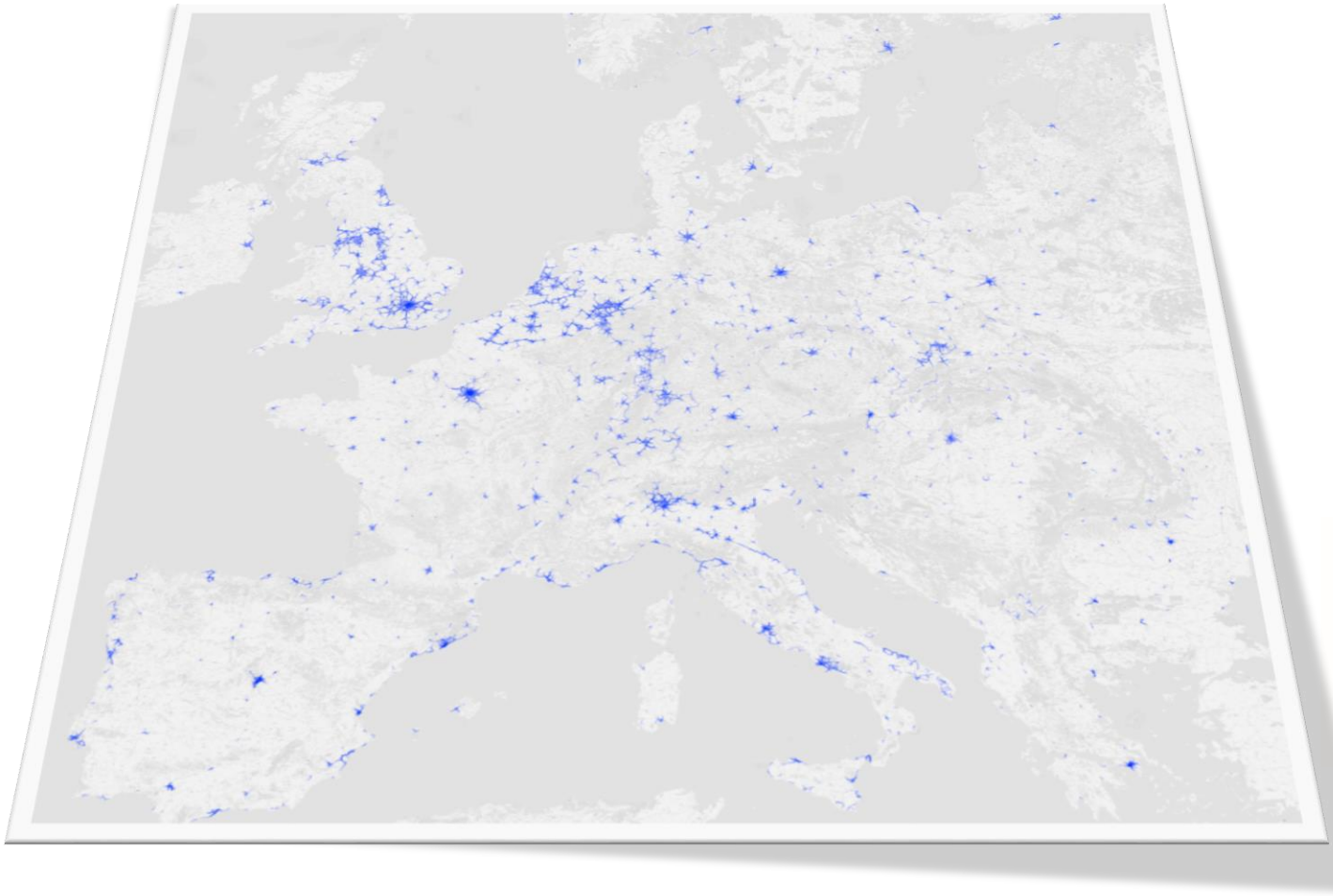


Virtual Planning Tools

Analysis of Bicycle Data
Effect estimation of Bicycle Measures

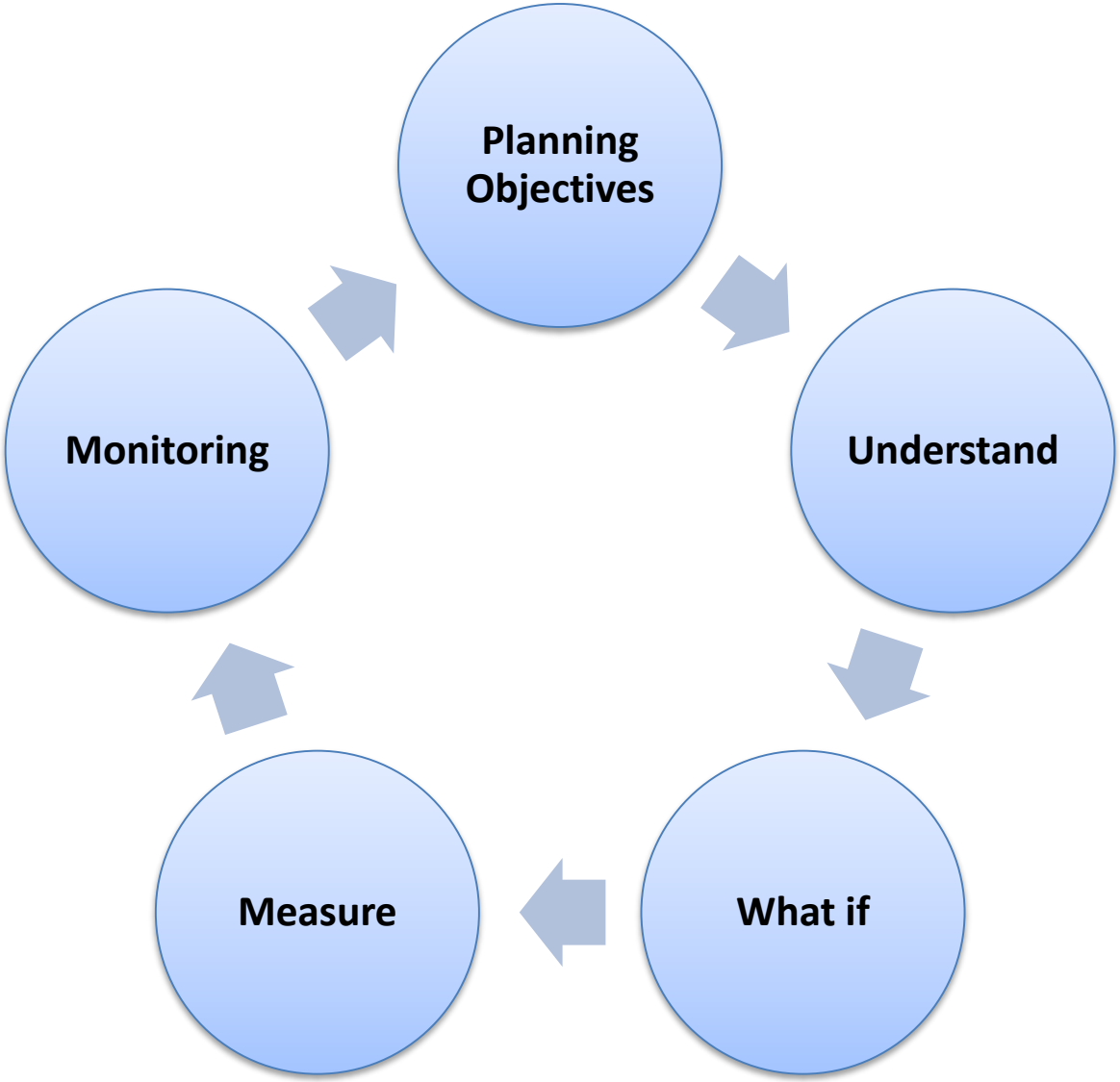
Dirk Bussche
NHTV

Interreg North-West Europe CHIPS
European Regional Development Fund

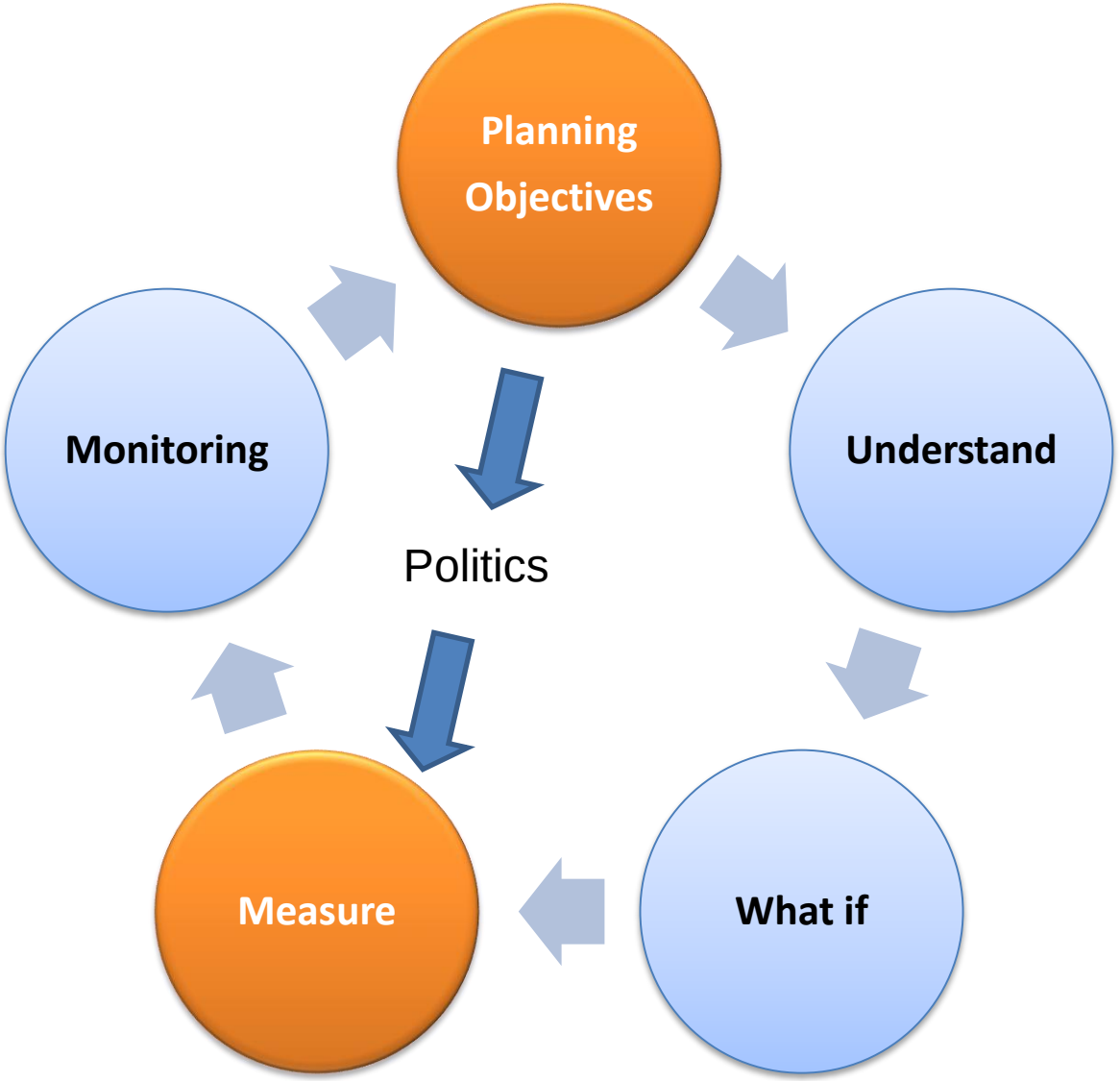
Breda University of Applied Sciences

Foto: Wikipedia

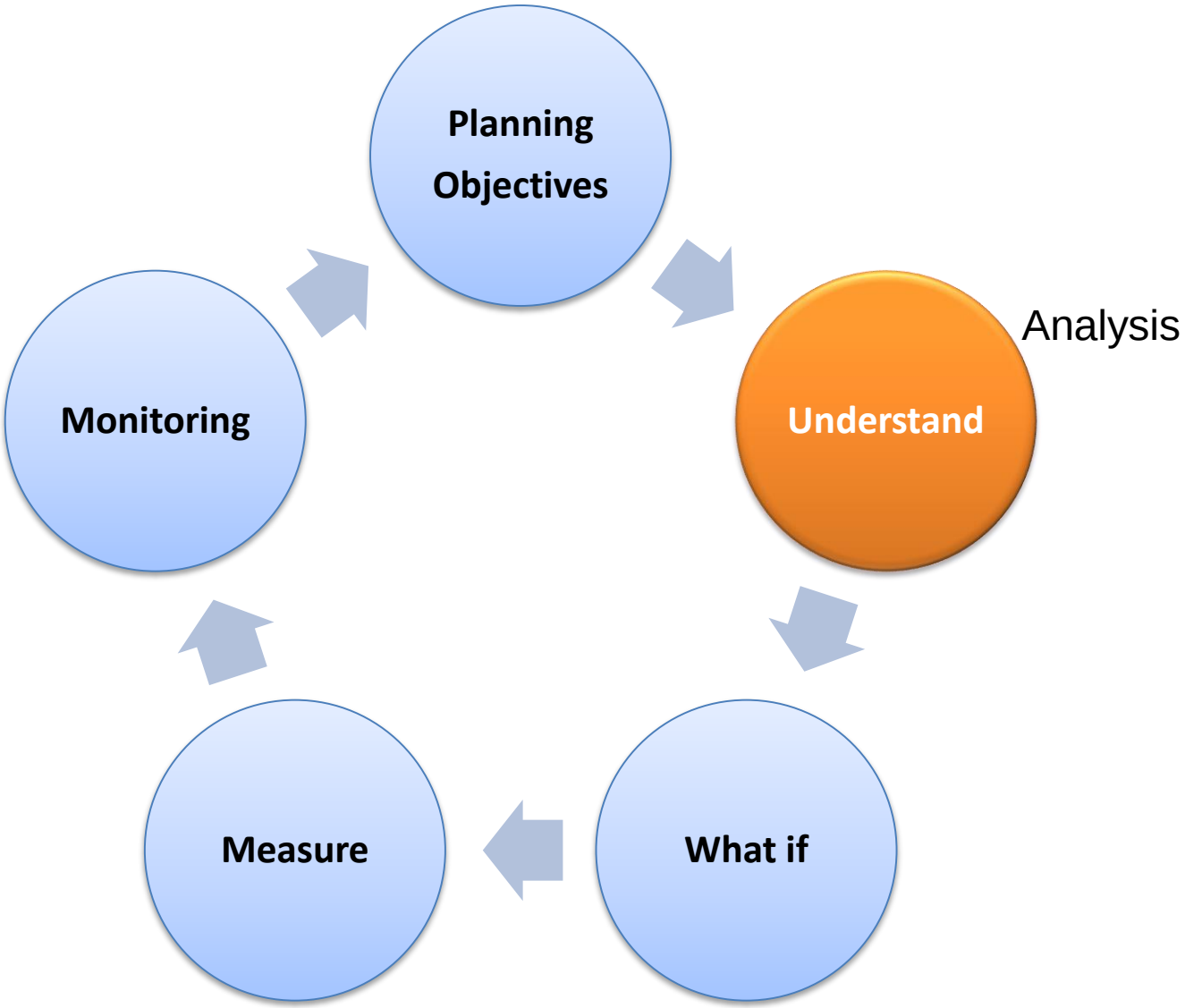
Planning cycle Bicycle Traffic



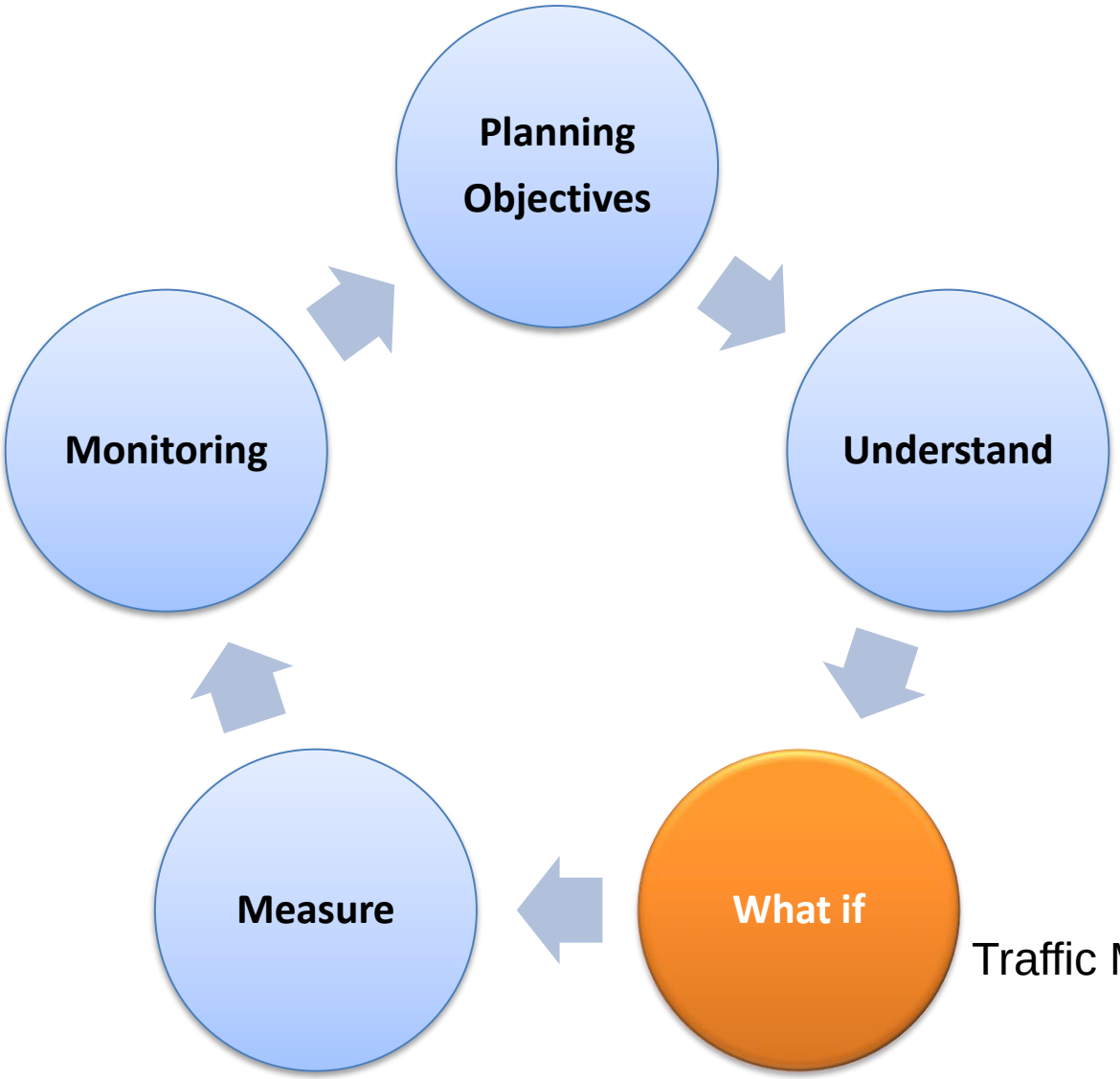
Planning cycle Bicycle Traffic



Planning cycle Bicycle Traffic

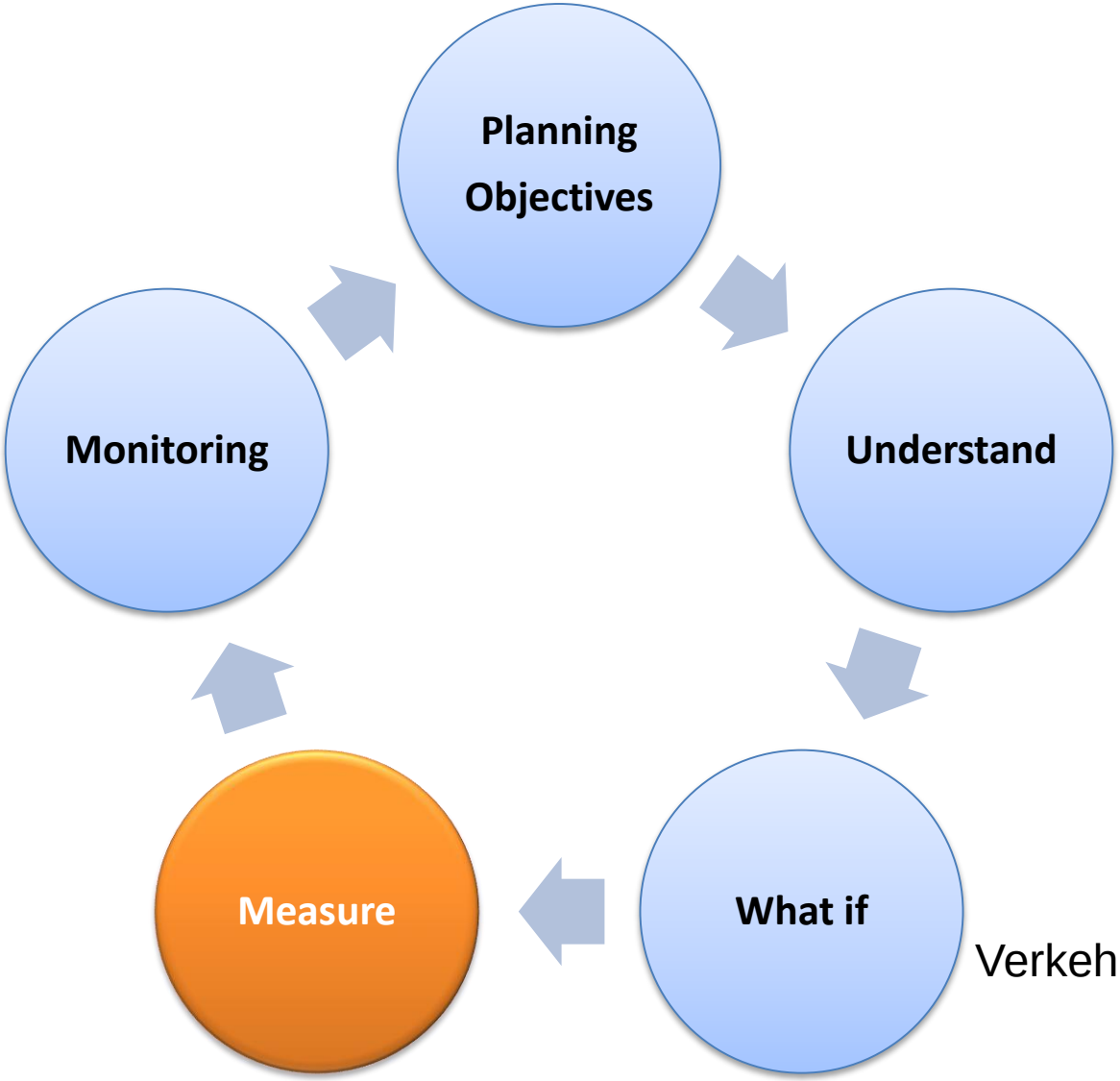


Planning cycle Bicycle Traffic



Traffic Model

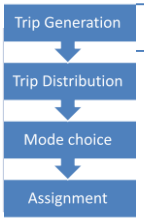
Planning cycle Bicycle Traffic



Verkehrsmodell

Tooling Cycle Highways

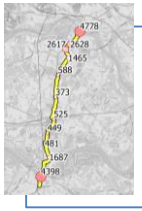
Cycle Highway Network



