NET ZERO CITIES

EU MISSION PLATFORM

CLIMATE NEUTRAL AND SMART CITIES

This project has received funding from the H2020 Research and Innovation Programme under grant agreement n°101036519.

Understanding the Ecosystem

Webinar

29.09.22

10:00 - 12:00 CEST

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Welcome & Intro

Francesca Rizzo & Åsa Minoz

This project has received funding from the H2020 Research and Innovation Programme under grant agreement n°101036519.

A city as a system of systems

Julio Lumbreras

This project has received funding from the H2020 Research and Innovation Programme under grant agreement n°101036519.

Systems thinking in cities

Julio Lumbreras
UPM & Harvard
julio.lumbreras@upm.es

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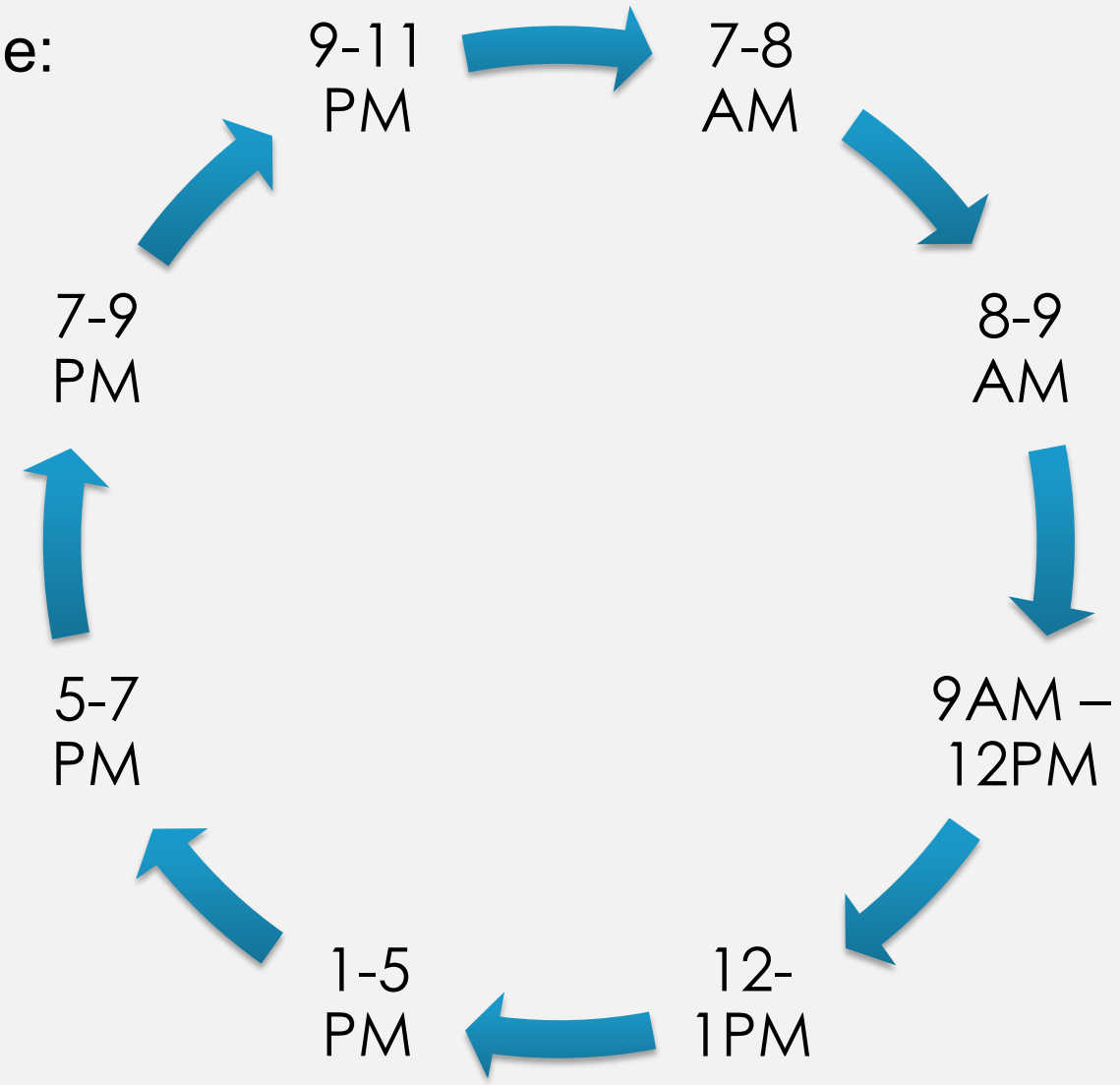
Let’s think about a day timeline:



Which are services the city is providing you?

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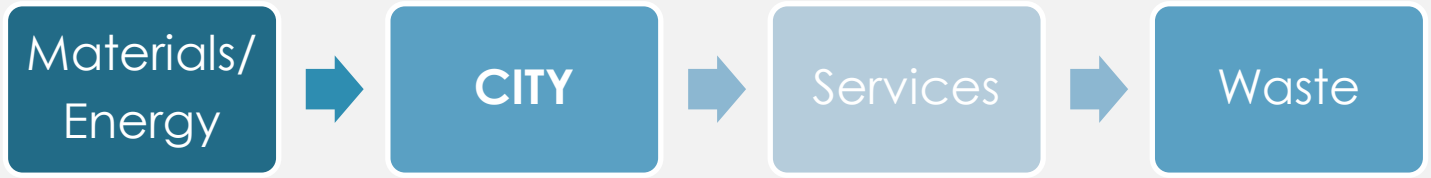
- **Material services:**
  - Food
  - Water
  - Energy
  - Mobility
  - Housing
  - Waste management
  - Green spaces and landscape

- **Social services:**
  - Education
  - Healthcare
  - Culture
  - Public safety



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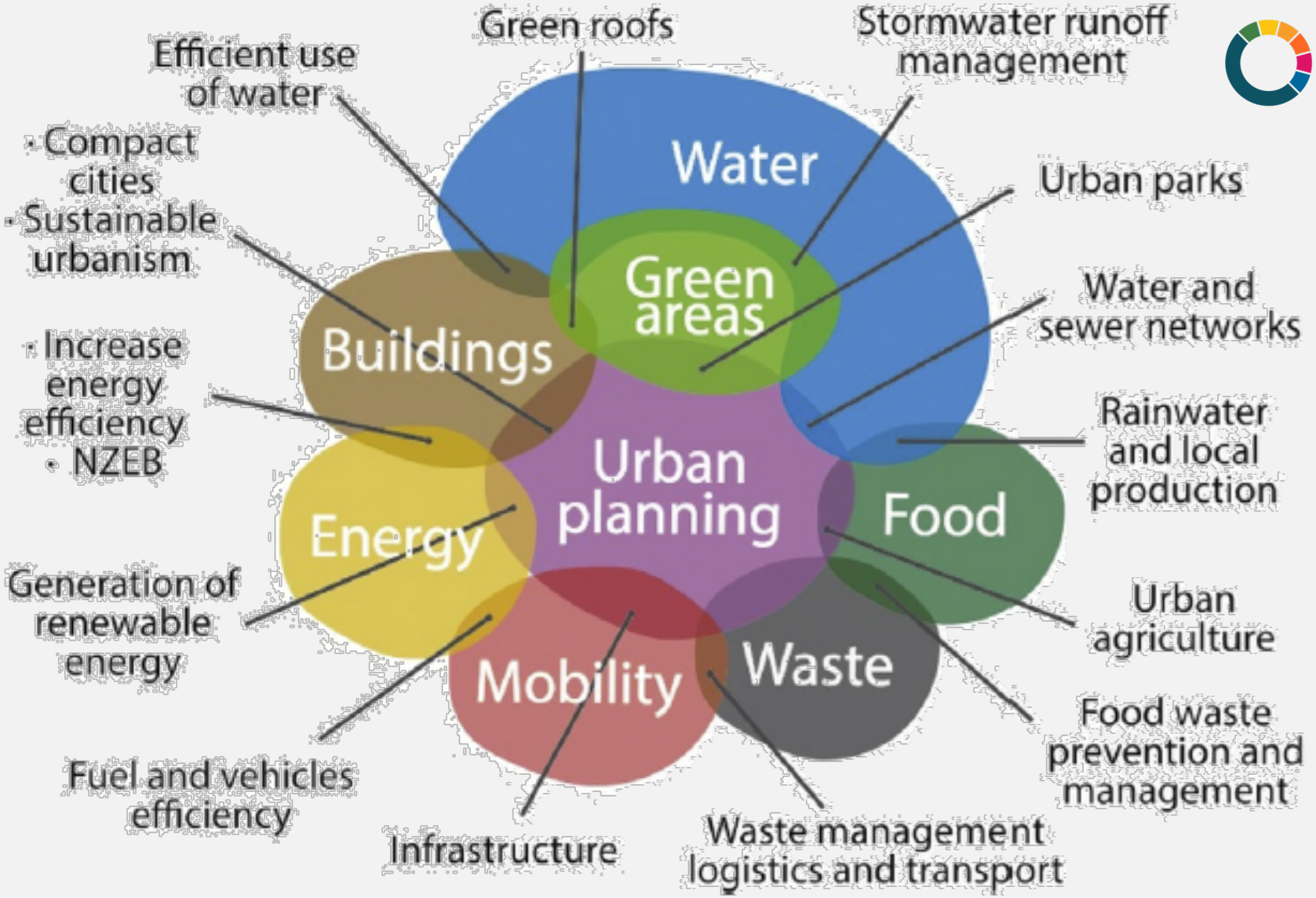
INTERCONNECTIONS

- **Material services:**
  - Food
  - Water
  - Energy
  - Mobility
  - Housing
  - Waste management
  - Green spaces and landscape
- **Social services:**
  - Education
  - Healthcare
  - Culture
  - Public safety



A. Petit-Boix et al., 2017

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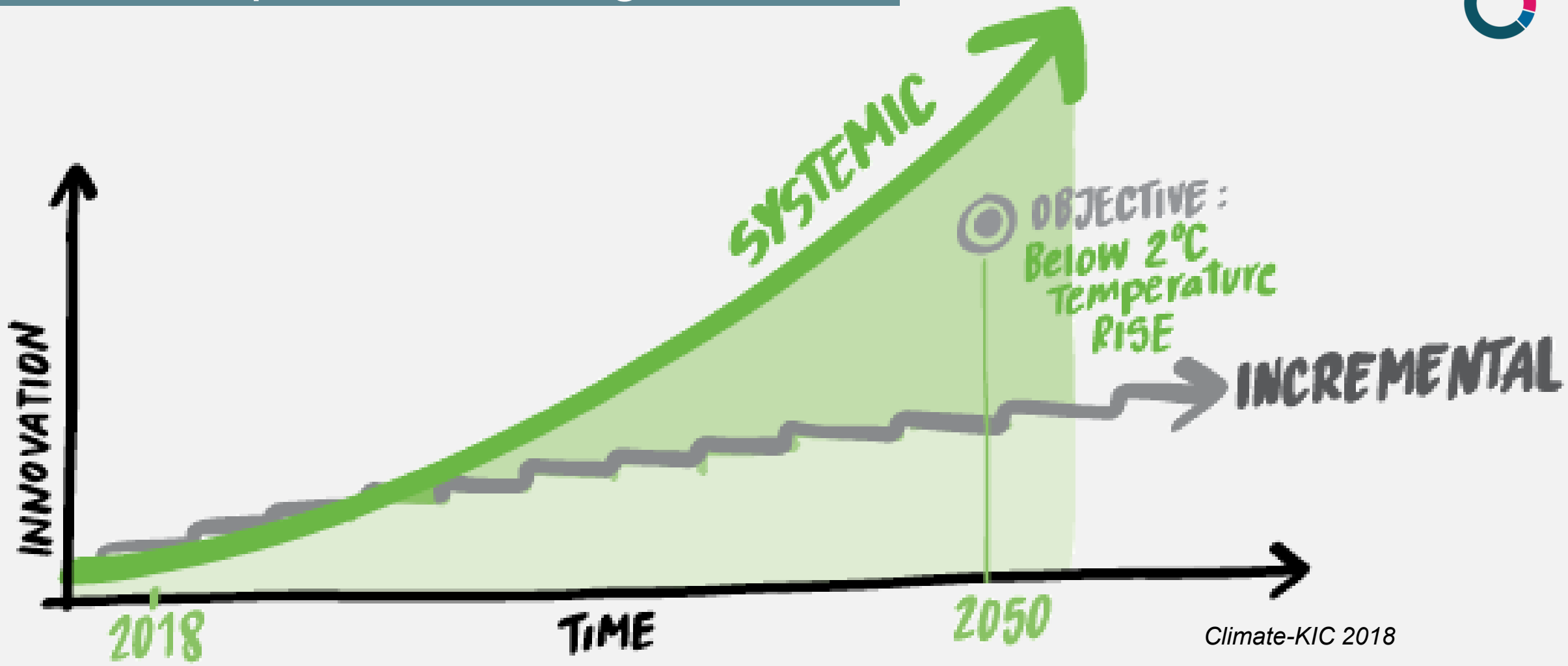
Need for exponential change



Climate-KIC 2018

The incremental approach is not working. We need to unlock exponential change

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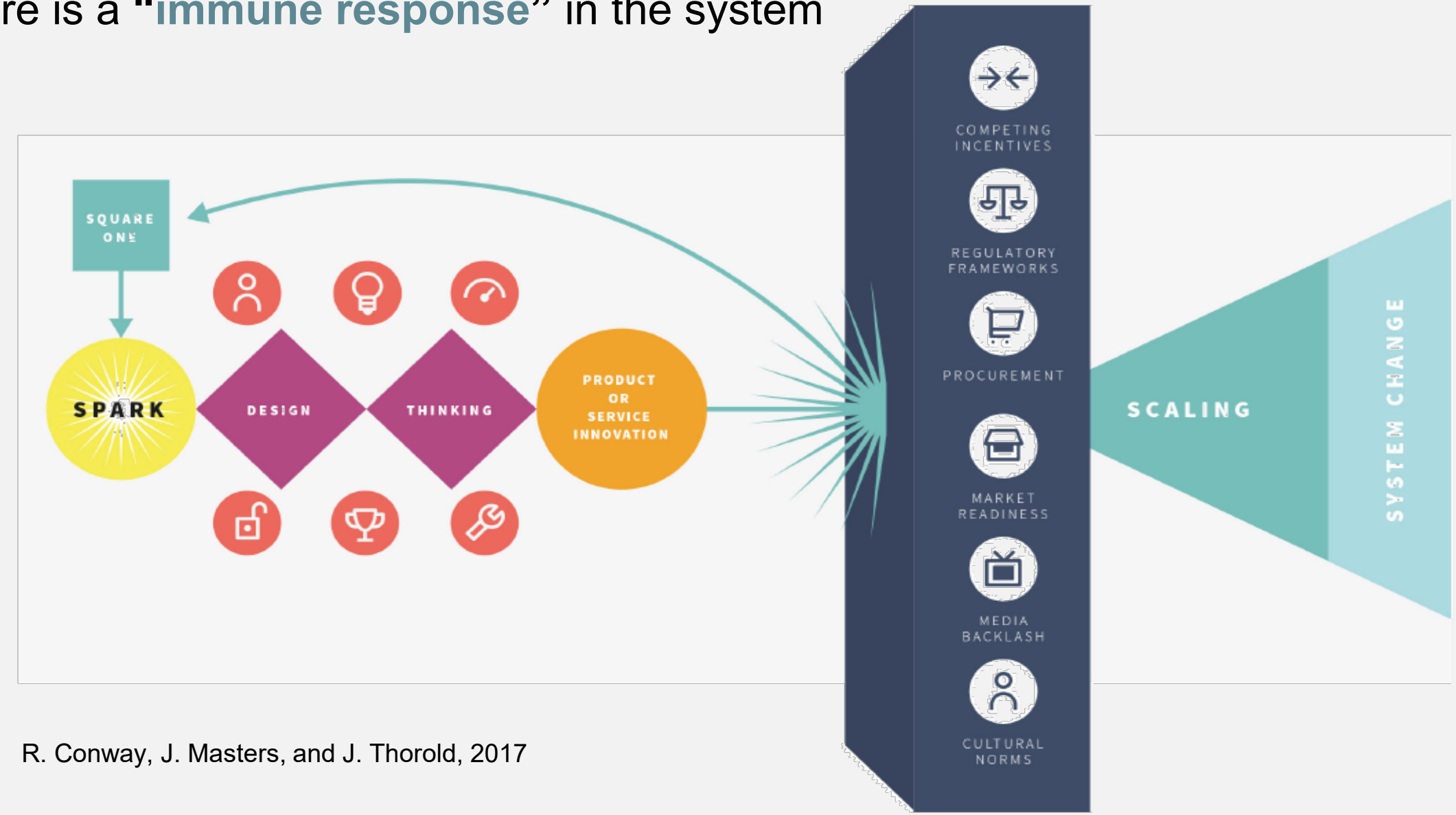
There is a “immune response” in the system



R. Conway, J. Masters, and J. Thorold, 2017

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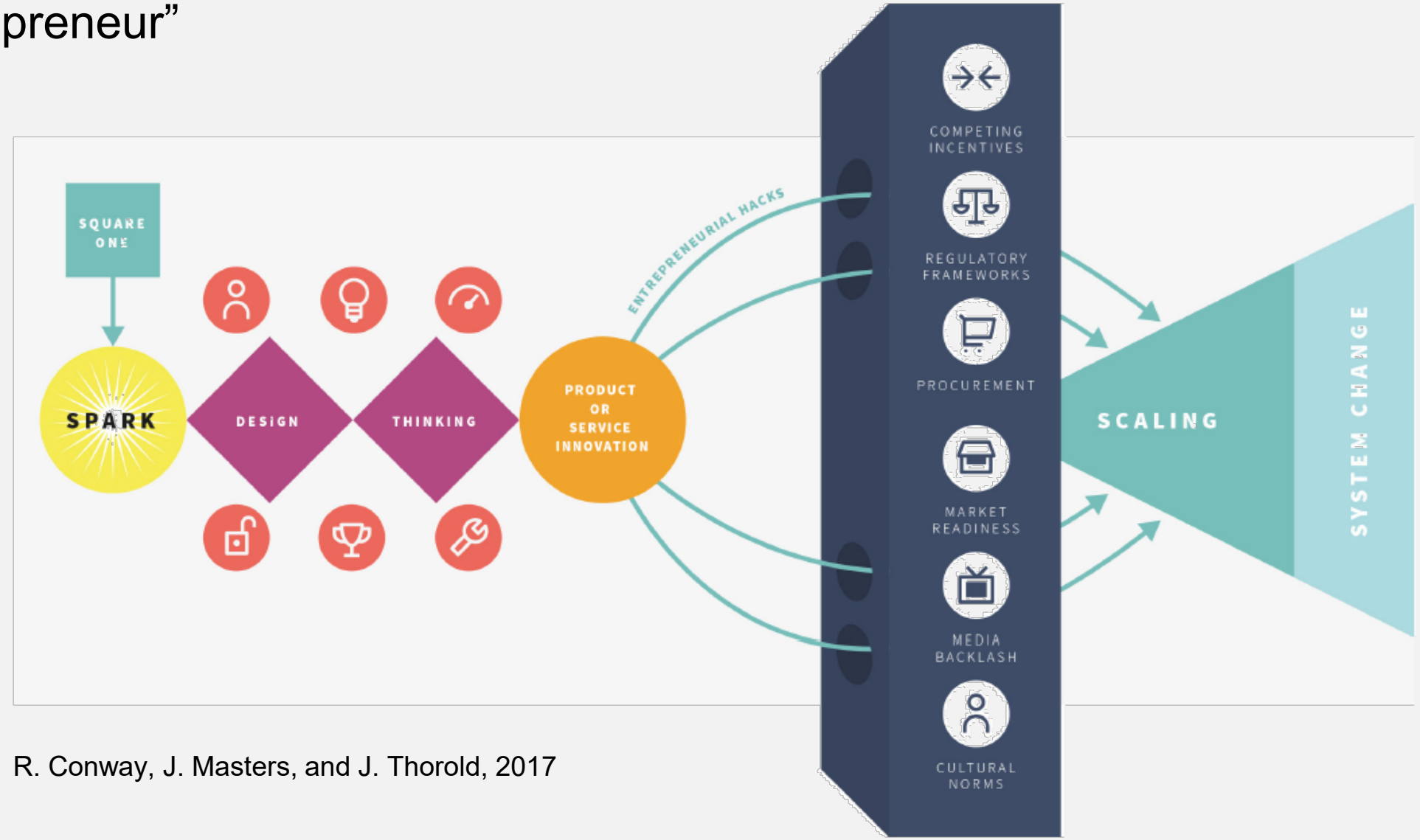
Alternative: "Think like a system, act like an entrepreneur"



R. Conway, J. Masters, and J. Thorold, 2017

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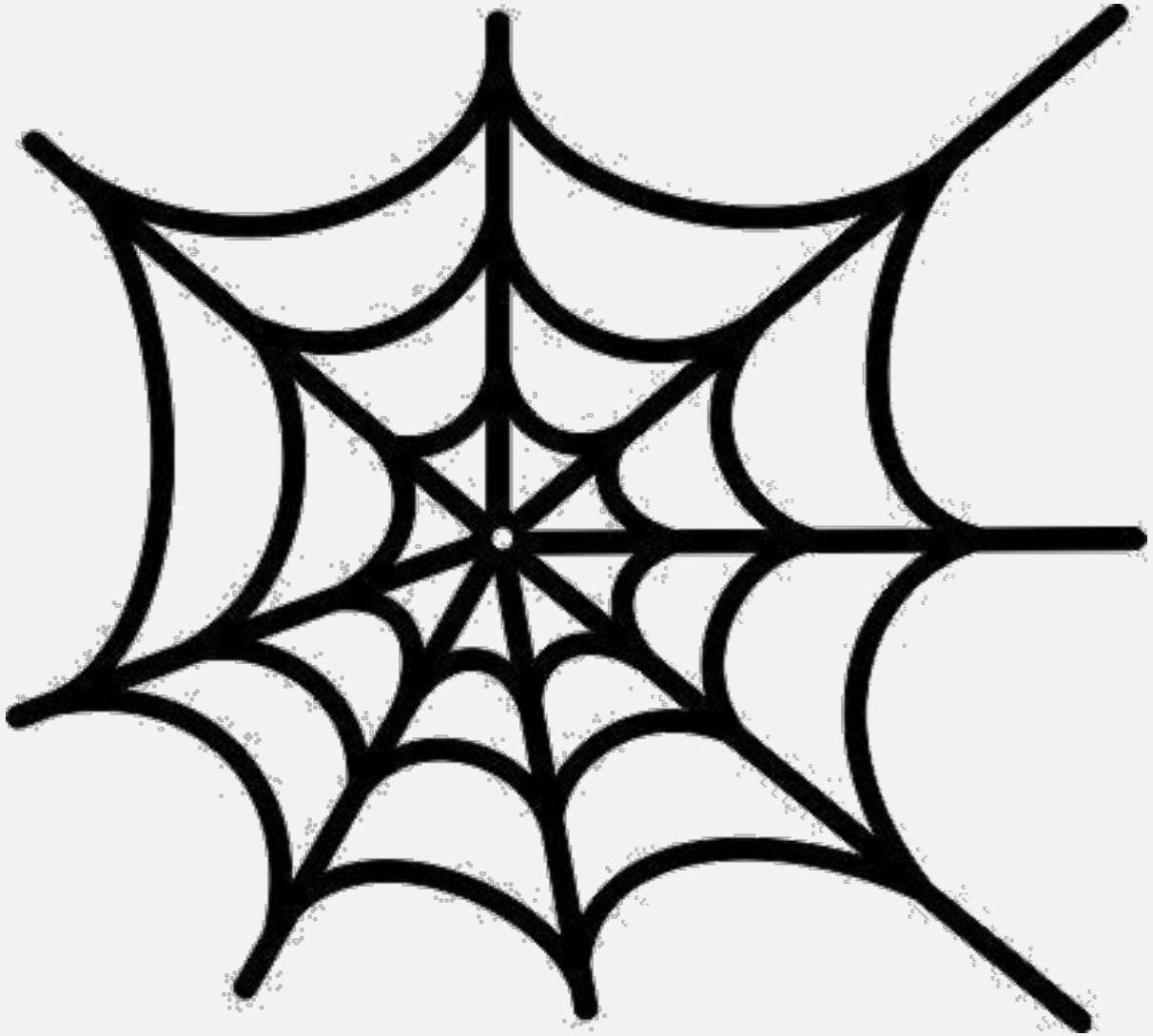
Need for systemic change



