POLITECNICO DI MILANO

POLITECNICO DI MILANO

Poliedra
Politecnico di Milano





Green Move: a (sustainable) project of electric vehicle sharing for the city of Milan

Alberto Colorni

Politecnico di Milano and
Cons. Poliedra - Politecnico

Summary

Introduction

1. What is the project
2. Some cases of success
3. Key points
4. Configurations
5. Stakeholders
6. Maps
7. Demand analysis
8. Trial (the condominium car)
9. Conclusions

Introduction: demand regulation

- **Incentives and taxes**
  (use alternative modes, reduce driving)
  - ✓ congestion & park pricing *(Button and Verhoef,1998)*
  - ✓ mobility credits *(Banister, 2000)*
  - ✓ …
- **Improved transport choice**
  - ✓ demand-responsive services *(Brake et al., 2007)*
  - ✓ car pooling *(Correia and Viegas, 2006)*
  - ✓ vehicle sharing *(Katzev, 2003)*
  - ✓ services for nonmotorized *(Pucher and Buehler, 2008)*
  - ✓ …
- **Policies, programs, land use management**

Car sharing

- A service about the **shared use of a car fleet**

- Cars available for a group of users:
  - ✓ reservation system
  - ✓ cost proportional to use

- Allow to have at disposal a car
  for family or company needs, not owning one :
  - ✓ without fixed costs (tax, insurance, maintenance, box, …)
  - ✓ paying only the use

- Ideal solution for those driving **less than 10.000 km per year**

Car sharing characteristics

- Vehicle sharing is attractive for an “occasional” use
- Barriers: capillarity and availability *(Katzev, 2003)*
- The concept had different evolutions, such as neighborhood model, station cars, multi-nodal *(Barth & Shaheen, 2002; Brook, 2004)*
- Until the 90’s, most of the services were a failure: public support *(Shaheen et al., 1998; Burlando et al, 2007)*
- Environmental benefits *(Katzev, 2003; Martin & Shaheen, 2011)*
  - car ownership: reduction of 12-15 private cars for each car shared
  - cars circulating: 20% less emissions for each member of car shar.
  - soil occupation
- Recently: use of electric cars

Summary

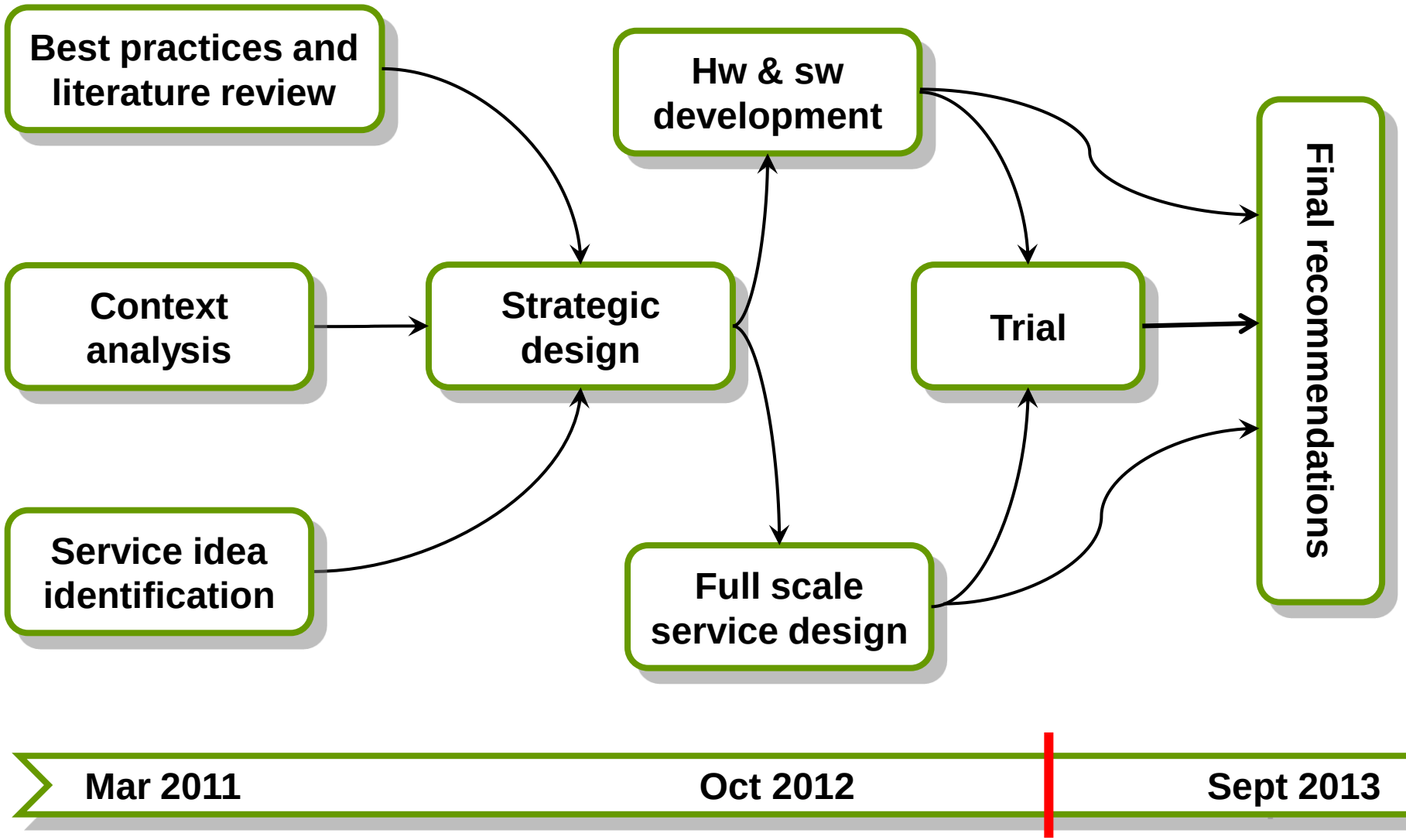
1. **What is the project**
2. Some cases of success
3. Key points
4. Configurations
5. Stakeholders
6. Maps
7. Demand analysis
8. Trial (the condominium car)
9. Conclusions

Green Move

- Objective: design & test a **electric car-sharing system** in Milan
- Coordinating a 2½ years project financed by the Lombardia Region (5 millions €), involving **eight research centers** of Politecnico di Milano
- Outcome:
  - the design of a **full scale** service
  - a **trial** with a limited number of docking stations in Milan

Switch from “buy a vehicle” paradigm to **“buy mobility services”**

The scheme


Best practices and literature review
Context analysis
Service idea identification
Strategic design
Hw & sw development
Full scale service design
Trial
Final recommendations
Mar 2011
Oct 2012
Sept 2013

The main steps of a journey

book your trip

receive your code

unlock the vehicle

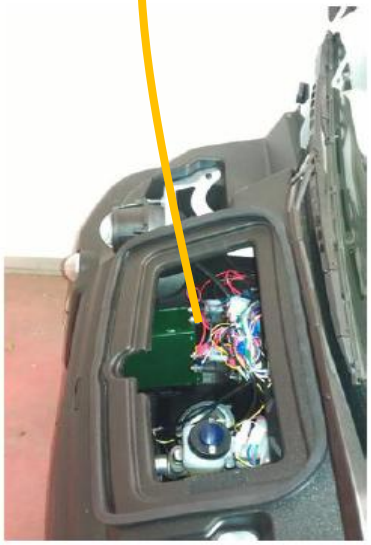
make your trip

return the car

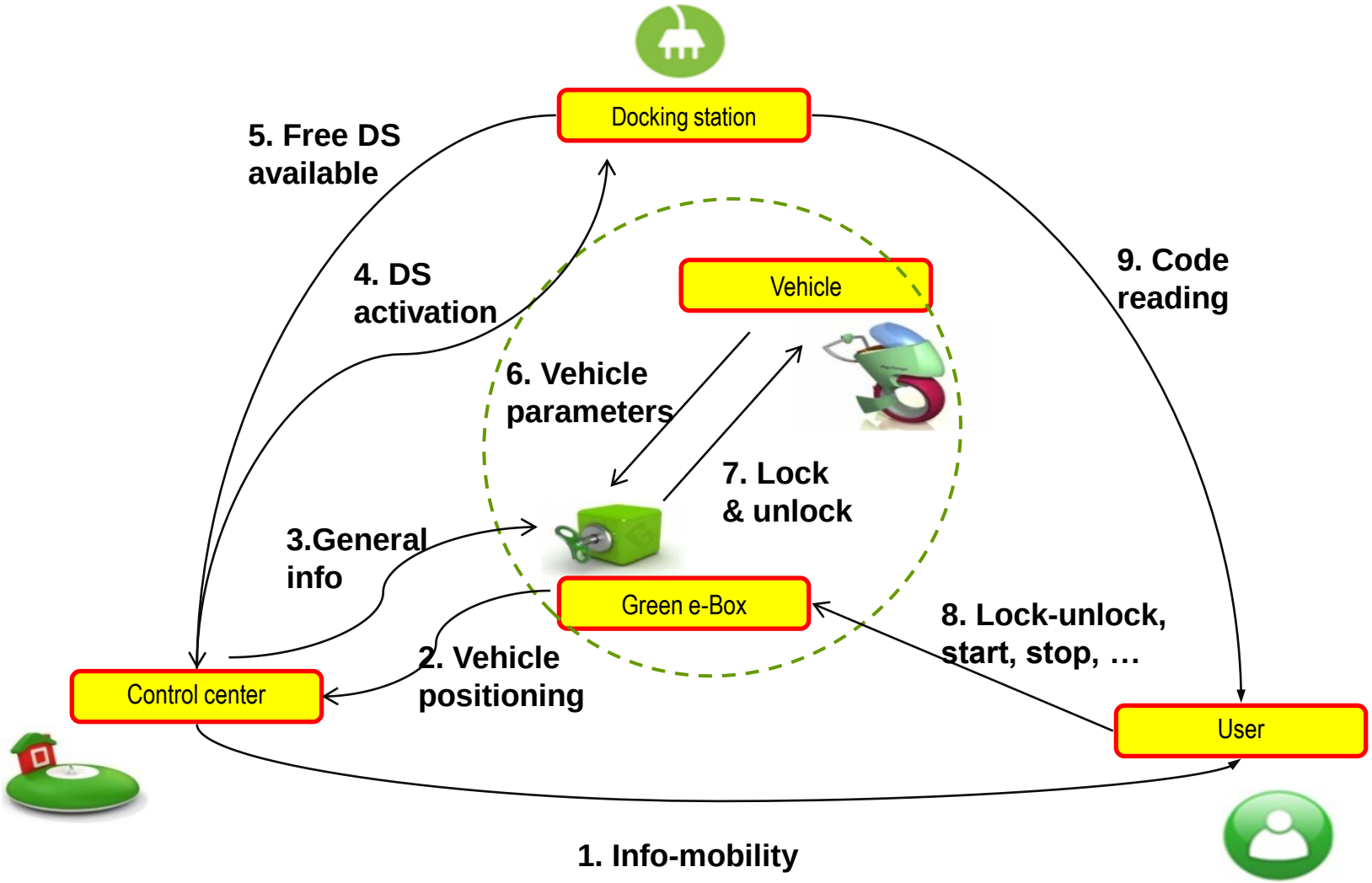
The GeB (Green e-Box)

Device to manage the vehicle functionalities, which can be installed in any (recent) vehicle

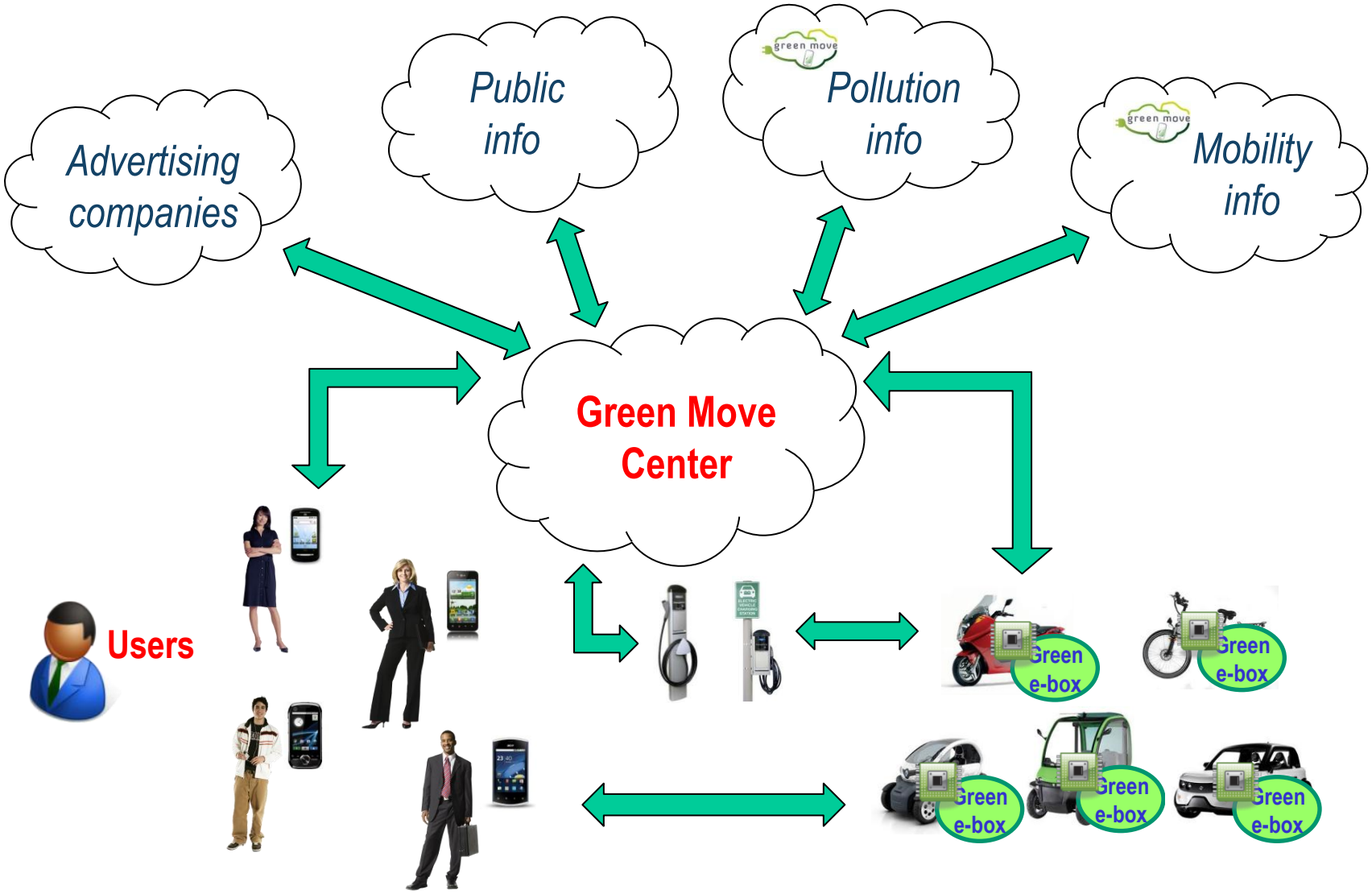
- **Keyless:** doors and/or engine enabled by smartphone, RFID, or SMS (no need for physical key exchange)
- **Multi-owner:** single users, private companies, asso-ciations, …, can share their cars or fleet
- **Floating parking**: wireless communication with the central station and GPS (no need for docking stations)



