



Superblocks, an urban planning tool for cities revitalization

Cynthia Echave

Coordinator Urbanism & Public Space
Urban Ecology Agency of Barcelona



ADFC Symposium, More Space for Cycling
Berlin - 15th November of 2019



Agència
d'Ecologia Urbana
de Barcelona



Our mission

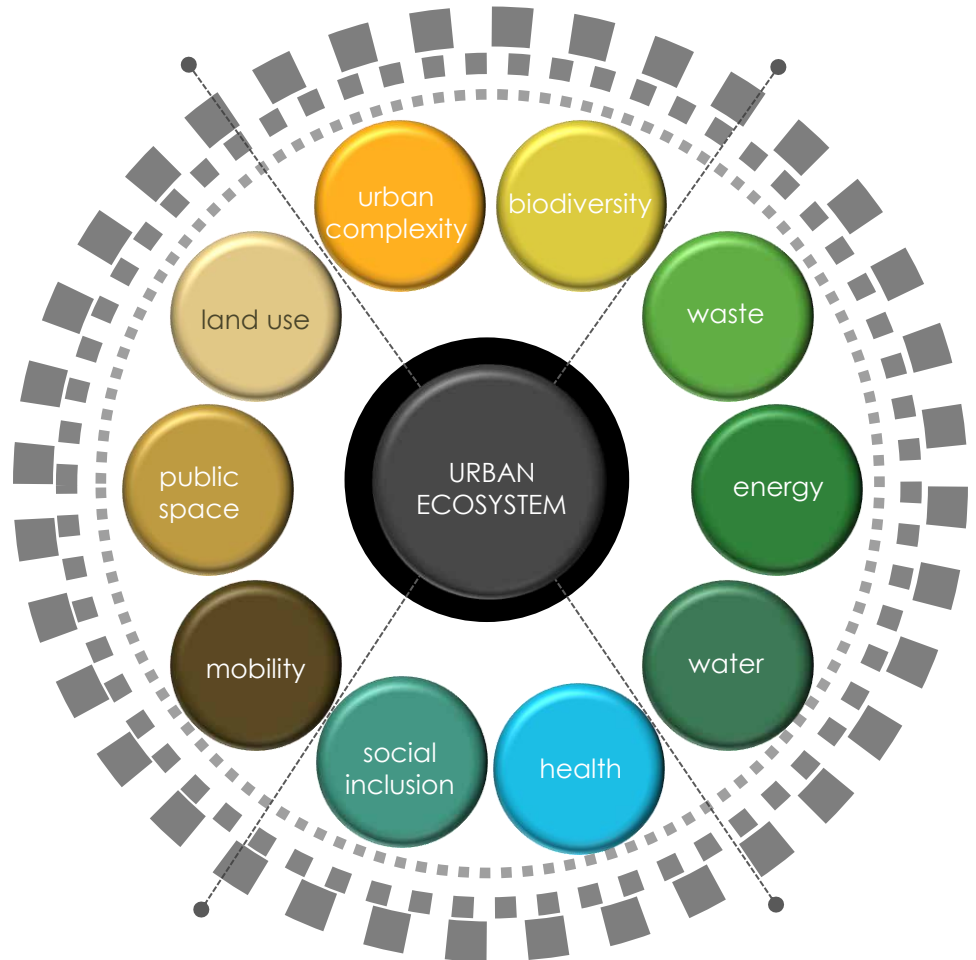
**Rethink cities in key of resilience
and sustainability**

developing the necessary instruments to drive a
urban planning and territorial strategies towards
this direction