- **Leverage points**
- **Portfolio approach**
- **Learning by doing**

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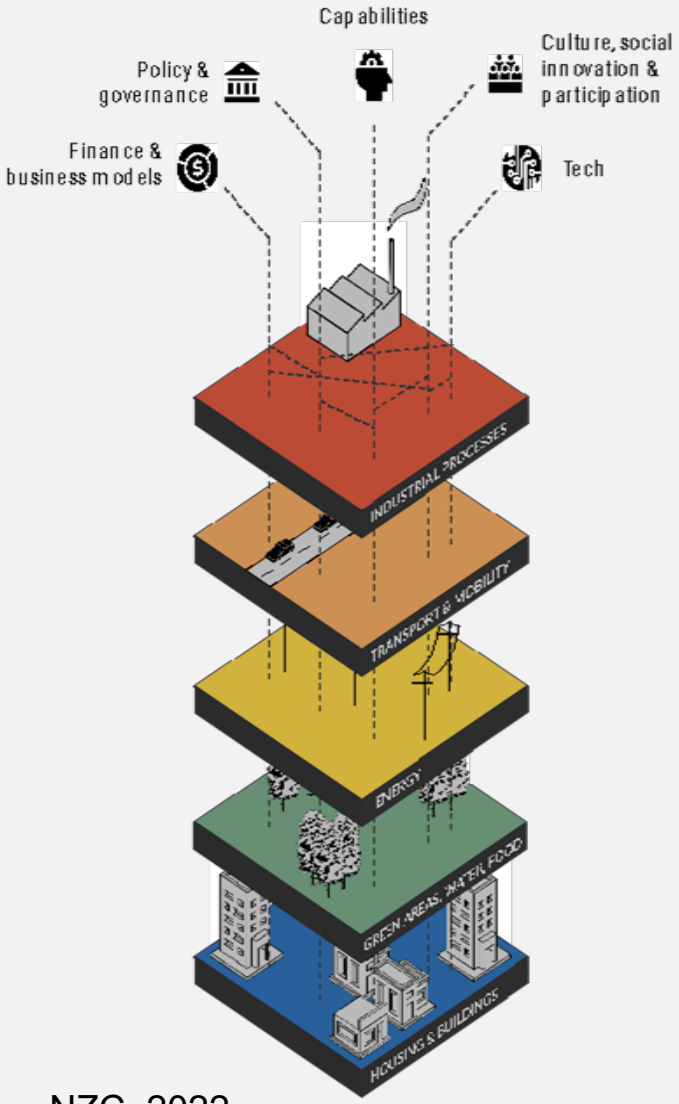
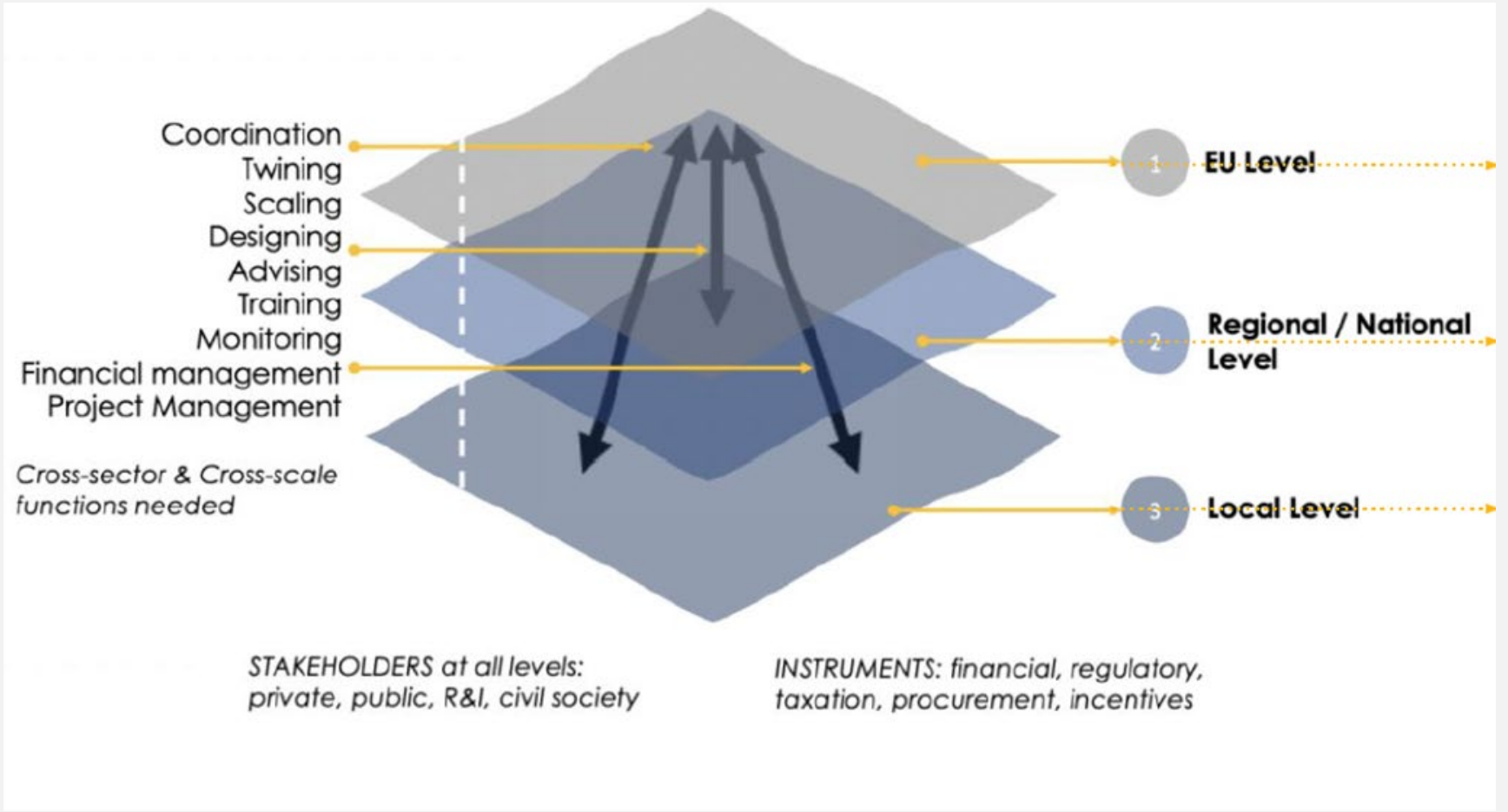


NZC, 2022



EU Cities Mission, 2020

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The NoiseAbility Project

Ed Synnott & Jane McLaughlin

This project has received funding from the H2020 Research and Innovation Programme under grant agreement n°101036519.

NoiseAbility

Making sense of sound in the city

Jane McLaughlin & Ed Synnott

eAbility
nse of sound in the city

What's it about – from noise to sound

NoiseAbility
Making sense of sound in the city

'To demonstrate that cities can holistically incorporate noise measurement into cities' management of urban spaces for improving liveability, using IoT at the heart of citizen-centric engagement with noise; and with intelligent data at the core of city-based multilayered responses.'

- **Pilot the capacity for cities to understand noise from the viewpoint of citizens** ('how do you feel about the sound?'), using IoT at the heart of citizen-centric engagement; and with intelligent data at the core of city-based multi-layered responses.
- **Crowdsourcing** and combined digital and in-person citizen engagement methodology successfully **mapping** personas and seeking feedback across three cities simultaneously.
- **Interoperable** IoT data collection and integration with open data services and standards.

NoiseAbility
Making sense of sound in the city

Rapid capture and mapping of perception and acceptability of sound:

Perceptions of sound in real-time captured across three cities simultaneously over a 6-week period.

The locations:

- Mixed-use urban spaces
- Many different sources of sound

The people:

- Residents
- Visitors & Tourists


Bilbao, Plaza Nueva


Edinburgh, Grassmarket


Eindhoven, Strijp-S

3	19	4	6000	4
CITIES	SENSORS	WORKSHOPS	CITIZEN DATA POINTS	TRANSPORT LAYERS

UrbanTide · The Lunar Works · Tynos Consulting · Bilbao · Edinburgh The City of Edinburgh Council · Eindhoven · SYNCHRONICITY

A strategy for mapping citizen perceptions of sound:

NoiseAbility
Making sense of sound in the city

1. Define locations
2. Define key sound types and frequencies
3. Identify simple personas
4. Map stakeholder ecosystem
5. Identify multiple and highly localised approaches to citizen engagement
6. Co-create digital mapping of real-time citizen perceptions of sound - the ‘feelometer’
7. Collection of data points through ‘on the street’ data capture and online

What we asked the citizens:

NoiseAbility
Making sense of sound in the city

Themes:
what type of sound are you commenting on?

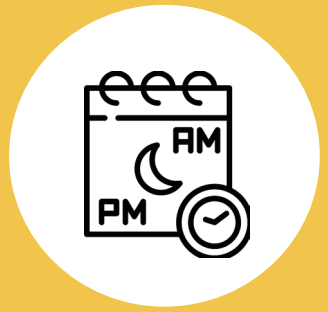
TRAFFIC

CONSTRUCTION / RECYCLING / GARBAGE COLLECTION

PEOPLE & HOSTELRIES

MUSIC

ANIMALS



When do you hear it:
Weekday / Weekend.
Morning / afternoon / evening / night.

How often do you hear it?
How long does it last?
How loud is the sound?

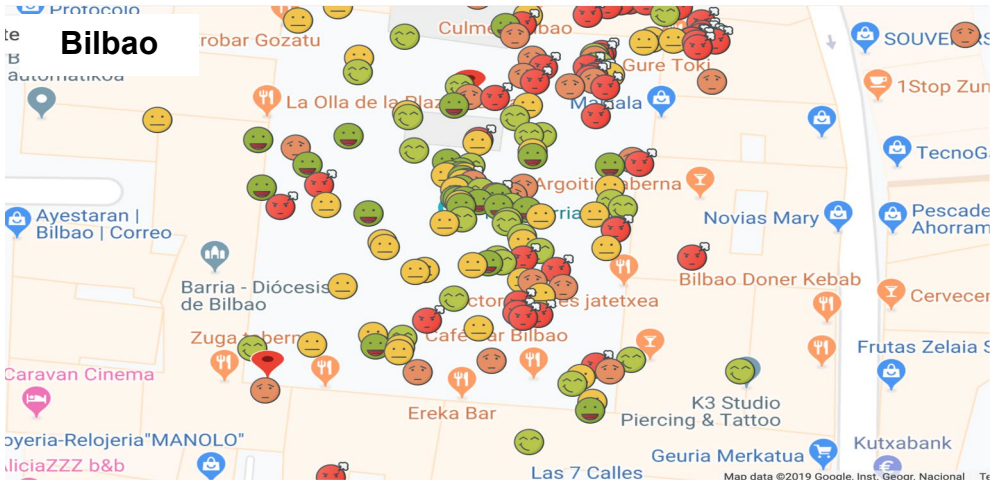
How do you feel about this sound?

Mapping citizen feedback by sentiment – crowdsourced data

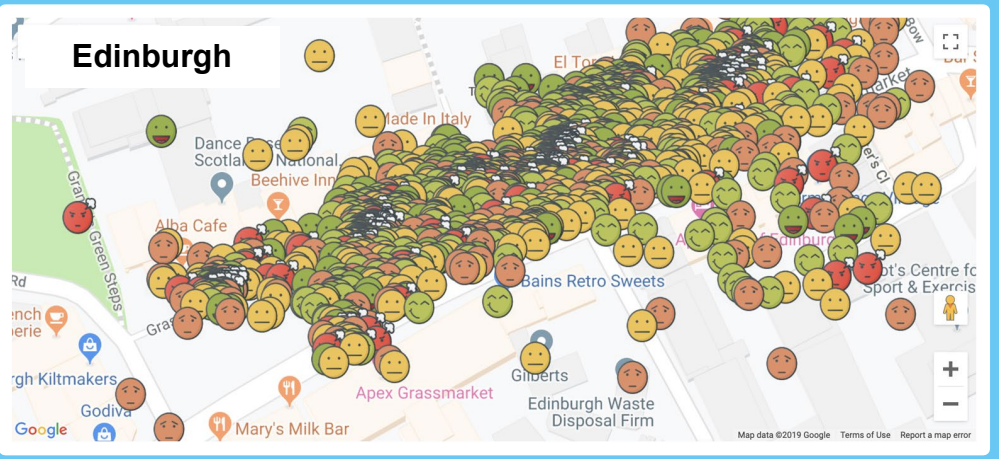
NoiseAbility
Making sense of sound in the city

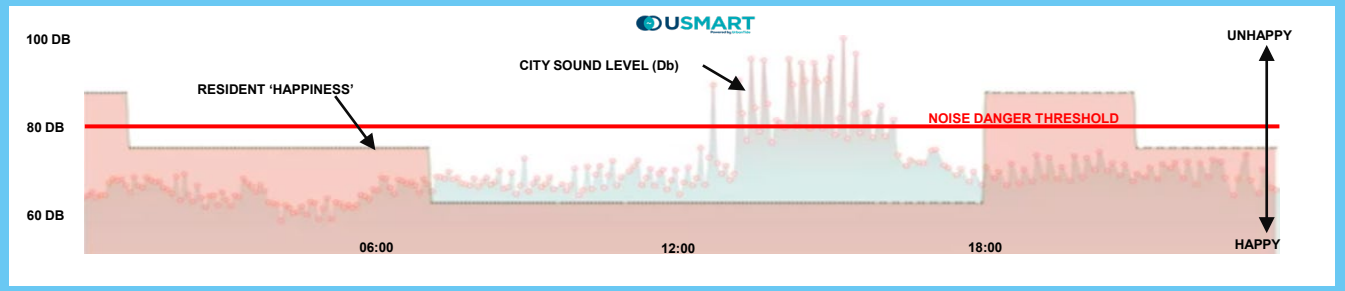
Eindhoven

Bilbao



Edinburgh





UrbanTide · The Lunar Works · Tynos Consulting · Bilbao · Edinburgh · Eindhoven

SYNCHRONICITY

Ground-breaking outcomes:

NoiseAbility
Making sense of sound in the city

Pilot:

- Rapid piloting and prototyping working collaboratively with 3 cities in just 6 months.

Technical:

- New data model to support sound ‘type’ via frequency capture and analysis.
- Demonstrating interoperability of data.

City managers:

- Matching sound perception to noise observed enabled specific activities to be identified as key concern (not necessarily the highest decibels), as well as how perception varies by time of day.

Urbanists:

- AI-driven tool enables modelling of sound perception to support planning across the city.
- Opens up possibility of crowdsourcing citizen involvement in creating and managing ‘scapes’, whether this is sound or other types of enveloping attributes (e.g. air quality, Urban Heat Island effect etc).
- Particularly useful for understanding the design principles to support particular spaces e.g. quite spaces, ‘meanwhile’ spaces etc.
- Rapid method demonstrates nuance is possible, given the right design in the mapping process.
- Mapping techniques can deliver insights which democratise feedback – i.e. no longer solely the preserve of workshops.

Design processes and visual tools for mapping systems

Ellery Studio

This project has received funding from the H2020 Research and Innovation Programme under grant agreement n°101036519.

NetZeroCities

Mapping, coloring and designing carbon neutral futures

ellery studio

29 September 2022

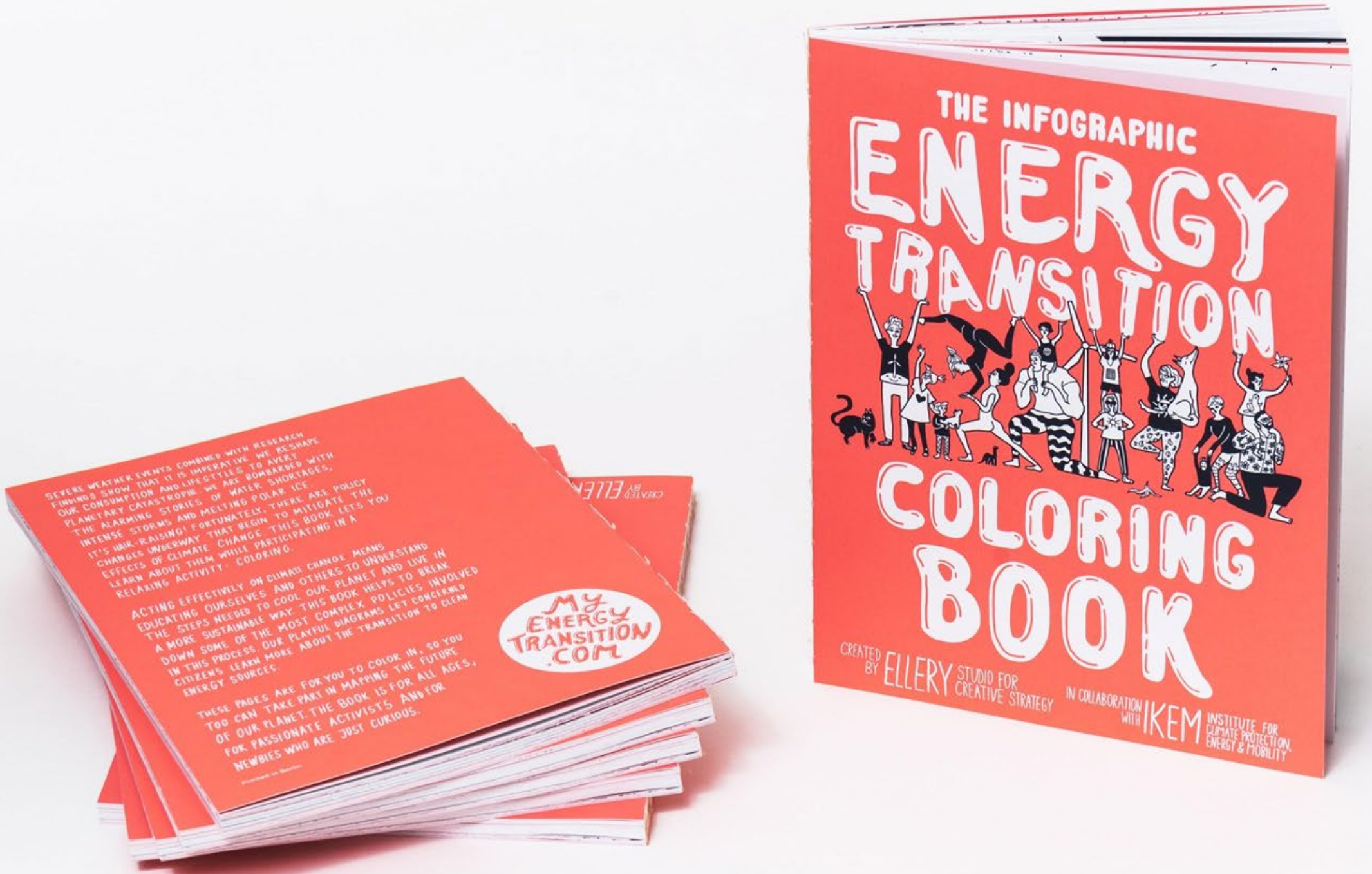
Hi, I’m Niels!

Courageous communication formats as innovation drivers


FYS
THE CORE: MISTRESS OF DEATH
HAT STYLES OF THE 1900s
DEPRESSING DATA


IT'S OUR FUTURE!
MAKE THE EARTH COOL AGAIN!
Die Dinos dachten auch, sie hätten für immer ZEIT.
3 TIPPS
Buy 2. Hand
EAT LESS MEAT


THE EGG


SEVERE WEATHER EVENTS COMBINED WITH RESEARCH FINDINGS SHOW THAT IT IS IMPERATIVE WE RESHAPE OUR CONSUMPTION AND LIFESTYLES TO AVERT PLANETARY CATASTROPHE. WE ARE BOMBARDED WITH THE ALARMING STORIES OF WATER SHORTAGES, INTENSE STORMS AND MELTING POLAR ICE. IT'S HAIR-RAISING! FORTUNATELY, THERE ARE POLICY CHANGES UNDERWAY THAT BEGIN TO MITIGATE THE EFFECTS OF CLIMATE CHANGE. THIS BOOK LETS YOU LEARN ABOUT THEM WHILE PARTICIPATING IN A RELAXING ACTIVITY: COLORING.
ACTING EFFECTIVELY ON CLIMATE CHANGE MEANS EDUCATING OURSELVES AND OTHERS TO UNDERSTAND THE STEPS NEEDED TO COOL OUR PLANET AND LIVE IN A MORE SUSTAINABLE WAY. THIS BOOK HELPS TO BREAK DOWN SOME OF THE MOST COMPLEX POLICIES INVOLVED IN THIS PROCESS. OUR PLAYFUL DIAGRAMS LET CONCERNED CITIZENS LEARN MORE ABOUT THE TRANSITION TO CLEAN ENERGY SOURCES.
THESE PAGES ARE FOR YOU TO COLOR IN, SO YOU TOO CAN TAKE PART IN MAPPING THE FUTURE OF OUR PLANET. THE BOOK IS FOR ALL AGES, FOR PASSIONATE ACTIVISTS AND FOR NEWBIES WHO ARE JUST CURIOUS.
MY ENERGY TRANSITION .COM
THE INFOGRAPHIC
ENERGY TRANSITION
COLORING BOOK
CREATED BY ELLERY STUDIO FOR CREATIVE STRATEGY
IN COLLABORATION WITH IKEM INSTITUTE FOR CLIMATE PROTECTION, ENERGY & MOBILITY

THE BIG PICTURE

Renewable Power Capacities in the World

While there's a lot of excitement around renewable energy, its share in the global energy supply is still very small. The new renewables (wind, solar, marine) contribute only about 6 % to the world's energy supply. The good news: China is developing renewables at an unprecedented speed. With over 169 gigawatts of wind installed today, China's wind capacity is more than triple that of trailblazer Germany!

How to color

Pick a color for each energy source and fill in the key below. Check the number of the energy source and color in the corresponding part of the lightning bolt. You'll see the renewable energy spread of each country!

