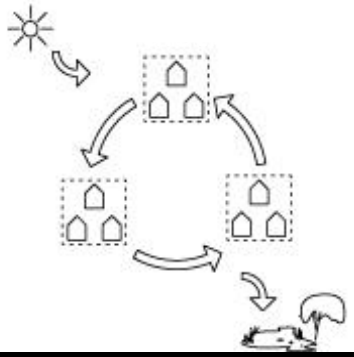
00 standard building

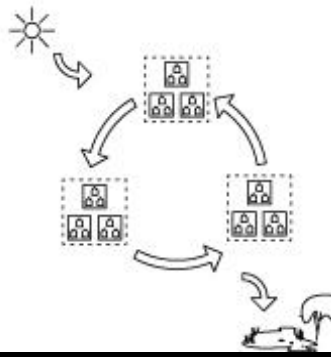
01 reduce consumption
– passive, smart and bioclimatic design

02 reuse waste energy streams
– wast heat, waste water, waste material
– in closed or connected cycles

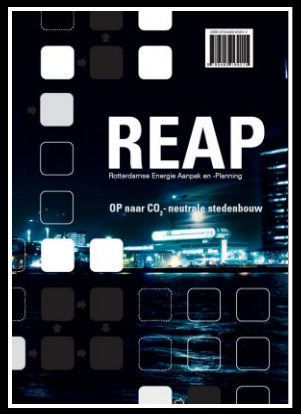






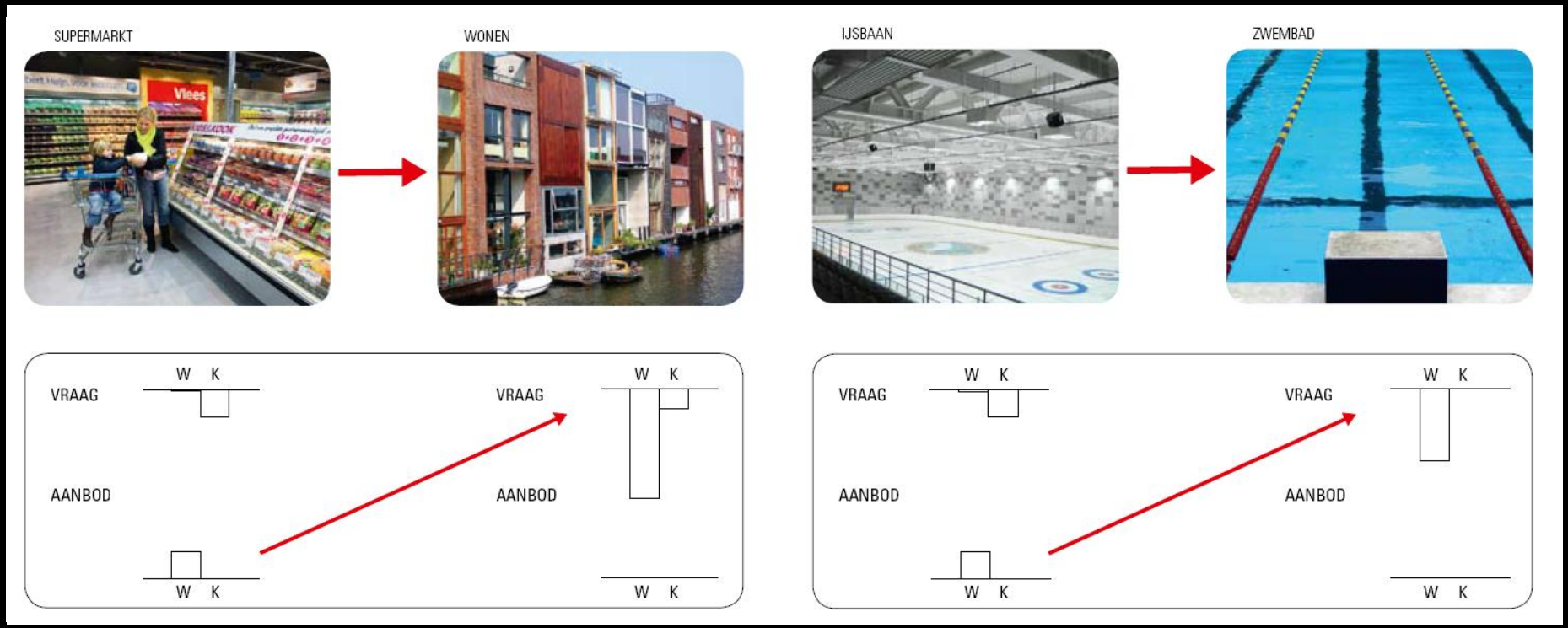


Exchange of Energy waste flows in REAP



1 m2 of super market can heat 7 m2 of appartment

1 m2 of green house can heat 4 m2 of appartment and produce food!!