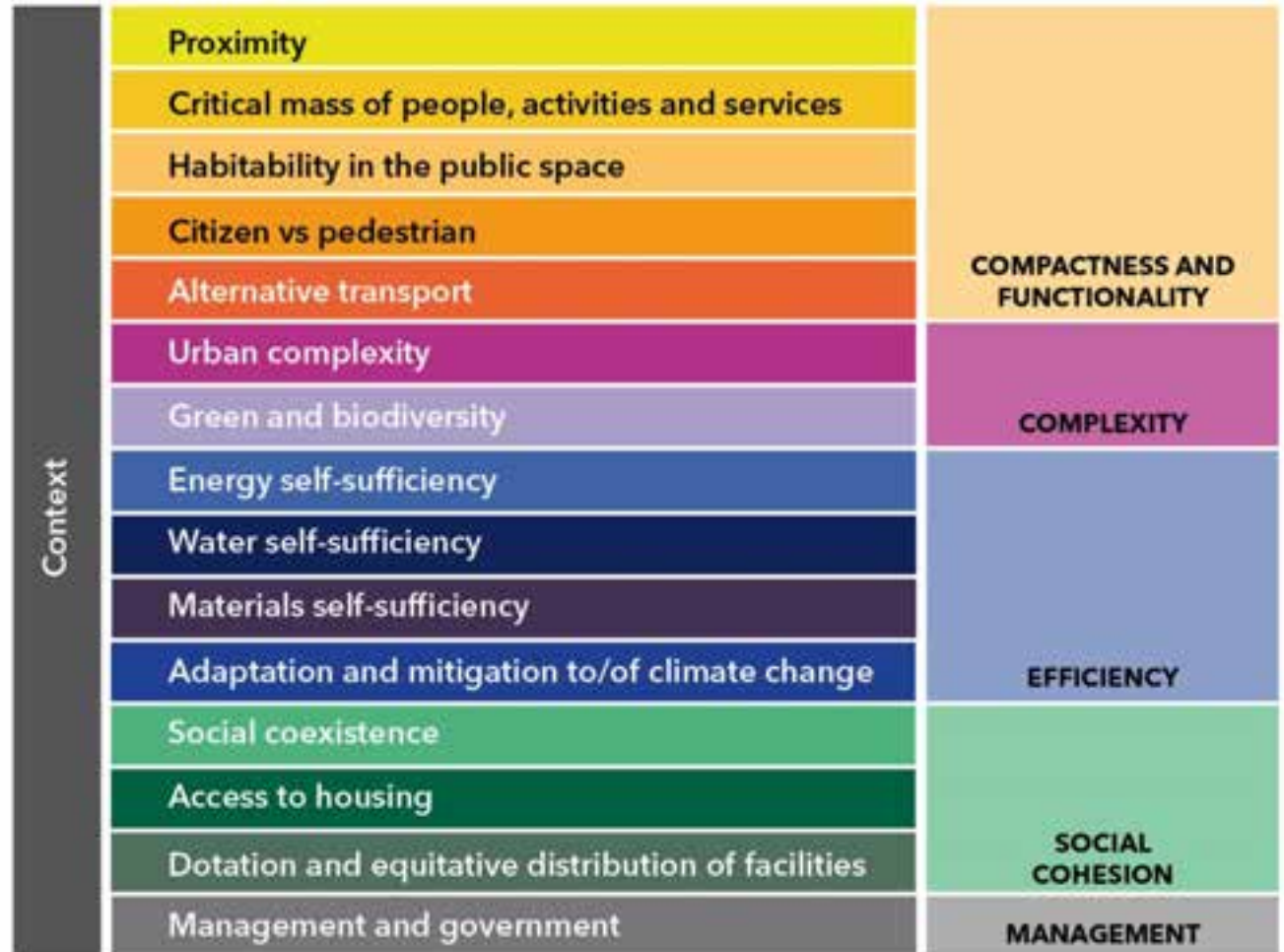
Ecosystemic

Conceptual model

- COMPACTNESS
- COMPLEXITY
- EFFICIENCY
- COHESION

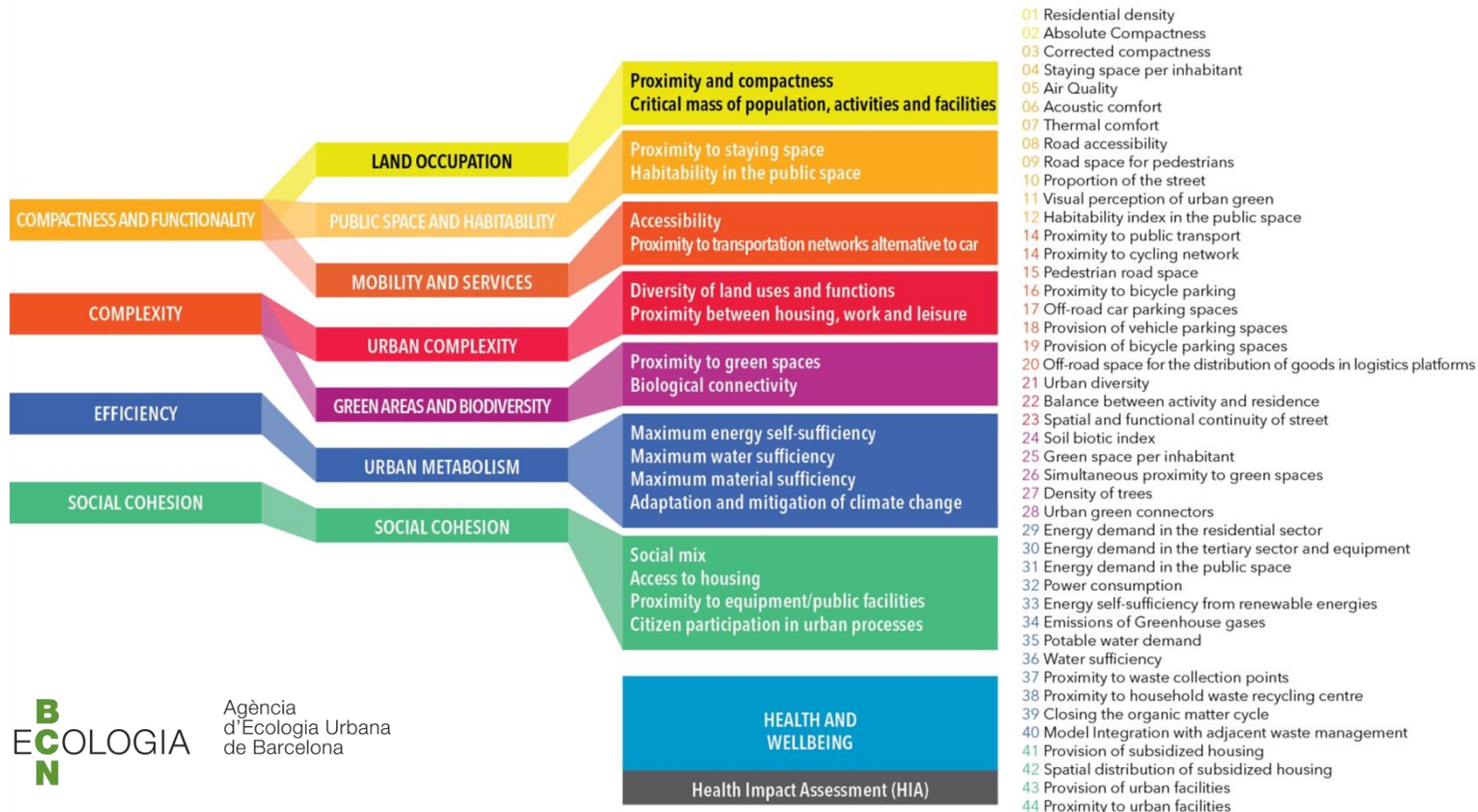


Principles Ecosystemic Urban Planning

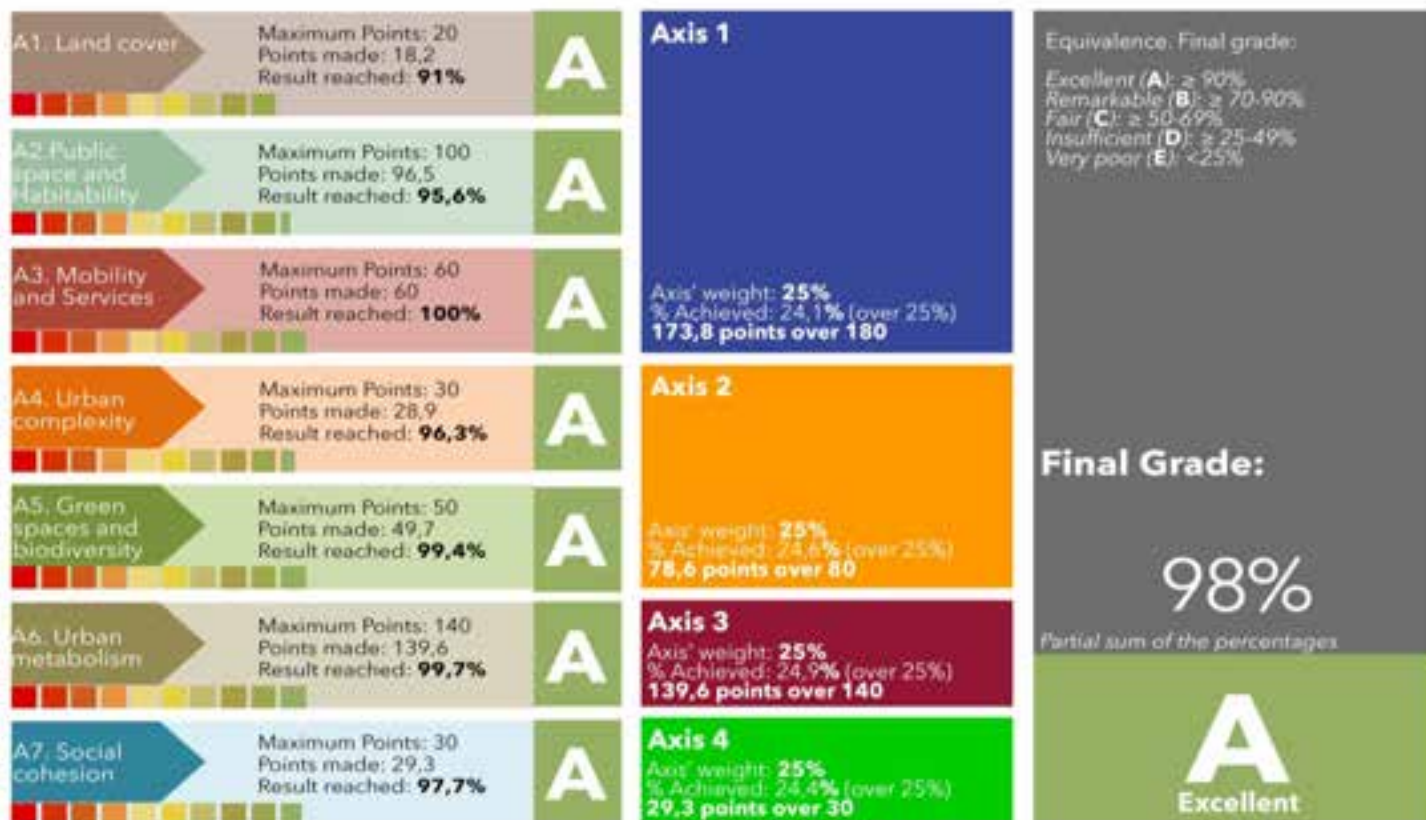


Indicators

Ecosystemic Urbanism Certification



Validation tools: Evaluation system

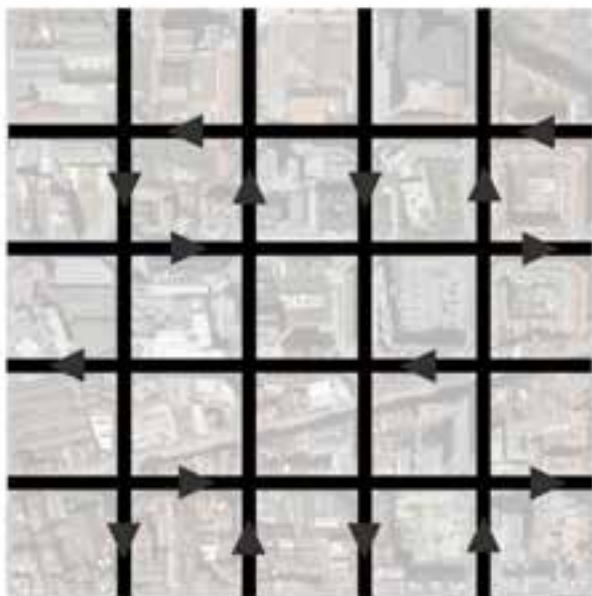


Superblocks

basis of the urban model

Road hierarchy in the new Superblock model

CURRENT SITUATION



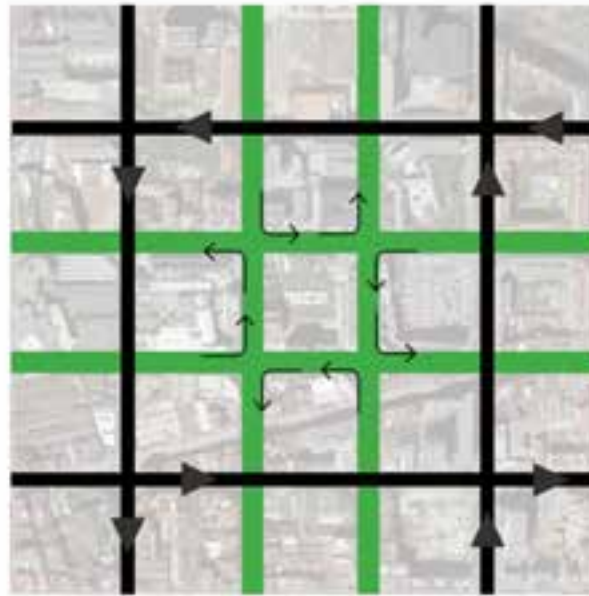
400 meters

Basic network: 50 km/h



SOLE RIGHT IN STREET SPACE: MOBILITY
HIGHEST AIM: PEDESTRIAN.

SUPERBLOCK MODEL



400 meters

Local network: 10 km/h



EXERCISE ALL THE RIGHTS THAT THE CITY OFFERS.
HIGHEST AIM: ACTIVE CITIZEN.

