European Transport Safety Council

Brescia, 8th March 2016

Sustaining sustainable transport: walking and cycling in a safe and healthy urban space

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University of Brescia - http://dicata.ing.unibs.it/tira/

UNITED NATIONS
SUSTAINABLE DEVELOPMENT SUMMIT 2015
25 - 27 SEPTEMBER


SUSTAINABLE
DEVELOPMENT
GOALS


1 NO POVERTY
2 NO HUNGER
3 GOOD HEALTH
4 QUALITY EDUCATION
5 GENDER EQUALITY
6 CLEAN WATER AND SANITATION
7 CLEAN ENERGY
8 GOOD JOBS AND ECONOMIC GROWTH
9 INNOVATION AND INFRASTRUCTURE
10 REDUCED INEQUALITIES
11 SUSTAINABLE CITIES AND COMMUNITIES
12 RESPONSIBLE CONSUMPTION
13 PROTECT THE PLANET
14 LIFE BELOW WATER
15 LIFE ON LAND
16 PEACE AND JUSTICE
17 PARTNERSHIPS FOR THE GOALS
THE GLOBAL GOALS

Transforming our world –
The 2030 Agenda for
Sustainable Development


11
SUSTAINABLE CITIES
AND COMMUNITIES

GOAL 11

MAKE CITIES AND HUMAN SETTLEMENTS INCLUSIVE, SAFE, RESILIENT AND SUSTAINABLE

SUSTAINABLE DEVELOPMENT GOALS

More at sustainabledevelopment.un.org/sdgsproposal

Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable

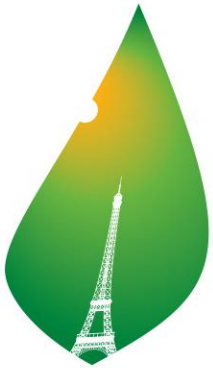
- 11.1 By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums
- 11.2 By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons
- 11.3 By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries
- 11.4 Strengthen efforts to protect and safeguard the world's cultural and natural heritage
- 11.5 By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations

- 11.6 By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management
- 11.7 By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities
- 11.a Support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning
- 11.b By 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015-2030, holistic disaster risk management at all levels
- 11.c Support least developed countries, including through financial and technical assistance, in building sustainable and resilient buildings utilizing local materials

FRANCESCO

Laudato si'

sulla cura
della casa comune



PARIS2015
UN CLIMATE CHANGE CONFERENCE
COP21·CMP11

30 NOVEMBRE - 11 DÉCEMBRE 2015

21E CONFÉRENCE DES NATIONS UNIES SUR LE CHANGEMENT CLIMATIQUE

TOUS ENSEMBLE POUR LE CLIMAT

30 NOVEMBER - 11 DECEMBER 2015

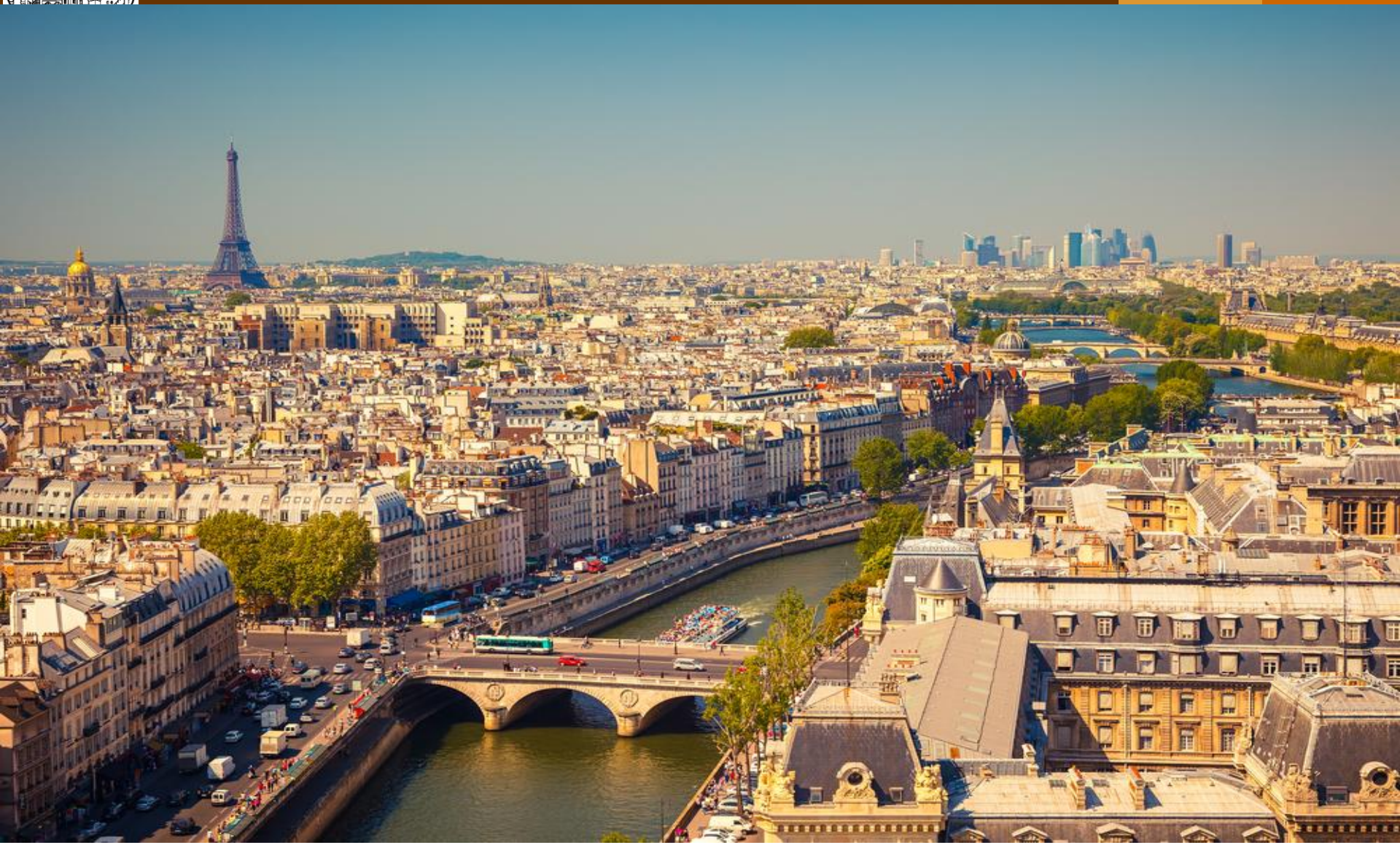
21ST UNITED NATIONS CLIMATE CHANGE CONFERENCE

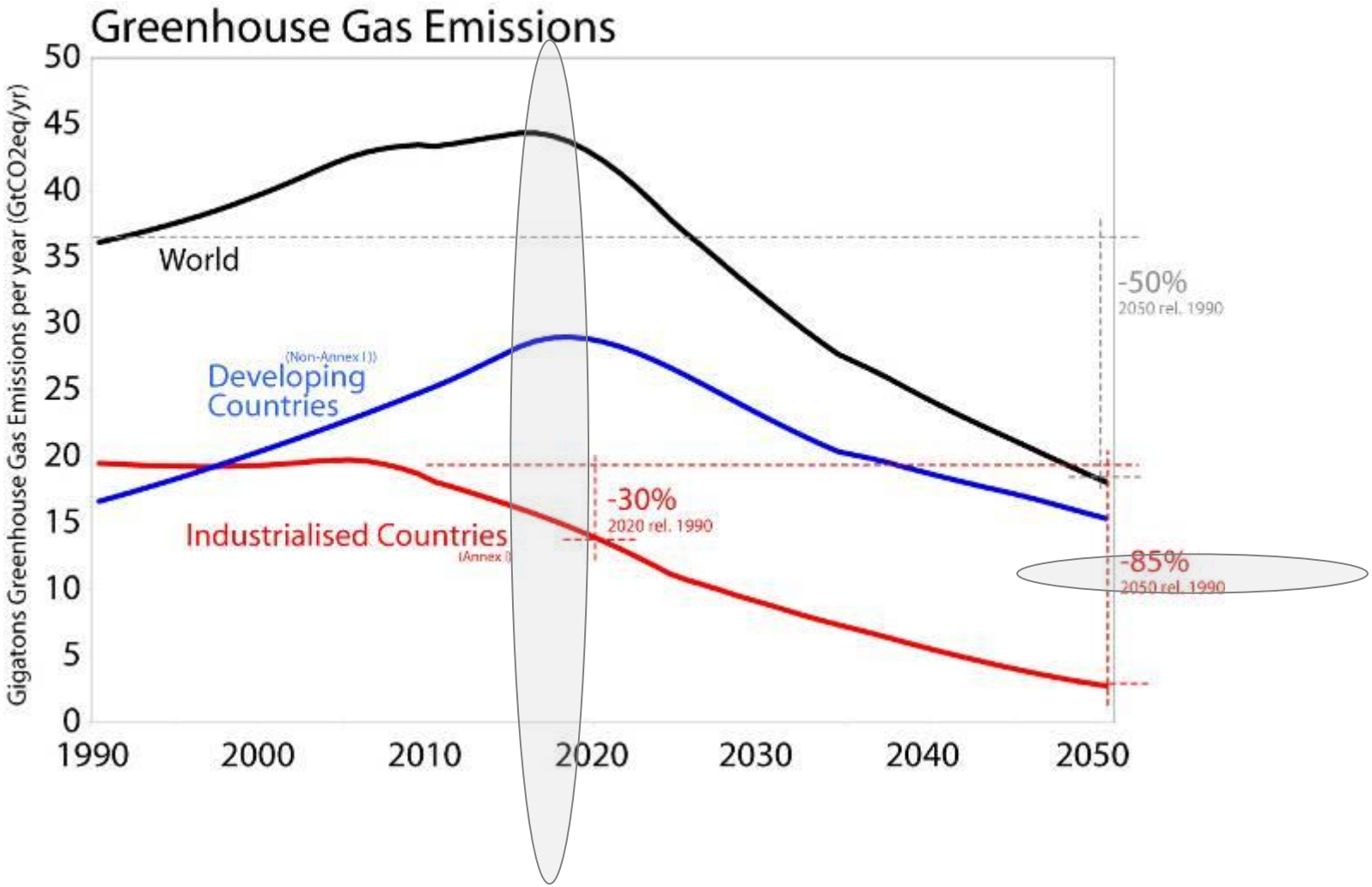
UNITED FOR CLIMATE ACTION

cop21.gouv.fr

THE NANTES DECLARATION OF

Mayors and Subnational Leaders on Climate Change




Greenhouse Gas Emissions
Gigatons Greenhouse Gas Emissions per year (GtCO2eq/yr)
50
45
40
35
30
25
20
15
10
5
0
1990
2000
2010
2020
2030
2040
2050
World
(Non-Annex I))
Developing Countries
Industrialised Countries
(Annex I)
-50%
2050 rel. 1990
-30%
2020 rel. 1990
-85%
2050 rel. 1990

HABITAT III

THE UNITED NATIONS CONFERENCE ON HOUSING AND SUSTAINABLE URBAN DEVELOPMENT

2016

>> TIMELINE

1976

HABITAT I

WORLD URBAN POPULATION **37.9%**

The United Nations General Assembly convened the Habitat I Conference in Vancouver in 1976, as governments began to recognize the need for sustainable human settlements and the consequences of rapid urbanization, especially in the developing world.

At that time, urbanization and its impacts were barely considered by the international community, but the world was starting to witness the greatest and fastest migration of people into cities and towns in history as well as rising urban population through natural growth resulting from advances in medicine.

MAIN OUTCOMES

// Recognition that shelter and urbanization are global issues to be addressed collectively

// Creation of the United Nations Center for Human Settlements (UNCHS-Habitat)

1996

HABITAT II

WORLD URBAN POPULATION **45.1%**

The Vancouver commitments were reconfirmed twenty years later, at the Habitat II Conference in Istanbul.

World leaders adopted the Habitat Agenda as a global plan of action for adequate shelter for all, with the notion of sustainable human settlements driving development in an urbanizing world.

MAIN OUTCOMES

// Cities are the engines of global growth

// Urbanization is an opportunity

// Call for a stronger role of local authorities

// Recognition of the power of participation

2016

HABITAT III

FORTY YEARS LATER...

It is becoming more and more clear that achievements on sustainable development will depend on how we will manage and guide global urbanization:

// Urbanization as an endogenous source of **Development**

// New urban models are required to effectively address the challenge of **Climate Change**

// Urbanization as a tool for **Social Integration and Equity**. In 2010, UN-Habitat reported that more than 827 million people were living in slum-like conditions

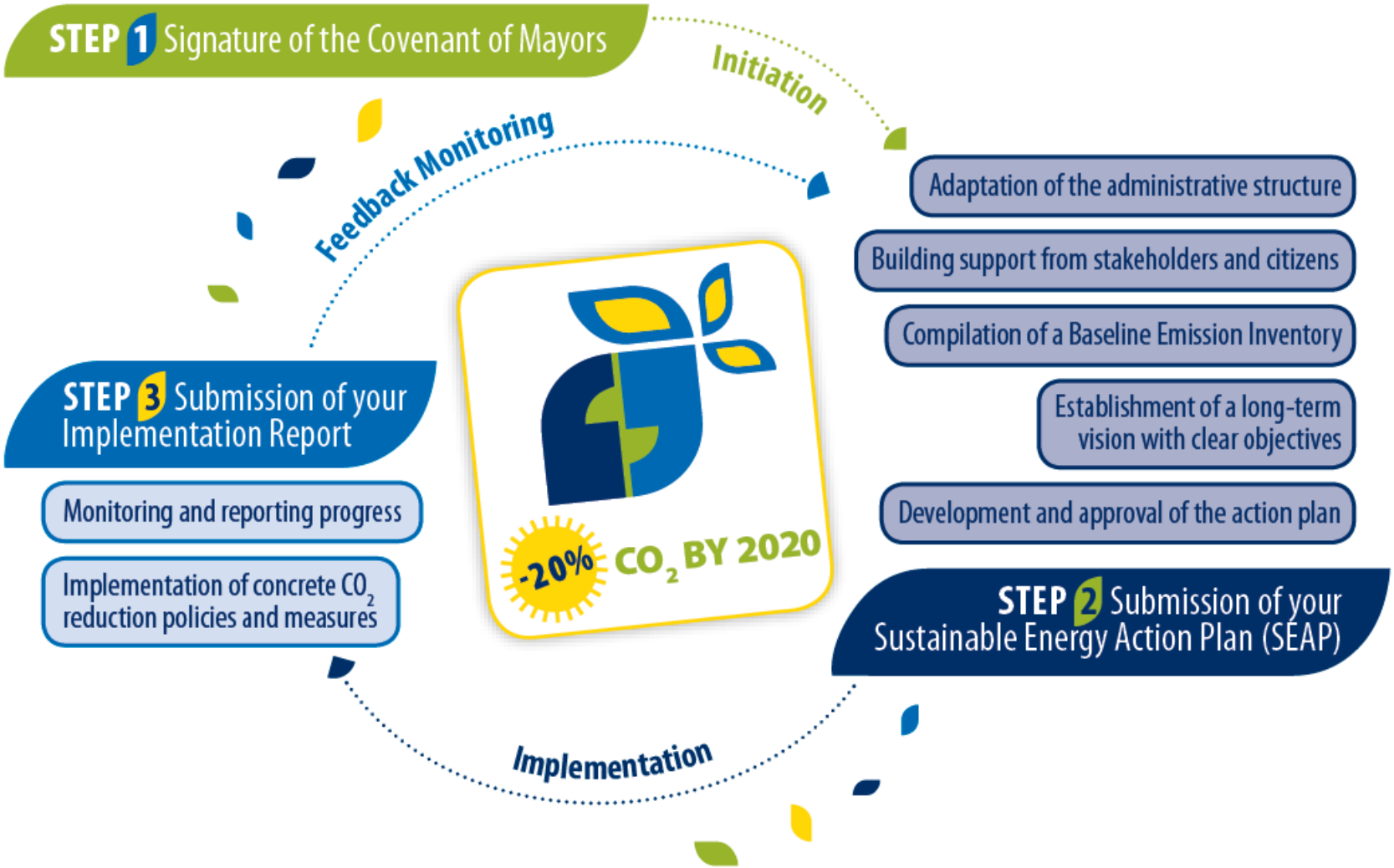
WORLD URBAN POPULATION **54.5%**

The Covenant at a glance

- EU initiative launched in 2008 by the Commission – DG ENERGY to endorse and support local and regional authorities in the fight against climate change

- Voluntary commitment of signatories to meet and exceed the EU **20% CO_2 reduction** target through the implementation of a **Sustainable Energy Action Plan**

The Covenant step-by-step



The Covenant Community

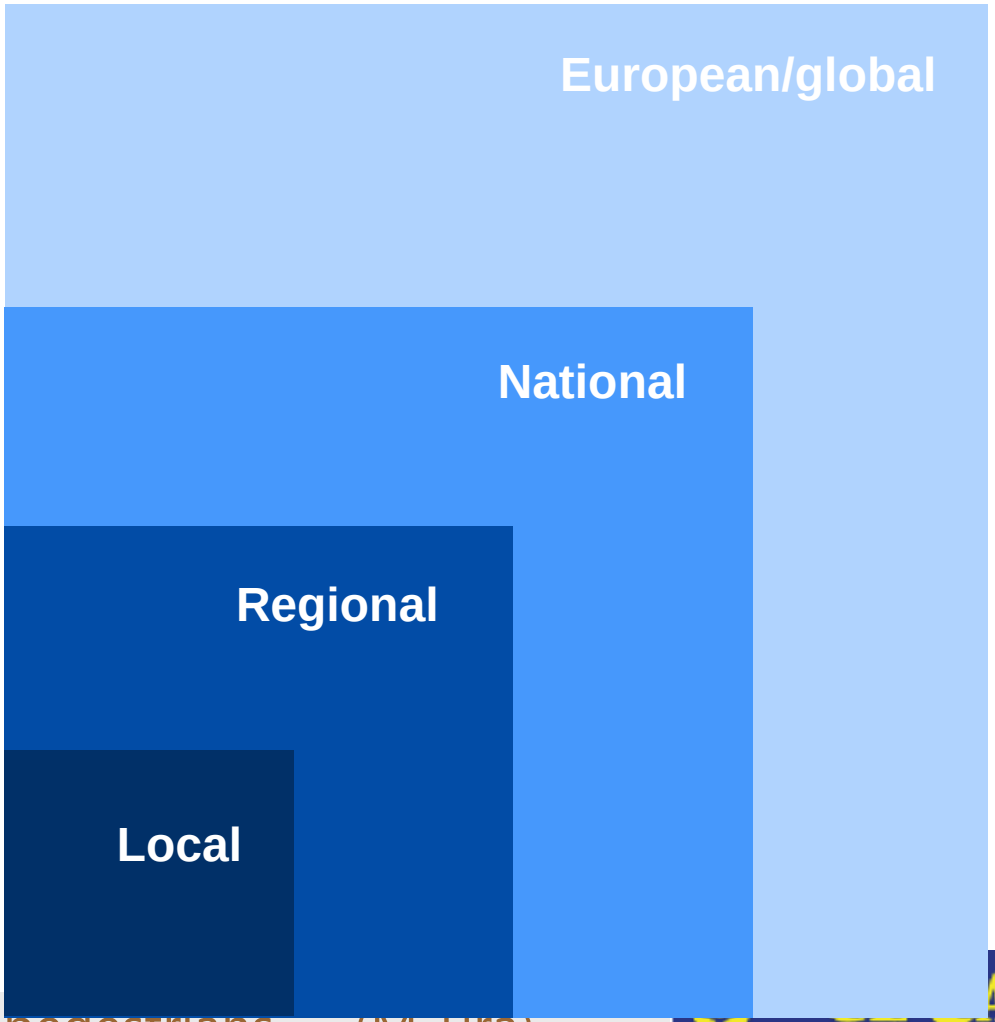
Associated Partners
European federations of companies, NGOs, international networks