Energy transition (existing) neighborhoods

Transition into a patchwork of Central and decentral

A mix of:

Electricity (solar, wind, geothermal, biomas etc)

heating

- district heating
- heat cascading
- low and medium temperature networks
- autarkic blocks
- wind, solar, biomass….etc

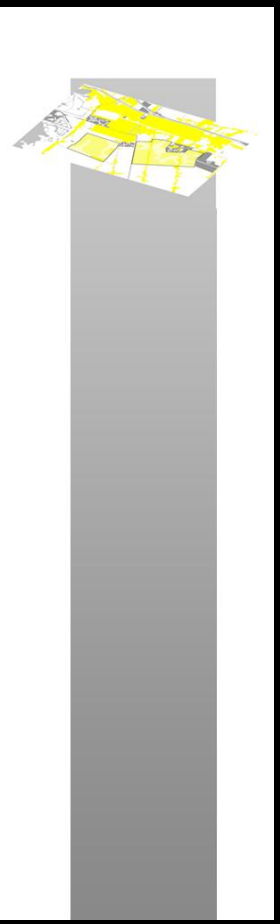
REAP 2: map by Doepel Strijkers

Energy potential mapping

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

10,5 GWh_e

26,5 GWh_{th}



6750 GWh_{pr}

12 GWh_e

solar electricity and heat

Per dwelling 40 m^2 pv of heatcollectors

Study area: PV roofs: 12 GWh_e

Study area: hc roofs: 35 GWh_{th}

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 $GWh_{(e+th)}$

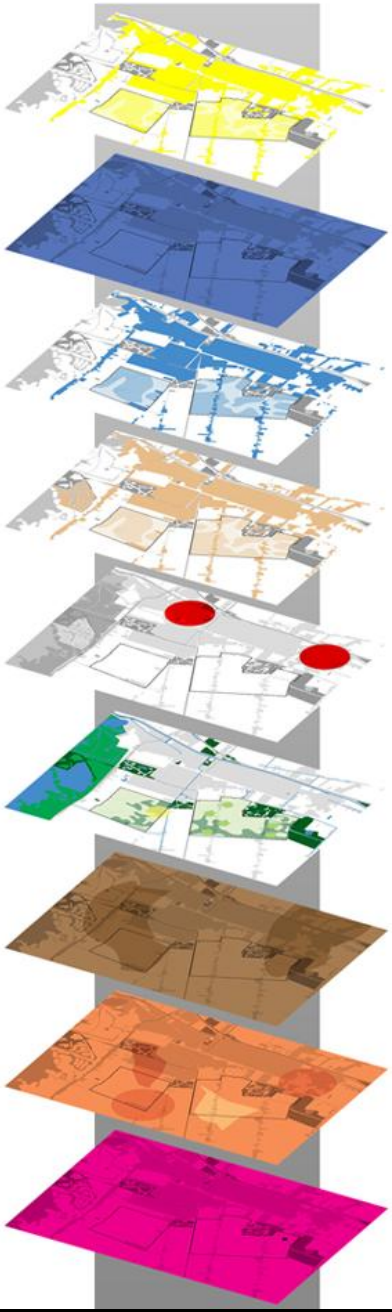
Restwarmte
Kappa
2x 125 GWH_{th}

Biomassa
Natuuronderhoud
4,7 MWh_{pr}/ha
Bosonderhoud
18,9 MWh_{pr}/ha
Onderhoud DGC
2,4 GWh_{pr}
Eifarm
1,1 GWh_{pr}
Onderhoud omgeving
20 GWh_{pr}

Bodem tot -50m
verticale WW
Bodemgeschiktheid WW
- Zeer geschikt
- Geschikt

Aquifers
w/k opslag
Aquifergeschiktheid
- Zeer geschikt
- Niet geschikt
- Onbekend
- Restrictiegebeiden

Geothermie, -3000m
105 °C
Geothermie
- 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