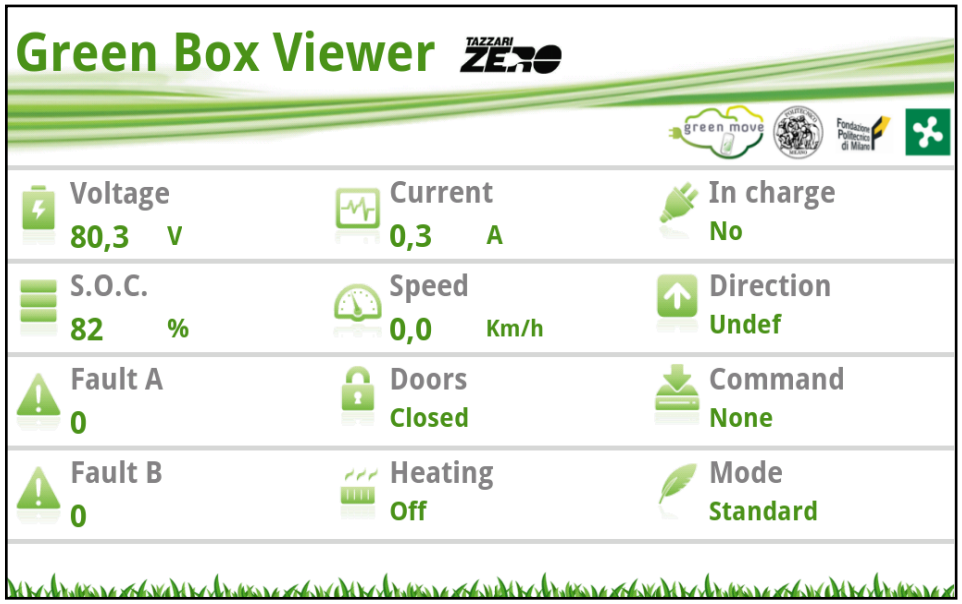
The information flow



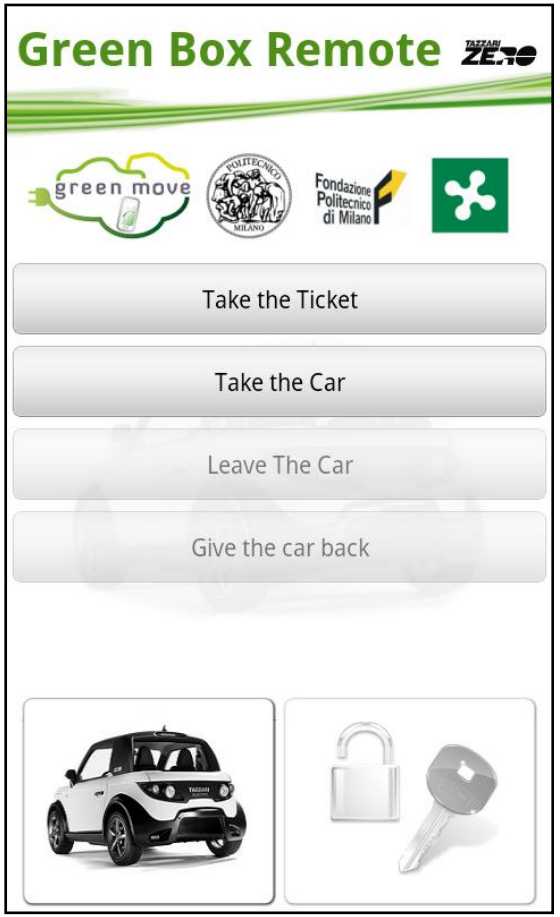
The services



App (tablet & smartphone)



Display of car data (tablet)

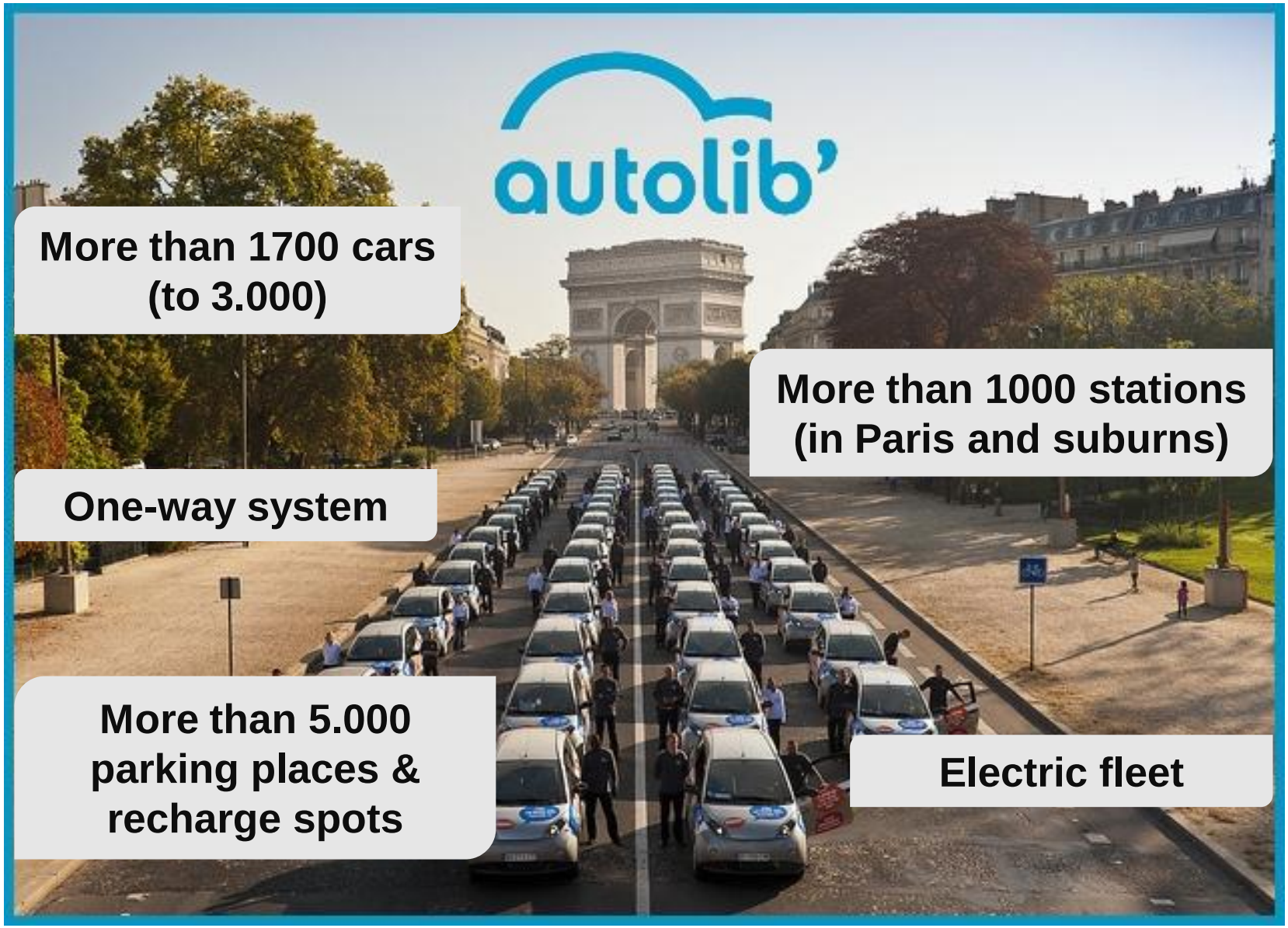


Booking and car taking (smartphone)

Summary

1. What is the project
2. **Some cases of success**
3. Key points
4. Configurations
5. Stakeholders
6. Maps
7. Demand analysis
8. Trial (the condominium car)
9. Conclusions

Autolib – Paris



Autolib – data (on average)

A URBAN REVOLUTION

3000 vehicles correspond to a reduction of **22.500** private vehicles, that is **164.500.000** km. not driven with polluting cars.
This contribute to the national commitment of 20% reduction of the carbon emissions by 2020.

First year with Autolib:

- **40’000 users** → **15 rents/user**
- **600’000 rents** → **1650 rents/day**

Now:

- **> 1milion rents**
- **60.000 pass-holders**
- **1.200 users/month**
- **growth: 15% per month**

A car is driven (on av.) **3 times per day**. The **av. trip** is **42 min** and **9 km**. **One user out of 3** think of Bluecar as **first choice for transport**.

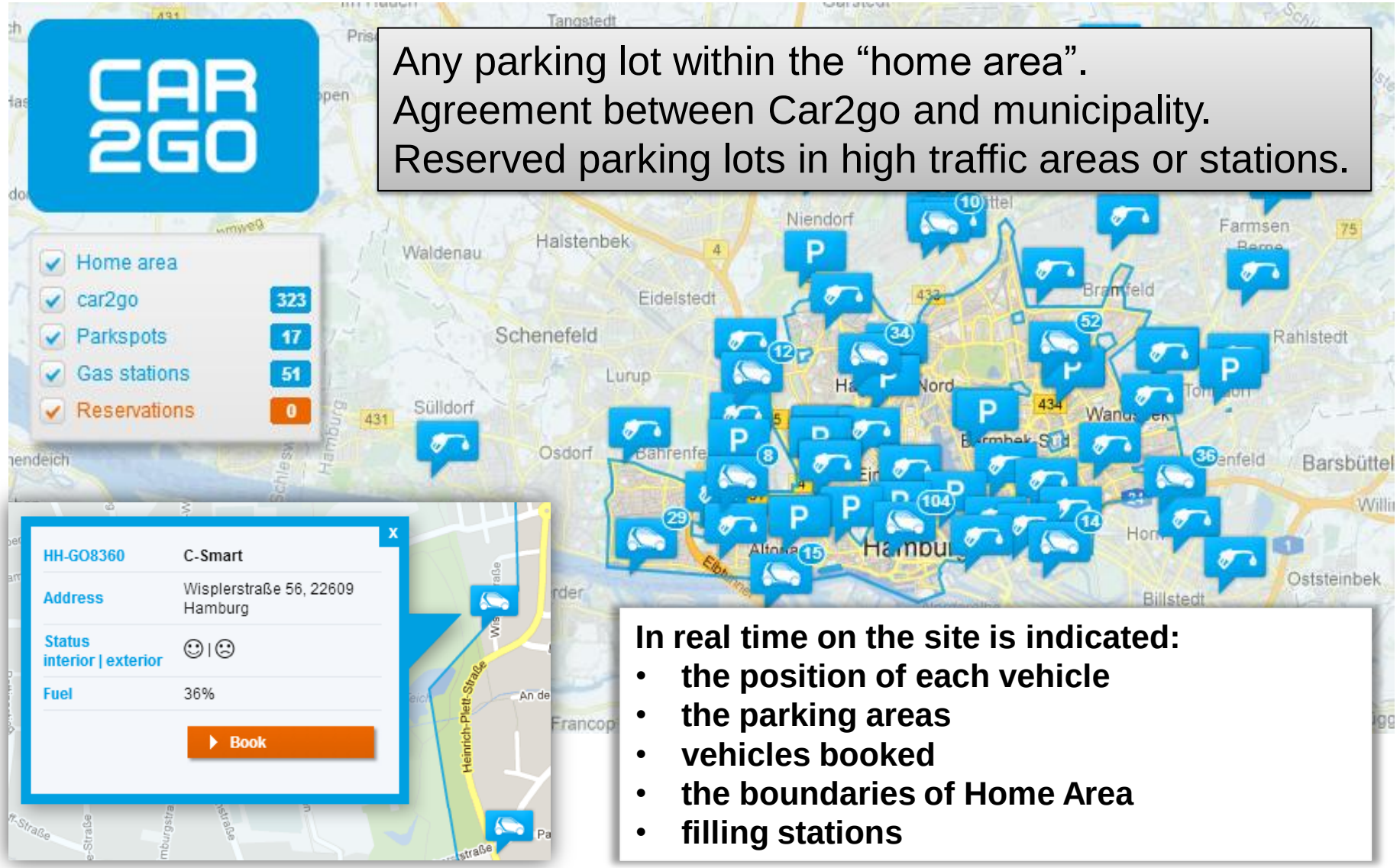
Car2go – 18 cities in EU and USA

- Online reservations (website or app).
- Every reservation gives 20 km free.
- Reservation and access in 15 min.

Amsterdam
Washington DC
Austin
Dusseldorf
Toronto
Cologne
Berlin
Calgary
London
Ulm
Miami
Hamburg
Stuttgart
Portland
Vienna
Vancouver
Seattle
San Diego
....

Car2go – you can park everywhere

Any parking lot within the “home area”.
Agreement between Car2go and municipality.
Reserved parking lots in high traffic areas or stations.



In real time on the site is indicated:

- **the position of each vehicle**
- **the parking areas**
- **vehicles booked**
- **the boundaries of Home Area**
- **filling stations**

Zipcar – USA, UK, Canada

- In more than 50 cities in North America, UK, Canada and Spain
- In more than 200 colleges in North America
- More than 750.000 users «zipsters» in the world
- More than 9000 vehicles fleet

CAR SHARING WORLD LEADER COMPANY

Reserve with app, drive System → two ways trip

Zipcar – the trend

Number of members trend

GM – best practices

Cases analysed (35 international CS projects)

1	eE-Tour Allgäu
2	Botelleros
3	Flinc/MobileRidesharing
4	Frankfurt Model
5	ICVS _ Honda
6	I-go
7	Phone Booths Charging
8	Autolib
9	Cambio
10	eVai
11	Greenwheels
12	GuidaMi
13	ICS
14	Mobility Car Sharing
15	MoveAbout
16	Yèlomobile
17	ZipCar

18	Alt Car
19	CiteVu
20	Cityzencar
21	Drive mycar
22	Getaround
23	Go Op
24	Sarecar
25	Spride
26	Tamyca
27	Whipcar
28	Zen Car
29	Car2go
30	Citycarshare
31	E-moving
32	Google's Relay Rides
33	London Liftshare
34	Pordenone Birò
35	ZEC