1 - WIND POWER

2 - SOLAR POWER

3 - BIOMASS POWER

4 - OCEAN, CSP, GEOTHERMAL POWER

Figures as of 2016

USA TOTAL OUTPUT RENEWABLES 145 GW

GERMANY TOTAL OUTPUT RENEWABLES 98 GW

ITALY TOTAL OUTPUT RENEWABLES 33 GW

INDIA TOTAL OUTPUT RENEWABLES 46 GW

CHINA TOTAL OUTPUT RENEWABLES 258 GW

JAPAN TOTAL OUTPUT RENEWABLES 51 GW

UNITED STATES

GERMANY

ITALY

INDIA

CHINA

JAPAN

GLOBAL ENERGY PRODUCTION

NON RENEWABLES 75.5 %

RENEWABLES 24.5 %

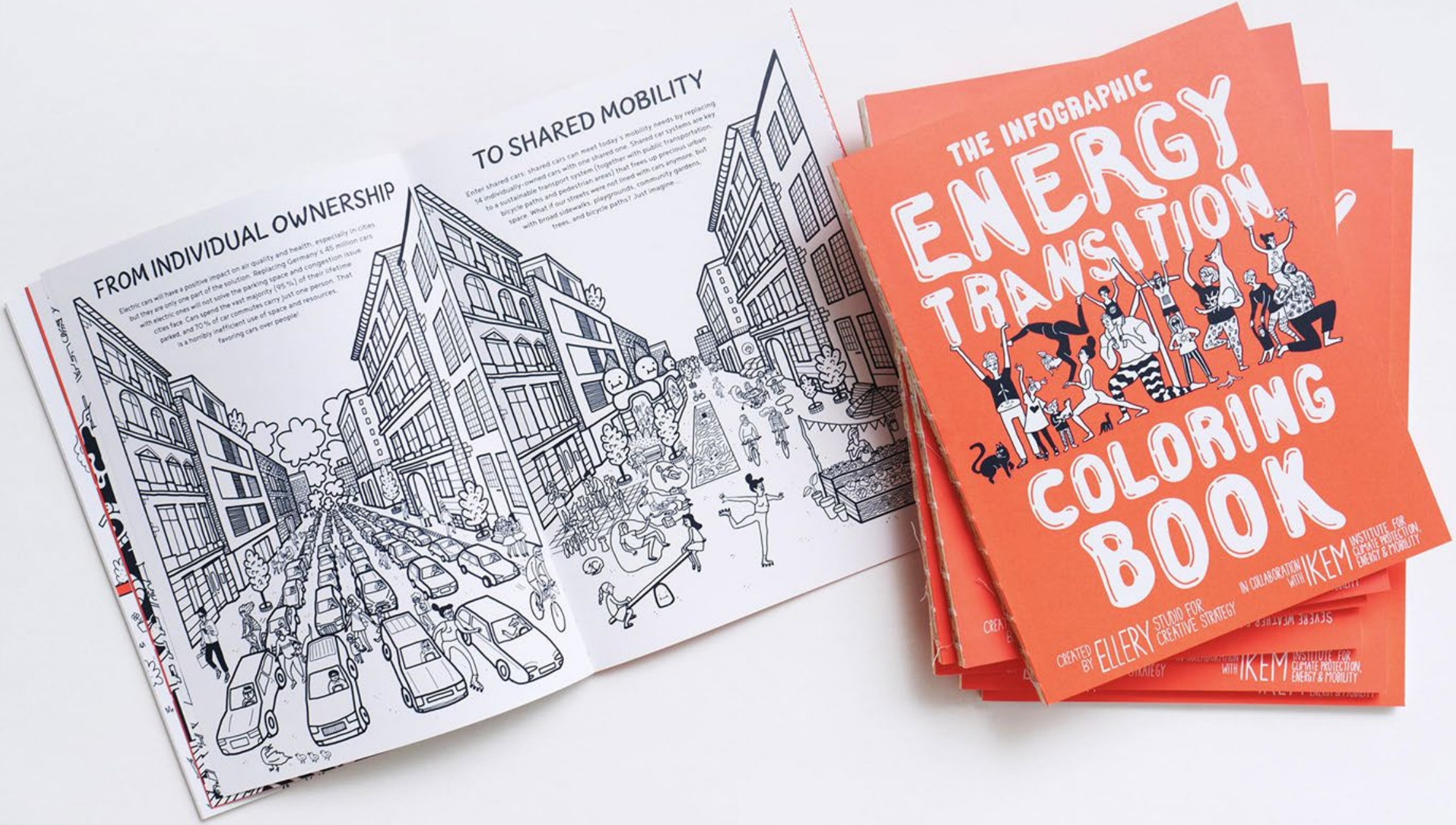
WIND 4 %

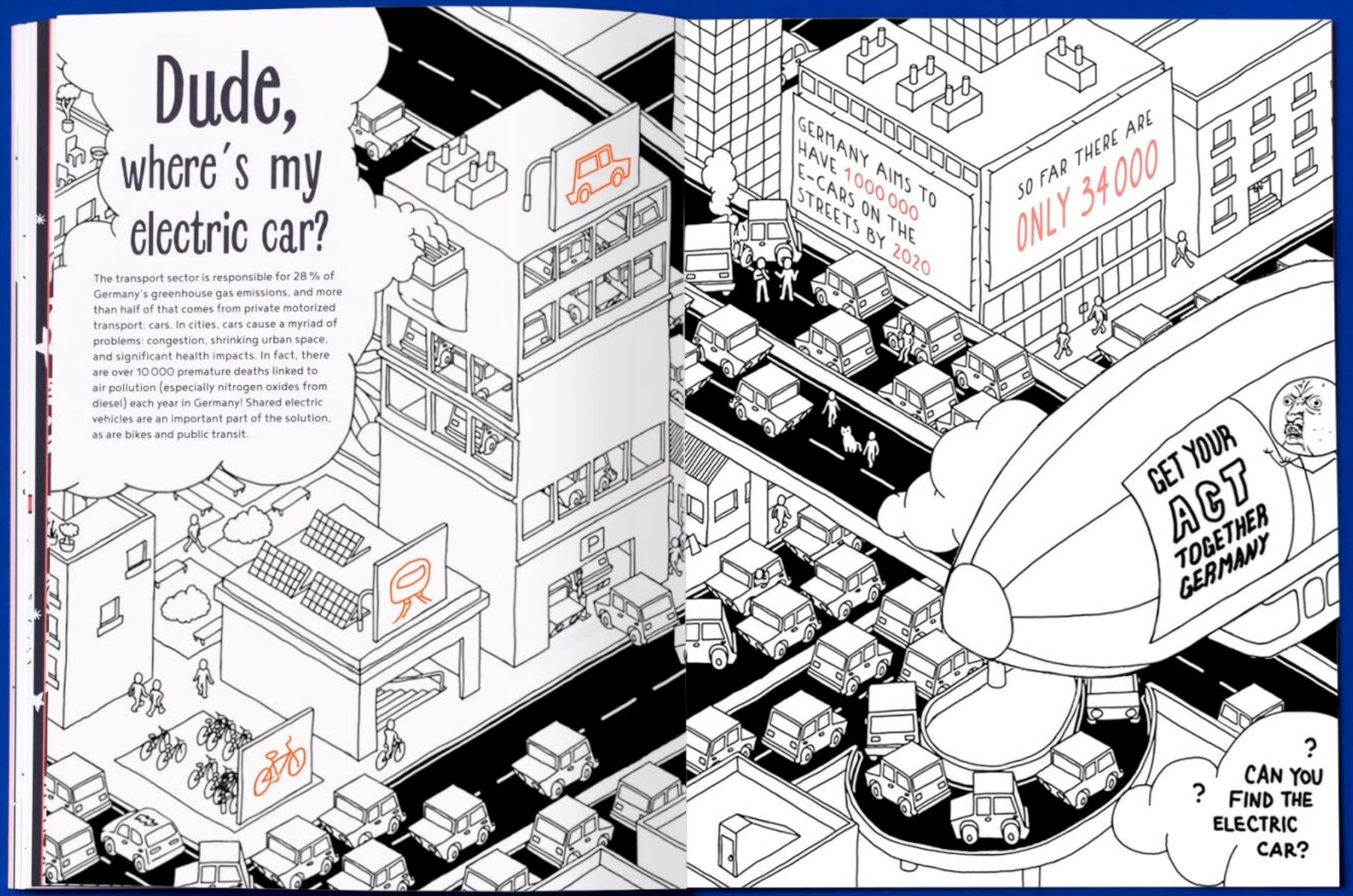
HYDRO POWER 16.6 %

BIOPOWER 2 %

SOLAR 1.5 %

OTHERS 0.4 %


FROM INDIVIDUAL OWNERSHIP
Electric cars will have a positive impact on air quality and health, especially in cities but they are only one part of the solution. Replacing Germany's 45 million cars with electric ones will not solve the parking space and congestion issue cities face. Cars spend the vast majority (95 %) of their lifetime parked, and 70 % of car commutes carry just one person. That is a horribly inefficient use of space and resources. favoring cars over people!
TO SHARED MOBILITY
Enter shared cars: shared cars can meet today's mobility needs by replacing 14 individually-owned cars with one shared one. Shared car systems are key to a sustainable transport system (together with public transportation, bicycle paths and pedestrian areas) that frees up precious urban space. What if our streets were not lined with cars anymore, but with broad sidewalks, playgrounds, community gardens, trees, and bicycle paths? Just imagine...
THE INFOGRAPHIC
ENERGY TRANSITION
COLORING BOOK
CREATED BY ELLERY STUDIO FOR CREATIVE STRATEGY
IN COLLABORATION WITH IKEM INSTITUTE FOR CLIMATE PROTECTION, ENERGY & MOBILITY


Dude,
where's my
electric car?
The transport sector is responsible for 28 % of Germany's greenhouse gas emissions, and more than half of that comes from private motorized transport: cars. In cities, cars cause a myriad of problems: congestion, shrinking urban space, and significant health impacts. In fact, there are over 10 000 premature deaths linked to air pollution (especially nitrogen oxides from diesel) each year in Germany! Shared electric vehicles are an important part of the solution, as are bikes and public transit.
GERMANY AIMS TO HAVE 1 000 000 E-CARS ON THE STREETS BY 2020
SO FAR THERE ARE ONLY 34 000
GET YOUR ACT TOGETHER GERMANY
? CAN YOU FIND THE ELECTRIC CAR? ?

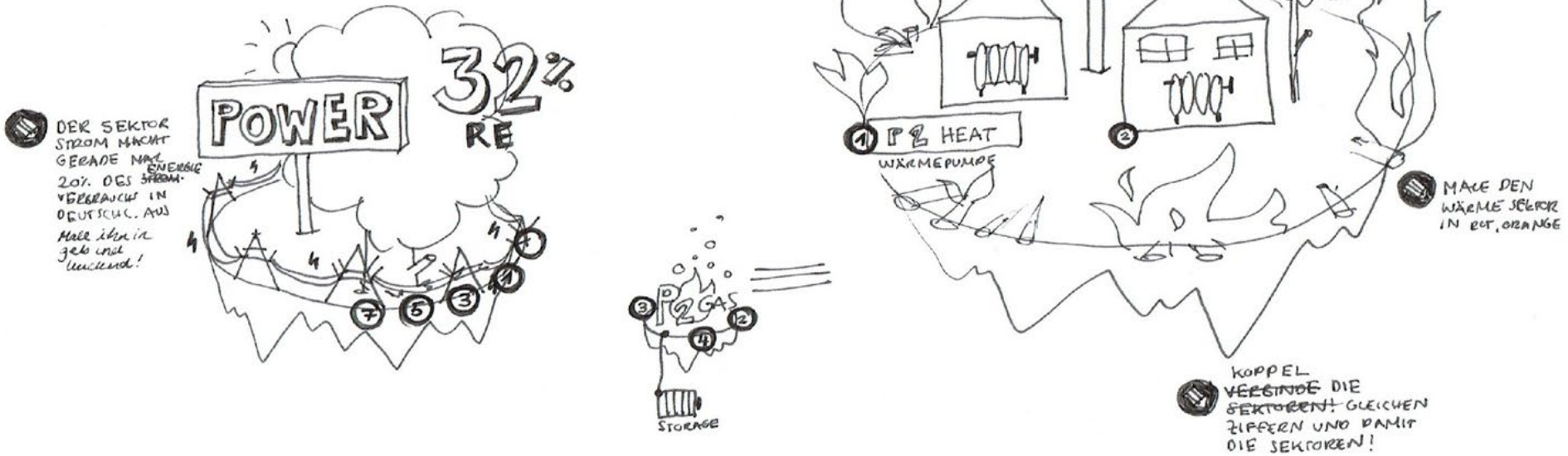
REPORTS

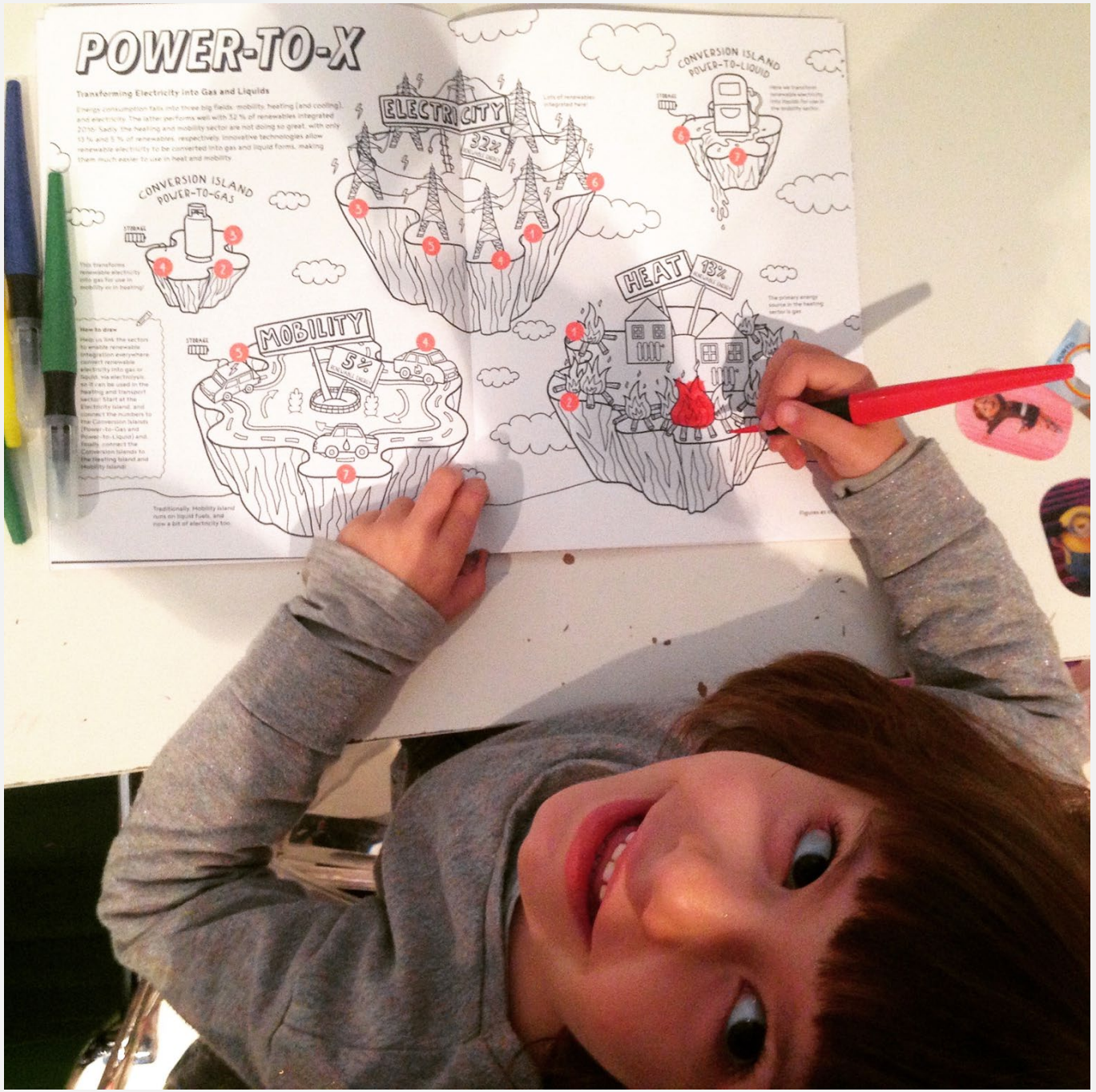
REBOUND EFFECT
POLITIK
buildings
ALTE ENERGIEN
E.ON
RWE
EnBW
Vattenfall
NO NAMES
NEUE ENERGIEN
ENERGY EFFICIENCY
Consumtion
HERAUSFORDERUNGEN
UPDATES (MAKE IT EASY)
fold-out off-the-charts diagram
PARIS ARRANGEMENT
FINANCE €
SUBSIDY
ACCEPTANCE
MALBUCH VS. WORKBOOK
CO_2 footprint
SOLARKOLLEKTOR
SOLARZELLE
DER BLACKOUT
GRIDS
Energy Colonialism
EU
RES from production to consumption vs OIL/HARDCOAL
EEG
STROMNETZ
SOCIETY
GRID
Job creation
Energy Highways
TIMELINES
NACHBARSHAFT
VERTEILUNG WINDEN
QUESTION QUIZZ RIDDLE
CONNECTING DOTS
ZENTANGLE
TRANSPORT
Transition strategies
X-MAS /HOLIDAY THEMED
Renewables distribution in the EU
SPEICHERUNG

POWER 2X

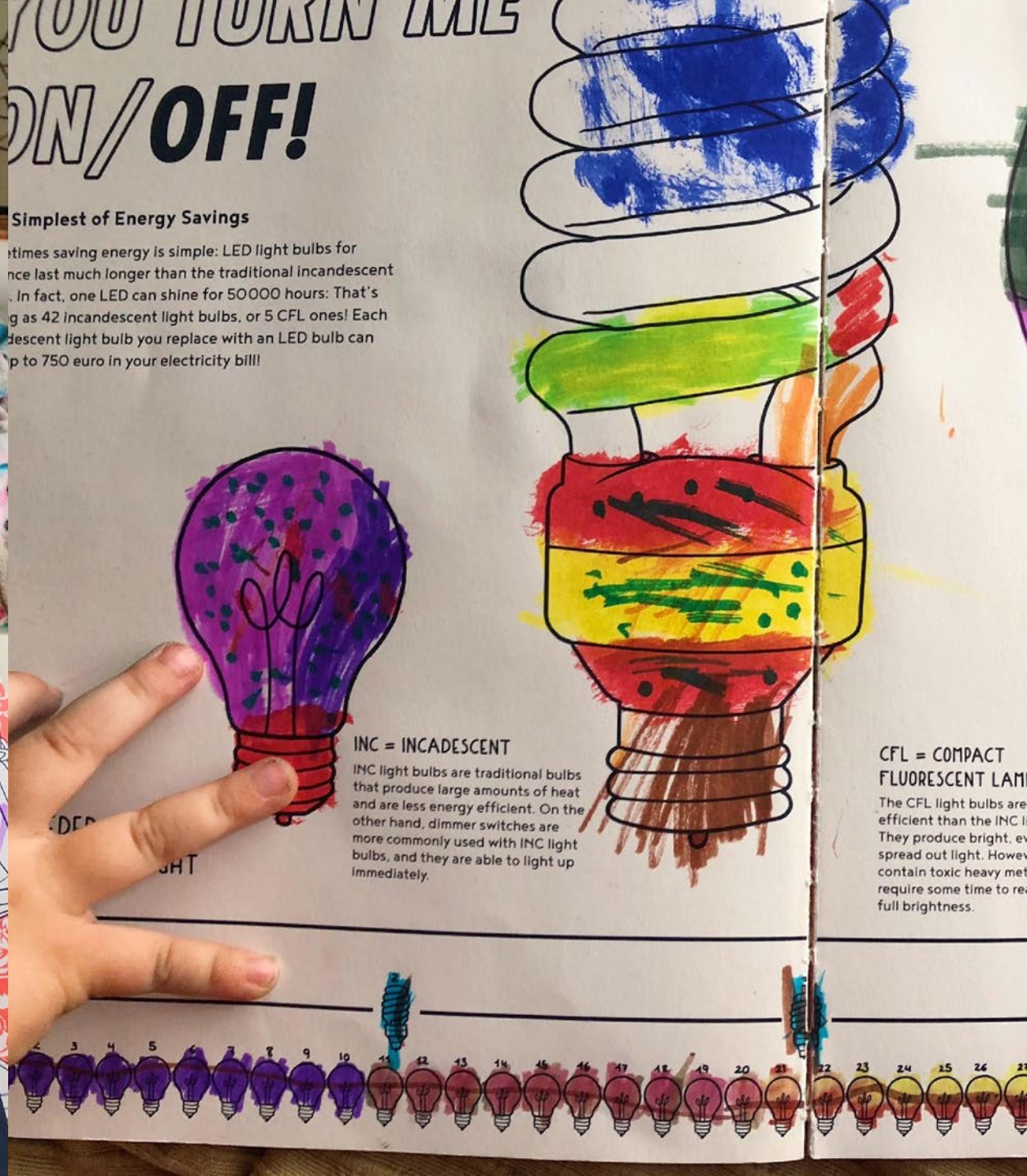
DER ENERGIEERHALTUNGSSATZ DER ENERGIEWENDE

OFT WIRD BEIM THEMA ENERGIEWENDE NUR DER STROMSEKTOR BETRACHTET. ER MACHT BEI WEITEM DEN GRÖSSTEN ANTEIL DER EE AUS, ALLERDINGS NUR ETWA 20% DES ENERGIEVERBRAUCHS. WIE KÖNNEN WIR ALSO DIE GRÜNE STROMENERGIE AUCH FÜR DIE ANDEREN SEKTOREN NUTZBAR MACHEN?




POWER-TO-X
Transforming Electricity into Gas and Liquids
CONVERSION ISLAND POWER-TO-LIQUID
CONVERSION ISLAND POWER-TO-GAS
ELECTRICITY
32%
HEAT
MOBILITY
5%


Meet the Renewables
Brown Coal
Gas
SOLAR POWER

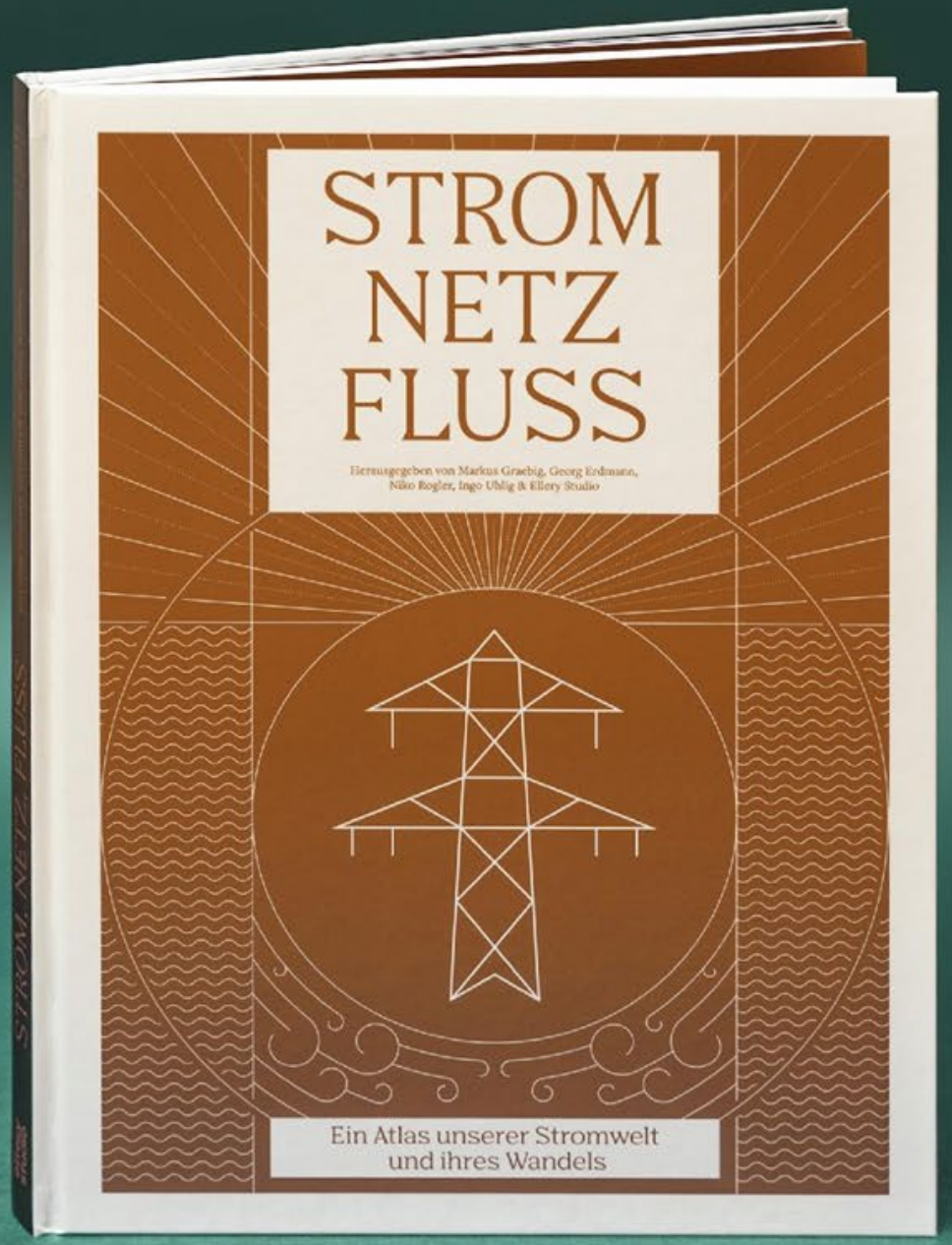

YOU TURN ME
ON/OFF!
Simplest of Energy Savings
INC = INCADESCENT
INC light bulbs are traditional bulbs that produce large amounts of heat and are less energy efficient. On the other hand, dimmer switches are more commonly used with INC light bulbs, and they are able to light up immediately.
CFL = COMPACT
FLUORESCENT LAM


THE INFOGRAPHIC
ENERGY

have you ever seen Angela smile ?


