

Mobility in towns: the stakes of the energy transition

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Lifestyles and energy in the city

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Contents

Preliminaries

Transport: energy / Co2 stakes

Towards more sustainable transport: success stories do exist

But a general feeling of small achievements only

Mind: future evolutions will not compare to past ones

Why is it so difficult to change mobility behaviour?

A detour through fundamental mobility analysis

The car as a “swiss knife”

The example of the potential of car/ bike and scooter substitution

Economic instruments: a real but limited potential

The example of classical policies in Europe

My personal preference and its requirements

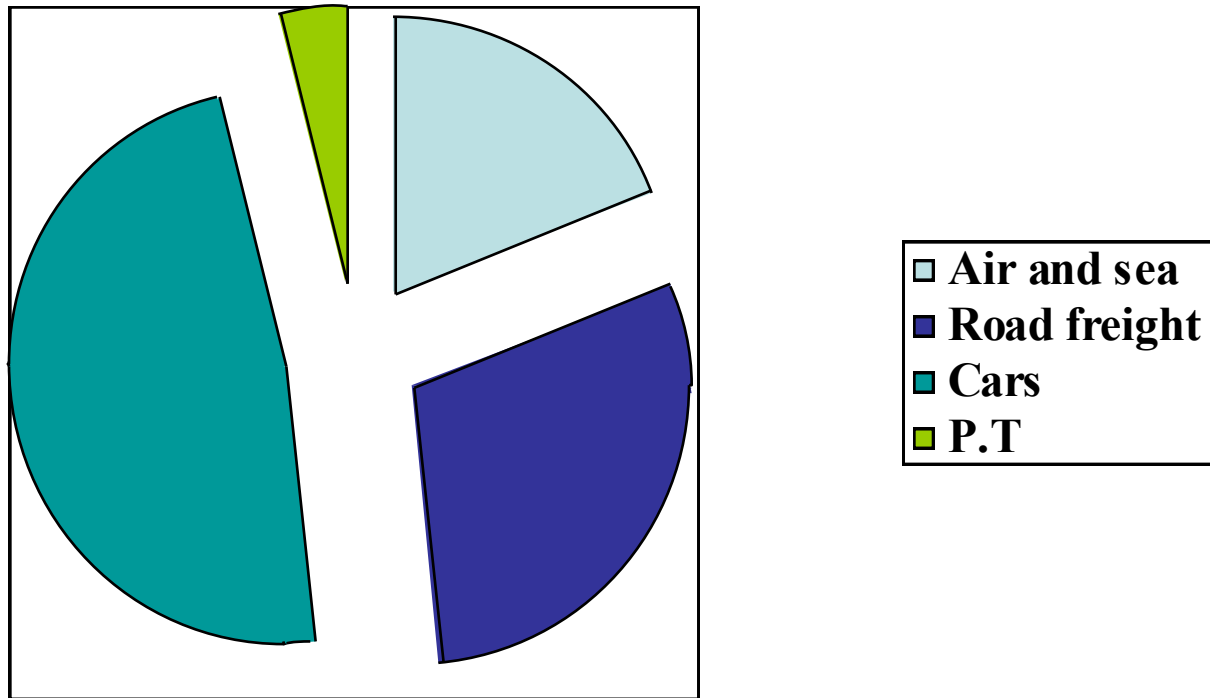
Transport: energy / Co2 stakes

Transport and Energy / CO2 stakes

- In France, Transport accounts for
 - 65 % of oil imported**
 - 35 % of CO2 emissions**
 - 28 % of Ghg emissions**
- In France, transport considered as the « bad guy » due to the past growth of its share in emissions
- It is quite impossible to achieve a 20 % reduction of national emissions without success in transport
- However, a very small place in energy debates, focused on nuclear/ renewables production

