Klimaat COP21 Parijs en Smart Emission, burger-sensor-netwerk in Nijmegen

Meet je stad, 6 maart 2016

Linda Carton, Universitair docent, Planning en Mapping

Radboud Universiteit

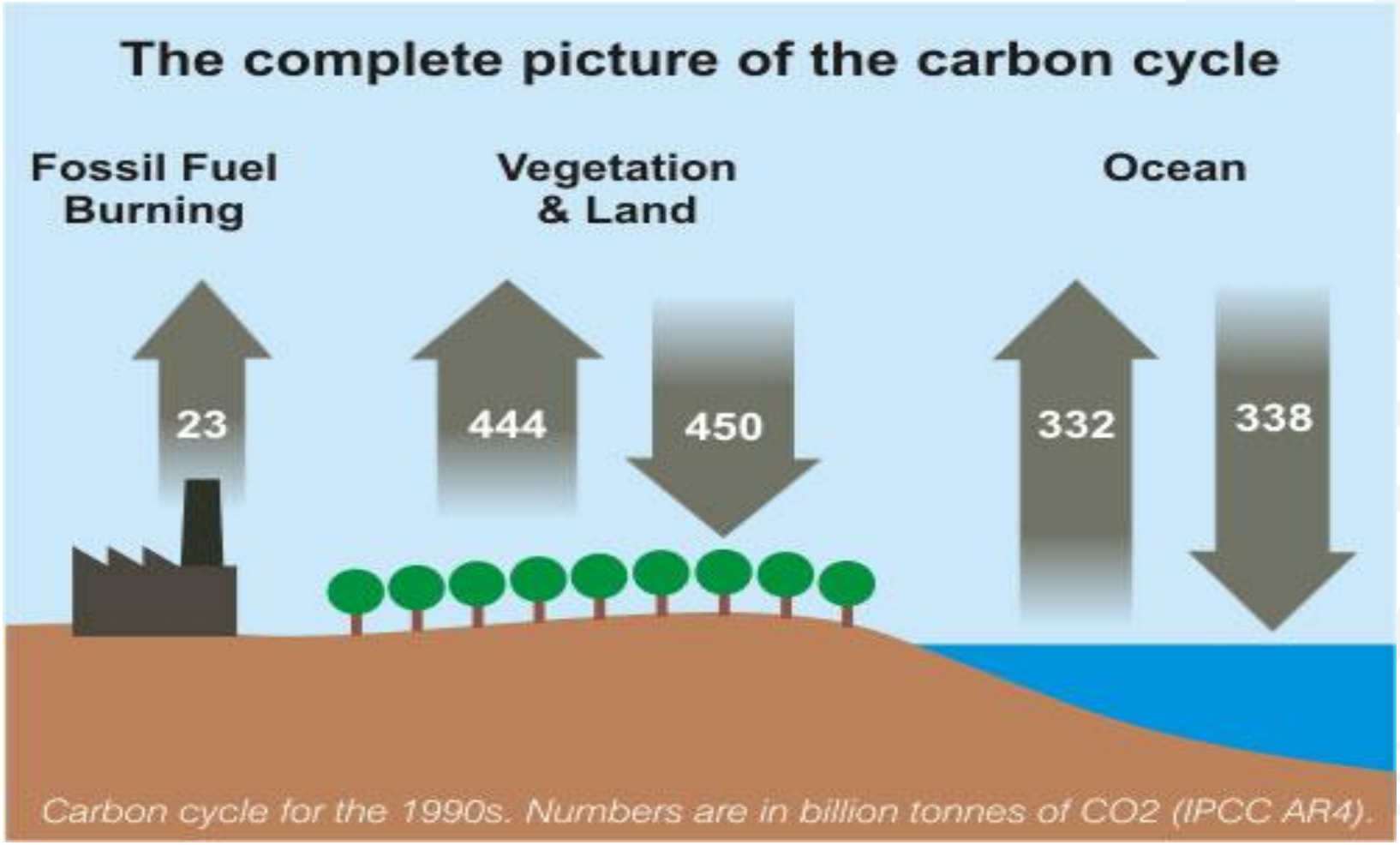
Inhoud:

1. Klimaatvraagstuk en UNFCCC conf COP21 Parijs

2. Burger-sensor-netwerk project Nijmegen: Smart Emission

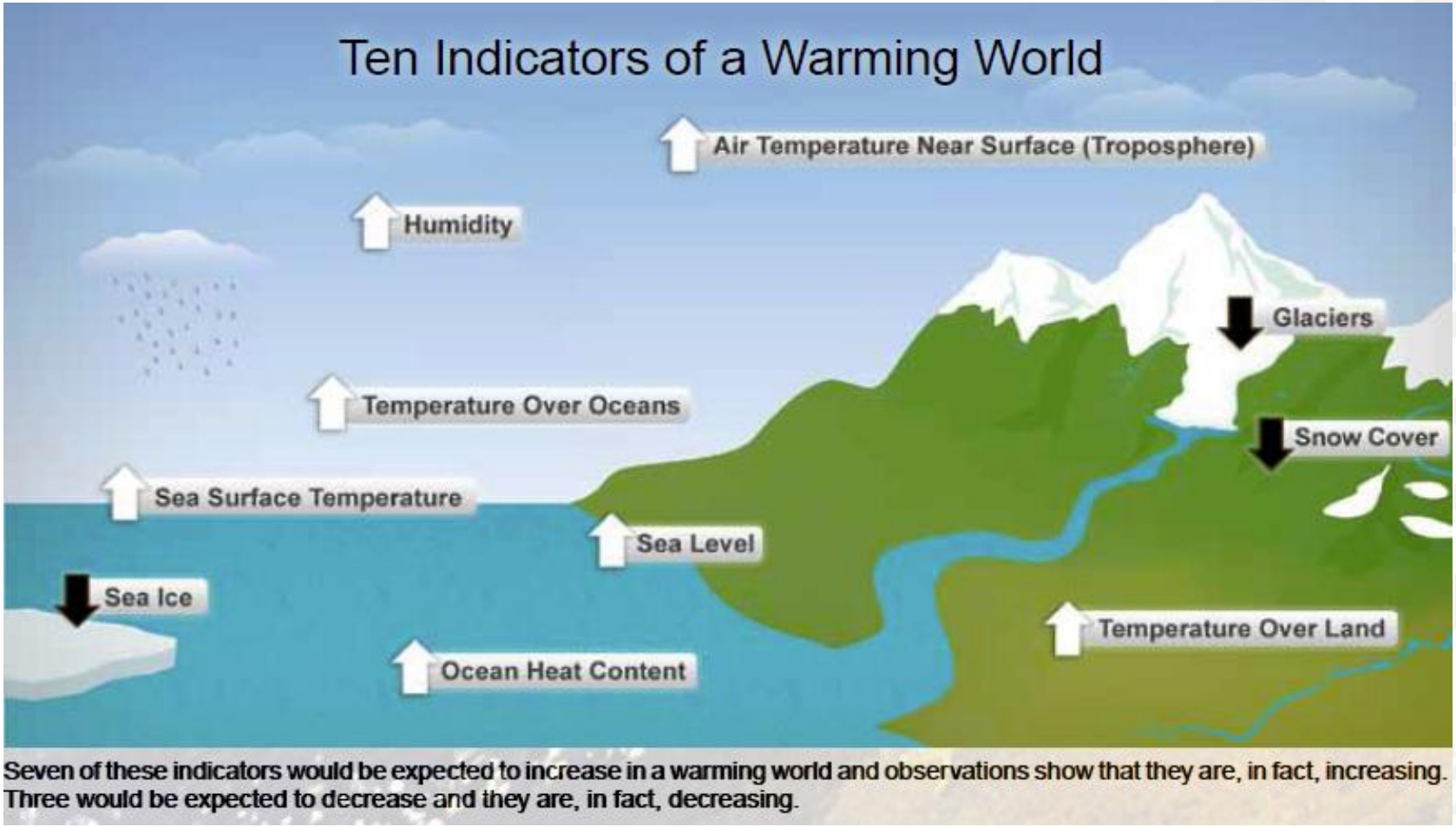
[De meeste slides zijn in het Engels.]

Summary of climate change science

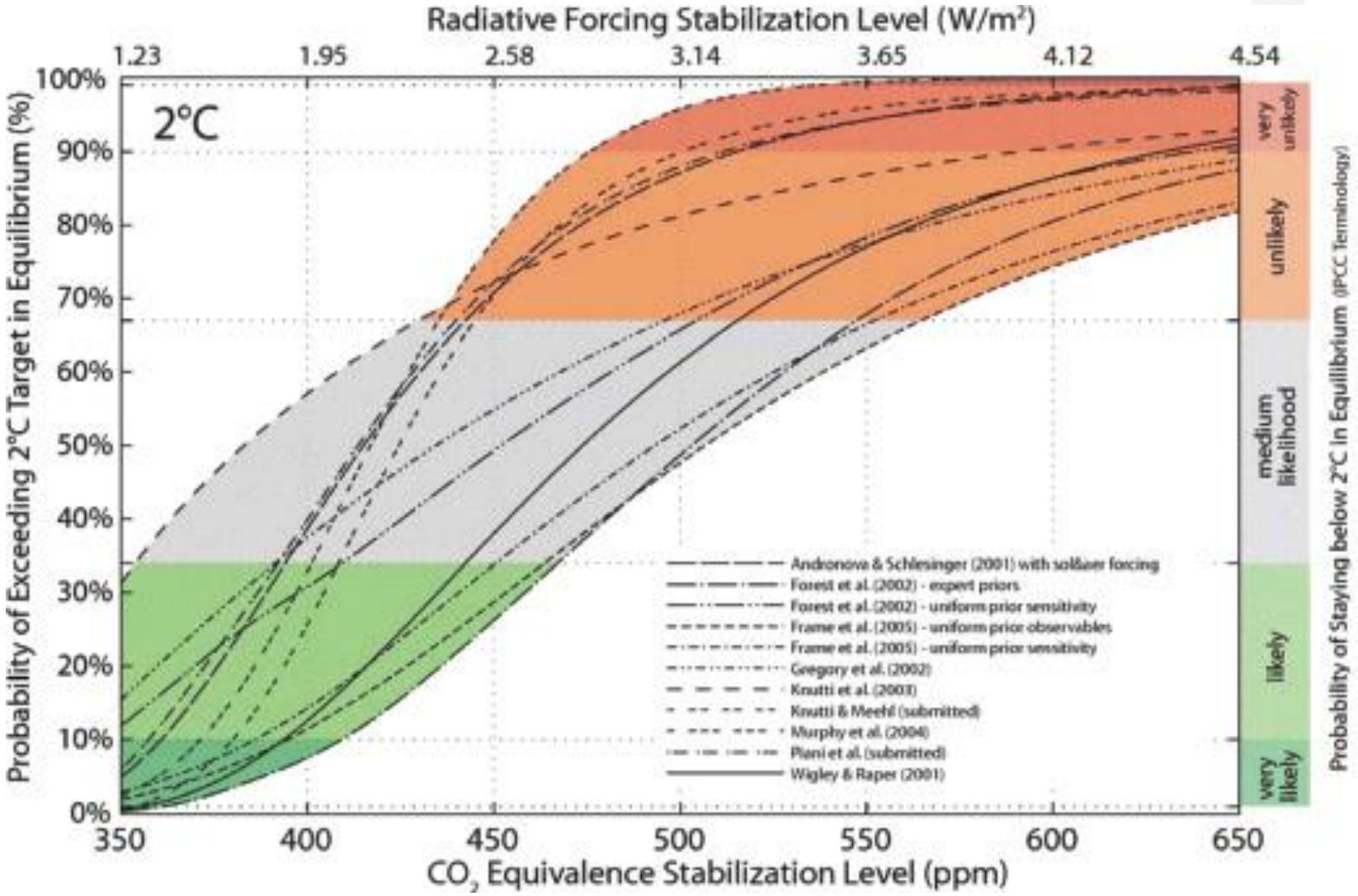


De mondiale CO2 cyclus. De cijfers representeren de dynamiek in gigaton CO2 (bron: figuur 7.3 in het IPCC AR4 rapport).

How scientists 'catch' the changes in the physical domain

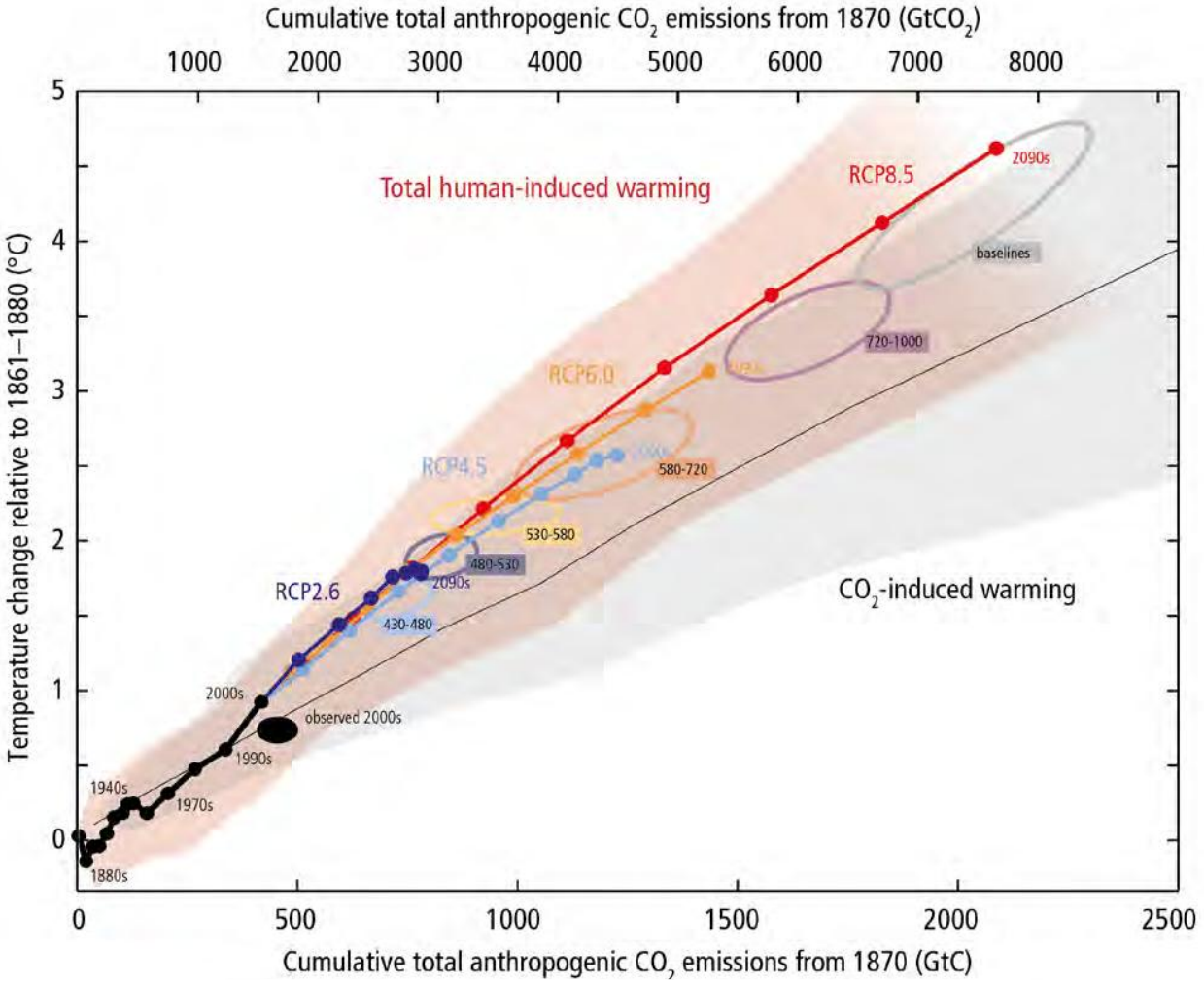


Tien indicatoren voor klimaatverandering, die allen wijzen op een trend van opwarming. Bron: NOAA.
http://www.noaanews.noaa.gov/stories2010/20100728_stateoftheclimate.html



Probability of exceeding an equilibrium global warming of 2°C above pre-industrial (1.4°C above 1990 levels), for a range of CO_2-equivalent stabilisation levels. Source: Hare and Meinshausen (2005). IPCC2007.