THE INFOGRAPHIC
ENERGY TRANSITION
COLORING BOOK


2030
2038
KWSB
KWSB


STROM
NETZ
FLUSS
Herausgegeben von Markus Graebig, Georg Erdmann,
Niko Rogler, Ingo Uhlig & Ellery Studio
Ein Atlas unserer Stromwelt
und ihres Wandels
STROM. NETZ. FLUSS.


Erste Hilfe
Agenda
PROSUMENT
UNB
UNB

Daten

Datenflüsse sind das Rückgrat der Elektrizitätsversorgung um Kraftwerkseinsätze und Kundenbedarf zu planen, Betriebszustände zu überwachen, Erzeugungsanlagen zu steuern, Verbrauchsmengen zu erfassen und Abrechnungen zu erstellen. Die ohnehin schon atemberaubende Vielfalt von energiewirtschaftlichen Daten wird mit digitalen Innovationen wie Smart Metering und Smart Home noch weiter zunehmen. Wir haben gar nicht erst den Versuch unternommen, alle Datenflüsse auf einem Blatt aufzuzeichnen. Im Layer „Daten" richten wir den Blick allein auf diejenigen abrechnungsrelevanten Daten, die erforderlich sind, damit eine Stromkundin oder ein Stromkunde eine korrekte Rechnung erhalten und schließlich den bezogenen Strom bezahlen kann. Und selbst dies ist natürlich nur eine vereinfachte Sicht auf die Datenflüsse in der Elektrizitätswirtschaft.

Erzeugung

Konventionelle Stromerzeuger
(mit denen Deutschland zurzeit ausstattet)

- Nuklear
- Kohle
- Gas
- Öl

(Zur Aufrechterhaltung von Versorgungssicherheit)

Fluktuierende erneuerbare Stromerzeuger

- Wind
- Photovoltaik

Steuerbare erneuerbare Stromerzeuger

- Biomasse
- Wasserkraftwerk (Laufwasser- und Speicherkraftwerk)

Vermarktung

Nicht-gefördert

Gefördert (KWKG)

Wird Strom und Wärme gleichzeitig erzeugt, wird dies mit einem besonderen Zuschlag belohnt.

Gefördert (EEG)

Strom aus erneuerbaren Energien wird finanziell besonders gefördert und genießt im Stromnetz einen Einspeisevorrang.

↓ **Erzeuger** werden vom (Groß-)Händler für Stromlieferung vergütet

↑ **ÜNB** zahlen EEG-Vergütung an **Erzeuger** und für den Fall von Engpassmaßnahmen (Abschaltung bzw. Einsenkung von Erneuerbaren-Anlagen aufgrund von Netzengpässen) kostenbasierte Entgelte.

→ Der **ÜNB** liefert die Ausgleichsenergie, um die Bilanzkreise glatt zu ziehen. Je nach Ergebnis erhält der **BKV** Geld oder muss Geld zurückzahlen.

Strombörse
Stromgroßhandelsplattform

(Groß-)Händler
(das können auch Aggregatoren, virtuelle Kraftwerke, Direktvermarkter sein)

ÜNB

↑ **Lieferant** führt EEG-Umlage an **ÜNB** ab.

↓ **ÜNB** leisten Zahlungsausgleich für KWK/EEG-Vergütungen an **VNB** zurück.

ÜNB: Netznutzungsabrechnung für das Übertragungsnetz.

↑ Alle Werte werden vom **Messstellenbetreiber** an **ÜNB, VNB** und **Lieferanten** übertragen.

↑ **ÜNB** zahlen Messstellenbetreiber

Staat

→ Der **Lieferant** gibt Stromsteuer + Mehrwertsteuer an den **Staat** ab.

← Erlöse aus der **EEG-Vermarktung.**

← Der **Lieferant** leitet Daten zu EEG-Umlage + Netzentgelten an **ÜNB** weiter.

→ **Lieferant** zahlt Netznutzungsentgelte, KWK- und sonstige Umlagen an **Netzbetreiber.**

Erzeugung & Verbrauch

(Ein- und Ausspeisung)

Speicher
z. B. Batterien, Schwungmasse, Pumpspeicherwerk

Prosumer
Produzent und Konsument

Vermarktung
Individuelle Förderinstrumente

Lieferant

↑ **Lieferant** zahlt für den Strombezug.

↓ Der **Verbraucher** zahlt Netznutzungsentgelt, Messstellenbetreiberentgelt, EEG-, KWKG- und sonstige Umlagen an den **Lieferanten.**

↑ Der **Lieferant** stellt die Rechnung an die **Verbraucher**, in dieser sind Stromsteuer, Mehrwertsteuer, Abgaben und Umlagen enthalten.

← Der **Messstellenbetreiber** stellt Netznutzungsabrechnung an den **Lieferanten.**

↑ Der **Lieferant** leistet Messentgelte an den **Messstellenbetreiber.**

← Zwischen **VNB** und **Lieferanten** wird eine Datenvalidierung in beide Richtungen ausgeführt.

VNB

VNB: Gesamt-Netznutzungsabrechnung inklusive Verteilungsnetz.

Messung

15-Min.-Reihe: täglich, kWh/Vortag/Last- u./o. Zählerstandgänge

Verbrau

Kunde Indu

Kunde Gewerbe
>10.000 kWh/a

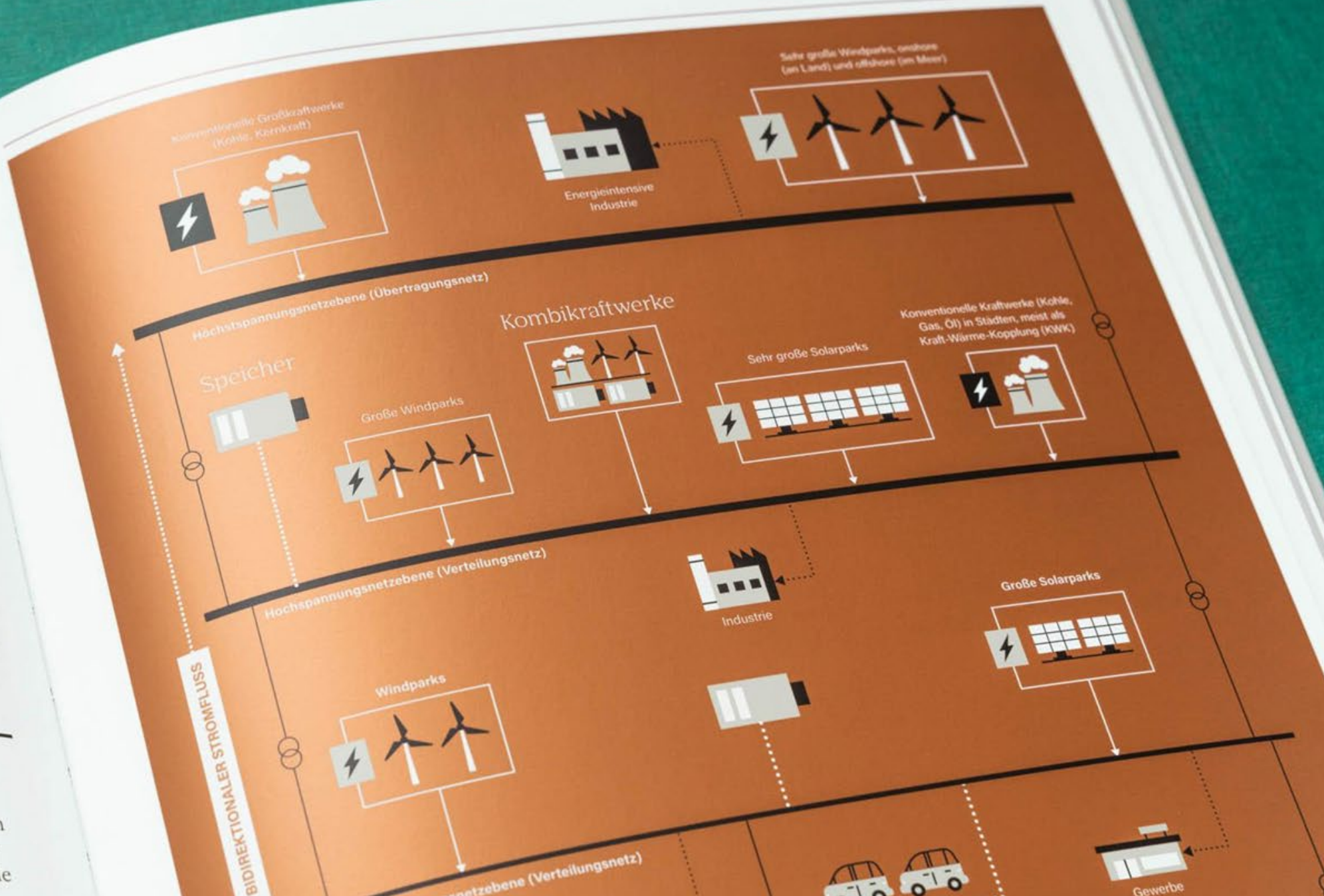
Die Einspeiser ab 7 kW bekommen ein intelligentes Messsystem.

würde sich in seiner vollen Länge über rund

40 Seiten

ses Buches (bei einer Seitenbreite von 24 Zentimetern) ziehen.

auch die Flexibilisierung der Strom-
erden steuerbare Verbraucher genau
enn beispielsweise viel Wind im System
untergefahren, wenn dies nicht der
die eine wichtige Rolle



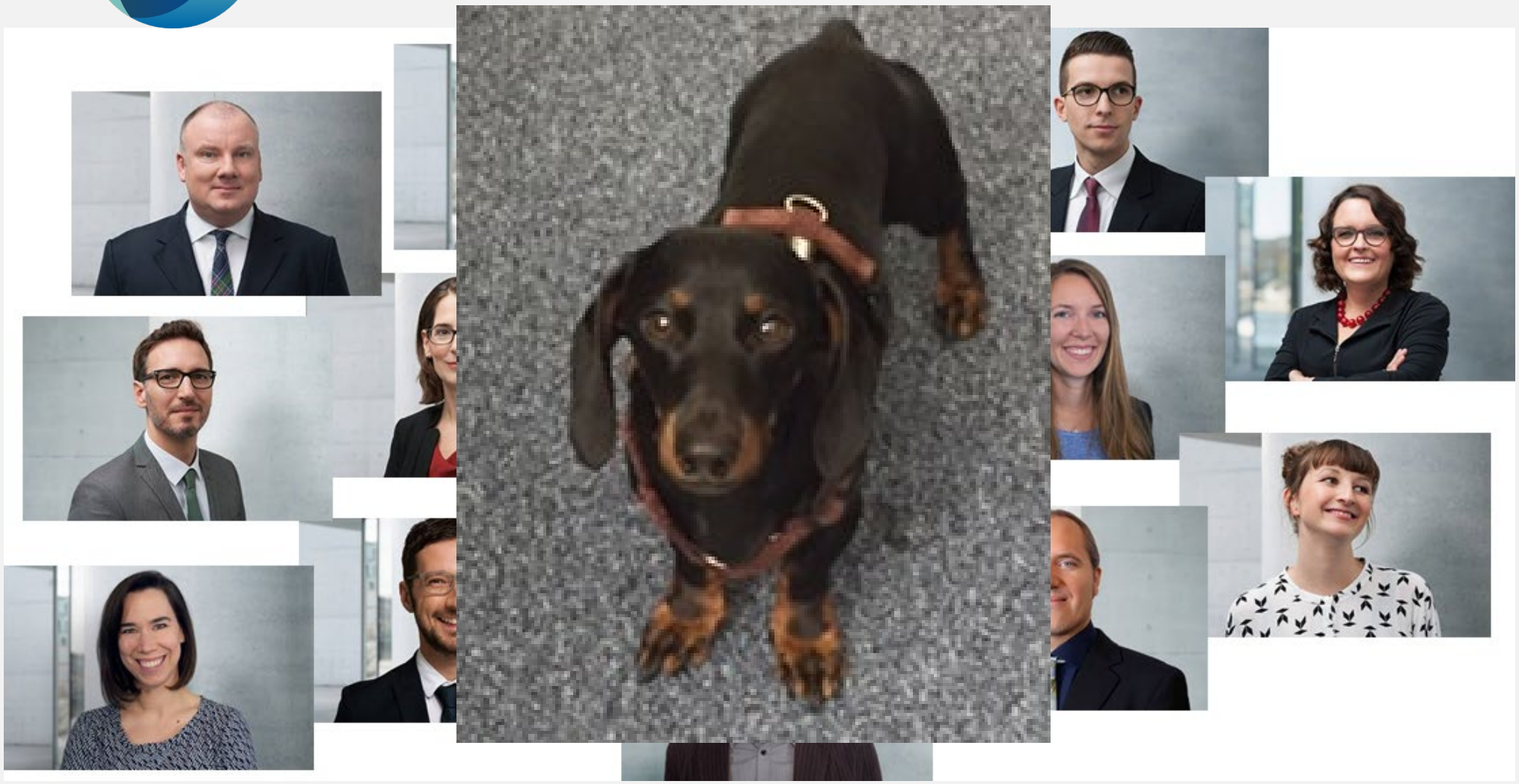

“We have to reconcile the emotions with the facts”
50 Annual Meeting 2020
WORLD ECONOMIC FORUM

Agora Verkehrswende

Mit der Verkehrswende die Mobilität von morgen sichern

12 Thesen zur Verkehrswende

Agora
Verkehrswende




EIN TRAUM
WIRD WAHR!

WHAT IS AN INFOGRAPHIC NOVEL?

In the postwar era, everyone loved the idea of car-centric cities.

The decisions of urban planners in the 1950s and 60s are why cars continue to dominate cities today.

THE CAR AS ROOMMATE

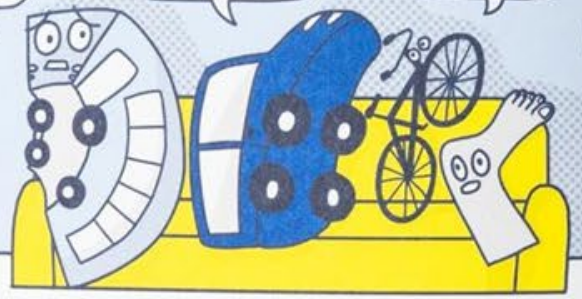
IMAGINE URBAN TRANSPORT IS A SHARED FLAT. WOULD YOU LIVE WITH SOMEONE WHO TAKES UP AS MUCH SPACE AS CARS DO IN CITIES?

12% OF JOURNEYS ARE TRAVELLED WITH PUBLIC TRANSPORT

50% WITH A CAR

14% WITH A BICYCLE

AND BY FOOT **24%**



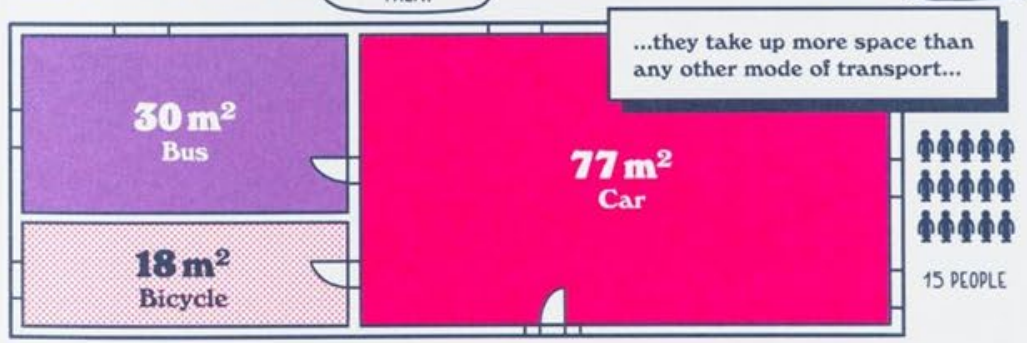
Modal share* of journeys made in Germany with over 100,000 inhabitants

*TERMS ARE DEFINED ON PAGE 76

Many cities are reaching the breaking point...

...because cars foul the air and ruin the climate...

...they take up more space than any other mode of transport...

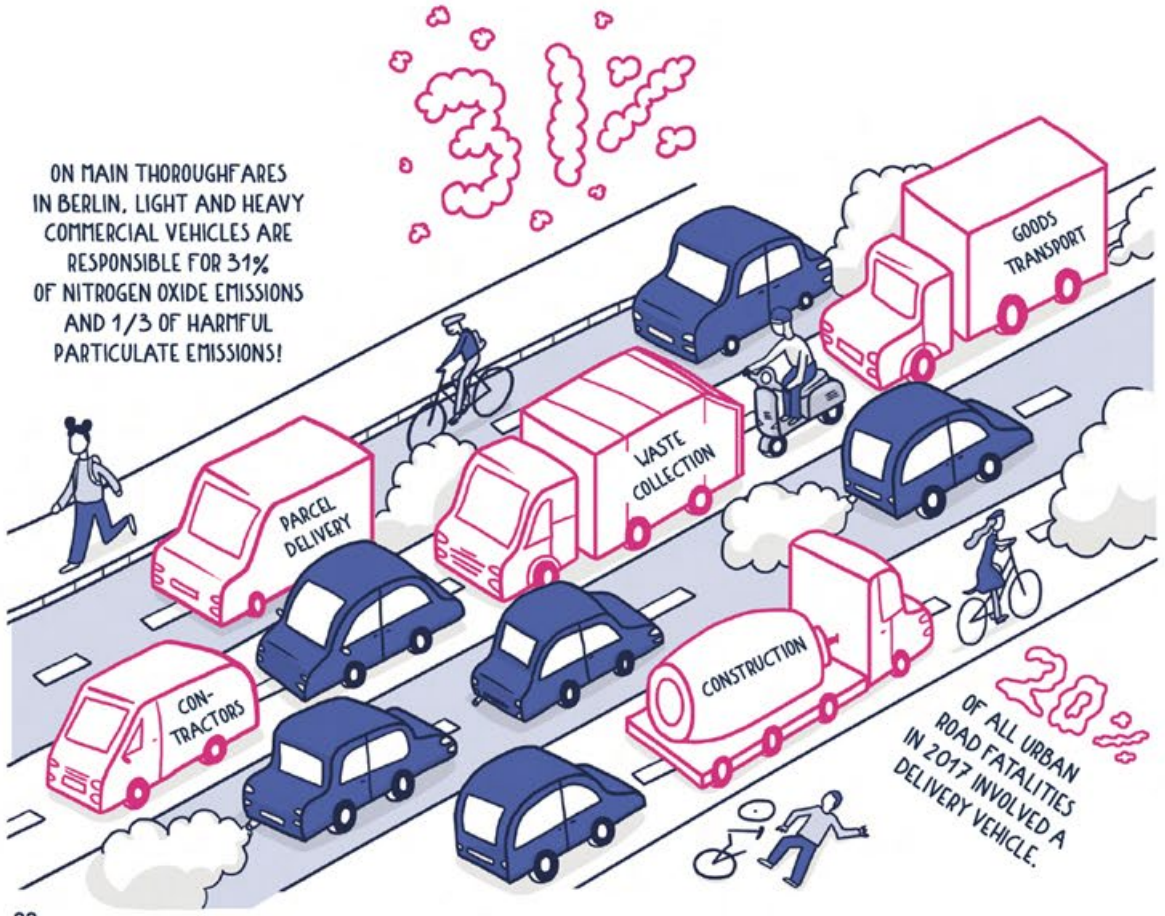


Street space required for the transportation of 15 people using various means of transport (based on the shared apartment analogy).

GOODS TRANSPORT IN CITIES

ANOTHER IMPORTANT BUILDING BLOCK OF SUSTAINABLE MOBILITY

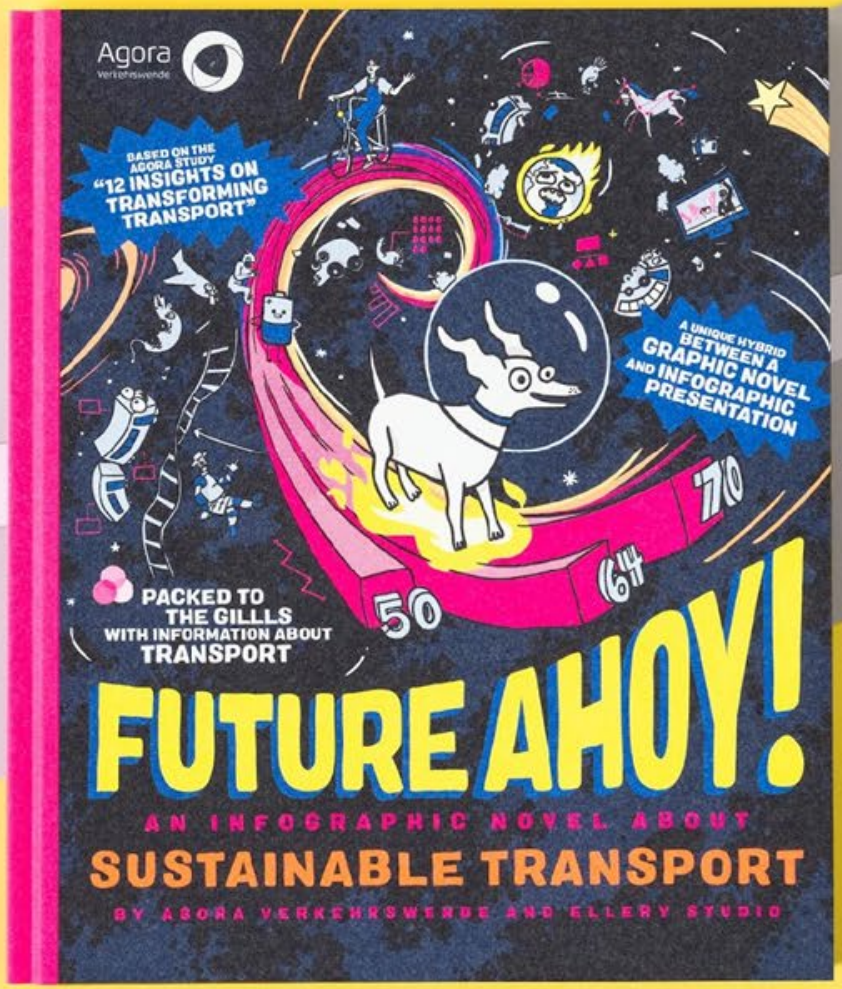
**Our roads are becoming ever more congested with people and goods.
The delivery of goods is essential for daily life, supplying us with food and other necessary items.
However, delivery vehicles compete with cars, buses, and cyclists for scare road space.
Cities will face numerous challenges in this sector in the coming decades.**



Despite the problems, we rely on deliveries more than ever before, as the following figures show:

Number of daily deliveries (trips) and shipments (dispatched goods) per business (in Wuppertal, Germany)

Households are also ordering more online than ever before.


Agora
Verkehrswende
BASED ON THE AGORA STUDY "12 INSIGHTS ON TRANSFORMING TRANSPORT"
A UNIQUE HYBRID BETWEEN A GRAPHIC NOVEL AND INFOGRAPHIC PRESENTATION
PACKED TO THE GILLS WITH INFORMATION ABOUT TRANSPORT
50
64
770
FUTURE AHOY!
AN INFOGRAPHIC NOVEL ABOUT
SUSTAINABLE TRANSPORT
BY AGORA VERKEHRSWENDE AND ELLERY STUDIO

Your contact person:

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What caught your interest in the presentations so far?