„Traditional“ Traffic Models

CyclePRINT Analytics

Cycle Scan

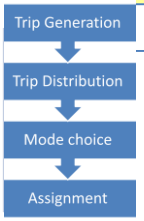


Counting

Tools of Kunda Culture, 8500-5000BC, Latvia
Photo: Wikipedia

Tooling Cycle Highways

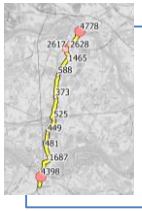
Cycle Highway Network



„Traditional“ Traffic Models

CyclePRINT Analytics

Cycle Scan

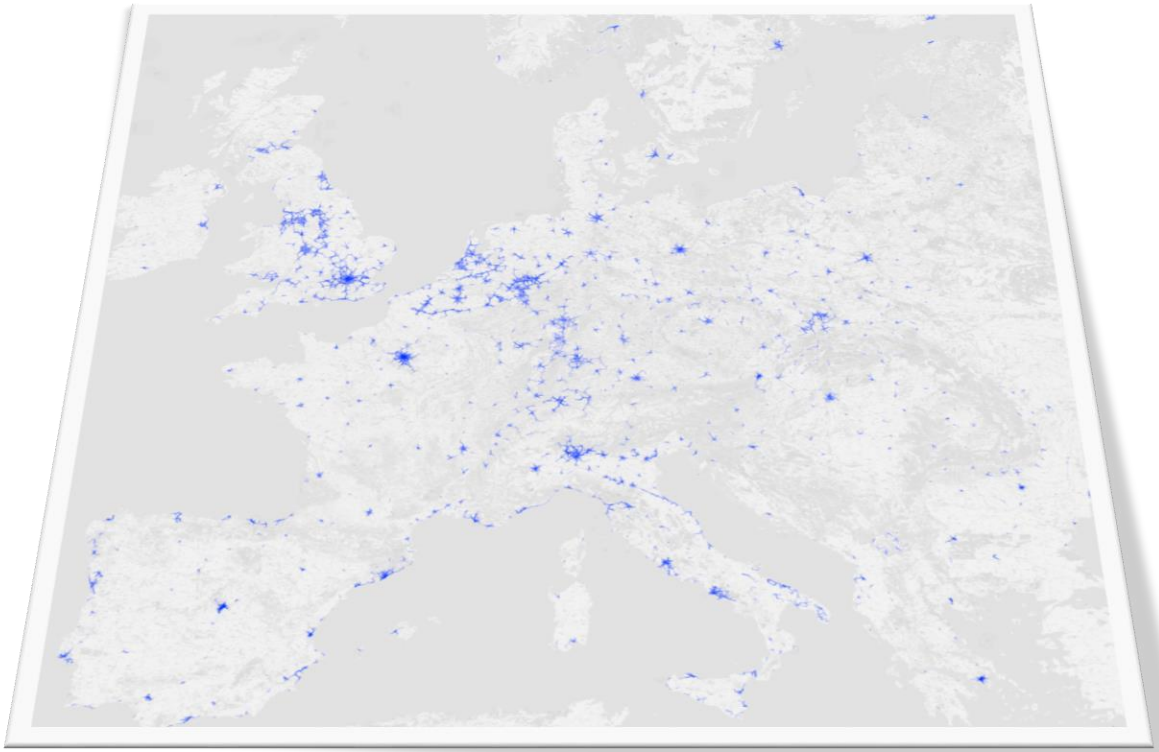


Counting

Tools of Kunda Culture, 8500-5000BC, Latvia
Photo: Wikipedia

Generating synthetic cycle highway network

potential traffic demand

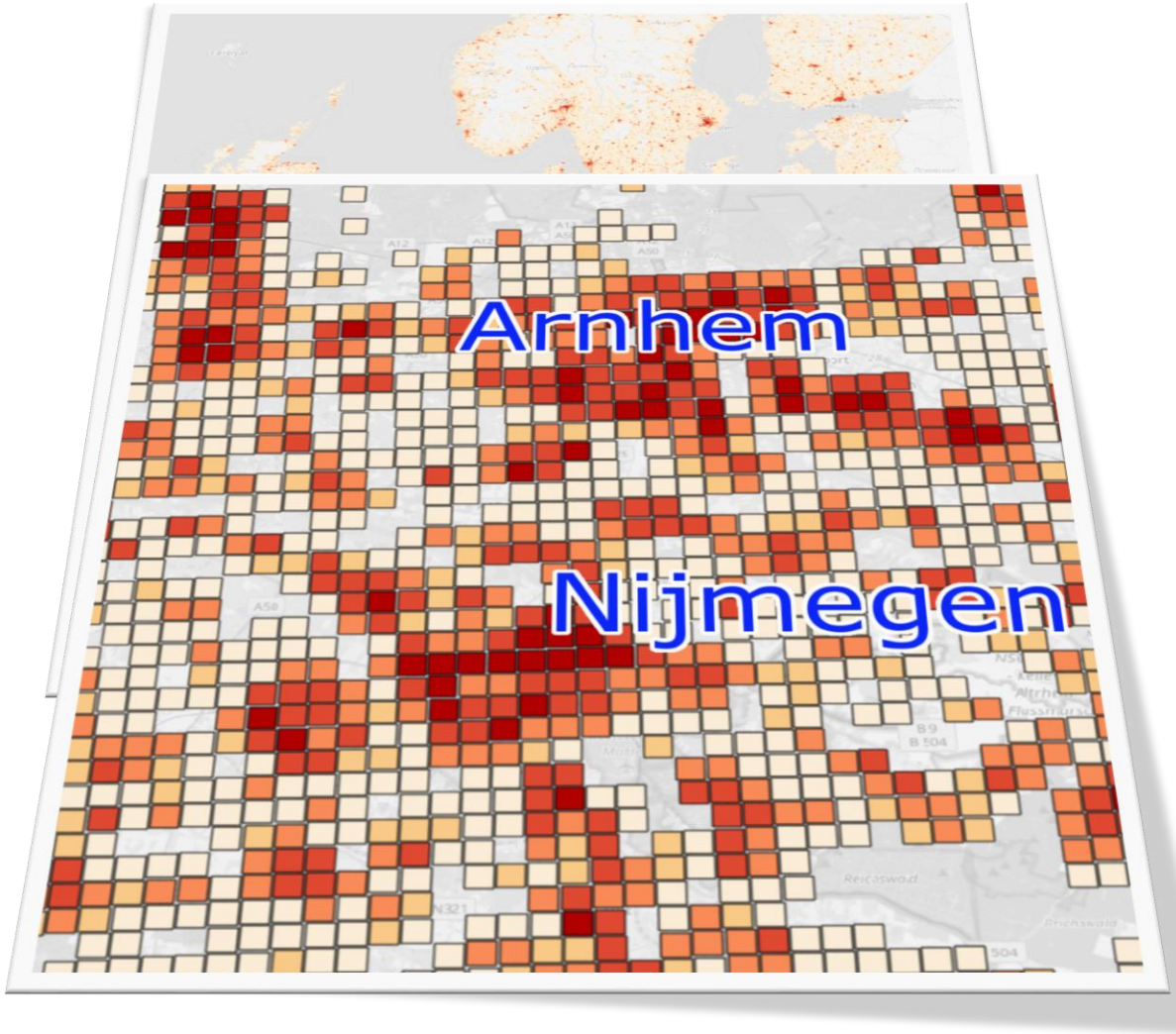


- Population data
- Trip generation
- Build network
- Assigning
- Clustering

GEOSTAT dataset

Population grid 1x1 km

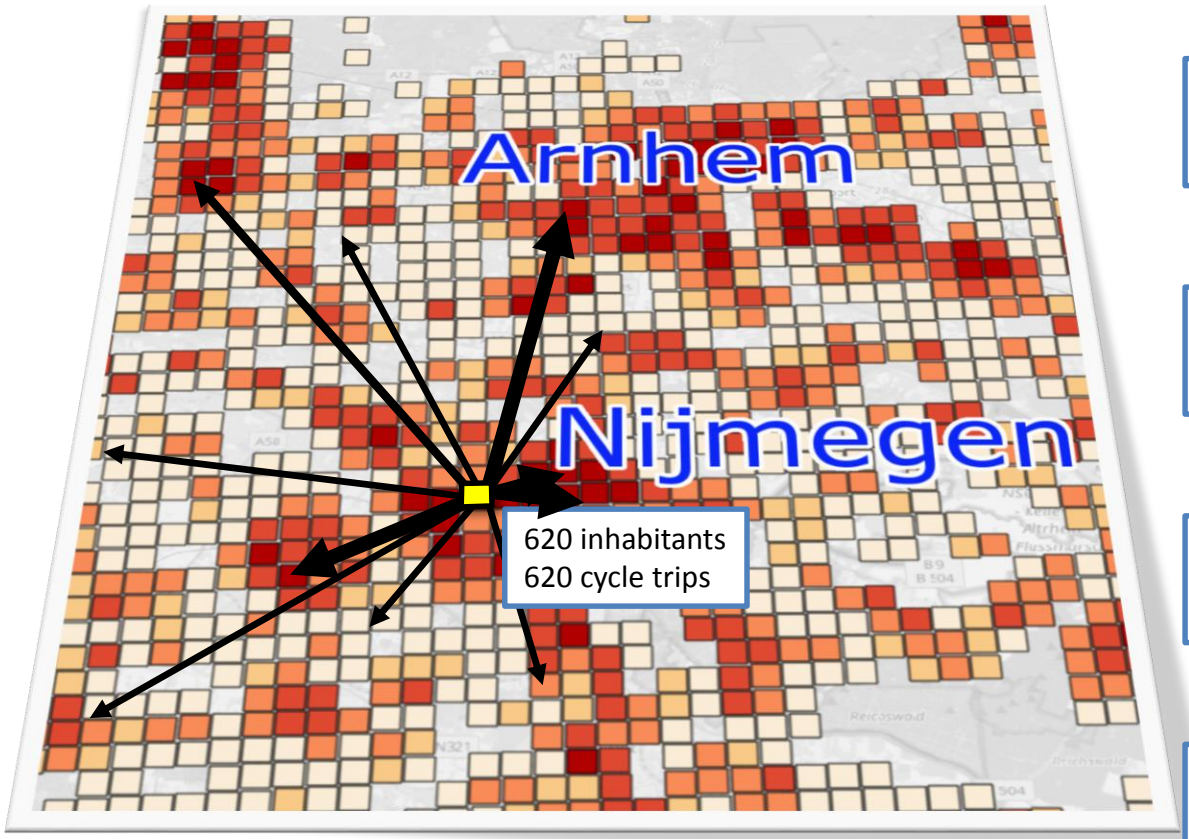
http://ec.europa.eu/eurostat/web/gisco/geodata/reference-data/population-distribution-demography/geostat