Supporters
LAs' networks, associations

National Coordinators
National Energy Agencies

Territorial Coordinators
Regions, Provinces

Signatories
Villages, Towns, Cities, Counties, grouping of local authorities



The Covenant key figures

... > **6,000+** signatory cities,

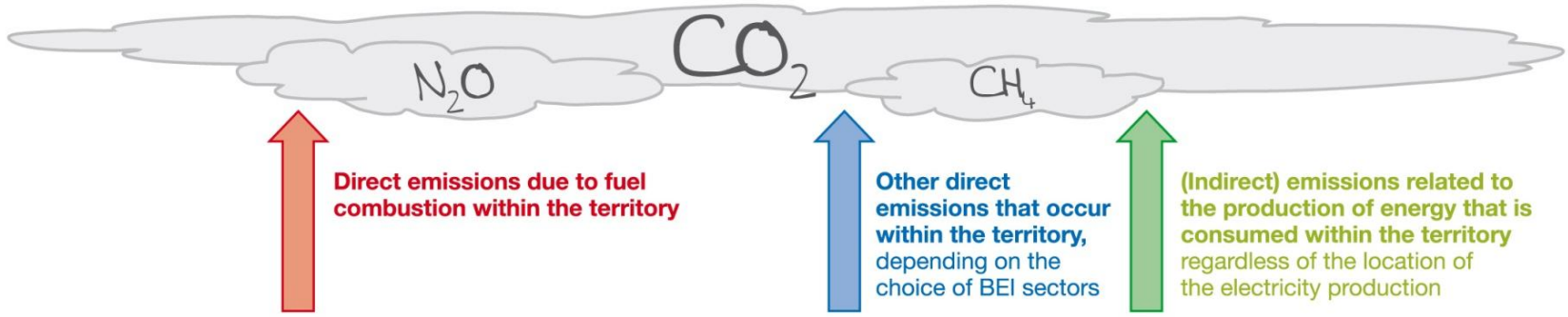
... **250** regions, provinces & grassroots associations,

... **25** associated partners

... > **4,000** Sustainable Energy Action Plans adopted

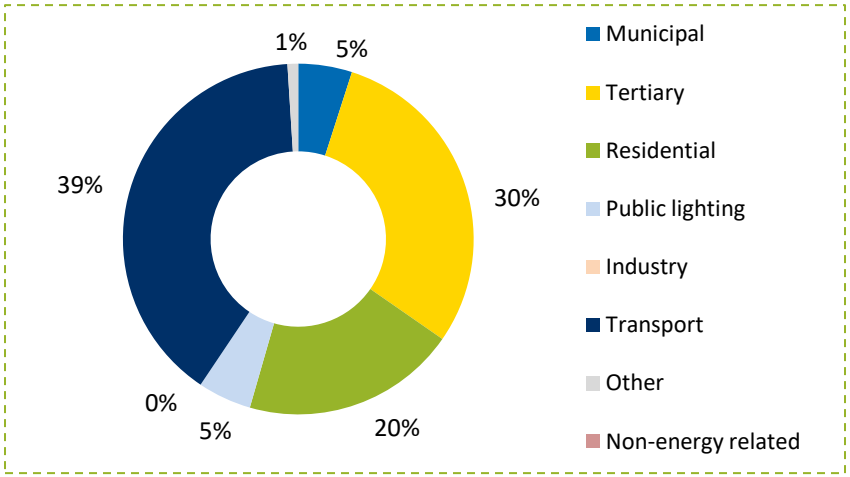
... about **25%** CO_2 emissions reduction commitment

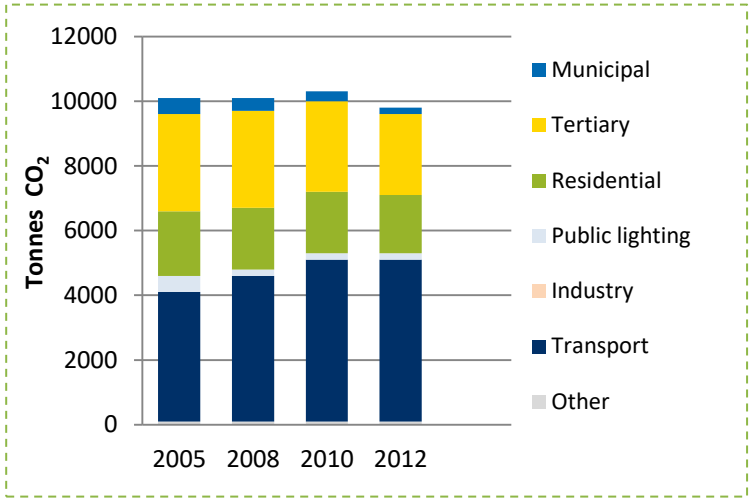
Sustainable Energy Action Plan

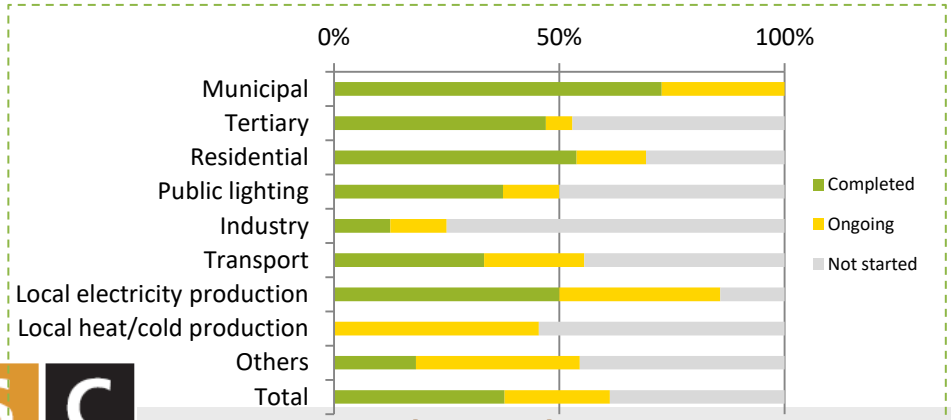


Buildings, equipments & facilities	Transport	Industries (ETS excluded)	Waste & waste water	Local energy production

Outcomes: Covenant Online

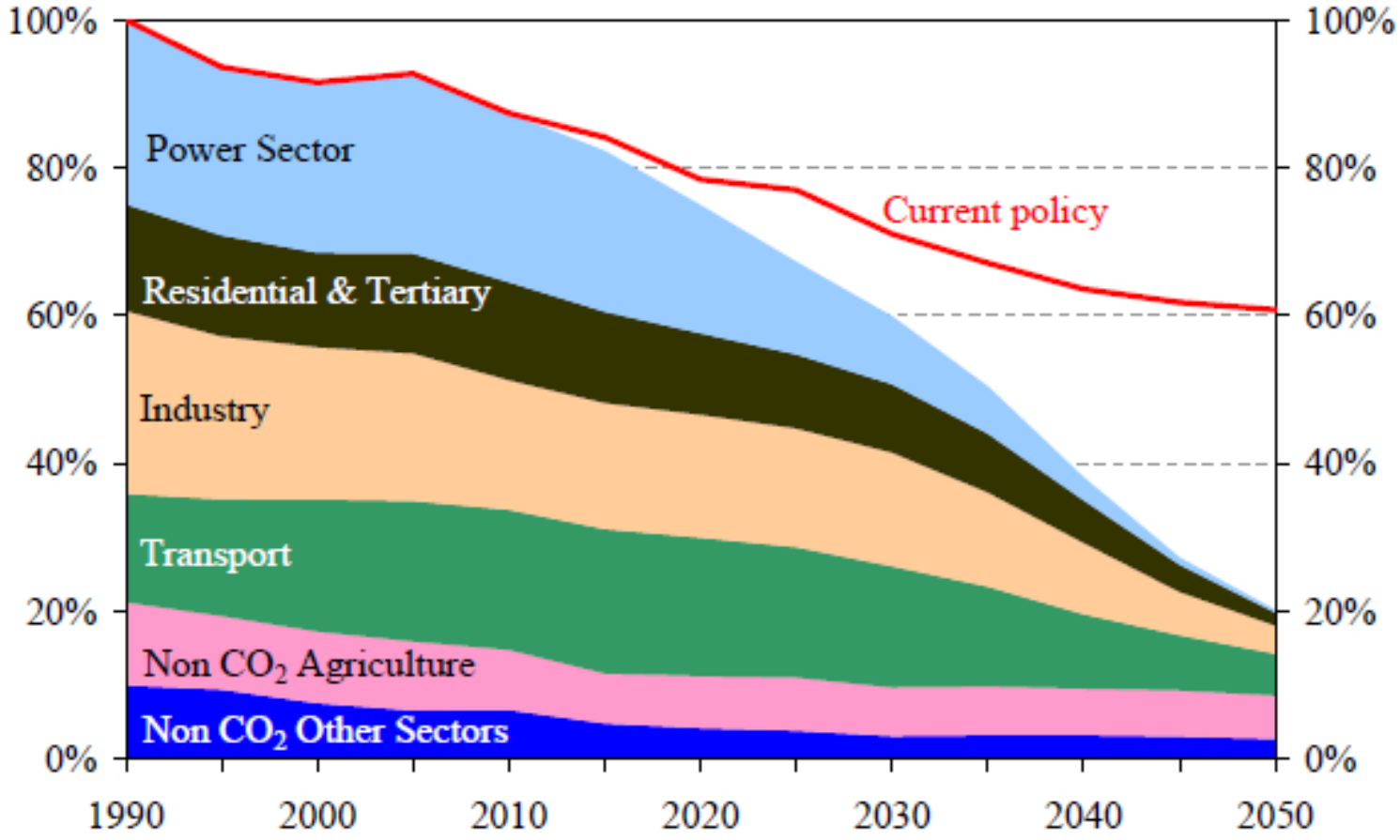




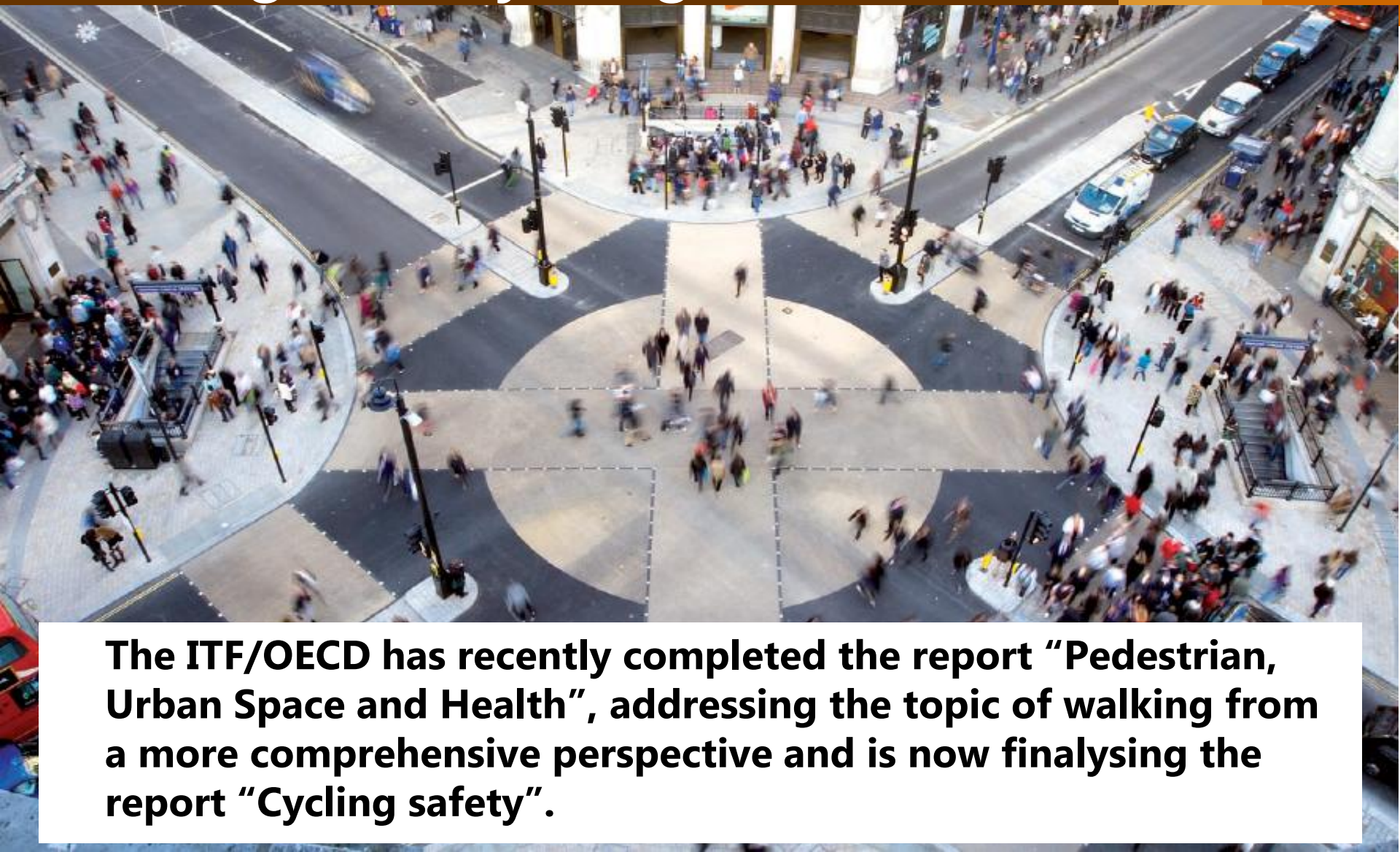


Visibility and transparency!

Figure 1: EU GHG emissions towards an 80% domestic reduction (100% =1990)



Walking anc cycling



The ITF/OECD has recently completed the report "Pedestrian, Urban Space and Health", addressing the topic of walking from a more comprehensive perspective and is now finalising the report "Cycling safety".

Why that is still an issue …

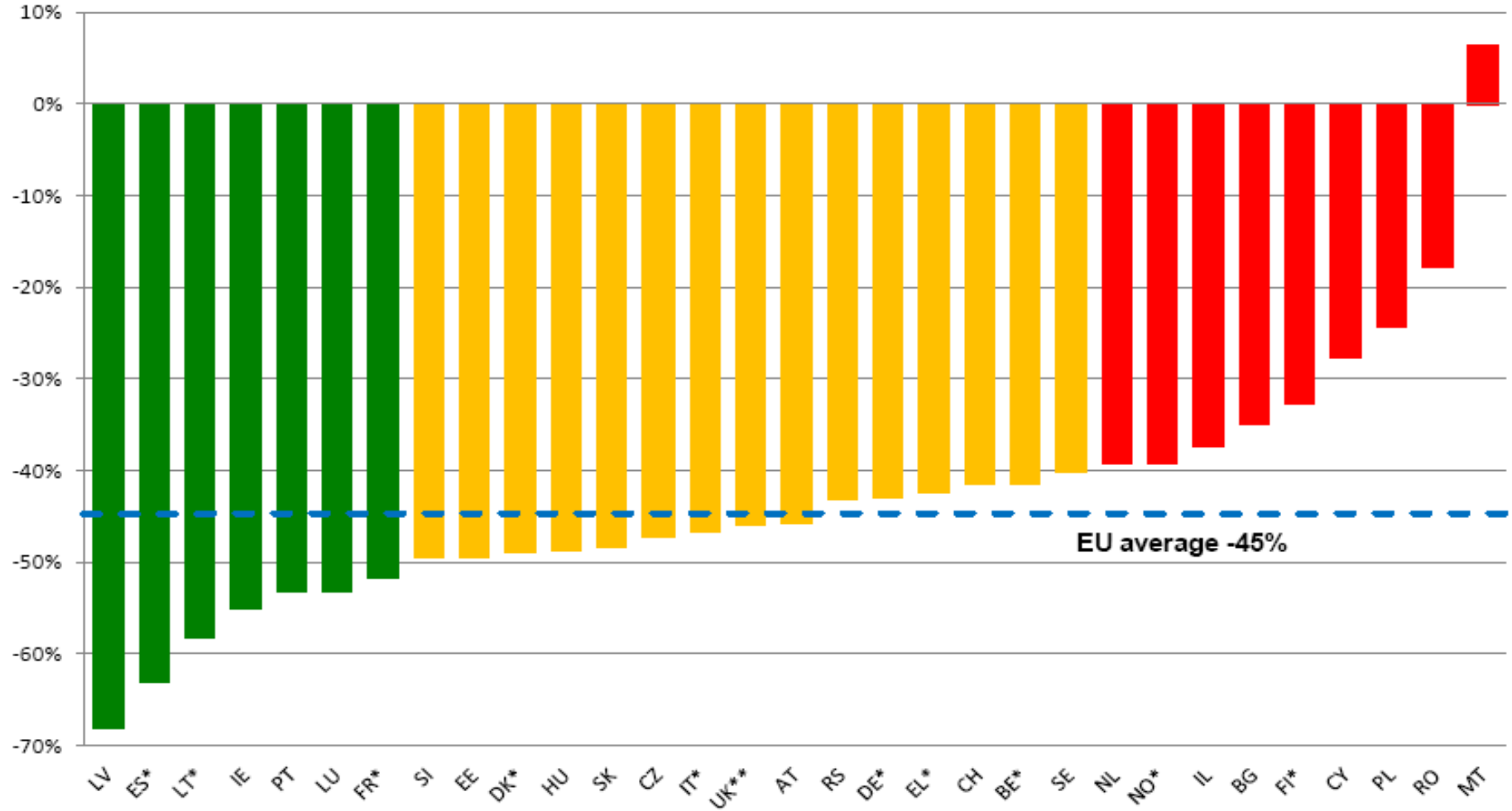
Between 2001 and 2009, some 107,700 pedestrians and cyclists were killed on EU roads, 9,250 of them in 2009 (6,900 pedestrians + 2,350 cyclists).

Within this 9-year period, deaths among this category of road users have been decreasing at a lower rate than for vehicle occupants, respectively **34%** compared with **41%.**

Pedestrian and cyclist accidents account for **26%** of all road fatalities!

