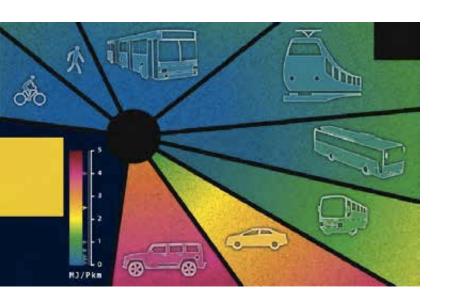




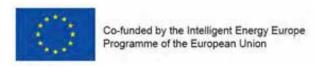
Progetto SPECIAL Meeting Multiplier

Palermo, 08/09/14



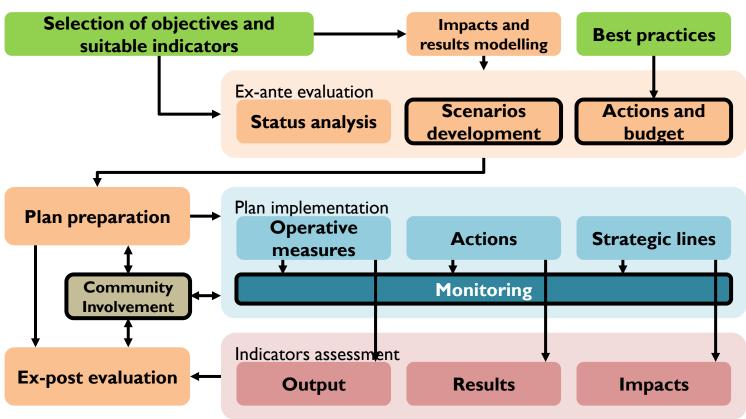
Trasporti Urbani ed

Efficienza Energetica

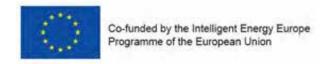


PIANI DI AZIONE PER LA MOBILITÀ SOSTENIBILE (SUMP)



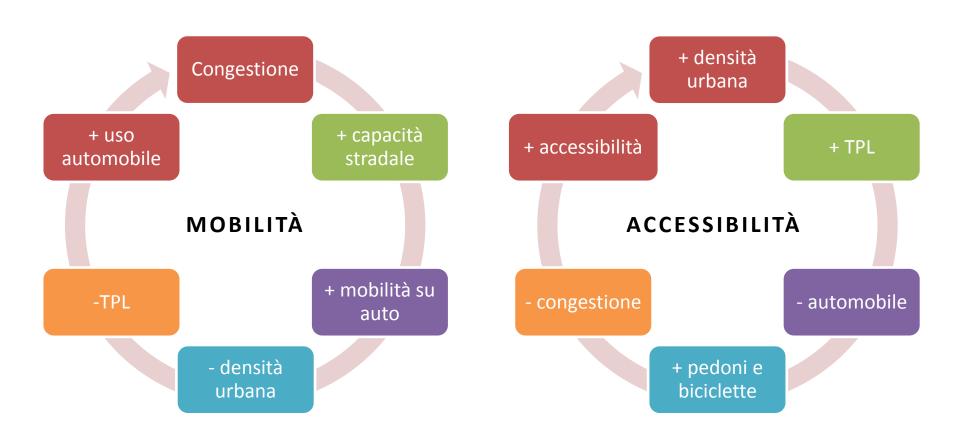


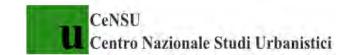


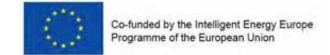


Mobilità vs Accessibilità





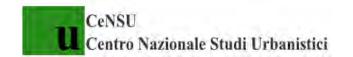


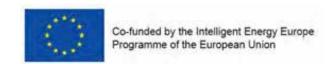


Road Pricing ICLEI, 2011



City/scheme	Traffic % change	Traffic notes	CO₂% change	CO₂ notes
Bologna	-23%	Access reduction during charging hours on a working day, 2004-2006	Not available	
Durham	-85%	From over 2000 to approximately 200 vehicles per day	Not available	
London	-16%	% change in vehicles, 2006 versus 2002 during charging hours	-16%	Change between 2002 and 2003
Milan	-14%	Decrease in vehicles accessing the Ecopass Zone, 2007 to 2008	-14%	Change after first nine months of operation
Rome	-18%	From 80,000 to 72,000 vehicles, 2000 to 2005	-21%	Change in mean values between 2001 and 2004





Parking management and pricing

SPECIAL
SPATIAL PLANNING and ENERGY for COMMUNITIES IN ALL LANDSCAPES

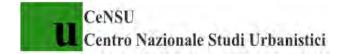
- Car drivers are willing to pay EUR 0.65 to get 100 m closer to their destination, or are ready for a three-minute search for a parking place in order to avoid a 200 m walk. Other studies have found that car drivers are willing to spend even longer to find a place as close as possible to their destination.
- Doubling parking costs decreases car mode share by about 20%.
- If parking costs are always at least the same as the public transport fare for regional trips up to about 40 km from the city centre, the share of car trips decreases by 8%.
- If the walking distance to and from a car is the same as that of a public transport alternative, the car mode share decreases by 13%.
- If all transit connections that include transfers are replaced by direct routes without transfer waiting and walking times, 10% of those car users that would have to make transfers if taking public transport (less than 20% of all respondents) would start to use public transport (thus, less than 2% overall).