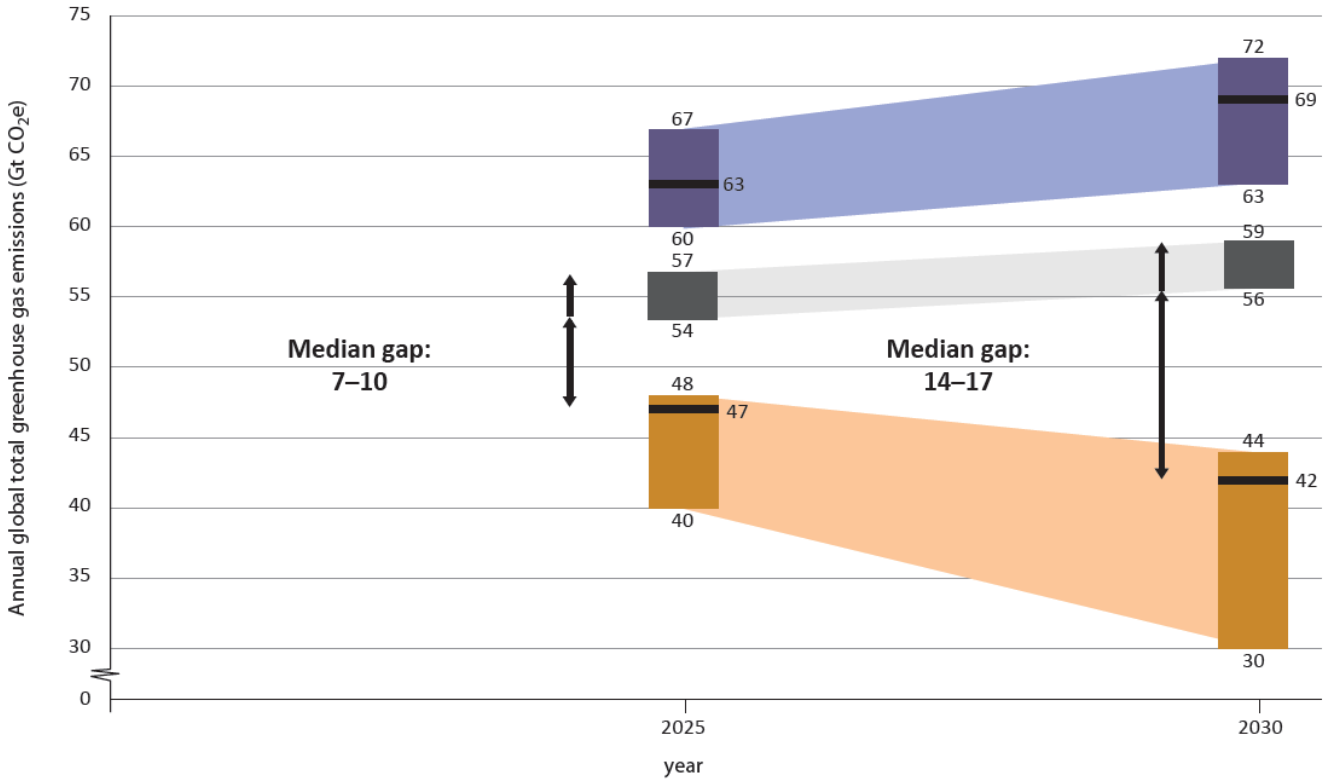
IPCC 2014: Cumulative global carbon emission and related temperature rise



This graph shows the relation between cumulative CO2 emissions (in gigatonnes) and related temperature rise according to various scenarios. The graph shows a baseline scenario headed for 4 degrees of temperature rise and a carbon budget of around 480 - 530 gigatonnes (GtC) needed in order to keep climate change limited to 2 degrees. According to the IPCC Fifth Assessmengt Synthesis Report (SYR-AR5) Figure 2.3, p. 117, 1 November 2014. (source: http://www.ipcc.ch/pdf/assessment-report/ar5/syr/SYR_AR5_LONGERREPORT.pdf)

The emission gap anno 2014

Gap according to best available scientific knowledge between projected annual global carbon emissions and amounts of 'responsible' annual global emissions, on levels that would be a maximum in order to stay within the 2 degrees scenario



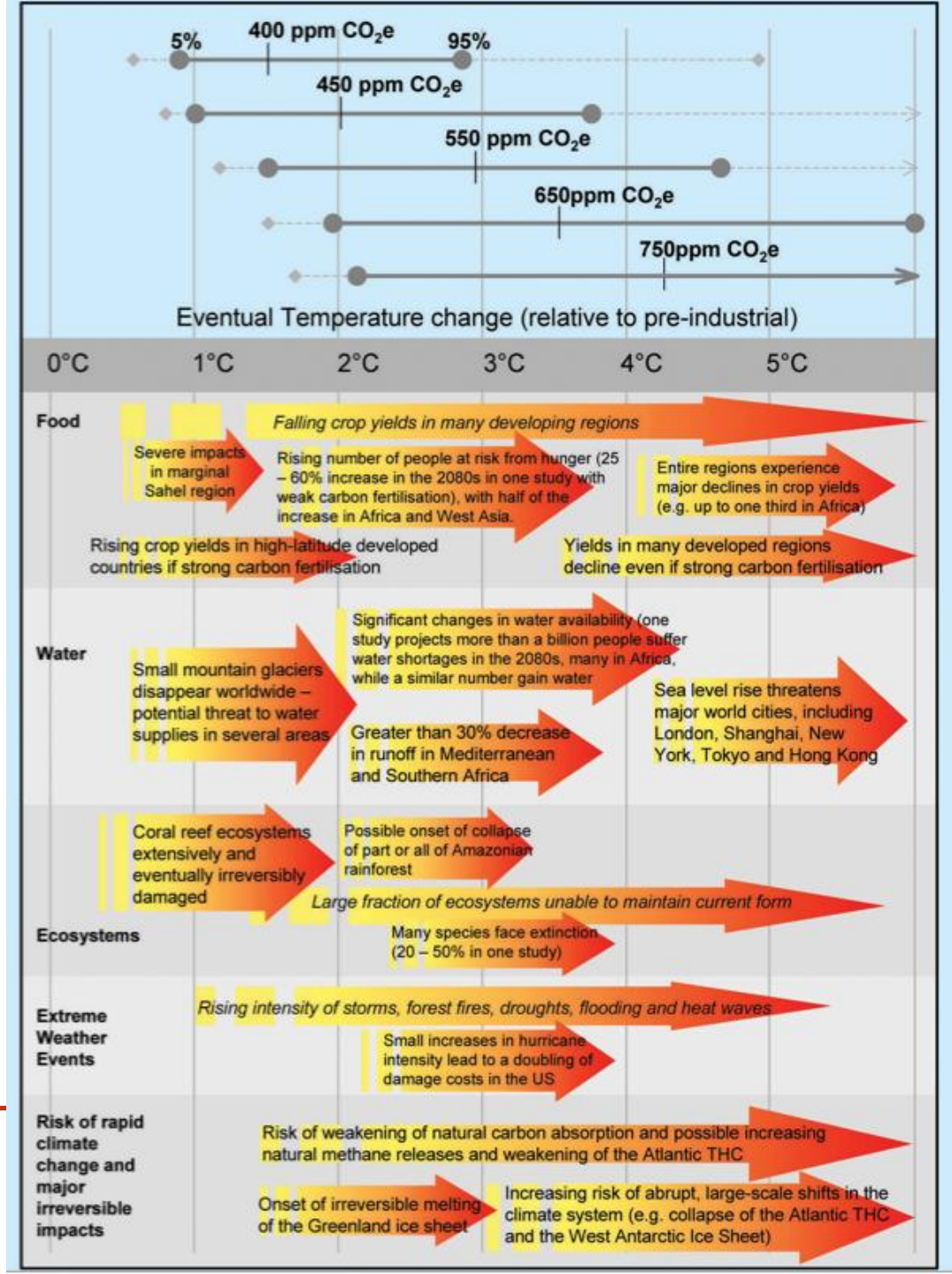
Note that here the authors speak of annual gigatonnes of CO2, while the total accumulative carbon budget is only 480 - 530 gigatonnes according to IPCC AR5. With a current global annual emission of circa 54 Gt CO2e a year (the e stands for CO2 emissions including CO2 equivalents), the limit of 480 gigatonnes will be reached in 9 years from now. (9 * 54 = 486). According to the Emissions Gap Report 2014 (UNEP, p. 18), global emissions have grown by more than 45 per cent since 1990 and were approximately 54 Gt CO2e in 2012. Since then, global emissions have not peaked yet, and thus are still on the rise.

Het Nicholas Stern rapport

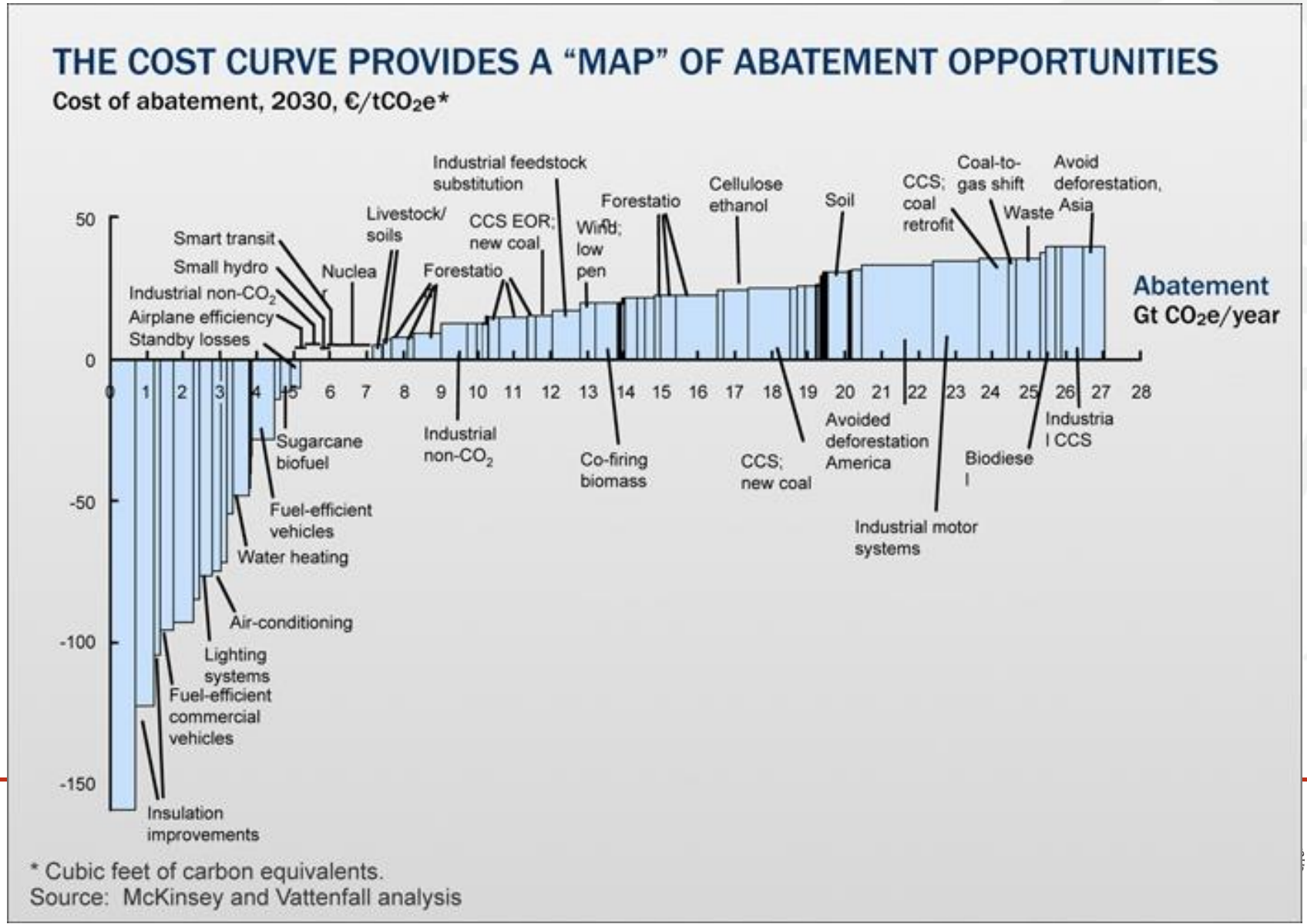
Stern Review on the Economics of Climate Change, 2006.

As economists propose different worldviews and different valuations of uncertainties and costs,
The report received support and criticism, as it was one of the first holistic economic assessments describing the long-term impacts and estimating their costs in monetary (besides physical) terms.

Targeted by the people who spread doubt about the nature of the problem of climate change and human influence. (the controversiality in words of Bram Bregman.)



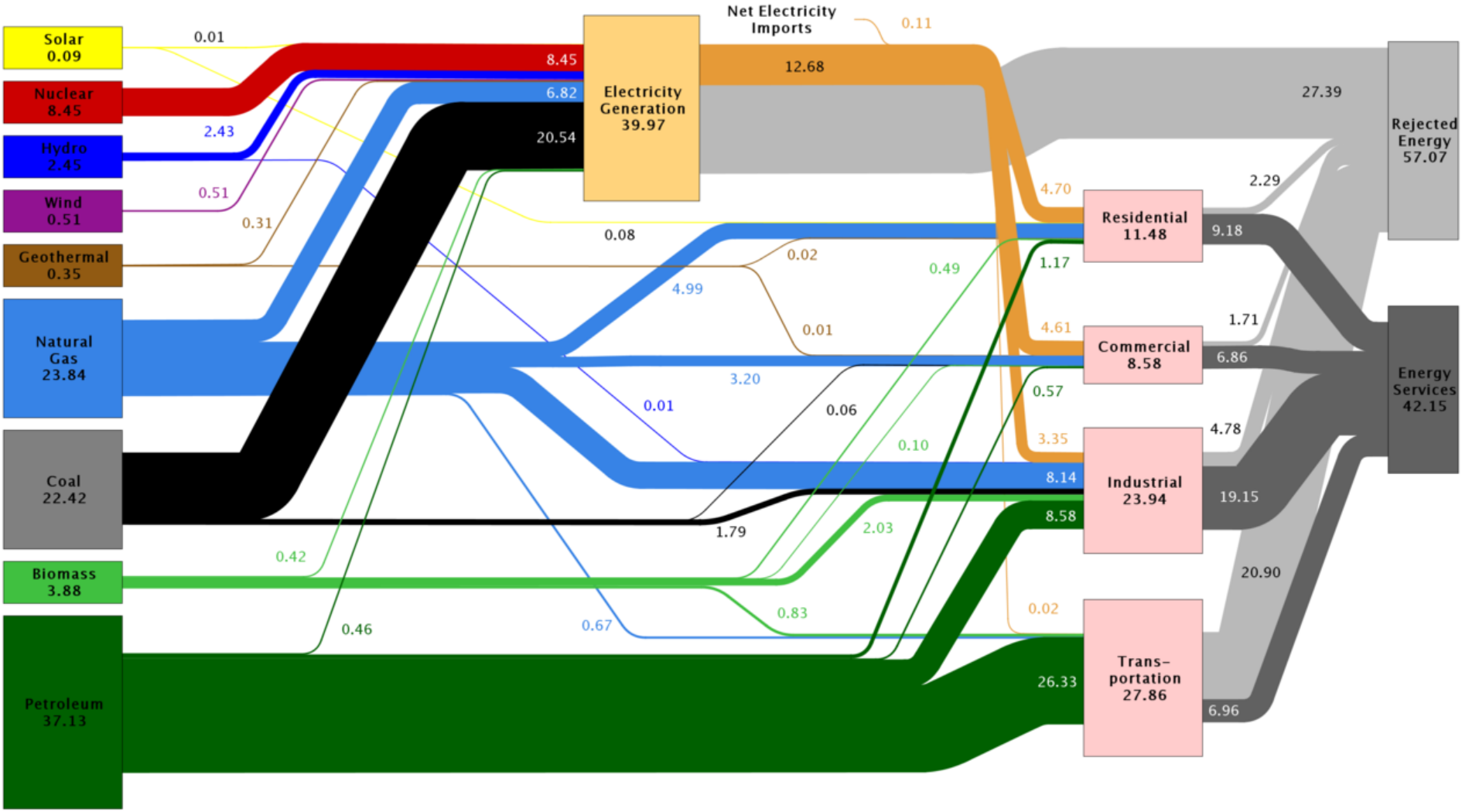
Technologic measures and their costs… a business consultants' inventory



Why is it so hard to make effective climate policy?

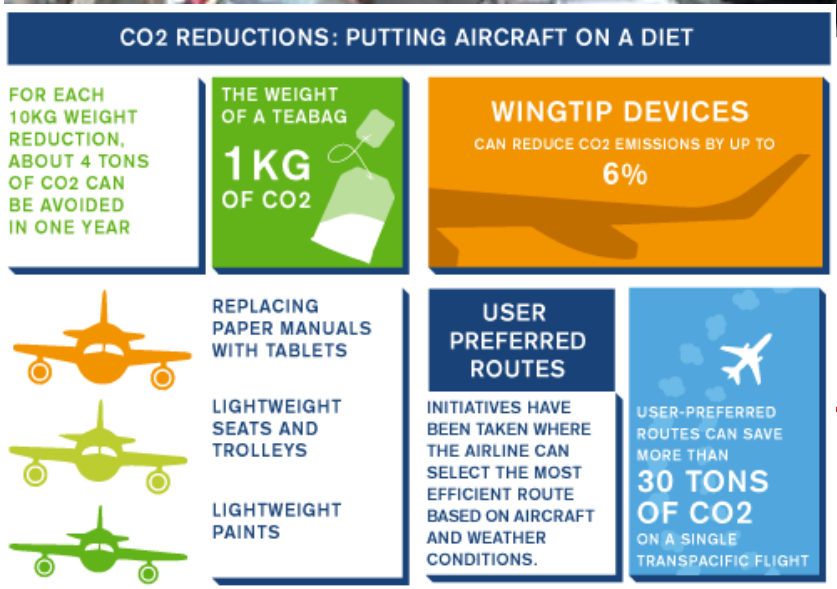
Estimated U.S. Energy Use in 2008: ~99.2 Quads

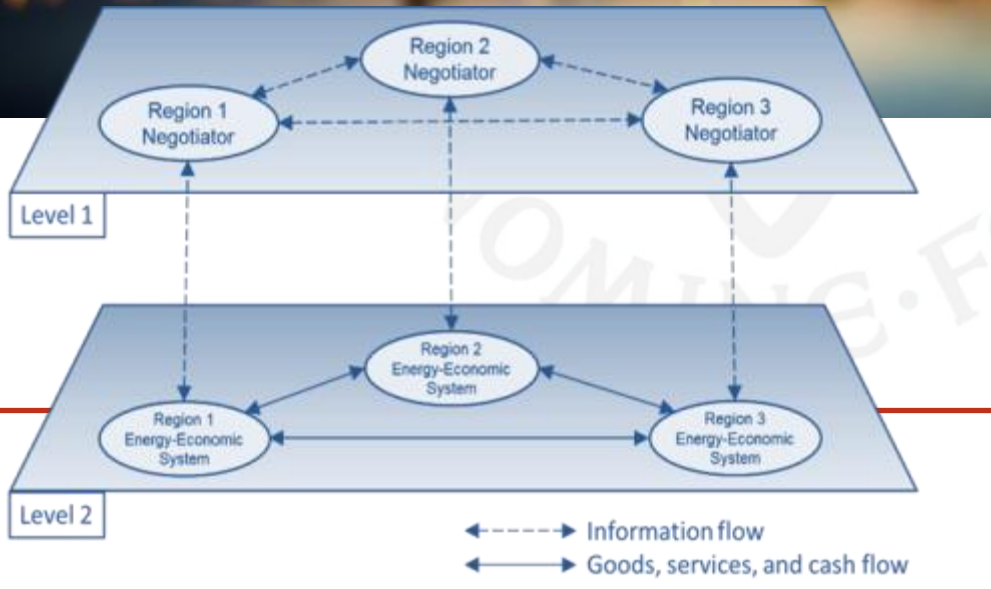
Lawrence Livermore National Laboratory



Source: LLNL 2009. Data is based on DOE/EIA-0384(2008), June 2009. If this information or a reproduction of it is used, credit must be given to the Lawrence Livermore National Laboratory and the Department of Energy, under whose auspices the work was performed. Distributed electricity represents only retail electricity sales and does not include self-generation. EIA reports flows for non-thermal resources (i.e., hydro, wind and solar) in BTU-equivalent values by assuming a typical fossil fuel plant "heat rate." The efficiency of electricity production is calculated as the total retail electricity delivered divided by the primary energy input into electricity generation. End use efficiency is estimated as 80% for the residential, commercial and industrial sectors, and as 25% for the transportation sector. Totals may not equal sum of components due to independent rounding. LLNL-MI-410527