The split of energy consumption between transport activities

Personal mobility accounts for 2/3 of
consumption on the domestic territory

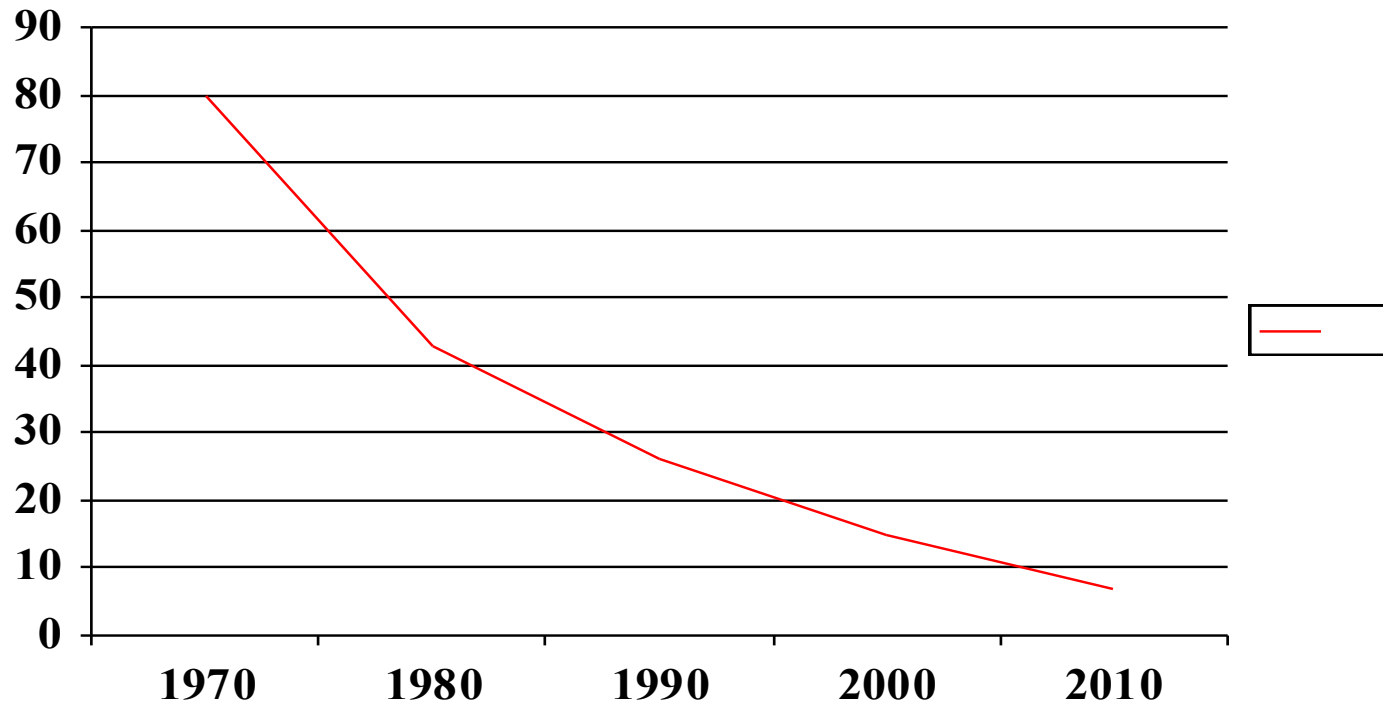


**Towards more sustainable transport:
success stories do exist**

Towards more sustainable transport

Yes we can, ...sometimes big success

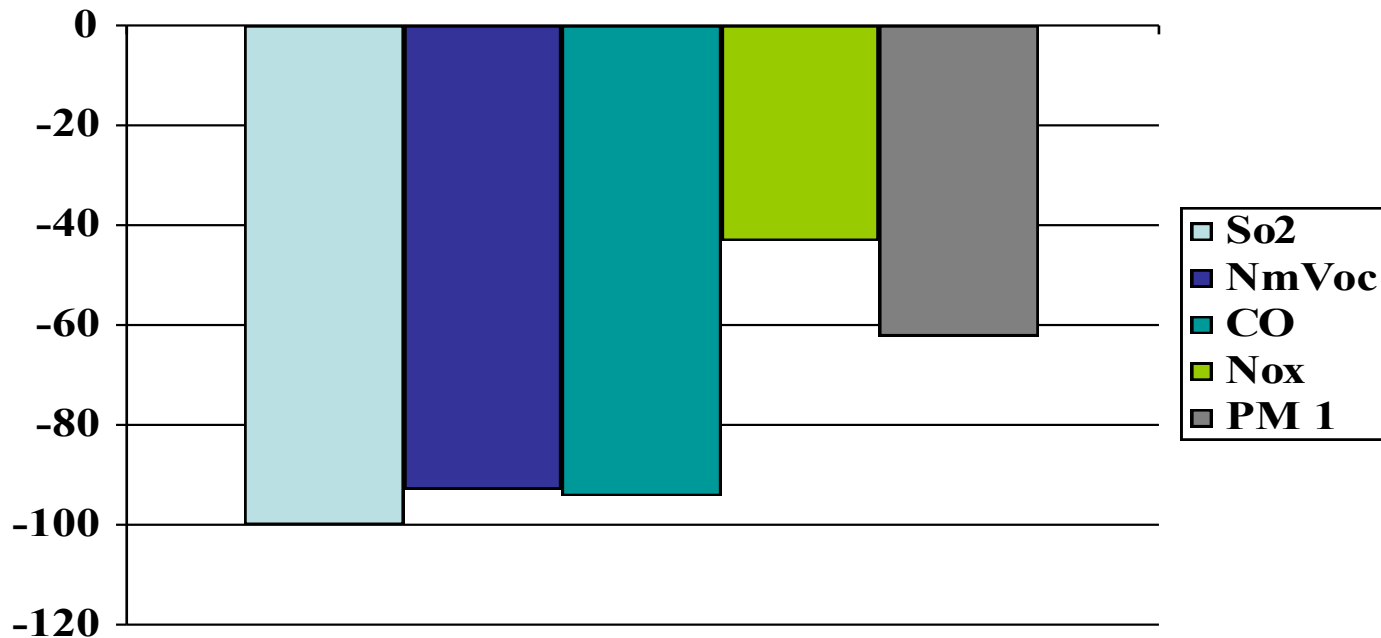
Fatalities / billion veh-km



Towards more sustainable transport

Yes we can, ...sometimes big success

From 1980 to 2012, huge reduction of pollutant emissions from transport, despite a **80 %** growth of road traffic