**CIRCULATING
VEHICLES DO
NOT PASS
THROUGH**

Length

912 km

Surface area

1483,6 ha



Barcelona road network (streets and sidewalks)
CURRENT SITUATION

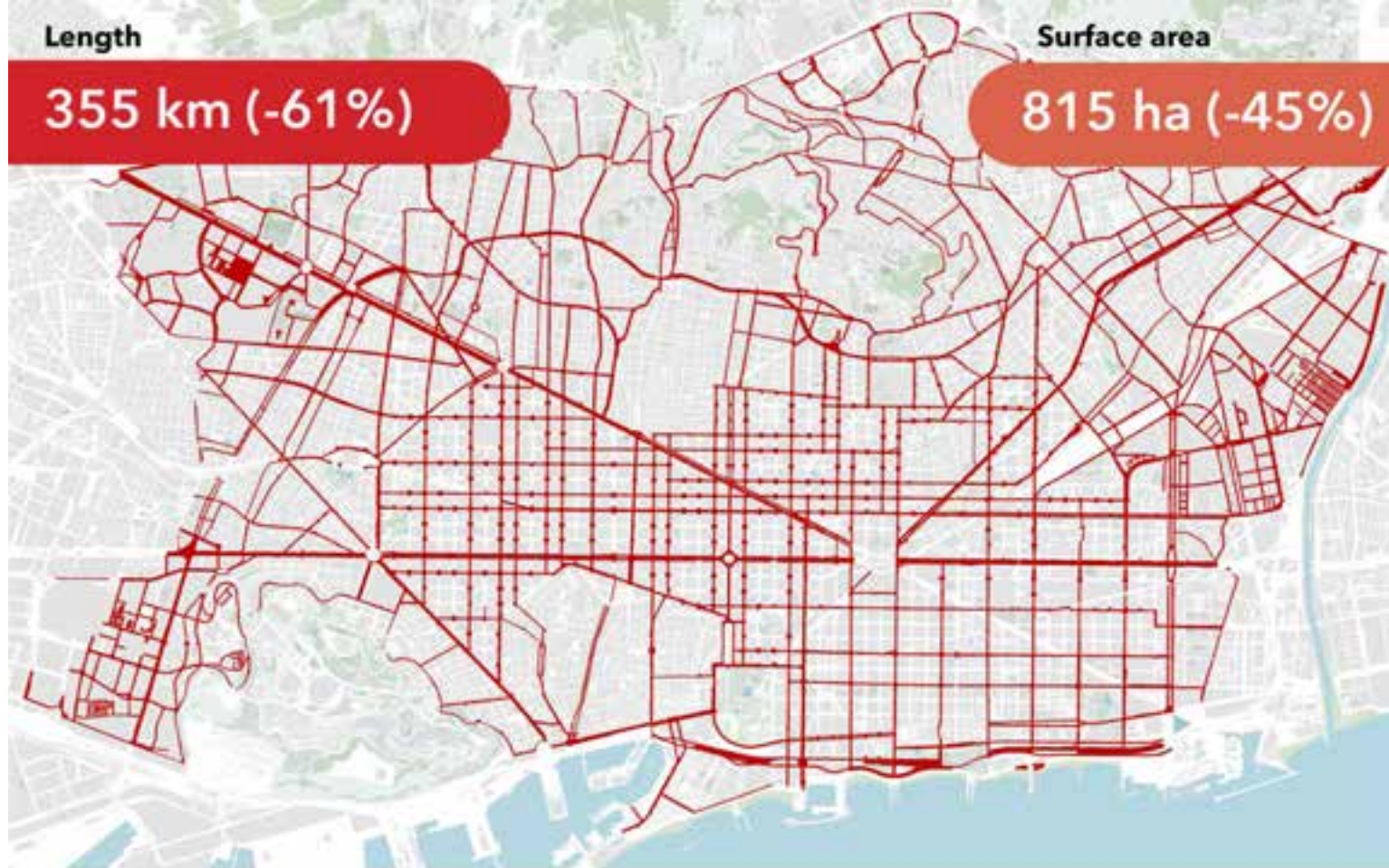


Length

355 km (-61%)

Surface area

815 ha (-45%)



Barcelona road network (streets and sidewalks)
FUTURE SCENARIO WITH NEW SUPERBLOCKS



Implementation

Functional Superblocks

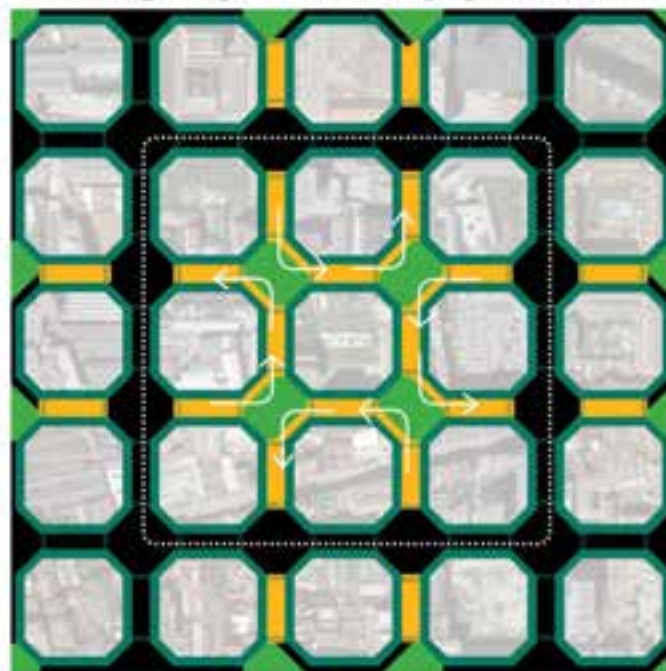
The functional Superblocks begin the process of transforming mobility and public space, integrating the entire transport network.

Functional Superblocks are defined by basic outer roads and prevents crossing through interior roads with a circulatory system of loops that force vehicles to circulate on the basic outer roads. Thus, circulation is divided into basic roads and areas of local mobility.

On the inner streets, **the maximum speed is 20 km/h.**

Phase 1 of implementation is done mainly through the change of traffic signs and signals.

Phase 1. Changing mobility patterns



Implementation

Urban Superblocks

The new Superblocks are transformed, expanding public spaces, where all citizen rights can be enjoyed, to almost all inner roads.

Its implementation can be carried out through pylons, a single platform and/or special signs.

The maximum speed permitted is 10 km/h.

Citizens occupy the entire space inside Superblocks. Vehicles (bicycles, scooters, cars) adapt their speed to pedestrians. On the basic outer roads pedestrians circulate on the sidewalks.

Inside the Superblock, 94% of total road space becomes public space.

Phase 2. Transforming public spaces



Public Transport

CURRENT SITUATION



PHASE 1. FUNCTIONAL SUPERBLOCKS



PHASE 2. URBAN SUPERBLOCKS



Maximum speed
 Black network: 30 km/h
 Yellow network: 30 km/h
 Green network: 10 km/h

Blue circle icon: Bus network
 Red circle icon: Bus stop



Bicycles

CURRENT SITUATION



PHASE 1. FUNCTIONAL SUPERBLOCKS



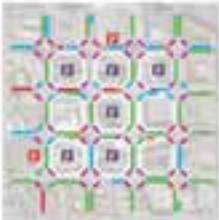
PHASE 2. URBAN SUPERBLOCKS



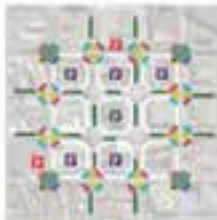
Bicycle network
 Orange line: Main (bicycle lane)
 Yellow line: Secondary (30 km/h)
 Green line: Shared space (cyclo-pedestrian) (10 km/h)

Parking

CURRENT SITUATION



PHASE 1. FUNCTIONAL SUPERBLOCKS



PHASE 2. URBAN SUPERBLOCKS



Types of parking

Blue Zone (paid)
 Green Zone (preferential residents)
 Green Zone (exclusive residents)
 Loading and Unloading Zone (LNU)
 Motorcycles

Parking off-road

Blue square icon: Private (courtyards)
 Red square icon: Public Access Parking

Basic / Inner Road Intersection



Basic / Basic Intersection



Urban distribution of goods

CURRENT SITUATION



PHASE 1. FUNCTIONAL SUPERBLOCKS



PHASE 2. URBAN SUPERBLOCKS

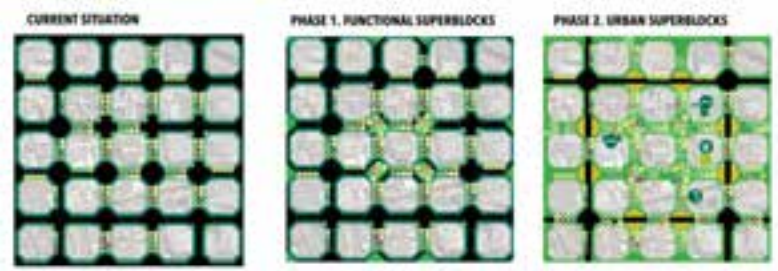


Maximum speed
 Black network: 30 km/h
 Yellow network: 30 km/h
 Green network: 10 km/h