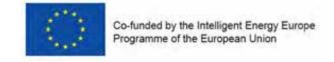
These results relate to particular cities at particular points in time, but may indicate an order of magnitude that may be relevant to other cities, especially those having similar characteristics.

Source: Cordis (2002).









Road pricing

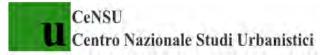


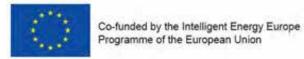
Table 5.13 Characteristics of several road-charging schemes

Town	Name	Date implemented	Scheme type	Area (km²)	Operating hours	Price	Enforcement system
Singapore	Electronic road pricing	1975	Cordon ring (in)	7	Mo-Sa 7.00 - 22.00	Gantry / time dependent EUR 0 to 1.5	Radiofrequencies + cameras
London	Congestion charge	2003	Cordon ring (in)	40	Mo-Fr 7.00-18.30	Flat rate, GBP 8/day	CCTV cameras
Stockholm	Congestion tax	2006 (became permanent in 2007)	Cordon ring (in and out)	35	Mo-Fr 6.30-18.30	EUR 1 to 2/crossing depending on time of day	Laser + cameras
Milan	Ecopass	2008 (temporary through end of 2009; extension possible)	Cordon ring (in)	8	Mo-Fr 7.30-19.30	EUR 2 to 10/day	Digital cameras

Note: For scheme type, "in and out" means that in Stockholm the cordon ring requires payment for both entering and exiting.

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Car sharing



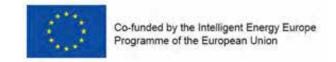
Table 5.10 Car usage prior to and after subscribing to car-sharing schemes

	Prior to car-sharing (km/y)	When car-sharing (km/y)	Proportion of total users
Never car owners	0	1 000	25%
Former car owners	10 000	5 000	65%
Still car owners	10 000	9 000	10%
Average	7 500	4 400	100%

Source: Moses, 2005.

IEA/OECD 2009. Transport, Energy and CO2- Moving Toward Sustainability

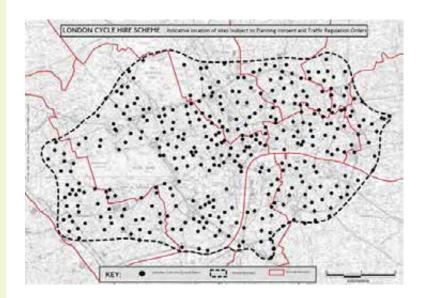




Bike-sharing in Europe

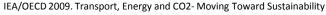


	France		Rest of the World			
City	Year of launch	Number of bicycles	City	Year of launch	Number of bicycles	
Aix-en-Provence	2007	200	Brussels	2006	250	
Amiens	2008	313	Barcelona	2007	6 000	
Besançon	2007	200	Córdoba	2004	35	
Caen	2008	350	Dublin	2009	500	
Cergy-Pontoise	2008		Gijon	2004	53	
Dijon	2008	400	Gothenberg	2009	150	
Lyon	2005	4 000	Luxembourg	2008	200	
Marseille	2007	1 000	Milan	2008	1 400	
Mulhouse	2007	200	Oslo	2006	1 200	
Nantes	2008	700	San Francisco	2008	120	
Paris	2007	20 600	Zaragoza	2008	400	
Perpignan	2008	150	Sevilla	2007	2 500	
Plaine-Commune	2009	450	Stockholm	2006	1 000	
Rennes	1998	200	Vienna	2004	500	
Rouen	2007	175	Washington DC	2008	150	
Toulouse	2007	1 470				



Note: In the Paris region there will be 25 000 bicycles available by the end of 2009 once the Velib system is extended to the cities immediately surrounding Paris.

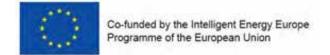






Pianificazione integrata trasporti/territorio

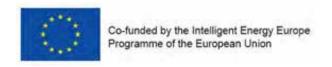
Impatto della pianificazione dei trasporti sul territorio