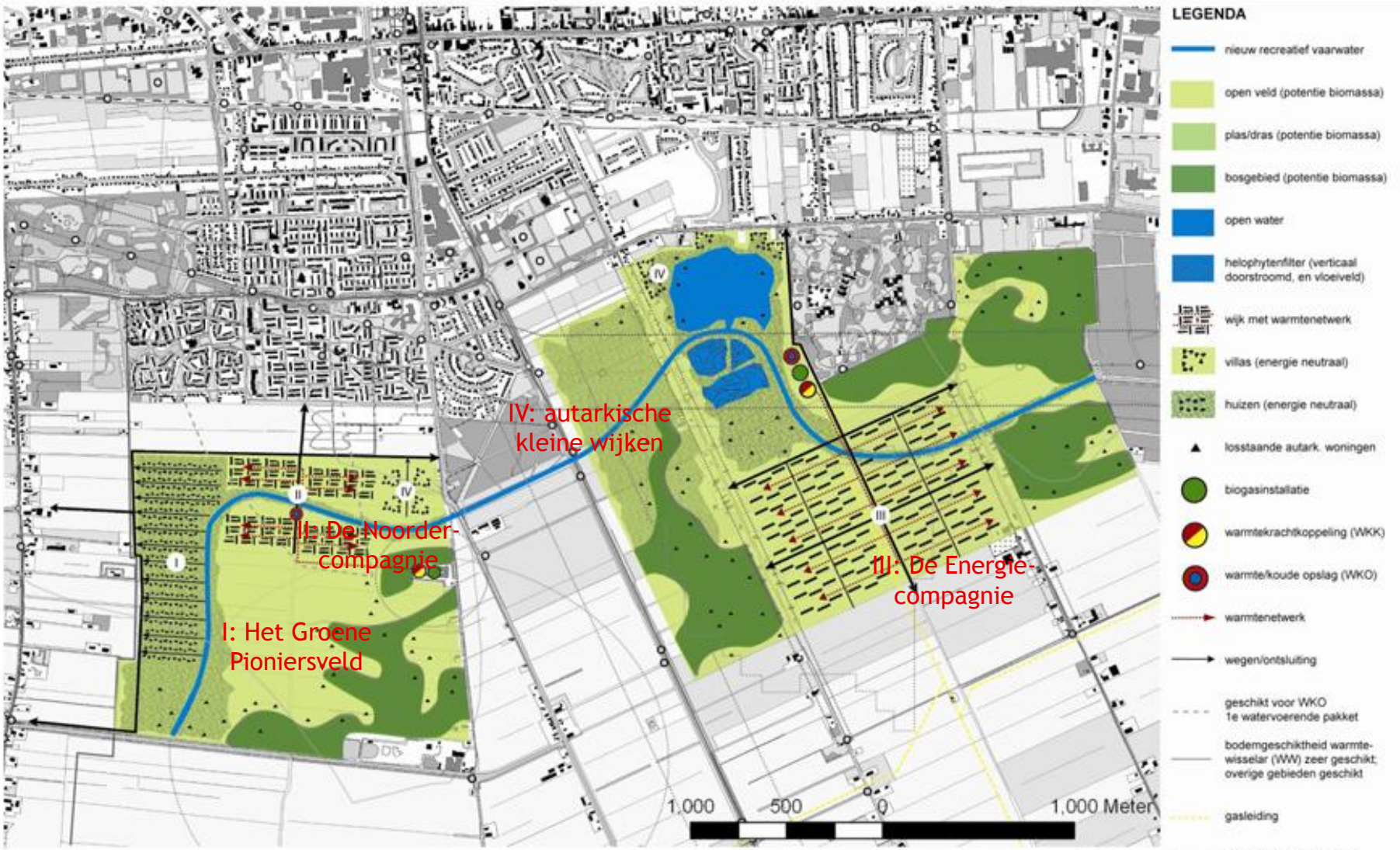
Afval, verbranding
1,2 $GWh_{(e+th)}$

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}

New plan based on local energy potentials nearly energy neutral and for a big part decentral, backed up to the network, more resilient, and with the locals as shareholders !



TU Delft

WAGENINGEN UNIVERSITY

stedenbouwkundig planvoorstel voor De Groene Compagnie op basis van energiepotenties 'individueel autarkisch en autarkische wijken'