Nationality

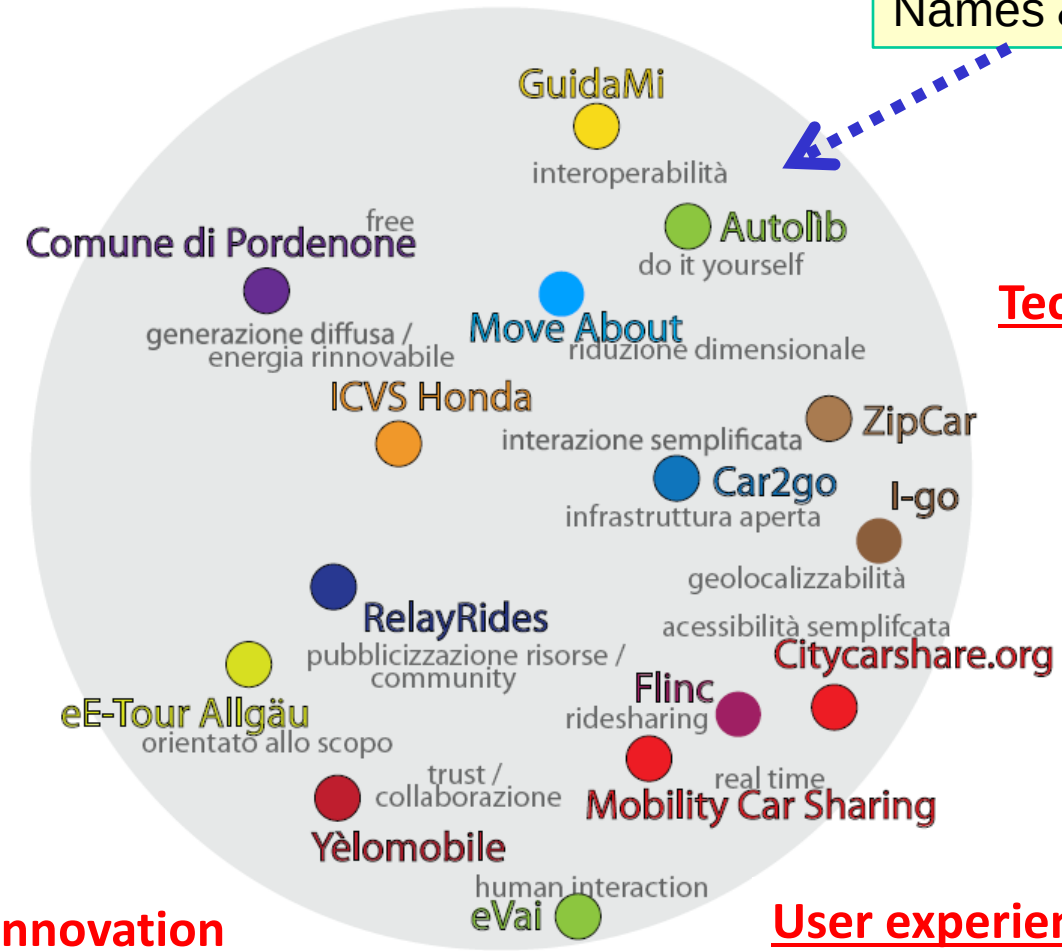
- Italians: 6
- European: 16
- Extra-Europe: 13

Engine

- **Electric: 16**
- Trad.-hybrid: 19

GM – case studies

Criteria
to study
the cases



Car sharing services in Milan

- **GuidaMi** (city of Milan)
  - 134 cars
  - 5.147 users
  - 80 pick stations
  - internal comb. engines

GuidaMi
CAR SHARING MILANO

- **e-Vai** (Lombardia region)
  - 37 pick stations (4 in Milan)
  - near airports and stations
  - electric vehicles

e·vai
SEMS

Summary

1. What is the project
2. Some cases of success
3. **Key points**
4. Configurations
5. Stakeholders
6. Maps
7. Demand analysis
8. Trial (the condominium car)
9. Conclusions

Key points

1. Capillarity (i.e. stations/km^2) is relevant: if too low → barrier
2. Fares policies: to incentive short trips
3. Build up a community: the role of the users
4. Integration with other services: i.e. car pooling (Zipcar-Zimride)
5. New technologies

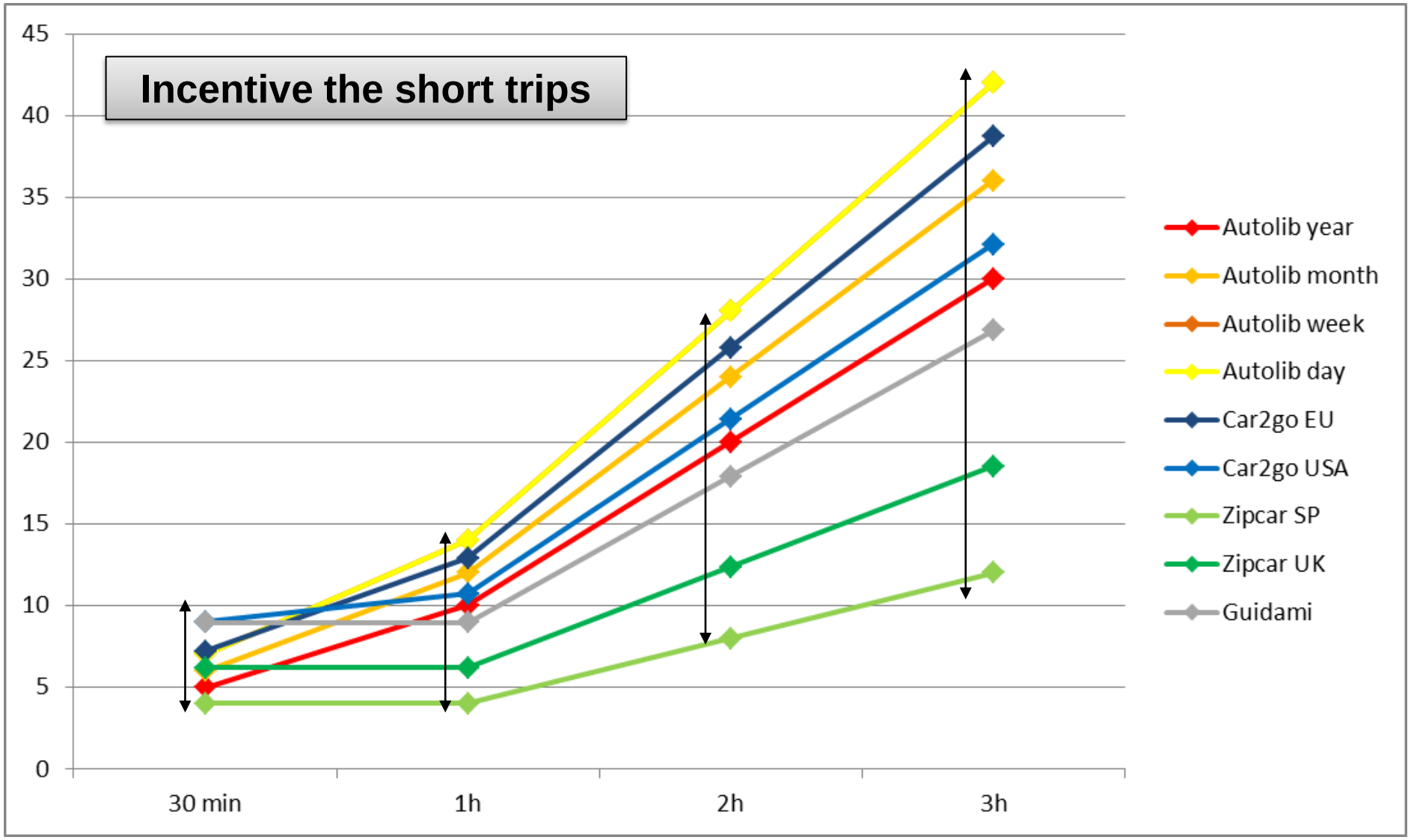
1. Capillarity: a comparison

		vehicles	% ICE	stations	park	place	km^2
Autolib	1w	**1.740**	0%	**1.100**	5.000	Paris	375
Car2go	1w	**1.200**	100%	**1.200**	M	Berlin	444
ZipCar	2w	**1.279**	100%	**1.084**	1/veh.	London	1.040
GuidaMi	2w	**134**	98,5%	**80**	1/veh.	Milan	225

The main difference → fleet dimension !!!

i.e. **Car2go** → sizes the service taking in account the area served, with a fixed capillarity

2. Fares policies

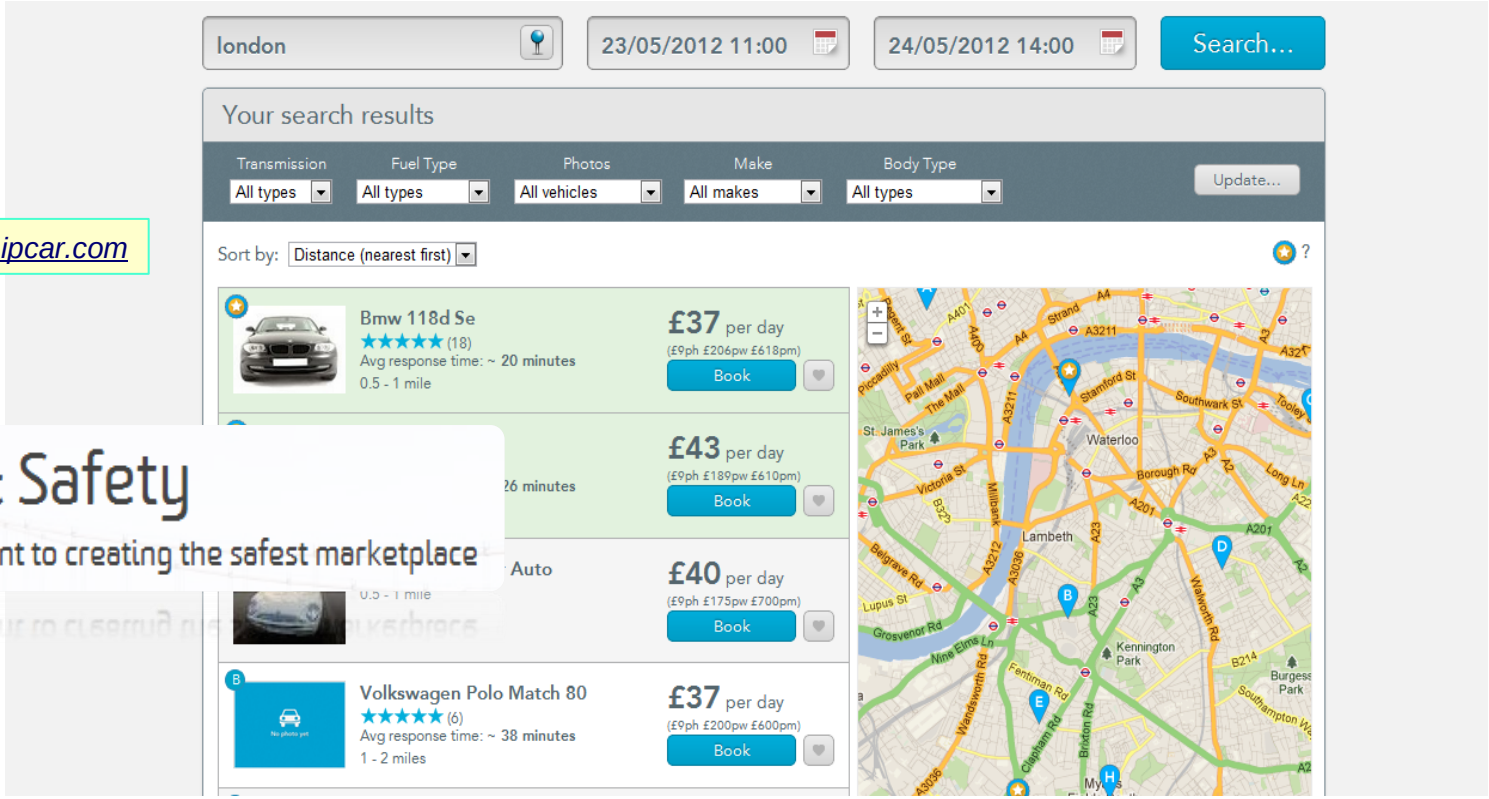


3. Build up a community: peer-to-peer car sharing

Peer-to-peer (P2P) car sharing

- sharing of the private car
- rates decided by the owner
- time window of availability decided by the owner

http://www.whipcar.com



3. Build up a community: p2p main obstacles

Cultural obstacles

- Insurance: perceive the automotive industry as a loss sector
- People identify the car sharing as a car rent: expensive and risky
- Cultural relevance of car ownership of the car

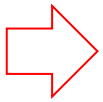
Practical obstacles

- Legal aspects still not solved
- Insurance: p2p standard missing
- For p2p the IT aspects are as much relevant as the transport ones

In Italy

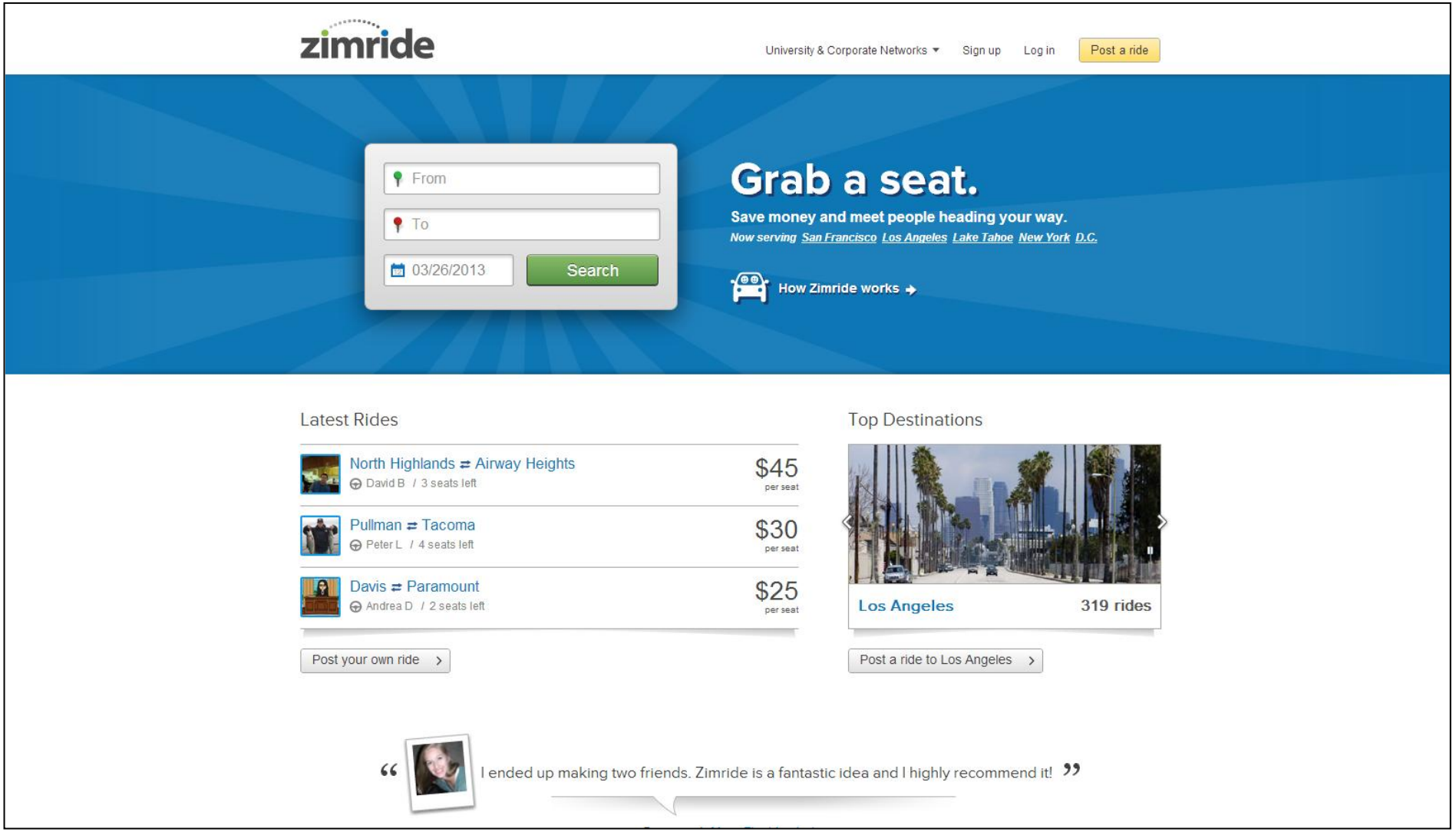
- Car sharing is associated to public transport
- The existing initiatives are promoted by LPT companies