Our daily reality…





Theory about dilemma's and tensions human-environment interactions

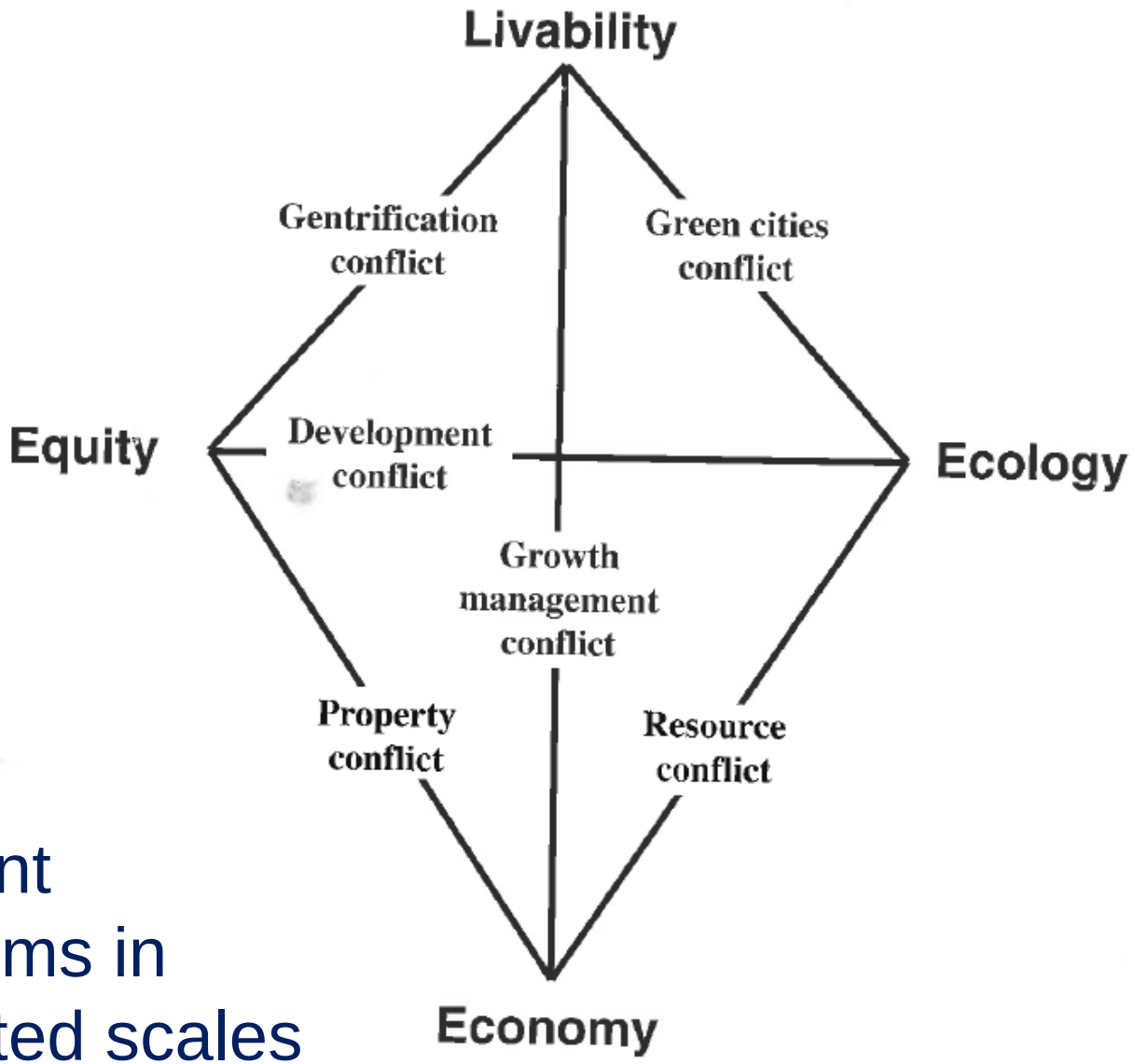
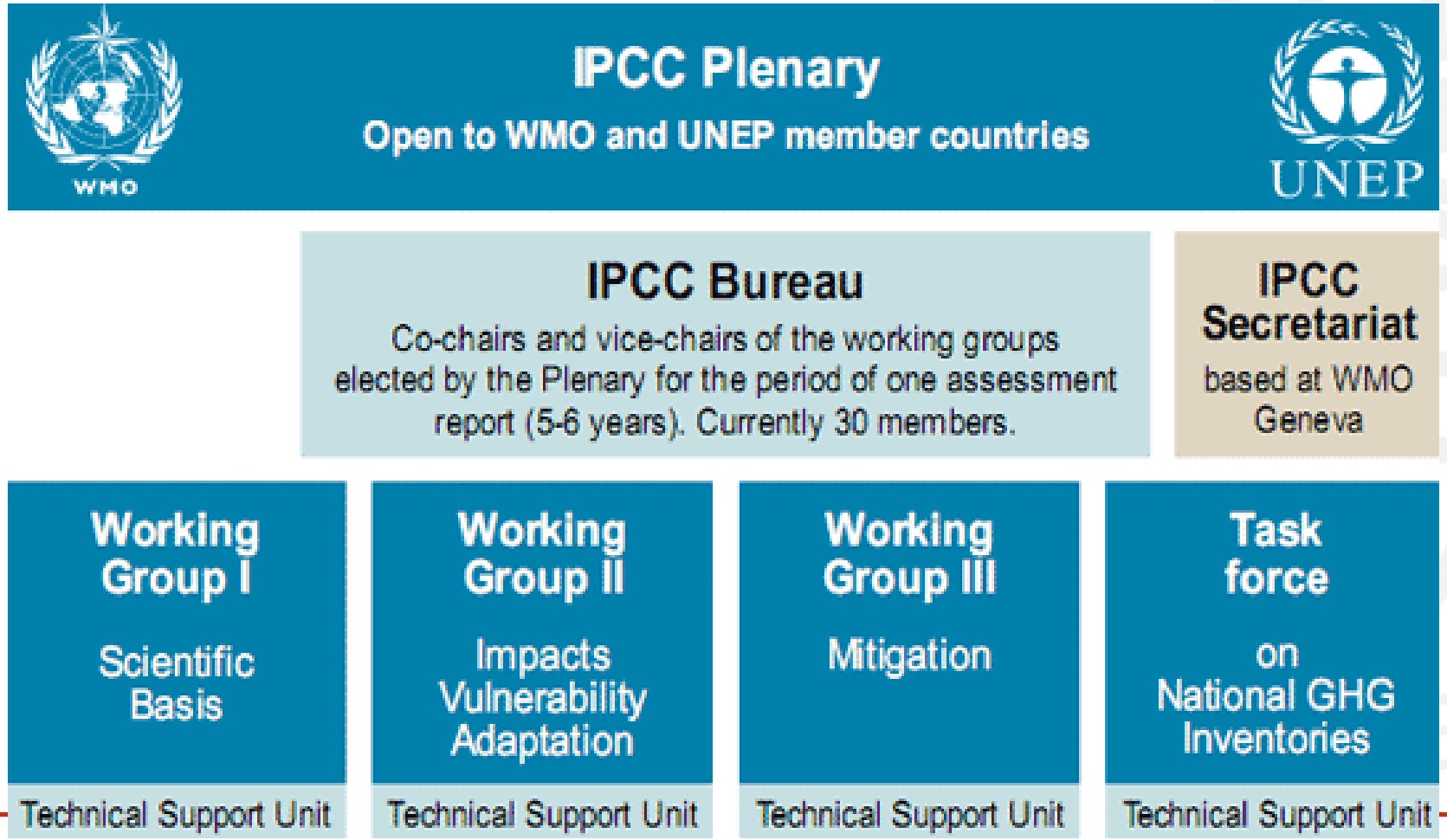


Figure 2.1
Godschalk's Community Sustainability Prism. Tensions occur among the four objectives. (*Source:* Adapted from Godschalk 2004, with permission of David Godschalk.)

Reason for persistent sustainability problems in communities at nested scales

Institutions at the 'top' - from science to policy



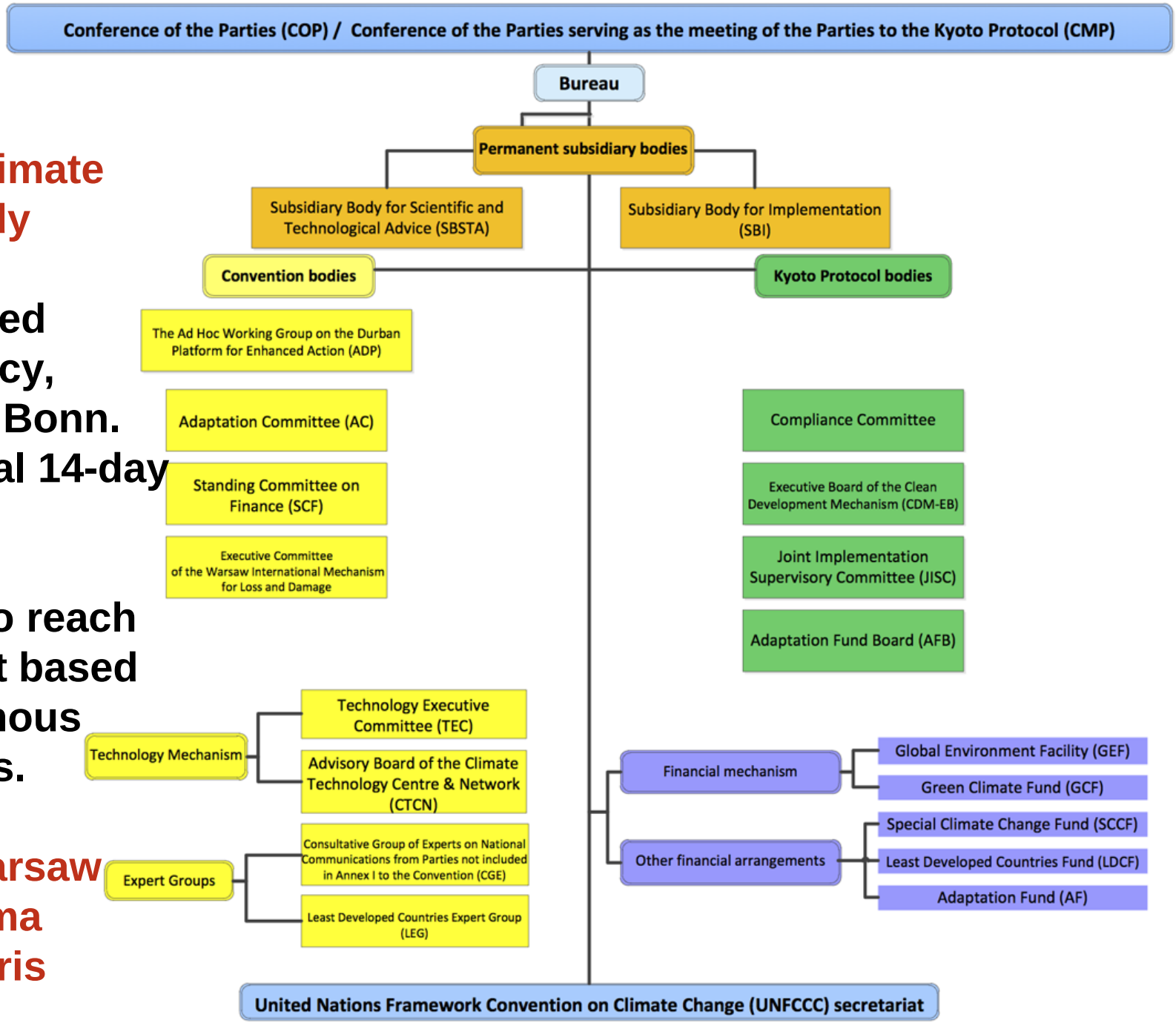
http://www.grida.no/images/misc/ipcc-organogram-540px.gif

UNFCCC
The UN Climate Policy body

An extended bureaucracy, located in Bonn. with annual 14-day congress,

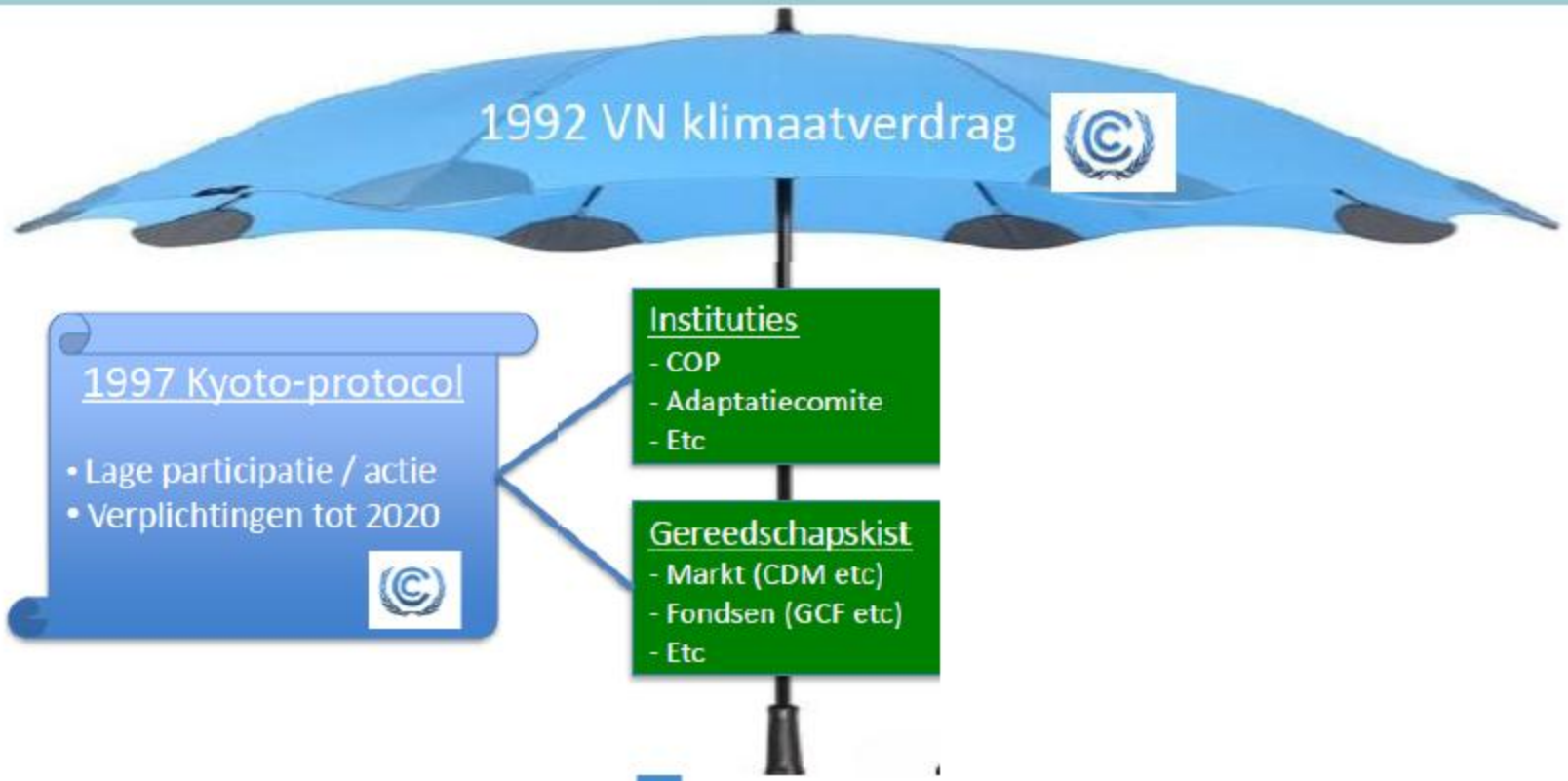
but hard to reach agreement based on unanimous consensus.

COP19 Warsaw
COP20 Lima
COP21 Paris



http://unfccc.int/files/inc/graphics/image/png/unfccc_bodies_large.png

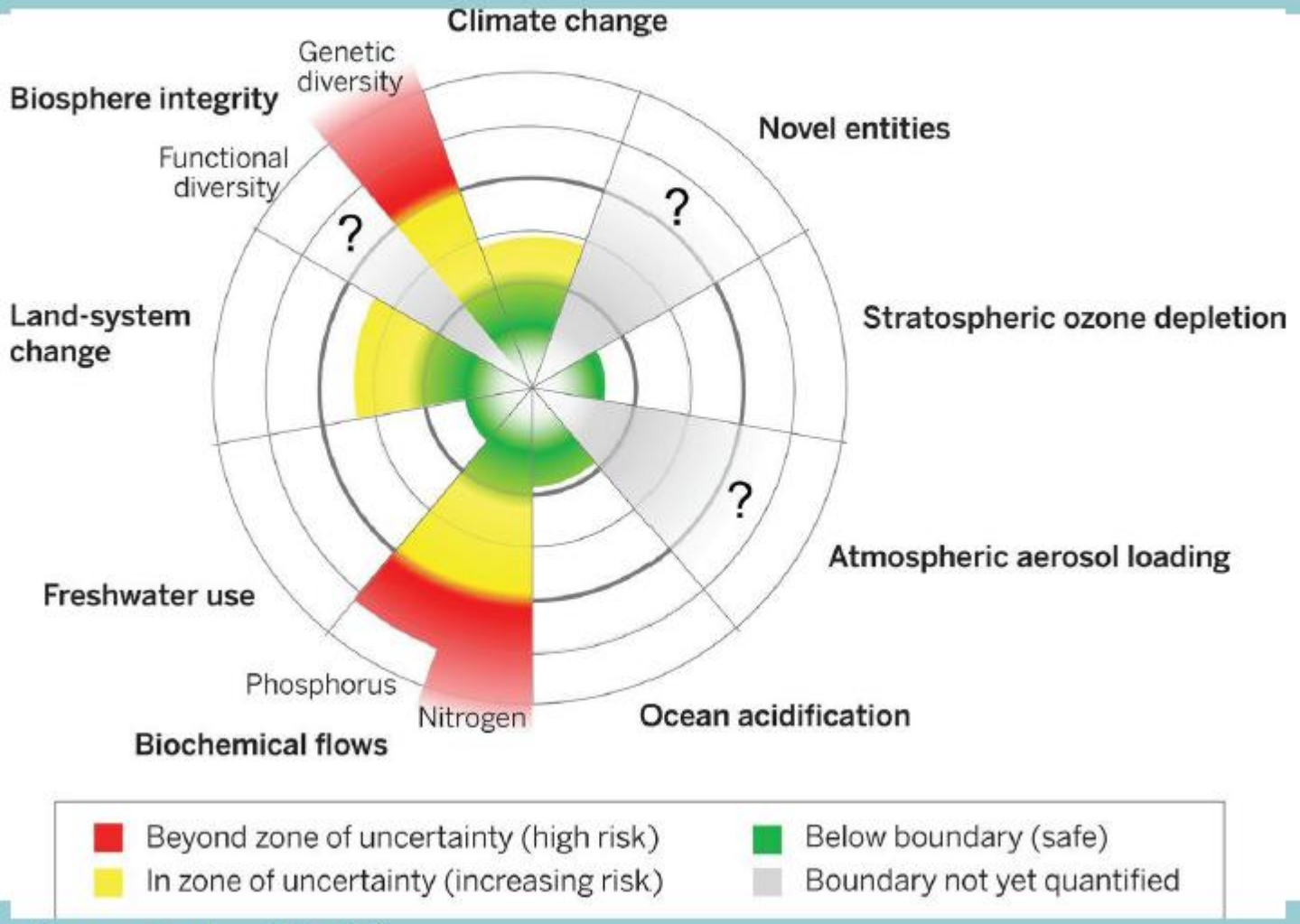
How to reach a global climate agreement?