- Population data
- Trip generation
- Build network
- Assigning
- Clustering

Trip Generation

Gravity model



- Population data
- Trip generation
- Build network
- Assigning
- Clustering

Make synthetical network

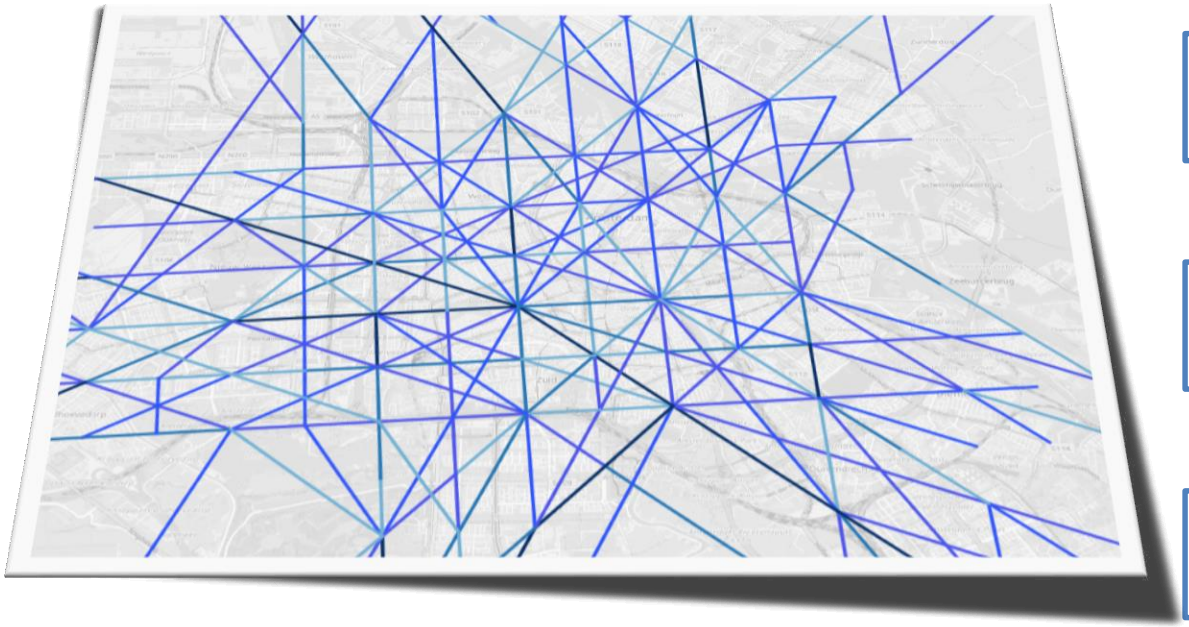
Generate a topological network

> 8 million links

- Population data
- Trip generation
- **Build network**
- Assigning
- Clustering

Assignment

Find shortest route for each relation

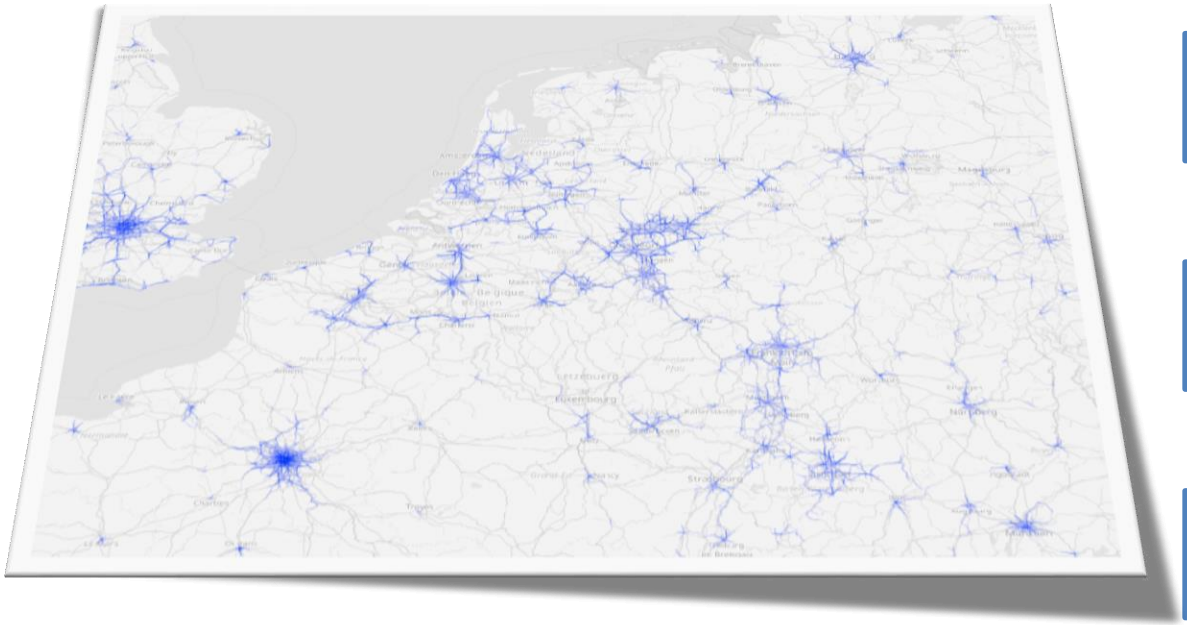


- Population data
- Trip generation
- Build network
- **Assigning**
- Clustering

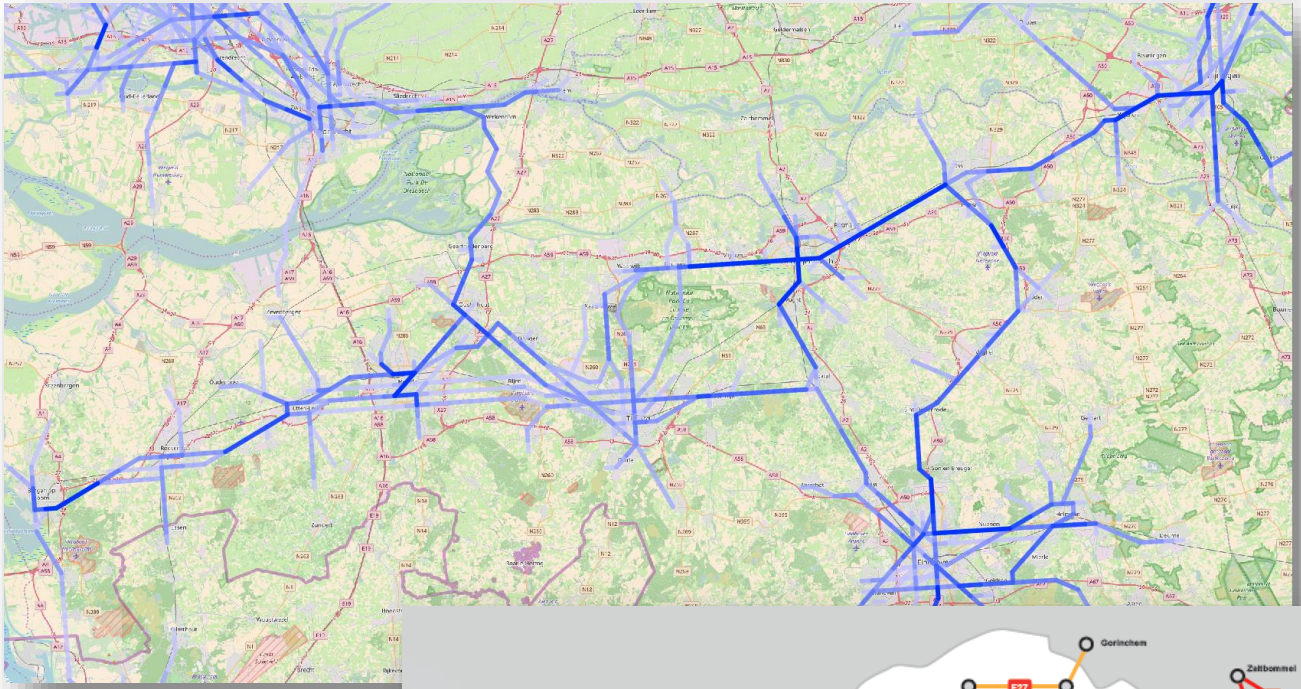
Clustering

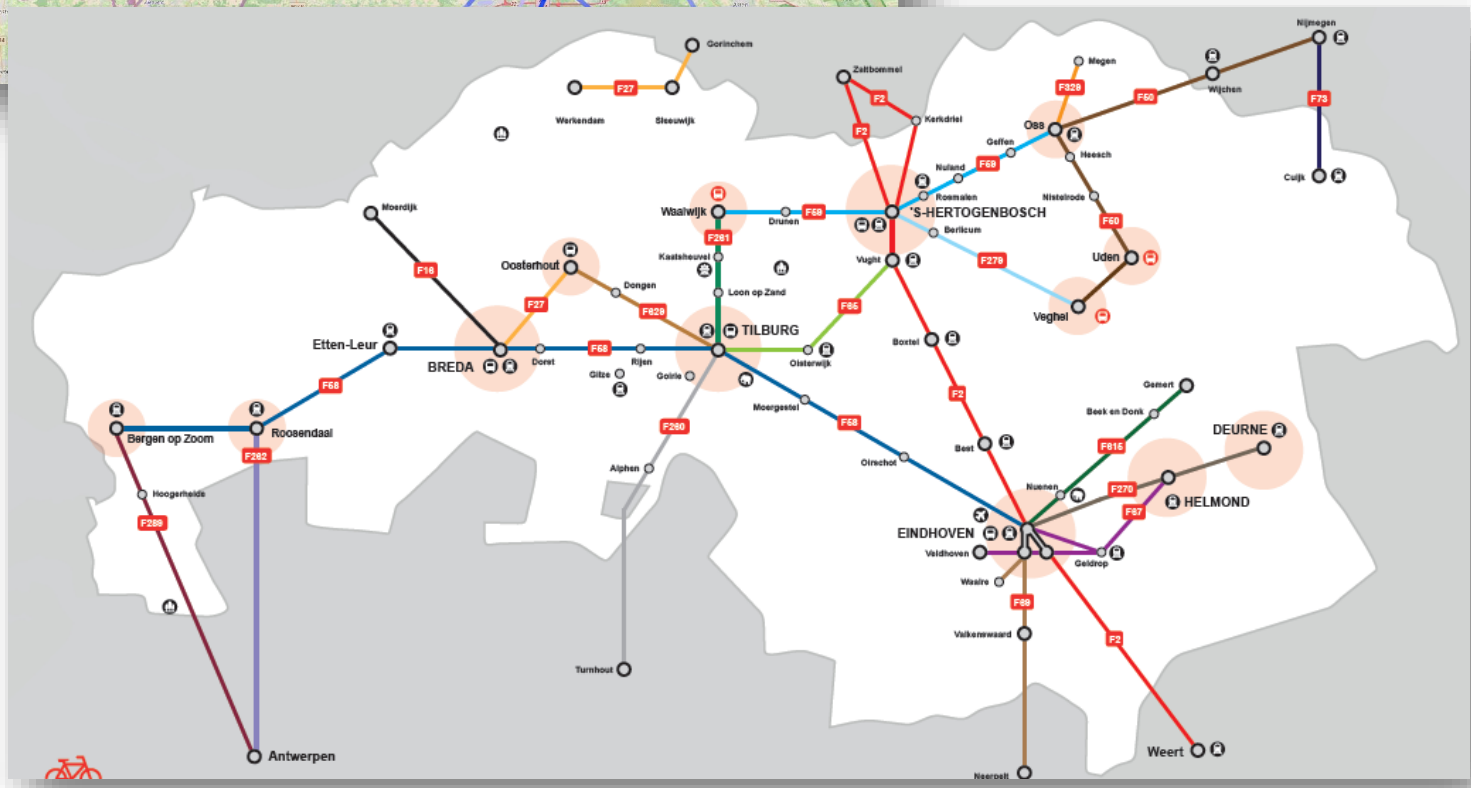
Iteratively rerouting cyclists

by increasing speed on heavy used links



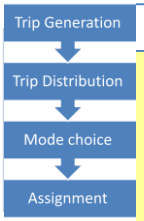
- Population data
- Trip generation
- Build network
- Assigning
- **Clustering**




Gorinchem
F27
Werkendam
Sleeuwijk
Zaltbommel
F2
Kerkdriel
Megen
F329
Oss
Nijmegen
Wijchen
F50
F73
Geffen
Heesch
Nuland
F69
Cuijk
Moerdijk
Waalwijk
F58
Drunen
'S-HERTOGENBOSCH
Rosmalen
Nistelrode
F60
Berlicum
F281
Vught
F278
Uden
Oosterhout
Kaatsheuvel
F16
Dongen
F27
Leon op Zand
F829
F85
Veghel
Etten-Leur
TILBURG
Boxtel
BREDA
Oisterwijk
Goirle
Rijen
Gilze
Moergestel
F68
F2
Gemert
Beek en Donk
Bergen op Zoom
Roosendaal
F280
Best
DEURNE
F816
Alphen
Oirschot
Nuenen
F270
HELMOND
F282
Hoogerheide
F67
EINDHOVEN
Veldhoven
Geldrop
F289
Waalre
F69
Valkenswaard
Turnhout
Weert
Antwerpen
Neerpelt