P2P is an important opportunity for mobility and environment: still not taken in Italy



Cultural change and removal of obstacles concerning insurance and legal aspects

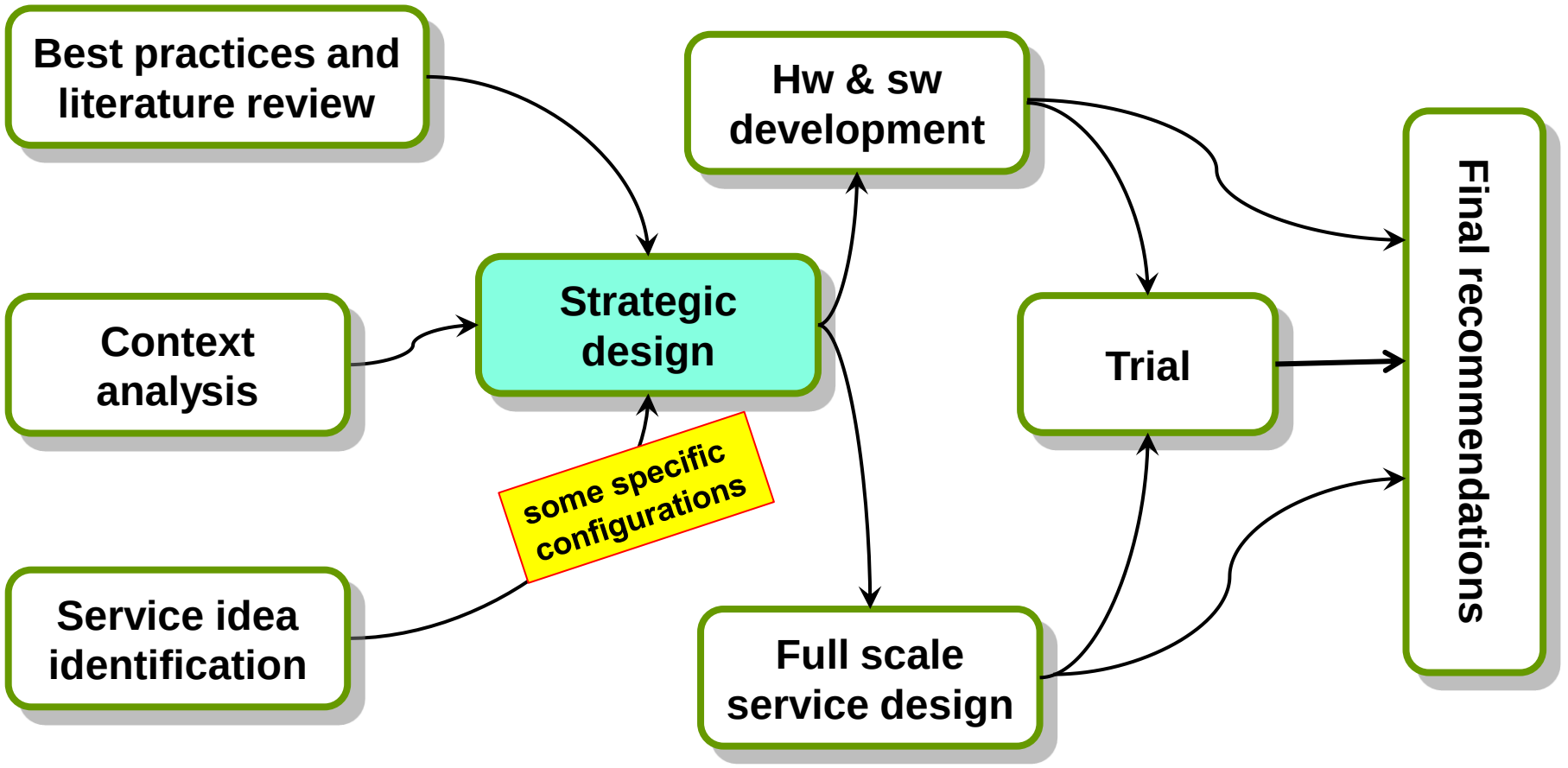
4. Integration with other services



Summary

1. What is the project
2. Some cases of success
3. Key points
4. **Configurations**
5. Stakeholders
6. Maps
7. Demand analysis
8. Trial (the condominium car)
9. Conclusions

The scheme


Best practices and literature review
Context analysis
Service idea identification
Strategic design
some specific configurations
Hw & sw development
Full scale service design
Trial
Final recommendations
Mar 2011
Oct 2012
Sept 2013

Three (+ one) configurations

The project has identified some interesting configurations of the car sharing service in terms of:

- *users (target customers)*
- *characteristics of the service*

(a) The condominium car

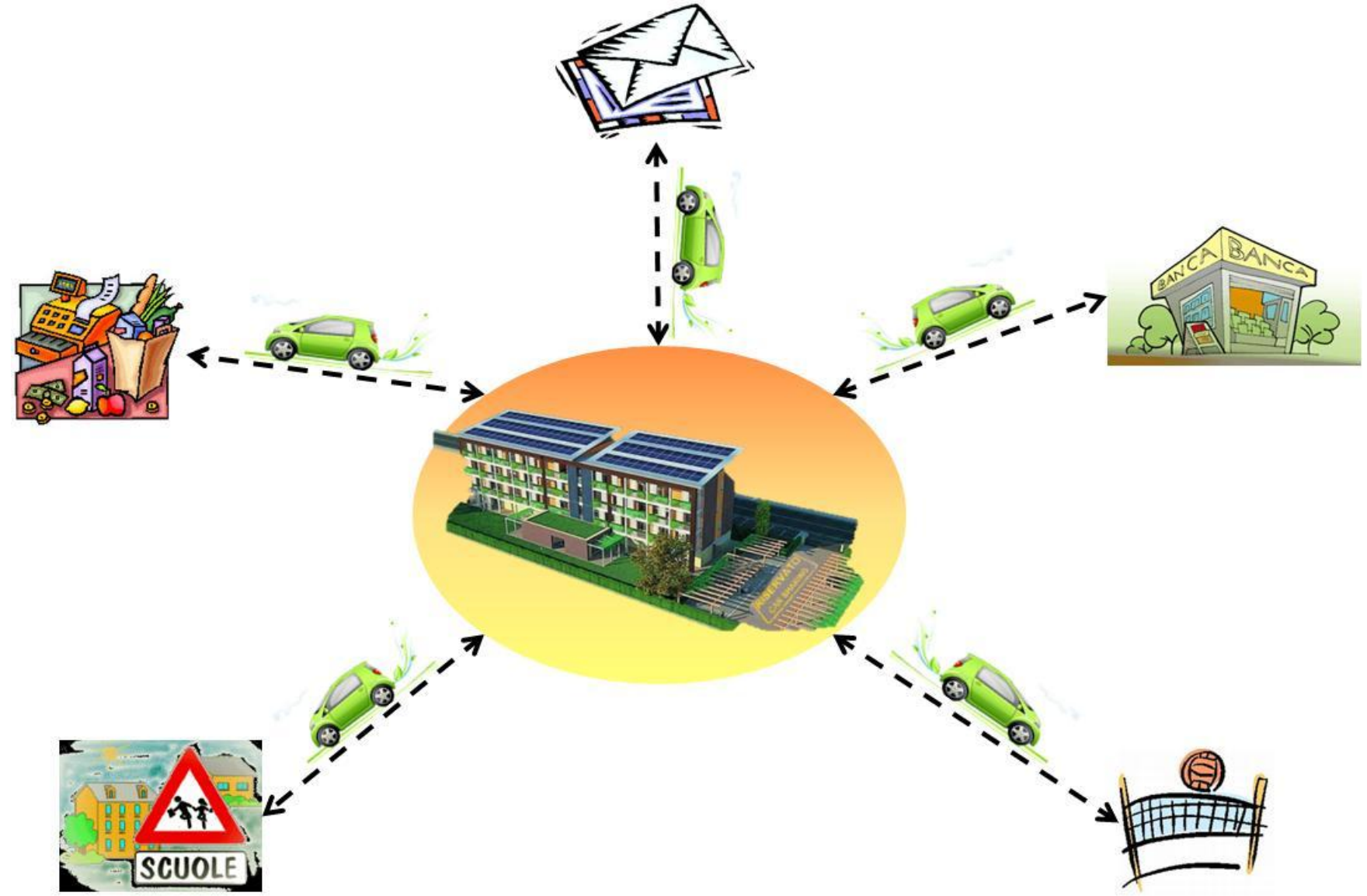
(b) The network of opportunities

(c) The car for the company

(d) The peer-to-peer system

- *users can share their car with other members*
- *users can create their own group sharing*
- *also open to non-electric vehicles*
- *possibility to increase the capillarity of the service*

(a) The condominium car



(a) The condominium car

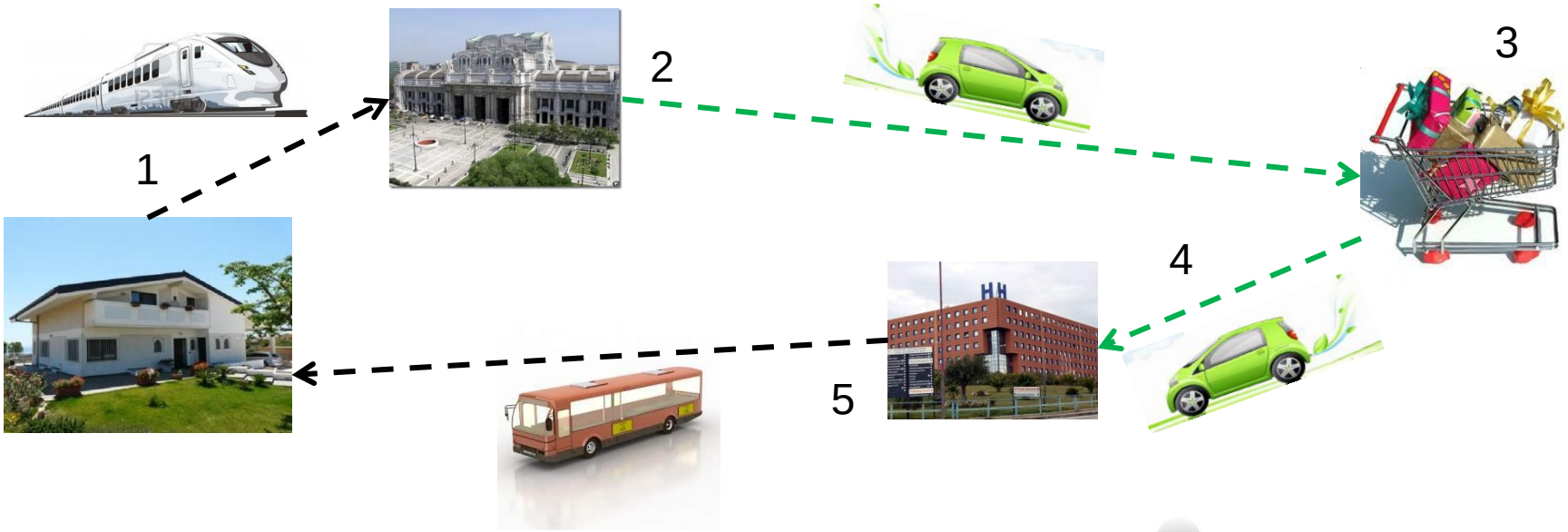
The **condominium car** is a sharing of (electric) vehicles that emphasize the car sharing model, based on the “neighborhood approach” – with cars shared within the district – eliminating one of the barriers to its use:

the distance from the pickup / delivery station

The **basic idea** is to:

- equip the building with vehicles shared in a group of people who already share at least spaces and building expenses,
- place the parking inside the building to ensure the requirements of proximity and vehicle safety.

(b) The network of opportunities



Mr Brambilla, lives in a town close to Milan:

1. He goes by train to Milan
2. And picks up a car from the train station
3. He makes shopping
4. And after goes to the hospital to picks up some medical tests, leaving the car there
5. He goes back home by bus

(b) The network of opportunities

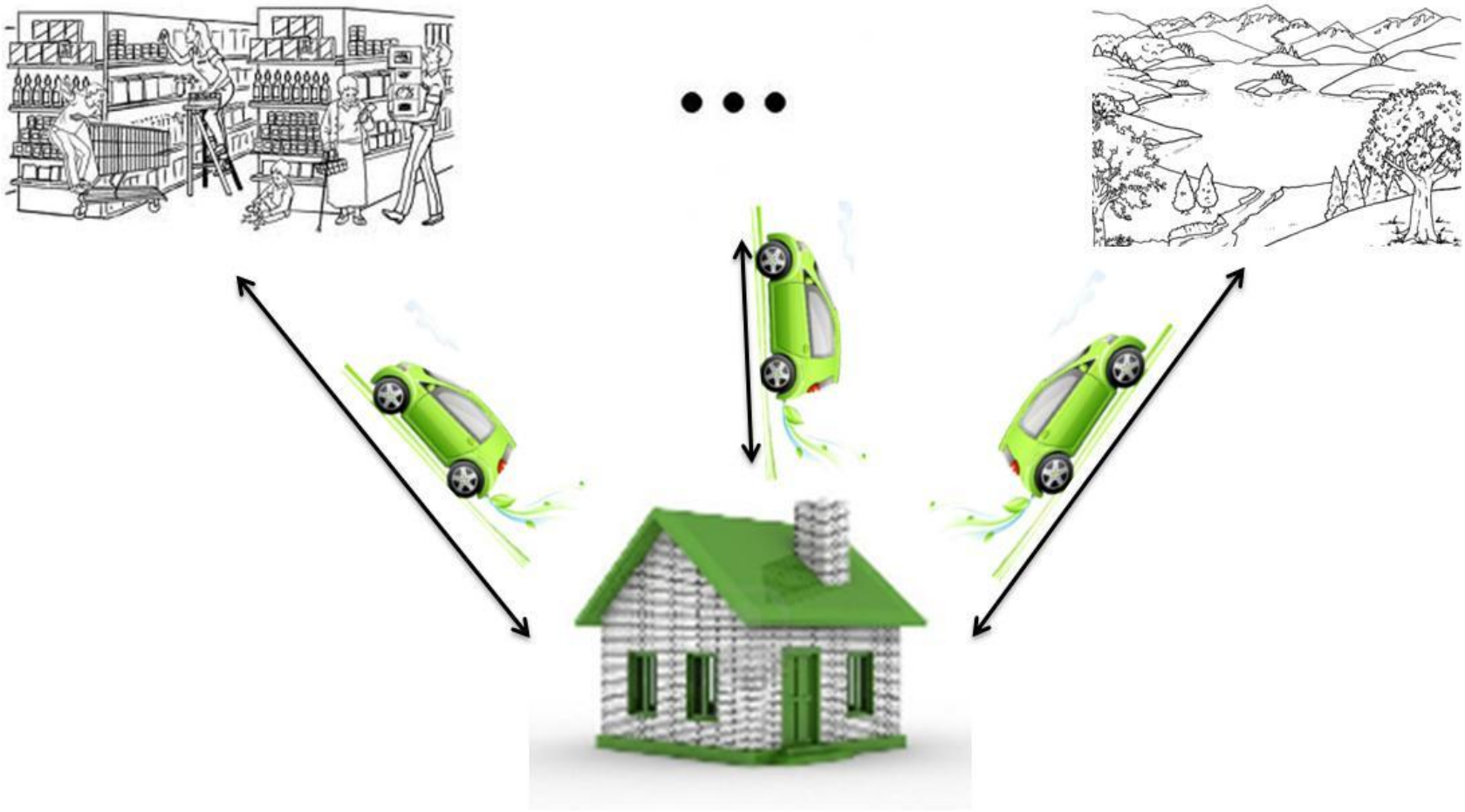
The "**network of opportunities**" integrate admission to various services offered by the city, with a mode of travel innovative, flexible, fun and economical.