What has been achieved so far …

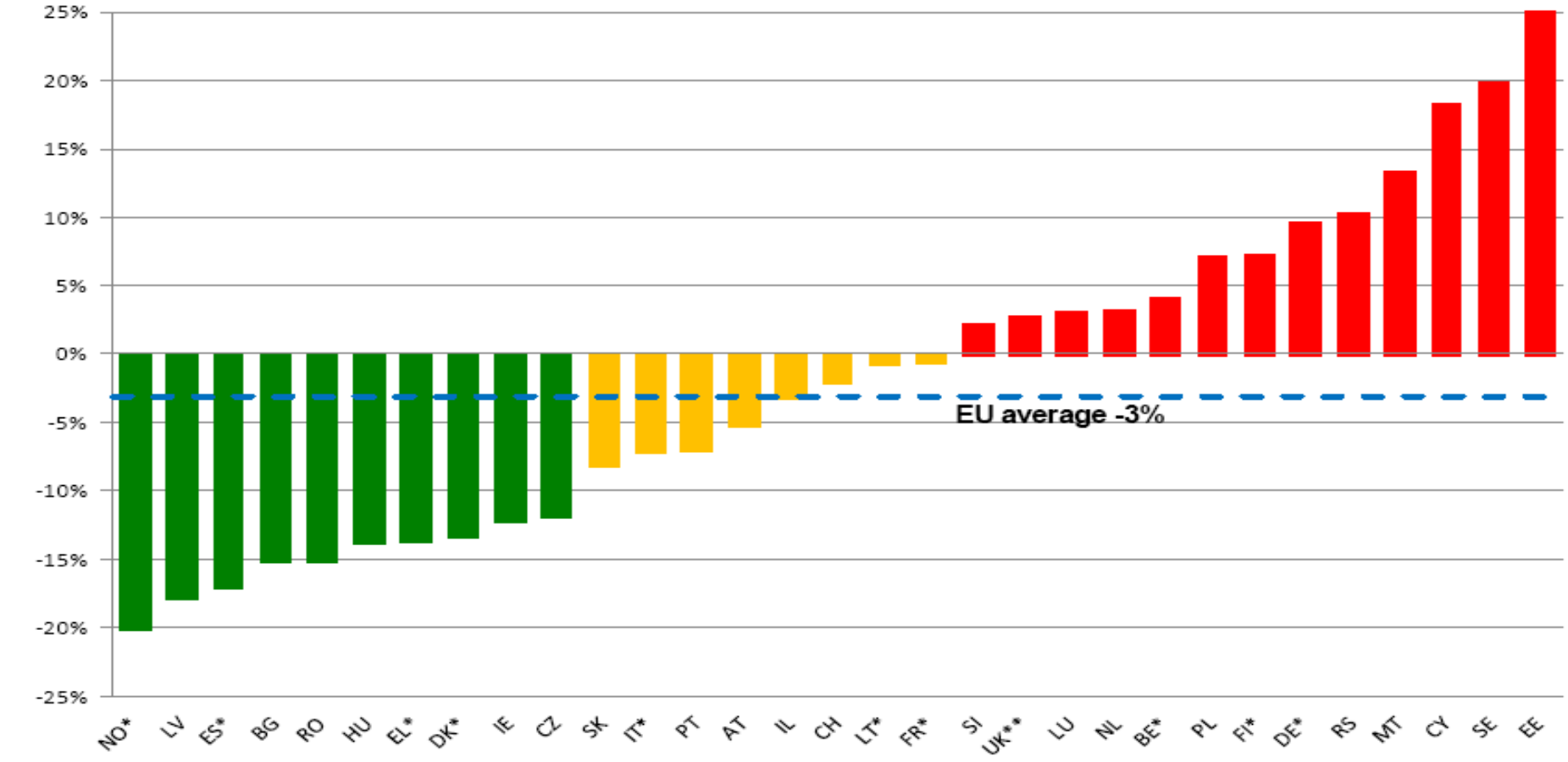
What has been achieved so far (Source ETSC)



Percentage change in road deaths between 2001 and 2011

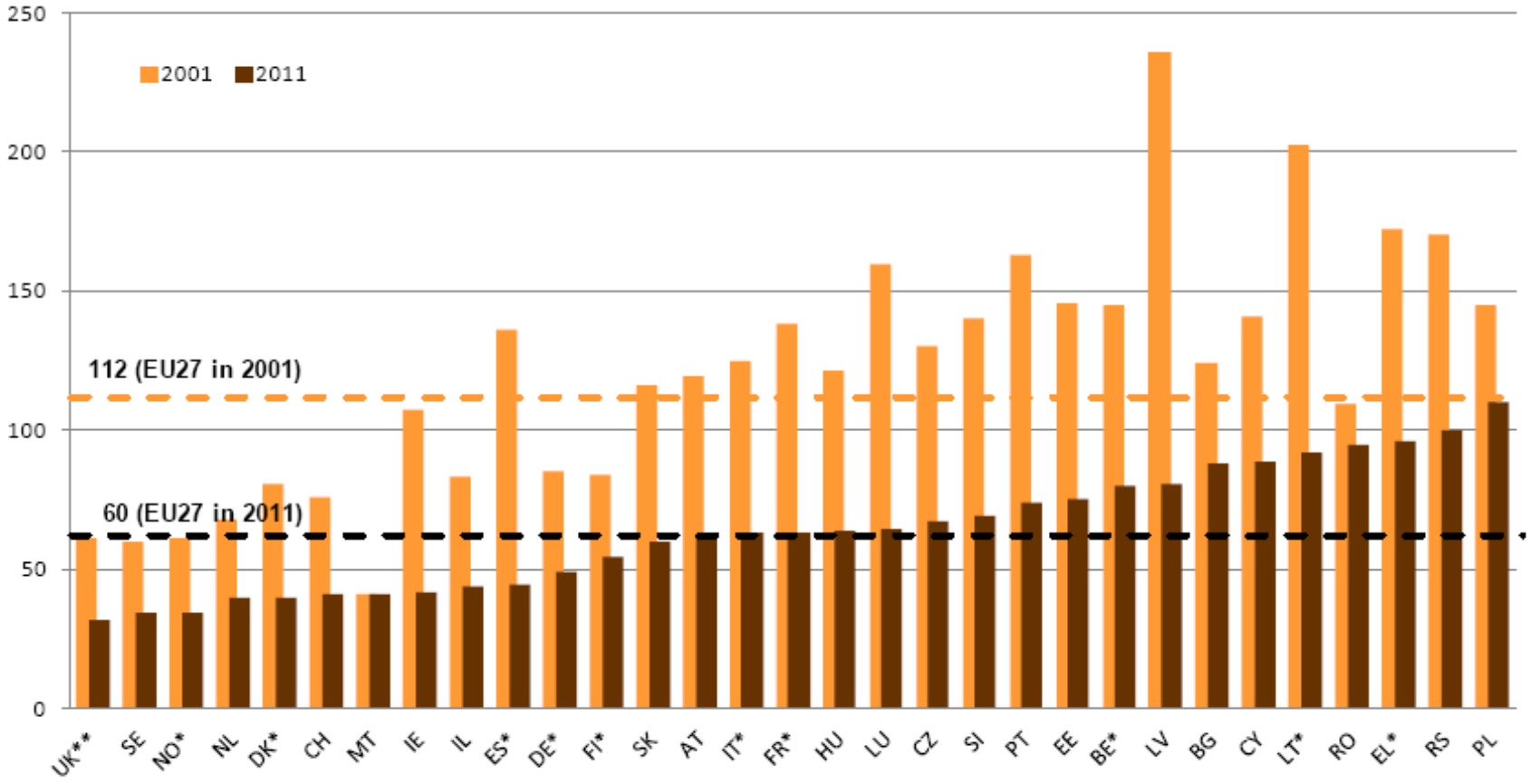
** Provisional estimates for 2011 from now on*

What has been achieved so far (Source ETSC)



Percentage change in road deaths between 2010 and 2011

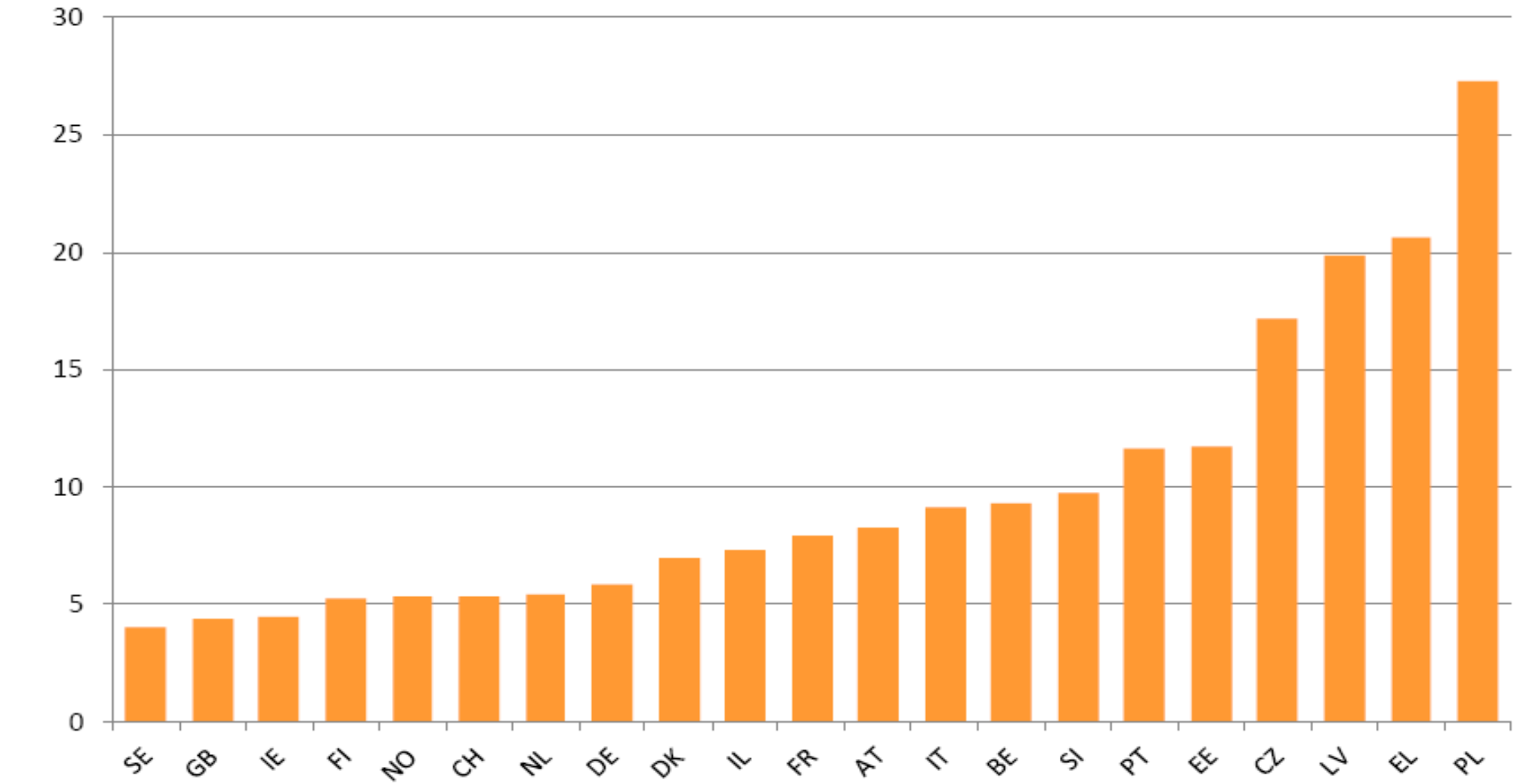
What has been achieved so far (Source ETSC)



Road deaths per million inhabitants in 2011 (with road deaths per million inhabitants in 2001 for comparison)

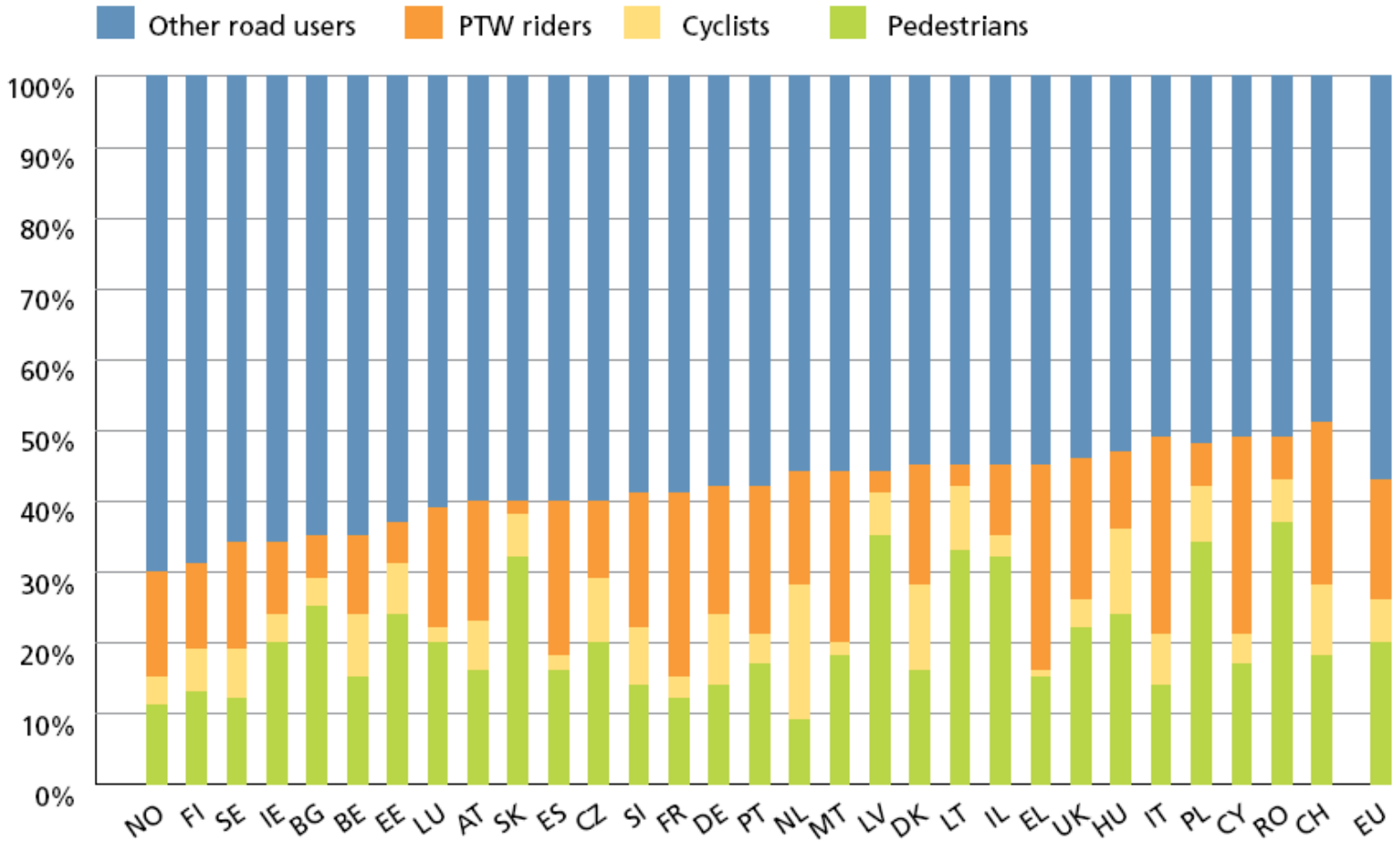
Why a stronger effort is needed …especially for pedestrians and cycle and PTW users?

Why a stronger effort is needed (Source ETSC)



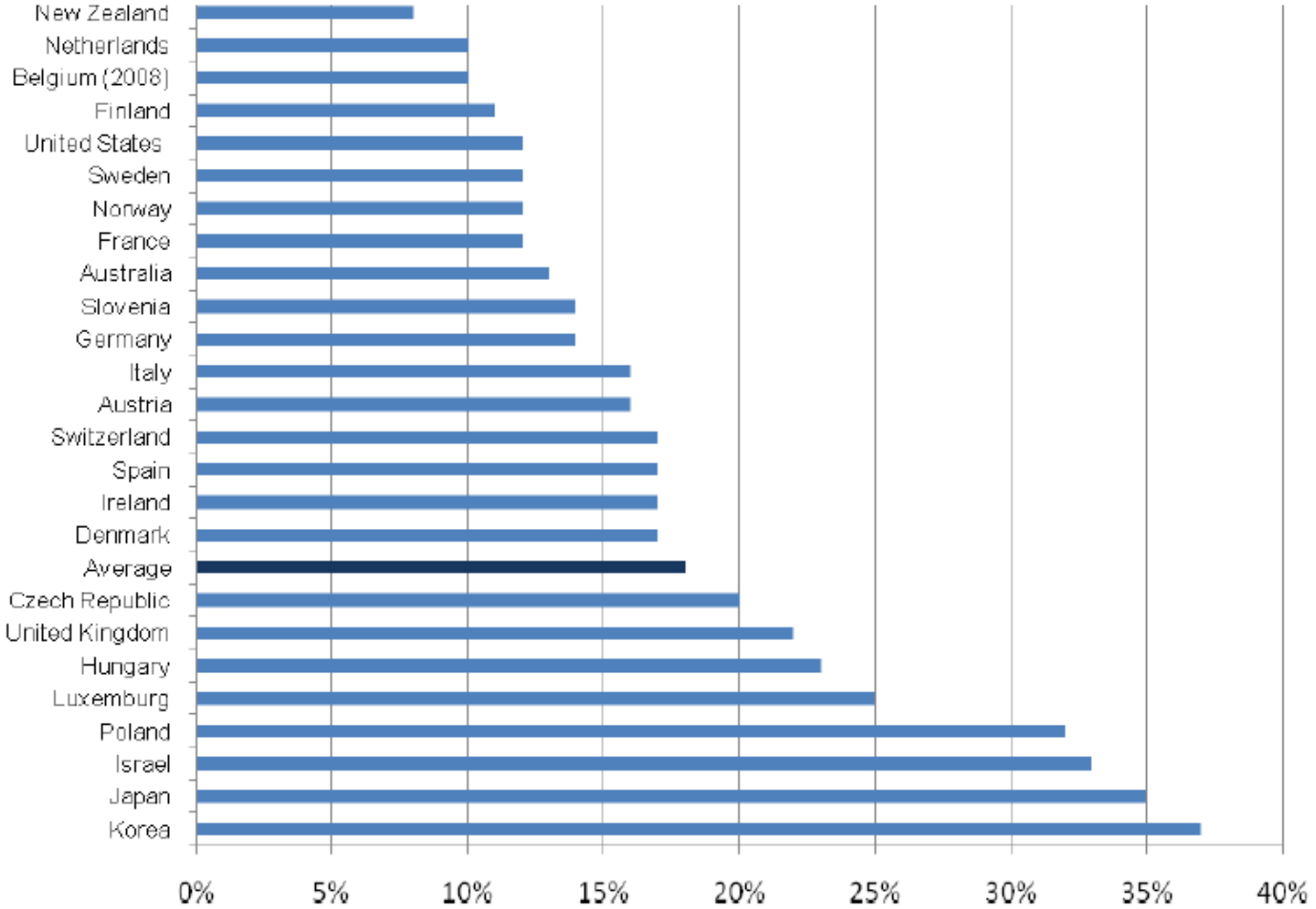
Road deaths per billion vehicle kilometres (average for the latest three years for which both the road deaths and estimated number of vehicle-km are available)

Why a stronger effort is needed (Source ETSC)



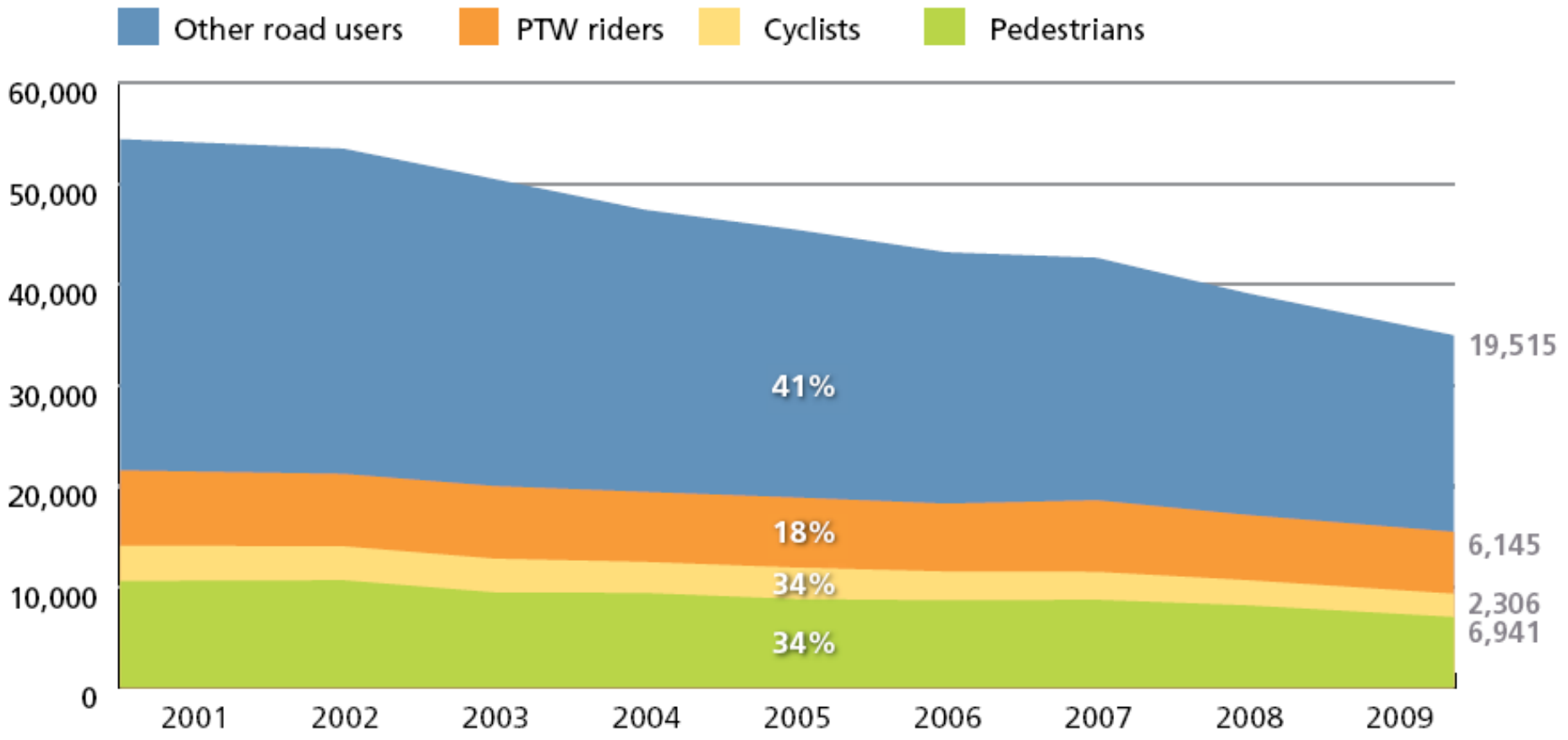
Pedestrians, cycle and PTW users' deaths as a percentage of all road deaths ranked by the share of deaths that were unprotected of all kinds taken together (2007-2009 average)