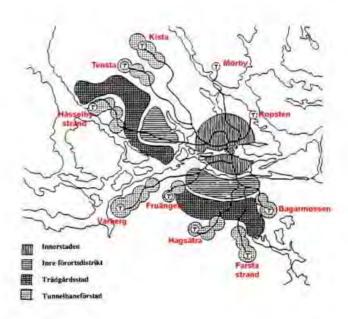


I grandi sistemi ferroviari suburbani



General Plan of Stockholm, 1952

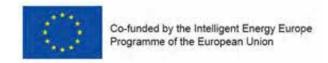


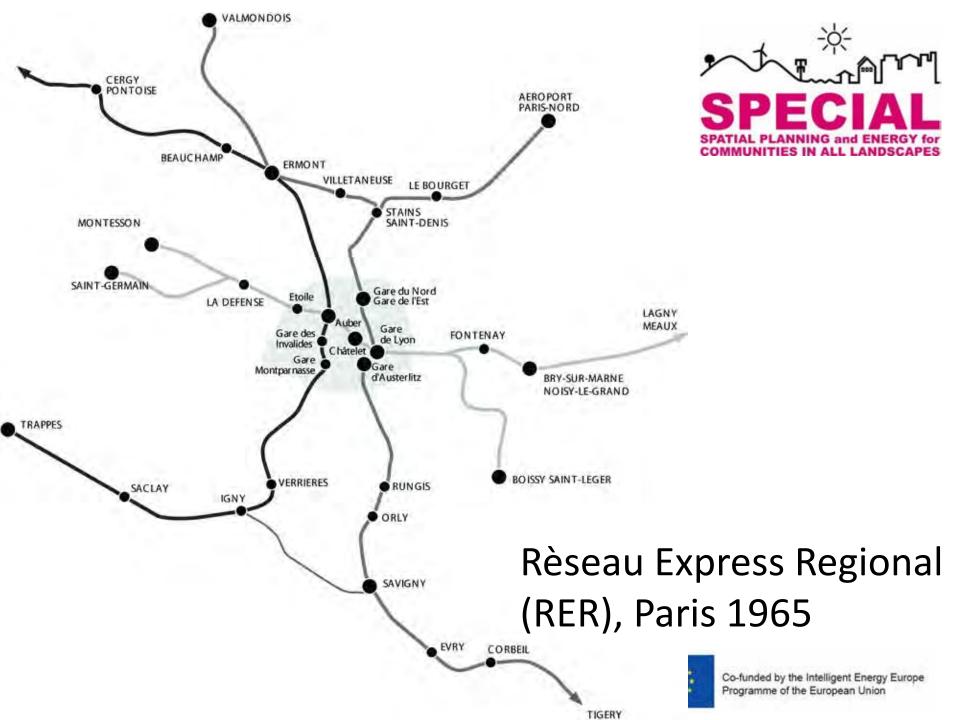






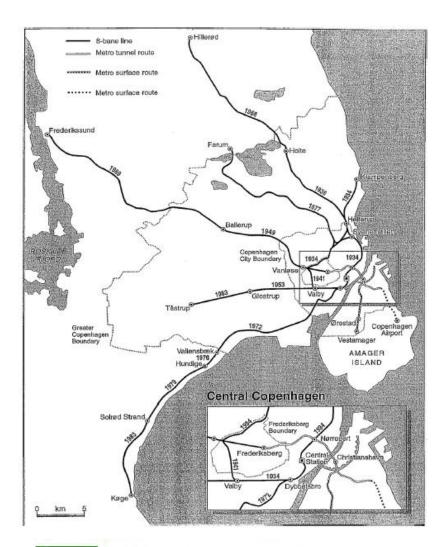




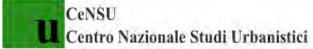


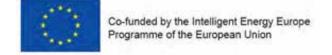
Finger Plan Copenhagen, 1947





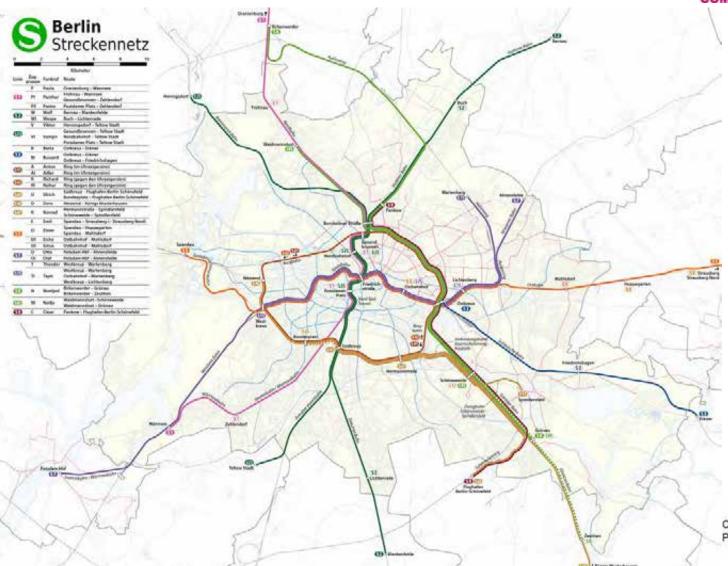






Stadt-Schnellbahn (S-Bahn) di Berlino



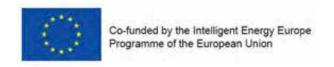


Co-funded by the Intelligent Energy Europe Programme of the European Union



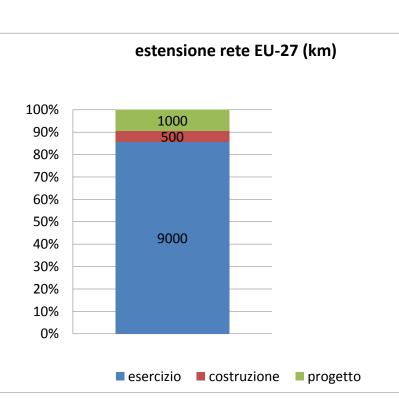


La riscoperta delle reti tranviarie



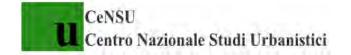
Rete tranviaria in Europa e in Italia

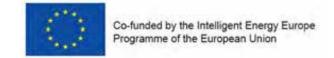






Gattuso, 2013

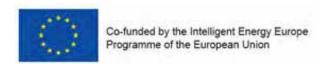








II BRT

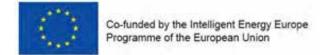






Pianificazione integrata trasporti/territorio

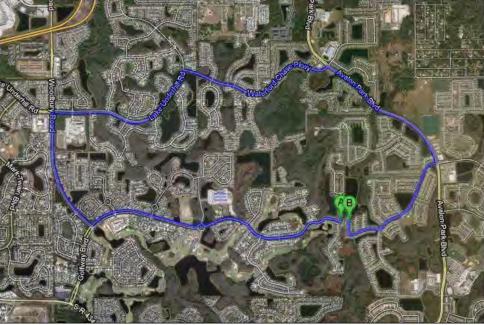
Impatto delle scelte urbanistiche sui trasporti



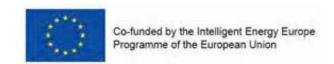
Distanze degli spostamenti e uso dell'auto











Densità urbana ed energia trasporti

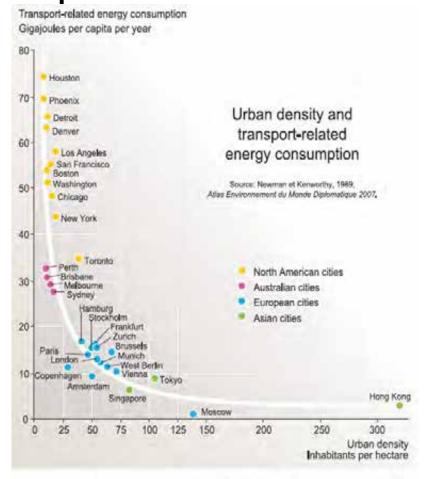
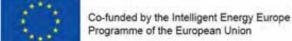


Figure 1 : The Newman and Kenworthy hyperbola: Urban density and ransport-related energy consumption









Transit Oriented Development

- Concentrare lo sviluppo urbano attorno ai nodi principali del trasporto pubblico è considerato uno degli strumenti più efficaci di riduzione della dipendenza dall'automobile.