The main aim is to improve accessibility to the **major poles aggregators** of people such as city center, shopping centers, stations, etc., integrating mobility services offered by the car sharing systems with those offered by other operators.

In fact the **basic idea** is to link the car sharing to the main attractive point of interests:

- placing spaces to accommodate GM (electric) vehicles, in order to satisfy the mobility needs of employees / customers / visitors;
- integrating the GM mobility service and the services provided by the point of interests.

(c) The car for the company

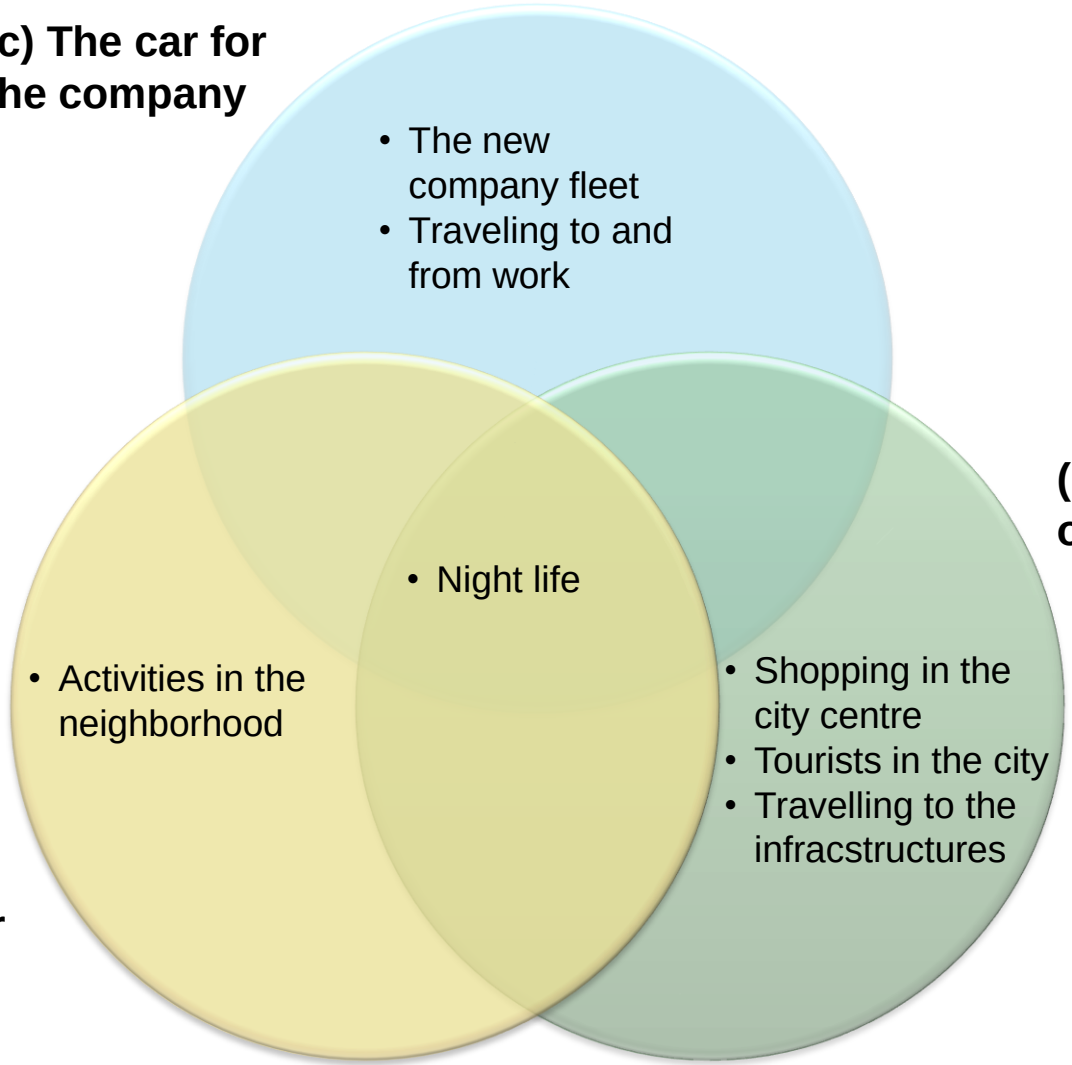


(c) The car for the company

The **car for the company** is a electric vehicle sharing for companies, based on:

- replacing the company's fleet with a vehicle sharing fleet (i.e. the company buys from GM an all inclusive mobility service);
- use of the vehicle by the company as a car of the company fleet during the day;
- vehicle used during evenings and weekends by employees for personal use;
- availability of cars in company parking places.

Configurations and profiles: an integrated model



Summary

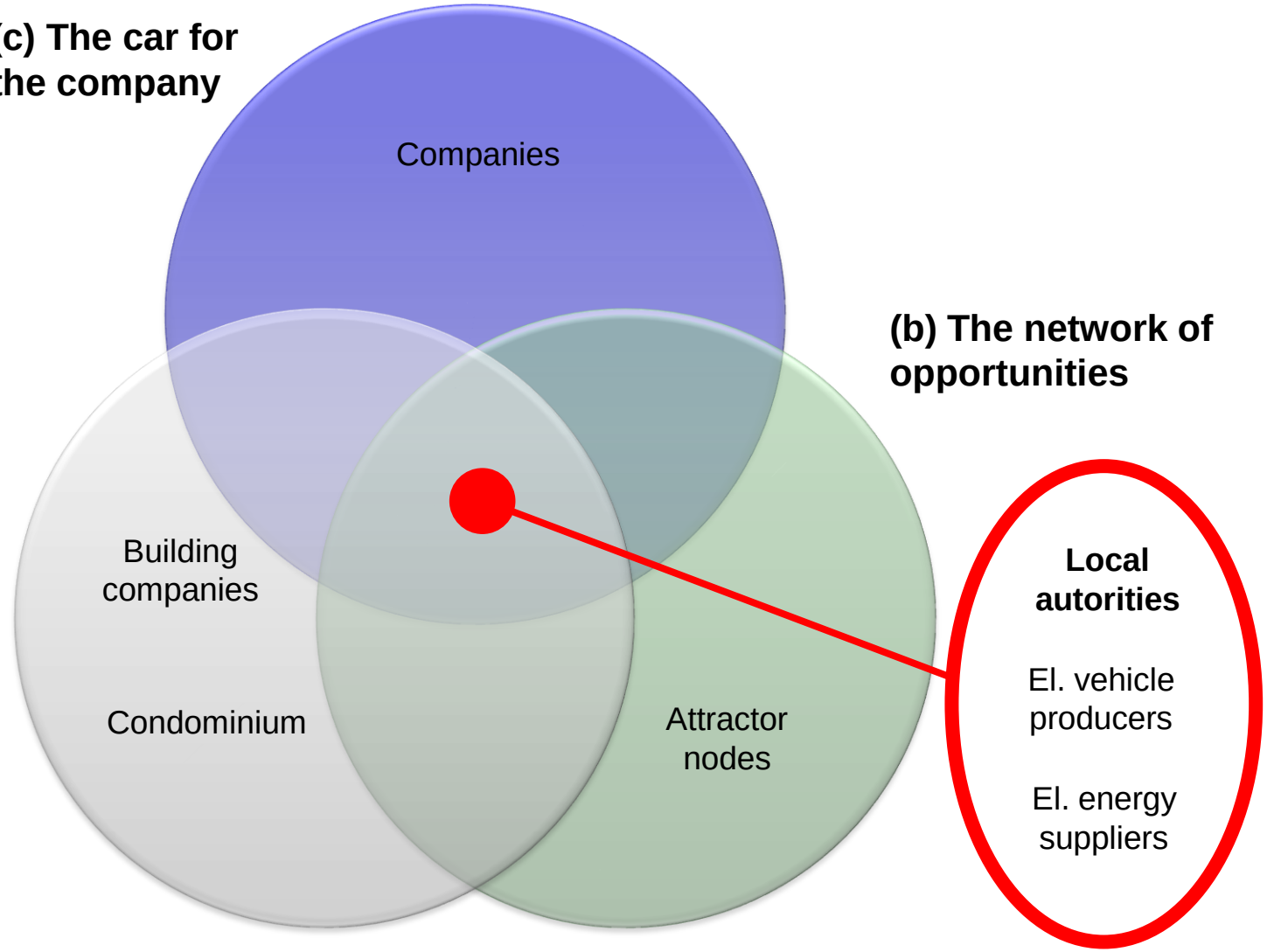
1. What is the project
2. Some cases of success
3. Key points
4. Configurations
5. **Stakeholders**
6. Maps
7. Demand analysis
8. Trial (the condominium car)
9. Conclusions

Configurations and main stakeholders

(c) The car for the company

(b) The network of opportunities

(a) The condo-minium car



Stakeholders support (outcome of 30 interviews)

Support / Stake-holders	Marketing	Management	Service design	Parking	Financing	Intermodality	Community
Local authoritiies							
Companies							
Condominiums & building comp.							
Attractor nodes							
Car & energy producers							

Stakeholders objectives

Objectives			
	Environment		Pollution reduction Greenhouses gas reduction Energy waste reduction
	Mobility		Urban congestion reduction Accessibility increase
	Social		Improving living urban space Increased environmental awareness ***Social Innovation***
	Economy		Financial sustainability

Summary

1. What is the project
2. Some cases of success
3. Key points
4. Configurations
5. Stakeholders
6. **Maps**
7. Demand analysis
8. Trial (the condominium car)
9. Conclusions

How to design/formalize the service ?

Problem characteristics:

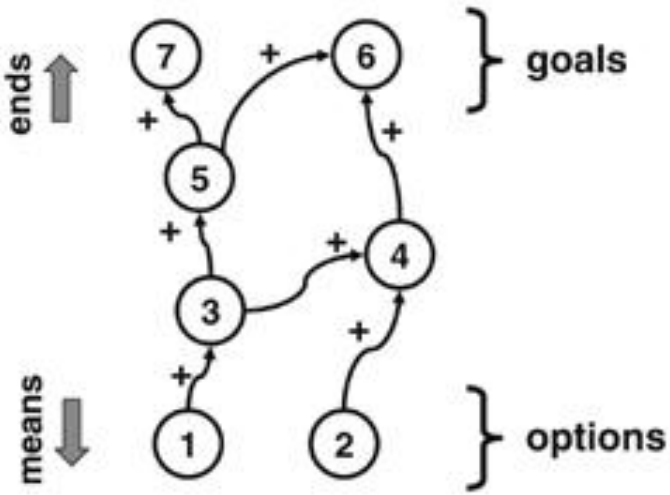
- **different actors** and stratification of governance levels,
  e.g. public administration (municipality, region), associations, …
- **uncertainty** in the definition of the variables,
  e.g. future policies for urban mobility, travel demand estimation for a non-existing service
- **conflicting criteria**,
  e.g. costs vs territorial coverage (such as in BikeMI)
- structuring the problem itself is an issue,
  e.g. definition of the configuration options to be evaluated is a key issue *(Hull and Tricker, 2005; Kelly et al., 2008; Jones et al., 2009)*

How to formalize the complexity ?

Maps in decision aiding

Causal maps:

- a powerful way of capturing decision-makers' views
- widely used in problem-structuring *(Rosenhead and Mingers, 2004)*
- used to help in identifying possible new better actions *(Montibeller and Belton, 2006)*
- a rich representation through modelling of complex chains (causes and effects) of arguments *(Eden, 2004)*

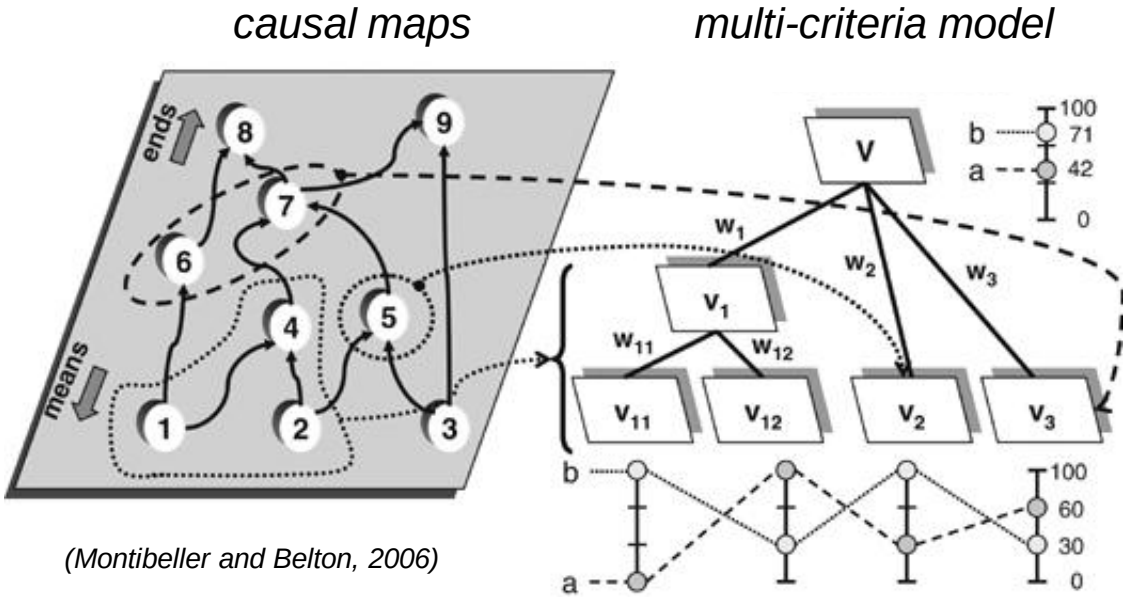


Casual maps & MCDA

Integration of causal maps with multi-criteria analysis:

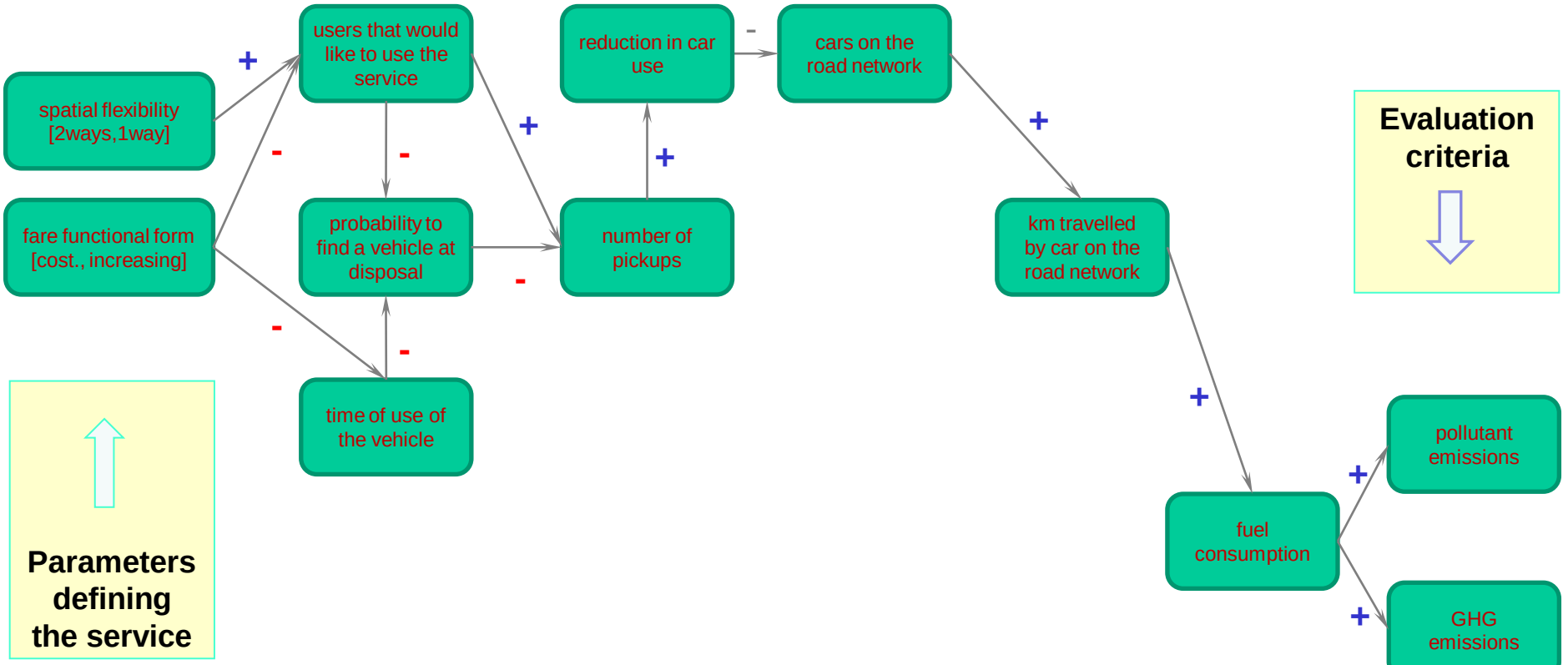
- model the **effects of a link**
  (qualitative or quantitative methods)
- definition of **aggregation rules**
  - qualitative → experts
  - quantitative

models (e.g. demand analysis)



(Montibeller and Belton, 2006)

A (partial) map for GM



Partial map
for the design of a vehicle sharing service

Parameters

1. Type of vehicle (EV, hybrid, ICE)
2. Service area
3. Capillarity and intermodality
4. Spatial flexibility → 1w-2w
5. Flexibility of service → temporal flexibility of booking
6. Fare:
    - 6.1. modes (hourly, km)
    - 6.2. function type (concave, convex, linear)
    - 6.3. level (high, medium, low)
7. Economic incentives (parking, congestion tax, LPT)
8. Incentives for service (areas with traffic restrictions, lanes ...)
9. Re-allocation model
10. Mechanisms for promotion and marketing

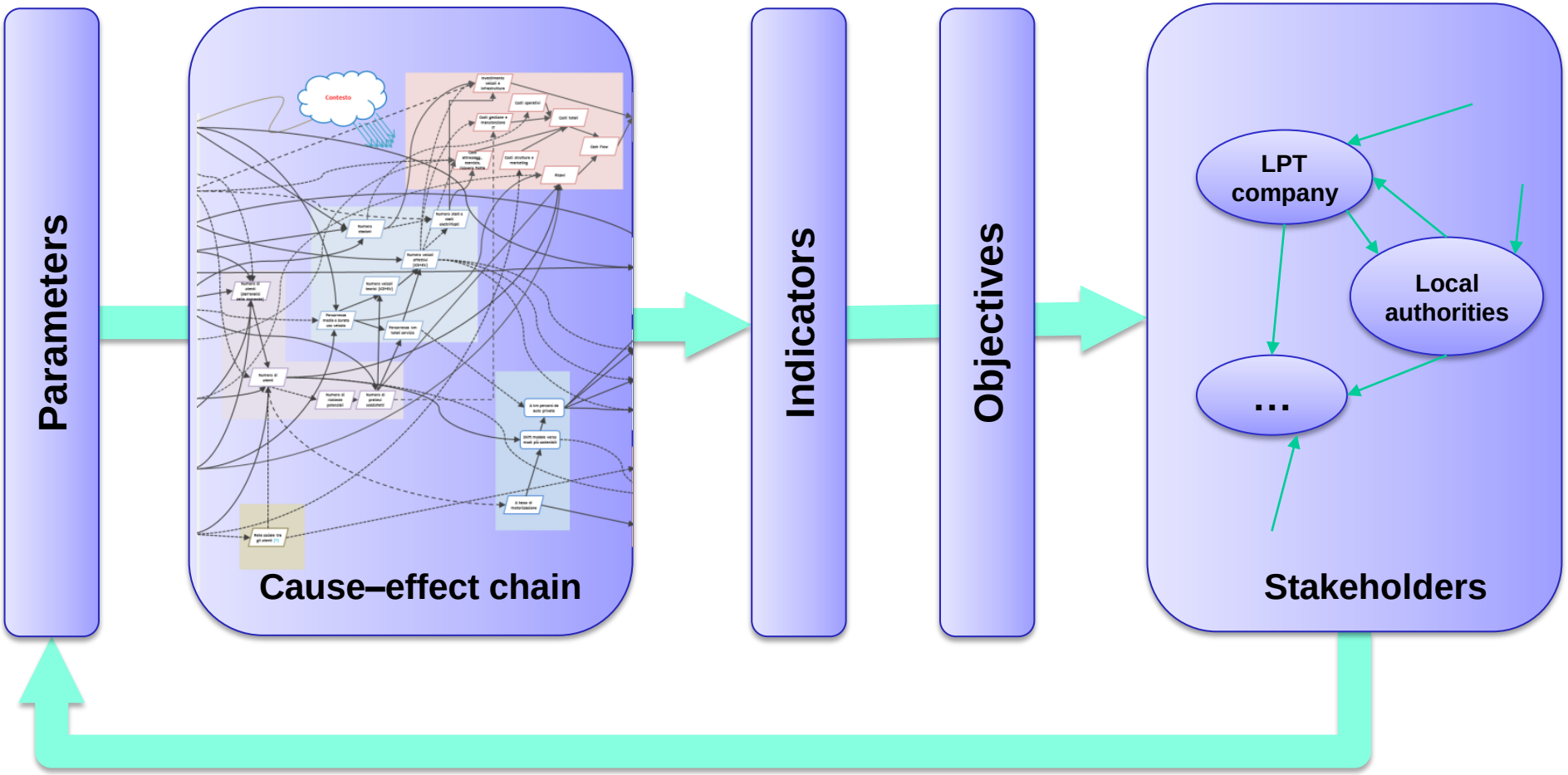
Indicators

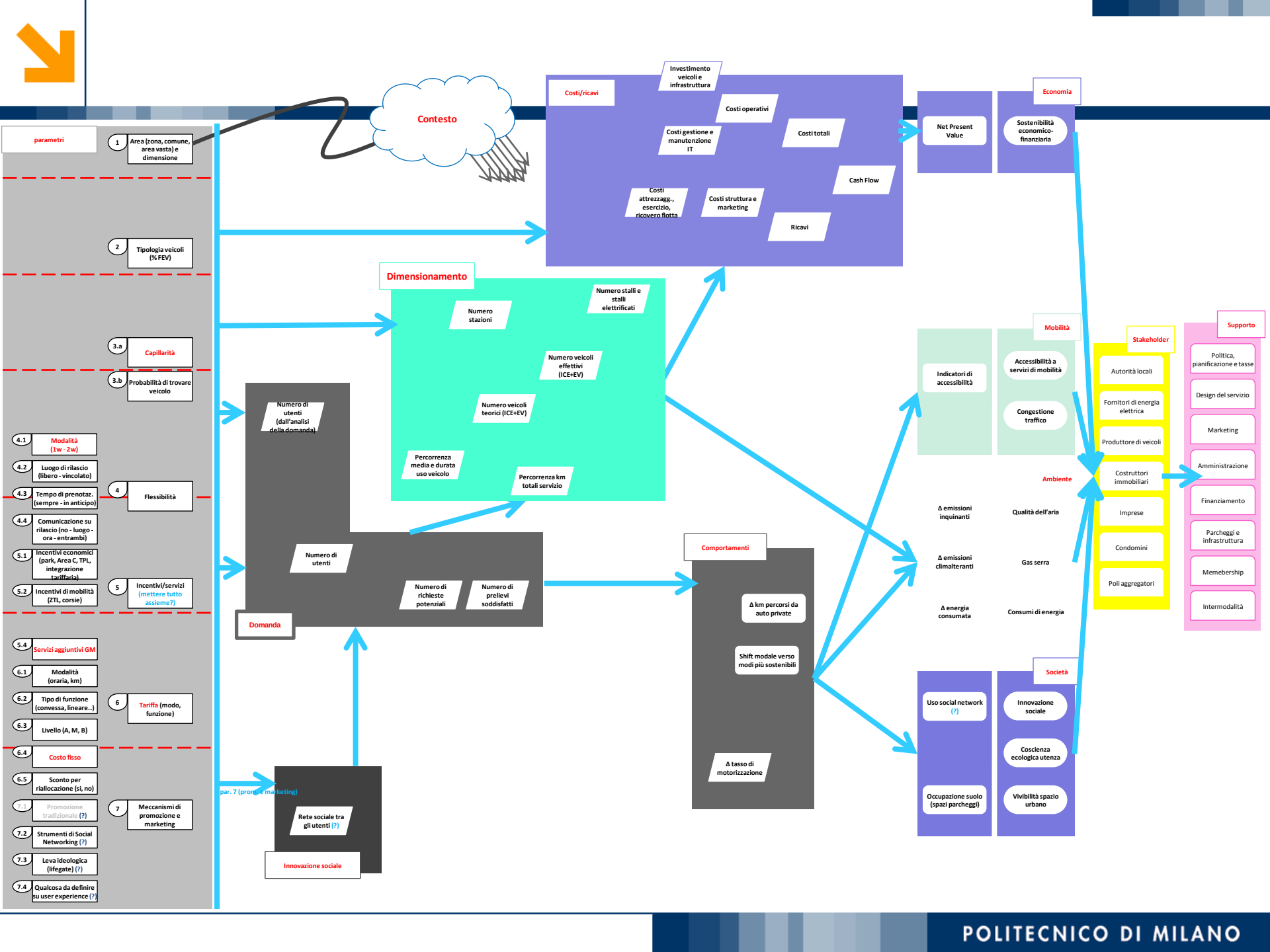
After the setting up of different options (alternatives), they can be evaluated and compared thanks to adequate indicators.

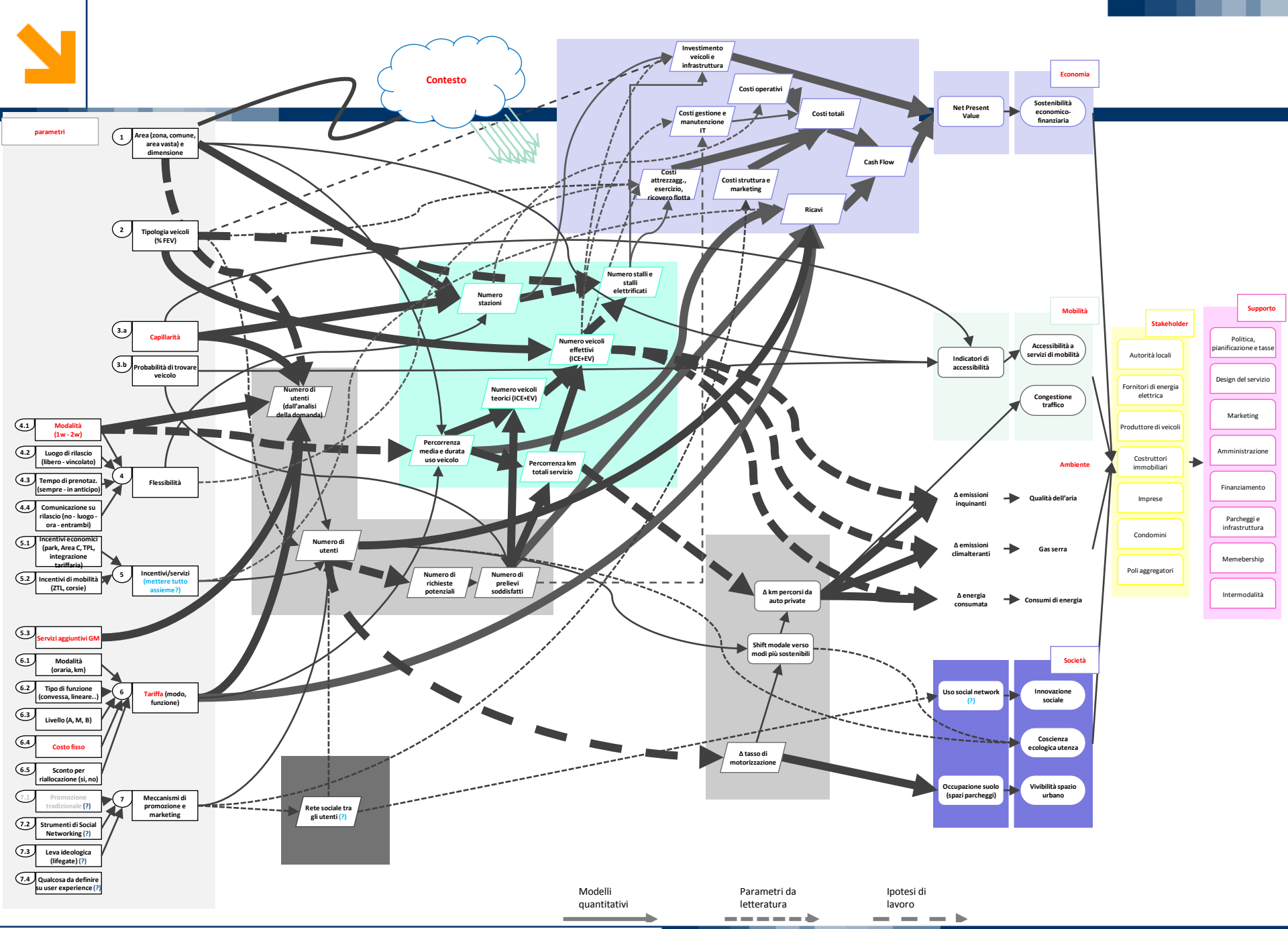
Evaluation and performance indicators (to measure the achievement of the objectives of stakeholders):

- Net Present Value
- Δ km traveled on the network
- Δ greenhouses gases
- Δ polluting emission
- Modal shift to sustainable mobility
- Number of users
- Connection in the social network
- Space occupied by parking
- Accessibility indicators
- ….