Why a stronger effort is needed (Source IRTAD)



Pedestrian fatalities as a percentage of all road fatalities (2009 , 26 OECD countries)

Why a stronger effort is needed (Source ETSC)



Reduction in road deaths 2001- 2009 for pedestrians, cyclists, PTW and other road users in EU-27

Why a stronger effort is needed (Source ETSC)

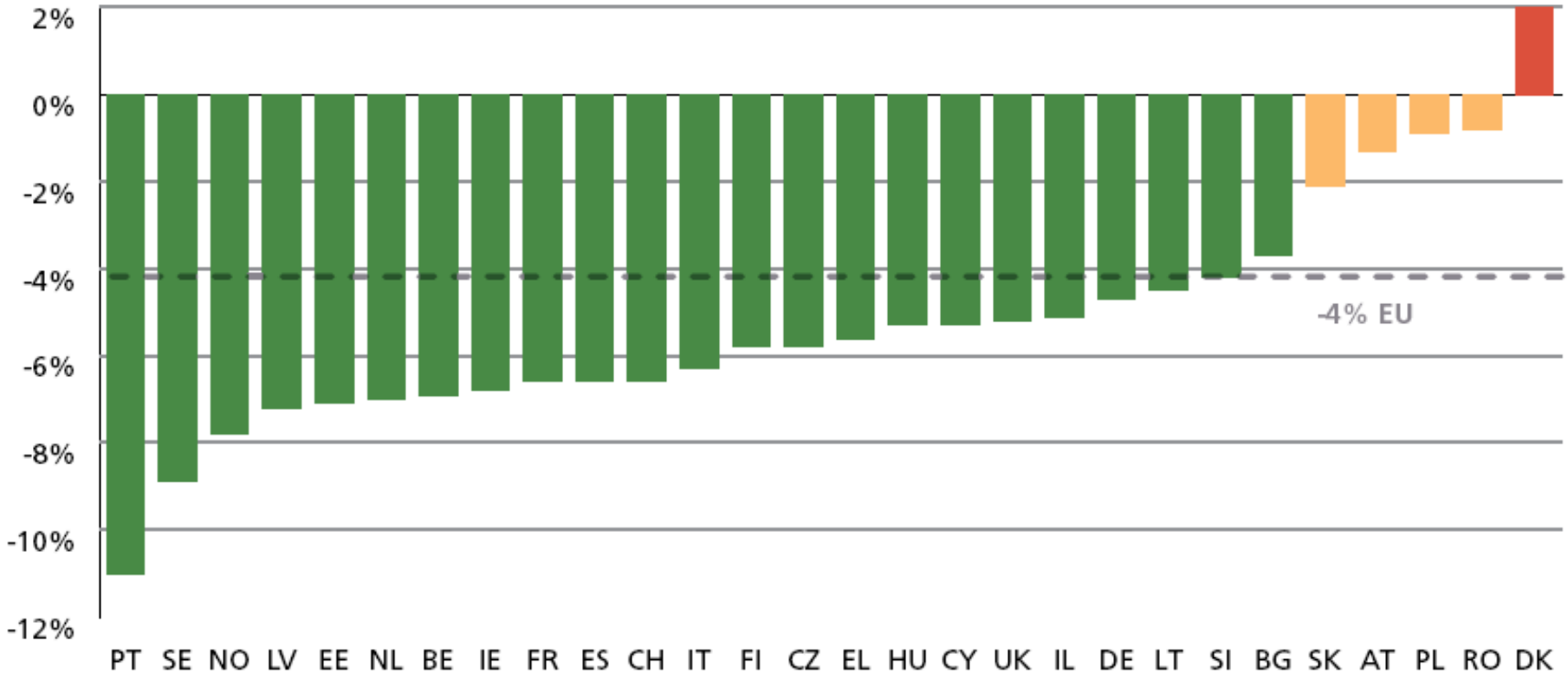


Fig. 10: Average annual percentage change in **pedestrian deaths** over the period 2001-2009.

Why a stronger effort is needed (Source ETSC)

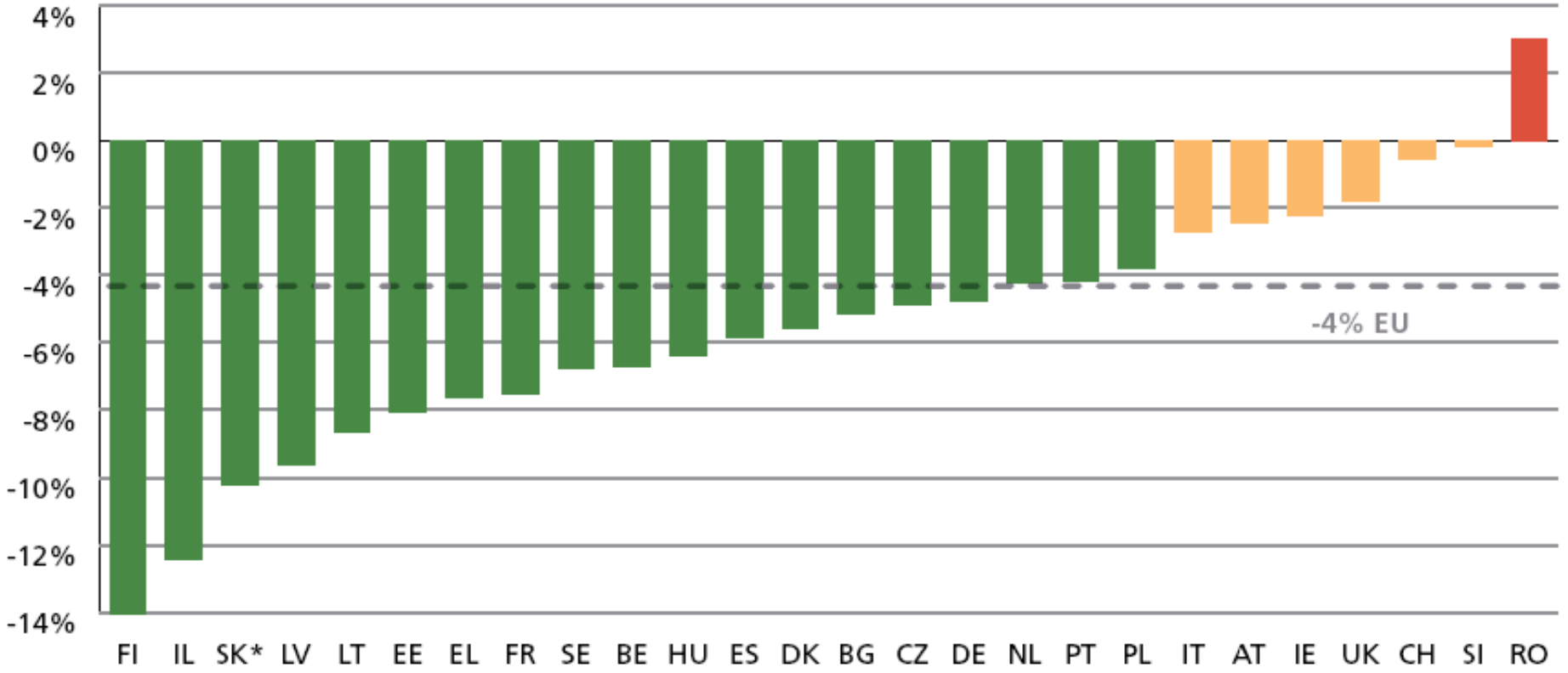
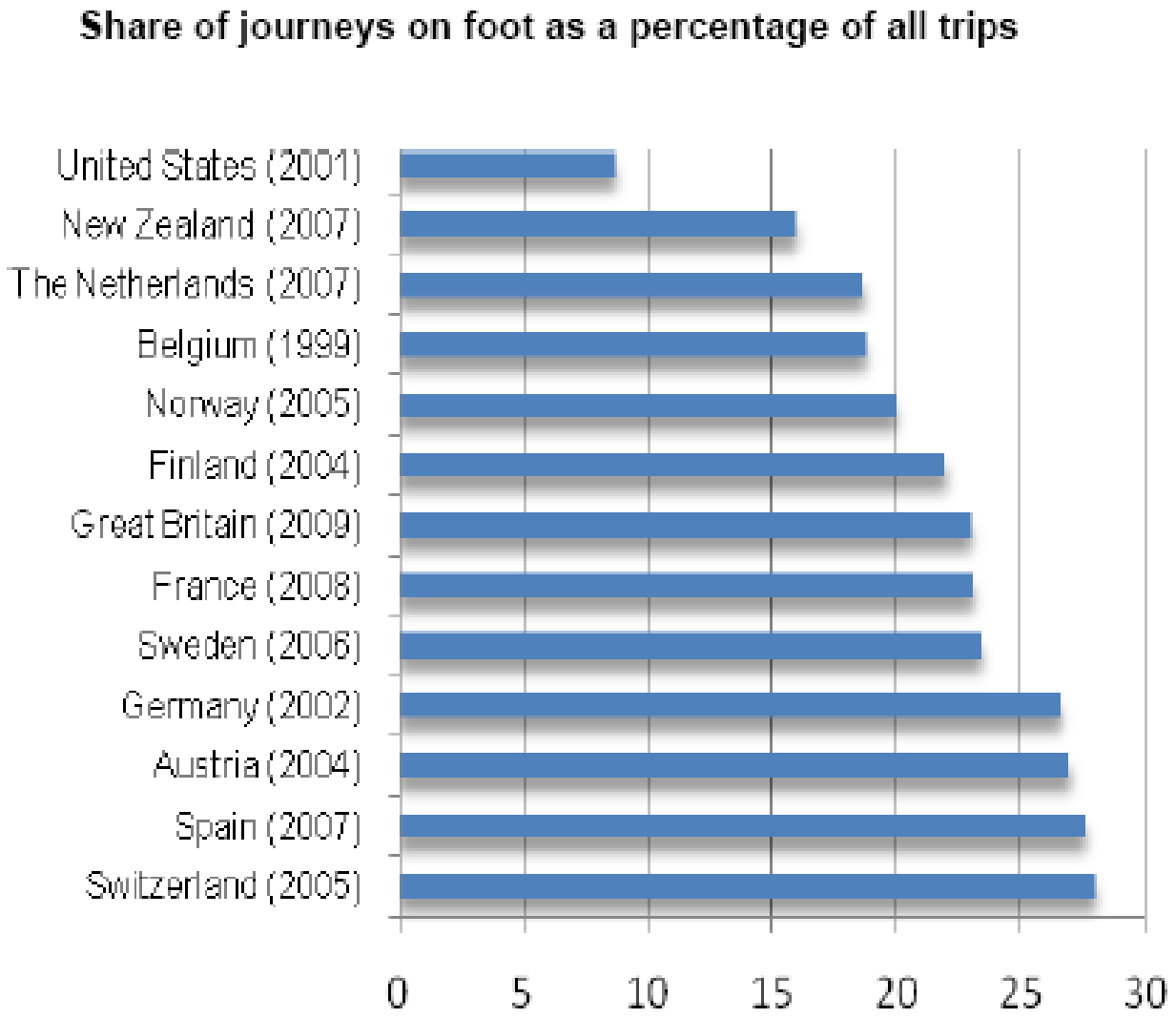


Fig. 11: Average annual percentage change in **cyclist deaths** over the period 2001-2009.

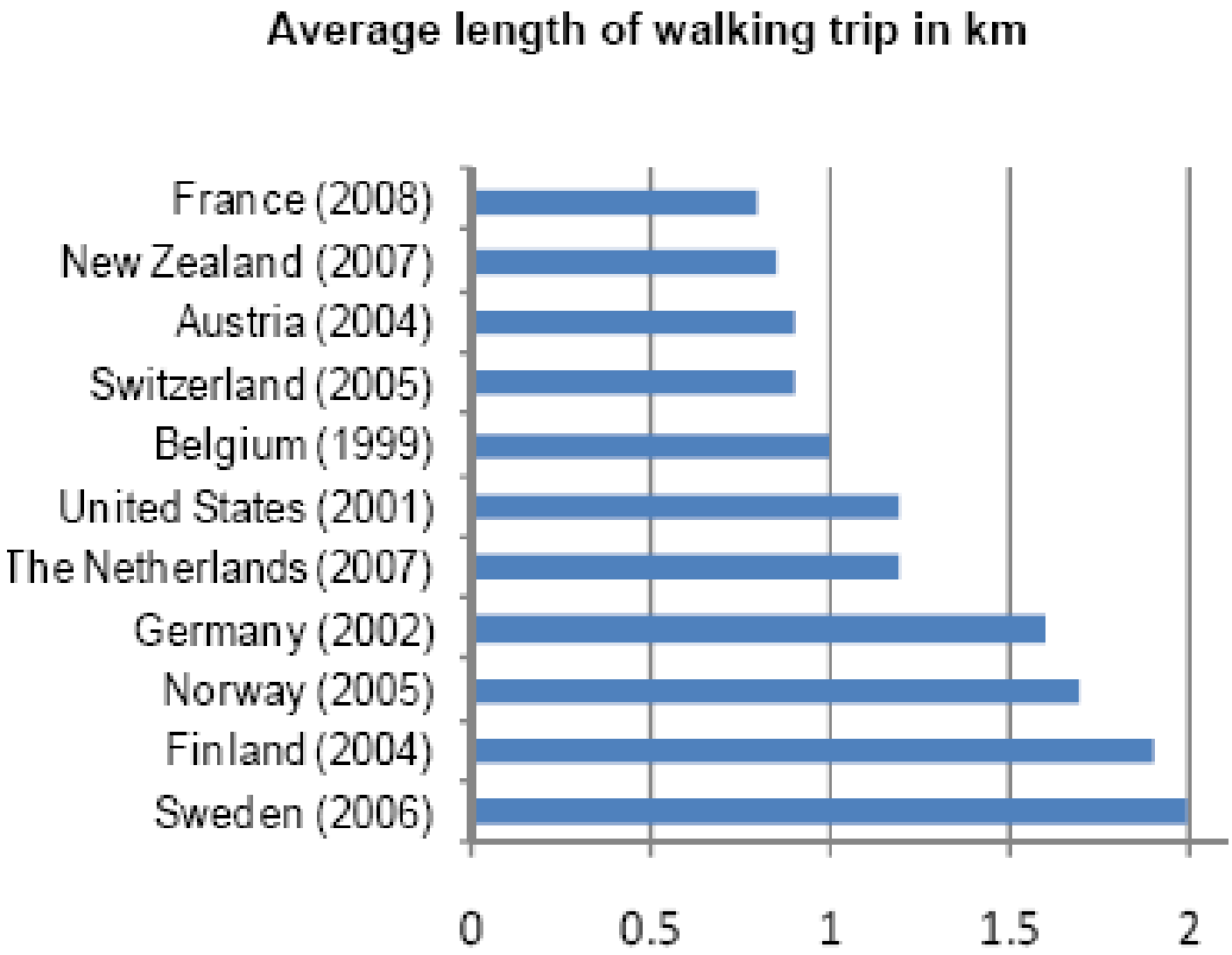
** SK 2002-2009.*

CY, LU and MT are excluded from this ranking because the numbers of cyclist deaths in those countries are so small as to be subject to substantial random fluctuation.

Exposure: pedestrian trips (Various national travel surveys)



Pedestrian trips (Various national travel surveys)



The forgotten modes

The aim of the presentation cannot just be a repetition of (well known) data, but the effort of identifying the main reasons why **walking and cycling** are often **forgotten in urban mobility**.

So the main features of the crucial integration between mobility and urban planning will be assessed

The integration between mobility and urban planning

Lessons from history show how different cultures have tried to make urban space an asset by shaping it to the needs of the population (sometimes indeed a small portion of it)

The integration between mobility and urban planning

One aspect of cities through history has been the problem of facilitating the movement of people going about their daily life

The integration between mobility and urban planning

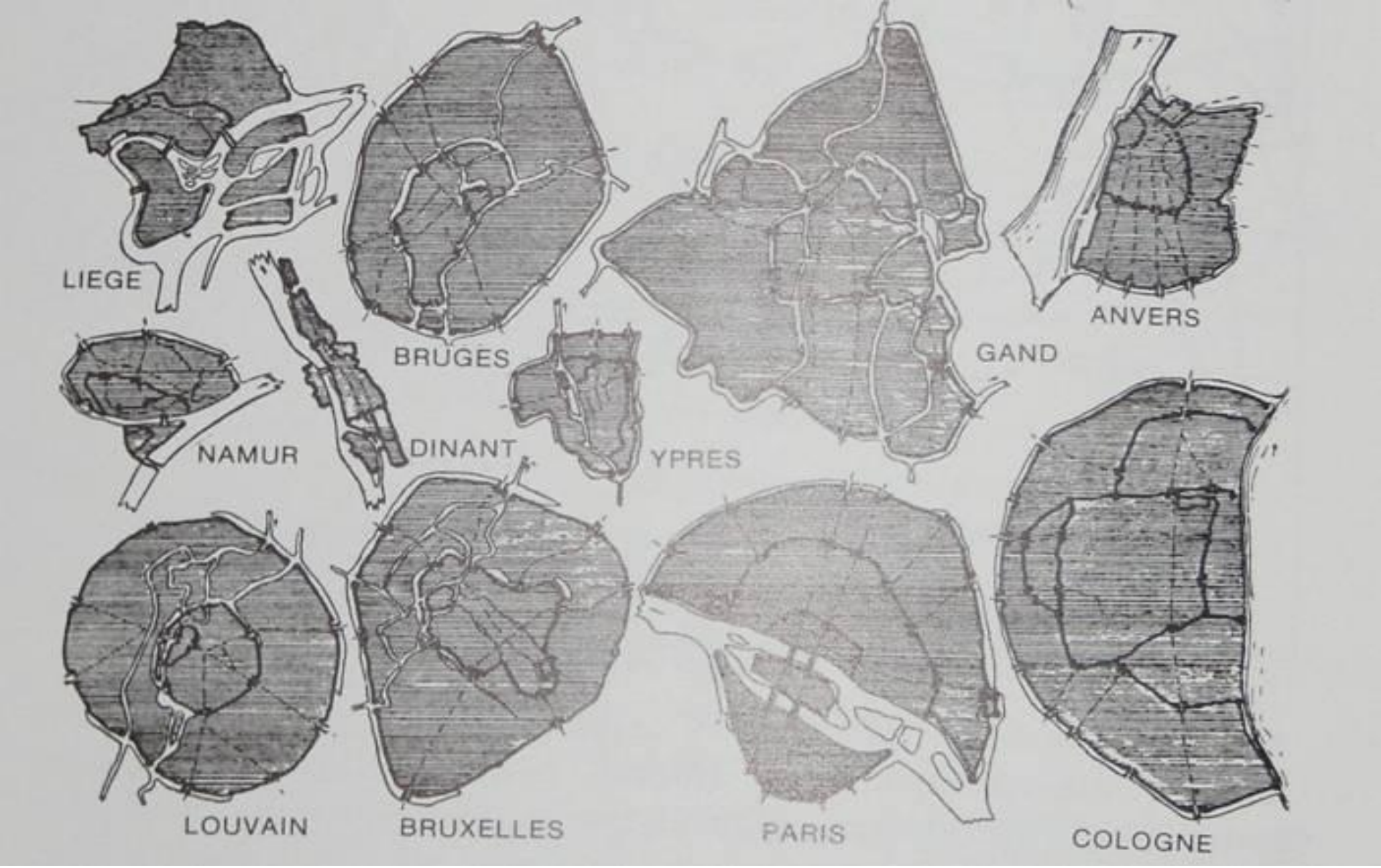
The lesson from history already gives three main hints to the actual planning issues:

- **proximity** as a pre-condition and a planning criteria,
- **energy saving** as a criteria to choose the means of transport,
- **safety** as a quality feature to walking and cycling.