VN Climate Panel IPCC delivers the scientific evidence

Bron: Bram Bregman

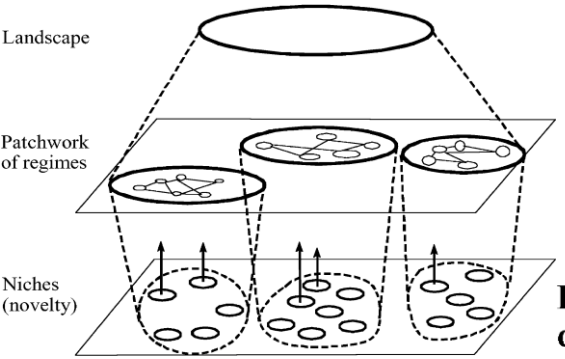
Save operation space

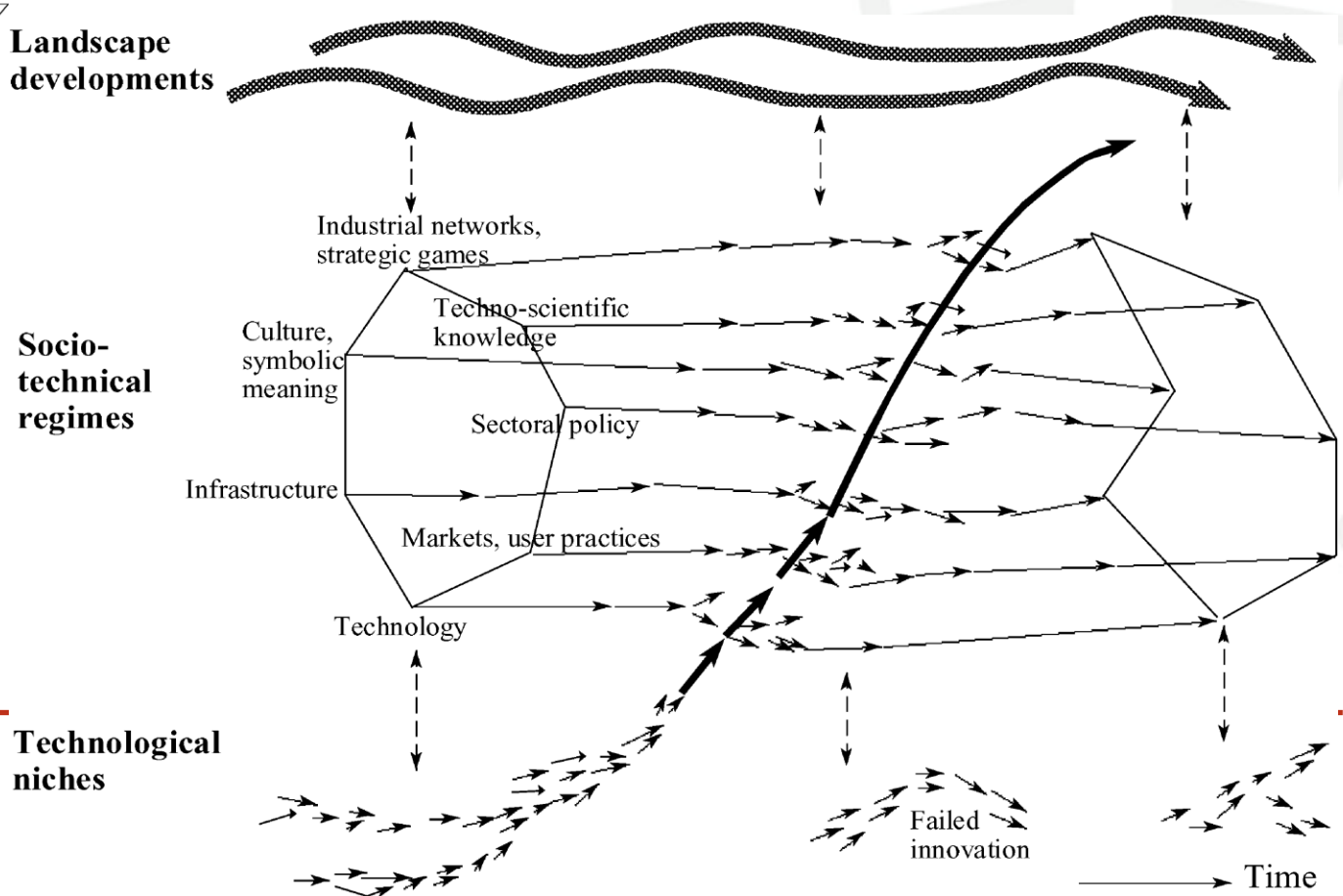


(Steffen et al., 2015)

Bron: Bram Bregman

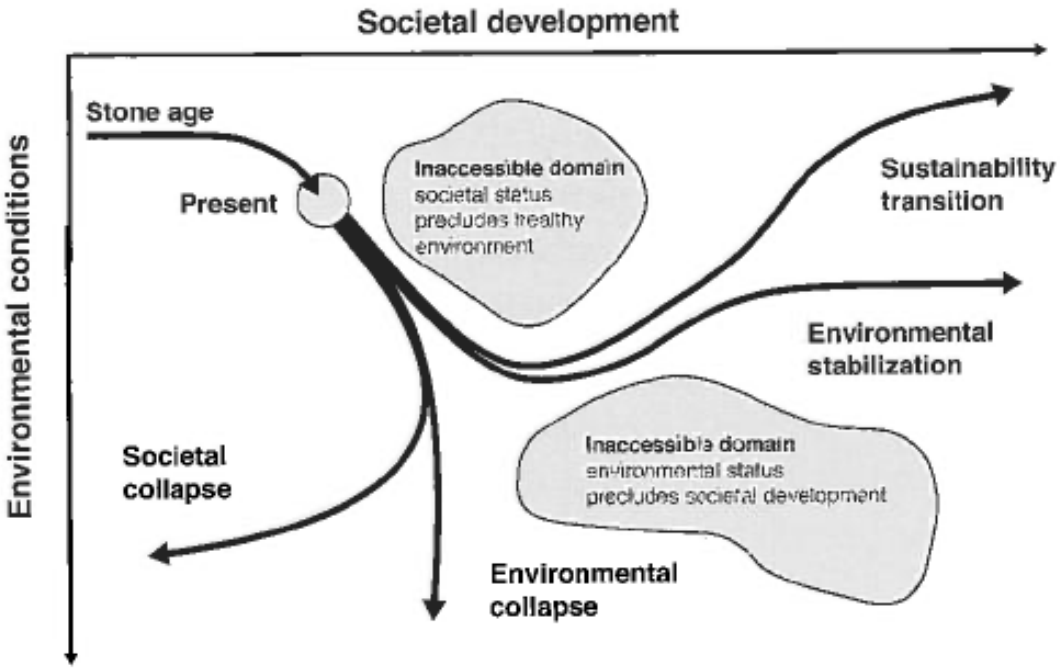
Perspectives on Transitions in society: from bottom-up to top





Geels, 2002

A Transitions view on the directions of societies

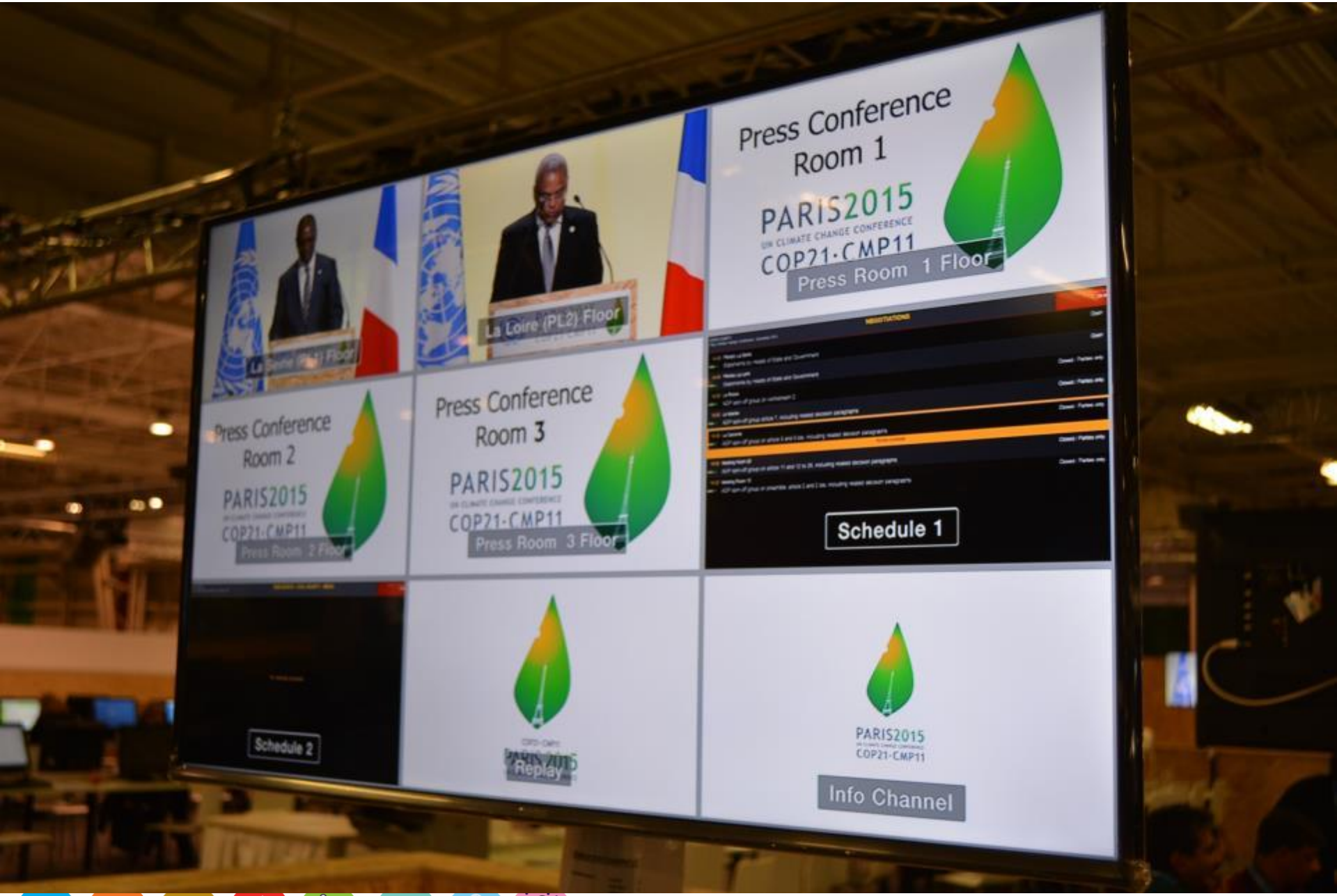


1. **Demographic** transition to a stable population.
2. **Technological** transition to supplying human needs and desires with lower impact per person.
3. **Economic** transition with growth in quality instead of in quantity.
4. **Societal** transition to less inequality.
5. **Institutional** transition to more effectively manage and cope with social conflict and the physical biosphere.
6. **Informational** transition in the acquisition and dissemination of knowledge
7. **Ideological** transition to a worldview that *connects* local, family, regional, religious, and national *loyalties* to a planetay consciousness and emphatic relationship with human beings and living creatures, now and for later generations.

Bron: Randolph, J. 2012, Environmental Land Use Planning and Management. Island Press.


Nations Unies
Conférence sur les Changements Climatiques 2015
COP21/CMP11
Paris-Le Bourget


PARIS2015
COP21·CMP11
01:03
Nations Unies
Conférence sur les Changements Climatiques 2015
Paris, France


Press Conference
Room 1
PARIS2015
UN CLIMATE CHANGE CONFERENCE
COP21·CMP11
Press Room 1 Floor
La Loire (PL2) Floor
Press Conference
Room 2
PARIS2015
COP21·CMP11
Press Room 2 Floor
Press Conference
Room 3
PARIS2015
COP21·CMP11
Press Room 3 Floor
Schedule 1
Schedule 2
Replay
PARIS2015
COP21·CMP11
Info Channel


N22
NO_2
CO
°C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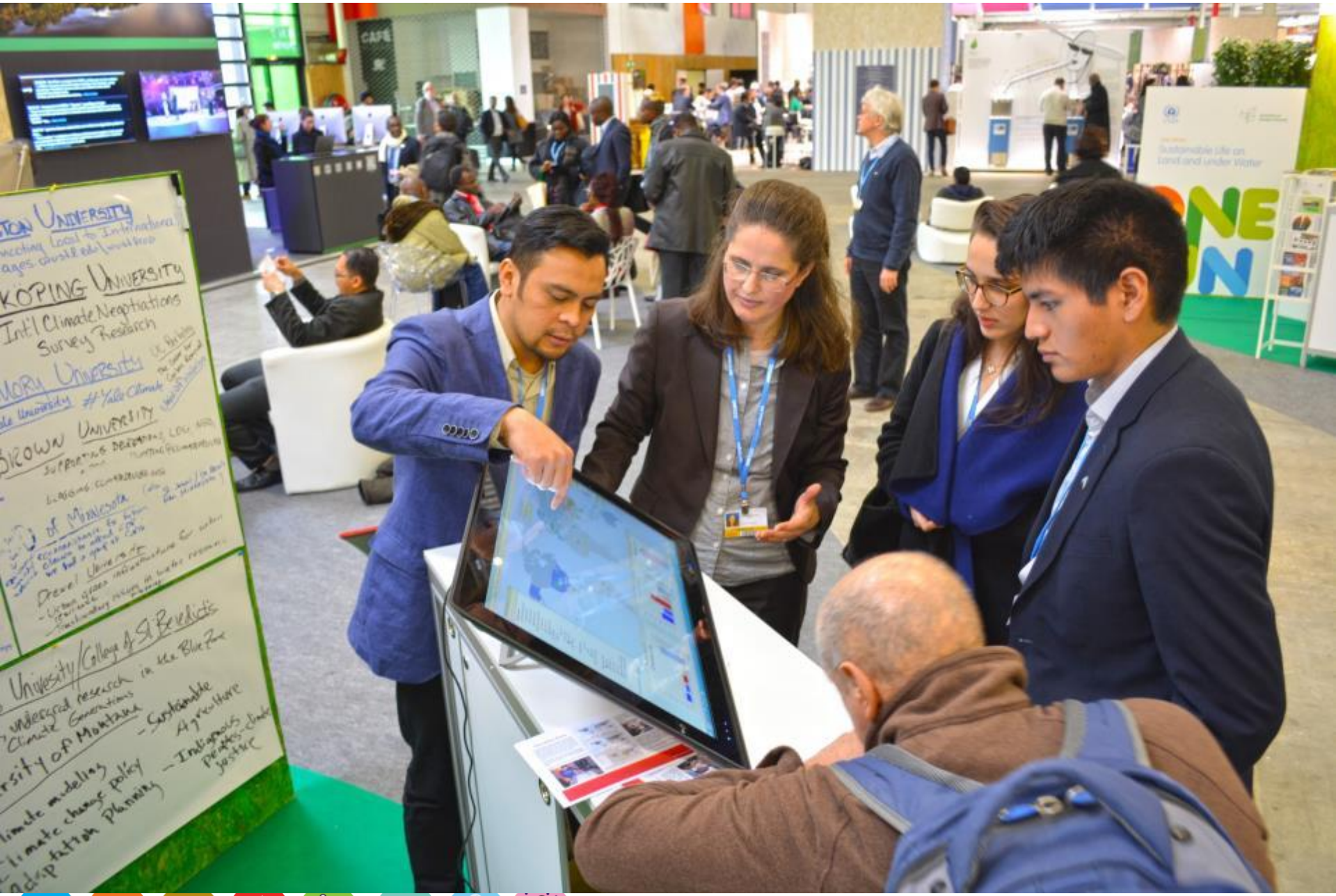
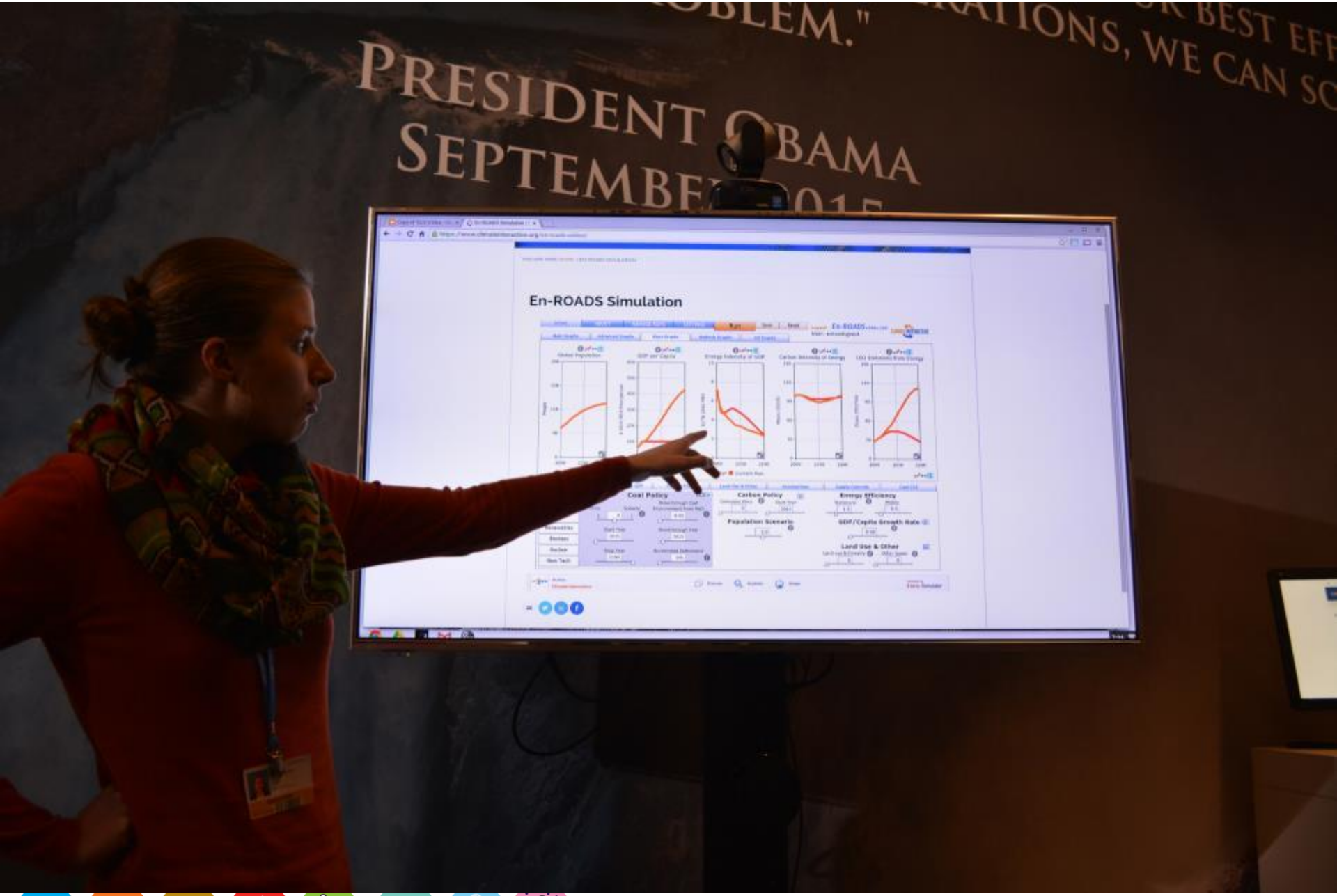
Conférence sur les Changements Climatiques 2015
COP21/CMP11
Paris, France
PARIS2015
COP21-CMP11


GDP per capita by 2100
lenovo


CAFE
Sustainable Life on Land and Under Water
Int'l Climate Negotiations Survey Research
Climate change policy
Adaptation Planning
Agriculture
Indigenous practices


PRESIDENT OBAMA
En-ROADS Simulation
Coal Policy
Carbon Policy
Energy Efficiency
Population Scenario
GDP/Capita Growth Rate
Land Use & Other


ESPAGNE | SPAIN
37

Draft Paris outcome, 9 Dec 2015

Have agreed as follows:

Article 1 *(DEFINITIONS)*

For the purposes of this Agreement, the definitions contained in Article 1 of the Convention apply.