Tooling Cycle Highways

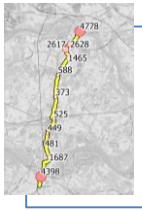
Cycle Highway Network



„Traditional“ Traffic Models

CyclePRINT Analytics

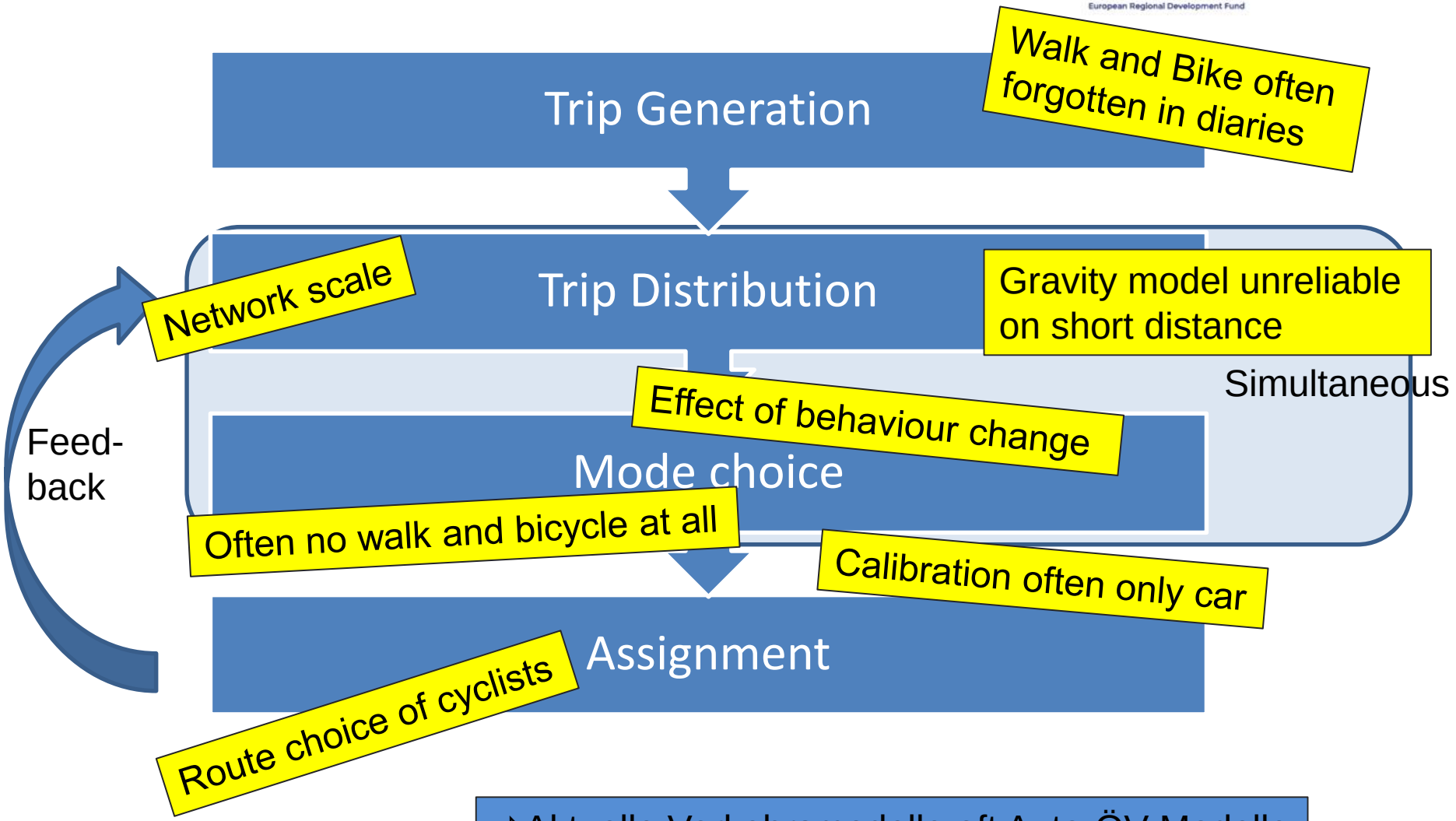
Cycle Scan



Counting

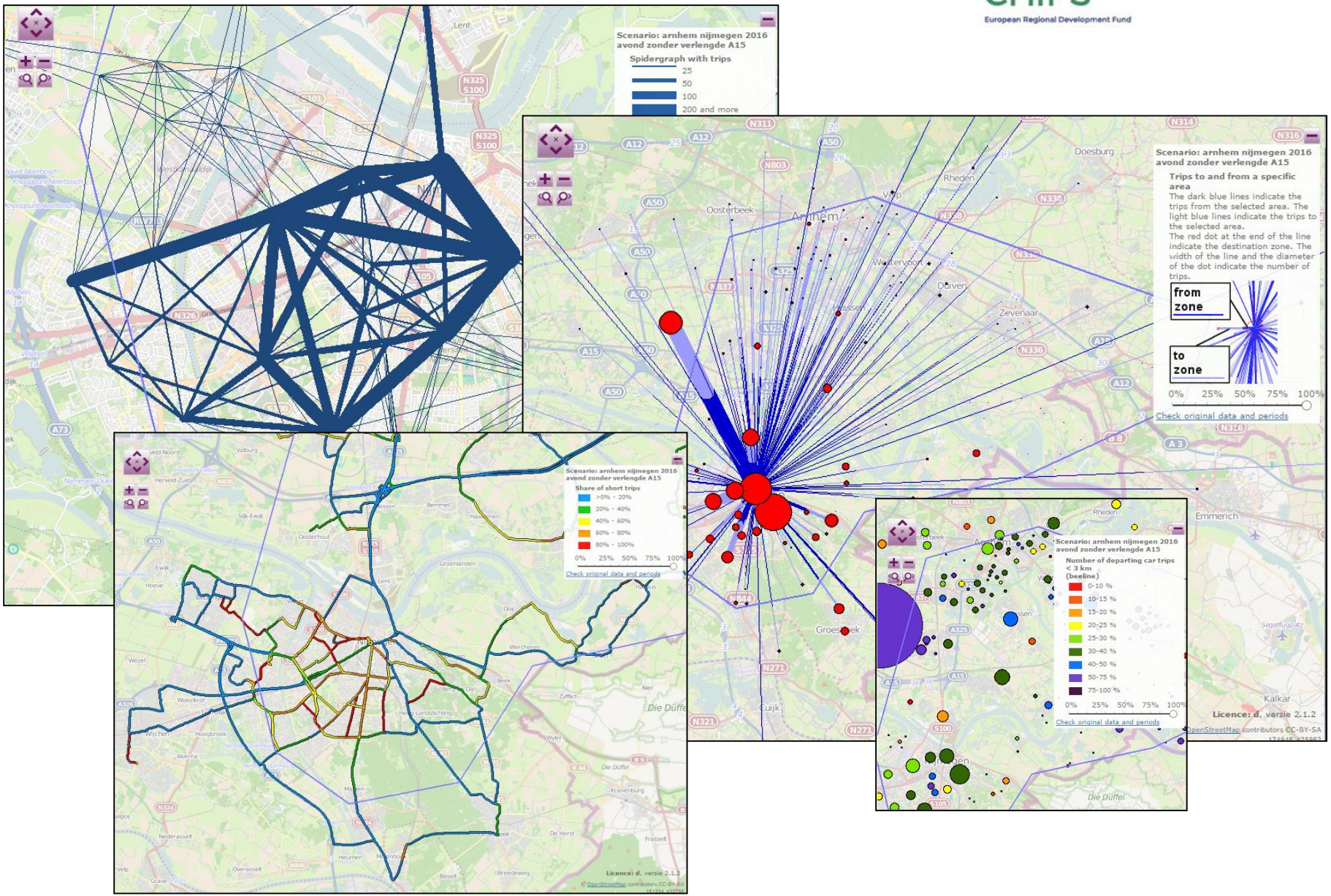
Tools of Kunda Culture, 8500-5000BC, Latvia
Photo: Wikipedia

Bicycle in traffic modals



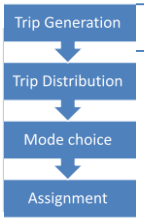
⇨Aktuelle Verkehrsmodelle oft Auto-ÖV Modelle

Short Car Trips



Tooling Cycle Highways

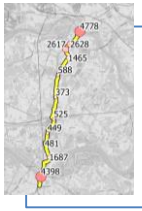
Cycle Highway Network



„Traditional“ Traffic Models

CyclePRINT Analytics

Cycle Scan



Counting

Tools of Kunda Culture, 8500-5000BC, Latvia
Photo: Wikipedia

Main Cycle Network

Foto: Wikipedia

BIKE PRINT

Home | Fietsgebruik | Snelheid | Fietspotentie | Scenario's | Over BikePrint | Contact | Login

Kies uw taal:

Kies dataset:
Brabant t/m januari 2014

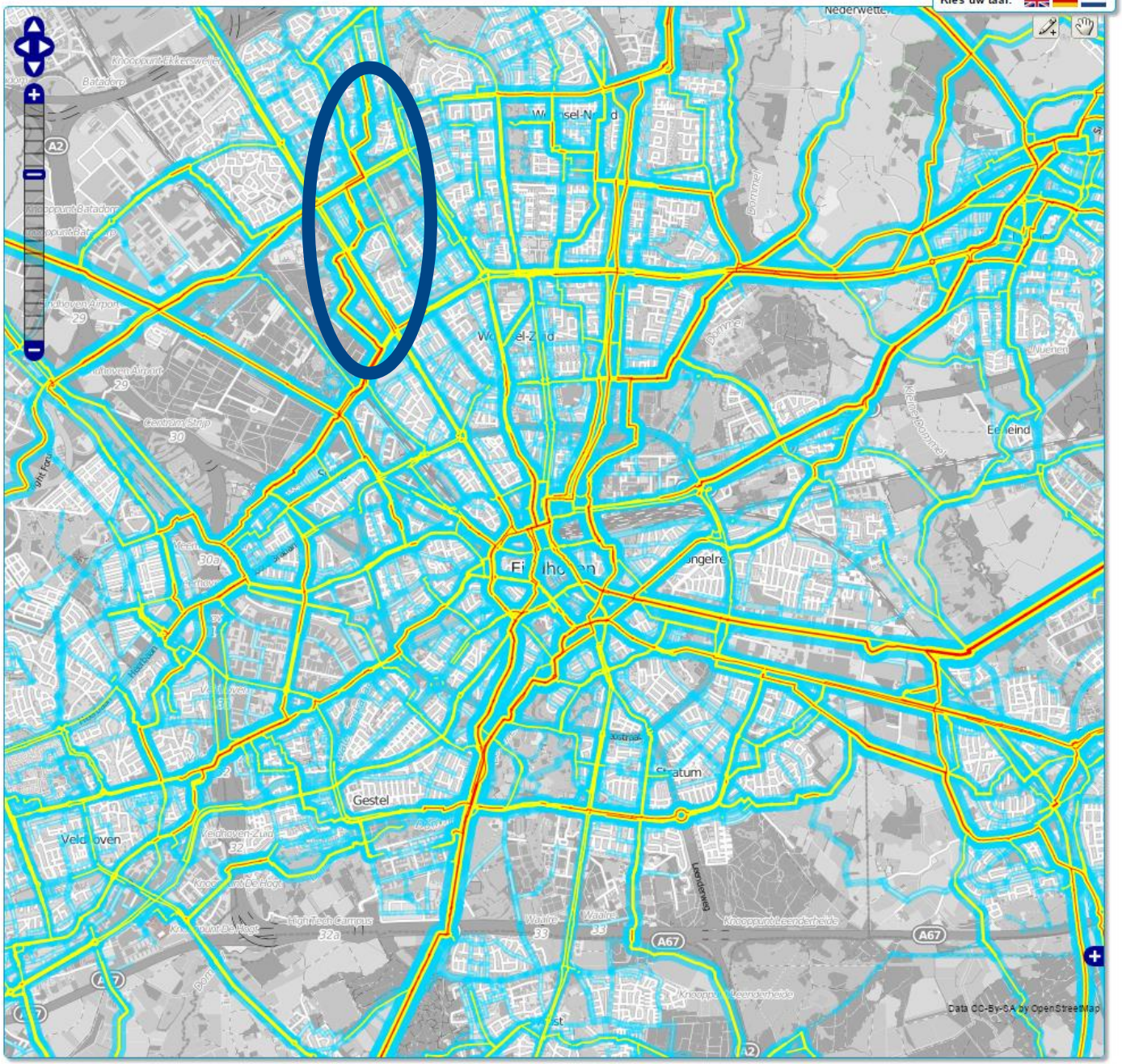
fietsers
snelheid: 0 km/u (0 %)
detailinformatie

Druktebeeld (heatmap)

Aantal waargenomen fietsers op het wegennet

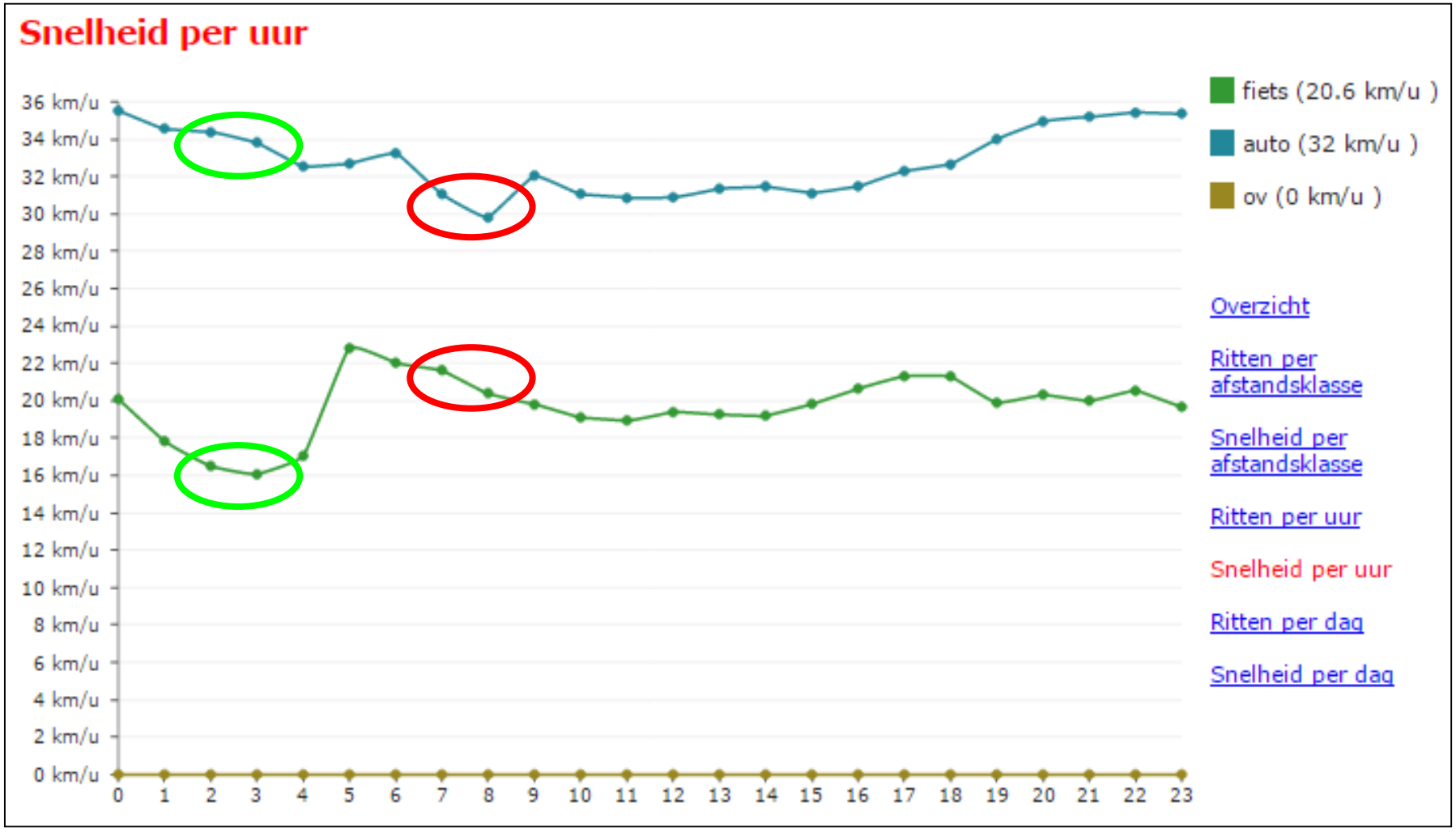
- 0 - 10
- 10 - 20
- 20 - 50
- 50 - 100
- 100 to 200
- 200 to 500
- 500 to 1000
- > 1000

Routes
intensiteit kortste route
verschil waargenomen/kortste
omrijfactor
inwoners
arbeidsplaatsen