Proximity

When living under the constraints of the sole pedestrian and animal power means of transport, urban settlements had **a reduced size being easily accessible on foot**.

Proximity was a must and life was held in a relatively narrow space.



European medieval towns of similar size in the XIV century (Benevolo, 1997)

Proximity

Proximity in the residential units: Radburn – New Jersey

The lost proximity

The era of the private car has completely changed town design worldwide. Most urban settlements have been planned explicitly assuming the use of the private car.

Loosing proximity

So people walk and cycle less because there are no destinations within a walkable or cyclable distance:

- shopping malls can be reached only by car (for distance and for safety reasons) and parking facilities are greater and free;
- services are concentrated for economic reasons (scale economy);
- public transport have then lost customers and reduced their efficiency

Loosing proximity

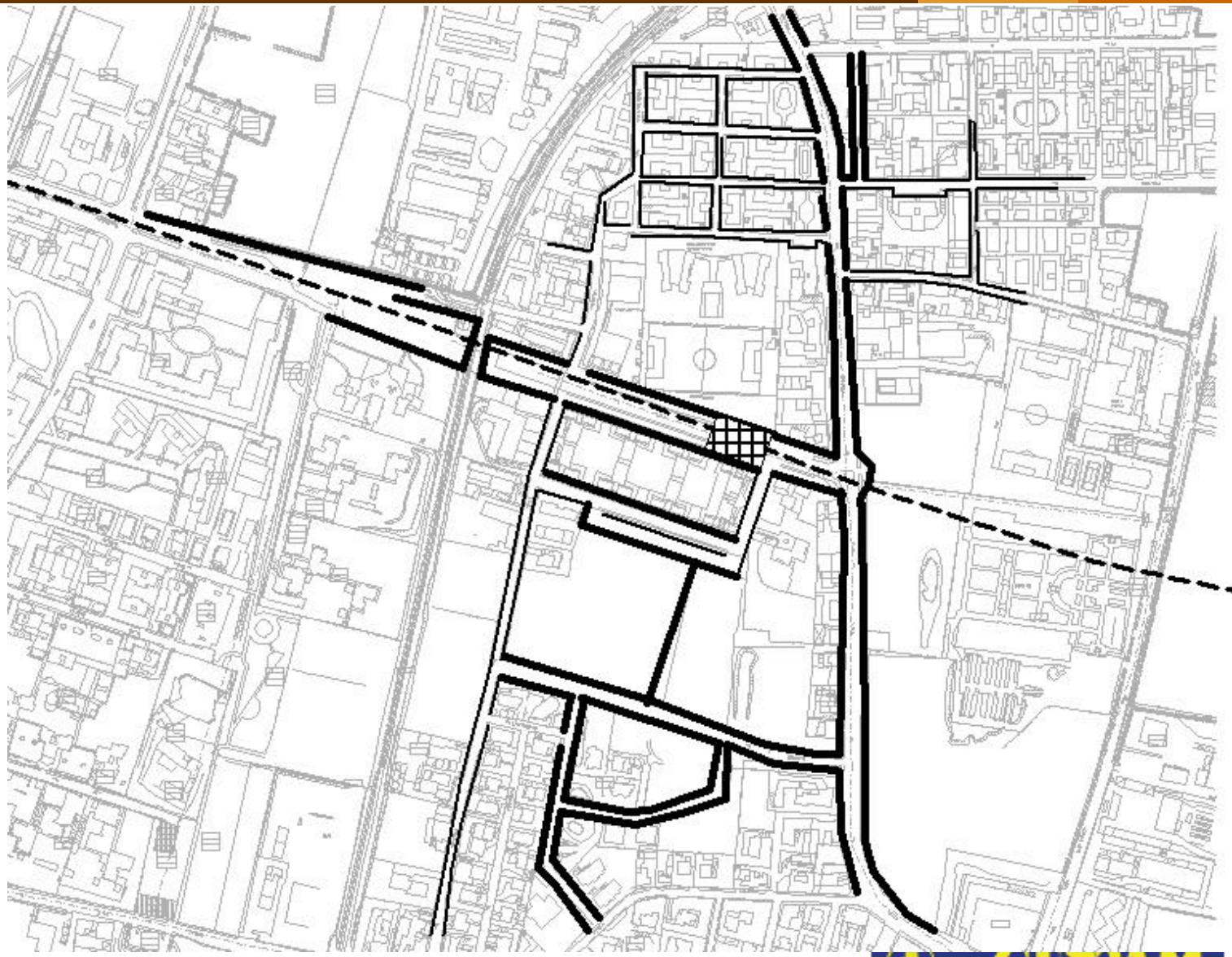
- work places are not fixed, so trips are multi-scope and they need a flexible means of transport;
- the relatively less expensive transformations in rural areas make sprawl more cost-efficient than urban renewal;
- low density is better appreciated by high income communities and sometimes defended for landscape preservation

The effect of “urban environment” as determined in urban planning

- Morphology of towns is going to be lost thus influencing the ability of people to “read” urban environment
- Road layout is given to users is an ever more intelligible way: the diffusion of GPS on cars is substituting maps, but continuing the tradition of clearing the way to car drivers.
- Pedestrians hardly know the dedicated facility network and they cannot really plan the trip: they will not know the sidewalk conditions, width, maintenance, continuity, visibility, lighting, comfort, etc..
- The lack of information can highly influence the modal choice.

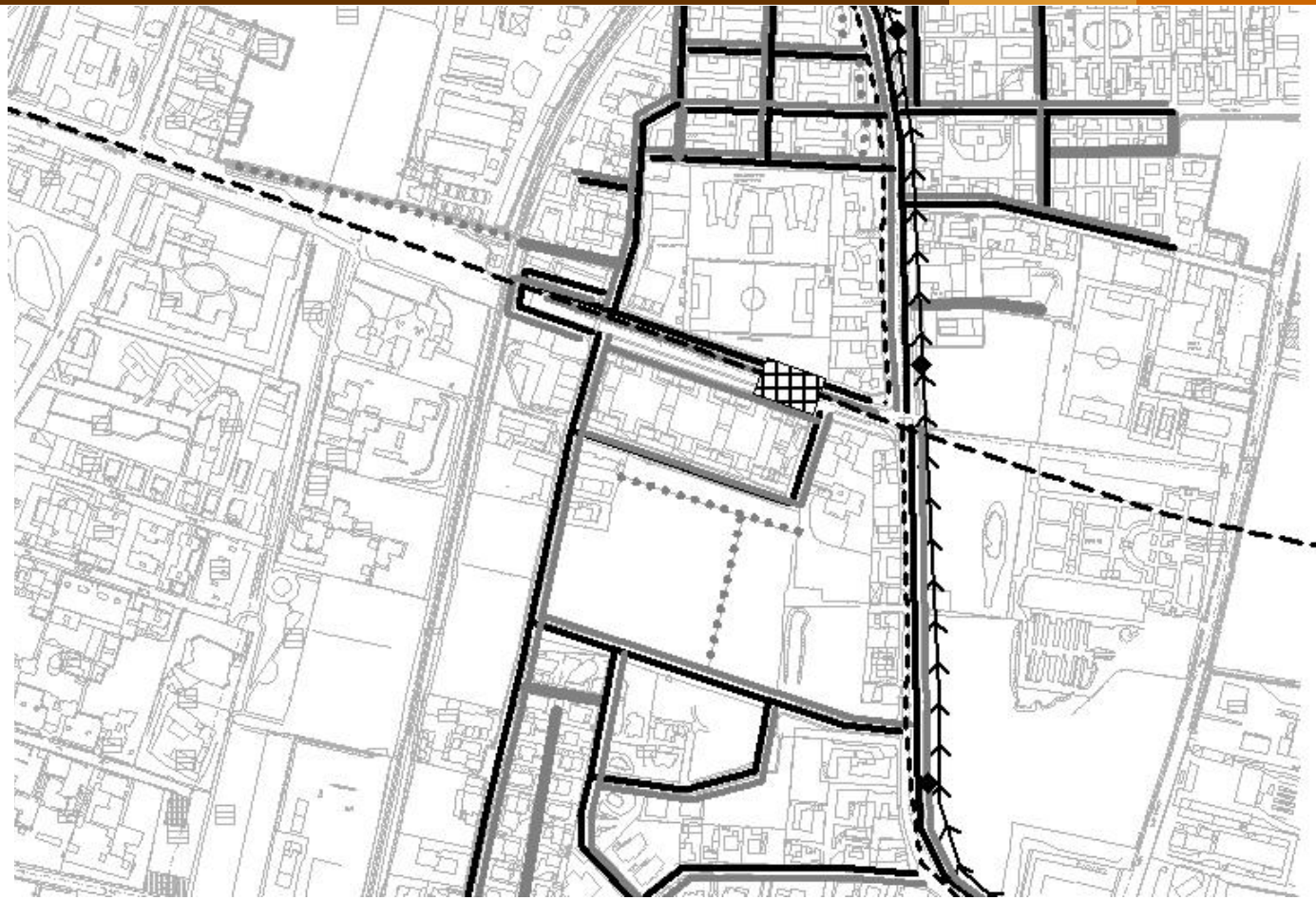
WHAT KIND OF FACILITIES AND INFORMATION DO PEDESTRIAN NEED?