Go to menti.com and use the code 1991 6682

or scan the QR code on the right ->

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LIVE RESULTS

https://www.mentimeter.com/app/presentation/53ef3dad66fb550a14d468e3527e81ec/f77f9a18a610

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Break

5’

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The City of Valencia

Fermin Cerezo - Head of Innovation Department

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València

#OnAMissionTogether

VALÈNCIA 2030+ Estratègia Urbana

Missions València 2030

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System of València

Context, current emissions & trends

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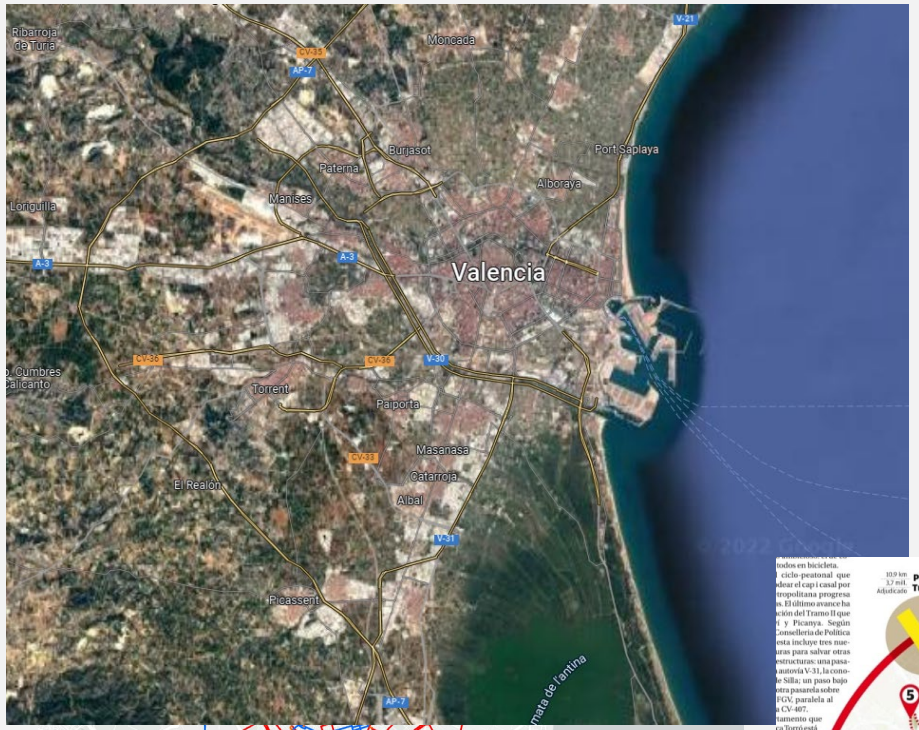
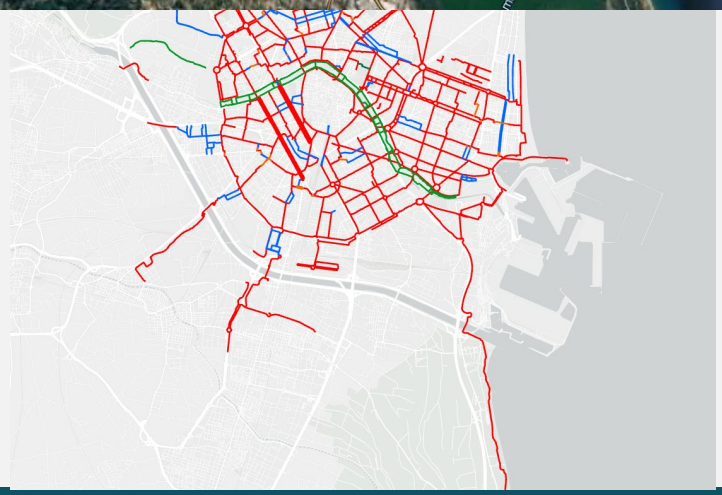
València Context

- 3rd most populated city in Spain
- 800.180 inhabitants (2021)
- 1.5 M inhabitans (metropolitan)
- Mediterranean sea
- Surrounded by two natural reserves of biodiversity and an orchand belt that feeds the city
- 4th busiest port in Europe
- Services, turism, agri-food industry & innovation ecosystem
- Mediterranean cycling capital





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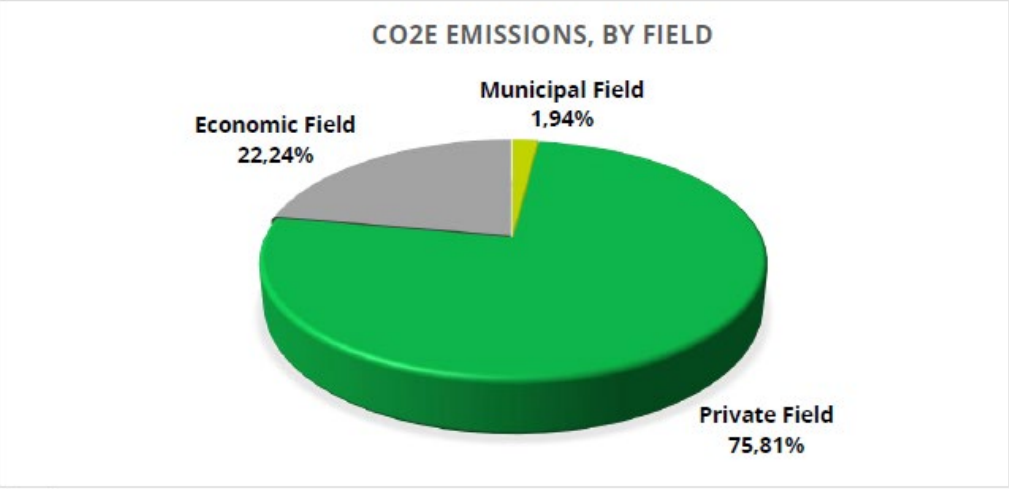
Current GHG Inventory

- Private Sector (76% CO2 emissions)
- Mobility (metropolitan) and homes energy consumption

Annex 1: Evolution of emissions in Valencia 2007 - 2020 in tonnes of CO2 e

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
	Emissions (t CO2)	Emissions (t CO2)	Emissions (t CO2)	Emissions (t CO2)	Emissions (t CO2)	Emissions (t CO2)	Emissions (t CO2)	Emissions (t CO2)	Emissions (t CO2)	Emissions (t CO2)	Emissions (t CO2)	Emissions (t CO2)	Emissions (t CO2)	Emissions (t CO2)
Areas that depend on the City Council	**91.717,07**	**83.293,77**	**76.964,43**	**65.700,74**	**81.244,68**	**67.254,45**	**73.997,61**	**73.695,57**	**79.545,21**	**76.054,90**	**81.013,86**	**76.700,01**	**67.582,47**	**43.549,73**
Municipal buildings, equipment and facilities	28.402,30	24.873,71	20.402,70	20.341,85	25.509,31	18.249,41	20.930,55	20.373,46	23.663,64	20.705,65	23.025,66	22.228,90	16.835,56	7.995,03
Public lighting	25.727,51	22.318,06	17.979,74	15.190,20	22.595,94	16.212,48	15.053,65	14.176,73	15.732,69	14.174,25	14.680,26	11.634,24	8.570,77	4.081,98
Public and municipal transport	37.587,25	36.101,99	38.581,99	30.168,69	33.139,43	32.792,56	38.013,41	39.145,39	40.148,88	41.175,00	43.307,93	42.836,87	42.176,13	31.472,72
Areas that do not depend on the City Council	**2.600.963,39**	**2.412.815,37**	**2.168.637,03**	**2.054.059,01**	**2.225.975,11**	**1.877.762,68**	**1.752.691,60**	**1.722.508,07**	**1.897.336,59**	**1.835.606,18**	**1.965.064,01**	**1.929.299,62**	**1.767.351,65**	**2.191.496,63**
Residential sector		425.295	394.477	365.539	431.047	358.184	320.028	284.414	338.993	293.225	350.840	346.796	275.305	308.343

Looking at the CO2 e emissions data by area, the private sphere emits more than three out of every four tonnes of GHG in the municipality of Valencia. This is due to the high consumption of private transport by the citizens of Valencia and the energy consumption of homes. The economic sector emits 22.24% of the total, while services provided by the City Council emit 1.94% of the municipality's total.



GLOBAL 2007-2020 EVOLUTION (CONT.)

	2007 Emissions (t CO_2)	2020 Emissions (t CO_2)	Change in emissions 2020 compared to 2019
Areas that depend on the City Council	**91.717,07**	**43.549,73**	**-52,52%**
Municipal buildings, equipment and facilities	28.402,30	7.995,03	-71,85%
Public lighting	25.727,51	4.081,98	-84,13%
Public and municipal transport	37.587,25	31.472,72	-16,27%
Areas that do not depend on the City Council	**2.600.963,39**	**2.191.496,63**	**-16,27%**
Residential sector	469.402,16	308.343,35	-34,31%
Services sector	486.125,01	157.018,04	-67,7%
Industry sector	132.812,33	42.293,99	-68,16%
Private and commercial transport	1.397.513,07	1.592.332,69	+13,94%
Urban rail transport	0,00	4.537,75	N/A
Waste (t) (non-energy)	115.110,83	82.162,80	-28,62%
Primary sector	N/A	4.808,01	N/A
Total in the city	**2.692.680,45**	**2.235.046,36**	**-17%**

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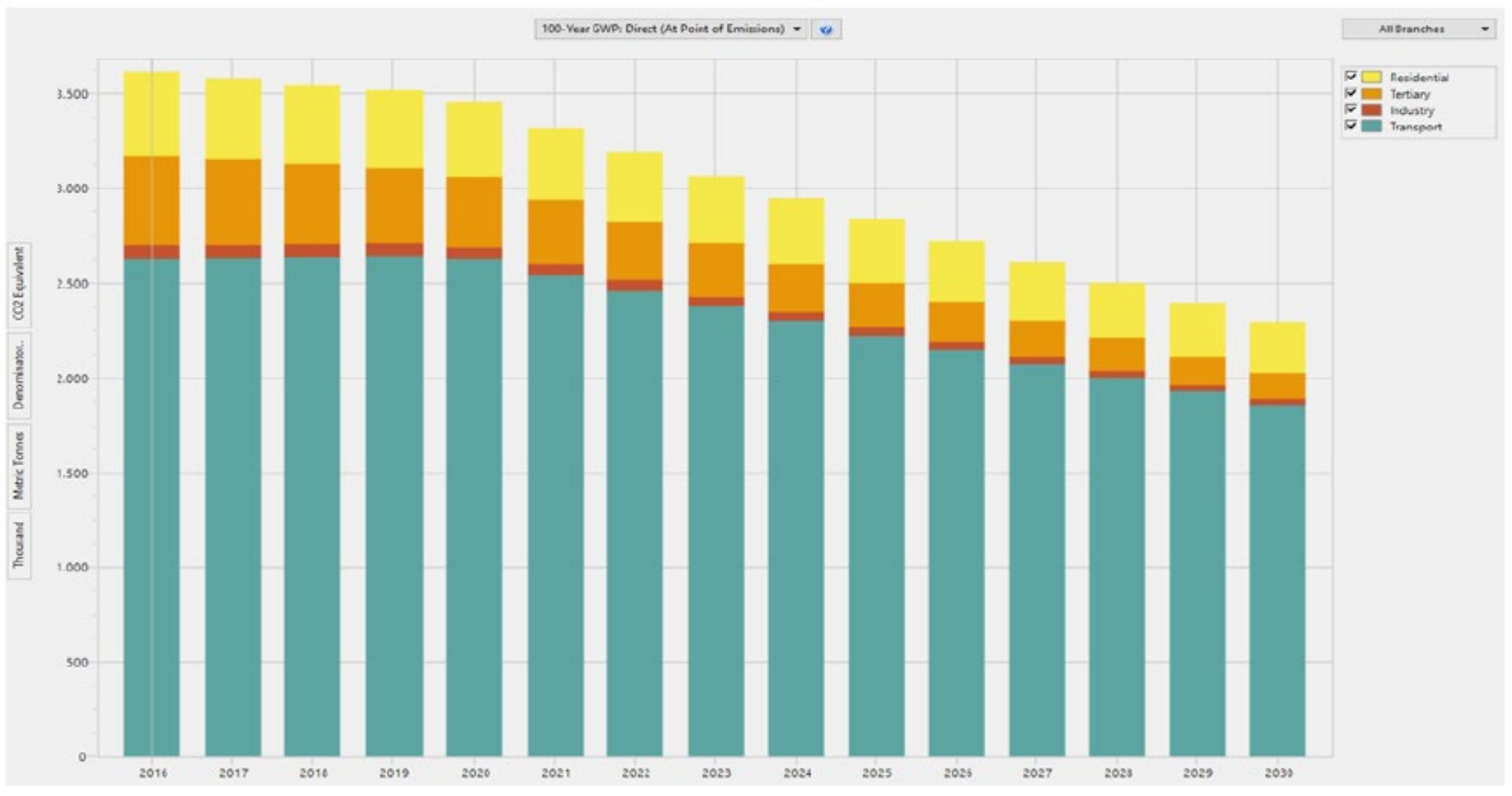
Trends in a business as usual scenario



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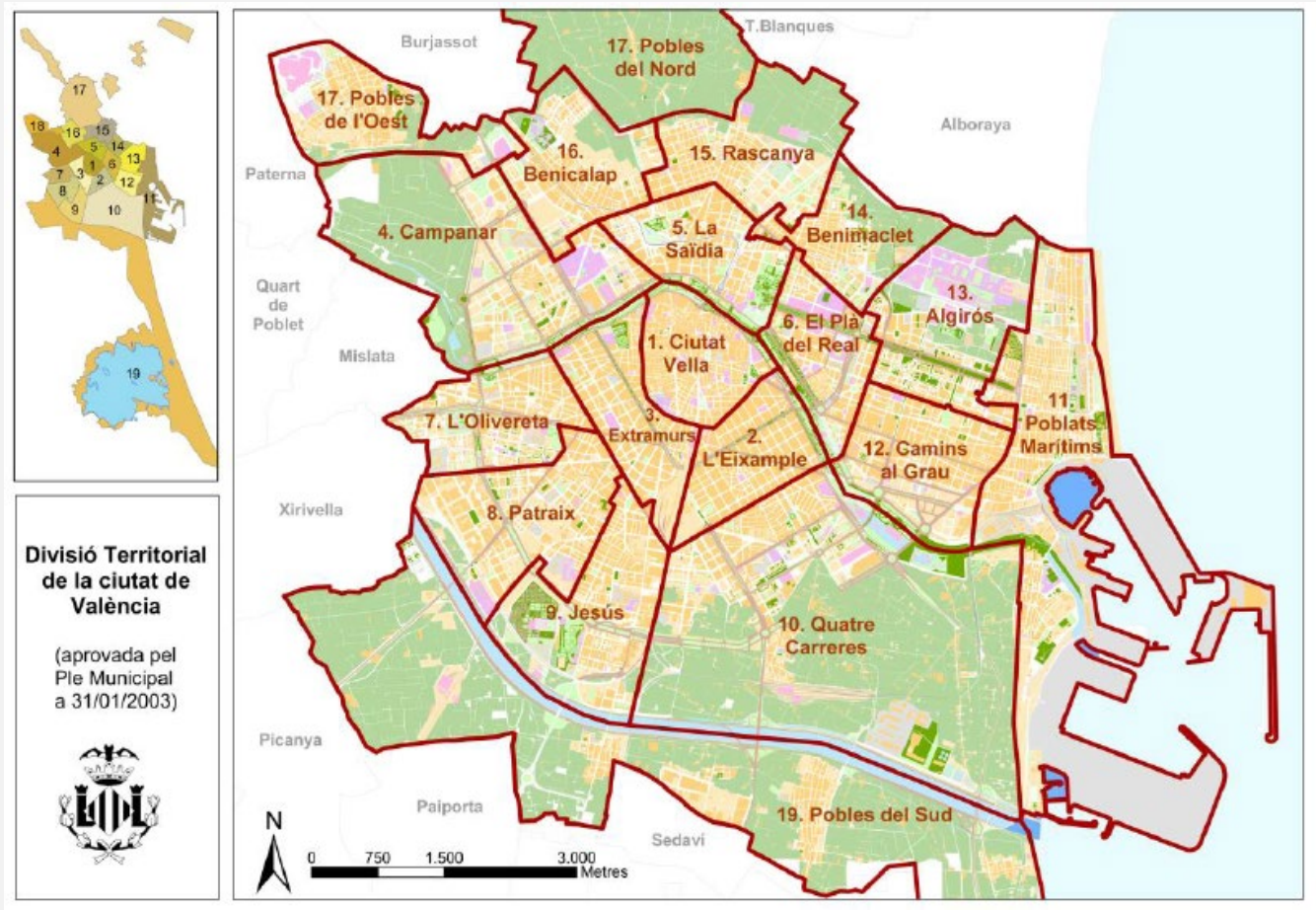
Understanding districts & neighbourhoods (2021)

CARBON NEUTRAL DISTRICTS

VALÈNCIA 2030

Mission: 100 Climate-neutral Cities by 2030 – by and for the citizens.

Analysis of the potential areas for the deployment of Carbon Neutral Districts



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Think globally and act locally

- Some districts are easier than others

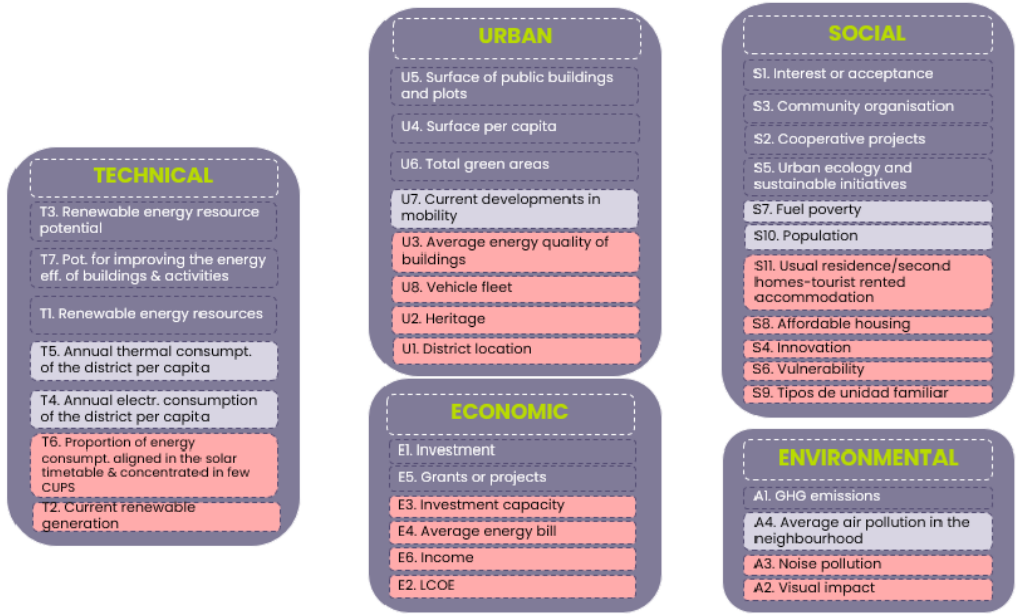

Figure 6. Criteria selection.

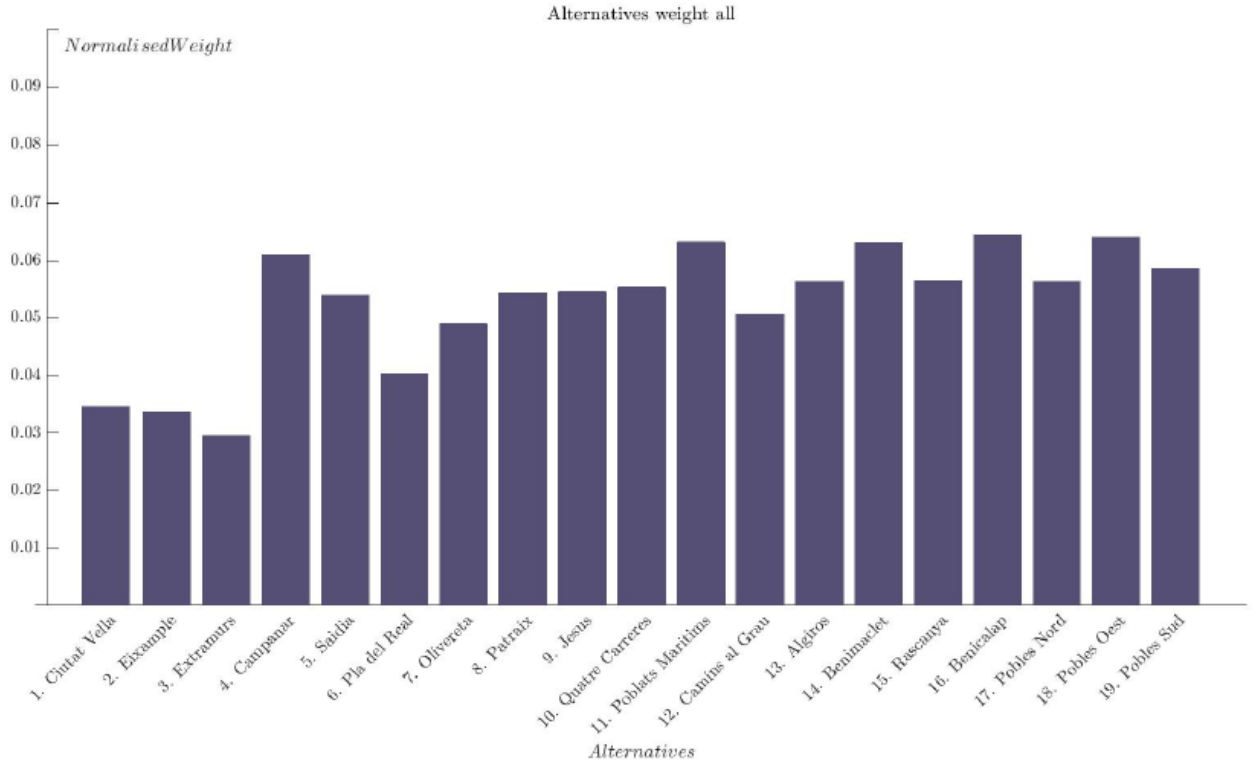

Figure 8. Weight of the alternatives with DEMATEL for the set of experts.