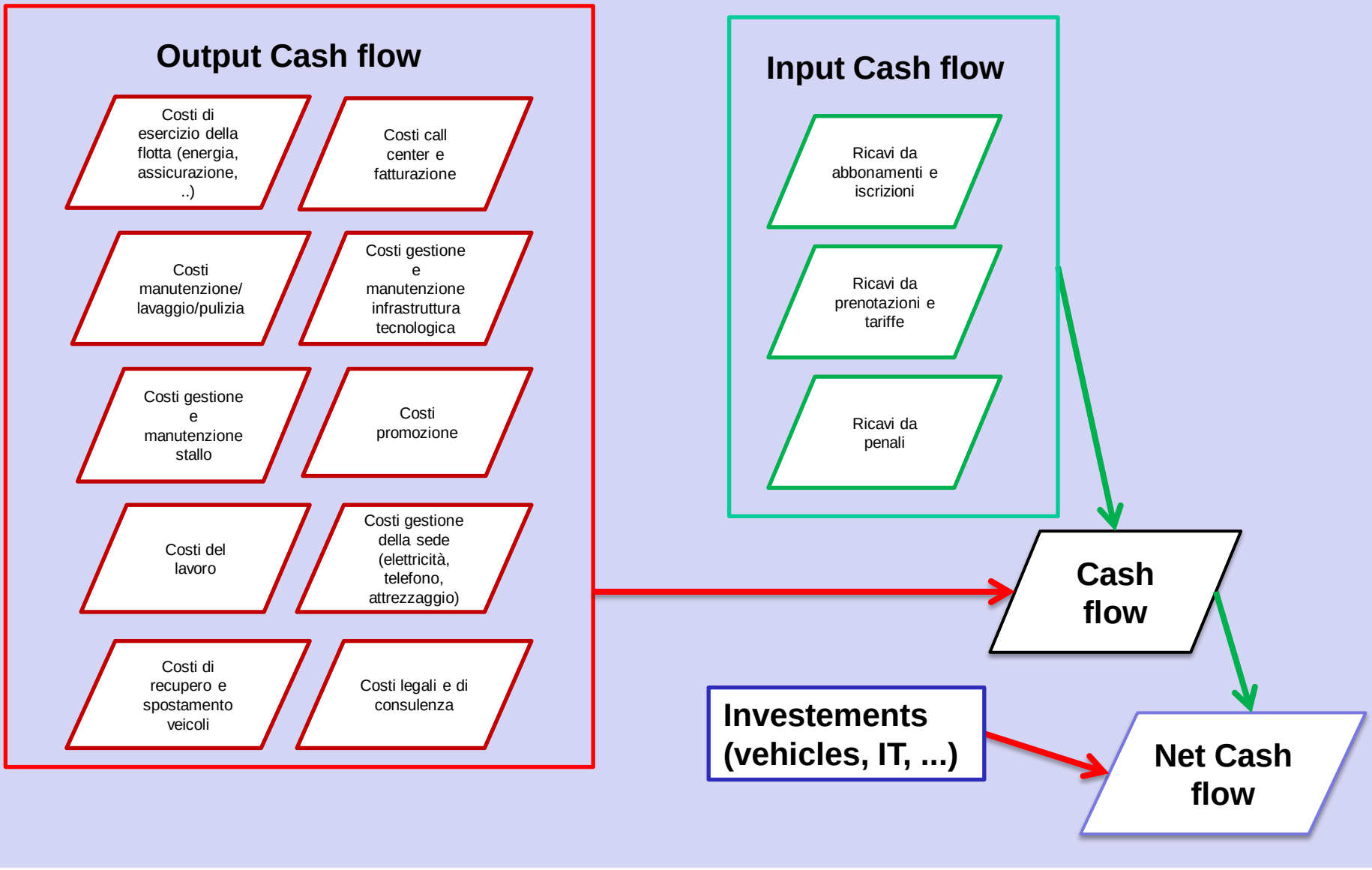
Flow chart


Parameters
Cause–effect chain
Indicators
Objectives
LPT company
Local authorities
…
Stakeholders


parametri
1 Area (zona, comune, area vasta) e dimensione
2 Tipologia veicoli (% FEV)
3.a Capillarità
3.b Probabilità di trovare veicolo
4.1 Modalità (1w - 2w)
4.2 Luogo di rilascio (libero - vincolato)
4.3 Tempo di prenotaz. (sempre - in anticipo)
4.4 Comunicazione su rilascio (no - luogo - ora - entrambi)
4 Flessibilità
5.1 Incentivi economici (park, Area C, TPL, integrazione tariffaria)
5.2 Incentivi di mobilità (ZTL, corsie)
5 Incentivi/servizi (mettere tutto assieme?)
5.4 Servizi aggiuntivi GM
6.1 Modalità (oraria, km)
6.2 Tipo di funzione (convessa, lineare..)
6.3 Livello (A, M, B)
6 Tariffa (modo, funzione)
6.4 Costo fisso
6.5 Sconto per riallocazione (si, no)
7.1 Promozione tradizionale (?)
7.2 Strumenti di Social Networking (?)
7.3 Leva ideologica (lifegate) (?)
7.4 Qualcosa da definire su user experience (?)
7 Meccanismi di promozione e marketing
Contesto
Costi/ricavi
Investimento veicoli e infrastruttura
Costi operativi
Costi totali
Costi gestione e manutenzione IT
Cash Flow
Costi attrezzagg., esercizio, ricovero flotta
Costi struttura e marketing
Ricavi
Net Present Value
Economia
Sostenibilità economico-finanziaria
Dimensionamento
Numero stazioni
Numero stalli e stalli elettrificati
Numero veicoli effettivi (ICE+EV)
Numero veicoli teorici (ICE+EV)
Percorrenza media e durata uso veicolo
Percorrenza km totali servizio
Numero di utenti (dall'analisi della domanda)
Numero di utenti
Numero di richieste potenziali
Numero di prelievi soddisfatti
Domanda
par. 7 (promo e marketing)
Rete sociale tra gli utenti (?)
Innovazione sociale
Comportamenti
Δ km percorsi da auto private
Shift modale verso modi più sostenibili
Δ tasso di motorizzazione
Indicatori di accessibilità
Accessibilità a servizi di mobilità
Congestione traffico
Mobilità
Ambiente
Δ emissioni inquinanti
Qualità dell'aria
Δ emissioni climalteranti
Gas serra
Δ energia consumata
Consumi di energia
Uso social network (?)
Occupazione suolo (spazi parcheggi)
Innovazione sociale
Coscienza ecologica utenza
Vivibilità spazio urbano
Società
Stakeholder
Autorità locali
Fornitori di energia elettrica
Produttore di veicoli
Costruttori immobiliari
Imprese
Condomini
Poli aggregatori
Supporto
Politica, pianificazione e tasse
Design del servizio
Marketing
Amministrazione
Finanziamento
Parcheggi e infrastruttura
Memebership
Intermodalità


parametri
1 Area (zona, comune, area vasta) e dimensione
2 Tipologia veicoli (% FEV)
3.a Capillarità
3.b Probabilità di trovare veicolo
4.1 Modalità (1w - 2w)
4.2 Luogo di rilascio (libero - vincolato)
4.3 Tempo di prenotaz. (sempre - in anticipo)
4.4 Comunicazione su rilascio (no - luogo - ora - entrambi)
4 Flessibilità
5.1 Incentivi economici (park, Area C, TPL, integrazione tariffaria)
5.2 Incentivi di mobilità (ZTL, corsie)
5 Incentivi/servizi (mettere tutto assieme?)
5.3 Servizi aggiuntivi GM
6.1 Modalità (oraria, km)
6.2 Tipo di funzione (convessa, lineare..)
6.3 Livello (A, M, B)
6.4 Costo fisso
6.5 Sconto per riallocazione (si, no)
6 Tariffa (modo, funzione)
7.1 Promozione tradizionale (?)
7.2 Strumenti di Social Networking (?)
7.3 Leva ideologica (lifegate) (?)
7.4 Qualcosa da definire su user experience (?)
7 Meccanismi di promozione e marketing
Contesto
Investimento veicoli e infrastruttura
Costi operativi
Costi gestione e manutenzione IT
Costi totali
Cash Flow
Costi attrezzagg., esercizio, ricovero flotta
Costi struttura e marketing
Ricavi
Numero stazioni
Numero stalli e stalli elettrificati
Numero veicoli effettivi (ICE+EV)
Numero veicoli teorici (ICE+EV)
Numero di utenti (dall'analisi della domanda)
Percorrenza media e durata uso veicolo
Percorrenza km totali servizio
Numero di utenti
Numero di richieste potenziali
Numero di prelievi soddisfatti
Rete sociale tra gli utenti (?)
Δ km percorsi da auto private
Shift modale verso modi più sostenibili
Δ tasso di motorizzazione
Economia
Net Present Value
Sostenibilità economico-finanziaria
Mobilità
Indicatori di accessibilità
Accessibilità a servizi di mobilità
Congestione traffico
Ambiente
Δ emissioni inquinanti
Qualità dell'aria
Δ emissioni climalteranti
Gas serra
Δ energia consumata
Consumi di energia
Società
Uso social network (?)
Innovazione sociale
Coscienza ecologica utenza
Occupazione suolo (spazi parcheggi)
Vivibilità spazio urbano
Stakeholder
Autorità locali
Fornitori di energia elettrica
Produttore di veicoli
Costruttori immobiliari
Imprese
Condomini
Poli aggregatori
Supporto
Politica, pianificazione e tasse
Design del servizio
Marketing
Amministrazione
Finanziamento
Parcheggi e infrastruttura
Memebership
Intermodalità
Modelli quantitativi
Parametri da letteratura
Ipotesi di lavoro

Financial sustainability



Summary

1. What is the project
2. Some cases of success
3. Key points
4. Configurations
5. Stakeholders
6. Maps
7. **Demand analysis**
8. Trial (the condominium car)
9. Conclusions

Demands analysis

1 - Analyze the willingness to share
the private car and the relative price

2 - Quantify the percentage of users who
would be willing to use the service and at what cost

In quale tipo di abitazione risiede?

Immagini un sistema in cui possa mettere a disposizione la sua auto per la condivisione durante alcuni periodi, tipicamente nelle ore in cui non la utilizza. Assuma che, mettendo in condivisione la sua auto con questo sistema:

- riceva in cambio un pagamento (*con una transazione automatica e protetta*) da parte del gestore del servizio
- possa fissare luogo e ora per il prelievo/restituzione dell'auto e che questo vincolo venga sempre rispettato da chi usa la sua auto
- abbia una copertura assicurativa totale quando l'auto è usata da qualcun altro
- abbia la garanzia che l'auto le ritorni nelle condizioni iniziali (pulizia degli interni, niente odore di fumo...)
- non debba consegnare direttamente le sue chiavi (grazie a installato a bordo gratuitamente dell'auto)

The online survey

Quando sarebbe disposto a mettere a disposizione la sua auto o una della sue auto (immaginando ad esempio di farlo nei momenti di non utilizzo, perché a casa o sul posto di lavoro)?
Può indicare uno o più momenti della giornata, esprimendo la sua preferenza o le sue preferenze nella tabella sottostante

	Tutti i giorni	3/4 giorni feriali a settimana	1/2 giorni feriali a settimana	Solo nel week-end	3/4 giorni mese	Mai
Primo mattino (fino alle 8.00)	○	○	○	○	○	○
In mattinata (dalle 8.00 alle 12.00)	○	○	○	○	○	○
Nel pomeriggio (dalle 12.00 alle 17.00)	○	○	○	○	○	○
Nel tardo pomeriggio (dalle 17.00 alle 19.00)	○	○	○	○	○	○
In serata/notte (dopo le 19.00)	○	○	○	○	○	○

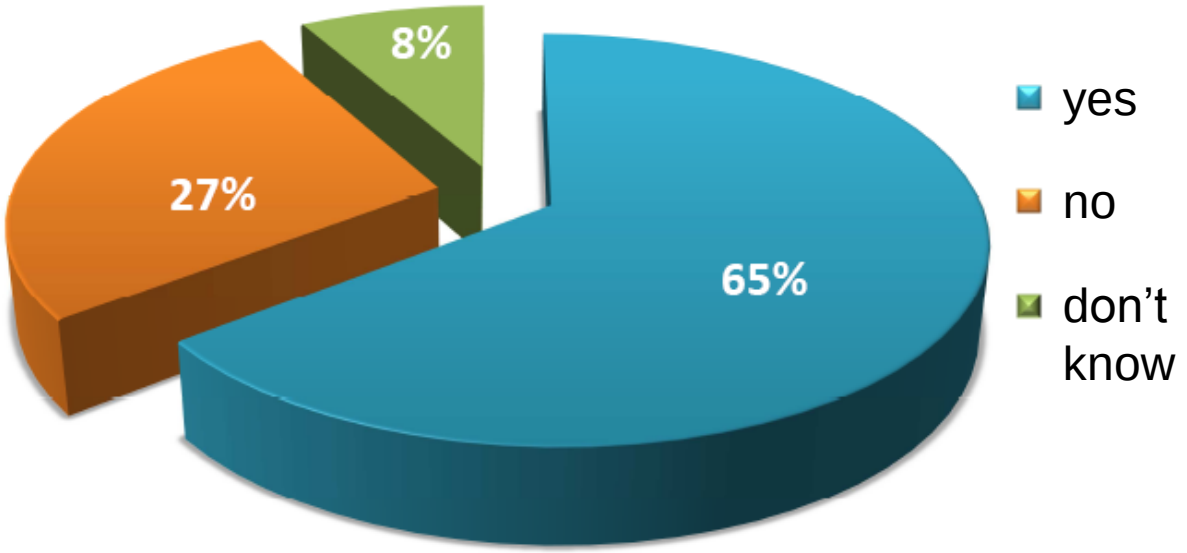
Car sharing use

General attitude

Are you interested to join a car sharing service ?

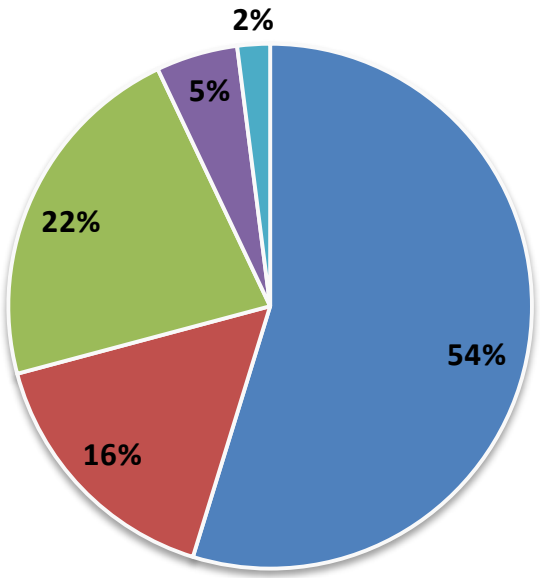
Sample:

1.211 people



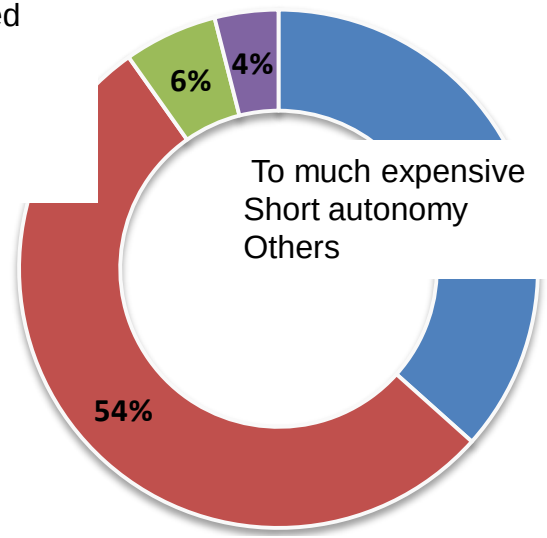
- Men (68.9%) > Women (60.5%)
- Graduated (69.8%) > Not graduated (62%)
- Employed ~ Not Employed (64.7% vs. 63.8%)

Willingness to share the private car



- Yes →→→→→
- No, car is a personal property
- No, I prefer to have my car at disposal in every moment
- No, i don't need money
- No, other

Zoom to potential sharers



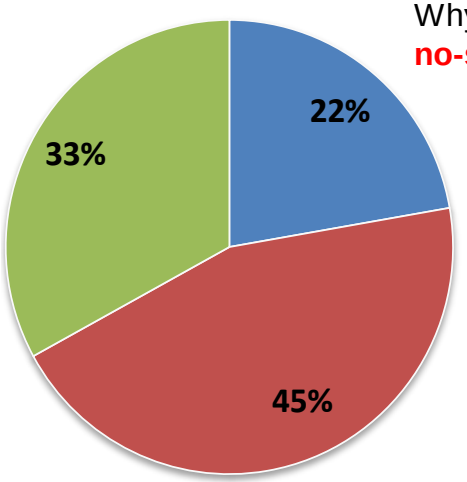
- Yes, with the whole users community
- Yes, but just with a selected group
- Yes, but only with my neighbors
- Yes, but only with my collegues

Willingness to share

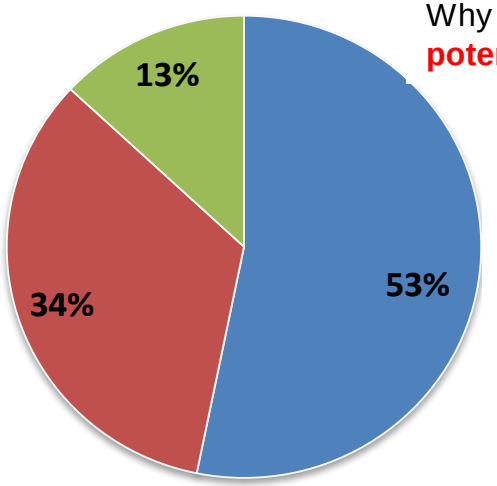
Purchase / sharing electric vehicle

What do you think about buy and share an electric car ?