The dimension of sidewalks



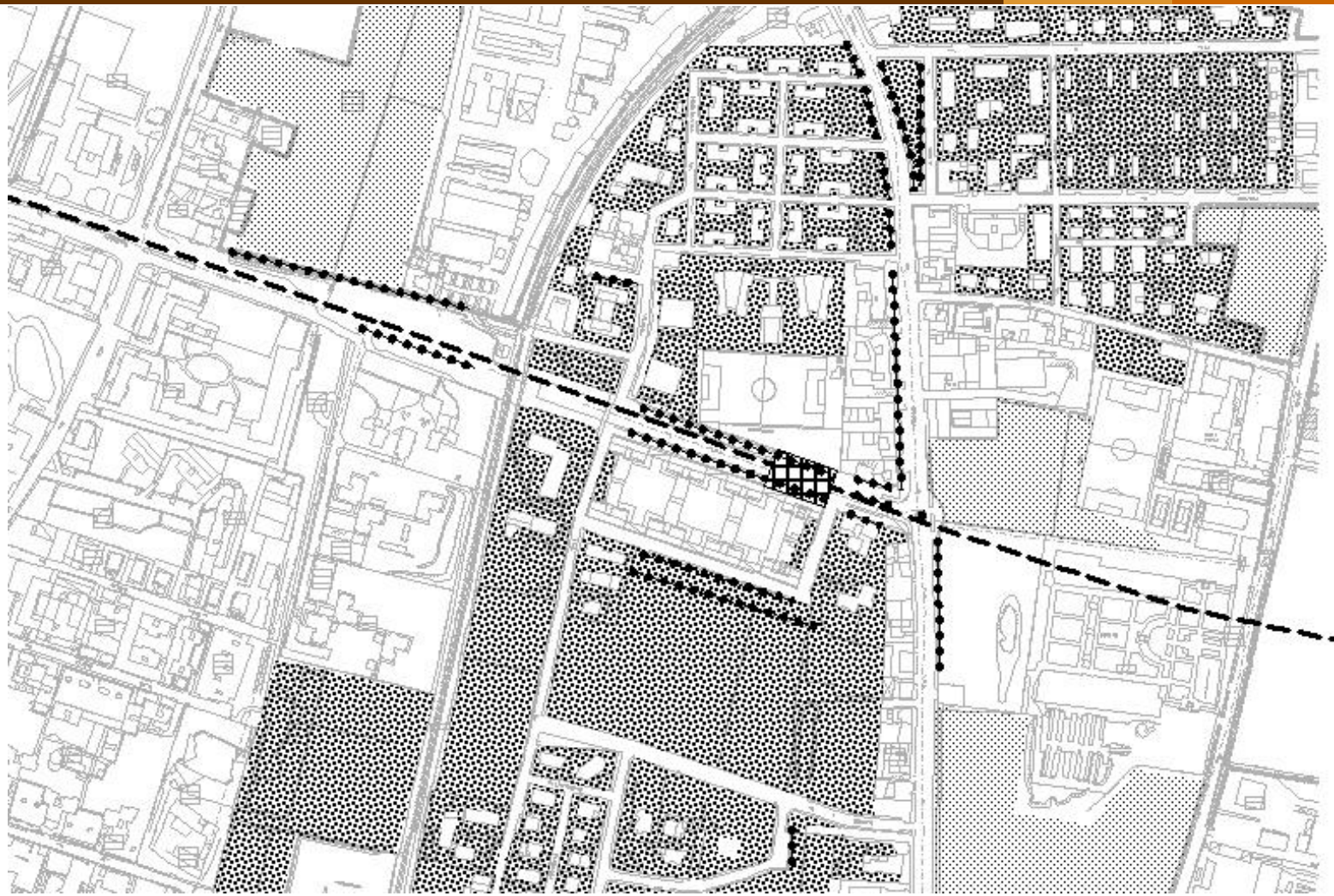
Fonte: B. Badiani

Traffic components



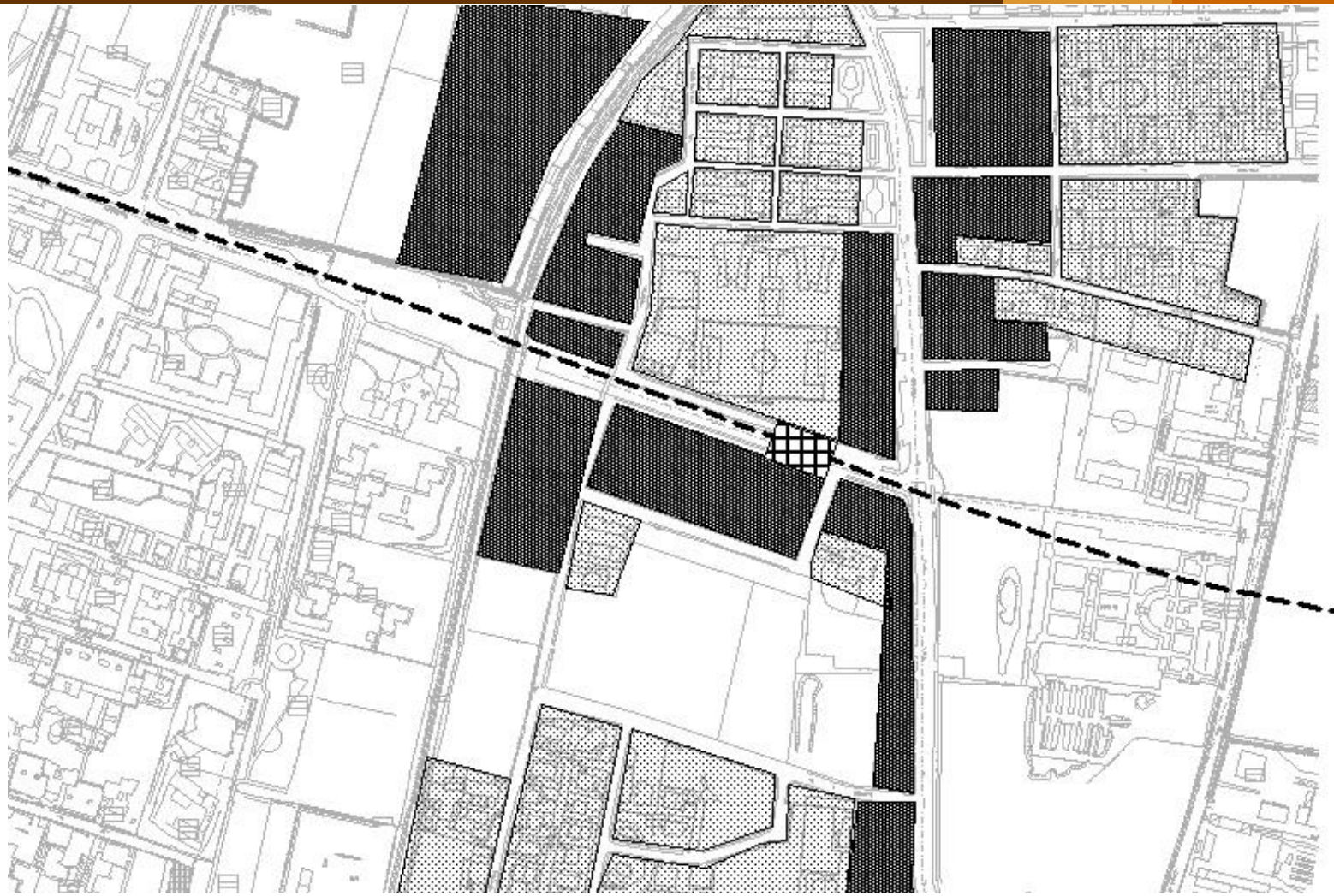
Fonte: B. Badiani

Presence of green areas



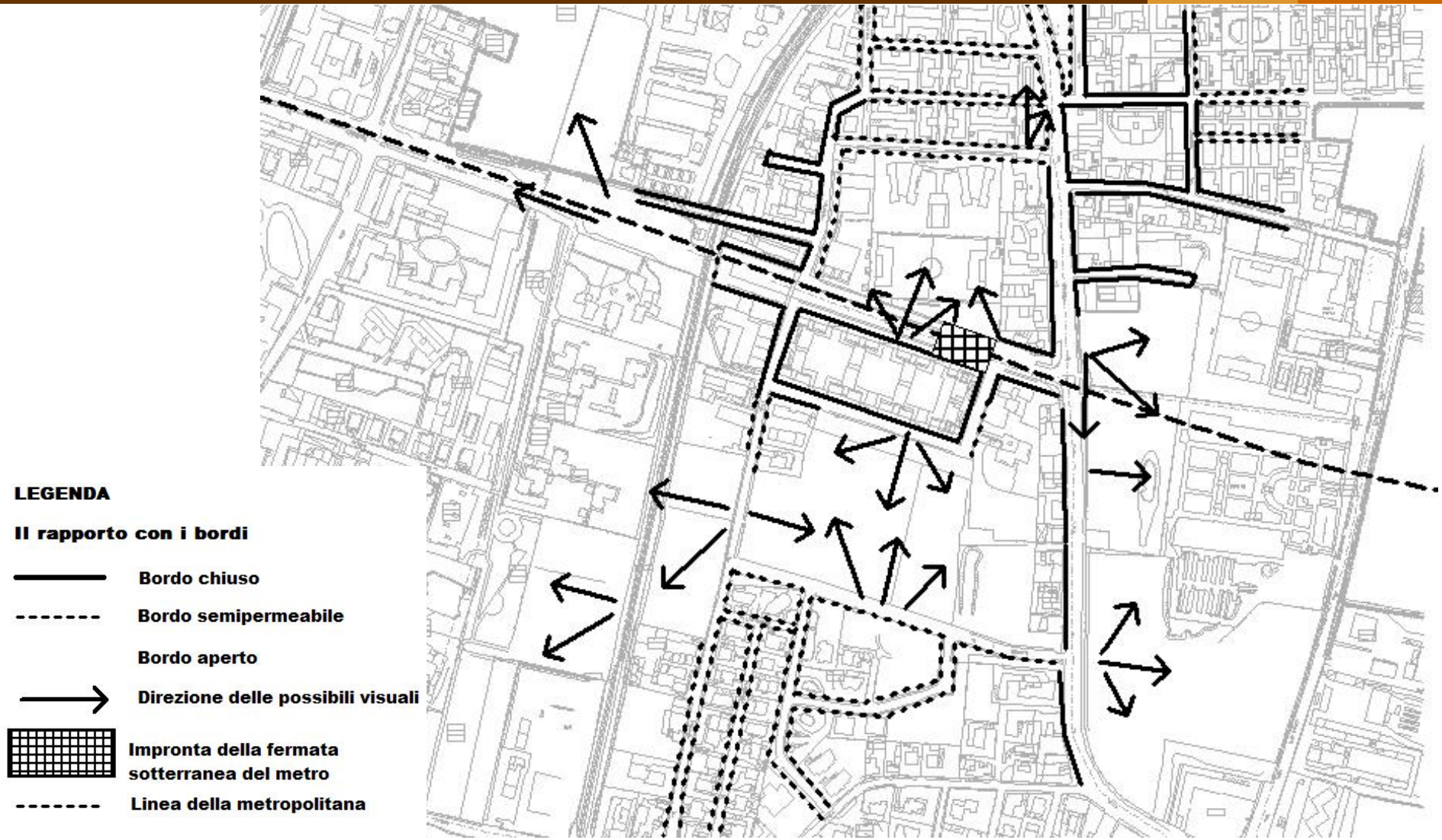
Fonte: B. Badiani

Built environment



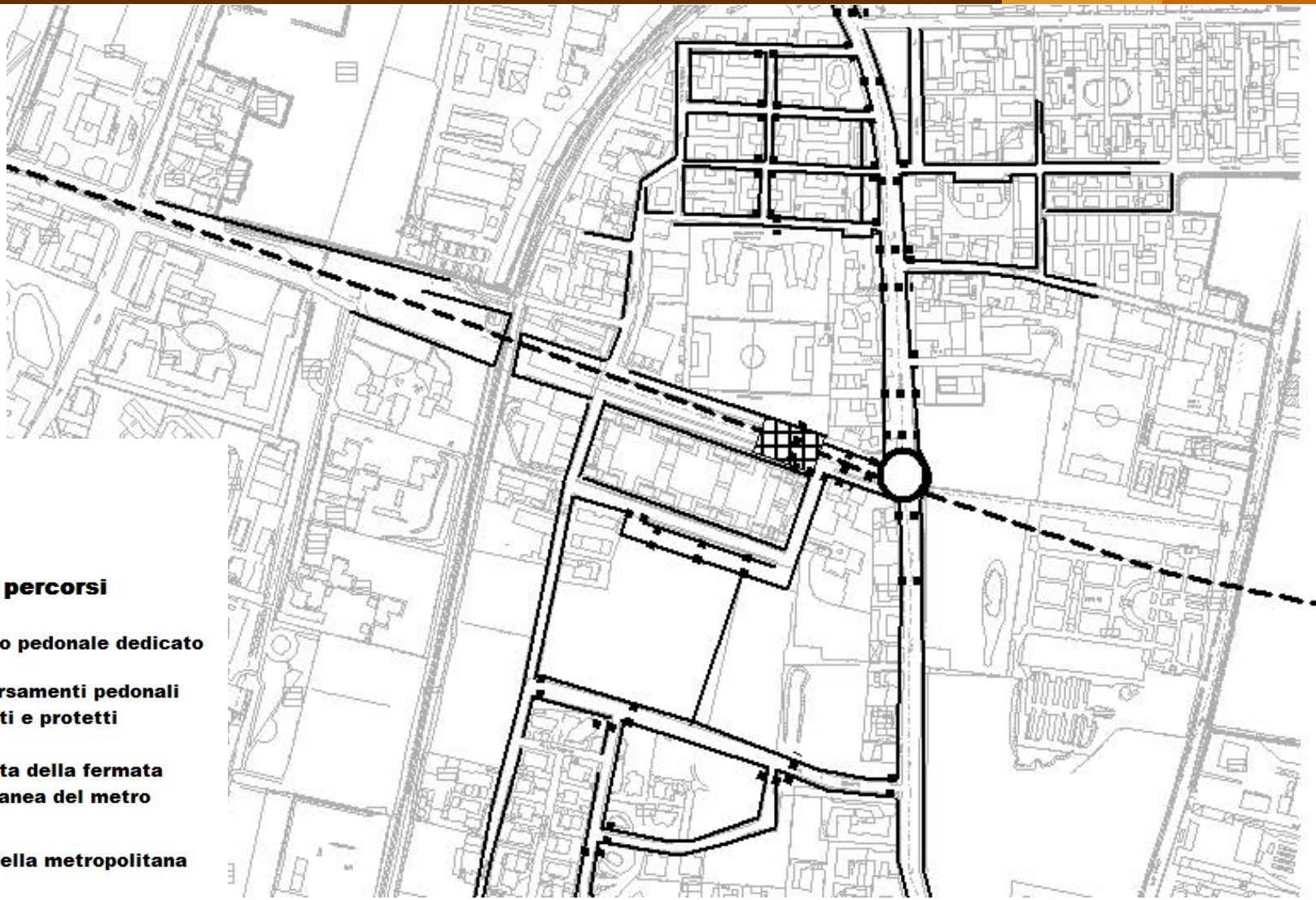
Fonte: B. Badiani

View from the path



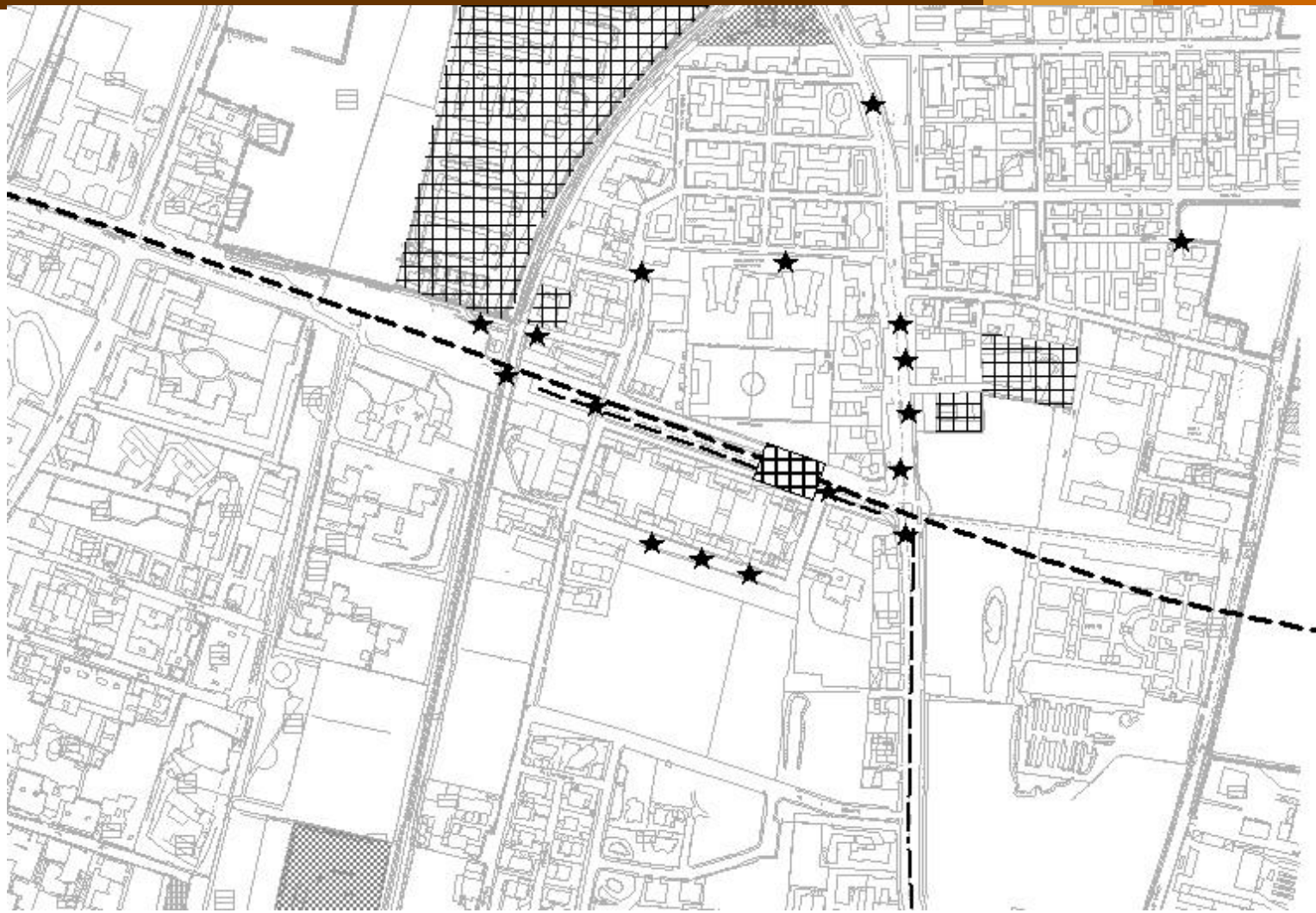
Fonte: B. Badiani

Continuity of paths



Fonte: B. Badiani

Safety and security: accident location

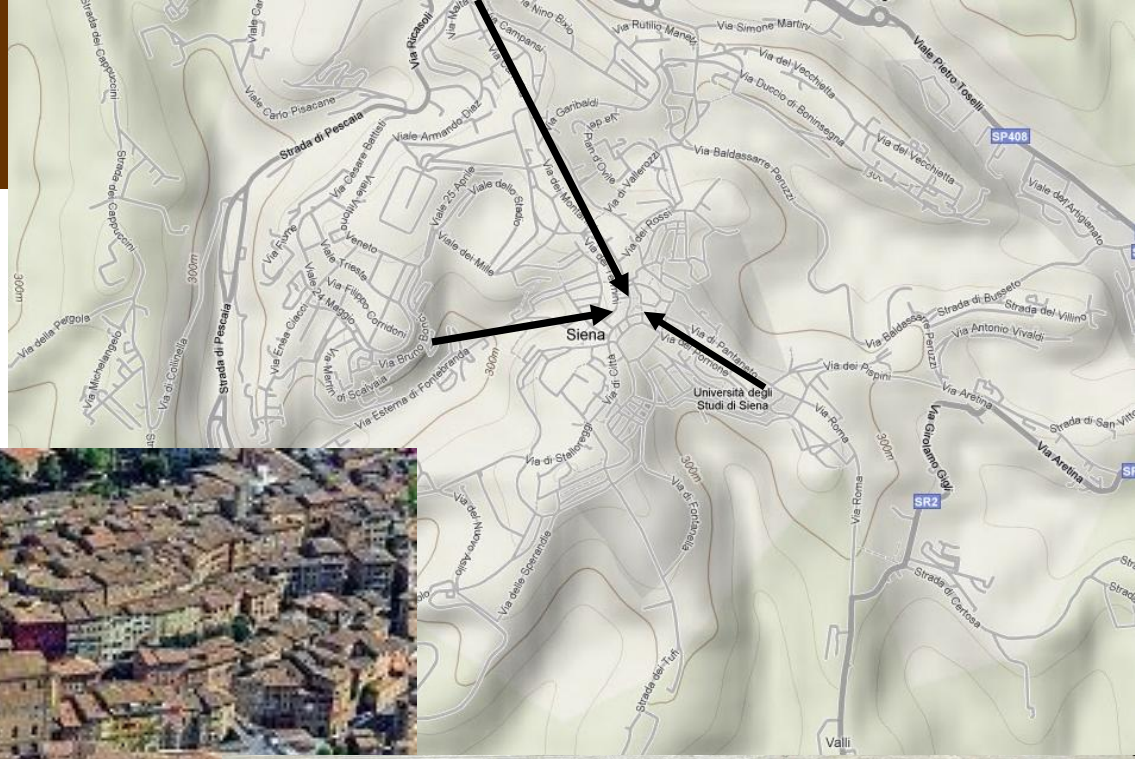


Fonte: B. Badiani

Energy saving

Proximity was not just a matter of rationality, but also affected by "**energy saving**" needs.
Even at the origin of several urban design in the central European hills we may find the morphological features: the fascinating slow curved medieval streets of Siena follow the contour lines in a space difficult to plan, and the secondary links have been realised with stairs.

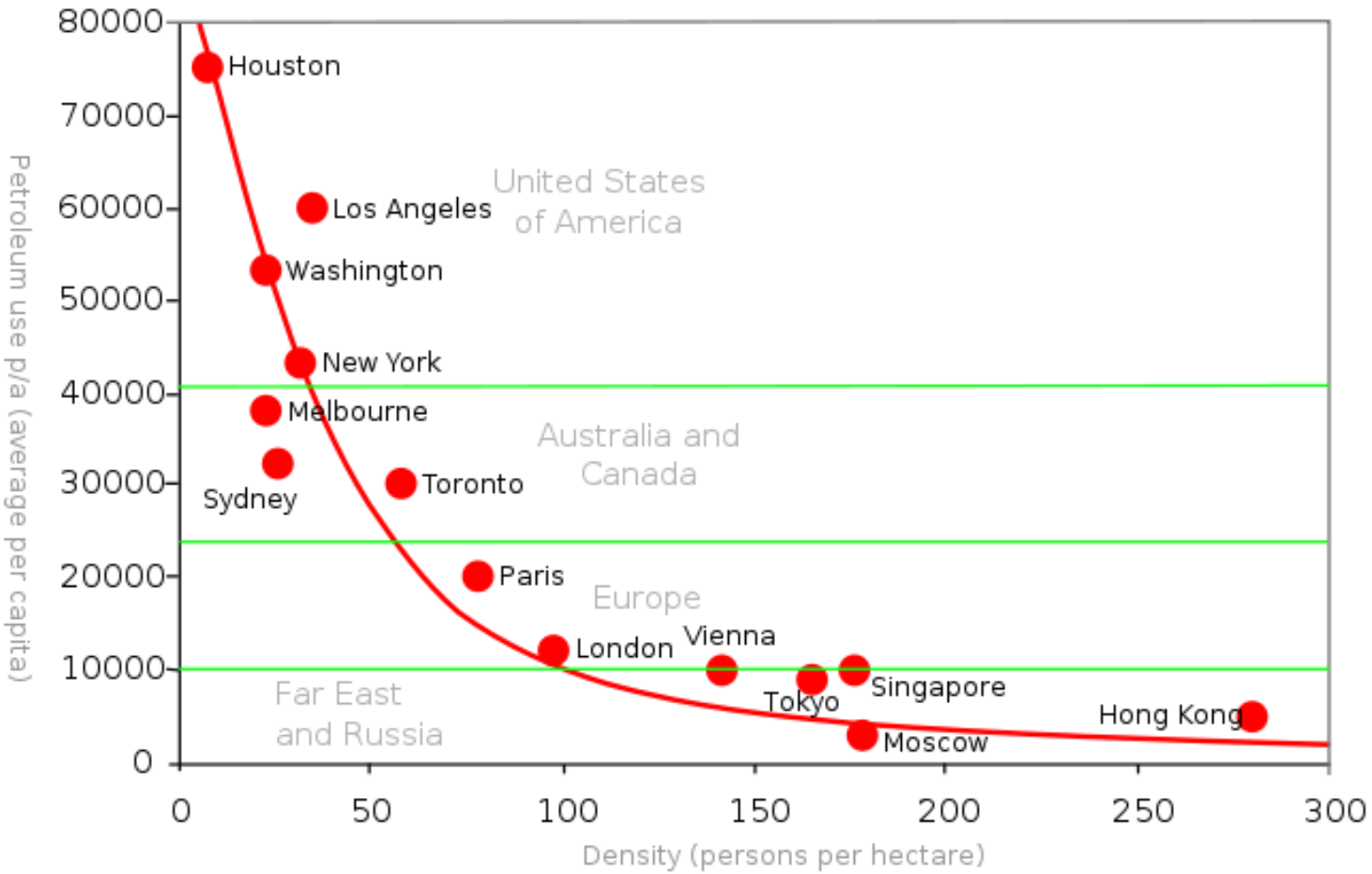
ergy saving



Street layout following contour lines in Siena (Italy) (Google maps ©)

ergy saving: transport and land use

A commonly used study of 32 cities by Newman & Kenworthy in 1989 concluded that there was a strong link between urban development densities and petroleum consumption.



Safety

Already in the roman towns pedestrian facilities were conceived to allow a more comfortable movement even at the time when animal power drive chariots were the only danger (as shown by the pedestrian raised crossings of Pompei, the Italian city destroyed under the Vesuvio eruption).

THE NEED FOR AN INTEGRATED MOBILITY AND URBAN PLANNING

The need for an integrated mobility and urban planning

Separation of urban and mobility planning have been the general rule through most of planning attempts to include cars in cities, such as Athens' Charter

The key concept was the creation of independent zones for the four 'functions': living, working, recreation, and circulation.

The need for an integrated mobility and urban planning

Some of these concepts have been widely adopted by urban planners, but mainly that of separating urban functions, rather than the inflexible approach to road hierarchy.

The need for an integrated mobility and urban planning

When considering the development of urban areas, three main phenomena occur:

- the building of city extensions (urban sprawl), consuming new land but easier for implementing mobility networks and also pedestrian-friendly schemes;

The need for an integrated mobility and urban planning in a time of crisis

… but in a time of crisis those phenomena are mainly:

- the reconstruction of cities, through brown-field regeneration, taking into account the relationships between administrators and developers;
- the new implementation of transport networks in existing urban infrastructure.