Article 2 *(PURPOSE)*

1. The purpose of this Agreement is to [enhance the implementation of the Convention and to achieve its objective] [further implement the objective of the Convention set out in its Article 2 [through enhanced action, cooperation and support]] so as:

(a) To hold the increase in the global average temperature to

Option 1: below 2 °C above pre-industrial levels,

Option 2: well below 2°C above pre-industrial levels [and to [rapidly] scale up global efforts to limit temperature increase to below 1.5 °C] [,while recognizing that in some regions and vulnerable ecosystems high risks are projected even for warming above 1.5 °C],

Option 3: below 1.5°C above pre-industrial levels,

taking into account the best available science, equity, sustainable development, the need to ensure food security and the availability of means of implementation, by ensuring deep reductions in global greenhouse gas [net] emissions;

(b) To increase their ability to adapt to the adverse impacts of climate change [and to effectively respond to the impacts of the implementation of response measures and to loss and damage];

(c) To pursue sustainable development in a manner that fosters climate resilience and low greenhouse gas emissions, and that does not threaten food production and distribution;

Draft Paris outcome, 9 Dec 2015

Article 3 *(MITIGATION)*

{Collective long-term goal}

1. **Option 1:** Parties collectively aim to reach the global temperature goal referred to in Article 2 through [a peaking of global greenhouse gas emissions as soon as possible, recognizing that peaking requires deeper cuts of emissions of developed countries and will be longer for developing countries; rapid reductions thereafter to [40–70 per cent][70–95 per cent] below 2010 levels by 2050; toward achieving net zero greenhouse gas emissions [by the end][after the middle] of the century] informed by best available science, on the basis of equity and in the context of sustainable development and poverty eradication.

   Option 2: Parties collectively aim to reach the global temperature goal referred to in Article 2 through a long-term global low emissions [transformation toward [climate neutrality][decarbonization]] over the course of this century informed by best available science, on the basis of equity and in the context of sustainable development and poverty eradication.

{Individual efforts}

2. Each Party shall regularly prepare, communicate [and maintain] [successive] ###[4] and [shall][should][other] [take appropriate domestic measures] [have in place][identify and] [pursue] [implement] [[domestic laws], [nationally determined] policies or other measures] [designed to] [implement][achieve][carry out][that support the implementation of] its ###].

{Differentiated efforts}

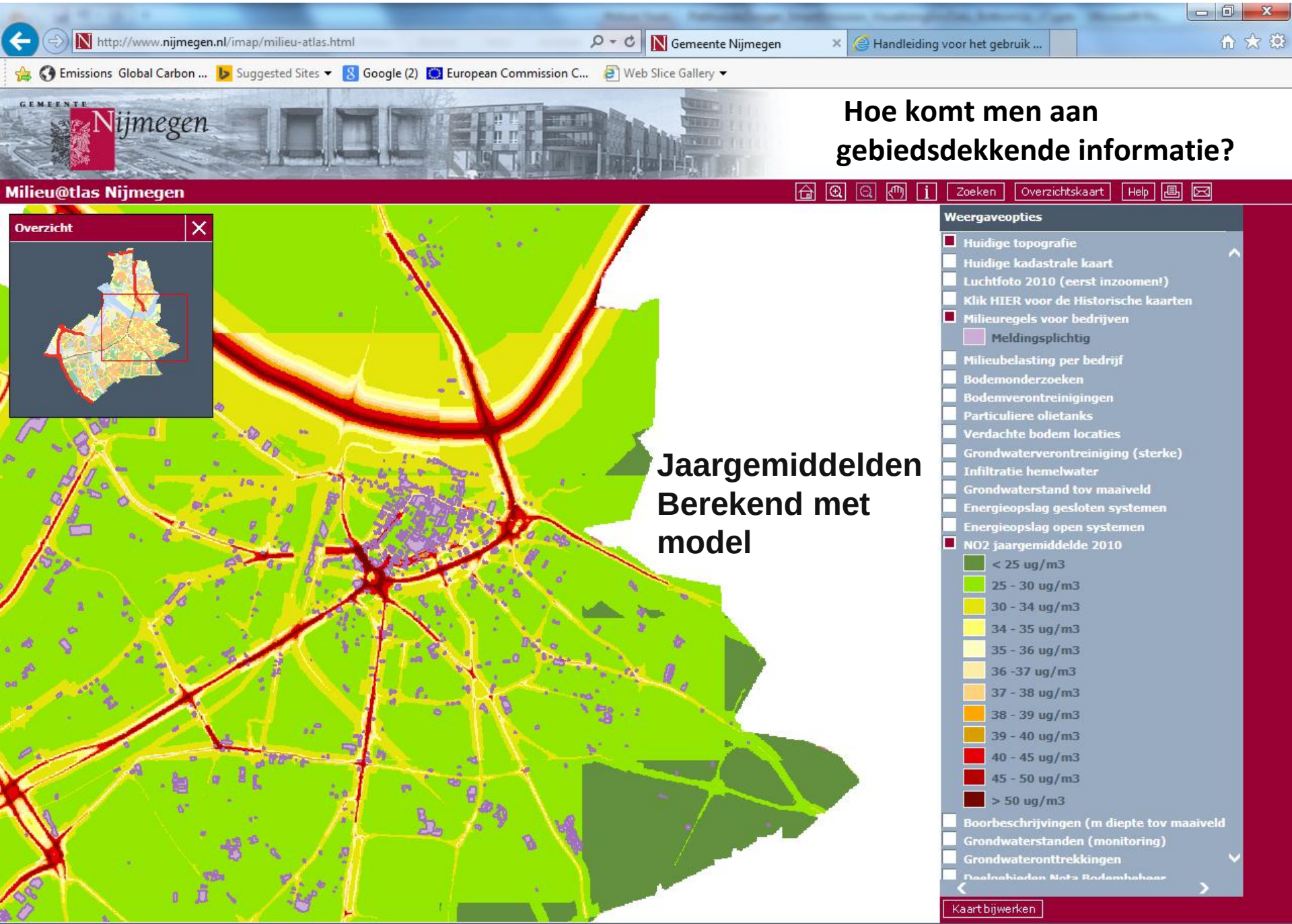
Option 1:

3. In accordance with Article 4, paragraph 2, of the Convention, developed country Parties and other Parties included in Annex I shall undertake quantified economy-wide absolute emission reduction and limitation commitments/targets, which are comparable, measurable, reportable and verifiable, cover all greenhouse gases and are implemented domestically without any conditions.

Emissies zorgen wereldwijd voor luchtvervuiling

Website met luchtvervuilingsindex

Mobiele app Chinese steden


http://www.nijmegen.nl/imap/milieu-atlas.html
Gemeente Nijmegen
Handleiding voor het gebruik ...
Emissions Global Carbon ...
Suggested Sites
Google (2)
European Commission C...
Web Slice Gallery
Nijmegen
Hoe komt men aan gebiedsdekkende informatie?
Milieu@tlas Nijmegen
Zoeken
Overzichtskaart
Help
Overzicht
Jaargemiddelden Berekend met model
Weergaveopties
Huidige topografie
Huidige kadastrale kaart
Luchtfoto 2010 (eerst inzoomen!)
Klik HIER voor de Historische kaarten
Milieuregels voor bedrijven
Meldingsplichtig
Milieubelasting per bedrijf
Bodemonderzoeken
Bodemverontreinigingen
Particuliere olietanks
Verdachte bodem locaties
Grondwaterverontreiniging (sterke)
Infiltratie hemelwater
Grondwaterstand tov maaiveld
Energieopslag gesloten systemen
Energieopslag open systemen
NO2 jaargemiddelde 2010
< 25 ug/m3
25 - 30 ug/m3
30 - 34 ug/m3
34 - 35 ug/m3
35 - 36 ug/m3
36 -37 ug/m3
37 - 38 ug/m3
38 - 39 ug/m3
39 - 40 ug/m3
40 - 45 ug/m3
45 - 50 ug/m3
> 50 ug/m3
Boorbeschrijvingen (m diepte tov maaiveld
Grondwaterstanden (monitoring)
Grondwateronttrekkingen
Kaart bijwerken

Kern idee Smart Emission

co-creatie, experimenteren met het bouwen van een burger-sensor-netwerk in de stad.

De slimme bewoners

Goed geïnformeerde bewoners geven zelf vorm aan oplossingen

Via een onderzoek van de Radboud Universiteit kunnen bewoners in West de komende vijf jaar zelf metingen in hun wijk gaan doen en meedenken over maatregelen om de luchtkwaliteit in de wijk te verbeteren.

Onderzoekers benaderen buurtbewoners en vragen of zij de luchtkwaliteit willen meten.

De bewoners krijgen dan een eenvoudige sensor die ze bij hun woning kunnen ophangen.

De universiteit verwerkt de meetgegevens van de sensoren en visualiseert het effect van aangedragen oplossingsrichtingen.

Deze worden met de bewoners besproken om tot een eindscenario te komen.

Illustratie: Anke Nobel

Smart Emission consortium

Een burger-sensor-netwerk in de stad Nijmegen

Sponsors:

STW
Enabling new technology

maps4society

Making Sense for Society | Living Lab for the Internet of Everything

Onderzoeksvragen Smart Emission

1. Kunnen goedkope sensoren informatieve meerwaarde toevoegen aan het fijnmazige beeld van luchtkwaliteitsindicatoren in de stad?

2. Werkt het concept van het burger-sensor-netwerk? – Test proof of concept

3. Werkt het idee van gezamenlijke sense-making met burgers en experts?

4. Opent dit idee mogelijkheden voor milieu-geïnformeerd stadsbeleid?

5. Reflectief: Is er een verandering merkbaar inzake bewustwording en gedrag; treedt er een verschuiving op in de houding en relatie tussen (a) overheid en burgers, en (b) burgers onderling, in relatie tot specifieke casuïstiek?

Benadering en onderliggende filosofie

1. Inclusive Citizen Sensing:

- Transparantie and 'democratisering', laten deelnemen van burgers aan monitoring in de stad
- Citizen-sensor-networks, voor fijnmazige metingen in ruimte en tijd
- Beoordelen van de fijnmazige metingen relatief ten opzichte van grootschalige modellen
- Kosten-effectieve milieu monitoring, Open Data

2. Towards Sustainable Cities:

- Waarderen van mensen hun gezondheid in de stad, door 'externaliteiten' (side-effects) te meten
- Ondersteunen om het dagelijks gedrag te veranderen, door te experimenteren en maatregelen te testen (real-time)

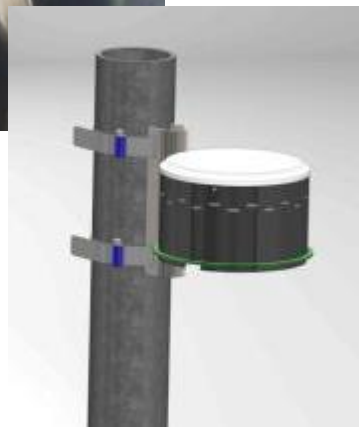
3. Smart Governance:

- Visualiseren van de 'urban footprint'
- Koppelen van kleine informatie cycli (feedback data) en grote cycli (info pompen door modellen)

Projectteam: Paul Geurts, Henk Nijhuis, Linda Carton, Antoine van de Cruyssen, Janus Hoeks, Robert Kieboom, Michel Grothe, Hester Volten.
En meerdere aangehaakte stagiaires, afstudeerders en collega professionals .

Sensor Jose (binnenwerk)

Made by:
Sensor: Janus Hoeks & Antoine van de Cruyssen, Intemo.



Data die Jose sensoren doorgeven:
Stikstofdioxide
Koolmonoxide
Kooldioxide
Ozon
Trillingen (x,y,z)
Geluidsdruk (in frequentiebanden)

Barometer
Altimeter
Luchtvochtigheid
Temperatuur
Temperatuurcompensatie

Lichtintentsiteit reflectie
Luchtkleur

Datum
Tijd
Lokatie y (Latitude)
Lokatie x (Longitude)

Voeding status
Foutmeldingen status
Base timer
Tijdsduur sessie
Serienummer van sensor

Intemo

Specification Jose sensor

hw. 1408 variant 310,320,330

Sensortype:	Min		Max	Resolution		
Temperature unit	-55	-	85	0,05	°C	
Temperature ambient	-55	-	125	0,05	°C	
Temperature extern interface	-55	-	125	0,05	°C	
Humidity	0	-	100	0,01	%RH	
Airpressure	500	-	1100	0,01	hPa	
Lightintensity topside	0	-	32767	1	lux	Guessing weatherconditions
Color detection topside	0	-	32767	1	lux RGB	Guessing weatherconditions (cloudy, sunny, passing clouds, etc)
Aircolor representation	0	-	ffffff	1	webcolor	Represents a 3x8 bit color representation
Tilting X-Y-Z	0	-	2	0,01	G	Detection of movement of object where sensor is mounted to
GPS longitude	-180	-	180	1×10^{-6}	coordinate	East - West
GPS latitude	-90	-	90	1×10^{-6}	coordinate	South - North
GPS DOP and quality	99-9	-	0	0,1	quality	
Realtime clock	0:00:00	-	23:59:59	1	hh:mm:ss	
RTC Second of day	0	-	86399	1	seconds	
Date	1-1-2000	-	31-12-2099	1	dd-mm-yy	
Weekday	1	-	7	1	dow	
Carbon monoxide (CO)	1000	-	1000000	1	ppb	These are specification from the supplier, but need to be calculated from raw sensordata and other variables
Nitrogen dioxide (NO2)	50	-	5000	1	ppb	These are specification from the supplier, but need to be calculated from raw sensordata and other variables
Ozon (O3)	10	-	1000	1	ppb	These are specification from the supplier, but need to be calculated from raw sensordata and other variables
Carbon dioxide (CO2)	0	-	2000	1	ppm	
Carbon monoxide (CO) raw		-		1	ohms	Raw sensorvalue voor calculation of gas equivalent on server
Nitrogen dioxide (NO2) raw		-		1	ohms	Raw sensorvalue voor calculation of gas equivalent on server
Ozon (O3) raw		-		1	ohms	Raw sensorvalue voor calculation of gas equivalent on server
Sound Pressure Level (SPL)	30	-	100	1	dB	Measured in 1/3 octave ANSI bands
SPL Maximum during sample time	30	-	100	1	dB	Measured in 1/3 octave ANSI bands
SPL Minimum during sample time	30	-	100	1	dB	Measured in 1/3 octave ANSI bands
SPL Average during sample time	30	-	100	1	dB	Measured in 1/3 octave ANSI bands
Rainsensor, 4 regions	0	-	15	1	binary	Detection of moist and rain, devided in 4 regions
Status messages						
Powerstatus						
Unit ID						
Unit status						
Basetimer						
Session uptime						
Total uptime						

Specifications of sensor Jose by:
Janus Hoeks & Antoine van de Cruyssen, Intemo.