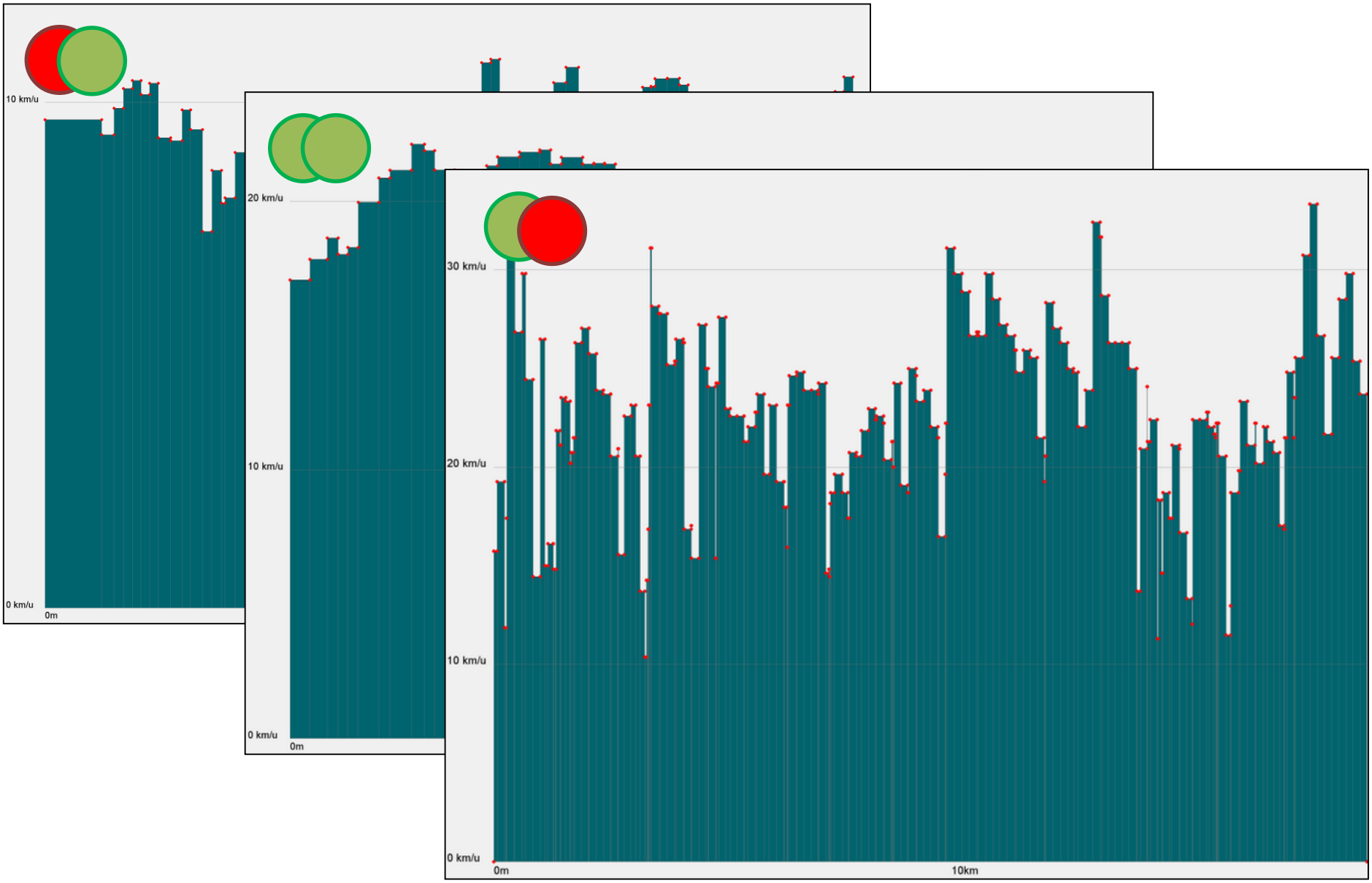


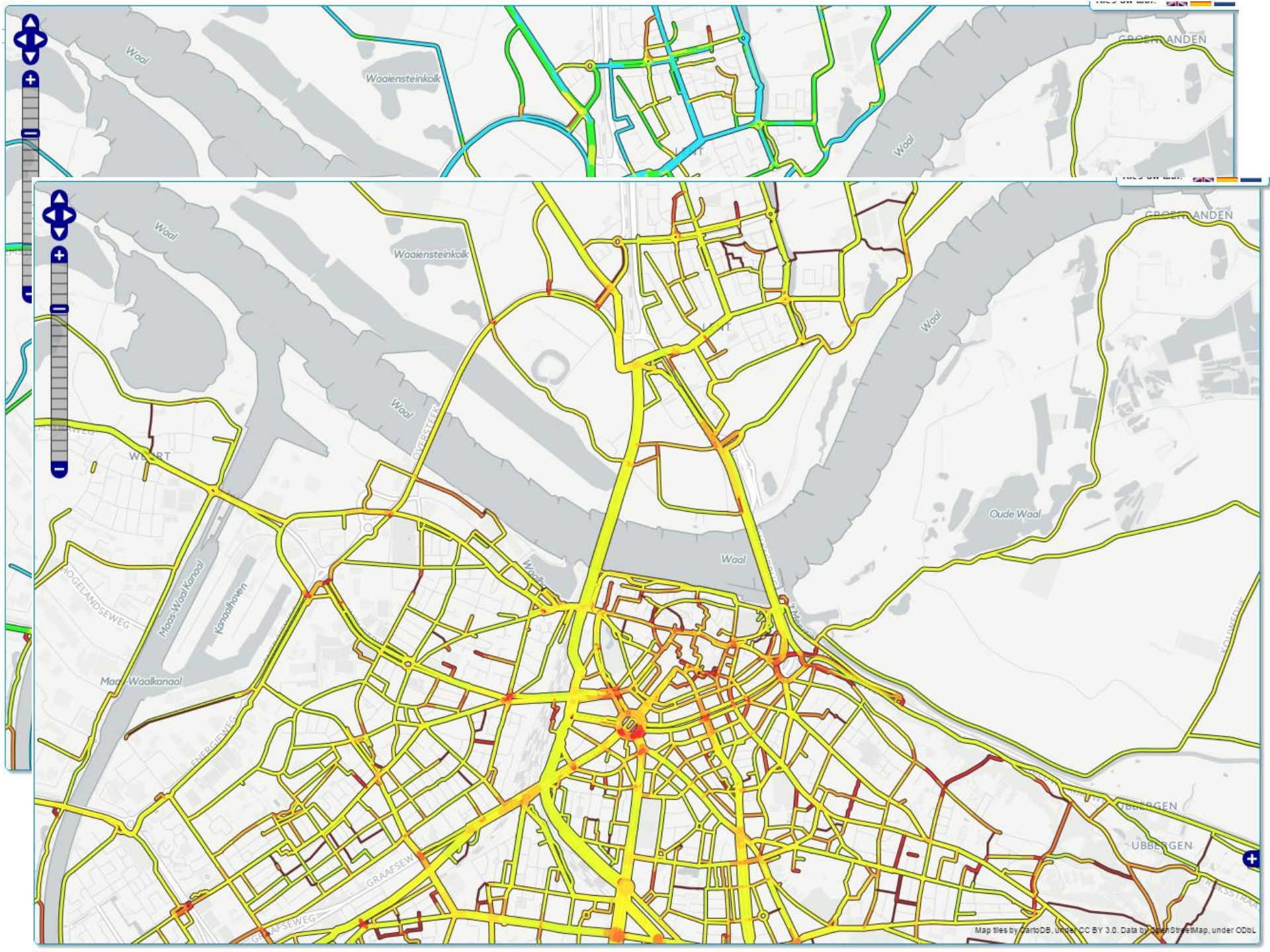
Bicycle Congestion

Foto: Fietsersbond


Snelheid per uur
36 km/u
34 km/u
32 km/u
30 km/u
28 km/u
26 km/u
24 km/u
22 km/u
20 km/u
18 km/u
16 km/u
14 km/u
12 km/u
10 km/u
8 km/u
6 km/u
4 km/u
2 km/u
0 km/u
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
fiets (20.6 km/u)
auto (32 km/u)
ov (0 km/u)
Overzicht
Ritten per afstandsklasse
Snelheid per afstandsklasse
Ritten per uur
Snelheid per uur
Ritten per dag
Snelheid per dag

Speed Measure




Waal
Waaiensteinkolk
Oude Waal
Maas-Waalkanaal
Kanaalhaven
Map tiles by CartoDB, under CC BY 3.0. Data by OpenStreetMap, under ODbL

Kies dataset:
Brabant t/m januari 2014

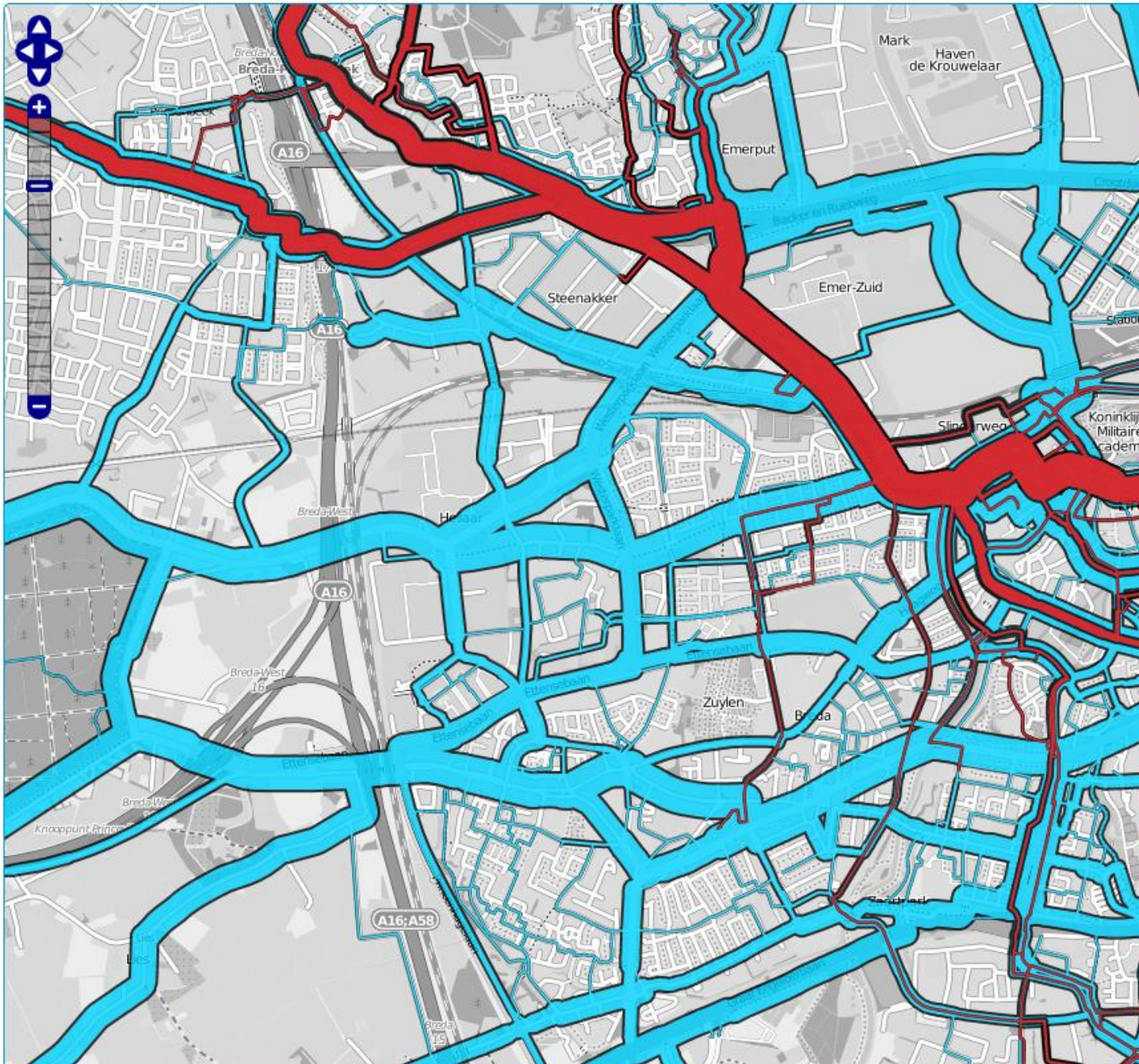
195 fietsers
snelheid: 20 km/u (0 %)
detailinformatie

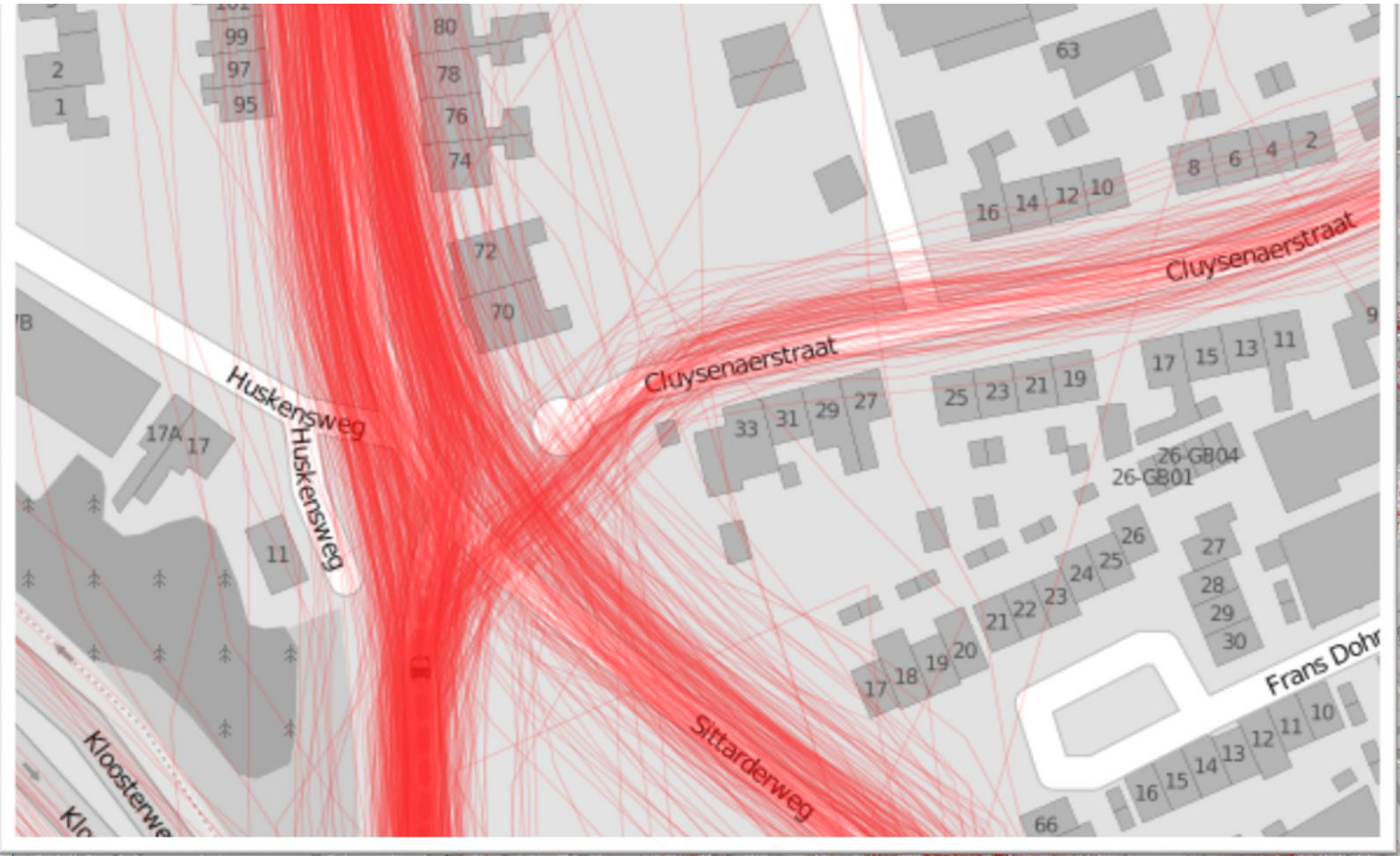
Druktebeeld / routes

Waargenomen drukte
uit tracks en selected links: klik in kaart om traks te tonen die langs muispositie lopen

- 0 tot 3
- 4 tot 6
- 6 tot 8
- 8 tot 10
- 10 to 15
- 15 to 20
- 20 to 25
- 25 to 30
- 30 to 50
- 50 to 75
- 75 to 100
- 100 tot 9999999

- intensiteit kortste route
- verschil waargenomen/kortste
- omrijfactor
- selected link
- inwoners
- arbeidsplaatsen




Huskensweg
Huskensweg
Cluysenaerstraat
Cluysenaerstraat
Sittarderweg
Frans Dohr
Kloosterwe
99
97
95
80
78
76
74
72
70
63
16
14
12
10
8
6
4
2
2
1
17A
17
11
33
31
29
27
25
23
21
19
17
15
13
11
26-GB04
26-GB01
26
25
24
23
22
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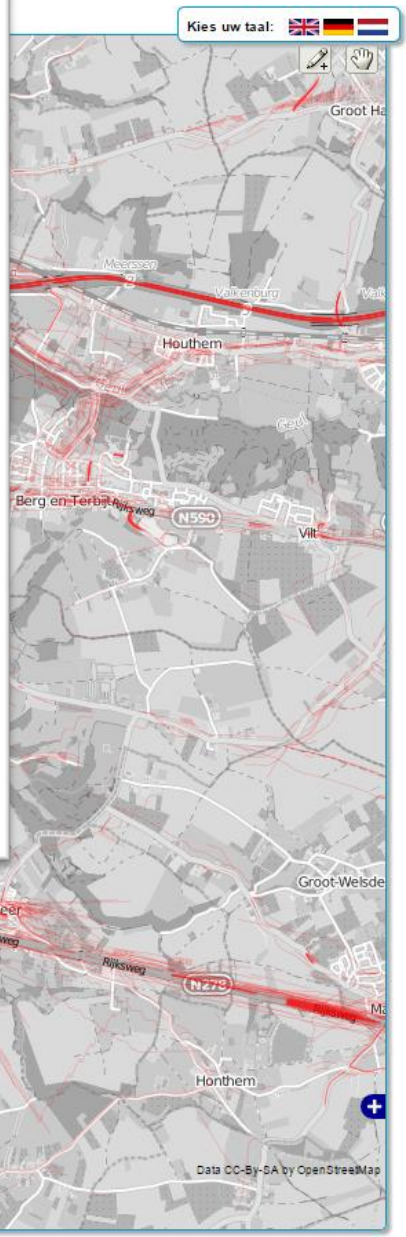
20
19
18
17
27
28
29
30
16
15
14
13
12
11
10
66


Kies uw taal:
Houthem
Berg en Terblijt
Rijksweg
N590
Vilt
Groot-Welsde
Cadier en Keer
Rijksweg
Rijksweg
N278
Honthem
Eckelrade
Data CC-By-SA by OpenStreetMap