Transilience Approach

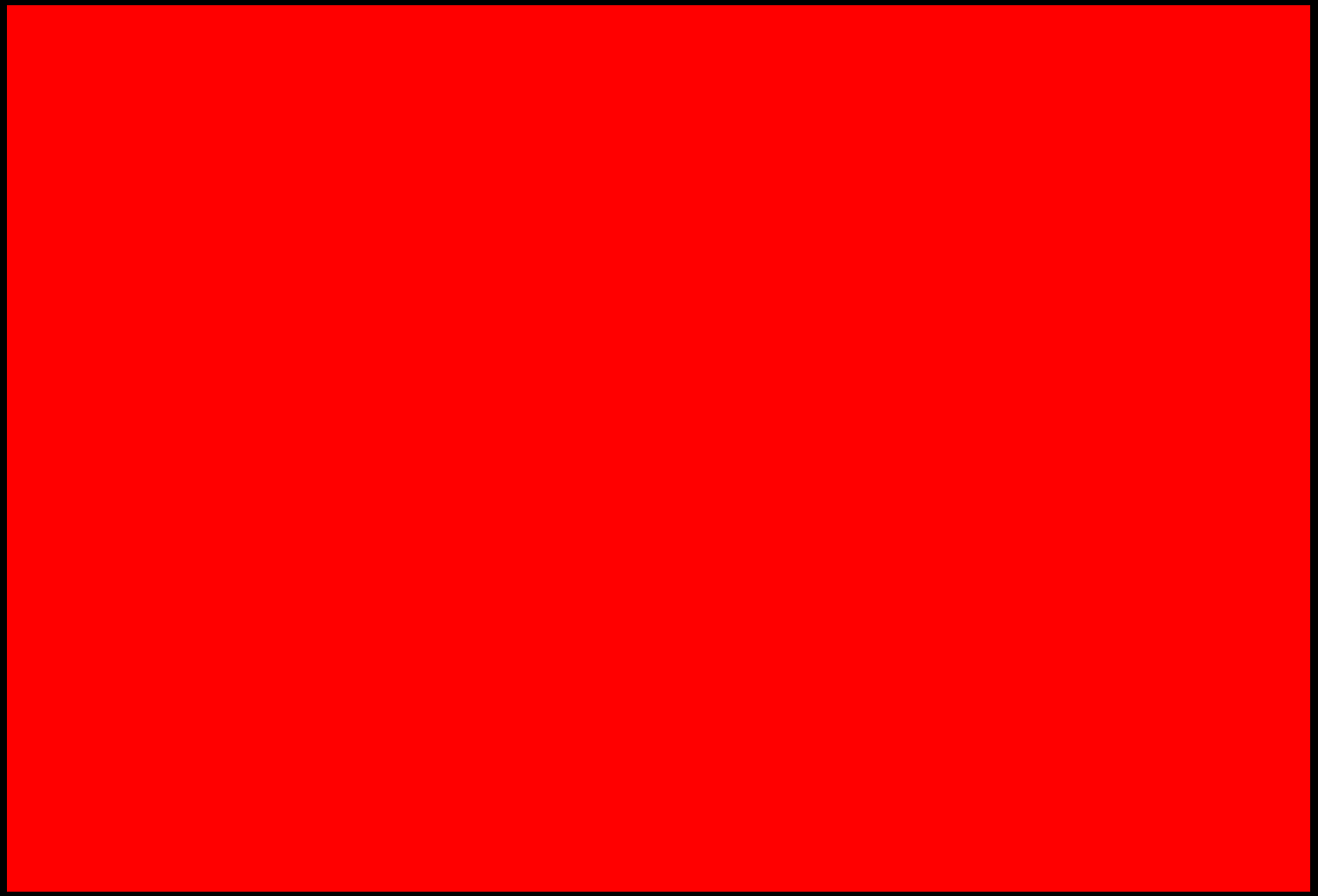
How we try to mainstream resilience

'Transilience is a recently introduced term to state the continuous changes cities have to adapt to. Guiding transitions, focusing initiatives stakeholders and developments in cities to become more resilient' (Tillie, Frantzeskaki 2013)

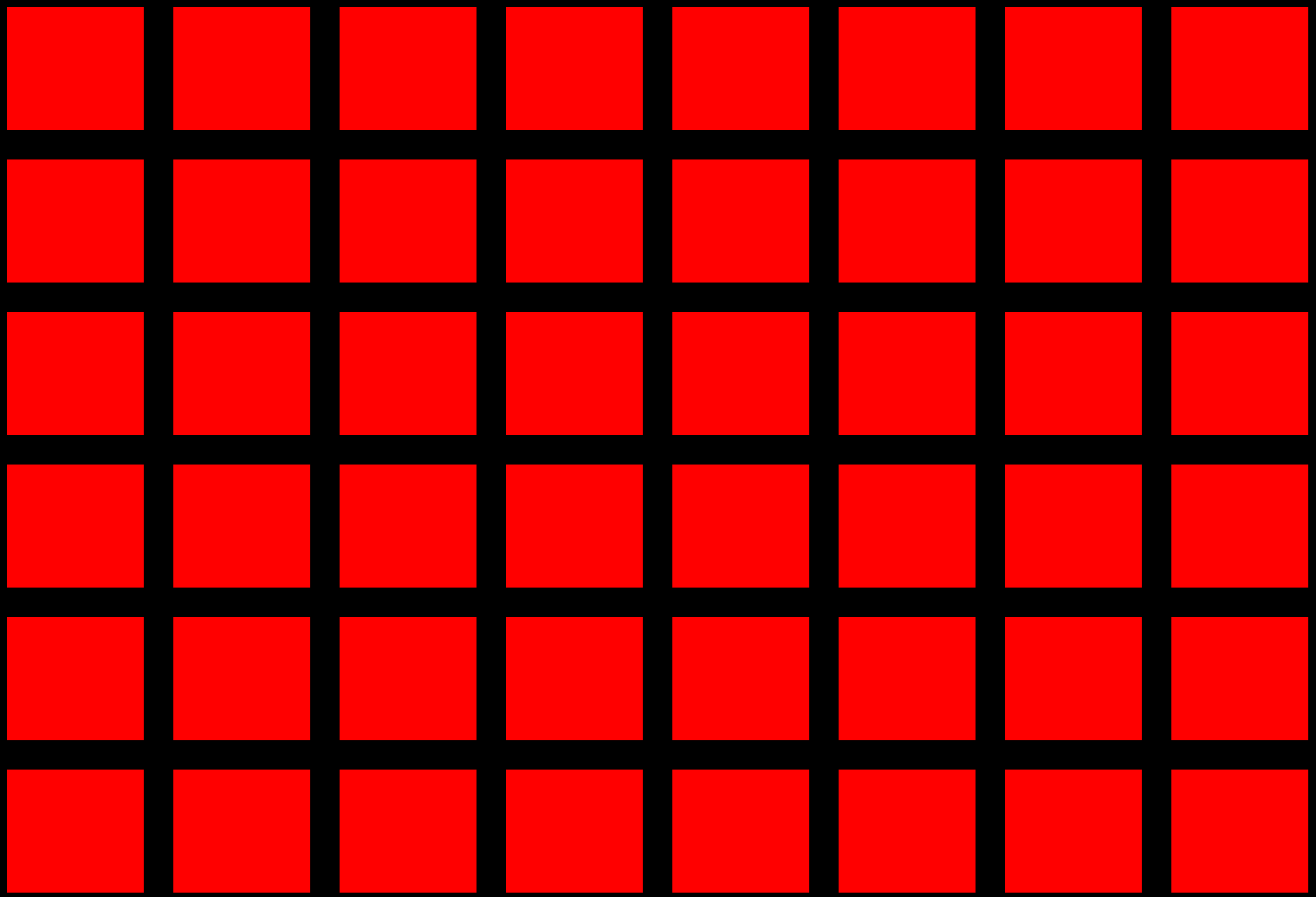
Steps:

Geo based assessment, mapping, focussing initiatives &stakeholder, process action!