Towards more sustainable transport

Yes we can, ...

sometimes moderate success

CO2 emissions of new cars sold in the year

2000: 162 g / km

2013: 117 g / km

-28 % in 13 years

Towards more sustainable transport

But a general feeling of small achievements only

Traffic

More cars. More congestion in towns.

Commuting

Longer distances (from 3 km in 1960 to 15 km 2010)

Oil dependence

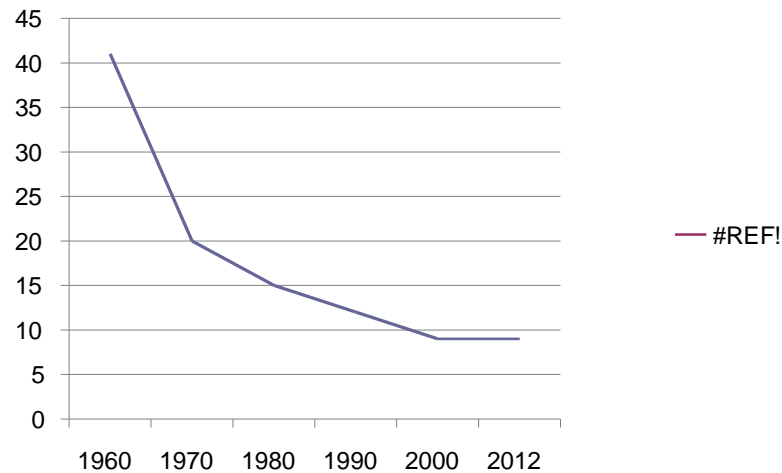
A growth of oil consumption until 2007, and a stabilisation perhaps only linked to the economic crisis