Intersections
 Pink circle icon: Service node (intermediate: Basic)
 Red circle icon: Road - Inner Road
 Red circle icon: Loading/Unloading points
 Red circle icon: Logistics platform



Urban green space



- Street trees
- Green space potential (permeable)
- Urban garden
- Green roof
- Green wall



Potential Green Network. Barcelona

- Main network (green corridors)
- Potential secondary network



Superblocks

basic unit for urban design
& urban management

Basic unit of ecosystemic urban planning on cities

Basic unit
for **urban
design**

**Urban legibility &
functionality**

Basic unit
for **urban
planning**

**Criteria for facilities provision
& urban interventions**

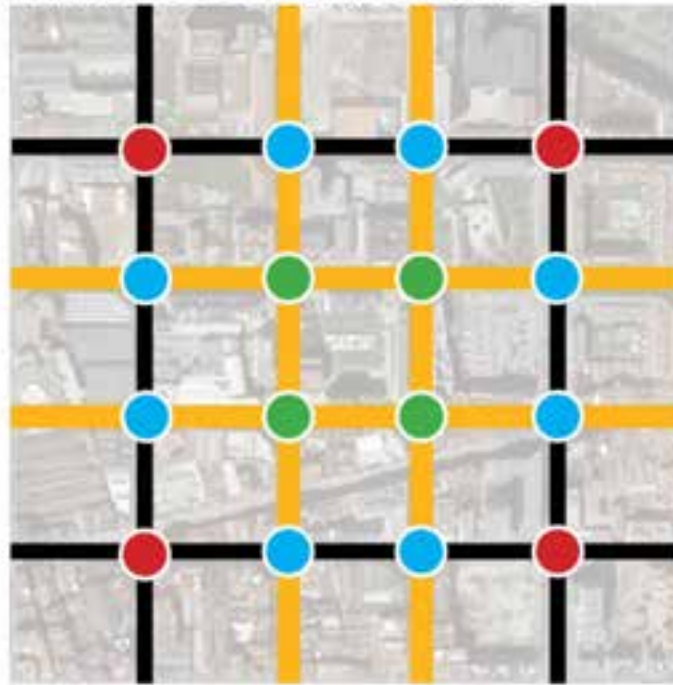
Basic unit
for **urban
management**

**Observatory &
monitoring**

Basic unit
for urban
design

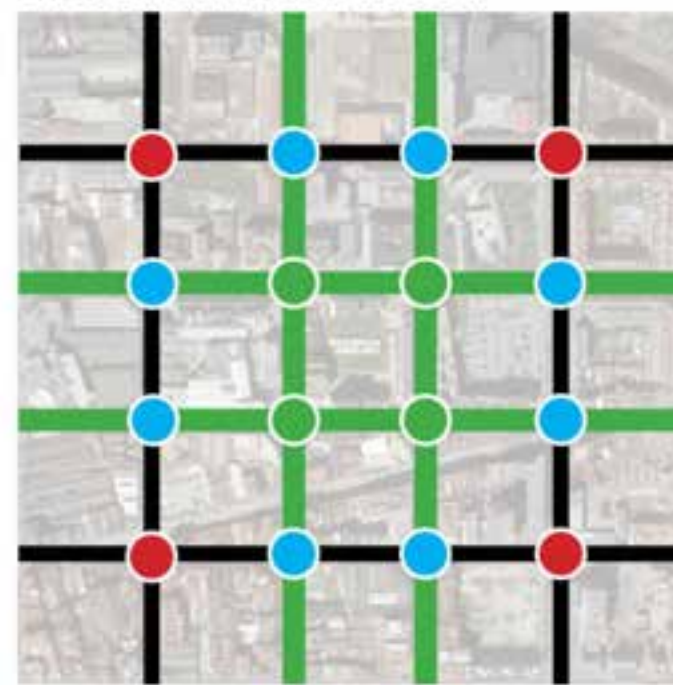
Urban legibility
& functionality

PHASE 1. FUNCTIONAL SUPERBLOCK



Basic network: 50 km/h
Local network: 20 km/h

PHASE 2. URBAN SUPERBLOCK



Basic network: 50 km/h
Local network: 10 km/h

- INTERMODAL NODE
- SERVICES NODE
- NEIGHBOUR NODE

Basic unit
for urban
design

Urban legibility & functionality



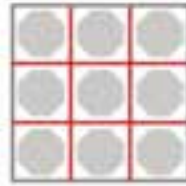
50 Km/h Basic network
PHASE 1



20 Km/h Inner Road
PHASE 1



10 Km/h Inner Road
PHASE 2



Basic unit
for urban
design

Urban legibility & functionality



Basic unit
for urban
design

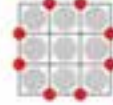
Urban legibility
& functionality

INTERMODAL NODE Intersection of Basic Road - Basic Road
PAGE 1



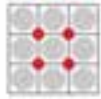
- Public Bicycle
- Electric & car-sharing
- Car-sharing/rideability
- Bus

SERVICES NODE Intersection of Basic Road - Inner Road
PAGE 2



- Loading and Unloading Zone
- Public Bicycle

NEIGHBORS NODE Intersection of Inner Road - Inner Road
PAGE 3



- Public Bicycle



Urban Mobility Plan of Barcelona 2013-2018

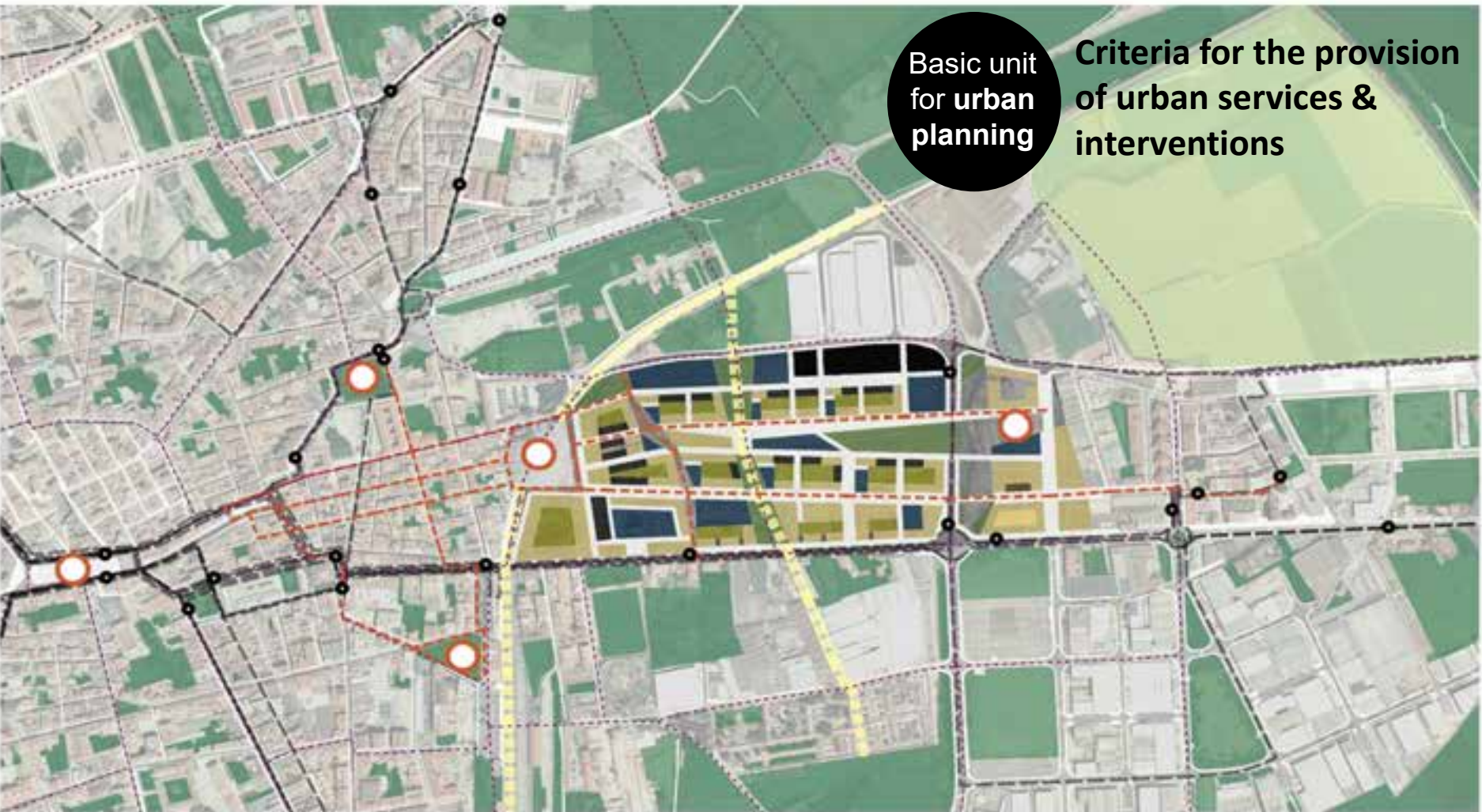
120 potential Neighbour Nodes
(= 23 ha.)