- Calthorpe definisce il TOD come "una comunità con usi misti del territorio entro una media di 600 metri a piedi da una fermata/stazione del TPL e dell'area commerciale."



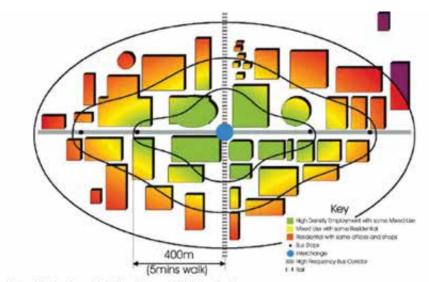
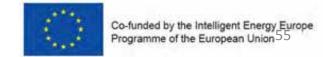
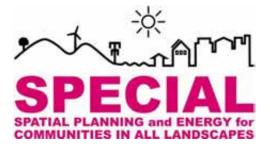


Figure 3.52 An Example of Microdesign and Walking Isochrones Source: Coin Buchanan and Partners (2001).





TOD





TOD in Vallingby (Sweden)



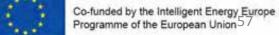












Rieselfeld, Freiburg

- 12.000 abitanti
- 15.000 ab/kmq
- 1000 posti di lavoro

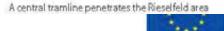


- Tram: linea rossa
- Bus: linee blu













Centri commerciali e trasporto pubblico

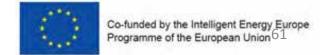






Auchan shopping centre is served by the tram of Nantes

Auchan servito dal tram a Nantes Parcheggi delle Porte di Catania





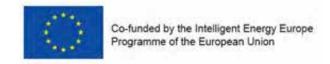




Source: Zimmerman (2008).

Note: The photo on the left shows a high-quality public transportation corridor between Arlington, Virginia, and Washington, D.C., with an underground metropolitan train (the orange line and M) and a feeder bus system. The corridor exhibits many elements of good macrolevel planning and transit-oriented development, including higher densities around high-quality public transportation (the underground) in an otherwise car-oriented environment. After 20 years of mixed use development around stations (such as Clarendon, pictured on the right), the corridor has become a good example of urban form.