Lafelt
Vroenhoven
N745
N79
N79
Riemst
Heukelom
N671
Kanne
N79
D'n Observant
171
Grons veld
A2
Eckelrade
Honthem
Rijksweg
Cannerweg
Albertkanaal
Oosterweg
Eckeldaderweg


Delays
Foto: Wikipedia

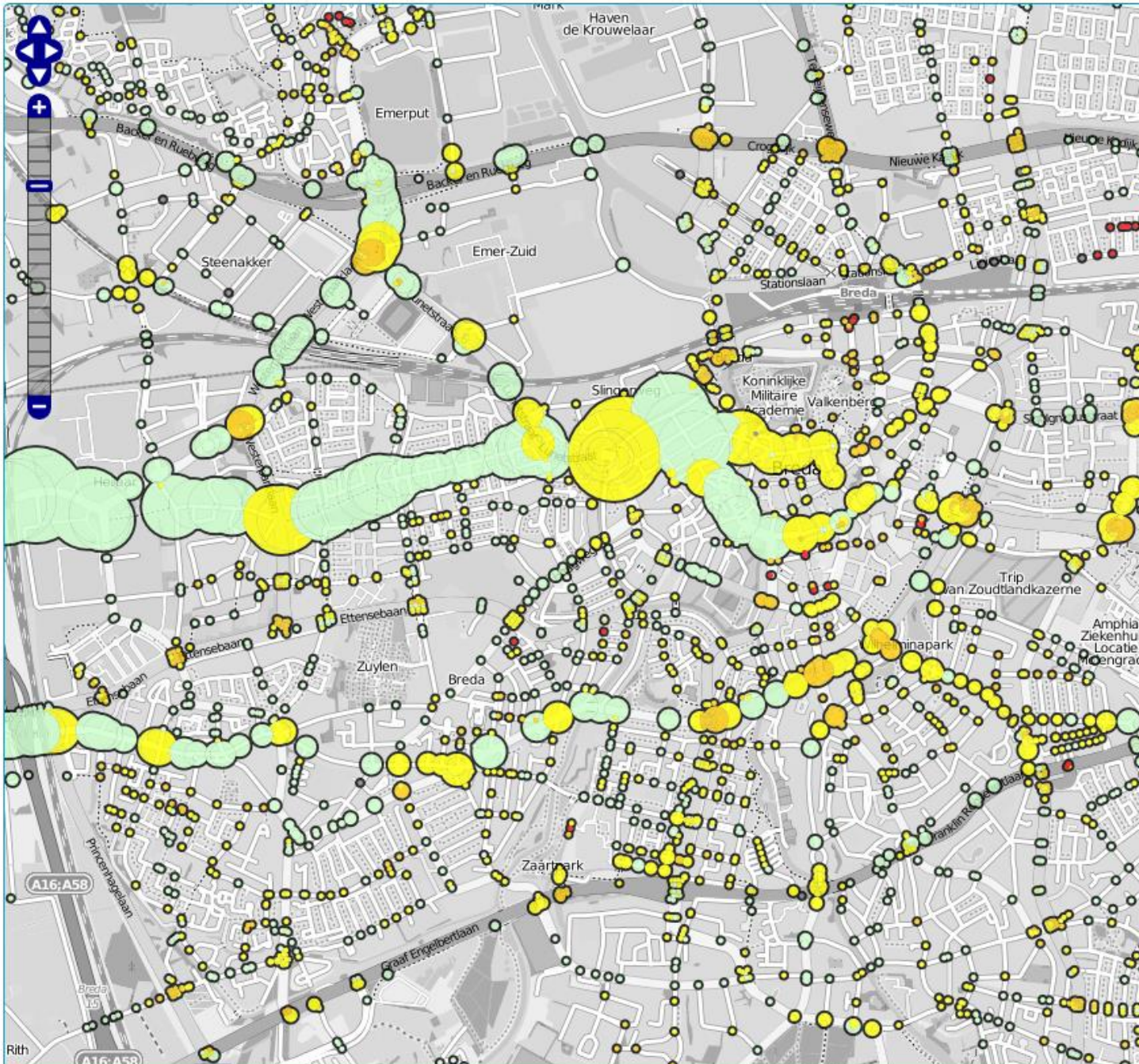
Kies dataset:
Brabant t/m januari 2014

87 fietsers
snelheid: 24 km/u (0 %)
detailinformatie

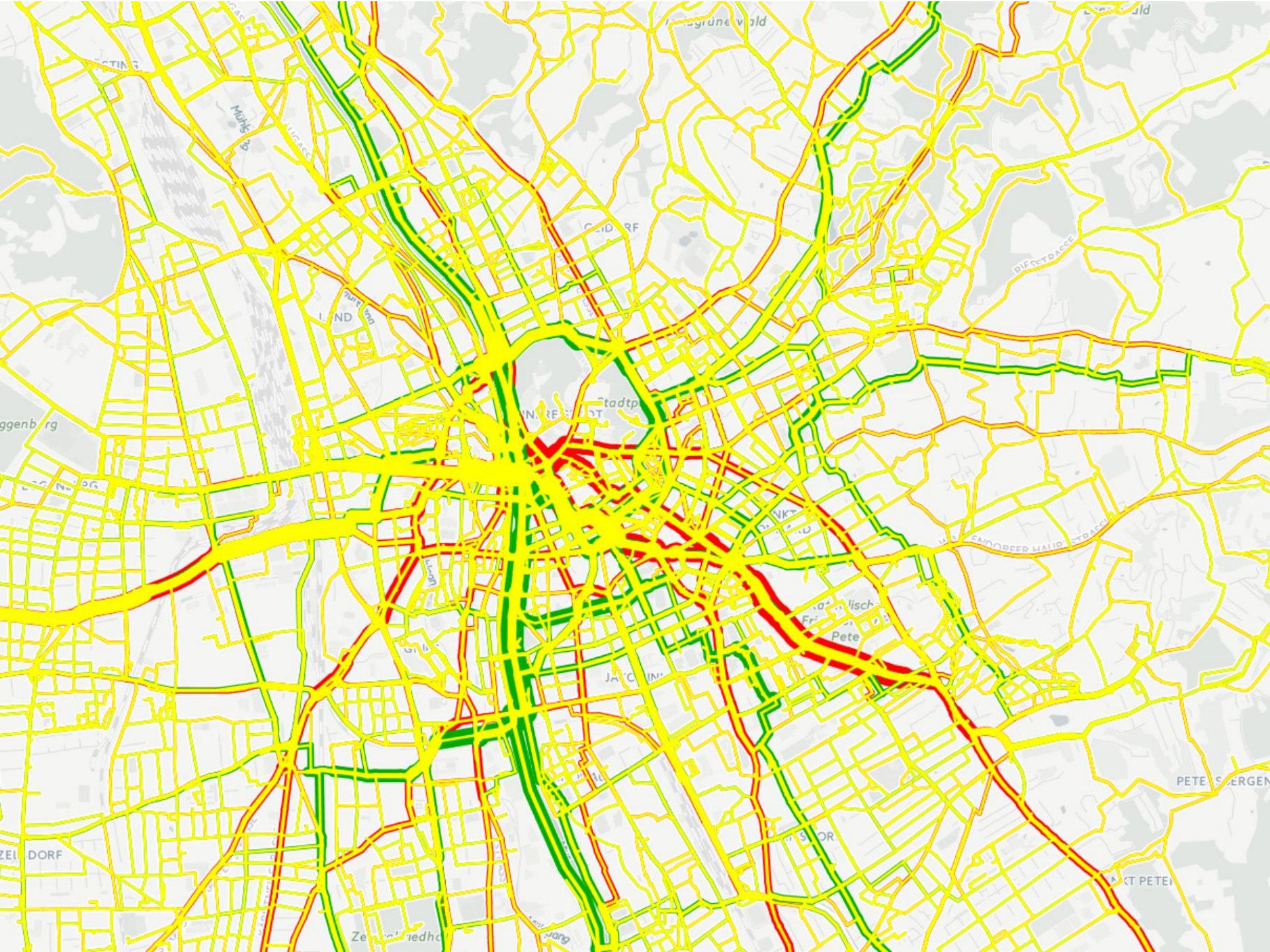
- [ ] snelheid absoluut
- [ ] snelheid relatief
- [x] vertraging

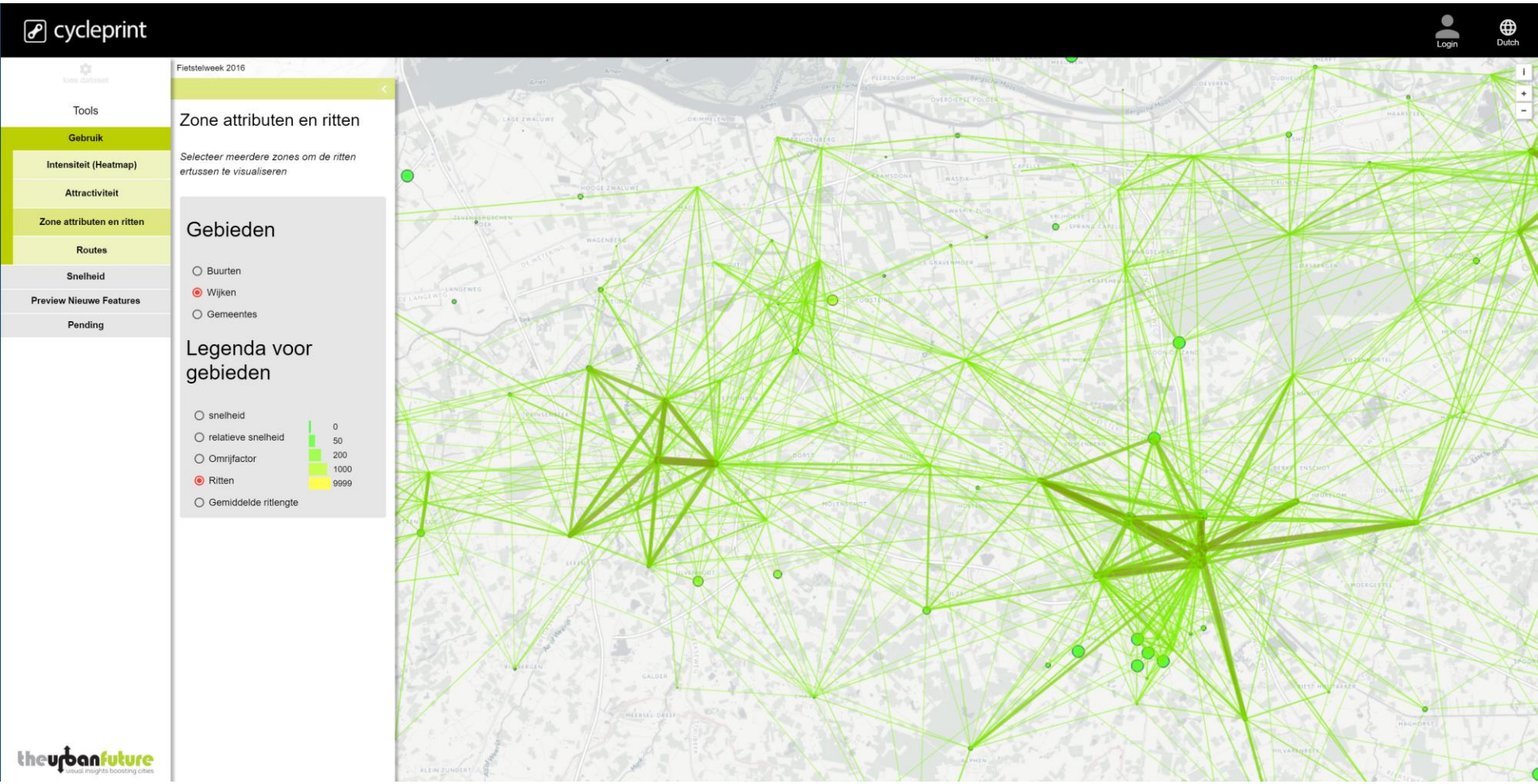
vertraging op knopen
- 1 tot 10 sec.
- 10 tot 20 sec.
- 20 tot 60 sec.
- meer dan 1 minuut

- [ ] Isochronen (vlakken)
- [ ] Isochronen (wegvakken)
- [ ] inwoners
- [ ] arbeidsplaatsen




No Cyclists =
No Potential?
Foto: Wikipedia





DECISIO POWERED BY NHTV

BiKE PRINT

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Kies dataset:

Brabant t/m januari 2014

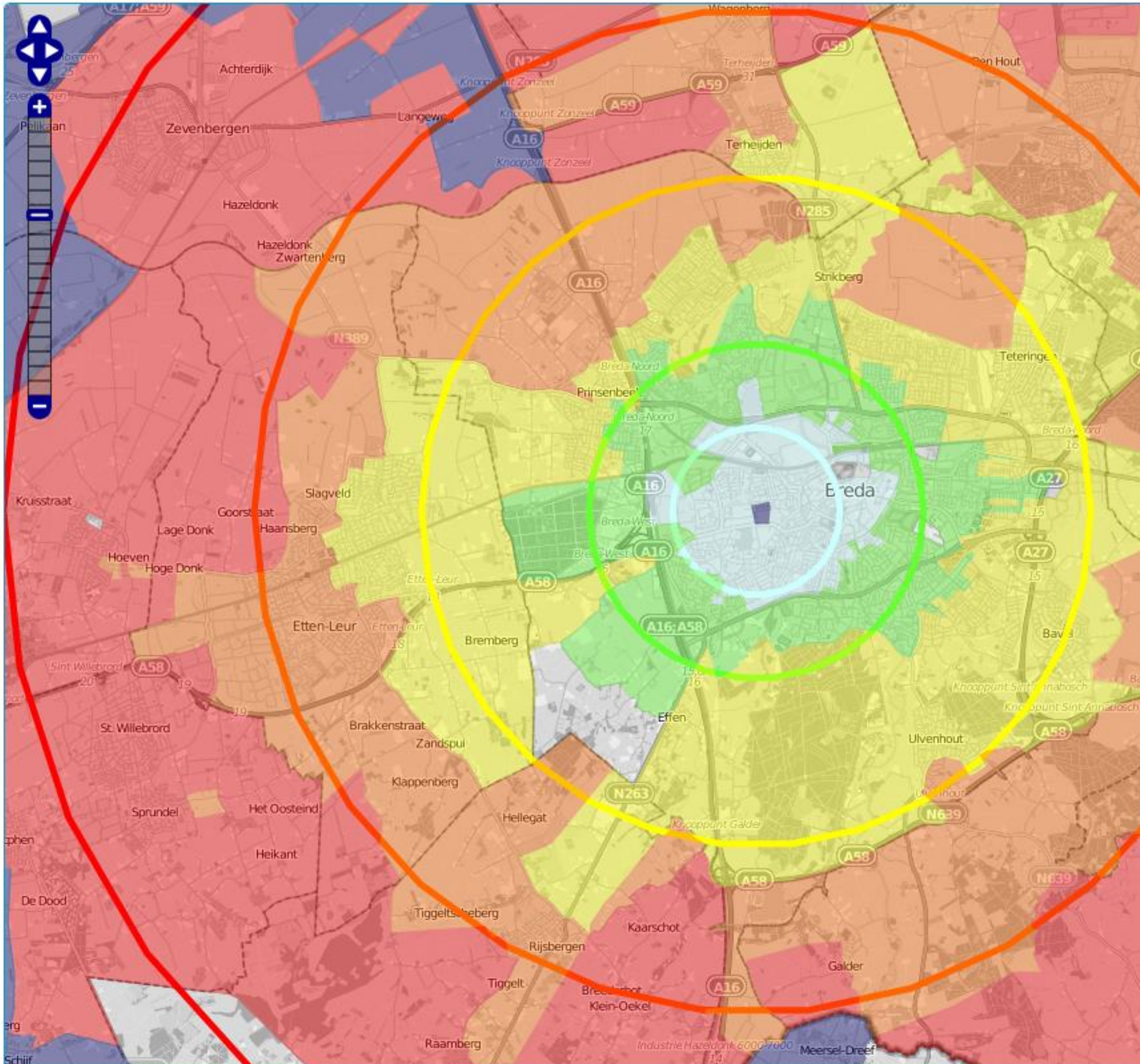
bekijk aantal inwoners/arbeidsplaatsen

- [ ] snelheid absoluut
- [ ] snelheid relatief
- [ ] vertraging
- [x] Isochronen (vlakken)

klik op een gebied om reistijden vanuit dat gebied te zien

- geselecteerd
- 0 tot 5
- 5 tot 10
- 10 tot 20
- 20 tot 30
- 30 tot 45
- meer dan 45