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Barries & Oportunities

- Breaking silos internally
- Breaking silos externally
- Going beyond political cycles
- Metropolitan mindset
- Attract private investment
- Access to data needed to pilot the transition
- Redirect resources & tools to the mission

- Urban Strategy (2030 Agenda)
- Valencia’s innovation ecosystem
- Communication of the benefits & value behind the mission
- Mission Valencia 2030 started en 2020 and climate mission in 2021.
- Wide social & political consensus
- Binomial City-University oriented to the mission

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Understanding the system

Strategy & instruments to accelerate the transition

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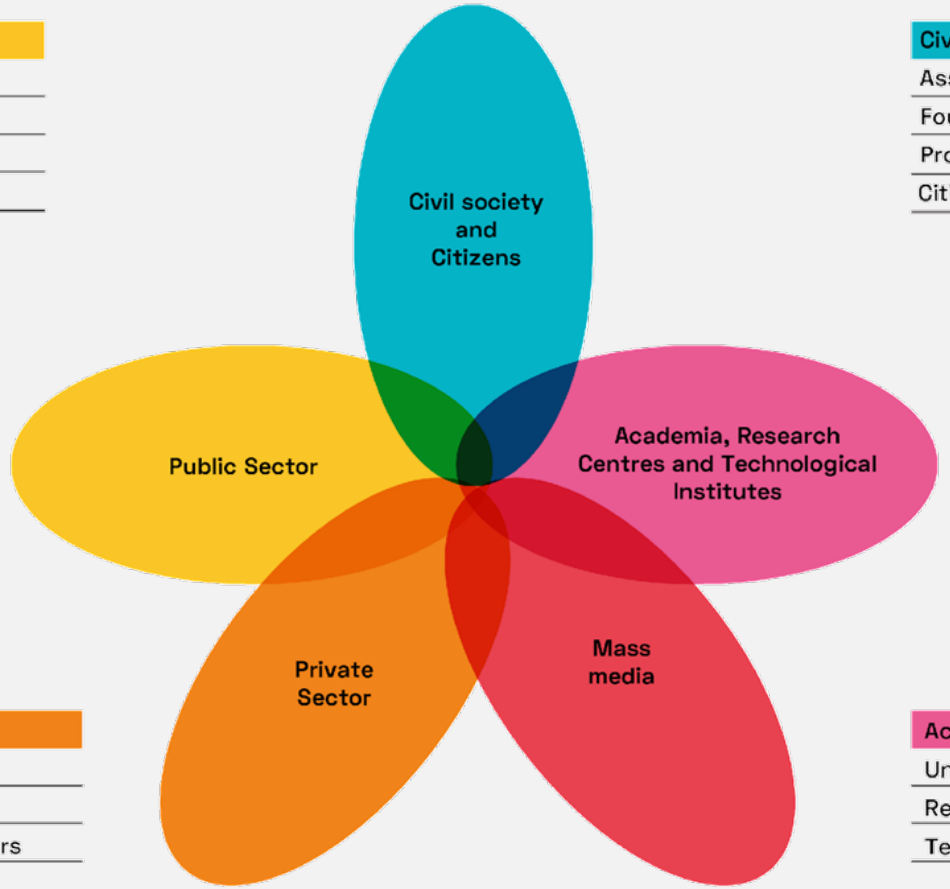
5 helix model approach



Public Sector
- Local Government
- Regional Government
- Spanish Government
- European Union

Civil Society
- Associations
- Foundations
- Professional Associations
- Citizenship

Private Sector
- Companies
- SMEs and Freelancers
- Accelerators and Incubators
- StartUp Ecosystem

Academia
- Universities
- Research Centres
- Technological Institutes

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Distributed leaderships from Mission Ambassadors (2020)

Mission is a collective journey rather than an individual destination

150 ambassadors organizations representing more than 4.000 enterprises and 8.000 professionals from València's ecosystem

Valencia 2030 Climate Mission Constellation

Cities - Missions Areas

- Healthy City
- Sustainable City
- Shared City
- Prosperous & Entrepreneur City
- Creative City
- Mediterranean City

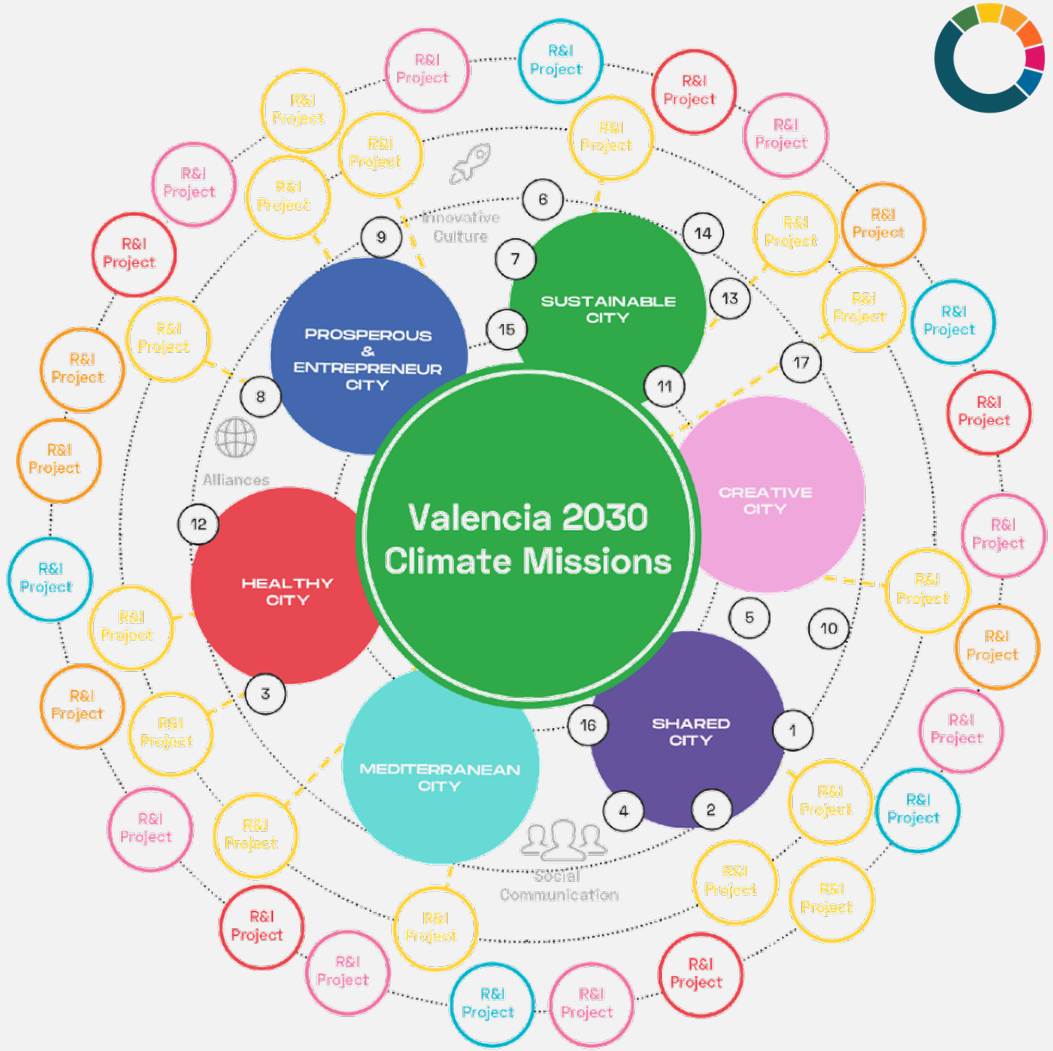
Five Helixes - R&I Projects

- Academy, Research Centre & Tech Institutes
- Civil Society & Citizenship
- Private Sector & Corporations
- Multilevel Public Sector
- Mass Media

Sustainable Development Goals (United Nations)

1 No poverty
2 Zero hunger
3 Good health & well-being
4 Quality education
5 Gender equality
6 Clean water & sanitation
7 Affordable & clean energy
8 Decent work & economic growth
9 Industry, innovation & infraestructure
10 Reduced inequalities
11 Sustainable cities & communities
12 Responsible consumption & production
13 Climate action
14 Life below water
15 Life on land
16 Peace, justice & strong institutions
17 Partnerships for the goals

AJUNTAMENT DE VALÈNCIA
Missions València 2030



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Systemic approach will be needed

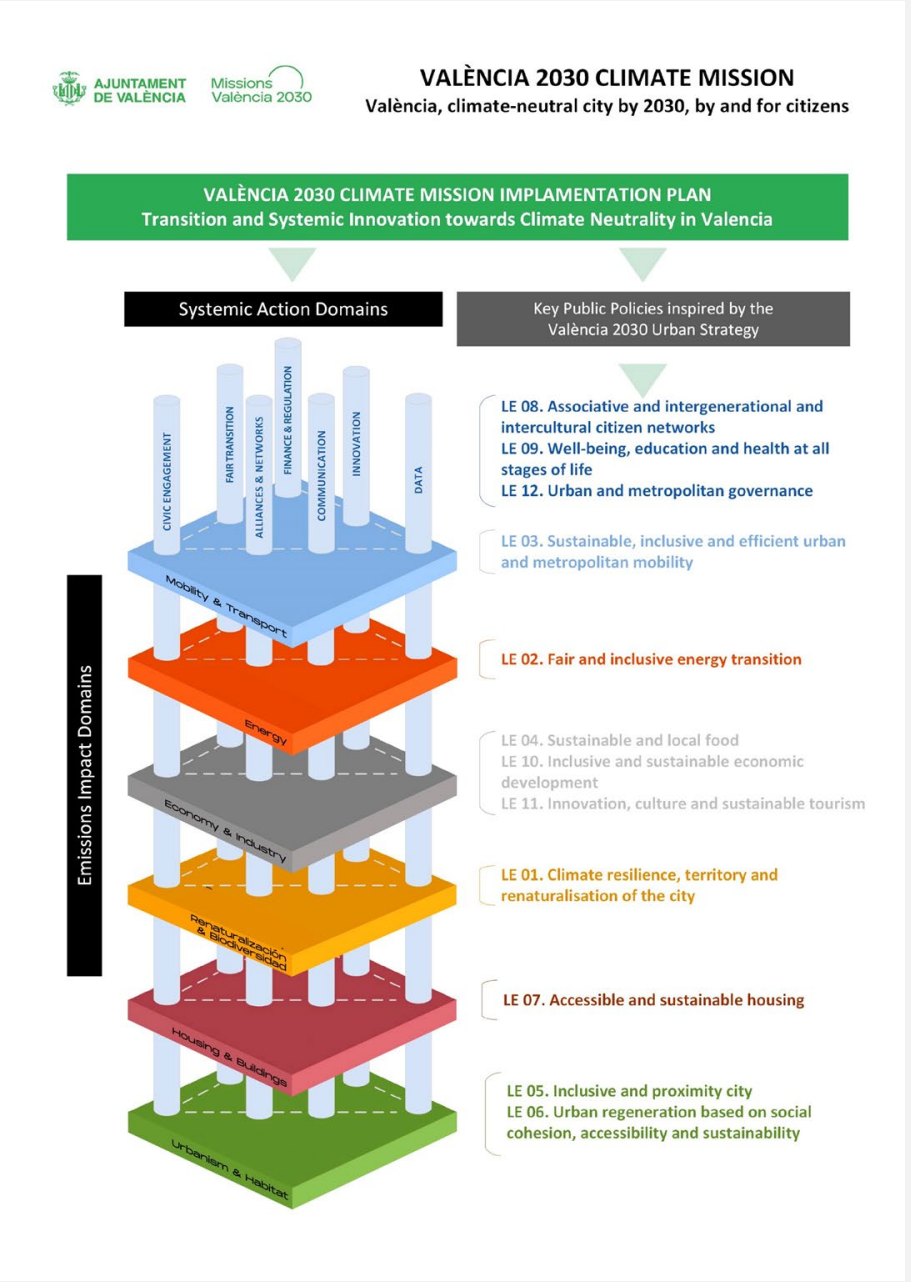
Bold public policies inspired by 2030 agenda

+

Mission-oriented R&I

are

both sides of the same coin.



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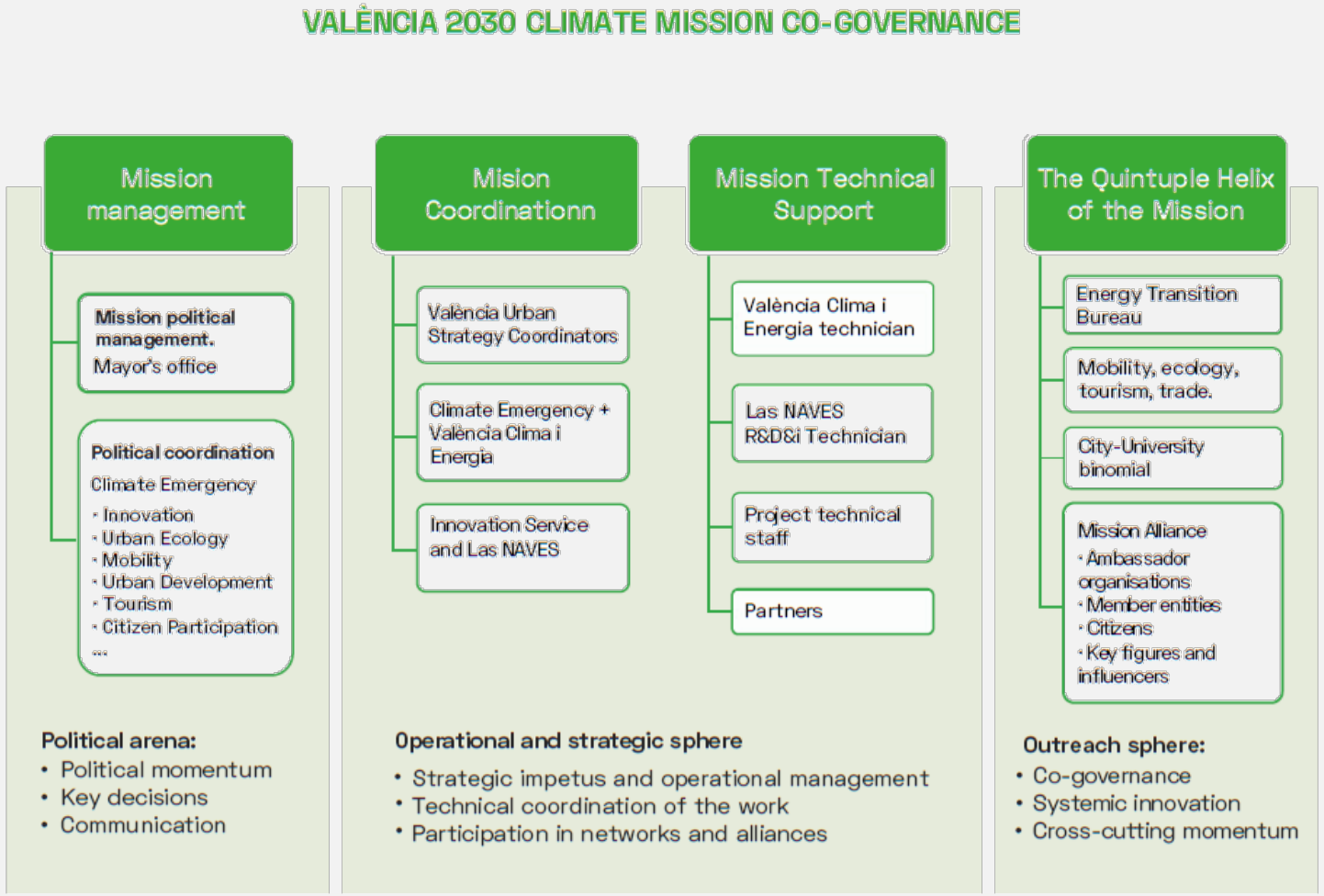
Mission Day to break internal silos

Mission Day

Every 15 days on Friday, agendas gets free for the mission team (15 people) and we get together on our innovation centre



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Creating new skills & capabilities oriented to the mission

1st

public procurement of innovation

oriented to the Climate Mission on 8 big challenges

PUBLIC PROCUREMENT OF INNOVATION ORIENTEED TO

VALÈNCIA 2030 CLIMATE MISSION

4 facts of the Consultations

1 161 proposals received

A total of one hundred and sixty-one (161) proposals were received for the different challenges posed.
A total success for the Consultation!

2 The circular and sustainable Valencian economy is the challenge with the greatest interest

CHALLENGES

1	SUSTAINABLE MOBILITY	25
2	ENERGY MODEL	18
3	URBANISM AND SUSTAINABLE HABITAT	18
4	CIRCULAR AND SUSTAINABLE VALENCIAN ECONOMY	38
5	RENATURALIZATION	7
6	RESILIENCE AND ADAPTATION	18
7	SMART GOVERNANCE	16
8	EDUCATION AND SOCIAL INVOLVEMENT	20

→ 161

3 High business participation

The business sector, including companies of different sizes and startups, was the one with the highest participation with 66% of proposals submitted. Followed by the academic and research sector with 27% and finally 7% by the selfemployed and others.

4 85% of participation comes from the Valencian innovative ecosystem

A total of 137 proposals were presented from the Valencian Community, which is equivalent to approximately 85% participation.
It should be noted that a total of 74 proposals were presented from the City of València, representing 46%.

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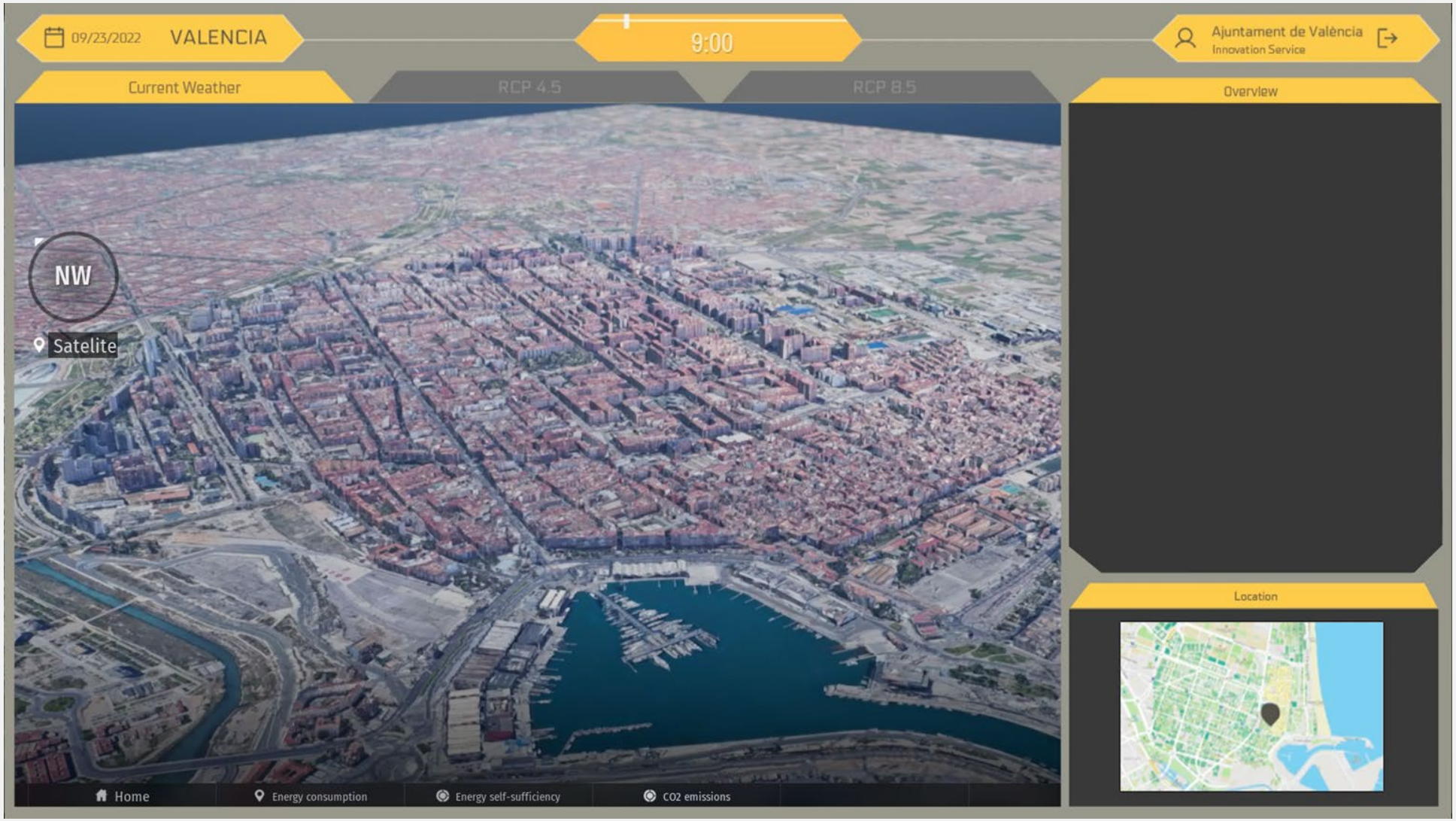
Digital Twins to go further on decisions and impacts



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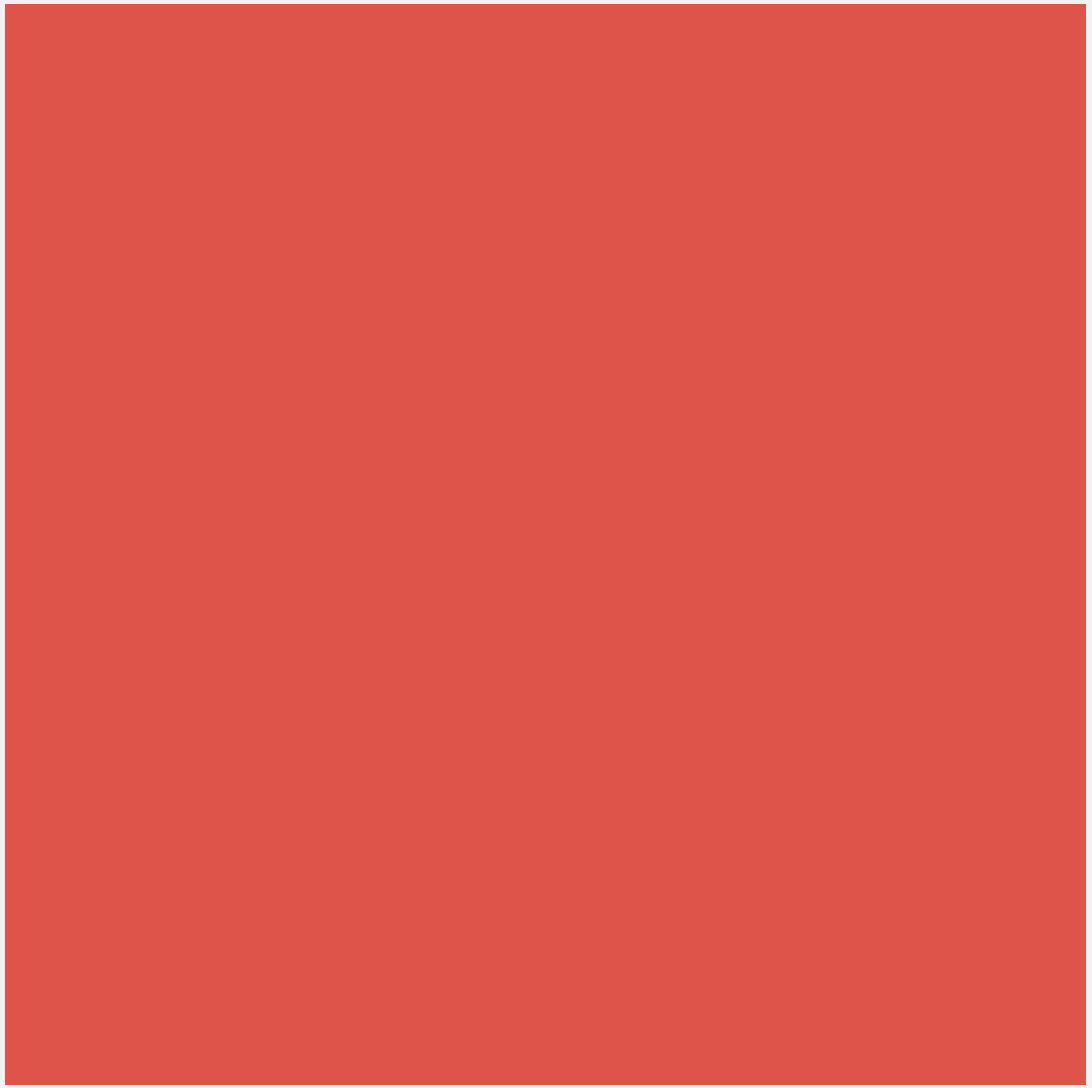
In the Climate Mission no city starts from scratch…

…so, let’s understand the system and our capabilities before planning action



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The City of Bologna

Marika Milani - Head of Urban Development, Housing Environment

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The system of Bologna

Location: **Emilia Romagna Region – North of Italy**

Metropolitan area (around 1 million inhabitants)

Extension: 140,86 km2

City: about **391.382** inhabitants,
of which around 60.000 are
foreign citizens

Hub: most important connection
north/south and east/west in Italy:

The **Marconi Airport** is the 7th largest airport in Italy

Bologna **Central Railway Station** is the main railway junction between North and South

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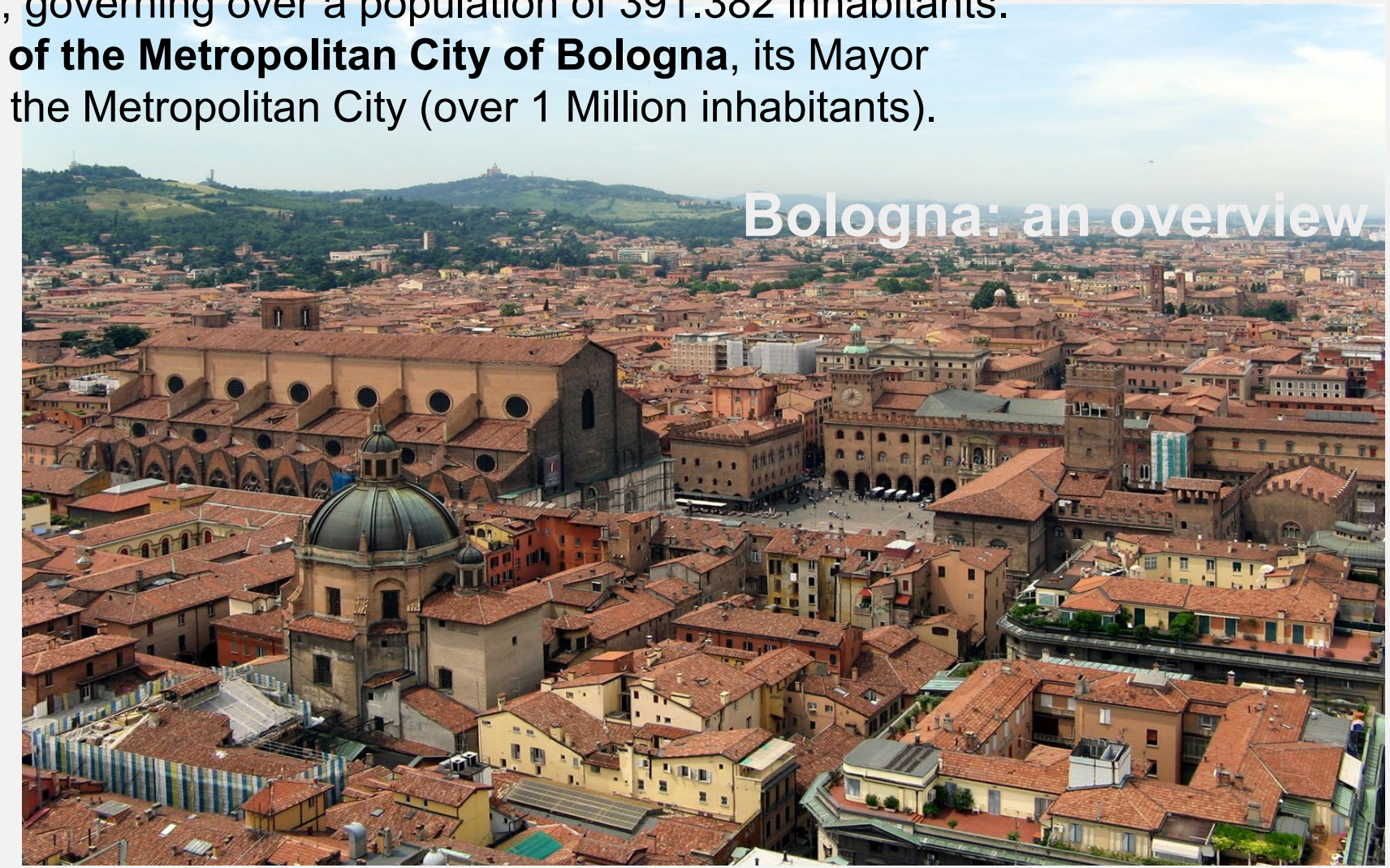
Comune di Bologna (Municipality of Bologna) is a public authority with over **4200 employees**, governing over a population of 391.382 inhabitants. Bologna is the **capital of the Metropolitan City of Bologna**, its Mayor being also the head of the Metropolitan City (over 1 Million inhabitants).