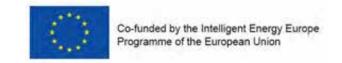
Public transport and density



Public transport needs a reasonably dense population in order to be effective. Cost-effective urban bus systems typically depend on a minimum density of 25 dwellings per hectare (dw/ha) (Banister, 2008). Due to its higher capacity, LRT needs at least 60 dw/ha. For comparison, the city of Paris has now an overall average of 150 dw/ha.

IEA/OECD 2009. Transport, Energy and CO2- Moving Toward Sustainability





Densità urbana ed energia trasporti

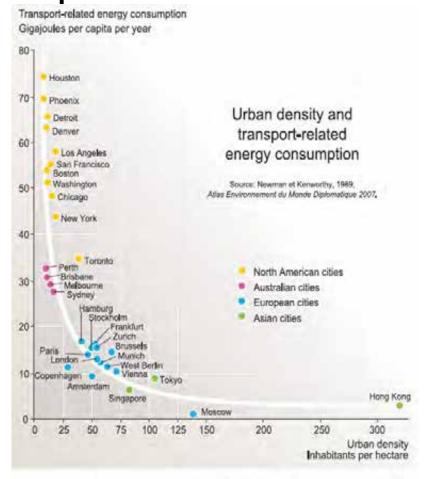
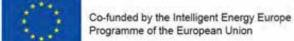


Figure 1 : The Newman and Kenworthy hyperbola: Urban density and ransport-related energy consumption









Densità Media Vs Dinamica Spaziale

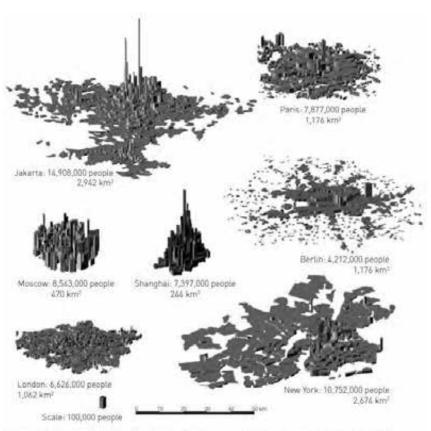
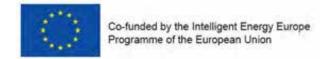


Figure 3. Residential density distribution in several cities. Source: (Bertaud, 2001).



- Un gradiente di densità negativo è generato dalla competizione economica per localizzazioni centrali. È influenzato dalle politiche urbanistiche, tassazione e infrastrutture.
- Un gradiente positivo aumenta il consumo di energia dei trasporti (addensamento origini spostamenti in periferia)



Distribuzione spaziale degli spostamenti



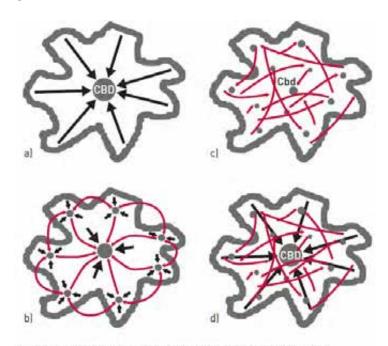
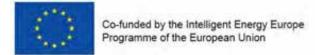


Figure 4. Typologie of urban movement according to Bertaud.

- a) The monocentric model
- b) The polycentric model: The urban village version
- c) The polycentric model: The random movement version
- d) The mono-polycentric model: Simultaneous radial and random movements

Legend:Schematic representation of trip patterns within a metropolitan area according to Bertaud. Strong Links (Black arrows) and weak links (Red arrows). Source: (Bertaud, 2001).

- a) Londra
- b) Stoccolma
- c) Los Angeles
- d) Evoluzione di una monocentrica in una megalopoli



Struttura spaziale ed efficacia del trasporti pubblici



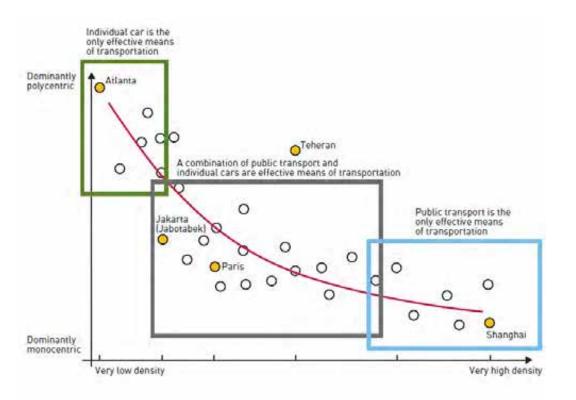
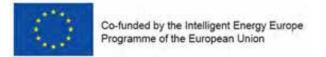


Figure 5. Relationship between Spatial Structure and the Effectiveness of Public Transport. Source: (Bertaud and Malpezzi, 2003).

Il trasporto
 pubblico è
 incompatibile con
 bassa densità e
 struttura
 totalmente
 policentrica



Quale modello: Barcellona o Atlanta?