- Neighbour Node
- Urban Green Connectors
- Existing 30 km/h Zone
- Superblocks



Basic unit
for **urban
planning**

Criteria for the provision
of urban services &
interventions



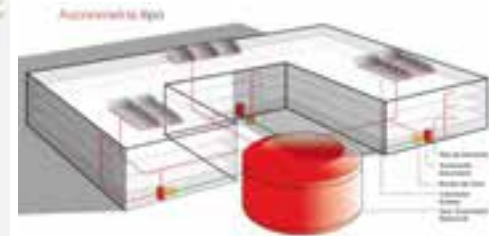
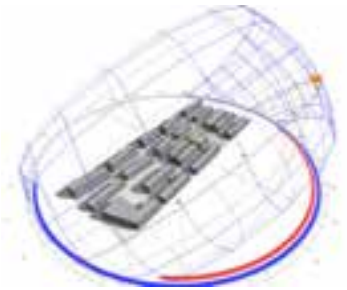
Basic unit
for urban
planning

Criteria for the provision of urban services and interventions

GREY ENERGY
181 Kg CO₂/m²
50% emission savings

BUILDINGS
70,9 kWh/m² year
40% energy savings

MOBILITY
151 MWh year
(internal displacements)
8.984 MWh year
(external displacements)



Basic unit
for urban
planning

Criteria for the
provision of
urban services
& interventions



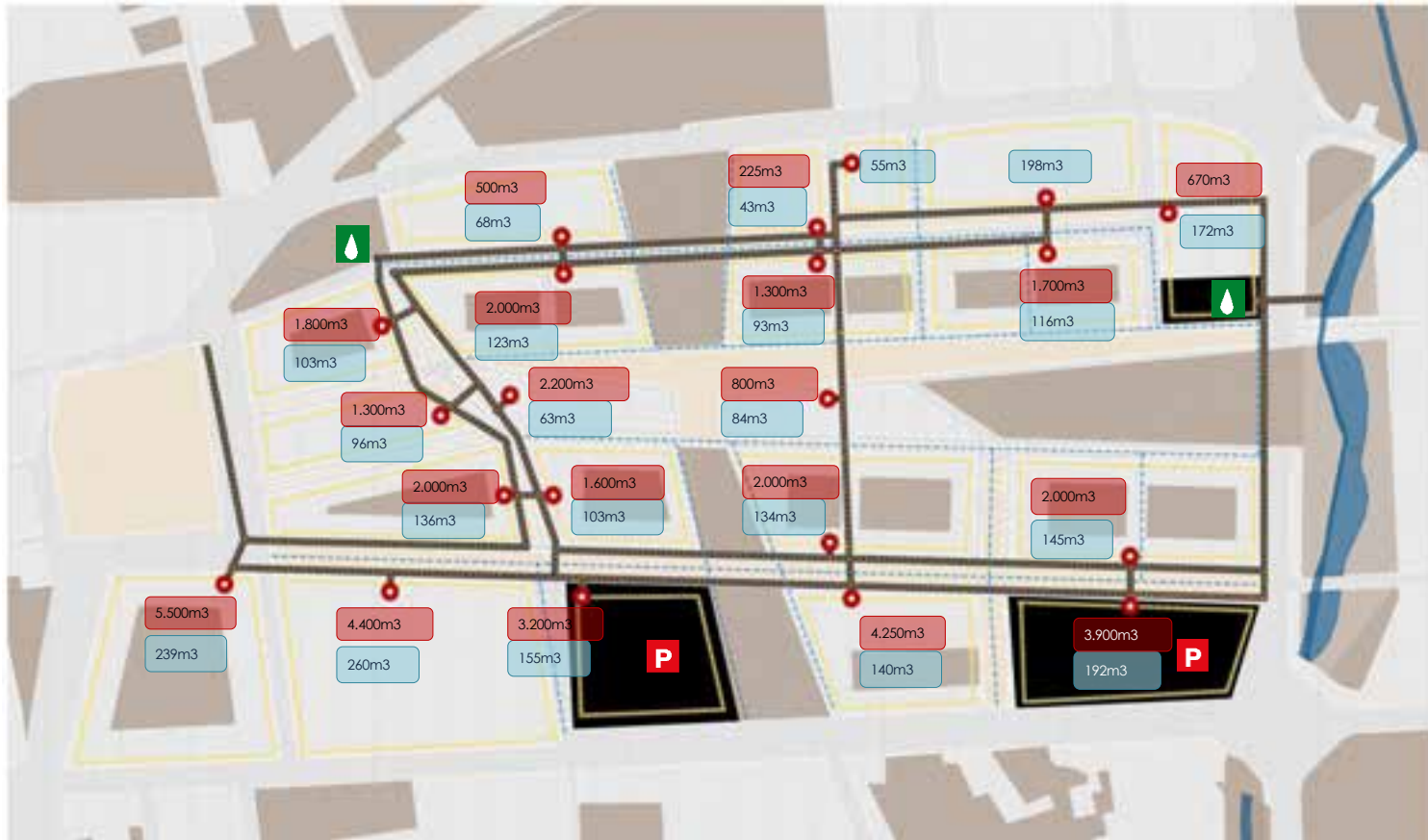
ECOLOGICAL URBANISM

GROUND LEVEL

- | | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> CODIÇA UNITAT DE PARCEL·LA EN TRACAT DE CARREB AL·LINDA D'UNA PARCEL·LA CODI PARCEL·LA URBANITAT RESIDENCIAL P8 URBANITAT RESIDENCIAL P6 URBANITAT RESIDENCIAL P4 URBANITAT RESIDENCIAL P2 | <ul style="list-style-type: none"> CIUTADANA APROXIMACIÓ EN CALÇADA DIRECCIÓ DE TRÀNSIT CARREB PRIORITAT VEHICULAR PASSEIG VORREB + V8 VORREB + S8 CANALS PARCEL·LA JARDINS PARCEL·LA D'AL·LINDA PLACES | <ul style="list-style-type: none"> XARXA DE BICI RESERVA D'ESPAI PER VEHICLES D'APARCAMENT DE VEHICLES RESERVA D'ESPAI PER MOBILITAT URBANA D'APARCAMENT DE BICICLETES RESERVA D'ESPAI PER MOBILITAT URBANA D'APARCAMENT DE VEHICLES RESERVA D'ESPAI PER MOBILITAT URBANA D'APARCAMENT DE VEHICLES |
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Basic unit for urban planning

Criteria for the provision of urban services & interventions



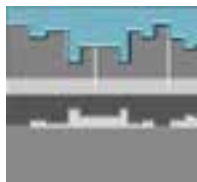
ECOLOGICAL URBANISM

UNDERGROUND LEVEL

-  ÚS GESTIÓ D'AIGUA
-  ÚS APARCAMENT RESIDENTS (SUBTERRÀNI)
-  SALA TÈCNICA
-  RESERVA VOLUM SCACS
-  RESERVA VOLUM CISTERNA AIGÜES MARGINALS
-  XARXA TRONCAL
-  XARXA SECUNDÀRIA (INTERIOR ILLA)
-  CLAVEGUERAM AIGÜES PLUVIALS

Basic unit
for urban
planning

Criteria for the provision of urban services & interventions



ECOLOGICAL URBANISM

ROOFS LEVEL

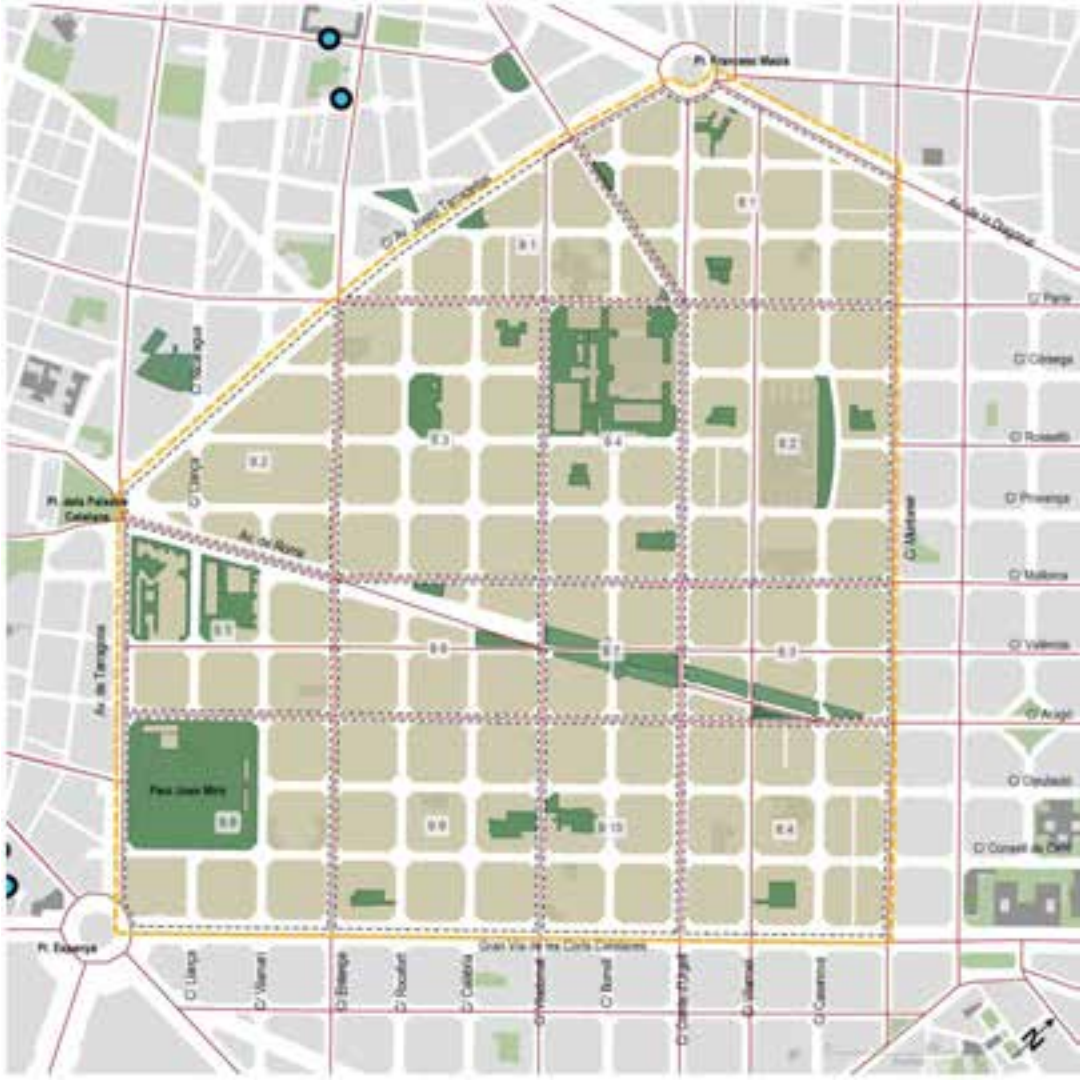
- Edificis 4m
- Edificis 7.5m a 11m
- Edificis 14.5m
- Edificis 18m
- Edificis 21.5m
- Edificis 25m
- Edificis 28.5m