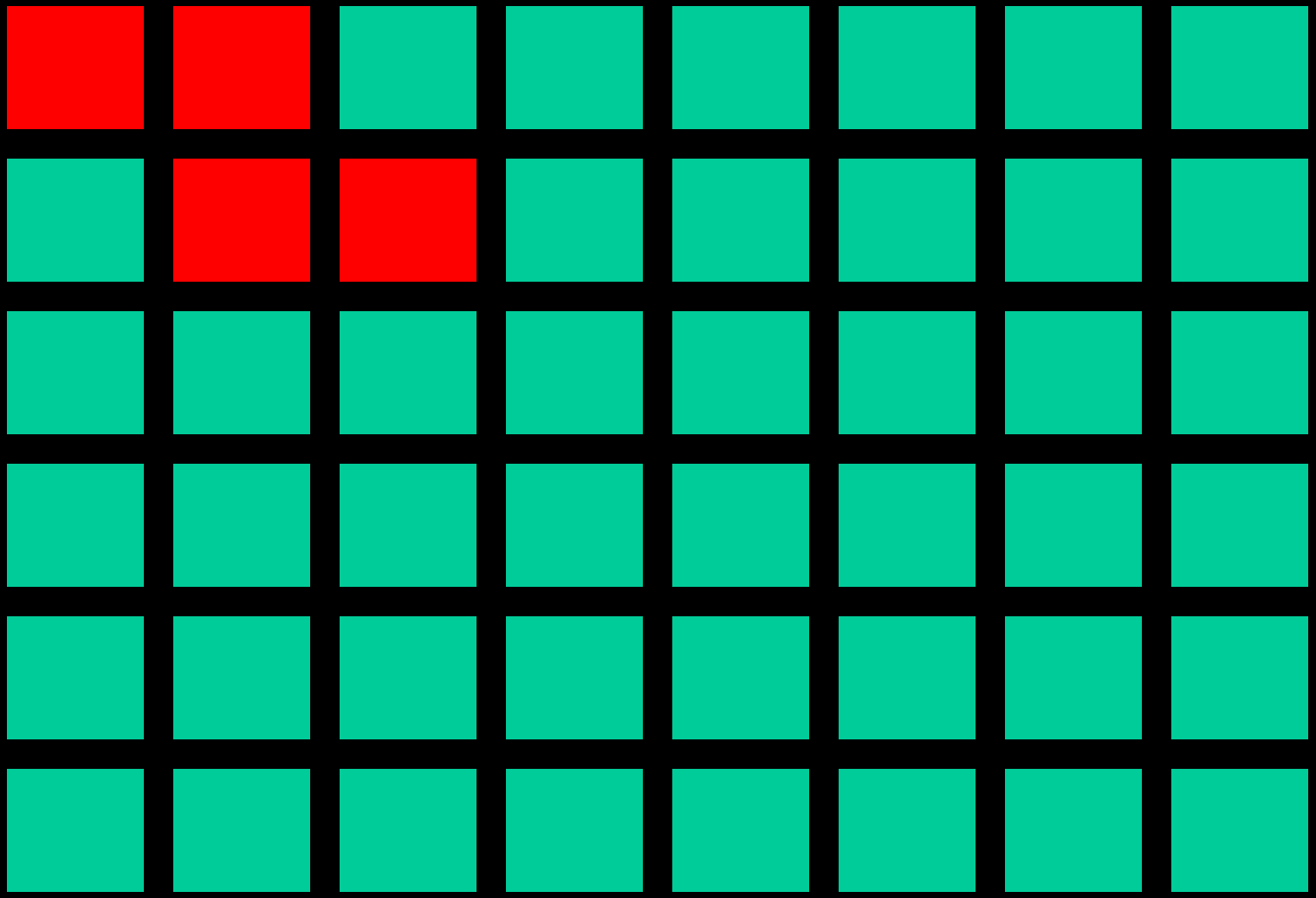
data for whole the city

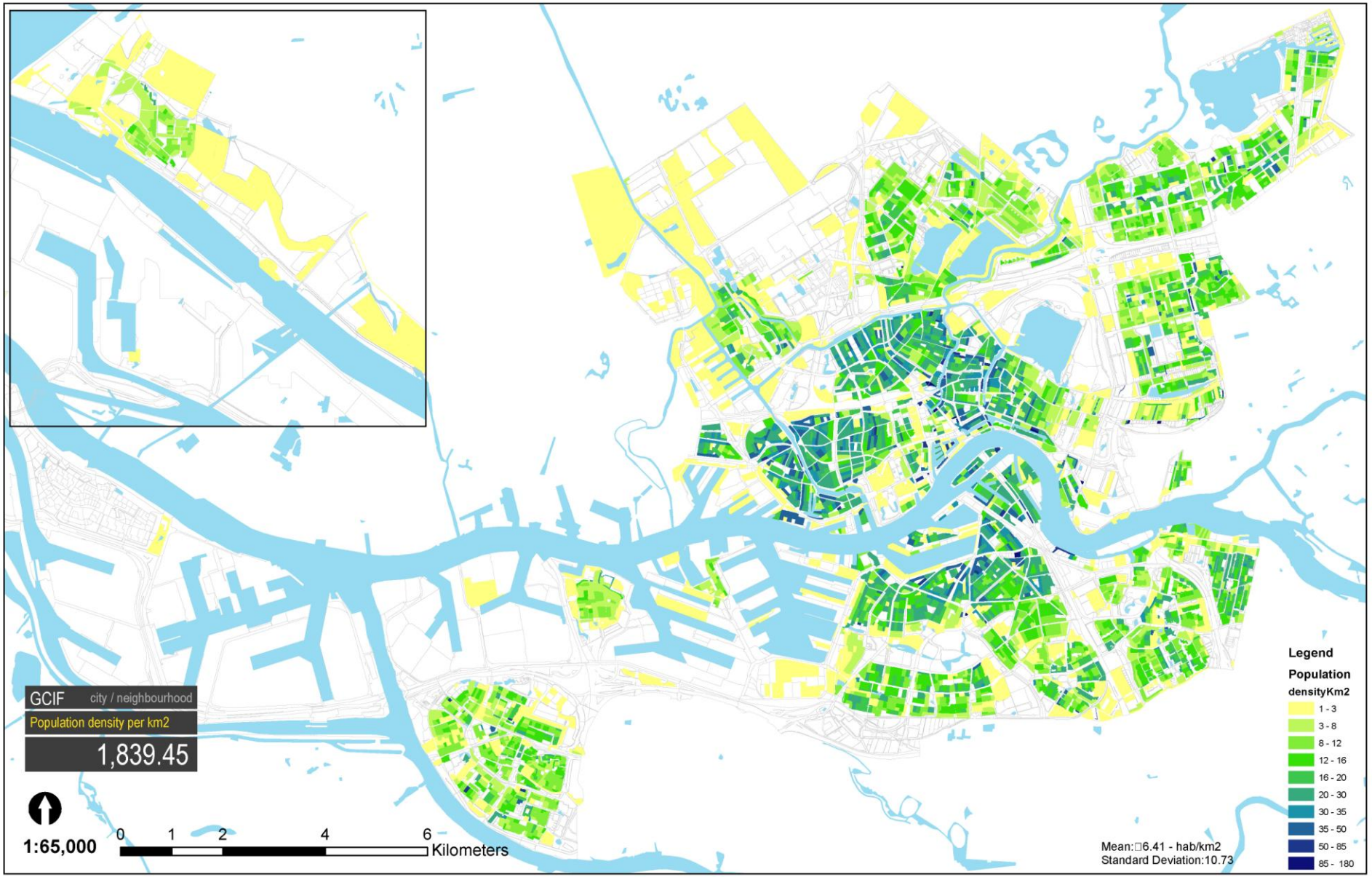


data for whole the city on detailed level



But also at neighborhood level ……it is very flexible, scalable for GIS





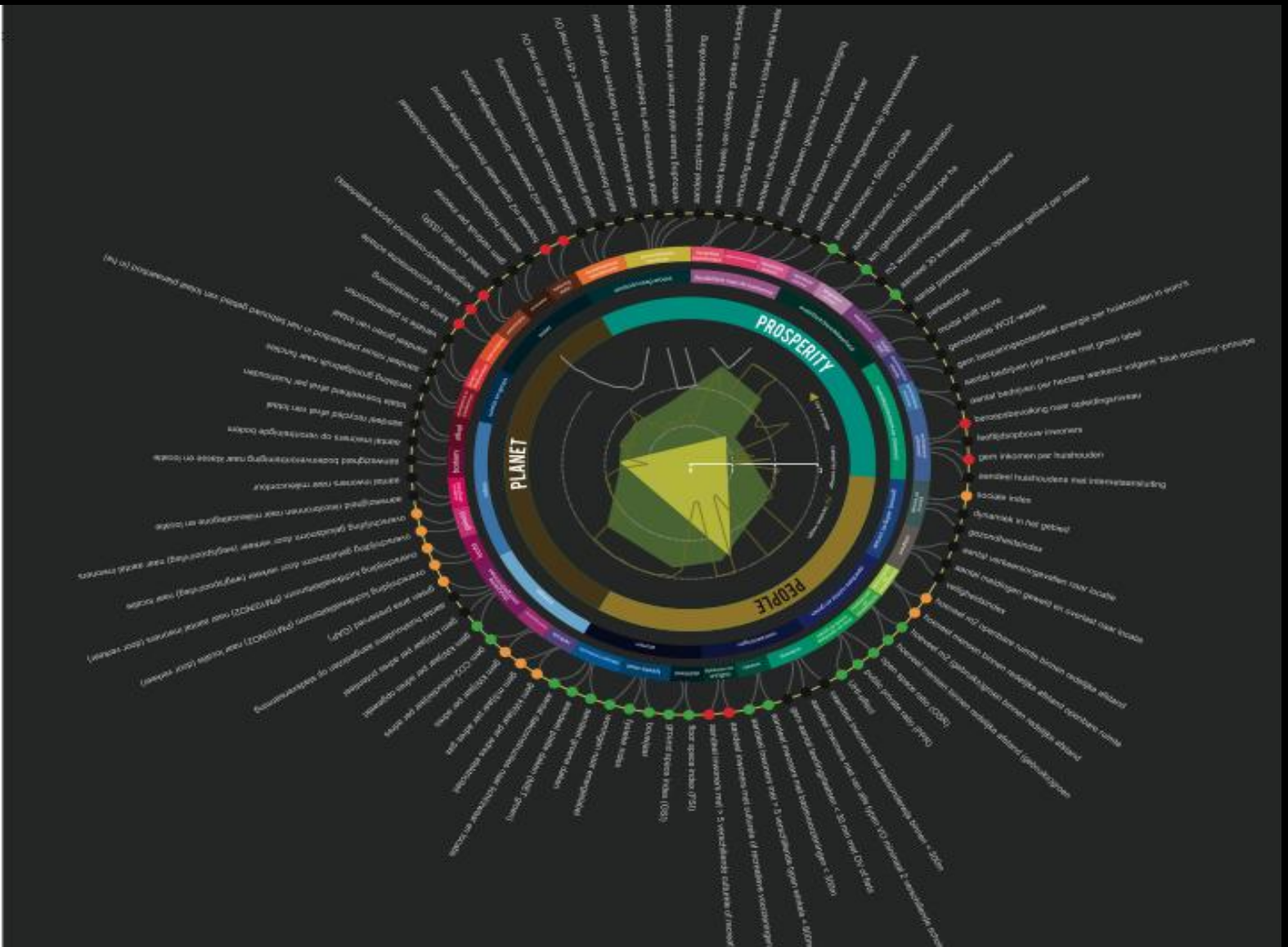
GCIF Indicators

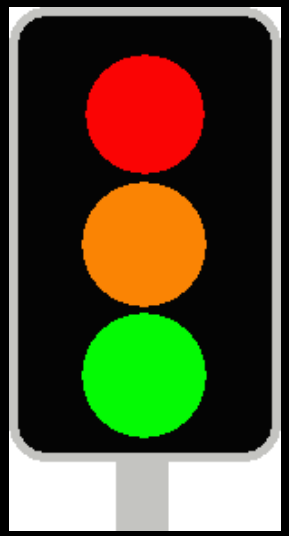
Urban Planning, Shelter and Environmen - Population density per Km2

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