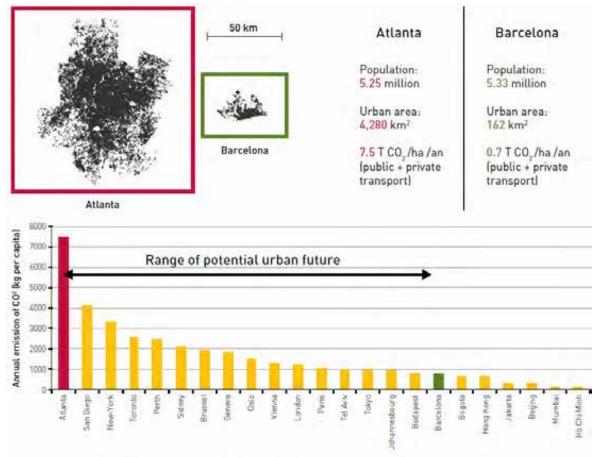
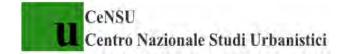
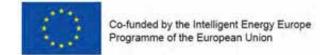


Figure 6. Atlanta or Barcelona, the range of possible urban futures. Source : Adapted from (Newman and Kerworthy, 1999).

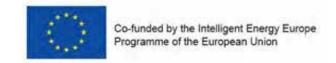




Urban modelling

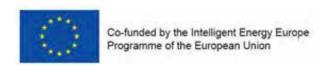


- Modelli complessi di interazione trasporti territorio per i ricercatori
- La pianificazione urbanistica e dei trasporti ha bisogno di modelli semplici per indirizzare lo sviluppo lungo i percorsi della sostenibilità



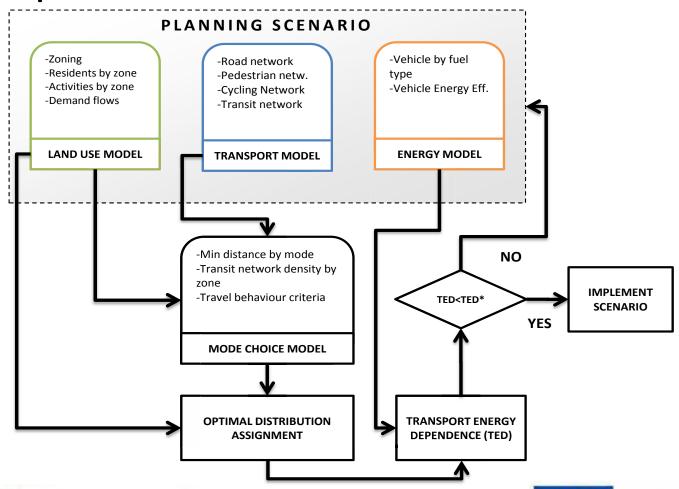


Modello di calcolo dell'Efficienza Energetica del sistema urbano Territorio-Trasporti