- Atoral petit port (A1)
- Atoral port mitjà (A2)
- Atoral gran port (A3)

ST % COBERTA RESERVADA PER:
ST = CAPTACIÓ SOLARS TERMICS
SF SF = CAPTACIÓ SOLAR
Ús FOTOVOLTAICA
USOS EN COBERTA

Basic unit urban management

Observatory & monitoring



Parameters	Values	Unit
Housing density	100-160	dwellings/ha
Population density	250-400	inhabitants/ha
Absolute compactness	> 5	meters
Green buildability	> 1.25	m ² /m ²
Built space	50-60	m ² /inhabitant
Connected compactness	10-20	meters
Public space for citizen use	10-20	m ² /inhabitant
Modal share (private vehicle journeys)	< 10	%
Road space for pedestrians (shared users)	> 75	%
Motorized road space	< 25	%
Proximity to alternative transport	< 300	meters (bus stop and bike lane)
Air quality (pollutants exposition)	100	% population derivative WHO spp ²
Acoustic quality (noise exposition)	> 75	% population (1 at 65A daytime)
Solar radiation (sunny hours of street)	1.7-2.4	hours/day (integrable months)
Road accessibility	100	% accessible streets
Habitability index in the public space	> 75	% (points HEP)
Urban diversity index	6	lots of information
Balance of uses (% tertiary surface)	30	%
Density of activities	> 25	activities/ha
rdH	2.880	
rdH @	700	
Green space	9	m ² /inhabitant
Biotic index of soil	30	%
Total energy consumption	20.6	GWh/year (total regime)
Energy self-sufficiency	100	% (total regime)
Total water consumption	< 104	lpd (optimized consumption)
Water self-sufficiency	100	% local sources
Waste generation	1.05	kg/inhab. and day
Climate change (yearly emissions CO ₂)	6.230	l CO ₂ /year (total regime)
Basic facilities	1.8	m ² /inhabitant
Protected housing	30-80	% (operations) (1-25 % public area)
Mix of people (income, age, origin)	< 10	% segregation index
Guidance function of sustainability (E/rdH)	< 10	

Basic unit
urban
managemen
t

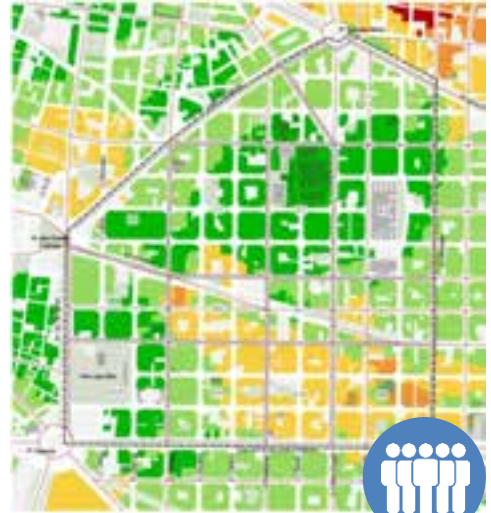
Observatory &
monitoring



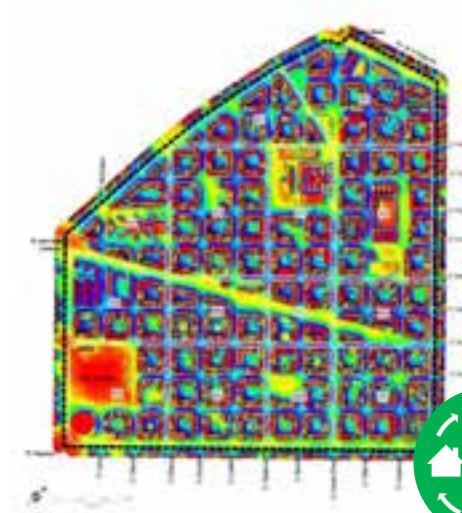
Density of economic activities



Density of population



Proximity to public facilities



Solar Radiation



Energy Consumption



Soil Permeability



Basic unit
urban
managemen
t

Observatory &
monitoring

Initial
scenario



% Street Space designated to Cars



Speed limit



Acoustic levels

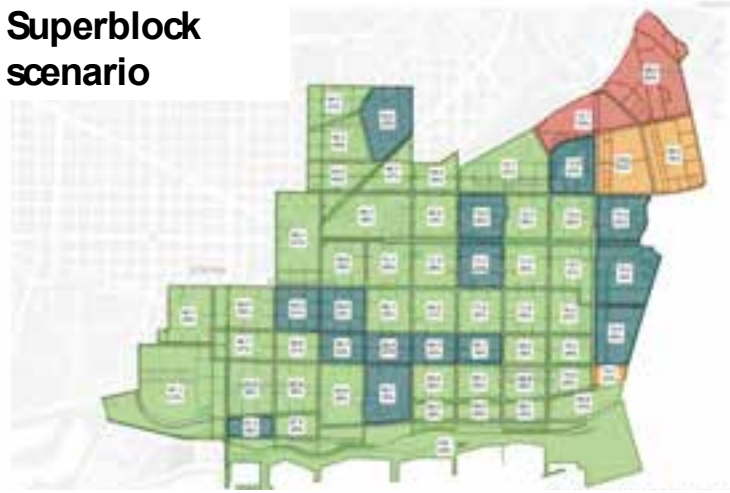


Air quality

Basic unit
urban
managemen
t

Observatory &
monitoring

Superblock
scenario



% Street Space designated to Cars



Speed limit



Acoustic levels



Air quality



Livability index

ergonomic



attraction



comfort



proximity



Observatory & monitoring

01 Ergonomical

Affect people's **displacement** and **movement** in open space

Accessibility
Pedestrians' public space
Street proportion

02 Psychological

Affect on people's **attraction**.

Green presence perception
Attractive activities
Urban diversity

03 Physiological

Affect on people's **health and comfort** wellness.

Thermal comfort level
Acoustic comfort level
Air quality

04 Walkability

Affect on people's **walking daily activities**.

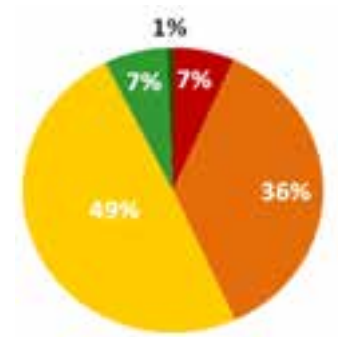
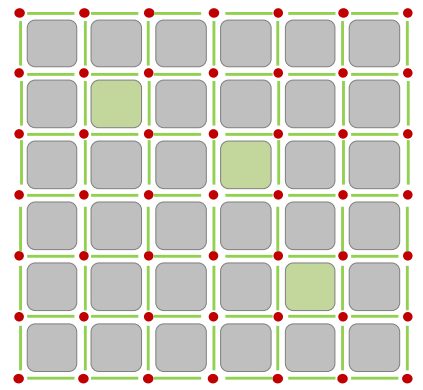
Walking accessibility to:
Sustainable mobility networks
Daily supply
Public services
Parks

Basic unit
urban
managem
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Observatory &
monitoring

Livability index

Initial situation

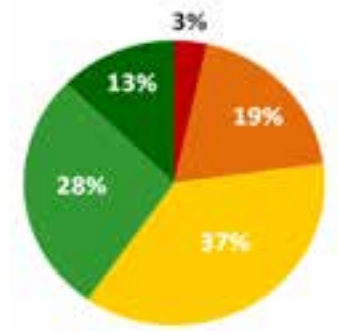
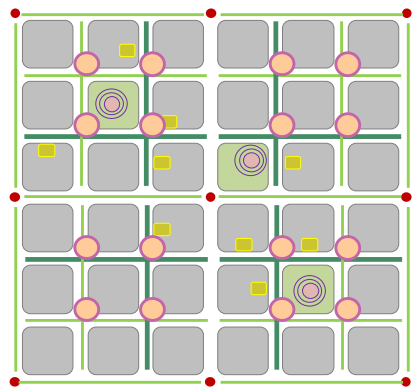


Basic unit
urban
managem
t

Observatory &
monitoring

Livability index

Superblocks scenario





initial scenario

Observatory & monitoring



Results Superblock pilot area (Les Corts)



future scenario



Superblocks

examples of application



Implementation evolution

Gràcia 2004-2005
SUMP District Gràcia



Program 2019-2023
To be continued...