A new (or renewed) land use development model is needed

- "New Urbanism"
- "Smart Growth"
- "Car-free cities"
- **"Transit-oriented Developments"**

  are coming to illustrate new possibilities for integration of transport and land use planning

  … and **Urban Safety Management** as a global approach to road safety

nsit Oriented Development (TOD)

ic transport spatial accessibility: new proximity challenges (Brescia – I)

LEGENDA

- Confini Comune Brescia
- Linee TPL
- Linea Metropolitana
- Rete Stradale
- Autostrade
- Tangenziali
- Rete ferroviaria

Accessibilità con tutti i modi di trasporto pubblico (TPL, Metro e Bicimia)
VALORE

High : 1

Low : 0

Present

Future (after metro)

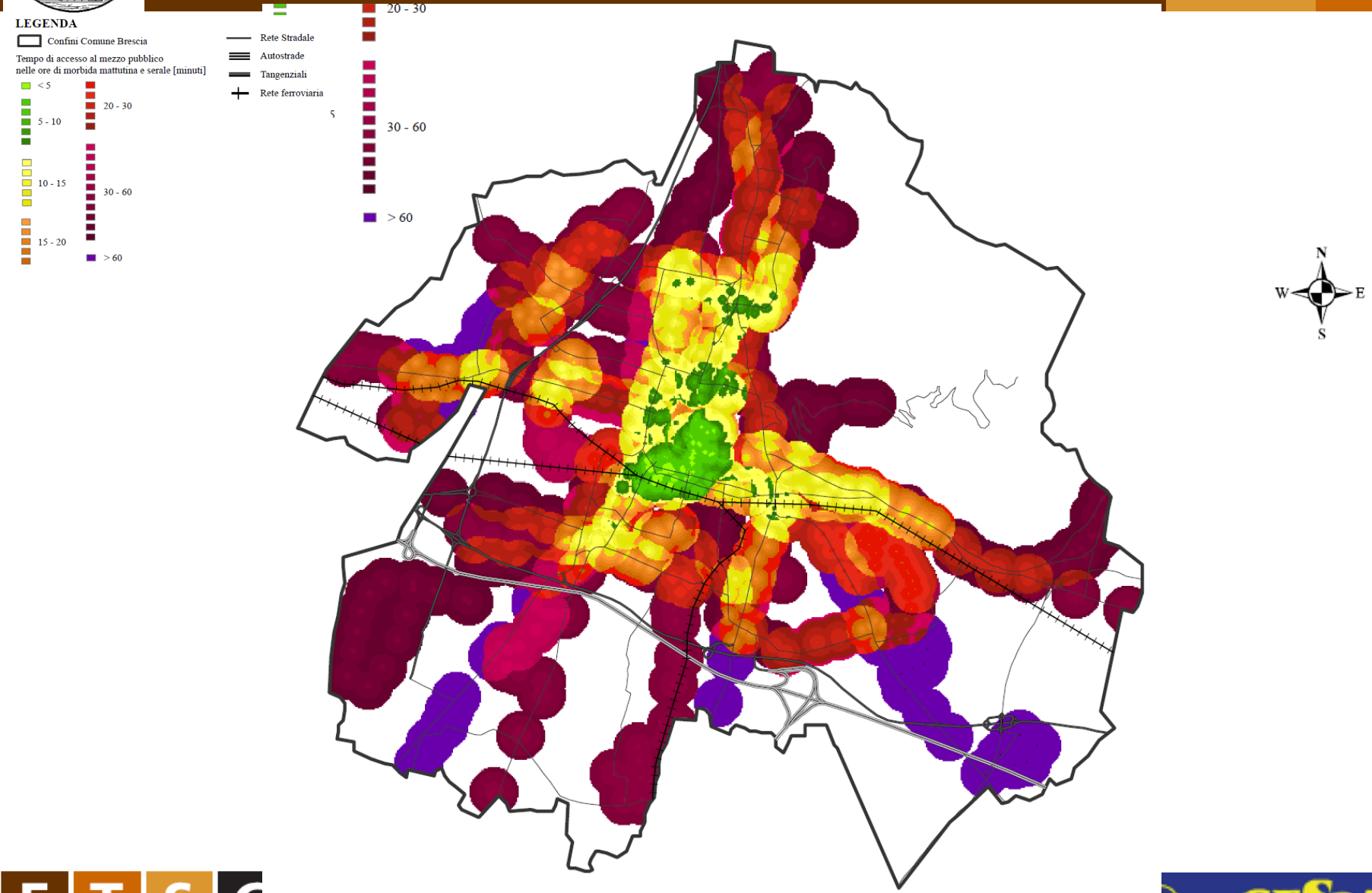
vate car spatial accessibility

PARKING PLACES

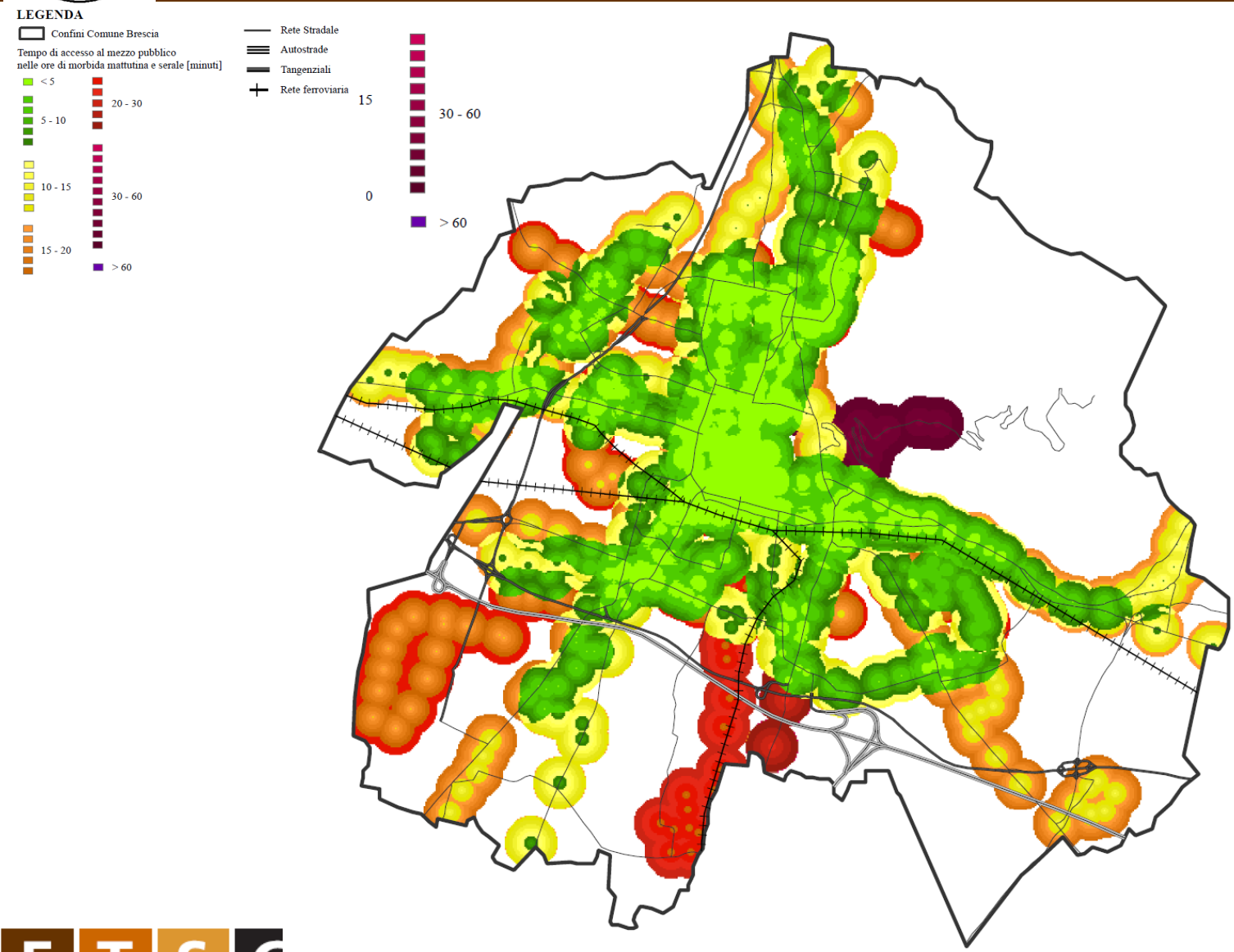
LEGENDA:
ZTL
Confini Comune Brescia
Rete Stradale
Autostrade
Tangenziali
Rete ferroviaria

PARKING DENSITY

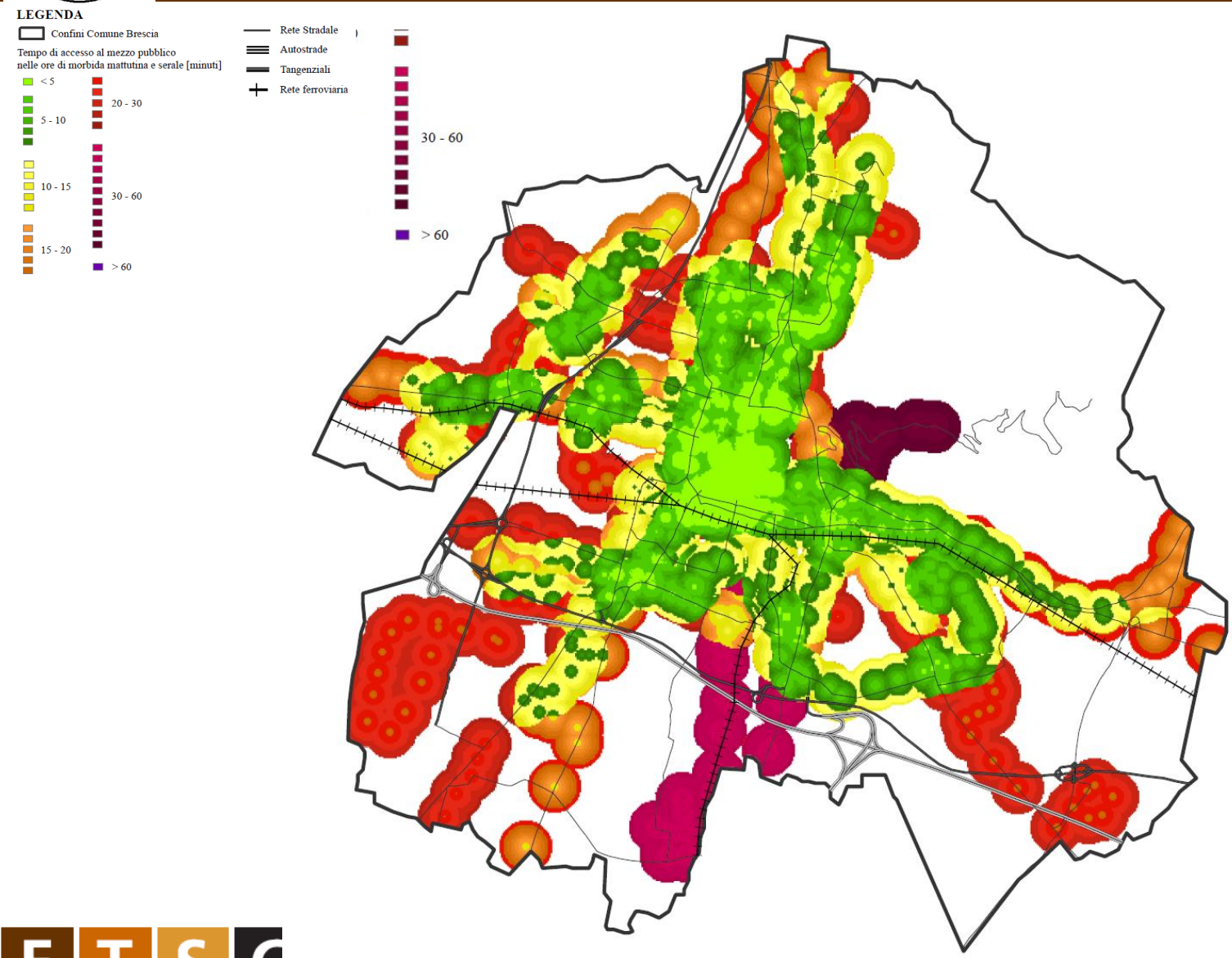
ne accessibility by public transport 5.00 – 7.00



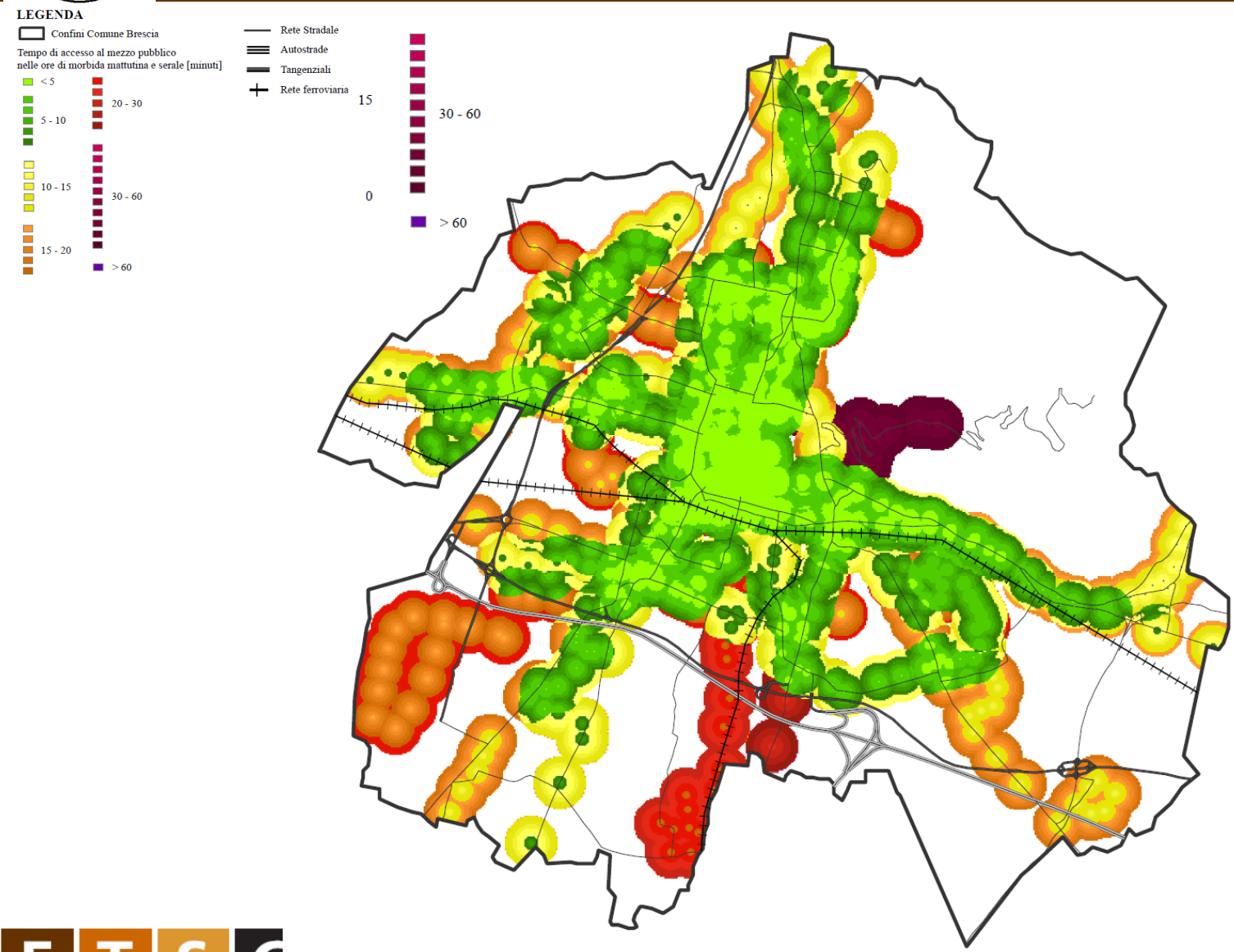
ne accessibility by public transport 7.00 – 9.00



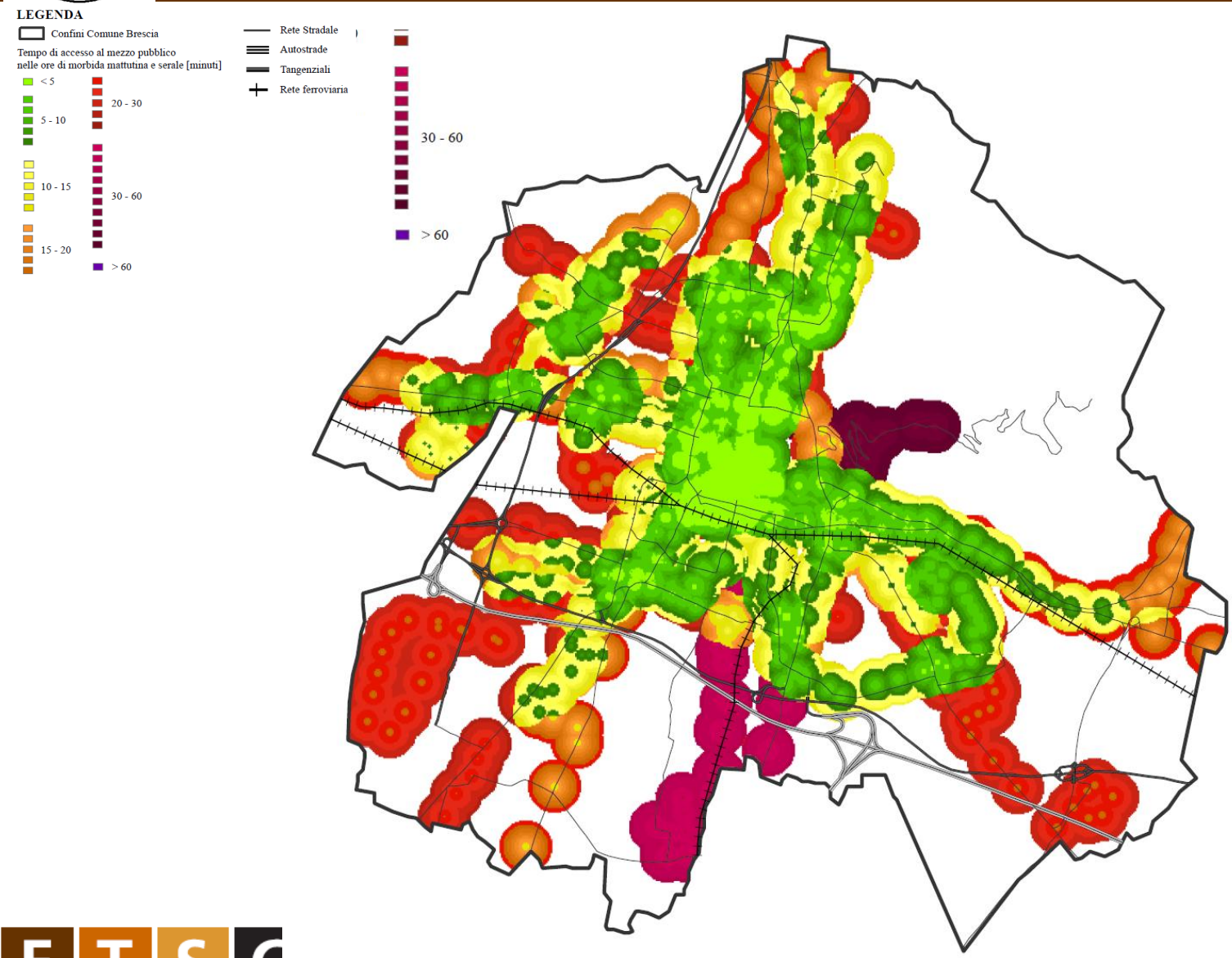
ne accessibility by public transport 9.00 – 11.30