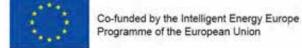


Modello di calcolo della Dipendenza Energetica dei Trasporti



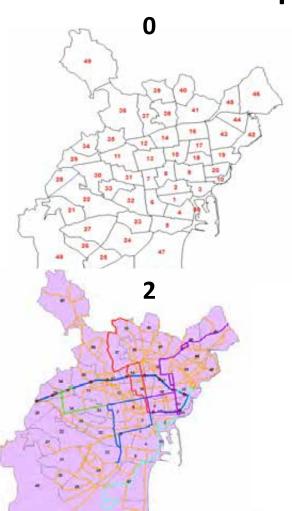


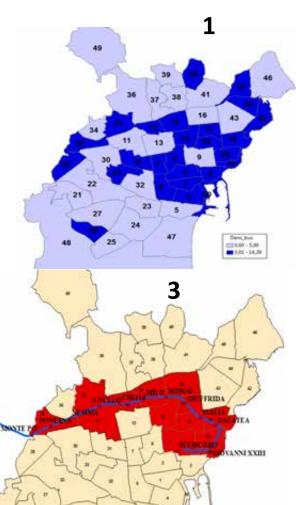




Caso studio Catania -Scenario di piano





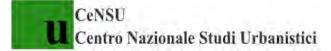


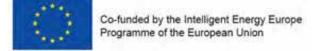
Sc. 0: situazione attuale

Sc. 1: accessibilità al TPL

Sc. 2: Rete BRT e metro

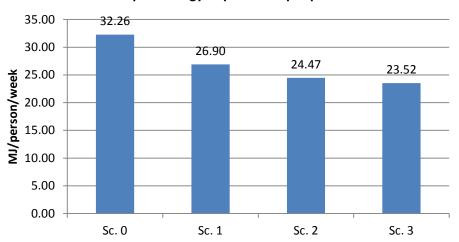
Sc. 3: politiche TOD



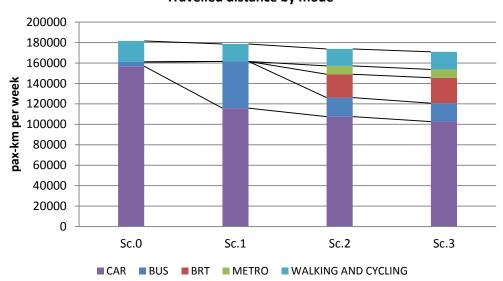


Energia per persona e ripartizione modale

Transport Energy Dependence per person

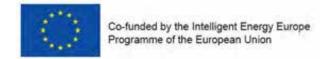


Travelled distance by mode



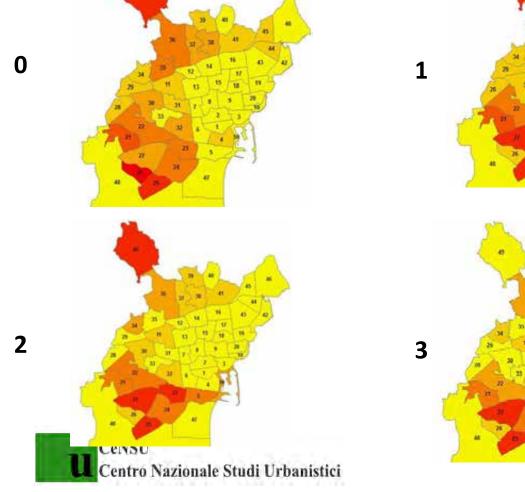


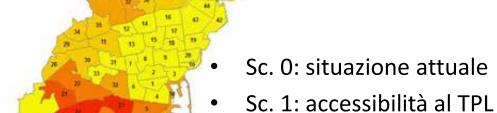
- Sc. 0: situazione attuale
- Sc. 1: accessibilità al TPL
- Sc. 2: Rete BRT e metro
- Sc. 3: politiche TOD



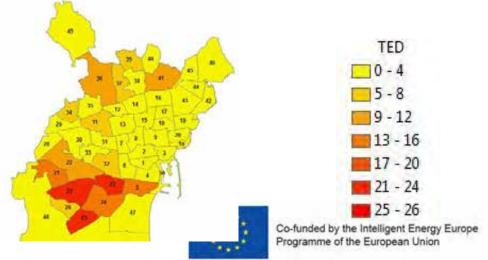
Energia per zona e per residente







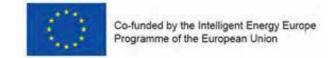
- Sc. 2: Rete BRT e metro
 - Sc. 3: politiche TOD





CASI STUDIO





BRT e TOD

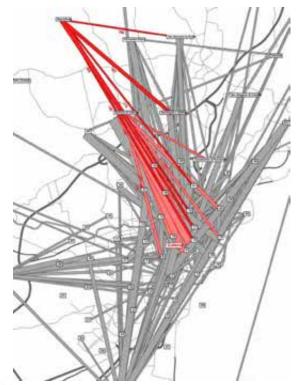
One-29 (200 to \$25-\$16)

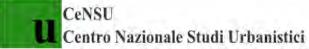


The density dilemma. A proposal for introducing smart growth principles in a sprawling settlement within Catania Metropolitan Area

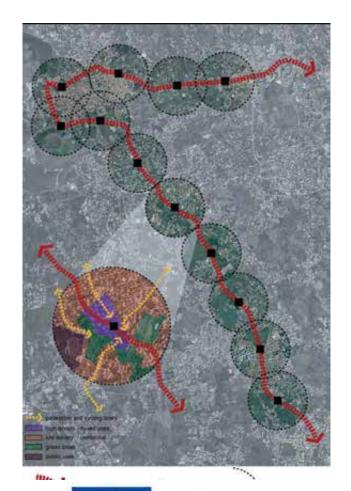
Paolo La Greca 4.º, Luca Barbarossa 4, Matteo Ignaccolo 6, Giuseppe Inturri 6, Francesco Martinico 6

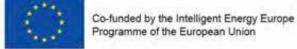
*Università di Calania, Operationesi di Androdore, 1665-*Strevista di Calania, Di pertinona di Ingrigorita Callo e Androdore, Suly





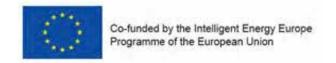








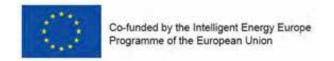
MODELLI URBANI TRASPORTI USO DEL TERRITORIO



Casi studio dal Portfolio di SPECIAL



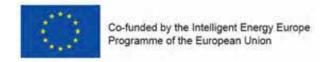
- 1. The first Bus Rapid Transit (BRT) line (Catania, Italy)
- 2. Sustainbale transports in Malmo
- 3. Sustainable Urban Mobility Plan (City of Judenburg / Styria, Austria)