Vila de Gràcia



1

2

3

4

Program 2013 - 2015
Impuls de Superilles Pilot a Barcelona

Program 2016 - 2019
Omplim de vida els Carrers de Barcelona



Results Superblocks in Barcelona City





Barcelona

Catalonia

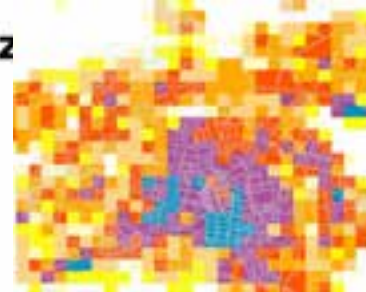
1.620.343 inhab.
8.036.260 disp.
101,9 km² area
15.901 inhab/km²
1.795 business/km²



Vitoria-Gasteiz

Basque Country

249.176 inhab.
911.307 disp.
276 km² area
902,8 inhab/km²
53 business/km²



Superblock's model application

Adaptation to Urban Fabric

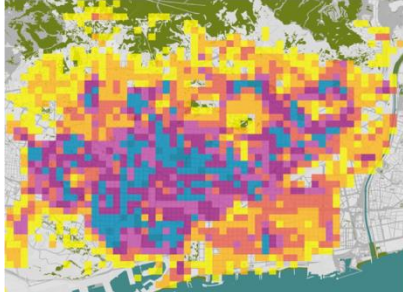


504

units

68





Barcelona

Catalonia

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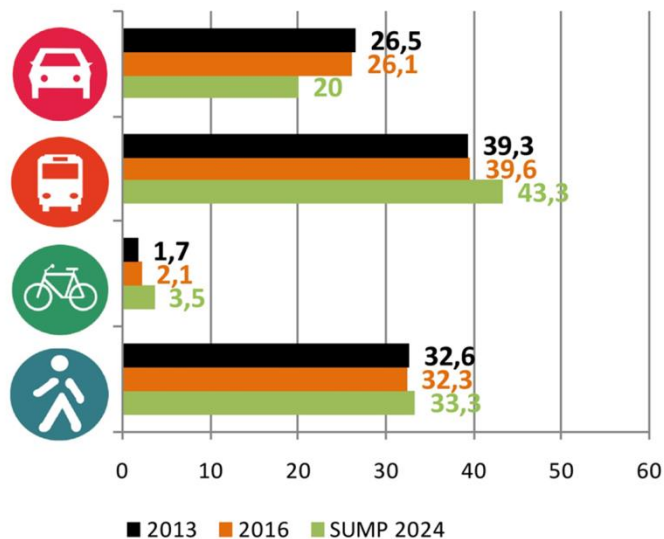
Vitoria-Gasteiz

Basque Country

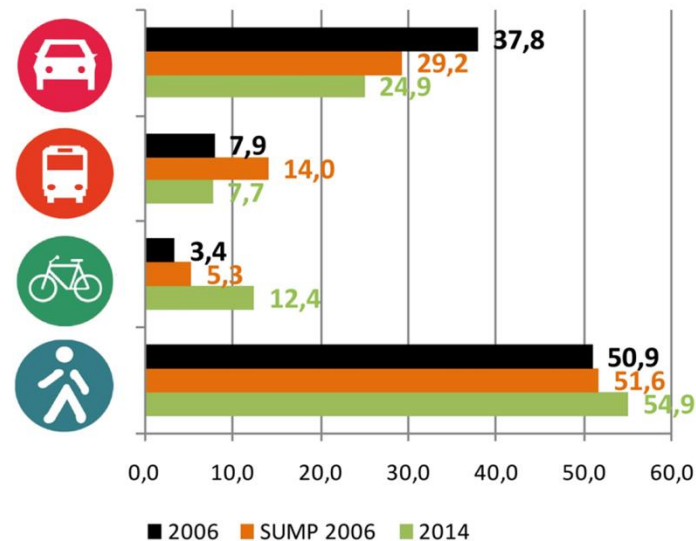
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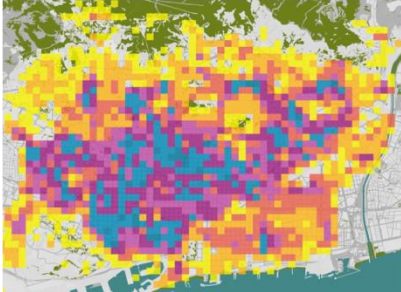
Superblock SUMP's Modal Split



Barcelona



Vitoria-Gasteiz



Barcelona

Catalonia

1.620.343 inhab.

8.036.260 disp.

101,9 km² area

15.901 inhab/km²

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Vitoria-Gasteiz

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249.176 inhab.

911.307 disp.

276 km² area

902,8 inhab/km²

53 business/km²



Superblock SUMP Results

(initial - final scenarios)

BICYCLES

population proximity to network



population proximity to network



PUBLIC TRANSPORTATION

population with GAI < 45 minutes



population with GAI < 35 minutes



ACOUSTIC COMFORT

population exposed to >65dB



population exposed to >65dB



AIR QUALITY

population > 40μ/m³ NO_x



population > 40μ/m³ NO_x



Bicycle Network in Barcelona



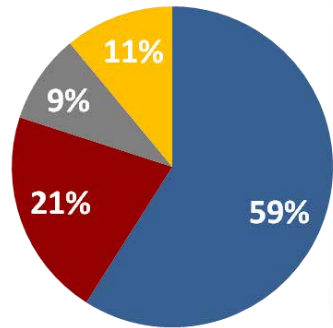
Main objectives

✓ Increase bicycle displacements by **75% by 2024** respect 2016

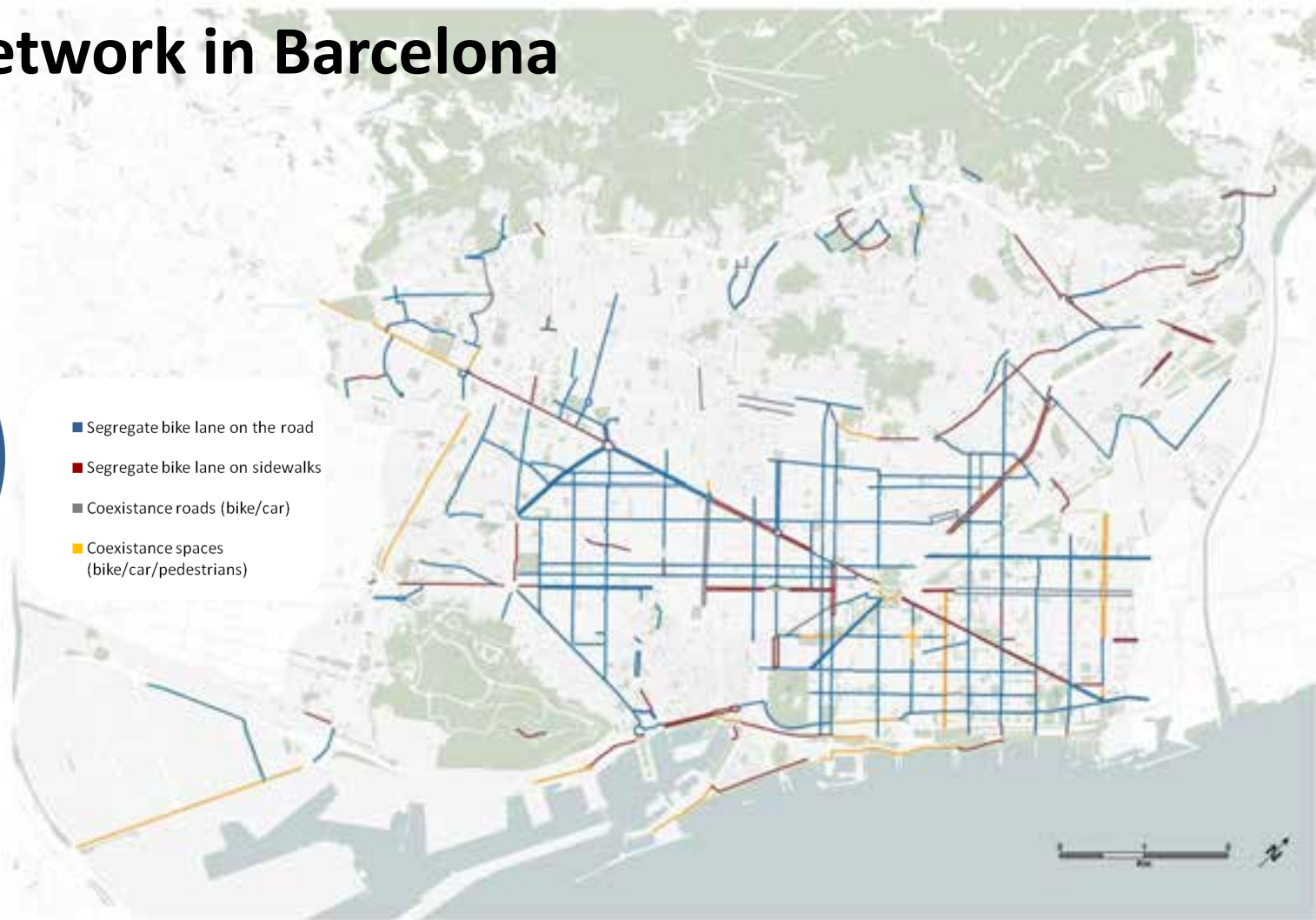
(*> 12,103 displacements per day*)