As a result

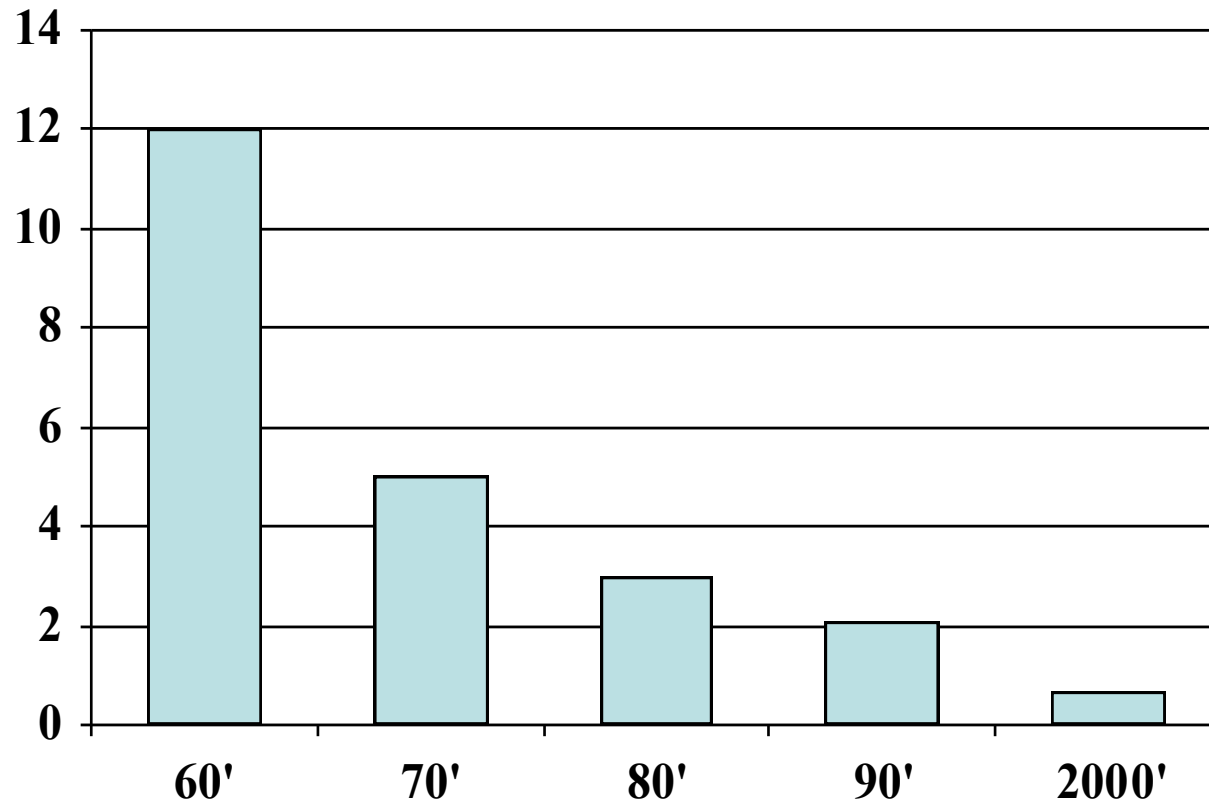
We still need to embark more than 1 ton (vehicle weight) to move ourselves (1 person, 75kg) on few km at a low speed

**Mind: future evolutions will
not compare to past ones**

Minutes of work at the minimum wage needed to buy a fuel liter



Annual rates of growth of travelled distances (air travel excluded)



**Why is it so difficult to change
personal mobility behaviour?**

**A detour through fundamental
mobility analysis**

Week day mobility: a few things to know

Mobility

It is needed to access to resources (jobs, schools, shops, healthcare, leisure) distributed on territories

The net utility of mobility

It relies on the balance between the utility of activities at destination and the cost of moving.

Your preferred dental surgeon is perhaps not the closest from your home

A better paid job may be further

Mobility organisation

It must meet the needs of the daily activity program

(for instance work, childcare, supermarket)

not only the needs of each trip separately

Week day mobility: a few things to know

The choice of a mobility means

It is made considering several types of personal costs and advantages: **monetary costs, travel time costs, fatigue, stress, comfort, predictability, safety**

A typical 10 km 20 mn car trip requires:

5 € travel time cost (value of time around 15 € / h)

3 € euros full car cost

1 € fuel cost, of which **0,5 €** for oil and **0,5 €** for tax

And **from 0 to 5-6 €** for parking (free of charge in most cases)

As a result, on this market, a 100 % increase in fuel cost translates into a 6 % growth of full cost and a 9 % growth of perceived variable cost: elasticities cannot be very important. Would be different on long distance market

Week day mobility: a few things to know when the conditions of mobility change

How daily mobility changes over time?

Transport policies change the conditions of mobility:

The availability of modes

**Speeds and capacity through new infrastructures,
new regulations**

Costs/ km through subsidies or taxes

The perception of safety, reliability, comfort

....