Een ‘Gradiënt’ in meetsystemen

Van (1) hoog geavanceerd en duur, tot (4) consumentenproduct of Do-It-Yourself kastjes

Weinig ⟷ Veel

1. RIVM LML Gassen en fijnstof meters	2. Locale boxen Gemeente Nijmegen	3. Small sensors Smart Emission project	4. Makers community, DIY beweging
Hoog geavanceerd	*Middel geavanceerd*	*Best beschikbare in ‘consumenten’ pr.*	*Laagste kosten consumenten pr.*
Accuracy conditions	Cost-accuracy assessment	Relative accuracy with low cost	Lowest cost, smallest accuracy.
Professional specialization	Professional specialization	Relatively simple to operate	Self-made
‘rocket science’	‘standard hospital equipment’	“light-weight camera”, for trained user	“Dustduino”

(source: L. Carton)

Photo and film: Fabi van Berkel

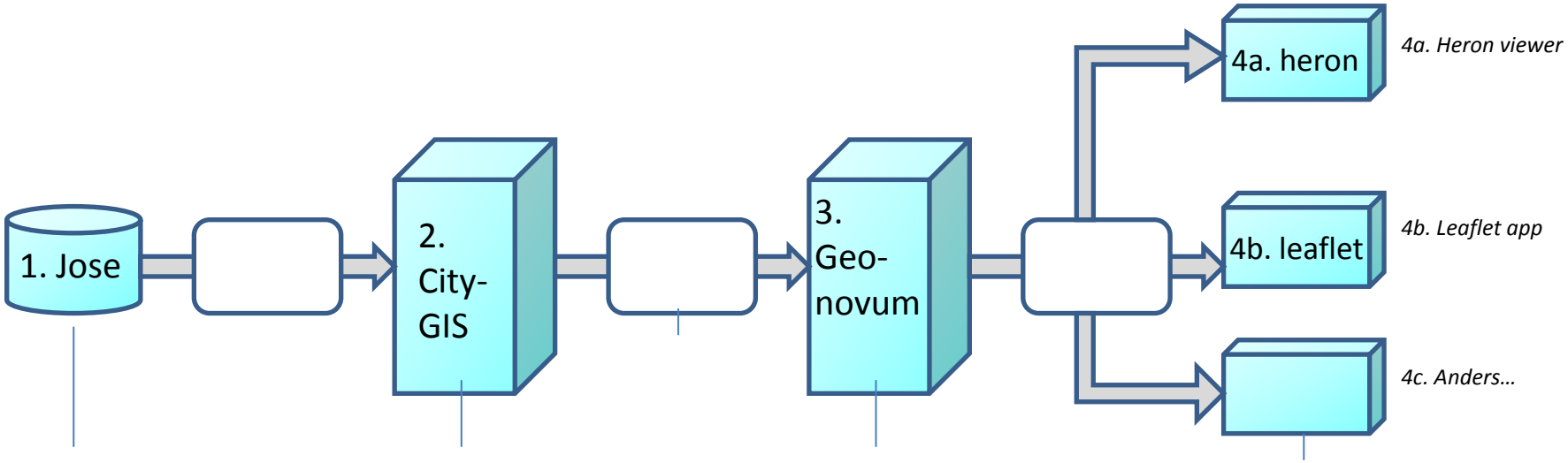
On site impression Keizer Karelplein: **Rotonde_KeizerKarelplein**

On site impression Keizer Karelplein: **Friettent_opRotonde**

On site impression

Stallinghouder_ondertitel Dhr. Ronnie Heimans

Technische infrastructuur: De Data-keten smart emission



1. Sensor Jose, of Intemo

2. Server CityGIS, Dataserver for data capture and storage, data provision

3. Server Geonovum, Webserver for distributing Open Data

4. Web Portals and apps

Interface for citizens/end-users

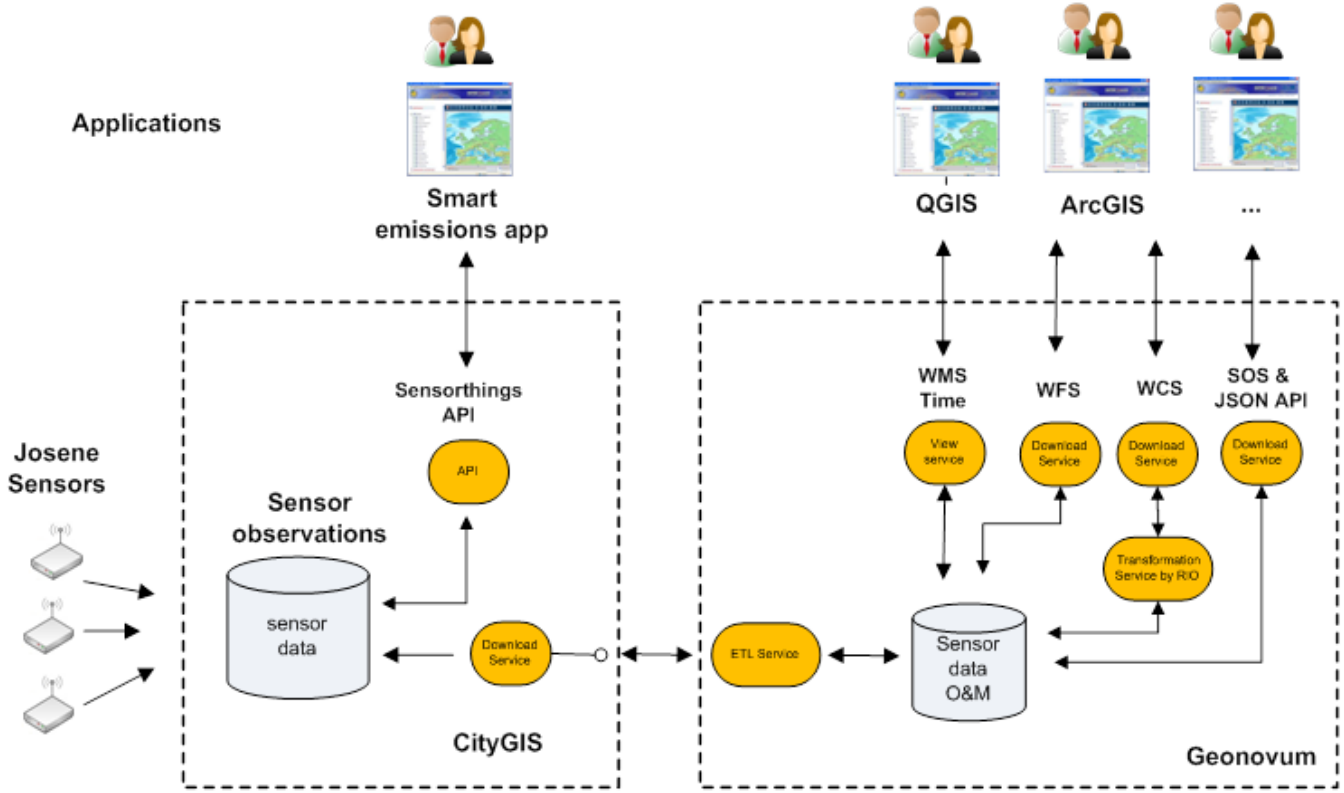
Citizen adopting a sensor

Schema: Linda Carton, Radboud Universiteit

Citizen looking at data from sensor

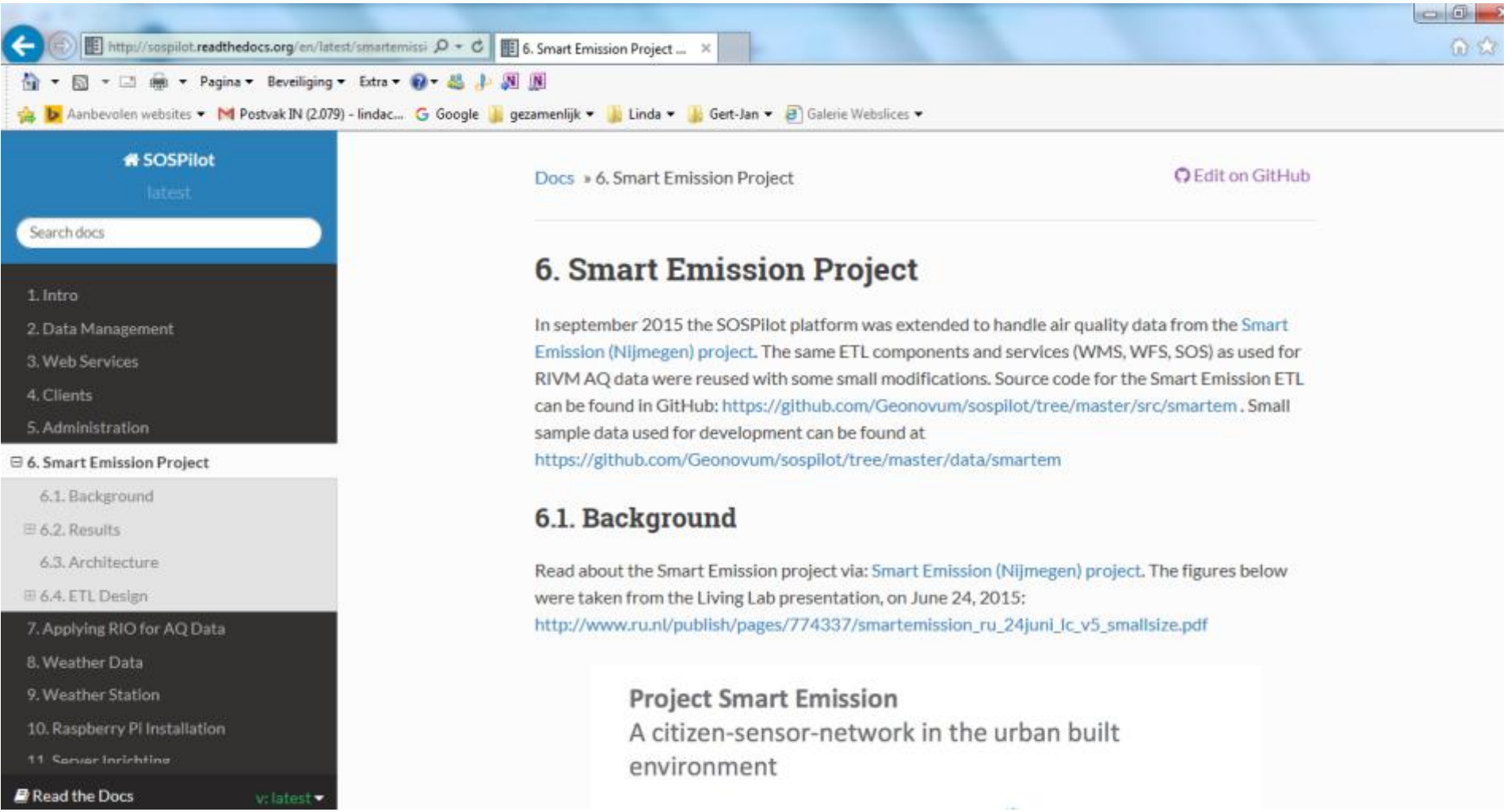
Ontwerp data-infrastructuur ten behoeve van:

- Bouw van een real-time App voor directe feedback aan burgers
- Analyseren van tijdreeksen (in ruimte-tijd) voor afgeleide en geaggregeerde informatie
- Data-flow Beschikbaar stellen middels Open Data standaarden



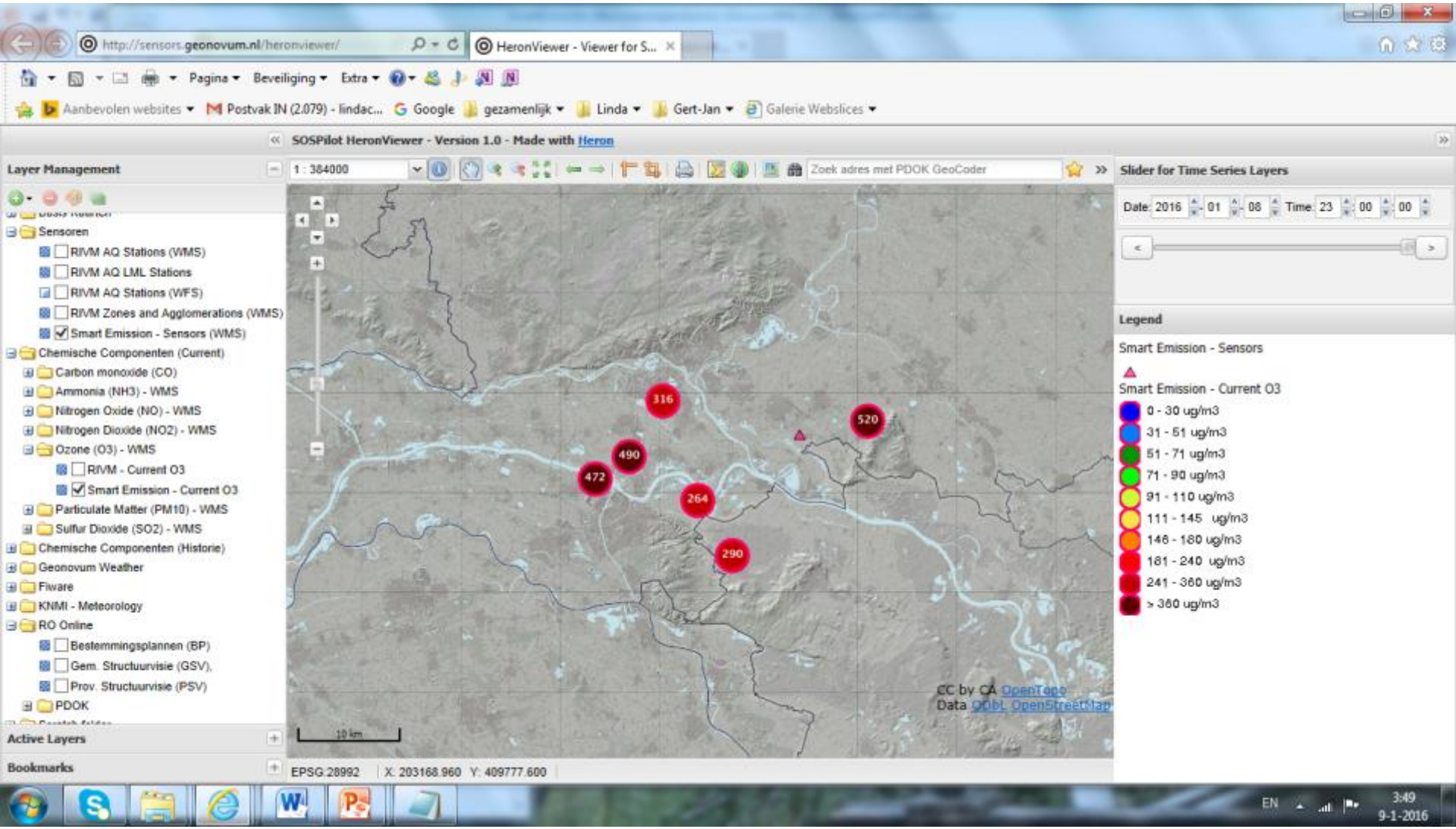
Gemaakt door en met dank aan:
- Paul Geurts, gem. Nijmegen,
- Just van den Broecke en Michel Grothe, Geonovum,
- Robert Kieboom, CityGIS,
- Matthijs kastelijns, GIMA master, TU Delft en Geonovum,
- Giel Vermeulen, HAS Den Bosch en gemeente Nijmegen.

Open Data: SOS-pilot en Fiware platform, Geonovum



Met dank aan Just van den Broecke en Michel Grothe, Geonovum.

Website met visualisatie van sensoren…
…is in ontwikkeling

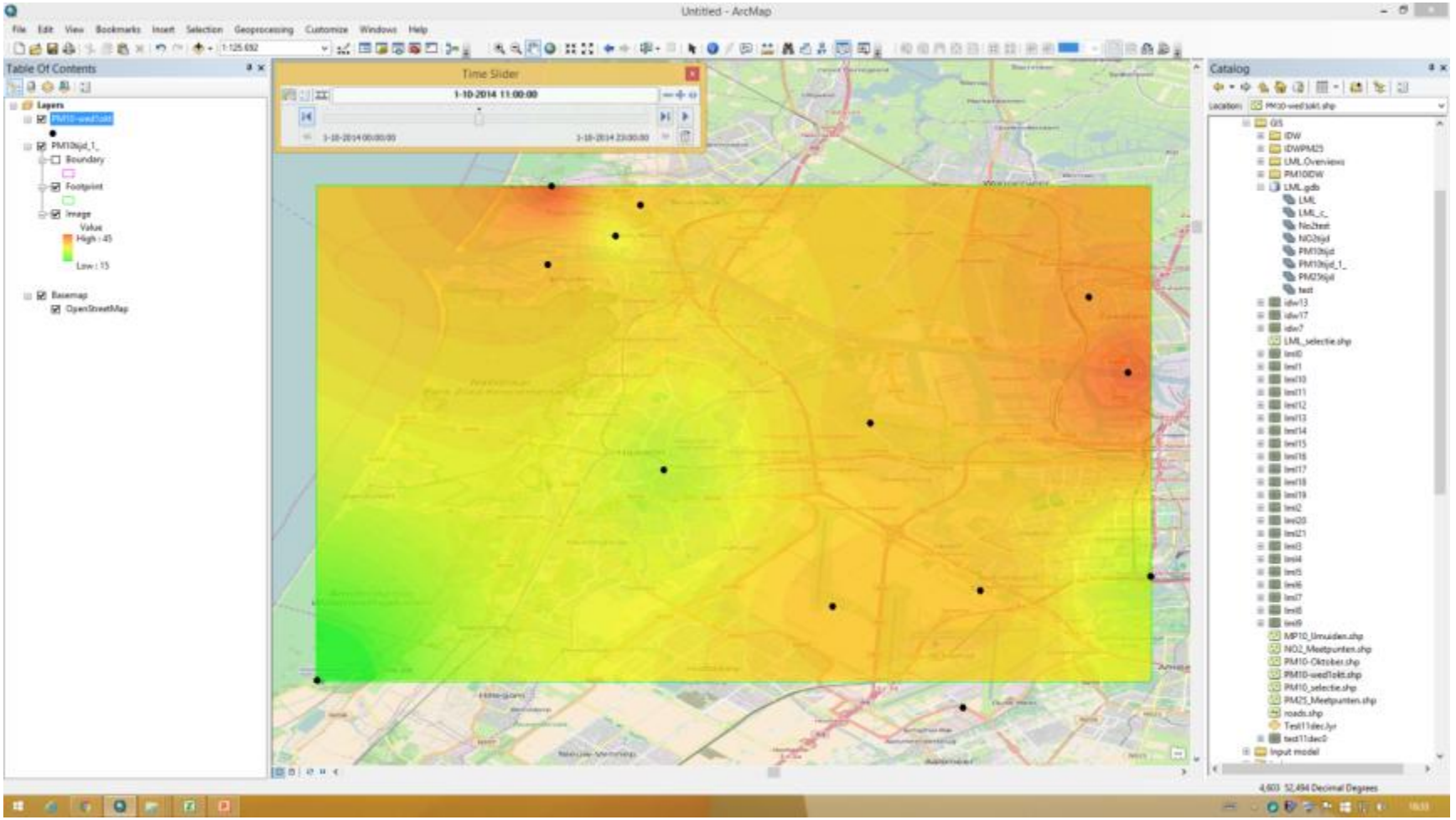


Met dank aan Just van den Broecke en Michel Grothe, Geonovum

Mobiele viewer, mockup Leaflet applicatie

Met dank aan Giel Vermeulen, HAS Den Bosch & gem Nijmegen

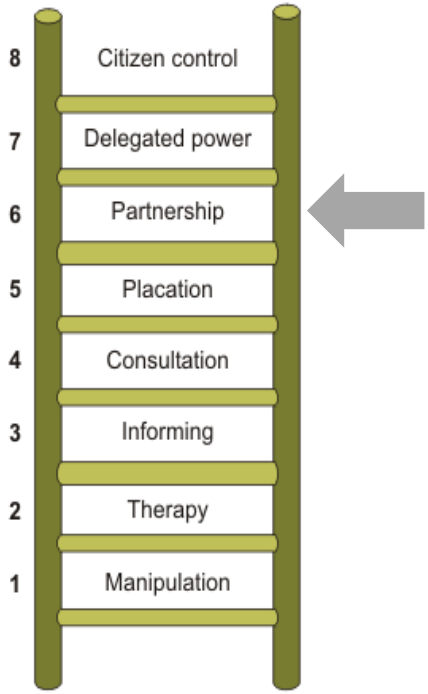
Eerste experimenten met visualisatie



Met dank aan Freek Thuis, Radboud Universiteit en nationale GI-minor

Onderdeel Burgerparticipatie

Citizen Participation Ladder



Kennisstroom in monitoring netwerk: balans vinden in samenwerking experts, burgers en sensing technologie

Arnstein, S.R. (1971) 'Eight Rungs on the Ladder of Citizen Participation', in Cahn, E.S. & Passett, B.A. (eds), *Citizen Participation: Effecting Community Change*, Praeger, New York.

image: www.dlsweb.rmit.edu.au/conenv/envi1128/focus3/f3_t9_q44.htm.