✓ Pass modal split from **2,1% to 3,5%**

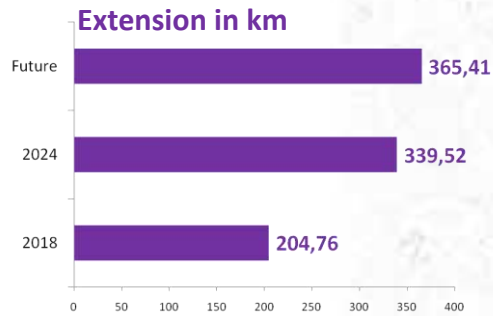
Bicycle Network in Barcelona



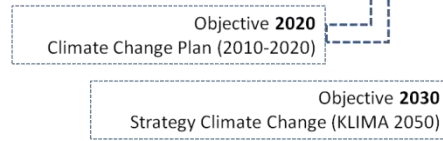
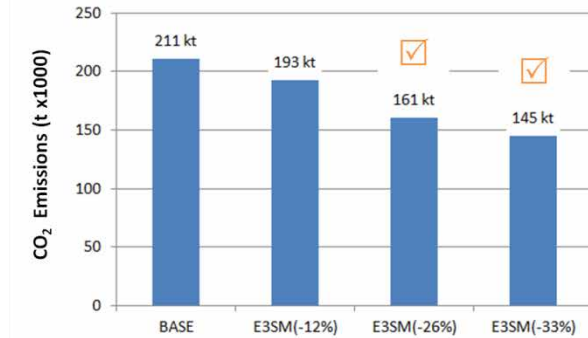
- Segregate bike lane on the road
- Segregate bike lane on sidewalks
- Coexistence roads (bike/car)
- Coexistence spaces (bike/car/pedestrians)



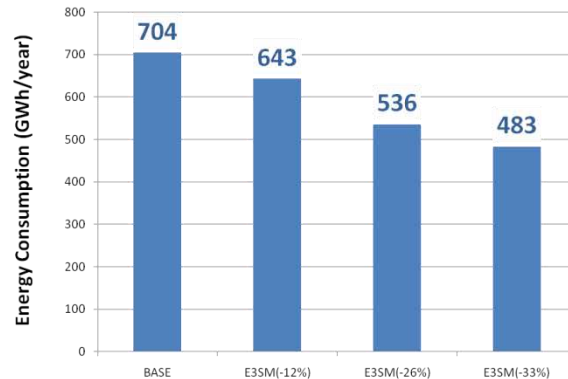
Bicycle Network in Barcelona



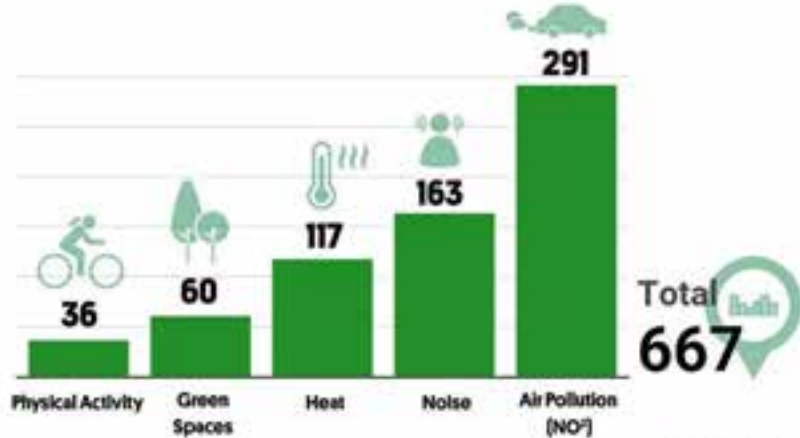
VITORIA-GASTEIZ SUMP – ANNUAL CO₂ EMISSIONS



VITORIA-GASTEIZ SUMP – ENERGY CONSUMPTION



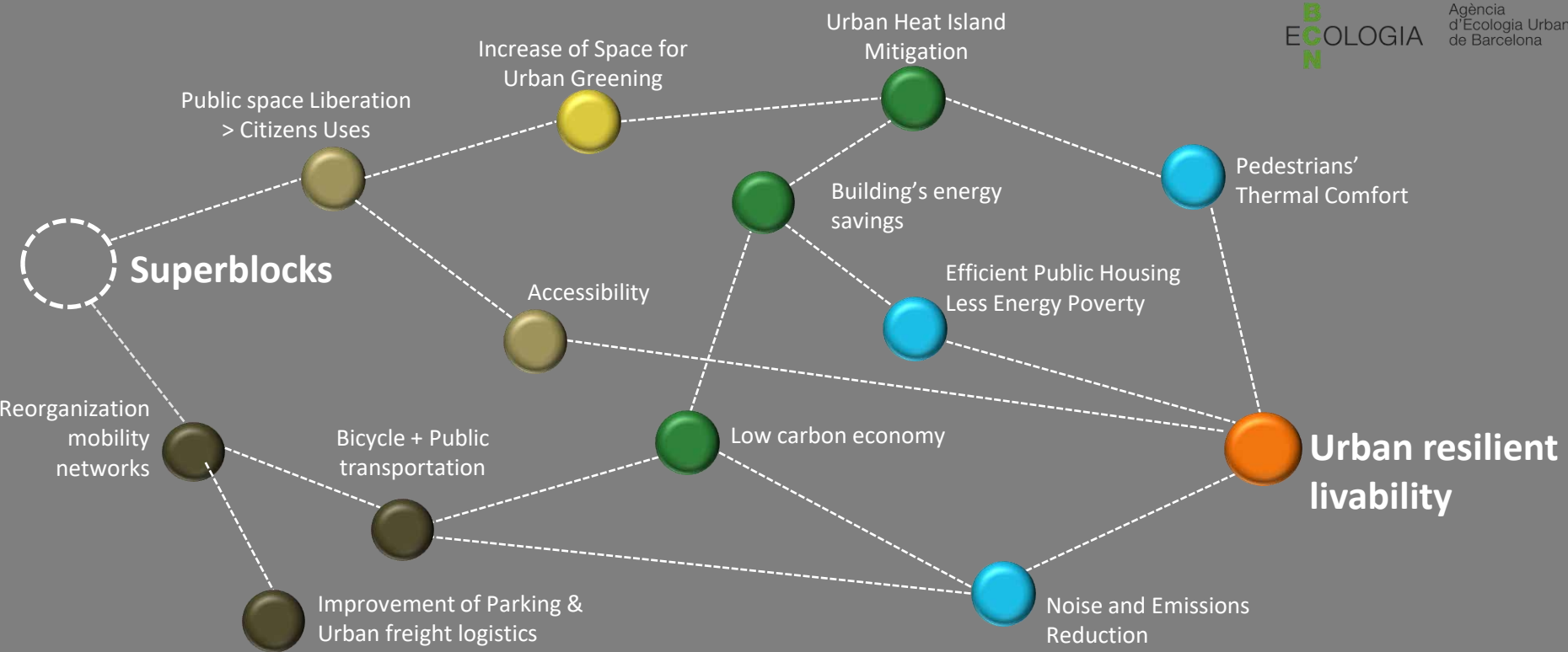
Annual Premature Deaths that the "Superblocks" Model Could Avoid in Barcelona



Source: Mueller et al. Changing the urban design of cities for health: the Superblock model. Environment International. 2018

ISGlobal

Superblocks
a starting point of
ecological transition



One Activity: Mobility



Mobility

5 Rights in urban context: Multiple activities





Col·lectiu



Superilla
Poblenou



Col·lectiu



Superilla
Poblenou





**Thank you for
your attention!**

Cynthia Echave
cynthiaechave@bcnecologia.net