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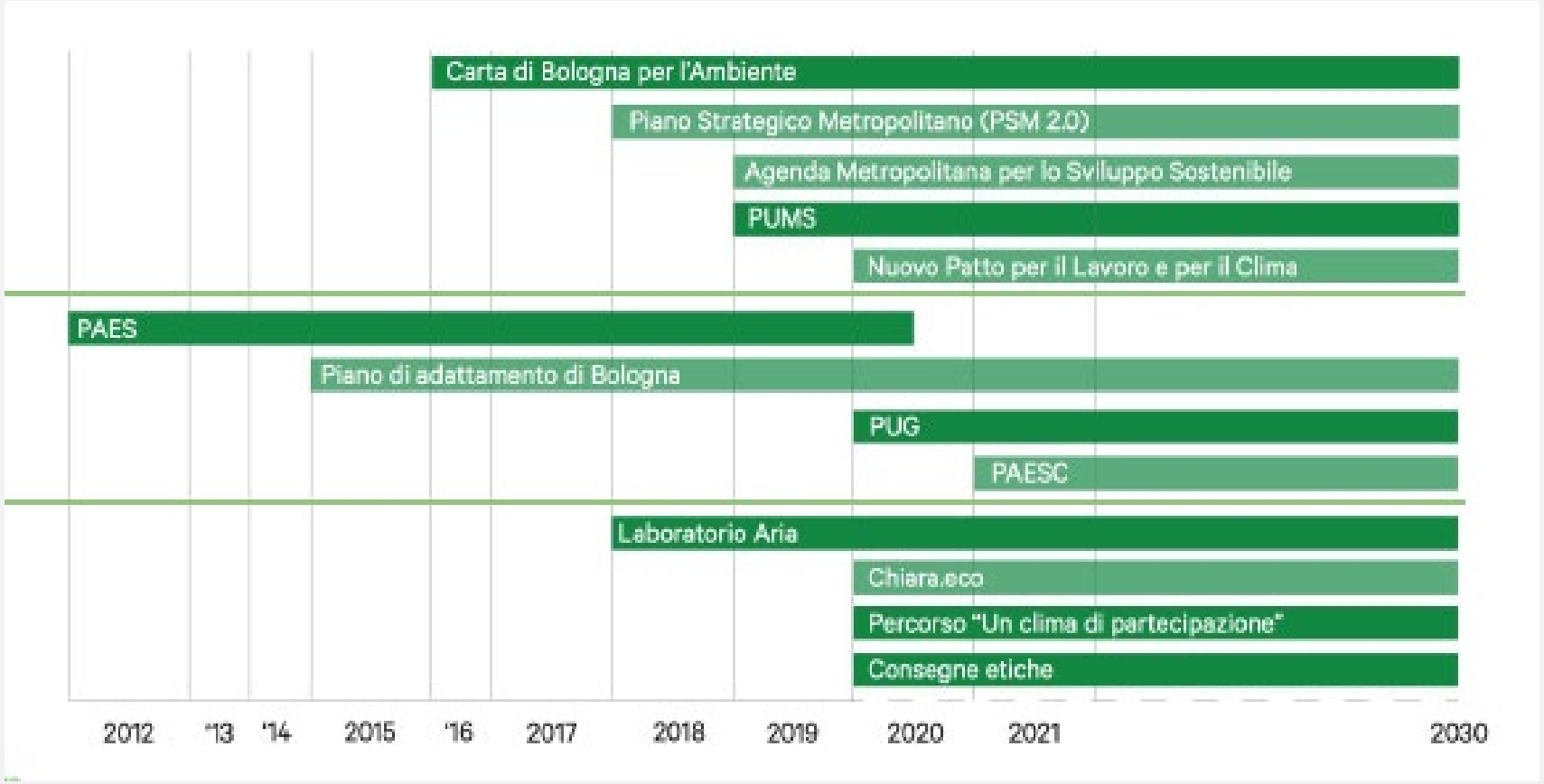
The system of Bologna

Kyoto Protocol (2007), Covenant of Mayors (2008), SEAP (2012), SUMP (2019), SECAP (2021), GUP - Green Plan (2021)

Metropolitan and Regional Level

City Level

Tools



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The system of Bologna

In 2021 the city officially set the neutrality goal in the Statute, defining Bologna strategic Commitment

So far the cumulative reduction between 2005 and 2030 is estimated al 44%

Our SECAP – Sustainable energy and Climate Action Plan defines different neutrality scenarios how to reach them by 2040

With the 100 cities Mission Bologna wants to accelerate the goal by 2030

According to SECAP we have to act in 6 Areas: building sector, tertiary sector, local energy production Industry, mobility and public facilities.

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The system of Bologna

GHG emissions in a year

Total Emissions: **1858352.4** CO^2 tons_____**4,72 CO^2 tons/ capita**

Emissions from buildings: **1310184.6** CO^2 tons_____**70,5%** of the total

Emissions from transports: **320871** CO^2 tons_____**17,27%** of the total

Emissions from waste: **57742** CO^2 tons_____**3,11%** of the total

Emissions from industrial processes: **147470.8** CO^2 tons_____**7,94%** of the total

Emissions from agriculture and land use: **13723** CO^2 tons_____**0,74%** of the total

Emissions from public lighting : **8361** CO^2 tons_____**0,45%** of the total

Source: HERA, SECAP (2018 data)

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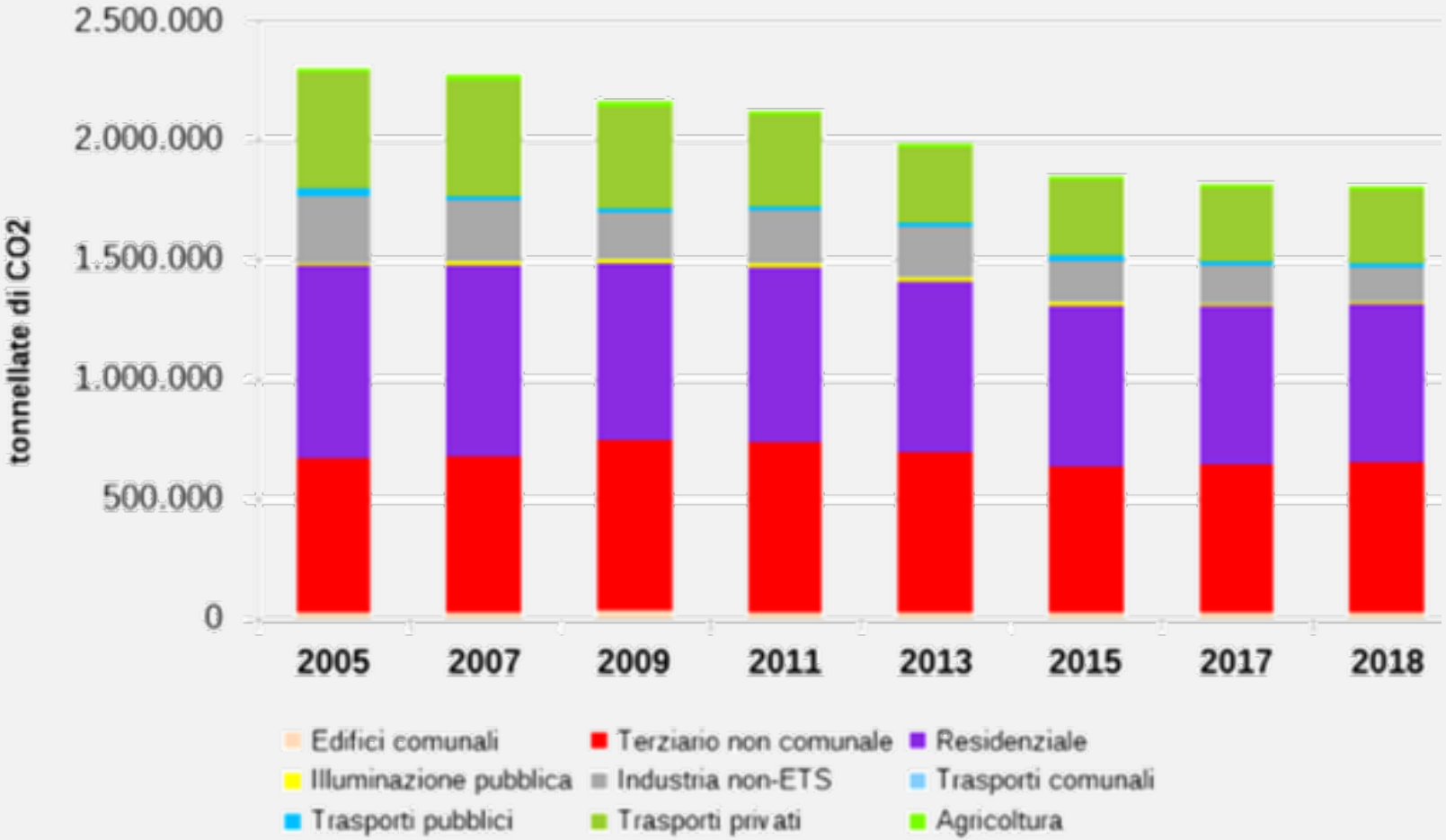
The system of Bologna



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The system of Bologna

Key measures already running:

1. Regulation for existing buildings.

2. Regulation for new buildings and districts

3. Electrification of local public transport and sustainable mobility

4. Transformation of public lighting into LED

5. Development of green infrastructure for CO_2 mitigation and reduction of energy consumption

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The new goal: neutrality by 2030

We need to **boost** actions and connect sysyems

Mobility & transportation

Decarbonisation of Local Public Transport

Biciplan project and incentives for active mobility

“Area Verde” (Green area)

Energy efficiency

Energy requalification of public residential buildings

Development of *positive energy districts*

Energy requalification of university buildings and positive energy districts

Public lighting

Complete transformation into LED lighting

Zero-emission energy supply for public lighting

Smart city - adaptive lighting

Waste

Construction of the "Power to Gas" plant

Interconnection of two energy systems to power the Fiera District and the University

Installation of an electrolyser to produce "green" hydrogen

Production of renewable energies

Replacing the supplies of fossil origin with supplies from renewable sources

Promotion of energy communities

Energy communities in public housing

Cross-cutting flagship projects

Impronta verde

(Green footprint)

Digital twin

City of knowledge

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The system understanding

MAIN BARRIERS

- physical: geographic location (Pianura padana); building stock, historical heritage buildings

- organization: silos thinking and “mono-sectoral” vision, too much burocracy

- knowledge and data: lack of system integration, data correlation, data mining, updating datasets.

- financial: lack of smart tools for PPP, models to build energy communities, incentives for citizen or enterprises

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The system understanting

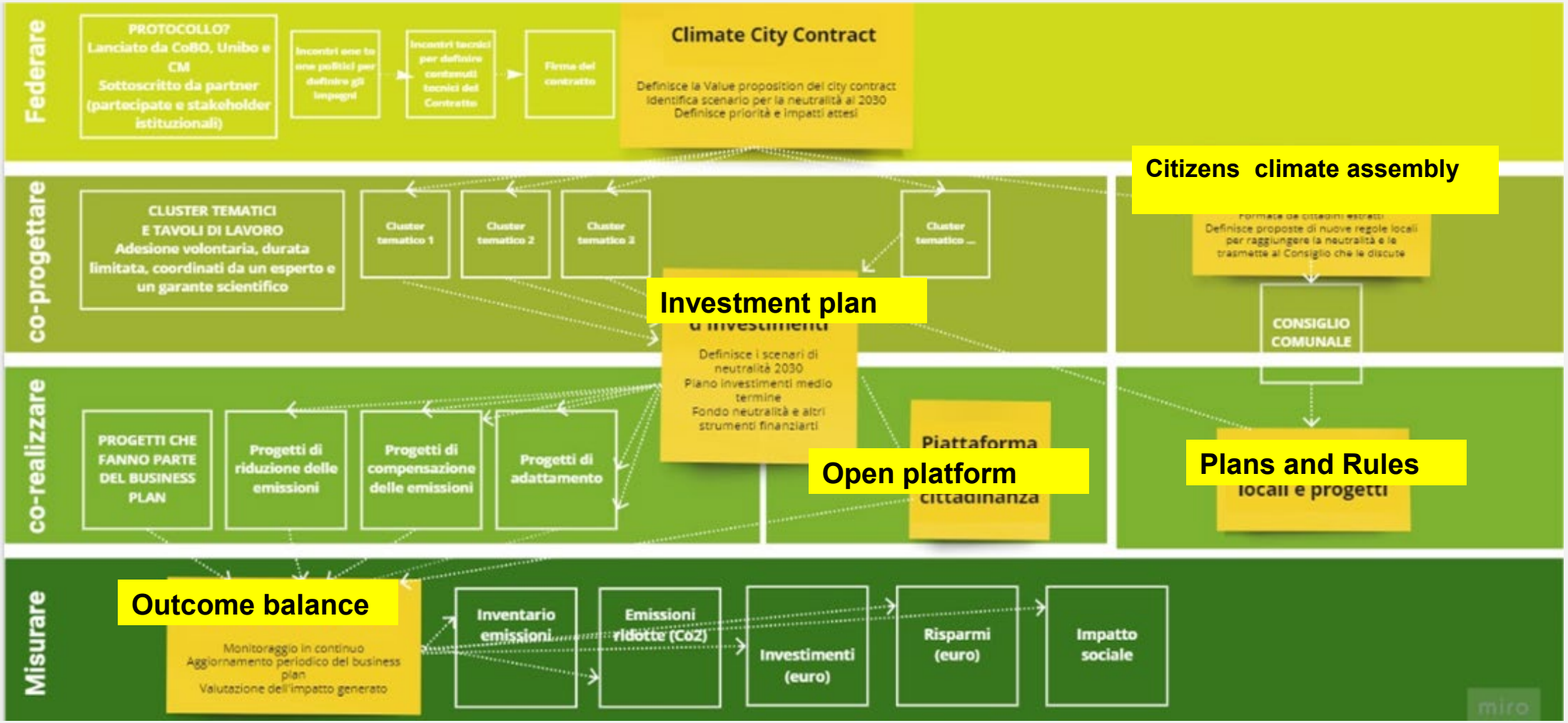
Who is involved:

- Bologna Municipality
- FIU – Urban Innovation Foundation
- AESS – Sustainable Energy Agency

- pubblic companies and facilities (HERA, ACER, Airport, University, etc.)
- private enterprises, professional bodies and associations
- local government (province, region, state)
- net of 9 italian cities neutral by 2030

This project has received funding from the H2020 Research and Innovation Programme under grant agreement n°101036519.

The system understanding



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The underlying system components

Main elements we need to develop

- better knowledge of the city: buildings emission profile, data modeling, digital twin (dynamic update)

- simplify rules burocracy: i.e. historical buildings, landscape protection areas, balance protection and climate challenge

- capacity building in Municipality organization, intersectoral workgroups, multi-disciplinary trainings

- planning and programming: measure of outcomes, common targets and indicators Mission oriented

- stakeholders and citizens: increase nets and awareness, one stop shops, participation, climate citizens assembly

- new financial models and incentives

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How system understanding was useful for your strategic goals?

Focus on main barriers helped us to recognize them and turn them in a plan of actions

Exchanging experiencies between cities shows the common challenges and helps to define the key themes and providing a systemic approach

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How did you harness assets and resources to achieve a common climate neutral strategy?

Bologna and other 8 italian city involved in the neutrality mission are co-projecting a proposal after NZC Call for Pilot cities.

Main barrier: silos model organization

Action: develop new model of governance in municipalities and a new systemic approach

Method: each city implements a challenge complementary to others (exchange and reuse outputs)

Bergamo
Bologna
Firenze
Milano
Padova
Parma
Prato
Roma
Torino

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How has the mapping be done collectively to gain different perspectives?

- Interviews
- Definition of a baseline
- Definition of a common language and indicators
- Focus groups
- Defining goals and actions
- Co-projecting on collaborative platform
- Collecting and exchanging data
- Build a common repository

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How did you manage to monitor the system for a systemic perspective?

Change the programming and budgeting system to include the CO2 emission reduction in every project

Task force intersectoral “to break” silos vision and monitoring outcome

Monitoring multidimensional outcome:

- CO2 emission
- amount of investiments
- savings for public and private system
- social impact

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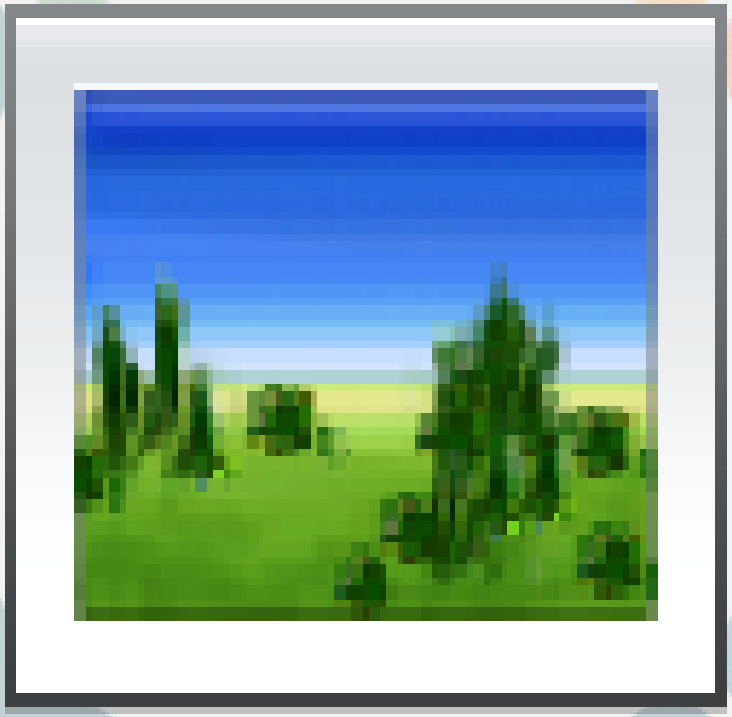
More information

www.chiara.eco

www.comune.bologna.it



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The City of Zagreb

Ivan Ivankovic
Head of Environmental Sustainability

https://eic.zagreb.hr/portal/apps/sites/#/eic

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Sustainable Espoo

Helena Kyrki

Manager for Sustainable Development

This project has received funding from the H2020 Research and Innovation Programme under grant agreement n°101036519.

The system of Espoo

The second largest and the fastest growing city in Finland

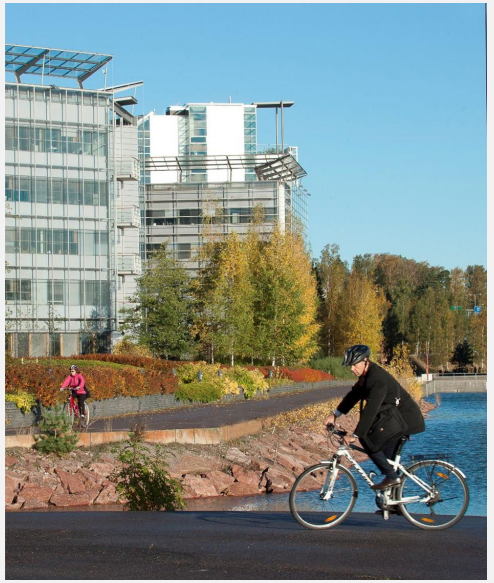
- 300 000 inhabitants with yearly population growth by 1,6 %
- The youngest population with highest level of education of the major Finnish cities

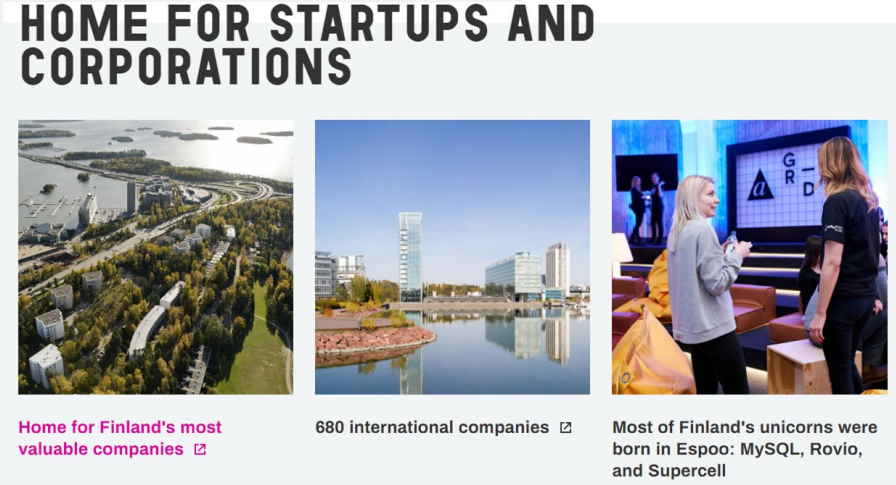
A big city close to nature

- Part of the Helsinki Metropolitan area
- Five city centers connected by rails
- Land area of over 300 square kilometers, 95 lakes and 58 km of seashore
- Nuuksio National Park, 95 nature reserves and 32 protected habitats

The innovation driver of Finland

- Home of Finland's most valuable companies with almost 50 % of the Helsinki Stock Exchange turnover
- 6th in patents in Europe (1 252 patents in 2021)
- 8th by capital invested in European tech hubs (2020)
- European Capital of Innovation finalist in 2019, 2020 and 2022

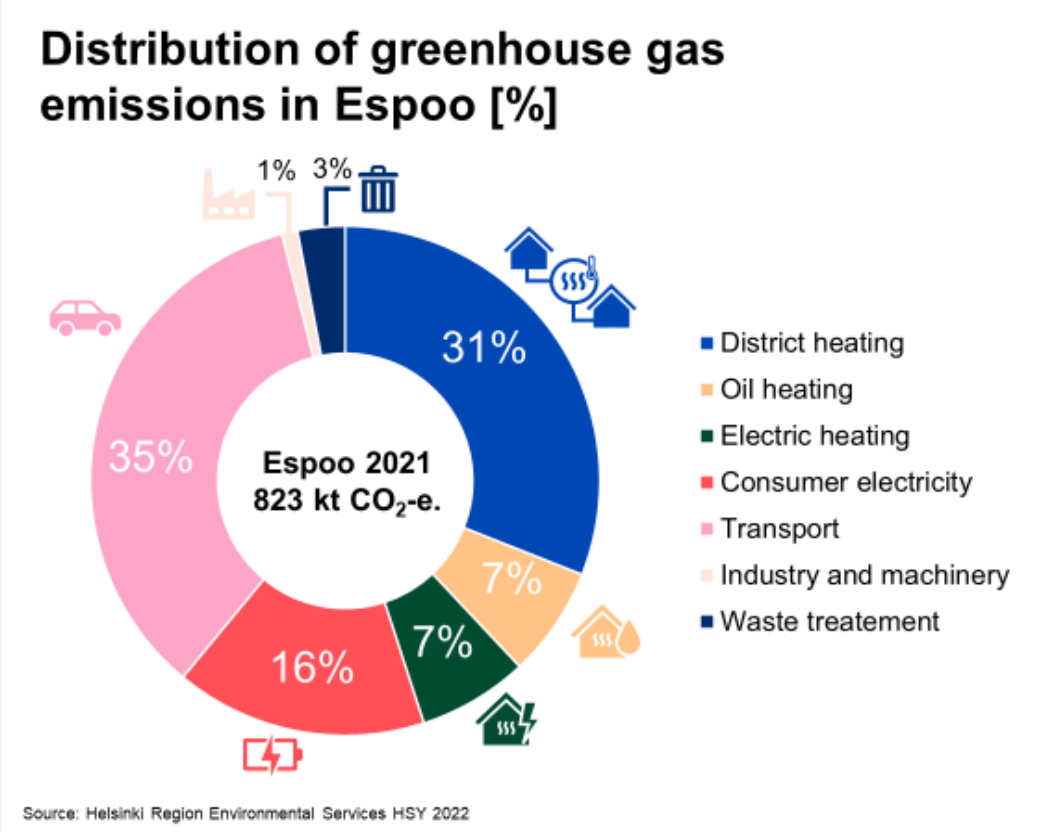




NetZeroCities has received funding from the H2020 Research and Innovation Programme under grant agreement n°101036519.