Resilience profile: assesmen on ppp

what themes are below our goals, thresholds





Facilitate the transition process

Asset based planning

Other stakeholders

Government as a stakeholder

PROJECT

challenges
opportunities

Coaltions

Goals

actions

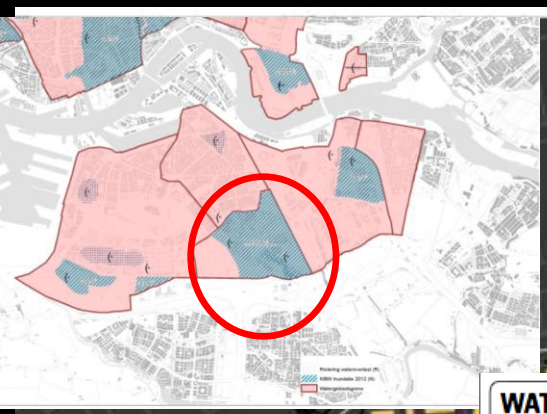
Resilinece profile

Put open, objective data at the table

Result: Stakeholder chosen themes

Waterproblems, recreation shortage

Possible solution : watergarden, square



oplossing

map code

Group topic
Environment

En1 - L

Monitorin aim
Water for recreational uses.

Core variables / measurement
Water bodies for recreational use in 500m walking range from households

Threshold
Walking distance of max 250m2 from a household,
and with an area of average 1500m2
0m - 65m - score 1
65m - 125m - score 2
125m - 180m - score 3
180m - 250m - score 4
> 250m - score 5