[Het project kiest in pilot-fase waarin de proof-of-concept centraal staat, niet voor de hoogste vorm van zelforganisatie op de dimensie van de 'citizen participation ladder,' met name om tempo te maken: in uitvoering brengen van innovatief, exploratief onderzoek zoekend naar een partnerschap, met een balans tussen inbreng experts project consortium en burgerdeelnemers].

Door:
Cécile Kerssemakers en Linda Carton,
Radboud Universiteit

Aan burger deelnemers: Wat vragen we van u?

A. Stroomvoorziening

- Liefst een binnen stopcontact (voortschrijdend inzicht)
- Of anders een waterdicht stopcontact

B. Een doorvoer voor een draad van buiten naar binnen

- Door raam, kier, of een pijp waar een usb-draad met gewone usb-poort aan het eind doorheen past (geen mini-usb)

C. Aansluiting op uw wifi-netwerk

- Naam van uw wifi-netwerk (letterlijke spelling)
- Uw wifi wachtwoord, waarmee de sensor met de router verbinding kan maken

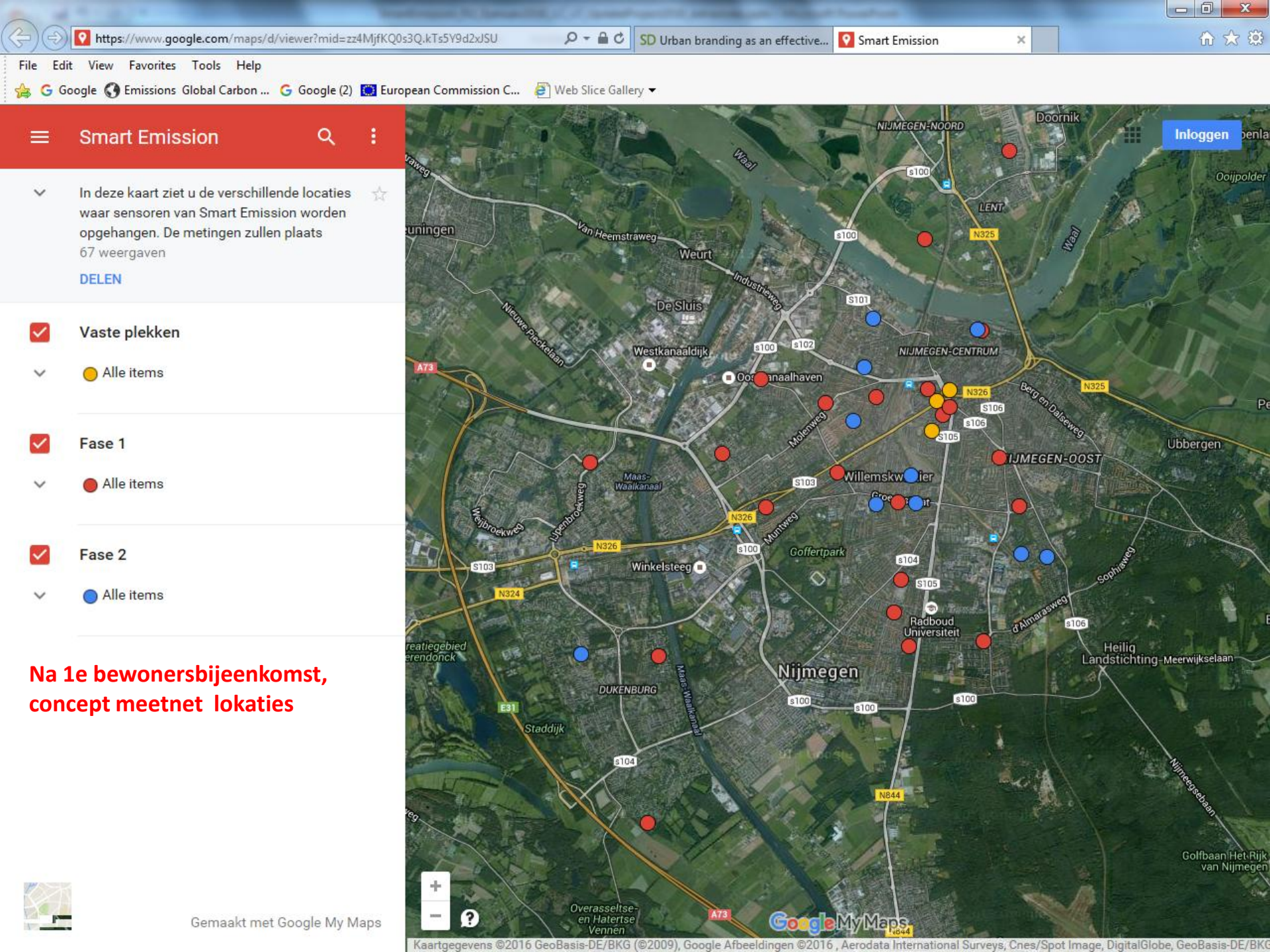
Aan burger deelnemers: Hoe gaan we het doen?

We sluiten dan een intentie-overeenkomst met u voor deelname aan het experiment

Wij komen de sensor bij u thuis installeren, met 2 personen.
De data die de sensoren produceren worden via Internet ge-upload naar CityGIS b.v., en van daaruit naar stichting Geonovum.
De data wordt beschikbaar gesteld als Open Data (voor u en voor anderen)

U kunt de data zelf ook analyseren en gebruiken naar uw eigen inzicht
Deelname is vrijwillig, u kunt ieder moment stoppen
Deelname geschiedt op basis van gesloten beurs.

We gaan er vanuit dat u zorgdraagt voor de sensor als was het uw eigendom
We halen de sensor bij u op nadat de proef (pilotfase 1 en/of 2) gereed is.


https://www.google.com/maps/d/viewer?mid=zz4MjfKQ0s3Q.kTs5Y9d2xJSU
Urban branding as an effective...
Smart Emission
File Edit View Favorites Tools Help
Google Emissions Global Carbon ... Google (2) European Commission C... Web Slice Gallery
Smart Emission
In deze kaart ziet u de verschillende locaties waar sensoren van Smart Emission worden opgehangen. De metingen zullen plaats
67 weergaven
DELEN
Vaste plekken
Alle items
Fase 1
Alle items
Fase 2
Alle items
Na 1e bewonersbijeenkomst, concept meetnet lokaties
Gemaakt met Google My Maps
Inloggen
NIJMEGEN-NOORD
Doornik
Waal
Ooijpolder
LENT
Van Heemstraweg
Weurt
Industrieweg
De Sluis
Nieuwe Pleckelaan
Westkanaaldijk
NIJMEGEN-CENTRUM
Molenweg
Berg en Dalseweg
Ubbergen
NIJMEGEN-OOST
Maas-Waalkanaal
Willemskwartier
Weijbroekweg
IJpenbroekweg
Muntweg
Goffertpark
Winkelsteeg
Sophiaweg
d'Almarasweg
Radboud Universiteit
Heilig Landstichting
Meerwijkselaan
Nijmegen
DUKENBURG
Staddijk
Nijmeegsebaan
Golfbaan Het Rijk van Nijmegen
Overasseltse- en Hatertse Vennen
Google My Maps
Kaartgegevens ©2016 GeoBasis-DE/BKG (©2009), Google Afbeeldingen ©2016 , Aerodata International Surveys, Cnes/Spot Image, DigitalGlobe, GeoBasis-DE/BKG

Viewers Smart Emission sensor data:

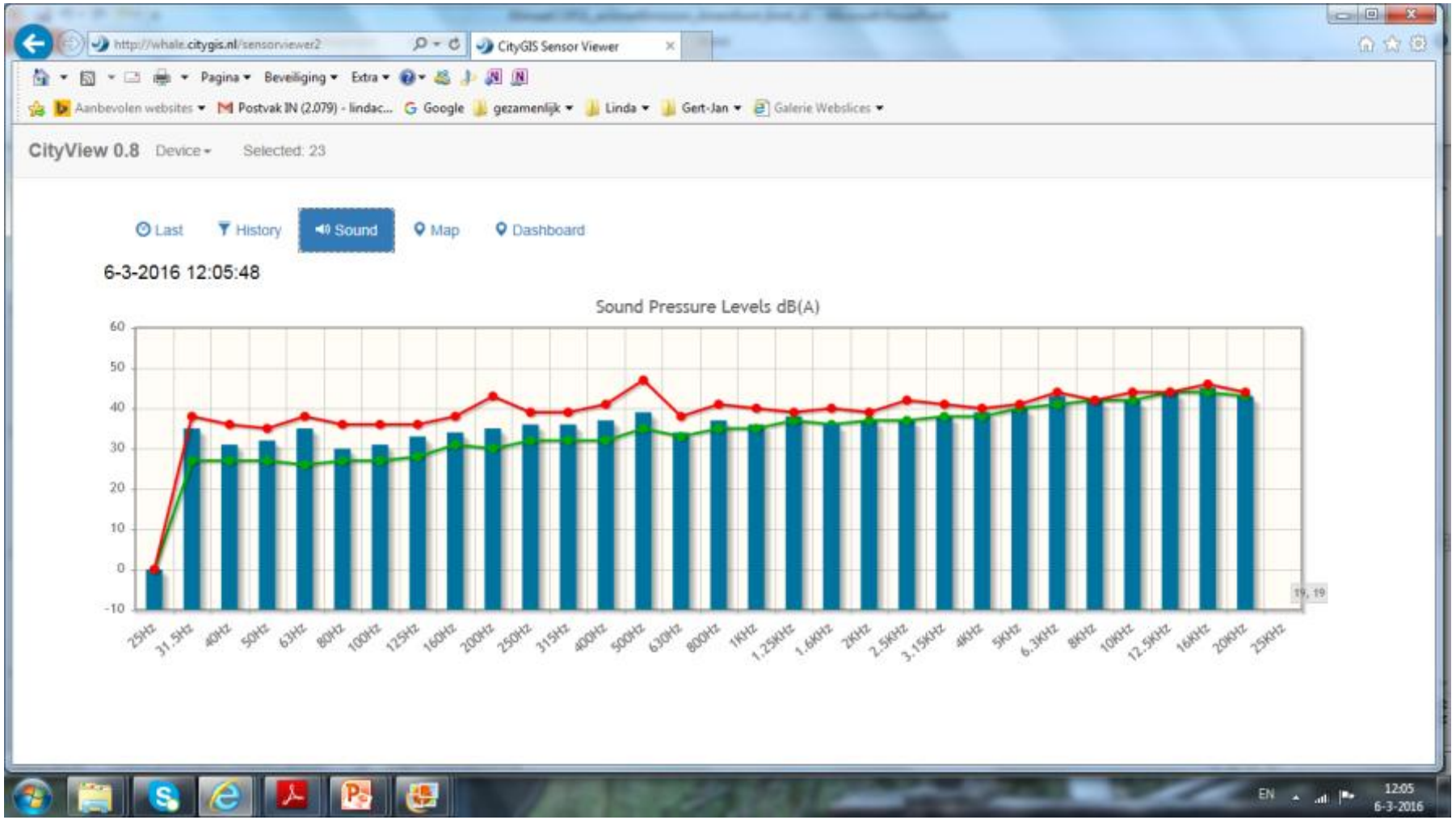
http://smartemission.nl

http://smartemission.nl/smartapp
http://smartemission.nl/heron

http://whale.citygis.nl/sensorviewer2

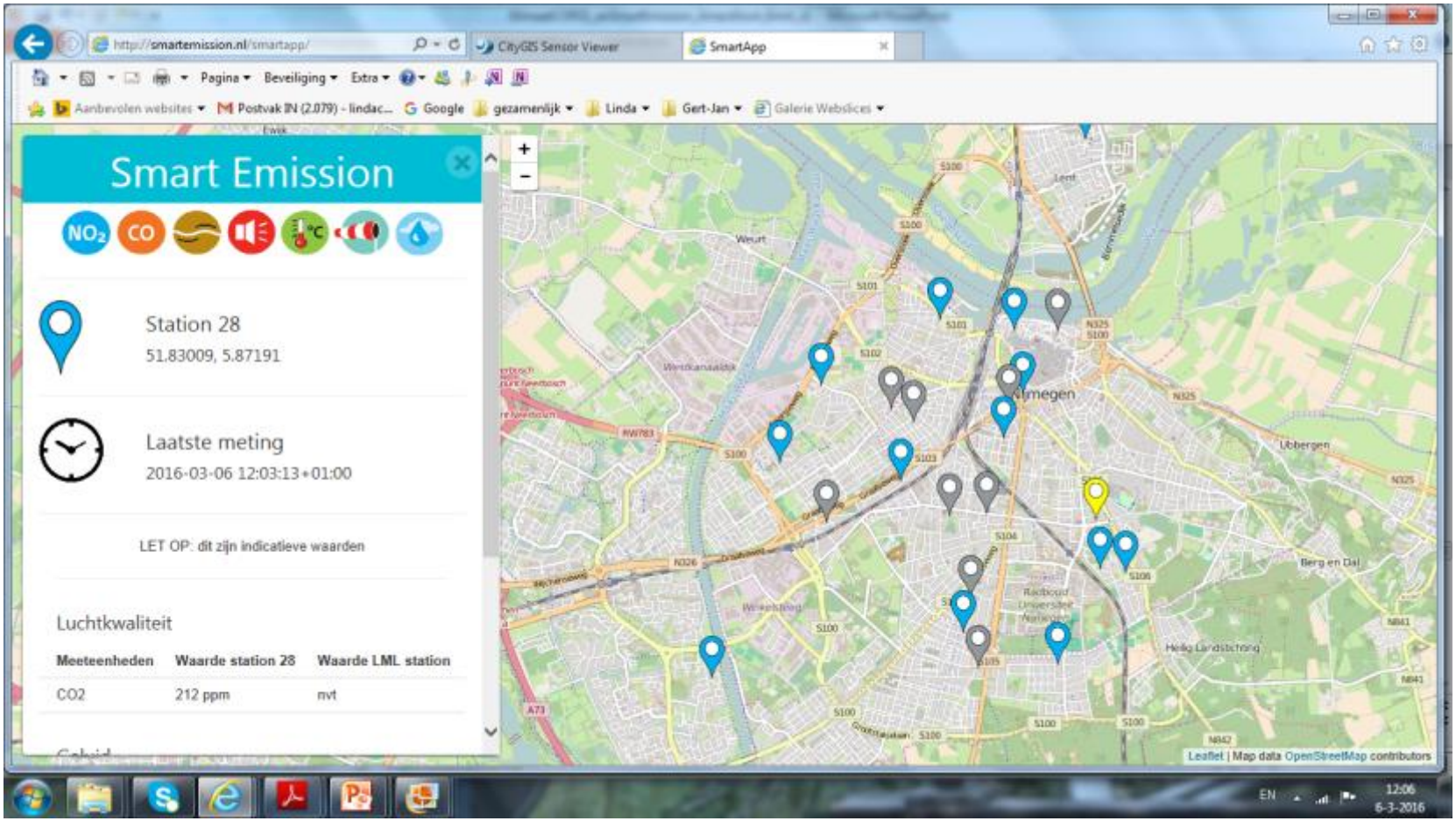
Viewers Smart Emission sensor data:

http://whale.citygis.nl/sensorviewer2



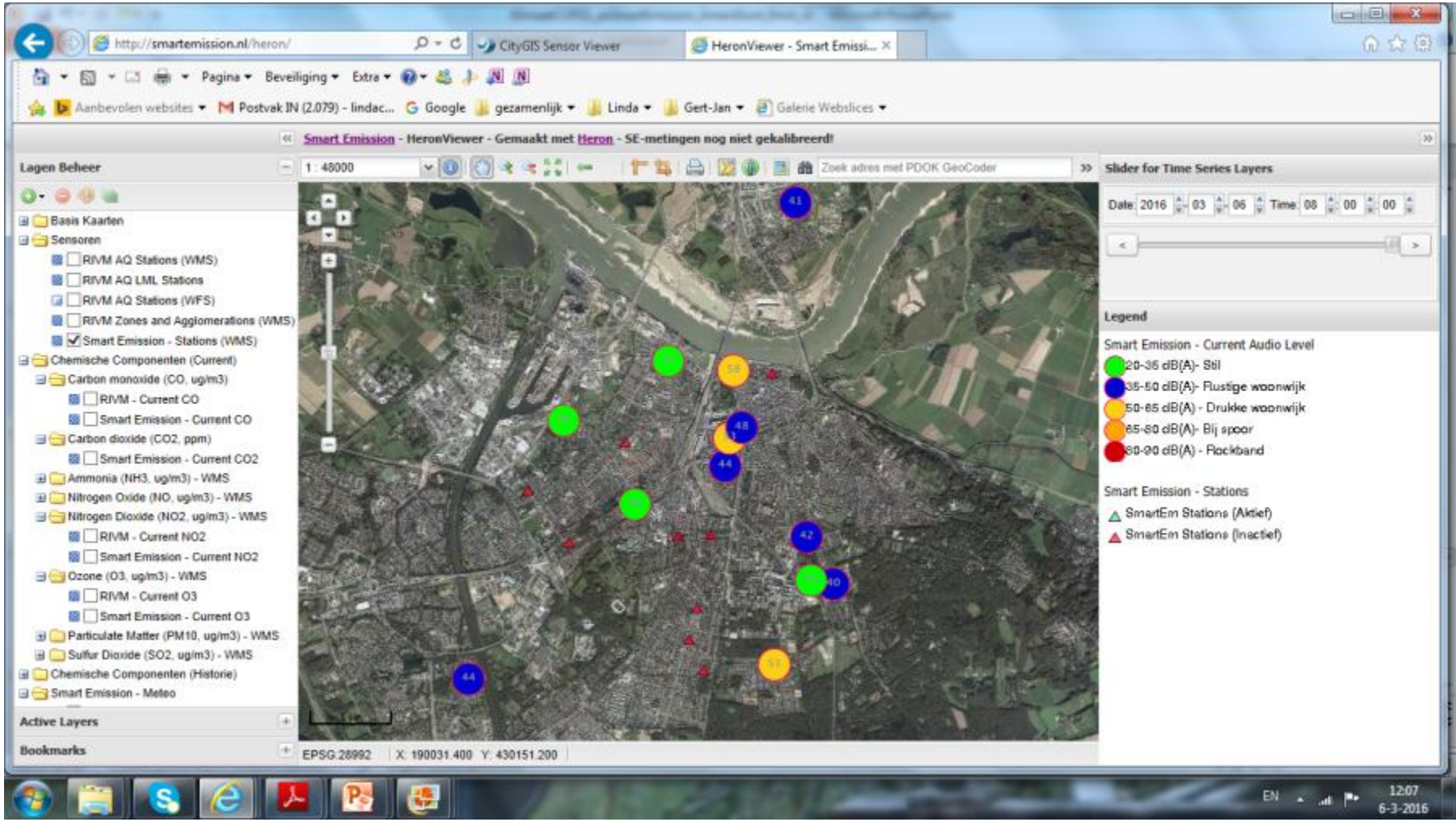
Viewers Smart Emission sensor data:

http://smartemission.nl/smartapp



Viewers Smart Emission sensor data:

http://smartemission.nl/heron



Bewoners bijeenkomst 1 maart 2016, Erasmustoren Radboud Un.