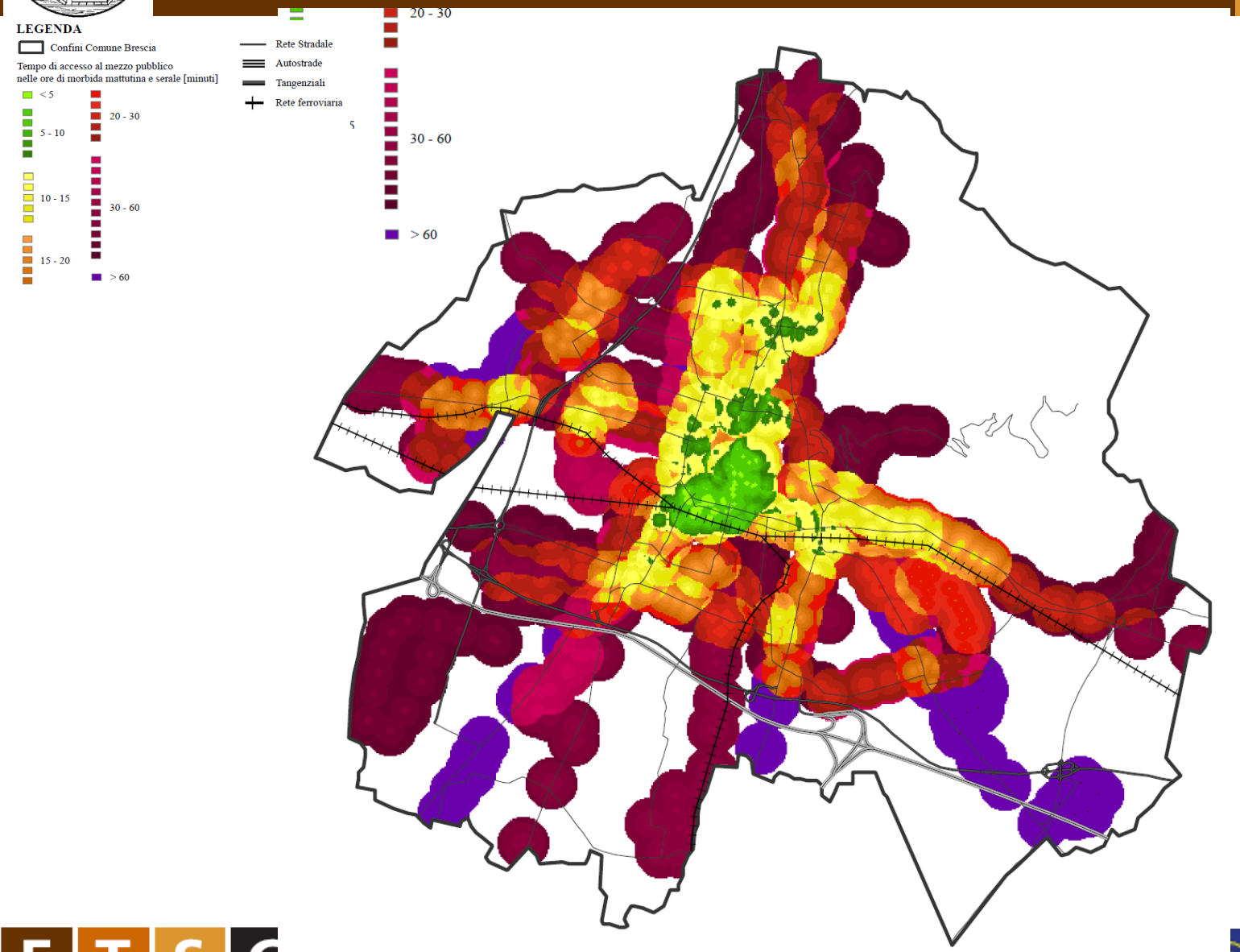
ne accessibility by public transport 11.30 – 14.00



ne accessibility by public transport 14.00 – 19.00



ne accessibility by public transport 19.00 – 23.00



nsit Oriented Development (TOD)

Safety of pedestrians …. (M Tira)

nsit Oriented Development (TOD)

THE ROAD USER HIERARCHY

Road User Hierarchy

Ranks the importance of road users:

People with mobility impairments

Pedestrians

Cyclists

Public transport users

Powered two-wheelers

Commercial/business

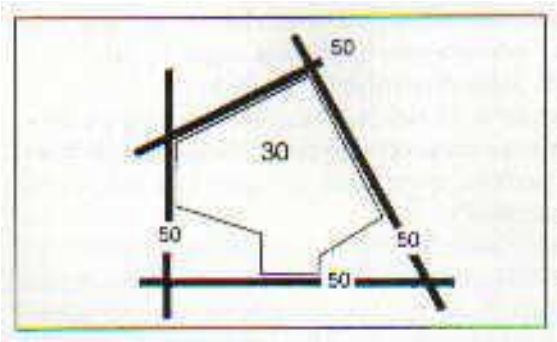
Car-borne shoppers

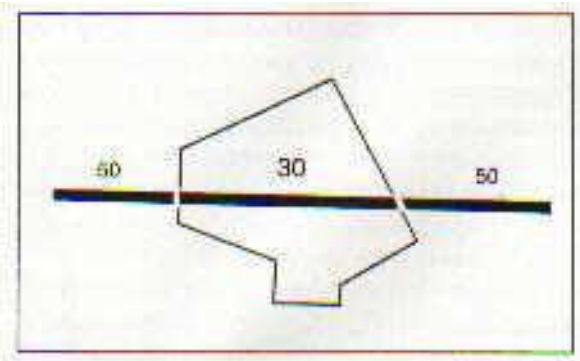
Car-borne visitors

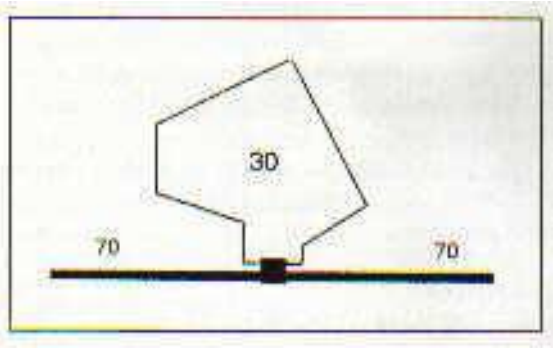
Car-borne commuters

Increasing Importance

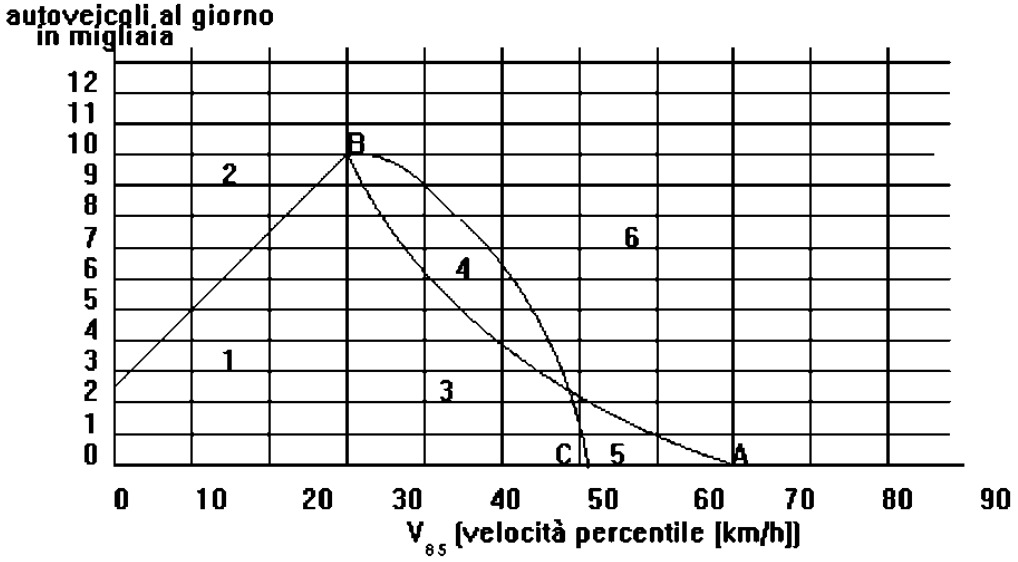
rent solutions for pedestrians and cyclists







Bicycle compatibility index



Area 1: speed lower than 30 km/h no specific facility
Area 2: low speed and high traffic: need assessment
Area 3: if Vp = 60 Km/h cycle paths must be done
Area 4: cycle path or lane must be realised
Area 5: low traffic and high speeds (60 – 80 km/h). Cycle paths only
Area 6: crucial physical separation

(CROW, 1994)

Old pedestrian area

New pedestrian area


New pedestrian area

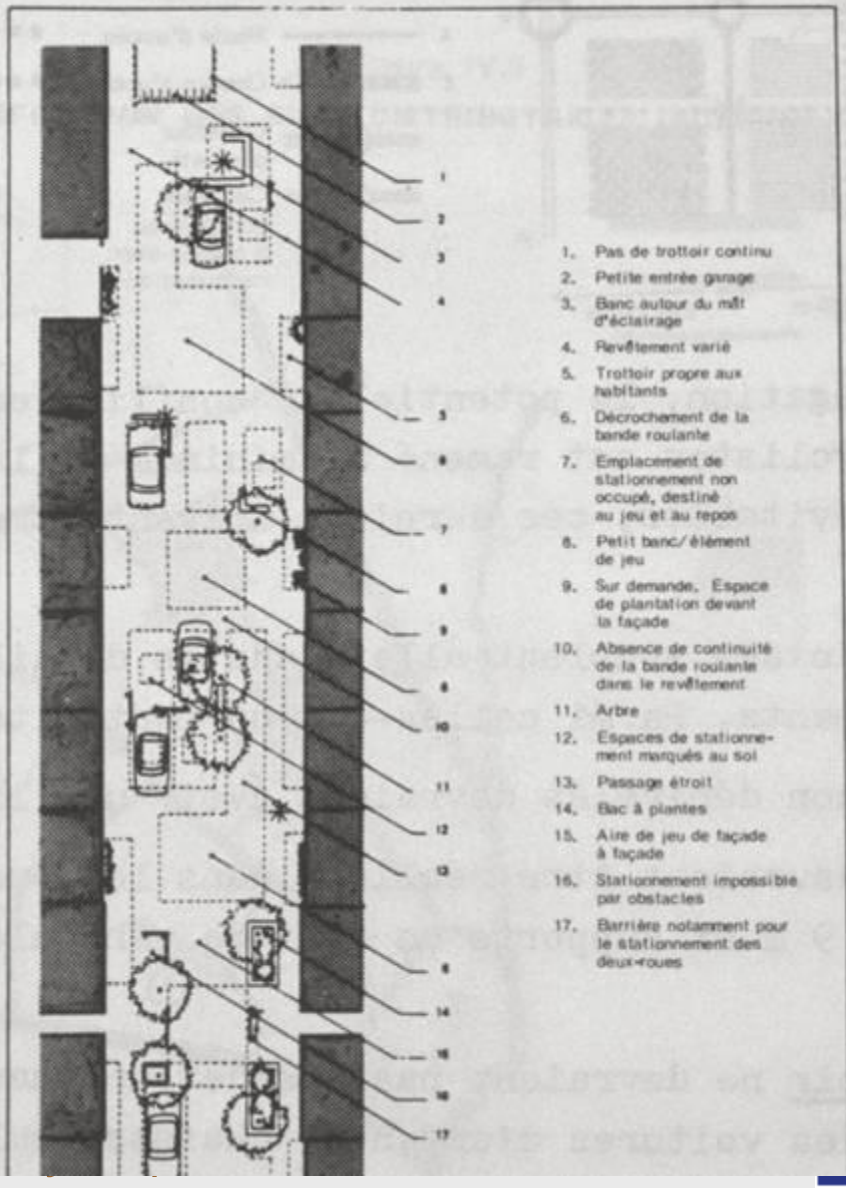
Residential streets

ronmental island

Since 1970 – Woonerf - Holland

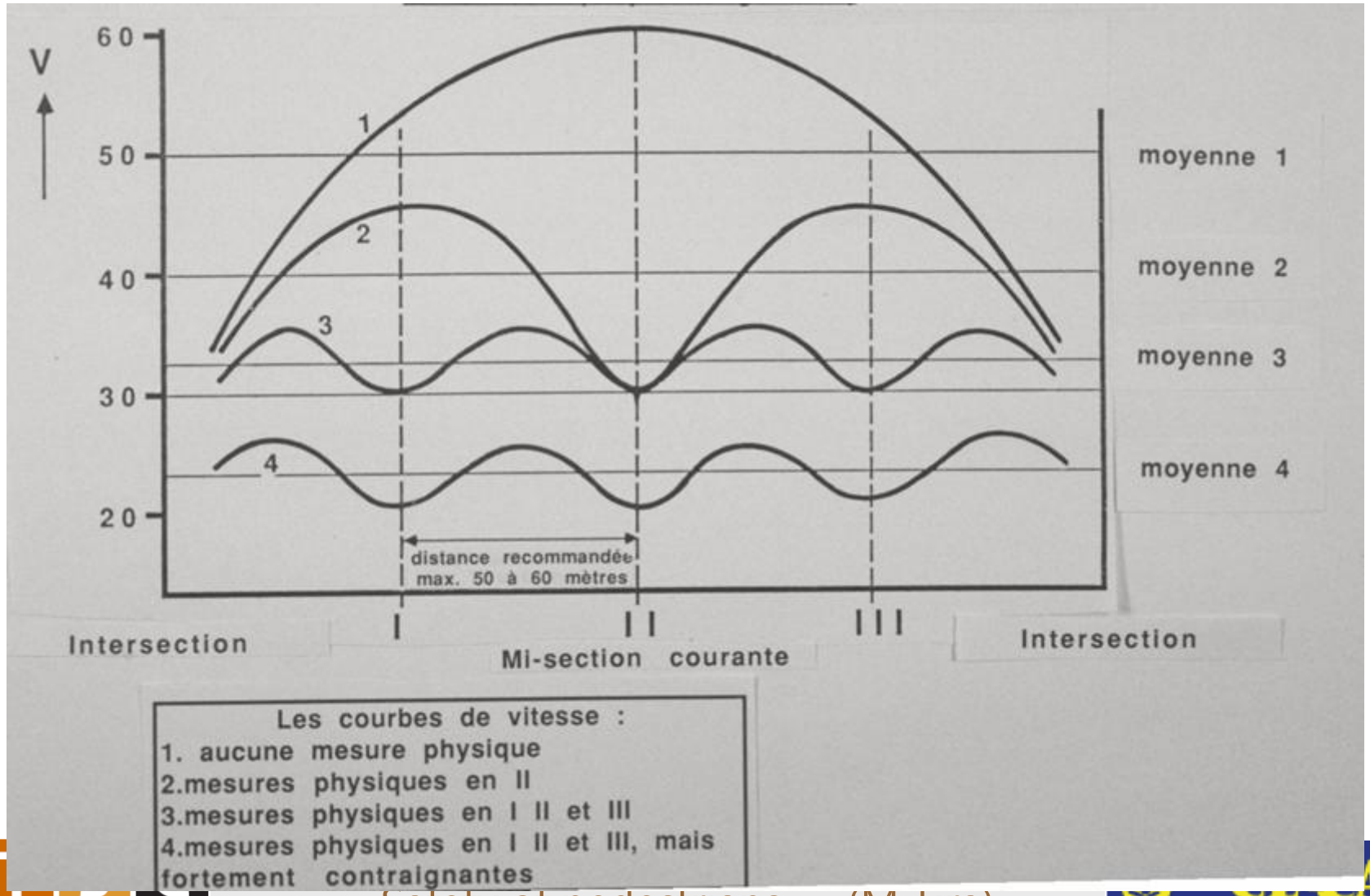
Woonerf principles – OCDE (1979)

EXEMPLE DE RUE DESSINEE SELON LE MODEL WOONERF (41)



1. Pas de trottoir continu
2. Petite entrée garage
3. Banc autour du mât d'éclairage
4. Revêtement varié
5. Trottoir propre aux habitants
6. Décrochement de la bande roulante
7. Emplacement de stationnement non occupé, destiné au jeu et au repos
8. Petit banc/élément de jeu
9. Sur demande. Espace de plantation devant la façade
10. Absence de continuité de la bande roulante dans le revêtement
11. Arbre
12. Espaces de stationnement marqués au sol
13. Passage étroit
14. Bac à plantes
15. Aire de jeu de façade à façade
16. Stationnement impossible par obstacles
17. Barrière notamment pour le stationnement des deux-roues

Speed reduction – Engel (1990)



Woonerf (Holland) – OCDE 1979

Widening the sidewalks

Manchester – OCDE 1979

Plantations and parking

Wohnbereich (Residential community)

Experimentations by H. E. Pettersson Sweden

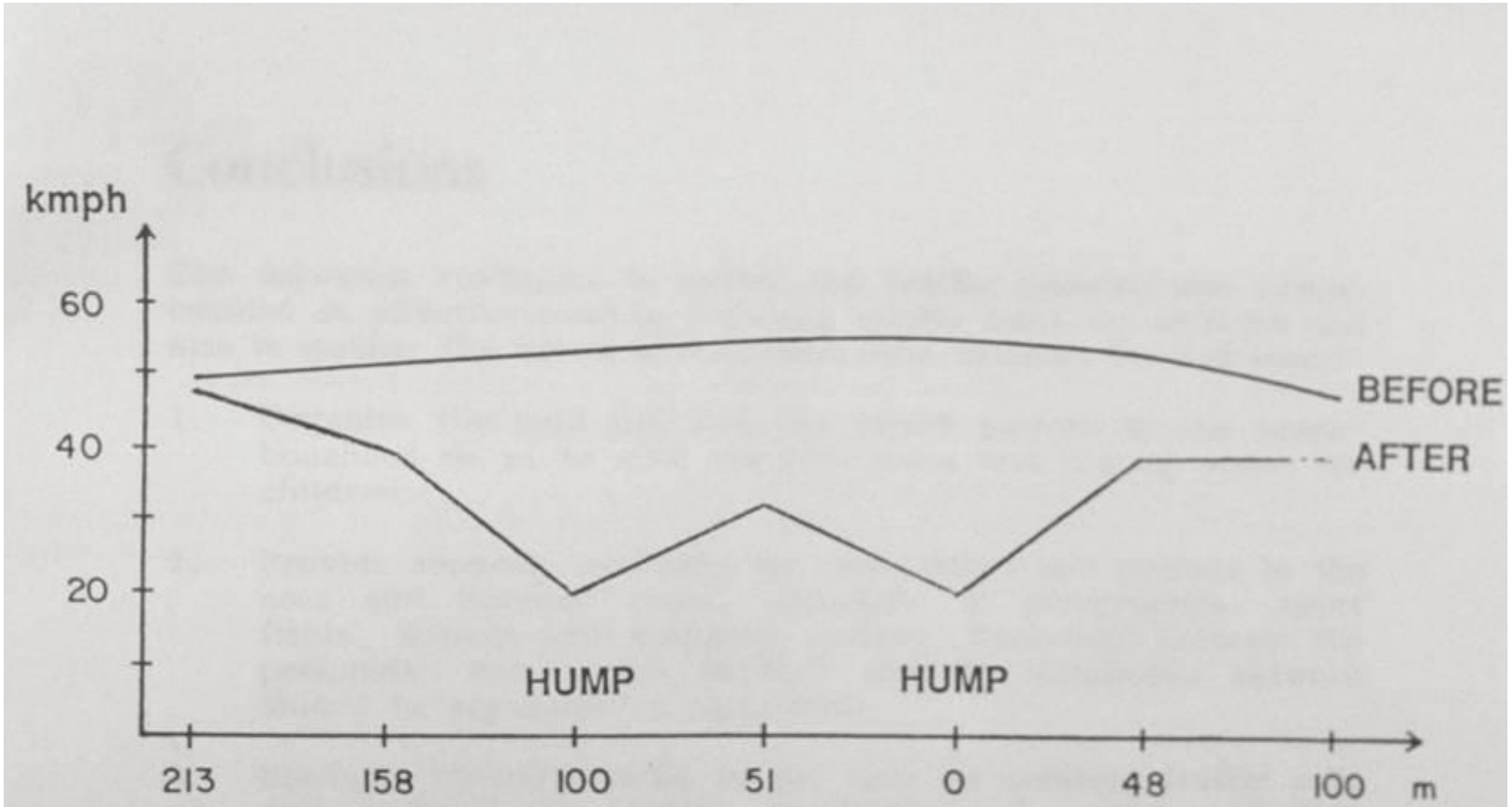


Figure 11. Speed reduction effect before and after installation of humps.

Zone 30 entrance - France

zone 30 - France

zone 30 (pict. CETUR)

zone 30 (pict. CETUR)

Zone 30 - Paris

Zone 30 - Paris

Ville plus sûre – Chambéry le Haut

Ville plus sûre – Chambéry le Haut

Road Hierarchy for motor traffic

Primary distributors

District distributors

Local distributors

Access roads

Pedestrian streets

Cycle lane and reduced perceived width for motor traffic

Crossing place on a route to school

n/h (20mph) zones

owards liveable streets

(*fonti:* www.transport2000.org.uk, www.paving.org.uk/pdf/hzone.pdf

Porto Alegre

Lyon

Cremona

… Towards liveable streets

… Towards liveable streets

Thank you for your kind attention!

e.mail: maurizio.tira@unibs.it