Legend

Lombardijen water scores

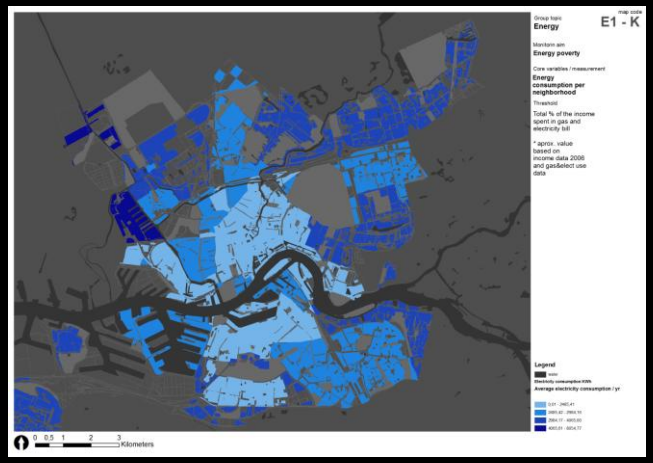
ranges 1 to 5

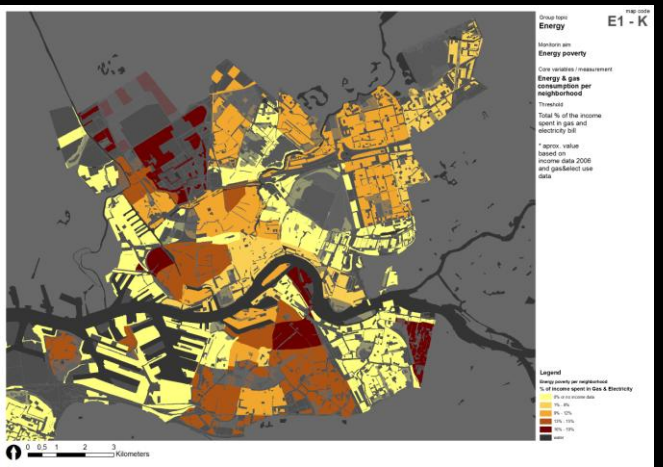
1 - optimal
2
3

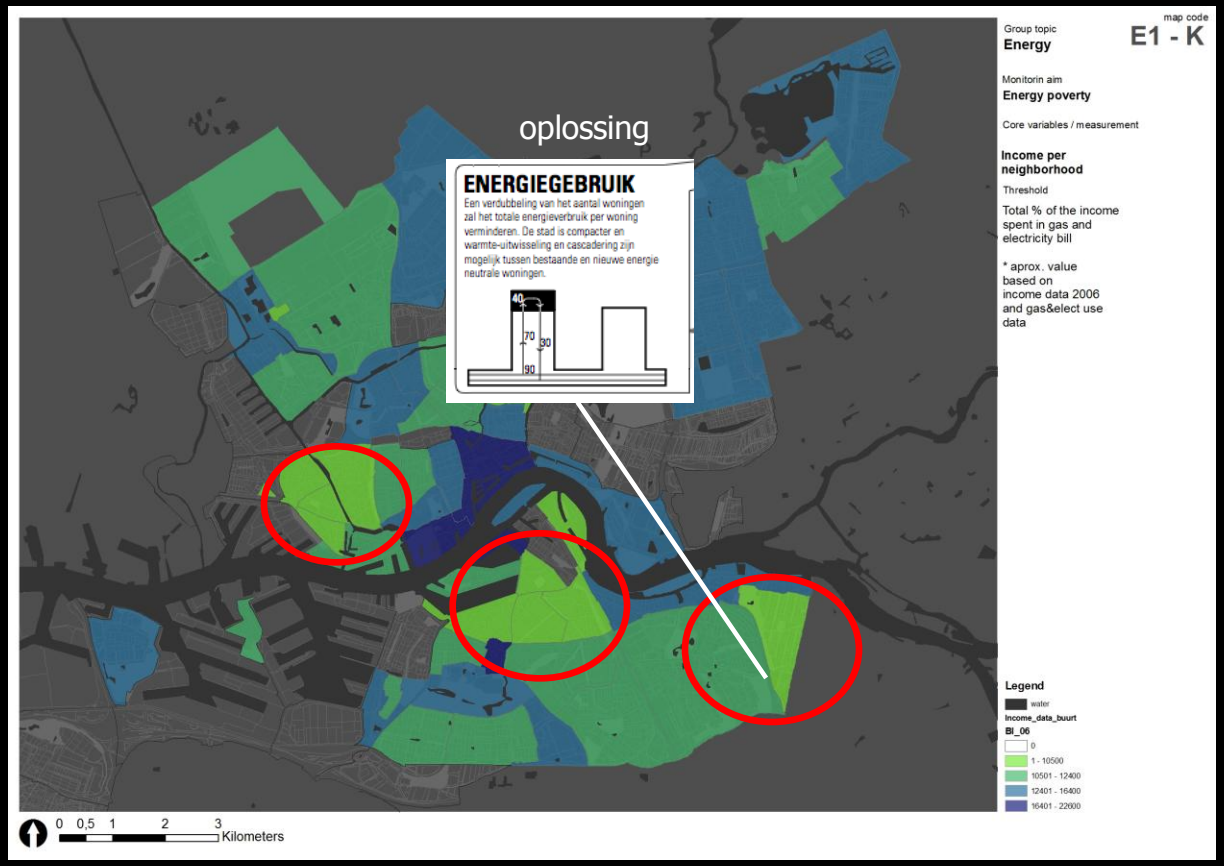
Stakeholder chosen themes:

High energy use, low income, energy too expensive

Possible solution: smart meters, insulation, reduction, lower rent







Next steps in Actions:

Combining

water, food production, energy, waste recycling, quality of life

...in short using local potentials and closing cycle..becoming more resilient!

Thank you for your attention!

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Gemeente Rotterdam
Stadsontwikkeling

MUSIC
mitigation in urban areas

Investing in Opportunities
This project has received European Regional Development Funding through INTERREG IV B.
INTERREG IVB

Photo: speeldernis Rotterdam (play wilderness)