Foto’s burgerparticipatie smart emission project

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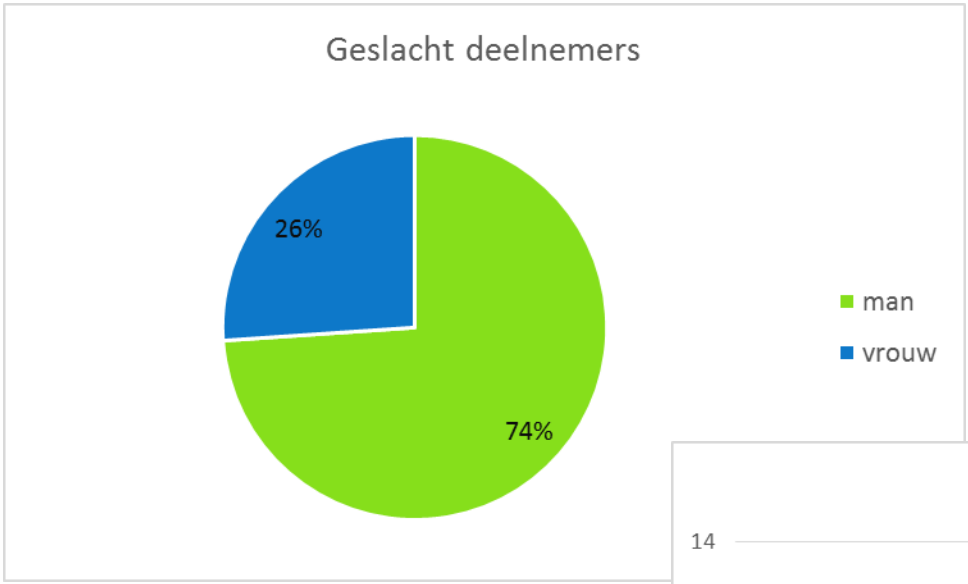
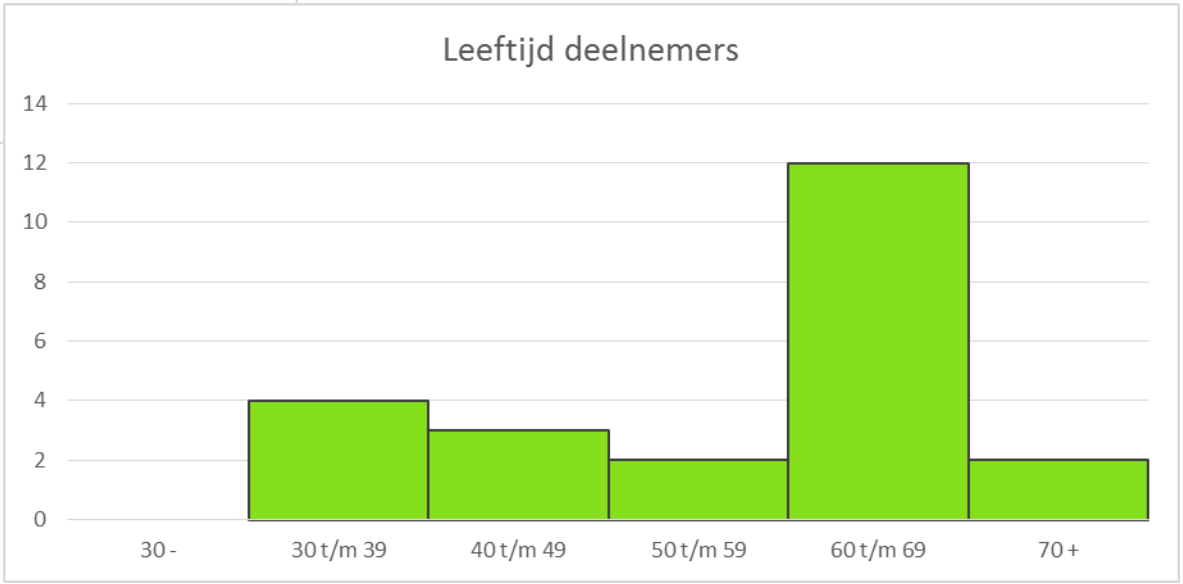
Bewoners bijeenkomst 1 maart 2016, Erasmustoren Radboud Un.

Wie zijn de burgerwetenschappers van Smart Emission?





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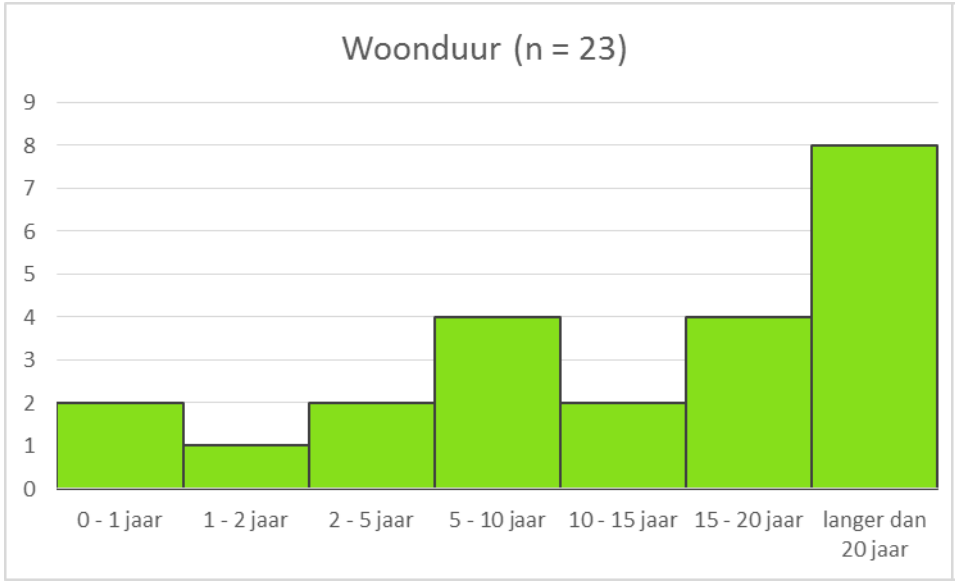

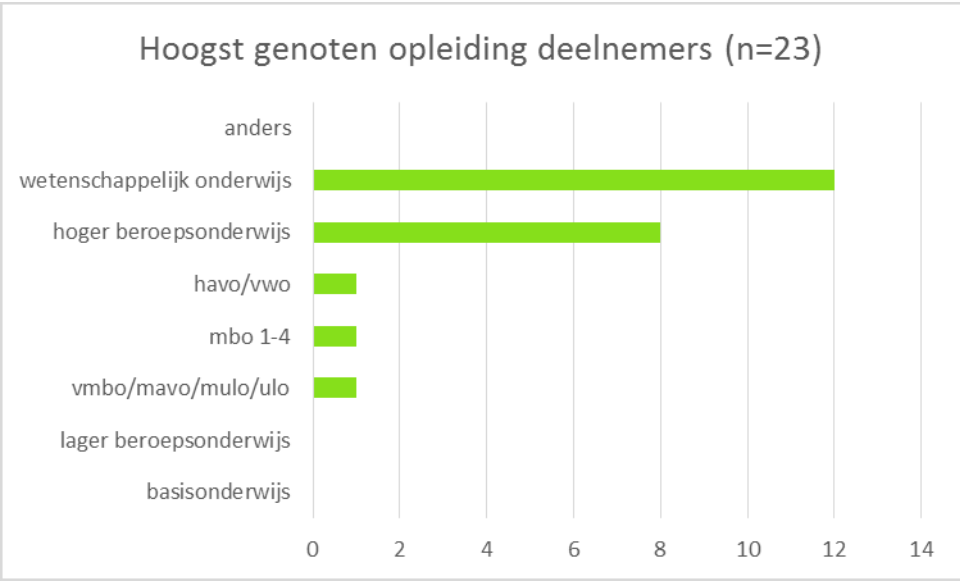

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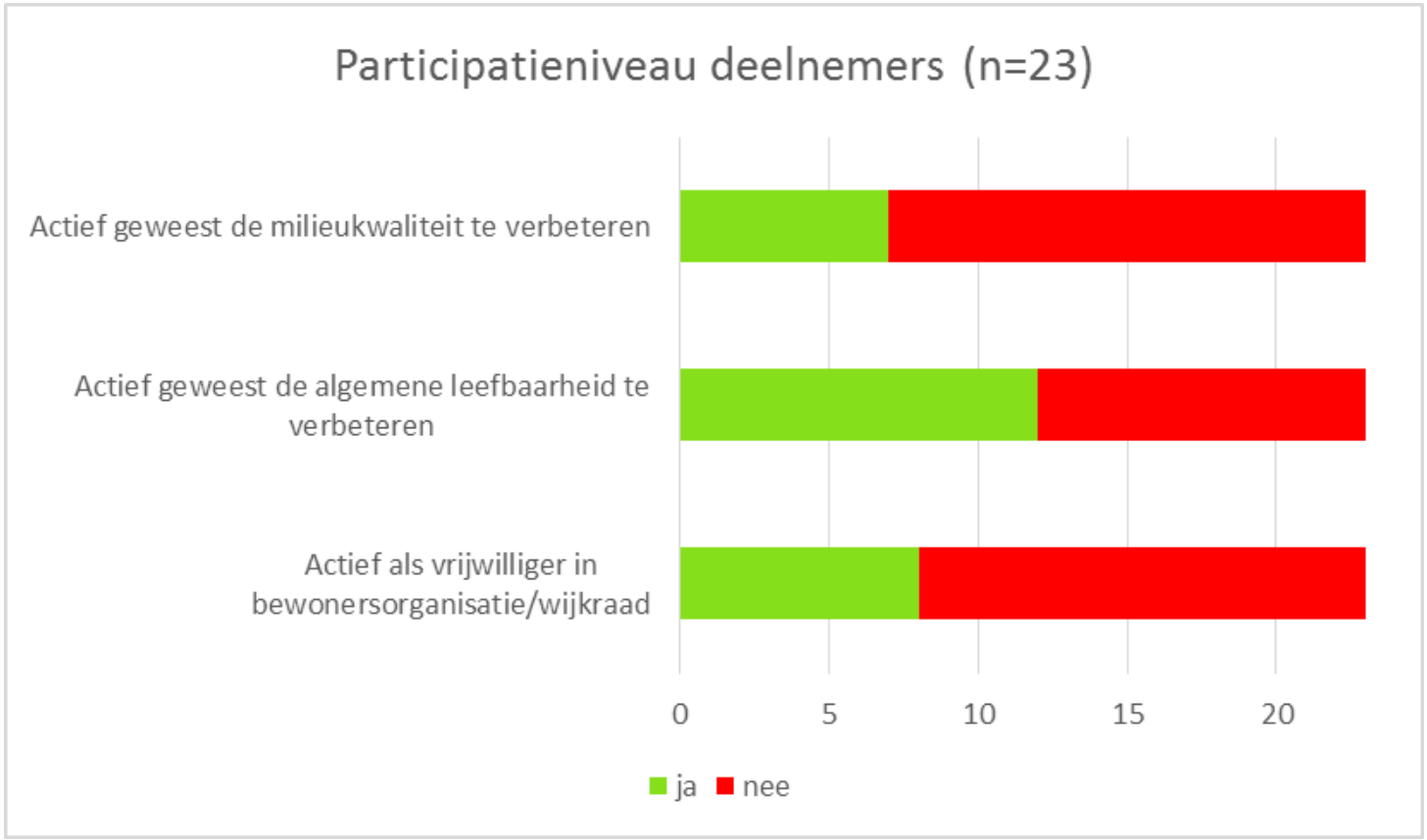
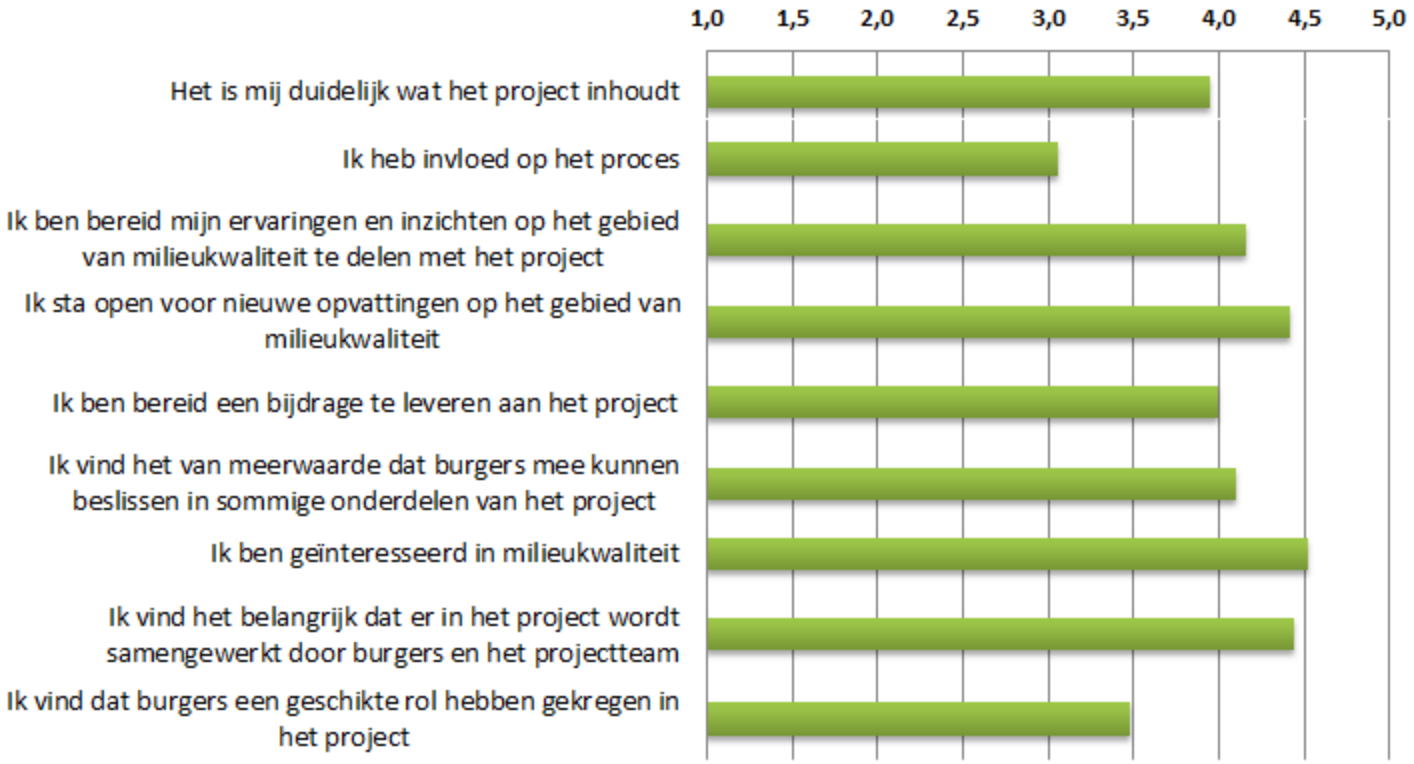


Waarom doen ze mee?

Feedback van bewoners over participatie, evaluatie 1e bewonersbijeenkomst

op 5-puntschaal



Motivatie: 8!

Participatietraject, Roadmap Smart Emission in 2016, deelnemersbijeenkomsten:

Za. 9 Januari 2016: 1e Bewonersbijeenkomst Pilotexperiment Smart Emission

Januari en februari 2016: Gedurende deze 2 maanden uitrol sensoren: "**Pilotfase 1**"

Half maart 2016: 2e deelnemersbijeenkomst, bijvoorbeeld op do. avond 17 maart

Eind mei 2016: 3e deelnemersbijeenkomst, presentatie voorlopige resultaten van de pilot studie

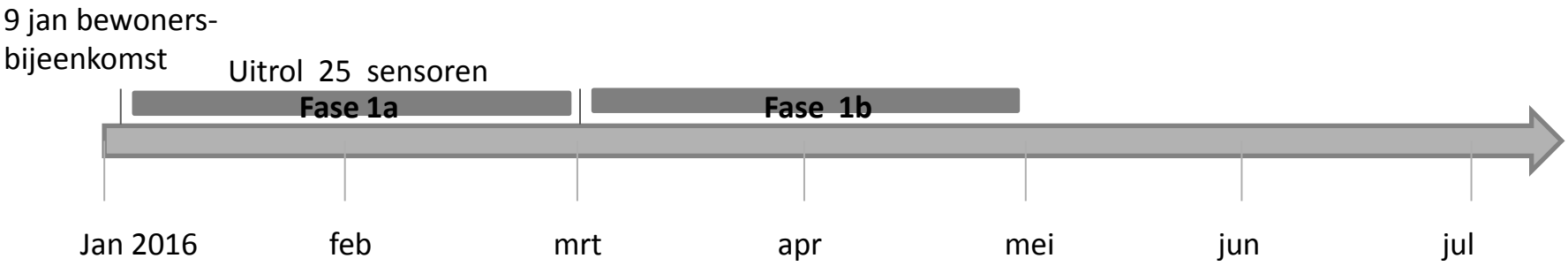
Zomervakantie

September - oktober 2016: mogelijk verplaatsen van de sensoren; "**Pilotfase 2**".

Eind november: Slotbijeenkomst, afronding pilotexperiment. Presentatie van eindresultaten en gezamenlijke evaluatie van resultaten m.b.v. een evaluatieworkshop.

December: Ophalen sensoren

Tijdlijn voor komende maanden, 2016



Streven:

- Op 1 maart uitrol van 25 sensoren op lokaties gereed.
- Eind mei de verwerking van data verbeterd.
- Indruk van specifieke 'casuïstiek,' van 2 of 3 speciale gevallen de analyse gereed.

Voorstel tot zomervakantie:

- Half maart: tweede bewonersbijeenkomst (do. 17 maart, in de avond)
- Eind mei: derde bewonersbijeenkomst (vr. 27 mei, in de namiddag)

Na zomervakantie:

- September-oktober: de sensoren ergens anders ophangen: pilotfase 2
- November: slotbijeenkomst met bewoners (vr. 25 november)
- December: ophalen sensoren.

Smart Emission

Experiment met een burger-sensor-netwerk in Nijmegen

Vragen? Danku voor uw aandacht

Radboud Universiteit