- [ ] Isochronen (wegvakken)
- [ ] inwoners
- [ ] arbeidsplaatsen



Kies dataset:
Brabant t/m januari 2014

87 fietsers
snelheid: 24 km/u (0 %)
detailinformatie

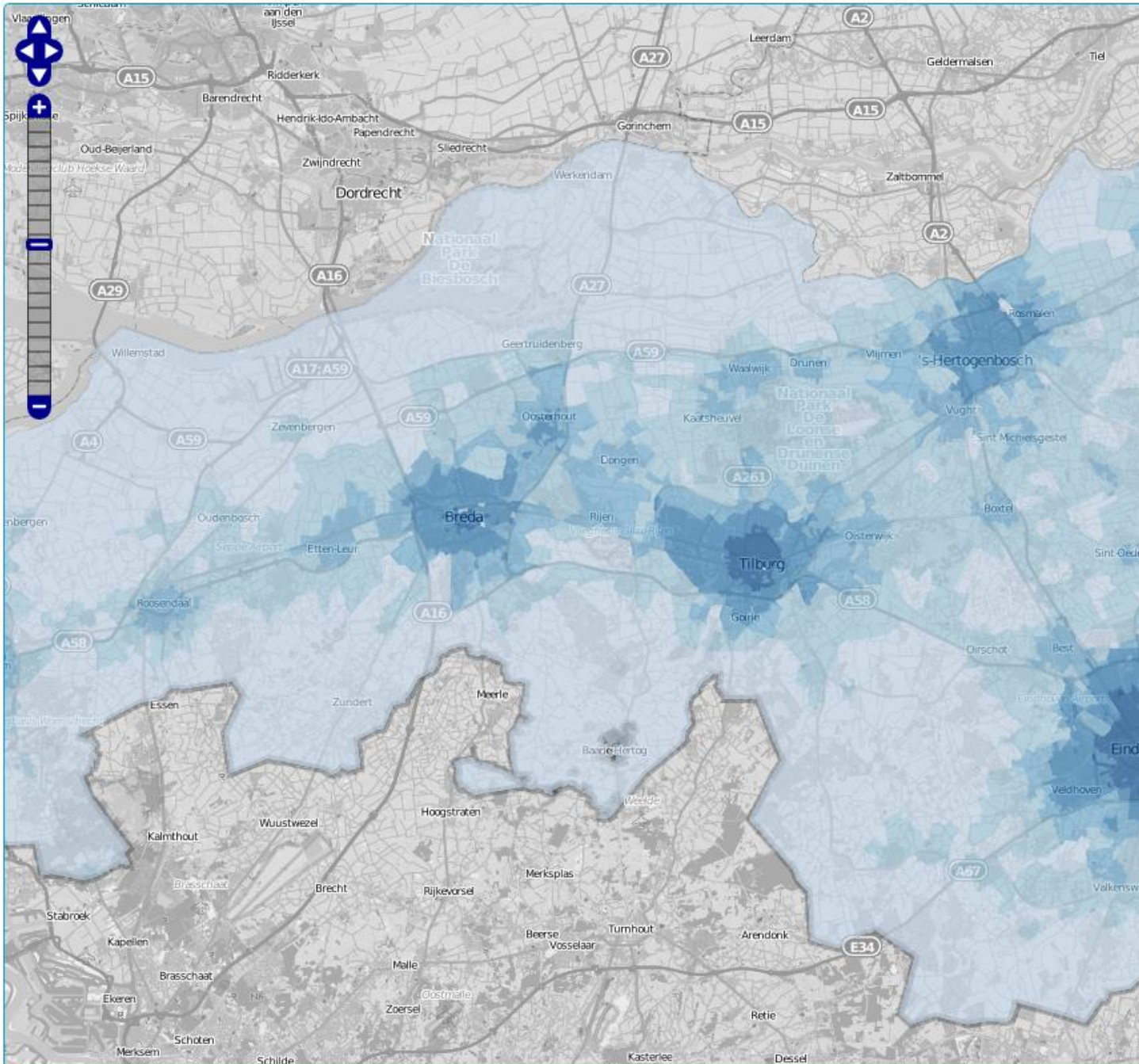
- [x] Aantal inwoners binnen fietsbereik

Aantal inwoners binnen fietsbereik

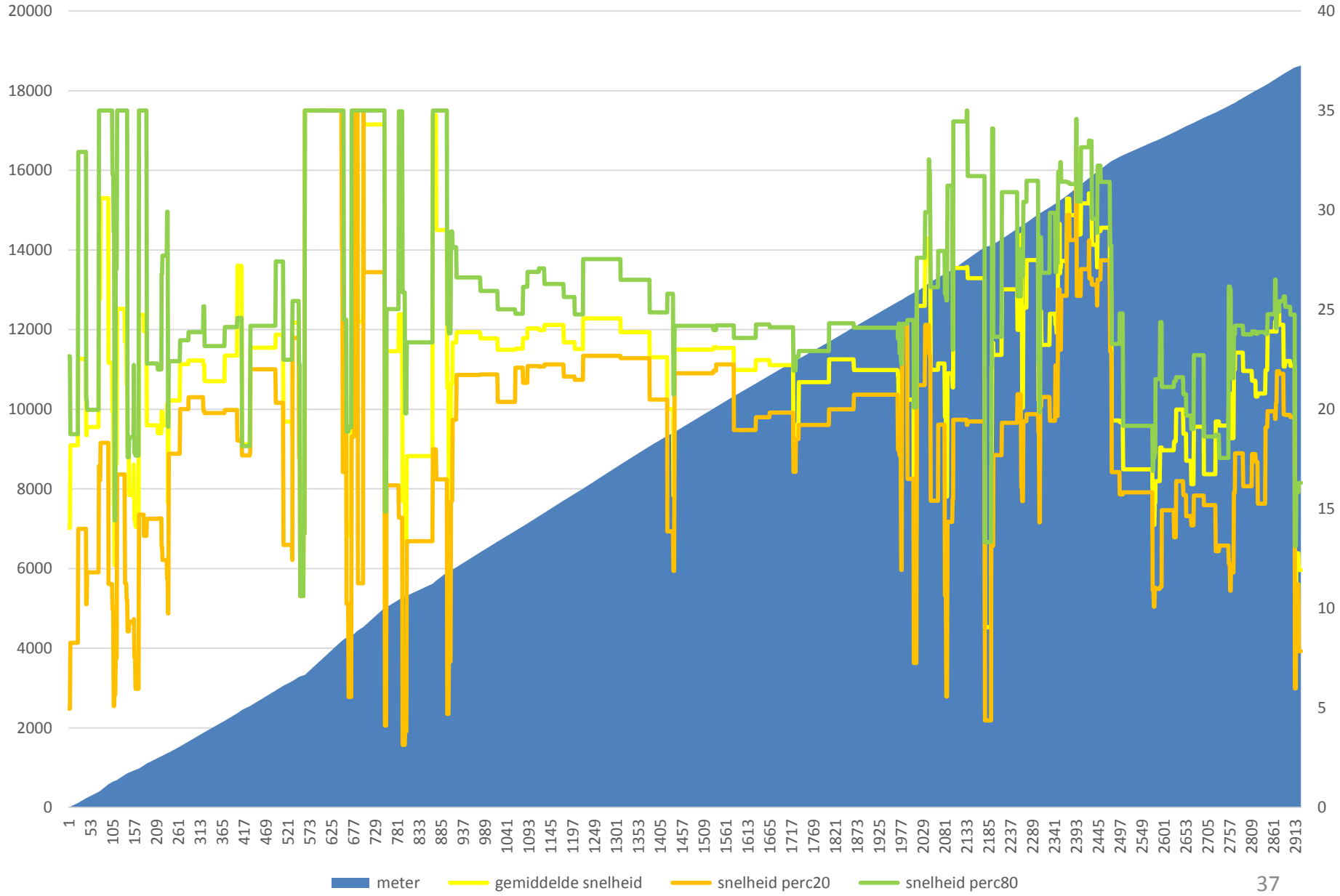
Relatief weinig potentie

Relatief veel potentie

- [ ] Aantal arbeidsplaatsen binnen fietsbereik
- [ ] inwoners
- [ ] arbeidsplaatsen

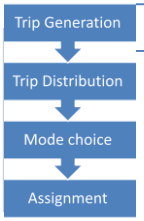


Combi-chart Tilburg-Waalwijk 2016
x-as seconden, y-as links meter, y-as rechts km/uur



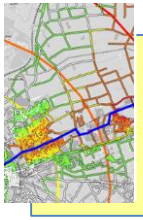
Tooling Cycle Highways

Cycle Highway Network

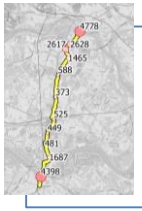


„Traditional“ Traffic Models

CyclePRINT Analytics



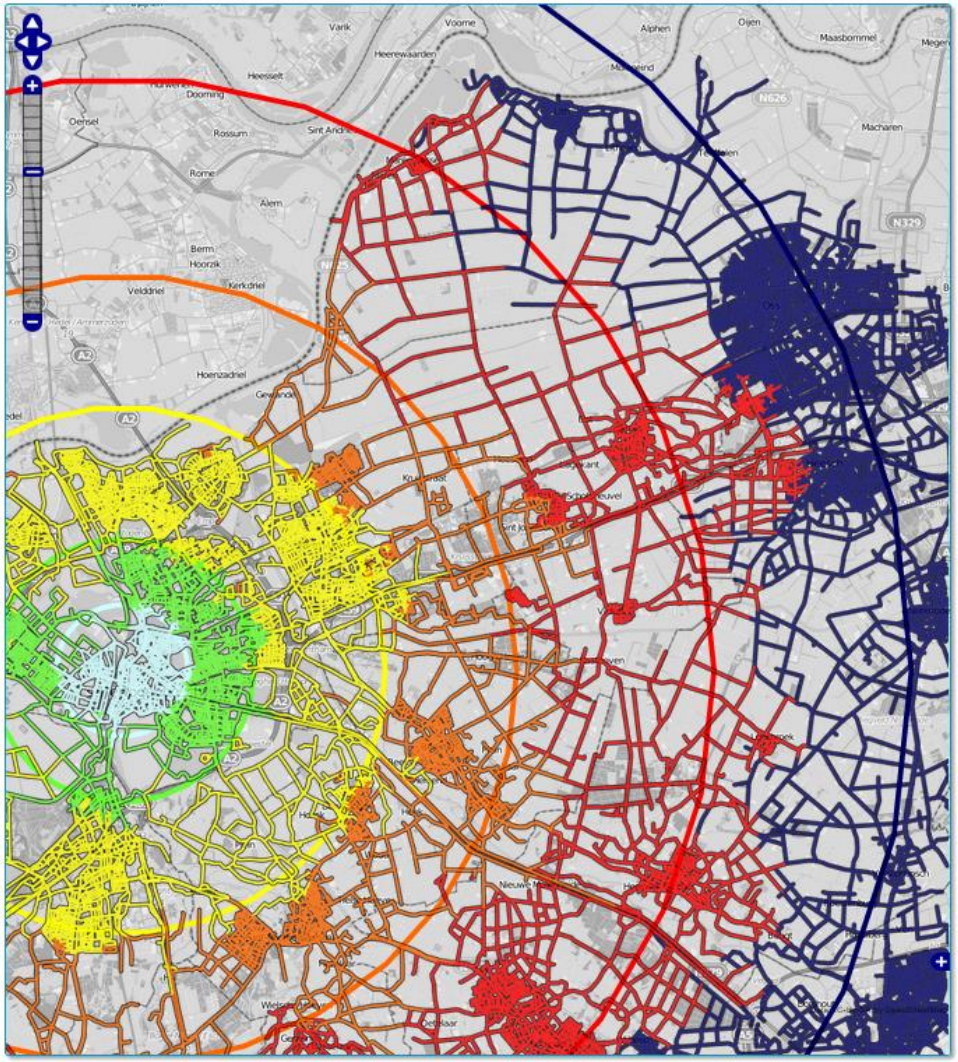
Cycle Scan

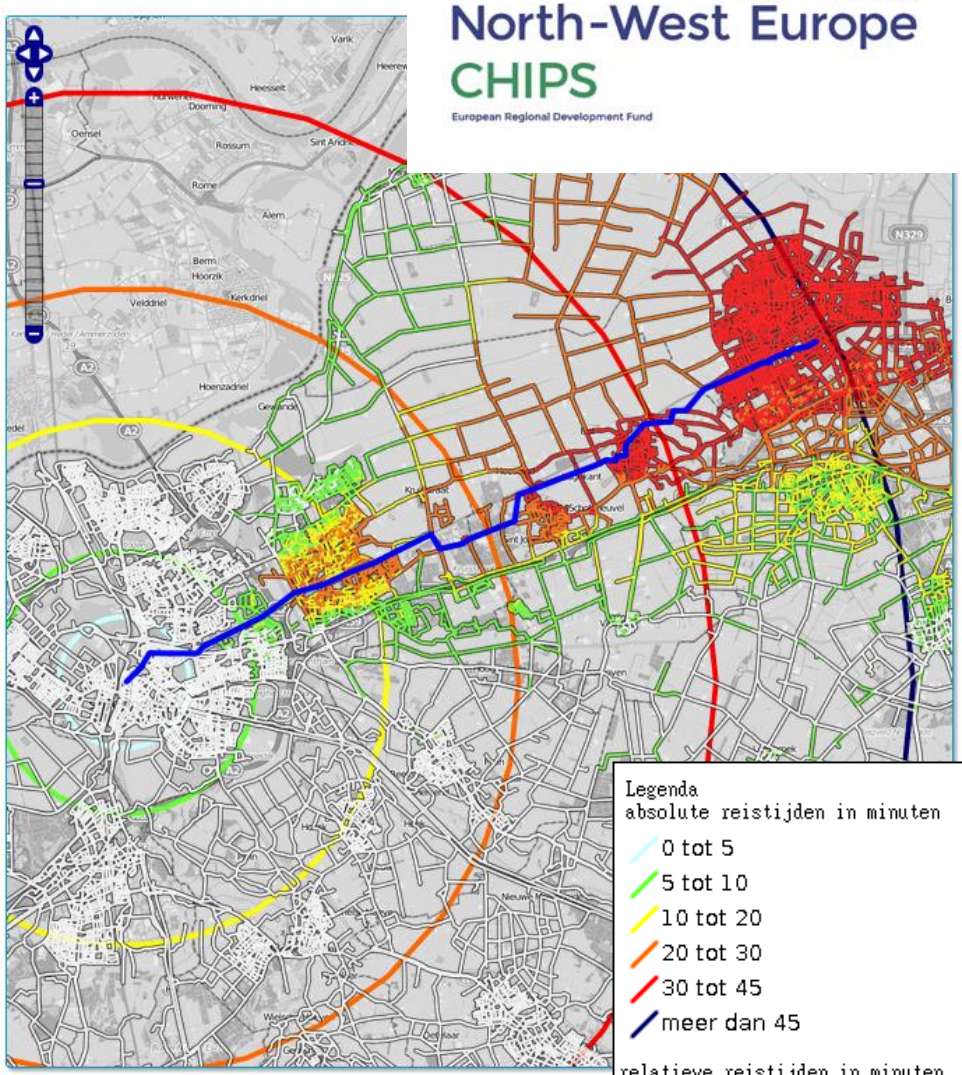


Counting

Tools of Kunda Culture, 8500-5000BC, Latvia
Photo: Wikipedia

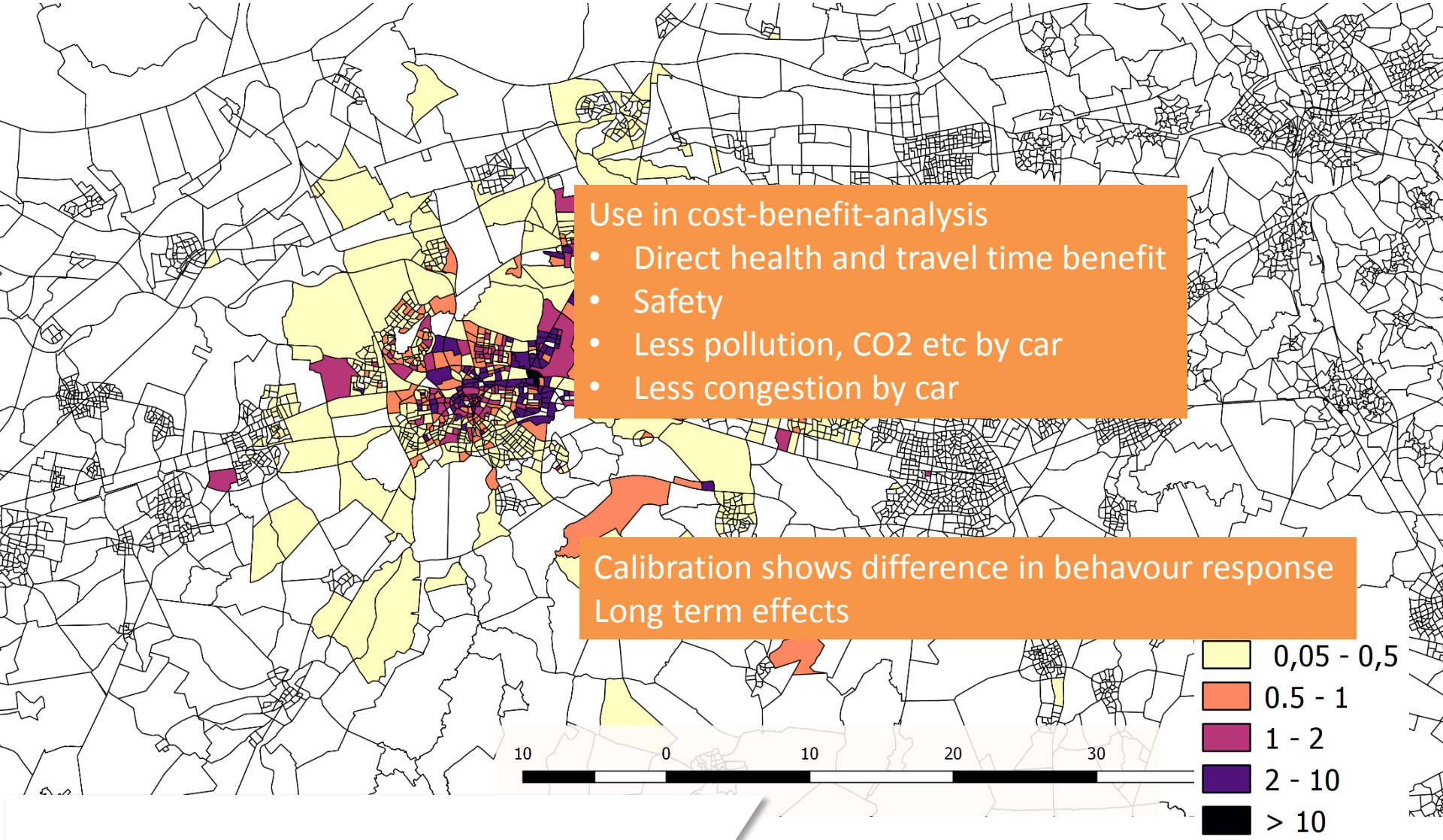
Interreg
North-West Europe
CHIPS
European Regional Development Fund