Climate-neutral Espoo by 2030

- Challenges:
  - Being a Nordic city, **heating** constitutes of nearly a half of our total emissions
  - New solutions for low-carbon **mobility** are needed: modal share of private cars is still 47 %
  - How to combine **city growth** with ambitious emission reduction targets while preserving **local natural values** and **biodiversity**?
- Opportunities:
  - Strong **political commitment** and **innovation community** with like-minded actors
  - Development of solutions that are both **sustainable and commercially successful**
  - Directing city growth along excellent **public transportation** connections and developing city centres as **multimodal** transportation hubs



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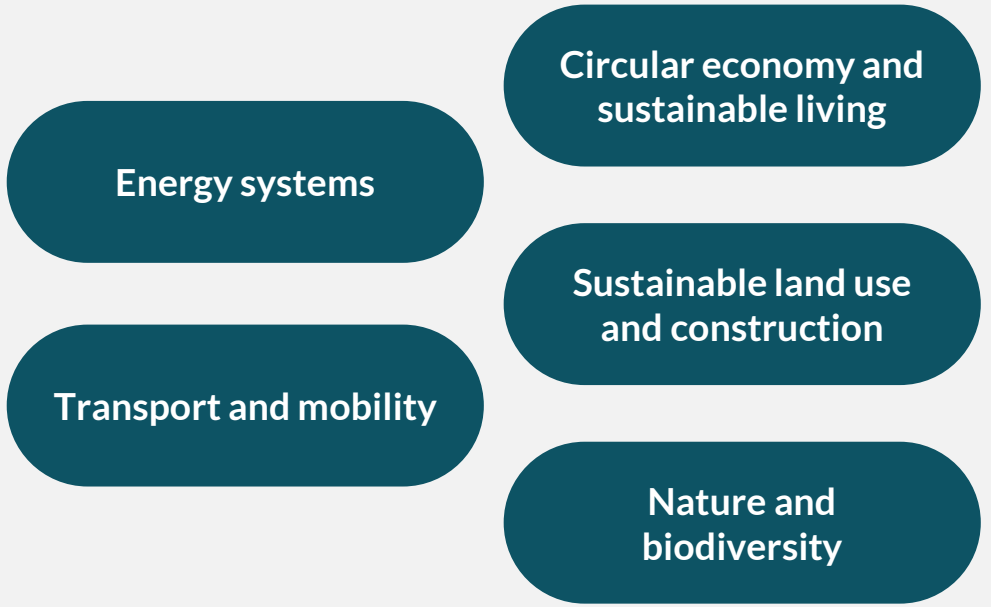
Sustainable Espoo Programme
- the system understanding, assets and resources

- Co-operation for systemic change
  - Shared vision and commitment
  - Multi-level partnerships
  - Concrete actions towards a climate neutral city
  - Project portfolio with EU and national funding

- Innovative cross-sectoral governance
  - Launched first in 2013
  - Supports the implementation of the city strategy, the Espoo Story.
  - Unites political leaders and city administration
  - Owned by the Mayor and supported by a team of 30 experts

Sustainable Espoo focus areas 2021-2025



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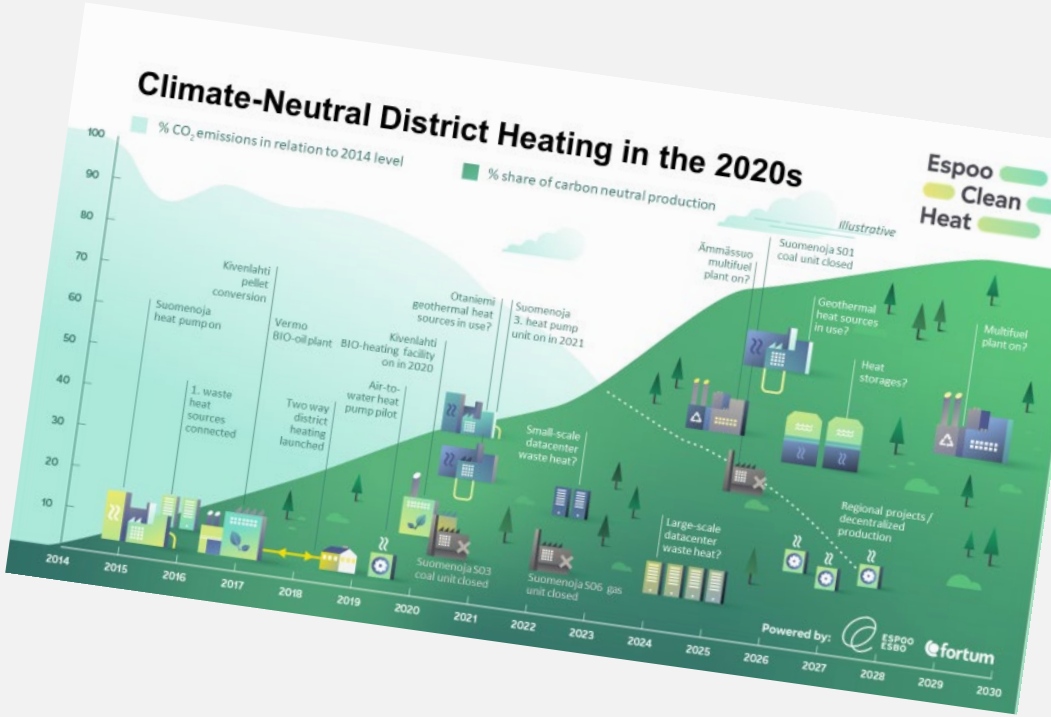
Understanding the system: Espoo Clean Heat

- District heating creates the largest share of climate emissions in Espoo *but* also the most rapid emission reductions in the past five years – already almost -50%.
- Joint commitment with local energy provider to carbon-free district heating by 2025 and climate-neutral system by 2030
- World's largest collaboration to heat homes
  - The new Microsoft data centre in Espoo will produce zero-emission district heating
  - 40% of all heating in the region will be generated by the data centre



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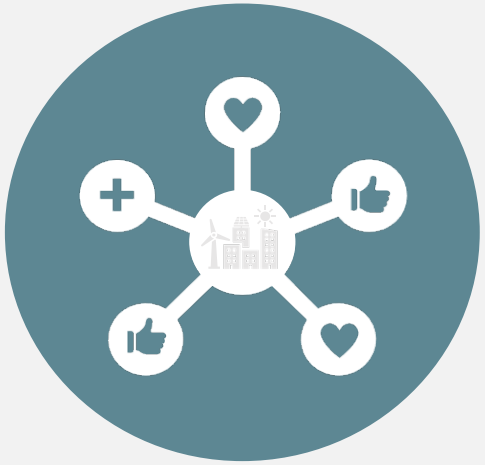
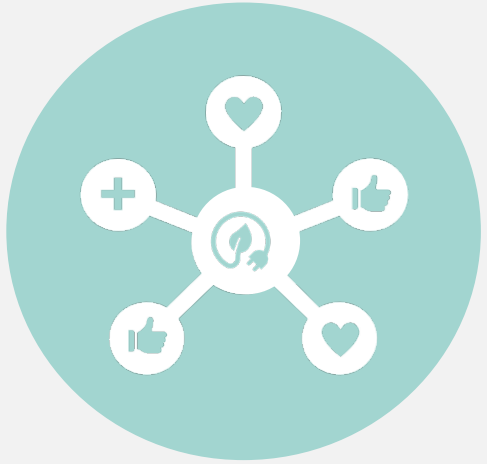
The underlying system components

- Working with the 100 most **relevant partners and stakeholders** to build impactful **ecosystems** to drive sustainable growth.

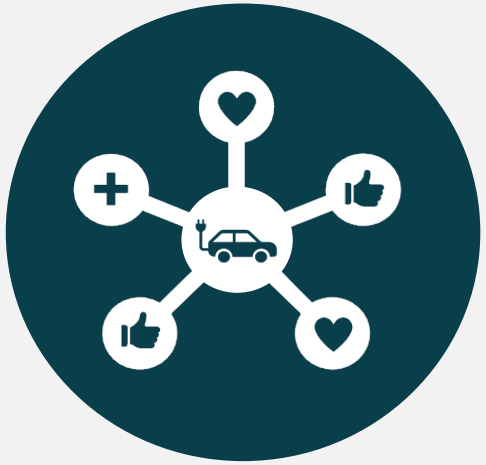
Smart Urban Development



Sustainable Energy



Low Emission Transport



Circular Economy of Materials

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Espoo Story – our strategy

- Understanding of our systems and knowing our partners has lead to better understanding of the **strategic value** and possible **co-benefits** of climate action.
- As a result, reaching climate-neutrality by 2030 was defined as **one of the city's seven key strategic targets** for the council term of 2021-2025.

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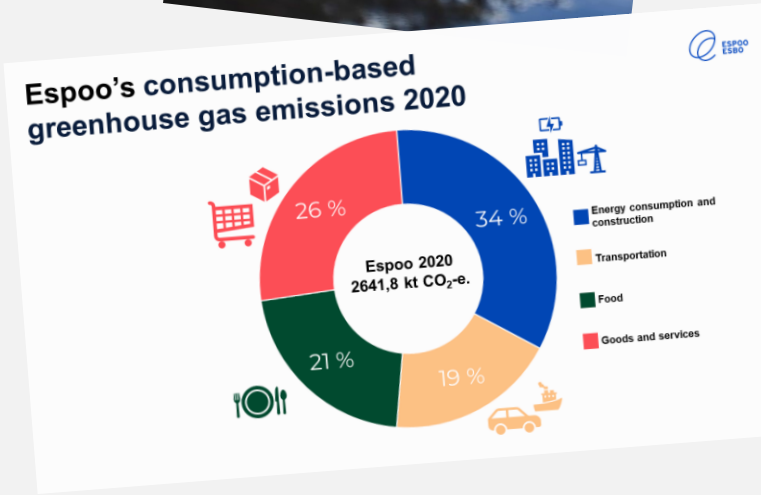
How to monitor the progress?

- Sustainable Espoo Programme
  - Set of **29 indicators** to monitor both direct outcomes as well as the impacts on systemic transformation
  - Constant **learning process**: new ways to measure impact will be developed and added to the list during the programme term
- Co-operation with **research** institutions to gain new knowledge and methodologies, e.g.
    - Consumption-based emissions measured for the first time in 2020 (15 Finnish cities)
    - Carbon-handprint for cities and regions manual published in 2021 (Espoo as case study)



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Thank you!

Helena Kyrki
Manager for Sustainable Development
City of Espoo

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#SustainableEspoo

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What aspect from the experience of the cities do you find most interesting?

Go to menti.com and use the code 6659 7890

or scan the QR code on the right ->

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LIVE RESULTS

https://www.mentimeter.com/app/presentation/a6ffc68c115417cdc54b29d06c7b3f24/d571a5f5c363

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Your key takeaway from this session?

Go to menti.com and use the code 6625 0693

or scan the QR code on the right ->

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LIVE RESULTS

https://www.mentimeter.com/app/presentation/43b365afee9e4adb7d978621b77ac2eb/2c5178dd5fae

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Tools for understanding the ecosystem

NetZeroCities' supporting resources

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How can *tools* support the ecosystem analysis?

1. Provide guidance along the process
2. Support collaborative work
3. Align and bring participants together
4. Move to the next stage of development

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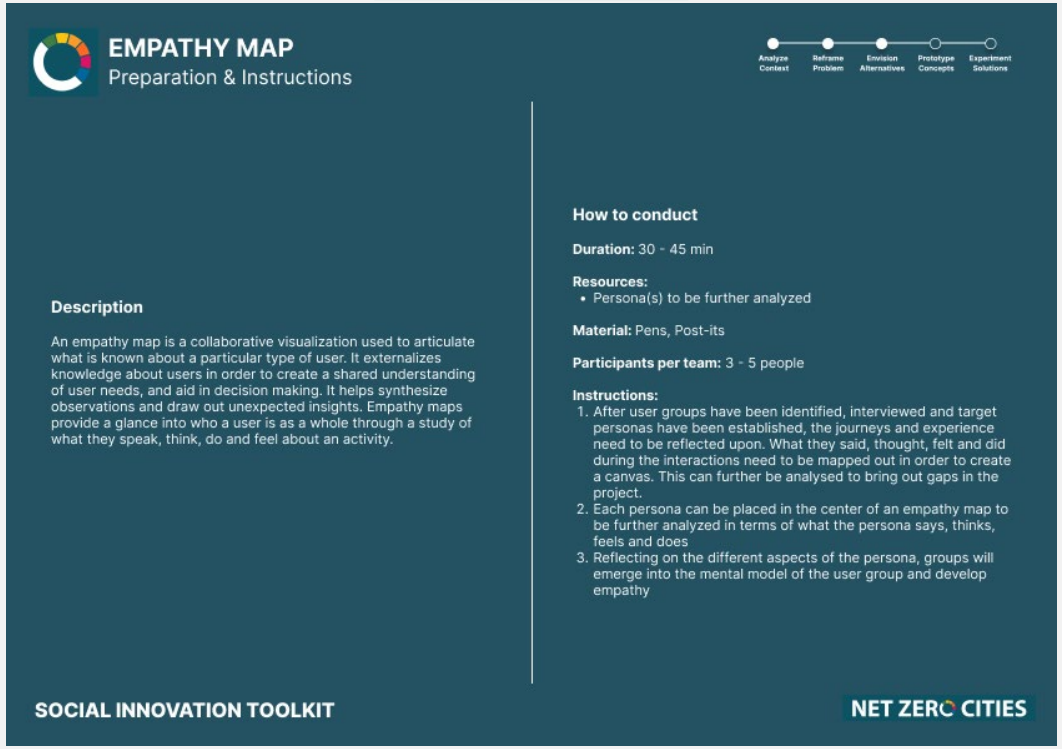
The NZC tools consist in a set of instructions for facilitators and a template

Instructions



EMPATHY MAP
Preparation & Instructions

Analyze Context · Reframe Problem · Envision Alternatives · Prototype Concepts · Experiment Solutions

Description

An empathy map is a collaborative visualization used to articulate what is known about a particular type of user. It externalizes knowledge about users in order to create a shared understanding of user needs, and aid in decision making. It helps synthesize observations and draw out unexpected insights. Empathy maps provide a glance into who a user is as a whole through a study of what they speak, think, do and feel about an activity.

How to conduct

Duration: 30 - 45 min

Resources:
- Persona(s) to be further analyzed

Material: Pens, Post-its

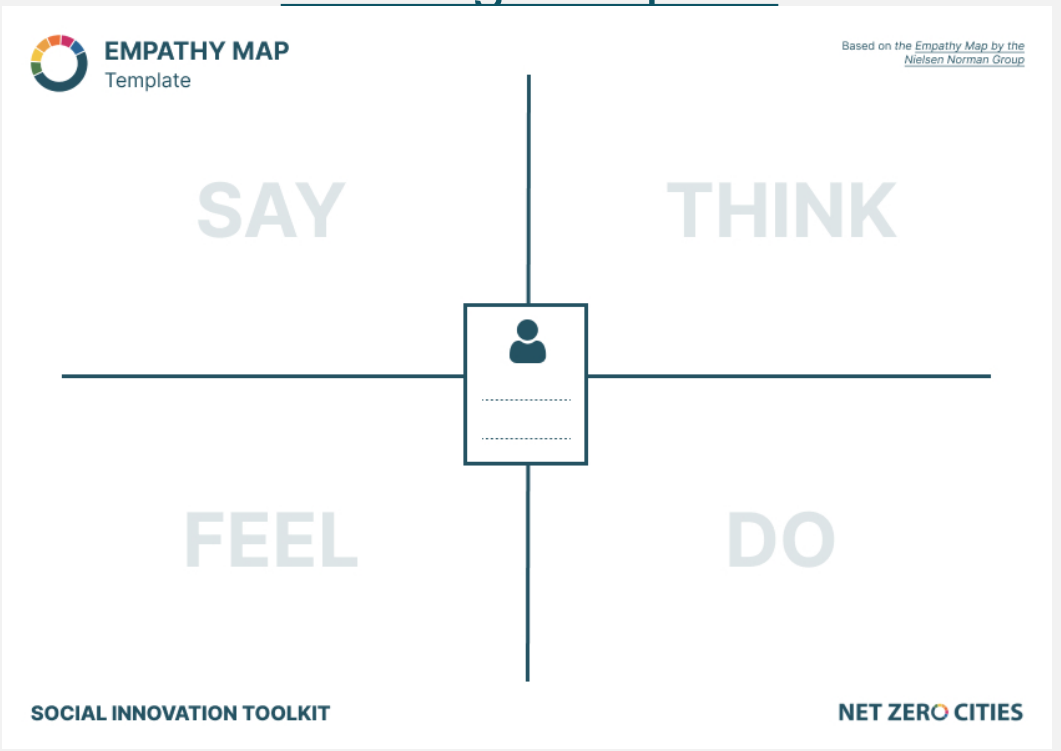
Participants per team: 3 - 5 people

Instructions:
1. After user groups have been identified, interviewed and target personas have been established, the journeys and experience need to be reflected upon. What they said, thought, felt and did during the interactions need to be mapped out in order to create a canvas. This can further be analysed to bring out gaps in the project.
2. Each persona can be placed in the center of an empathy map to be further analyzed in terms of what the persona says, thinks, feels and does
3. Reflecting on the different aspects of the persona, groups will emerge into the mental model of the user group and develop empathy

SOCIAL INNOVATION TOOLKIT

NET ZERO CITIES

Working Template



EMPATHY MAP
Template

Based on the Empathy Map by the Nielsen Norman Group

SAY

THINK

FEEL

DO

SOCIAL INNOVATION TOOLKIT

NET ZERO CITIES

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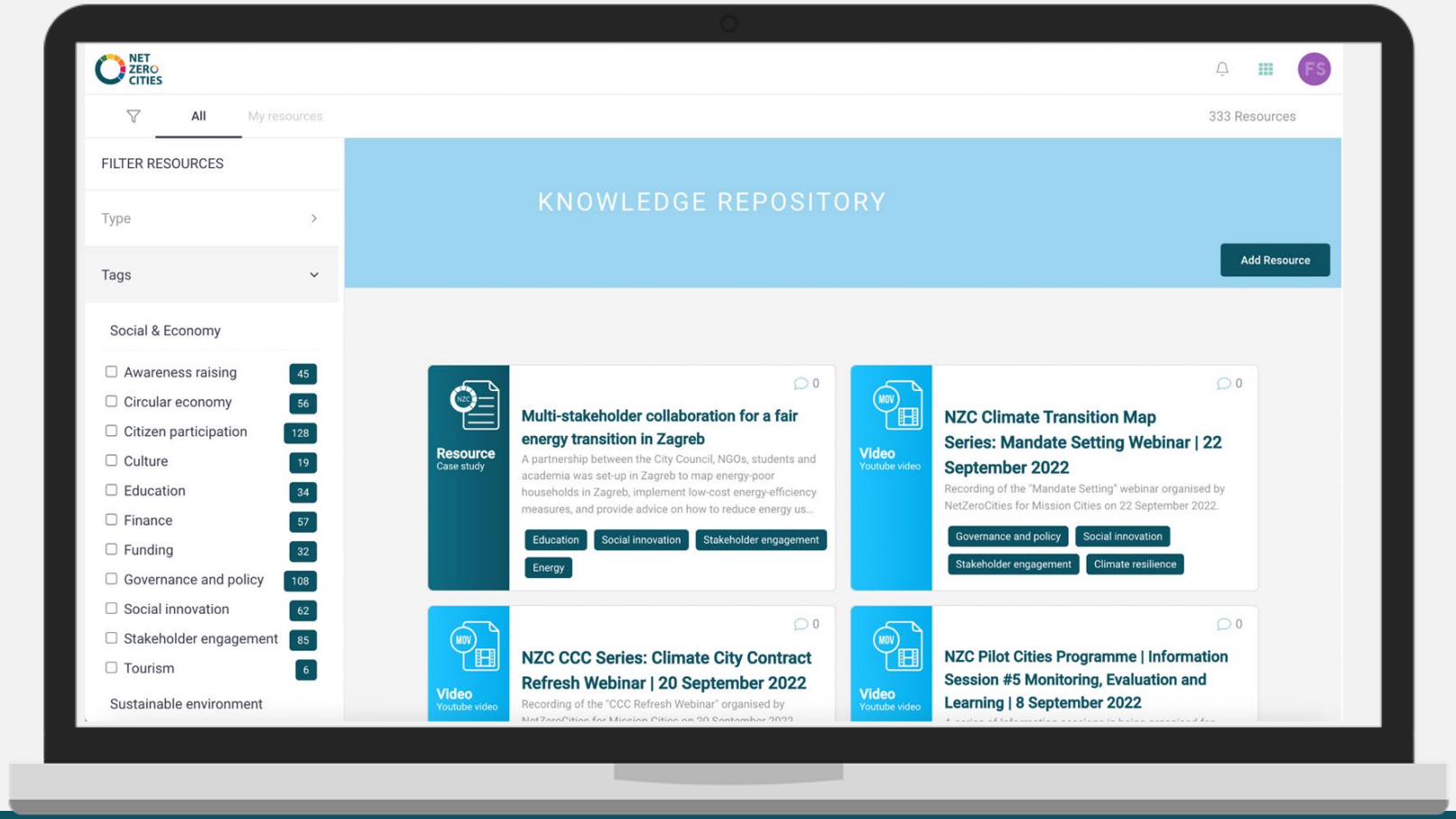
All tools are available on the NZC Portal

https://netzerocities.app/knowledge



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Get in touch with NetZeroCities!

@NetZeroCitiesEU

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