Why not : among **no-sharers**



Why not: among **potential sharers**



Model for (general) car sharing

Parameters		Value
Service characteristics		
β_{fixed_fare}	1	-0,181
β_{var_fare}	2	-0,163
β_{capill}	3	-0,339
β_{return}	4	+0,351
User characteristics		
β_{num_car}	5	+0,151
β_{gender}	6	-0,157
β_{age}	7	-0,061
β_{employ}	8	+0,179

Stated preferences (the model)

$$U_{yes} = \beta 1 * fixed\_fare + \beta 2 * var\_fare + \beta 3 * capill + \beta 4 * return + \beta 5 * num\_car + \beta 6 * gender + \beta 7 * age + \beta 8 * employ$$

The scenarios

Simulations …

DRAFT …

For the moment we decide for a simple interpolation (to consider the different scenarios from the point of view of modal split)

	certamente	+ molto prob.	+ probab.
Modal split: scenario A	**0,4%**	**2,0%**	**8,6%**
Modal split: scenario B	**1,2%**	**5,5%**	**17,3%**
Modal split: scenario C	**0,5%**	**2,9%**	**12,1%**

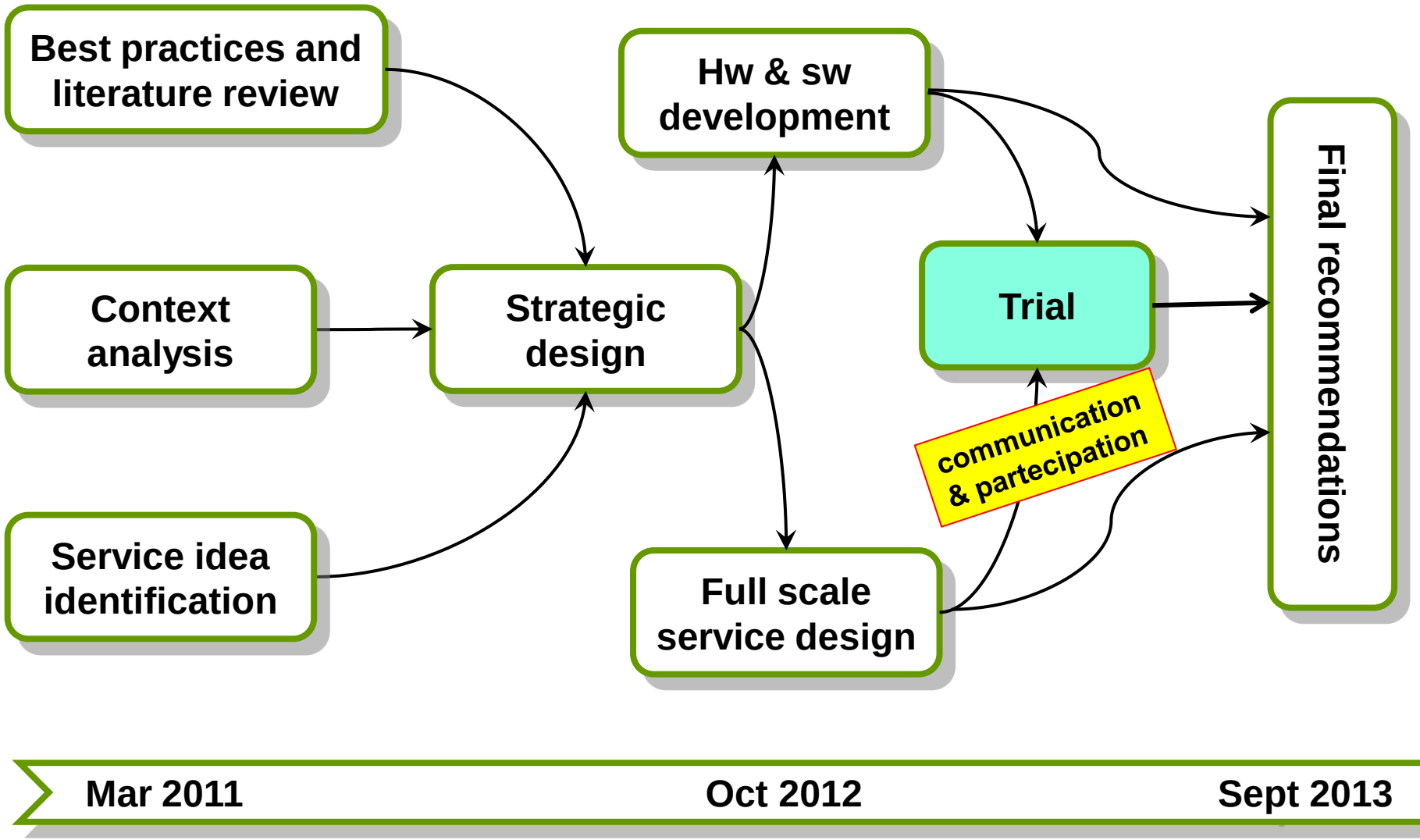
The demand scenarios are:

- **realistic** → "certamente"
- **optimistic** → all the positive answers

Summary

1. What is the project
2. Some cases of success
3. Key points
4. Configurations
5. Stakeholders
6. Maps
7. Demand analysis
8. **Trial (the condominium car)**
9. Conclusions

The scheme


Best practices and literature review
Context analysis
Service idea identification
Strategic design
Hw & sw development
Full scale service design
Trial
communication & partecipation
Final recommendations
Mar 2011
Oct 2012
Sept 2013

The trial

- Buildings → via Scarsellini & via Donadoni
  (for residents that want to join the service)

- Amazing opportunity to test an alternative model
  for a sustainable mobility in the city of Milan

- No-profit: payments will repay the costs and
  are useful to test the willingness to pay of users

- Verify the economic sustainability and
  the performances of the condominium car model

Cooperative, Via Scarsellini, Bovisa (Milano)

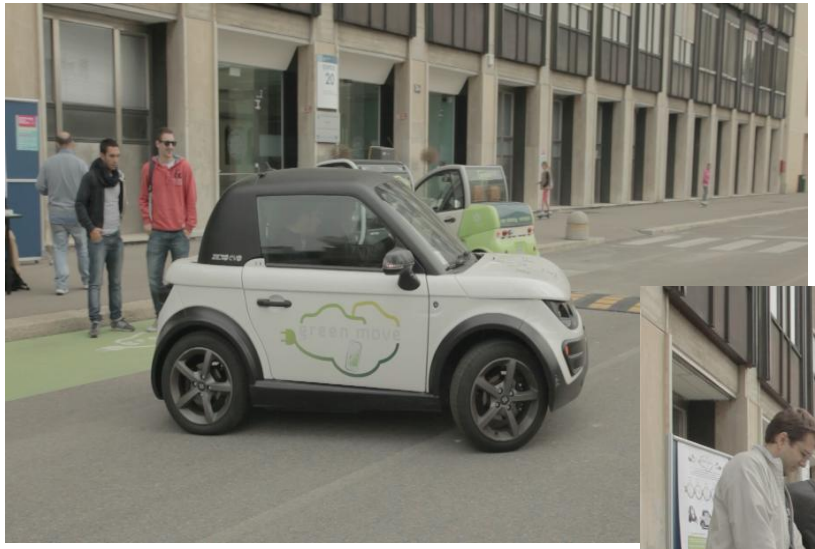
~ 100 families, common spaces

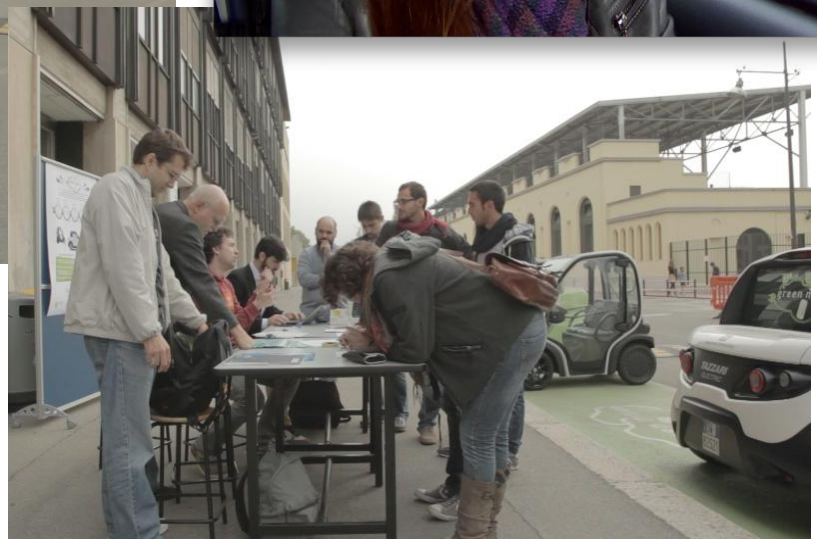
Cohousing, via Donadoni, Bovisa (Milano)

~ 30 families, common areas & services, open activities

The communication phase

First impression of the users





The video

The website (www.greenmove.polimi.it)

F.A.Q.

1. Perché se il servizio è senza fine di lucro
   è necessario corrispondere un pagamento per l'utilizzo ?
2. A chi vanno i soldi ?
3. Quali sono i vantaggi per l'utente ?
4. Se mi iscrivo al servizio devo necessariamente registrarmi
   ogni mese e corrispondere il corrispettivo pagamento ?
5. Come avviene il pagamento ?
6. Le auto sono assicurate ?
7. Cosa succede in caso di incidente ?
8. Essendo iscritto a e-Vai, posso utilizzare
   anche le auto del servizio esterne alla sperimentazione ?
9. Essendo un servizio basato sulle prenotazioni,
   cosa succede se porto in ritardo l'auto ?
10. ….

Summary

1. What is the project
2. Some cases of success
3. Key points
4. Configurations
5. Stakeholders
6. Maps
7. Demand analysis
8. Trial (the condominium car)
9. **Conclusions**

Conclusions

1. **Specific communities** → p2p, condominium, …
2. **Services *ad hoc*** based on specific needs
3. **Decision aid** for the strategic design (an innovative service)
4. **Multidisciplinary** approach → 8 research centers
5. **Stakeholder** → involvement and role
6. **Lack of rules** and procedures
7. **Communication** tools … (for communities)

References

- Banister D. (2000). *European transport policy and sustainable mobility*, Taylor & Francis.
- Barth M. and Shaheen S. (2002). Shared-use vehicle systems - a framework for classifying carsharing, station cars, and combined approaches. Proceedings of the Transportation Research Board meeting. Washington, Jan.
- Brake J., Mulley C., Nelson J.D., Wright S. (2007). Key lessons learned from recent experience with Flexible Transport Services. *Transport Policy*, vol. 14, pp 458-466.
- Brook D. (2004). Start up Issues and New Operational Models. Proceedings of the Transportation Research Board meeting. Washington, January.
- Burlando C., Arduino G., Nobile G. (2007). Il car sharing come business development area: analisi del settore, strategie d'impresa e ricadute socio economiche. IX Riunione Scientifica della Società Italiana degli Economisti dei Trasporti (SIET). Napoli, 3-5 Ottobre.
- Button J. and Verhoef E.T. (1998). *Road pricing, traffic congestion and the environment: Issues of efficiency and social feasibility*. Edward Elgar, Cheltenham.
- Correia G., Viegas J.M. (2006). Car pooling clubs: solution for the affiliation problem in traditional/dynamic ridesharing systems. Proceedings of the 11th Meeting of the EURO Working Group on Transportation, Bari, Italy, September.
- Eden C (2004). Analyzing cognitive maps to help structure issues or problems. *European Journal of Operational Research* 159: 673-686.
- Hull A.,Tricker R. (2005). An assessment of the barriers to the delivery of sustainable local surface transport solutions. Proceedings of the European Transport Conference. PTRC, London, 2005.

References

- Jones P., May A.D., Cinderby S. (2009). Innovative Approaches to Option Generation. *European Journal of Transport and Infrastructure Research*, vol.9, n.3, pp. 237-258.
- Katzev R. (2003). Car sharing: a new approach to urban transportation problems. *Analyses of Social Issues and Public Policy*, Vol 3 (1), 65-86.
- Kelly C., May A.D., Jopson A. (2008). The development of an option generation tool to identify potential transport policy packages. *Transport Policy*, vol. 15, pp 361–371.
- Martin E. and Shaheen S. (2011). The Impact of Carsharing on Household Vehicle Ownership. *Access*, n° 38.
- Montibeller G., Belton V. (2006). Causal maps and the evaluation of decision options - a review, *Journal of the Operational Research Society*, 57, pp 779–791.
- Pucher J. and Buehler R. (2008). Making Cycling Irresistible: Lessons from The Netherlands, Denmark and Germany, *Transport Reviews*, 28: 4, 495 - 528.
- Rosenhead J. and Mingers J. (2004). Problem structuring methods in action. *European Journal of Operational Research* 152: 530-554.
- Shaheen S., D. Sperling, C. Wagner (1998). Carsharing in Europe and North America: Past, present, and future, *Transportation Quarterly*, 52: 35–52.
- Wilke G., Bongardt D. (2005). Eco-efficiency of car-sharing at risk? Proceedings of the ECEEE 2005 Summer Study, 30 May – 4 June 2005, Mandelieu La Napoule, France.

- **Alberto Colorni**
  alberto.colorni@polimi.it

- **Green Move**
  www.greenmove.polimi.it

Thanks for your attention