Sustainbale transports in Malmo



- The City of Malmö developed a traffic and mobility plan in terms of a local Sustainable Urban Mobility Plan (SUMP).
- In the period 2006 to 2011 the amount of individual motor car traffic decreased by 6% (17.700 cars per day) despite of a population increase of 9 % and an increase of workers of 15 %.
- The innovative aspect is targeting specific user groups, e.g. by travel behaviour campaigns
- Additionally to "hard" measures of traffic steering and planning and implementation of low carbon traffic strategies also soft measures such as information, marketing, education and guidance are necessary for an successful implementation of a Sustainable Urban Mobility Plan (SUMP)

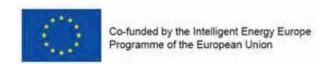


Sustainable Urban Mobility Plan (City of Judenburg / Styria, Austria)



- The ADVANCE Audit is a practical tool for improving Sustainable Urban Mobility Plans (SUMPs) in cities and municipalities.
- It provides a systematic evaluation method to compare the cities' mobility planning to an ideal sustainable urban mobility planning process.
- The main tool of the ADVANCE Audit is the self-assessment questionnaire.
- It is filled in by the members of the ADVANCE working group (cities representatives and internal stakeholders).
- The output of the Audit is the so called Action Plan.
- It gives detailed information about the measures that need to be implemented in order to improve Sustainable Urban Mobility Planning in Judenburg.



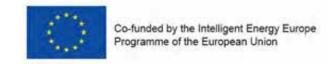


Transport development planning Greifswald (Germany)



- In December 2008 important stakeholders in the area of climate protection of Greifswald formed the climate protection alliance Greifwald 2020)
- The public utilities as main energy producer as well as housing companies, the clinical centre and the city administration as the biggest energy consumer are represented in this alliance.
- Signing the declaration the alliance members target to reduce the CO2 emission in the municipality by 2020 by 14% in comparison to 2005.



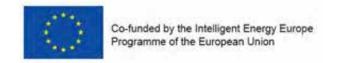


Transport in Bahnstadt Heidelberg (Germany)



- Bahnstadt is one of Germany's largest urban development projects. With the Bahnstadt campus, Heidelberg is reinforcing its position as the centre of science-based business. Internationally mobile scientists, business professionals and managerial staff will discover an attractive combination of working, residing and living on campus.
- The Bahnstadt campus and SkyLabs are situated just under a kilometre from the Neuenheimer Feld area of Heidelberg where the university's science-oriented faculties, clinics and research establishments are located.





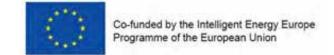
Il caso di Friburgo

- 220 mila abitanti
- tasso di utilizzo del trasporto pubblico tra i più alti d'Europa
- Uso dell'auto fermo ai livelli dei primi anni Settanta
- centro città chiuso al traffico dal 1973
- 90% dei residenti abita in zone a traffico ridotto
- 70% degli spostamenti urbani avviene a piedi, in bicicletta
- 400 km di piste ciclabili e più di
 4.600 parcheggi per i ciclisti
- Applicazione ideale del TOD





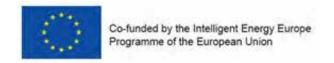






Sistema di monitoraggio, previsione e controllo del traffico in tempo reale

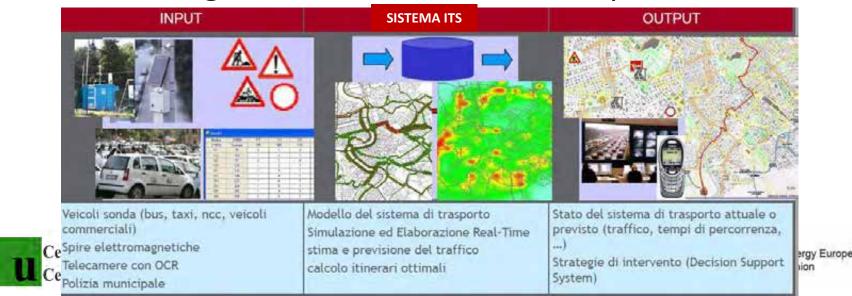
ITS per ridurre il consumo di energia



Cosa fa



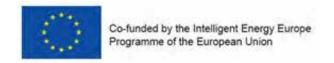
- Monitoraggio traffico da rilevatori fissi e mobili
- Stima traffico (flussi e tempi) su tutta la rete urbana
- **Previsione** evoluzione traffico a breve termine (30')
- Informazione ai cittadini affidabile e in tempo reale
- Controllo e gestione del traffico in tempo reale





Sistema dinamico di infomobilità multimodale

ITS per ridurre il consumo di energia



Journey Planner



- Sarà disponibile per i cittadini una piattaforma web in grado di fornire una strategia completa di viaggio per raggiungere la destinazione finale (su dispositivi mobili)
- Fornisce indicazioni sull'uso del trasporto pubblico sensibili alla posizione effettiva dei veicoli delle diverse linee (tempi previsti alle fermate, cancellazione corse, etc..)
- L'utente può personalizzare la richiesta rispetto alle proprie preferenze (pochi tratti a piedi, pochi trasbordi, distanza minima, tempo minimo, costo minimo, etc.)