Legenda
absolute reistijden in minuten
- 0 tot 5
- 5 tot 10
- 10 tot 20
- 20 tot 30
- 30 tot 45
- meer dan 45

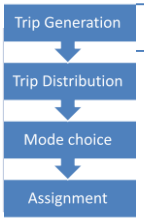
relatieve reistijden in minuten
- 0 tot 1
- 1 tot 2
- 2 tot 3
- 3 tot 5
- 5 tot 10
- meer dan 10



New Cyclists

Tooling Cycle Highways

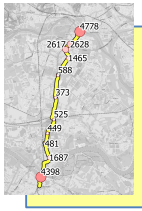
Cycle Highway Network



„Traditional“ Traffic Models

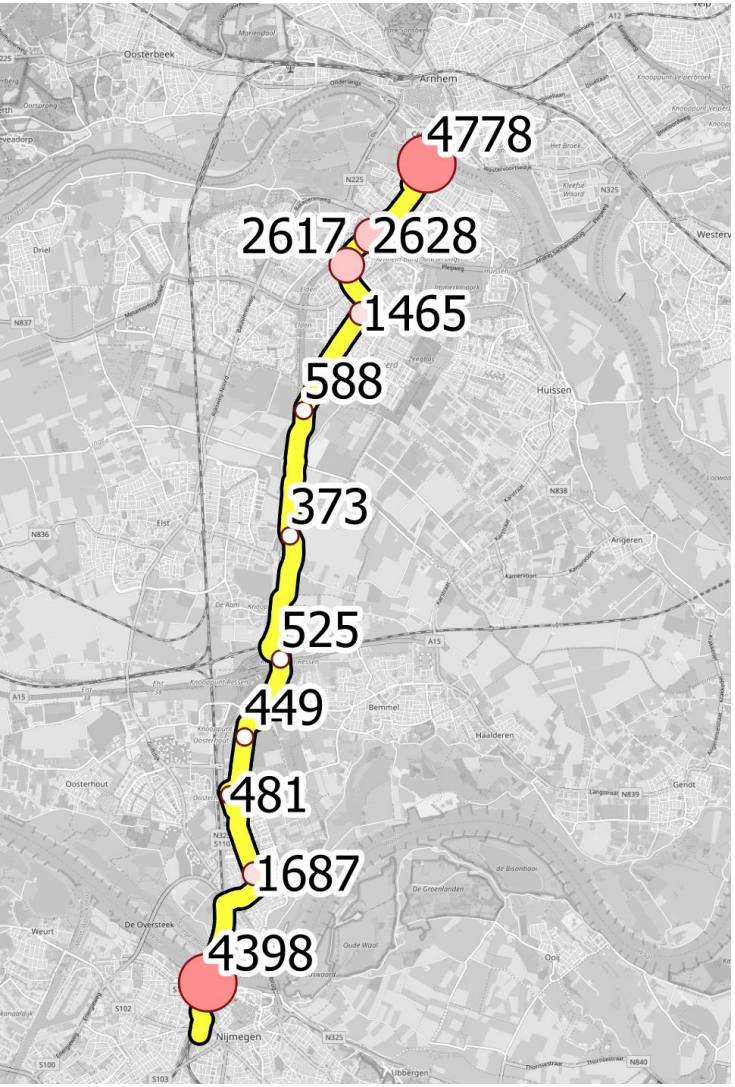
CyclePRINT Analytics

Cycle Scan



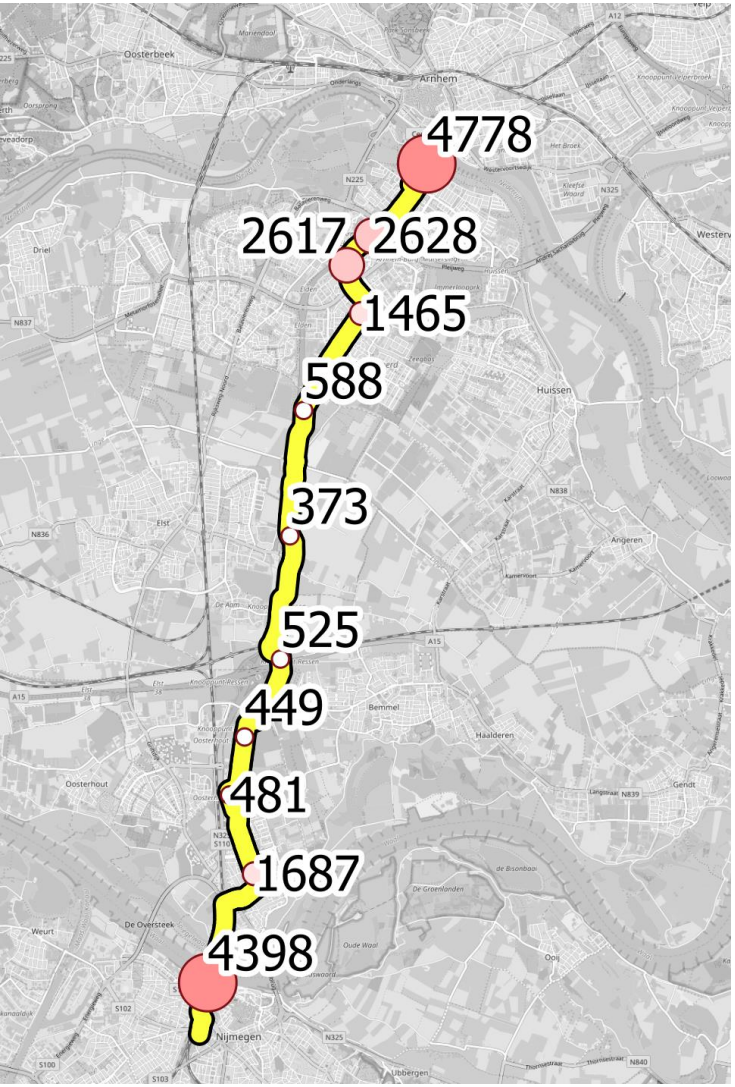
Counting

Tools of Kunda Culture, 8500-5000BC, Latvia
Photo: Wikipedia



All counts on Rijn-Waalpad

name	place	count	tracks	percentage
John Frostbrug west	Arnhem	4778	401	8
Fietspad Nijmeegseweg zuidoost	Arnhem	2628	389	15
Huissensedijk	Arnhem	2617	400	15
Fietspad Kruisstraat	Arnhem	1465	470	32
Fietspad RijnWaalpad	Overbetuwe	588	356	61
Sillestraat gemengde weg	Overbetuwe	373	343	92
Fietstunnel A15 (RijnWaalpad)	Lingewaard	525	366	70
Zwarteweg gemengde weg (noord)	Nijmegen	449	355	79
Zwarteweg zuid (Notenlaantje)	Nijmegen	481	353	73
Visveldsestraat gemengde weg	Nijmegen	1687	534	32
Snelbinder	Nijmegen	4398	1332	30



Trip length per count location

name	place	count	tracks	percentage
John Frostbrug west	Arnhem	4778	401	8
Fietspad Nijmeegseweg zuidoost	Arnhem	2628	389	15
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Snelbinder	Nijmegen	4398	1332	30

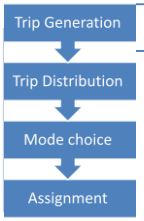
Sum of tracks: 5299

Unique tracks at count locations: 2573 (average cyclist is counted 2,06 times)

Total unique tracks on cycle highway: 4133 (only 62% of all users touches at least one count location)

Don't try this at Home!

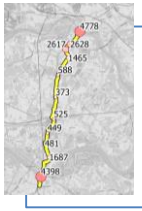
Cycle Highway Network



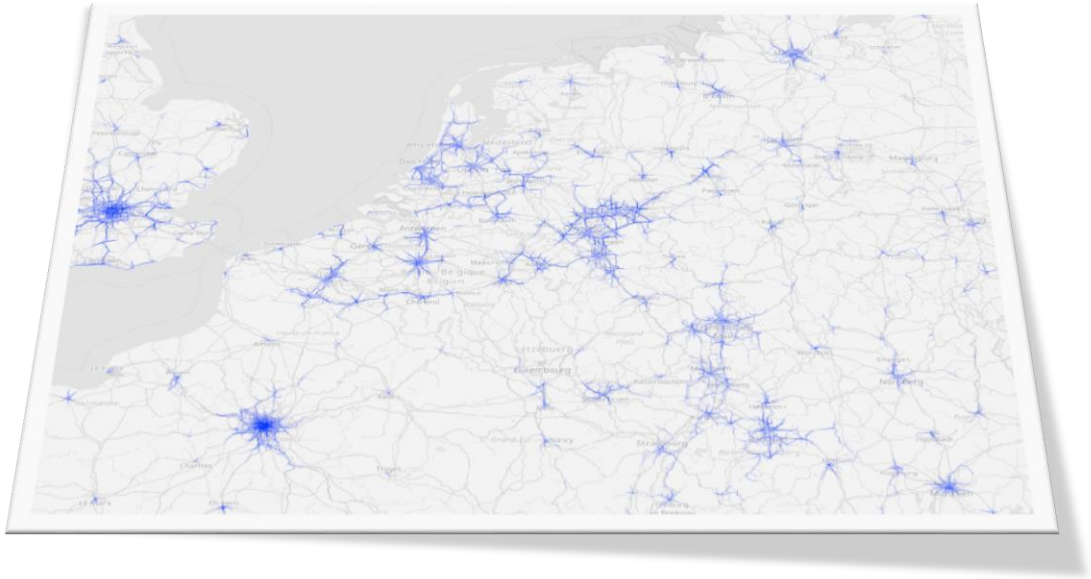
„Traditional“ Traffic Models

CyclePRINT Analytics

Cycle Scan



Counting



Dirk Bussche
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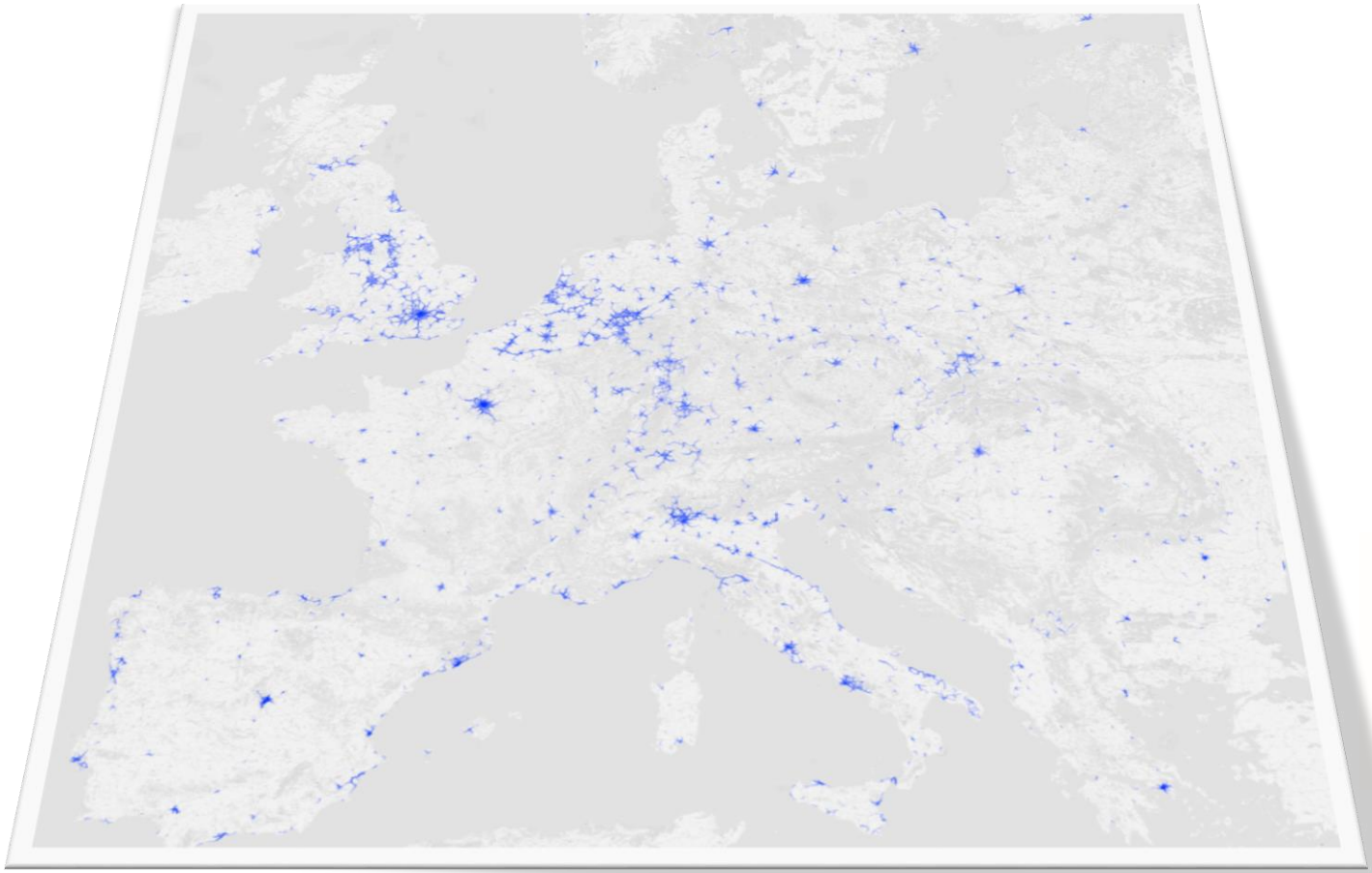
Breda University of Applied Sciences

Interreg North-West Europe CHIPS
European Regional Development Fund

Virtual Planning Tools



Analysis of Bicycle Data
Effect estimation of Bicycle Measures

Dirk Bussche
NHTV

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European Regional Development Fund

NHTV Breda University of Applied Sciences

Result and Discussion

- Do we need to fill gaps – generating a Pan-European-Network
- How much percent are cyclists willing to detour in order to get a cycle highway (strength of feedback in bundling)
- How long are cyclists ready to cycle? Do we want a second map for speed-pedelecs? (distribution function in gravity model)
- How useful is this map for local planning?
- Do we want to add local knownledge like jobs, stations, hospitals and existing plans and infrastructure?