Week day mobility: a few things to know when the conditions of mobility change

**All the players of the urban game take in account the
conditions of mobility in their location choices**

Ex when speed increases

Hypermarkets develop at the expense of local shops / supermarkets

**Households can choose suburban places, or neighbourhoods meeting
their requirements, even though they are far from their job place**

The companies can expand their employment basin

In brief, there is a growth of the “mobility norm**”, including for job
seekers and job agencies**

Week day mobility: a few things to know when the conditions of mobility change

(The “Zahavi” law)

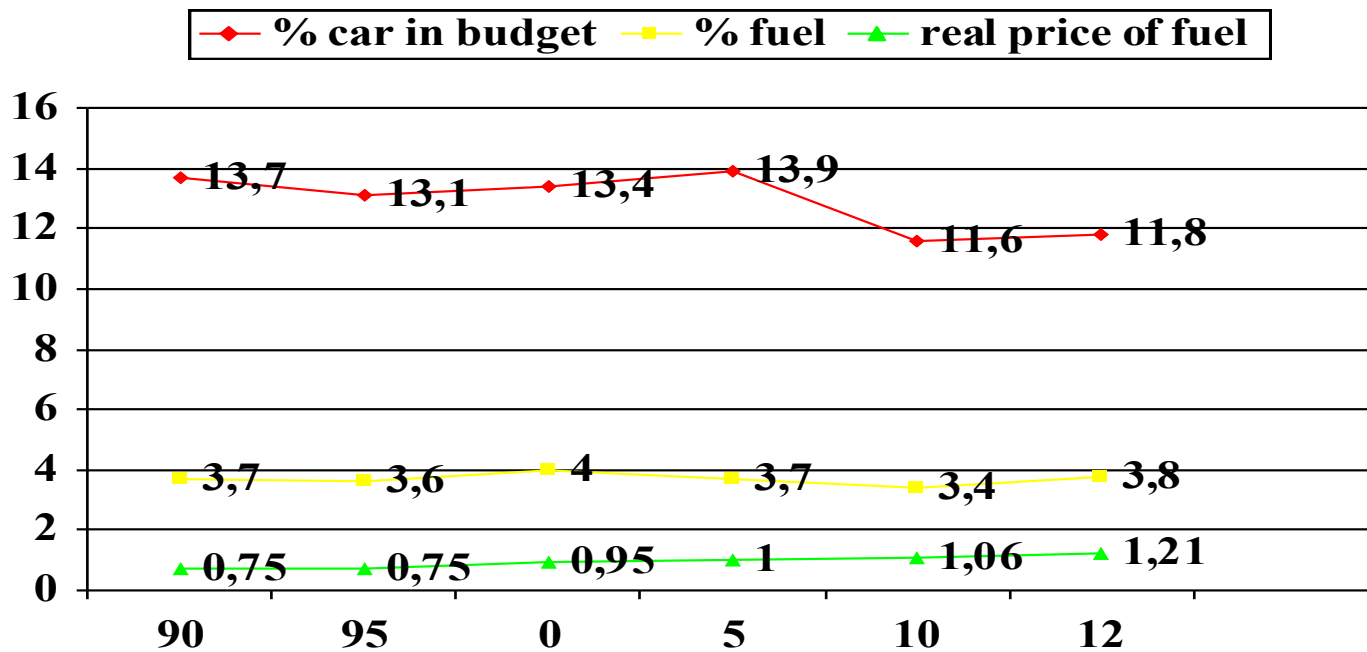
**We try to maximize our travelled distance
respecting 2 constraints:**

**The mean daily travel time budget of the
population remains constant**

**The mean share of transport in household’s
budget remains constant**

(A kind of “rebound effect” in the mobility field)

Example: despite a strong growth of the price of fuel, a stability of the share of car in household budgets



Example: trends (%) in local mobility on a week day
Tremendous changes in distances, stability in travel time
Travel time budgets: 55 mn (1982), 55 mn (1994); 55 mn (2008)

	1982-1994	1994-2008
Speed for cars	+18	+6
Speed over the day, all modes	+33	+7
Dist/ day/ person	+32	+9
Dist/day/ person, walk	-26	+5
Dist/ day/ person, 2 W	-47	+71
Dist/day/person, car	+61	+12
Dist/day/ person, public transport	-1	+0

**Why is it so difficult to change
personal mobility behaviour?**

**The car as a “swiss knife”, compared to
diverse and often poor P.T. alternatives**

There are different markets for personal mobility, with quite different alternatives to the car

Usual mobility (trips less than 100 km / long distance)

59 % / 41 %

In usual mobility, week day/ week end

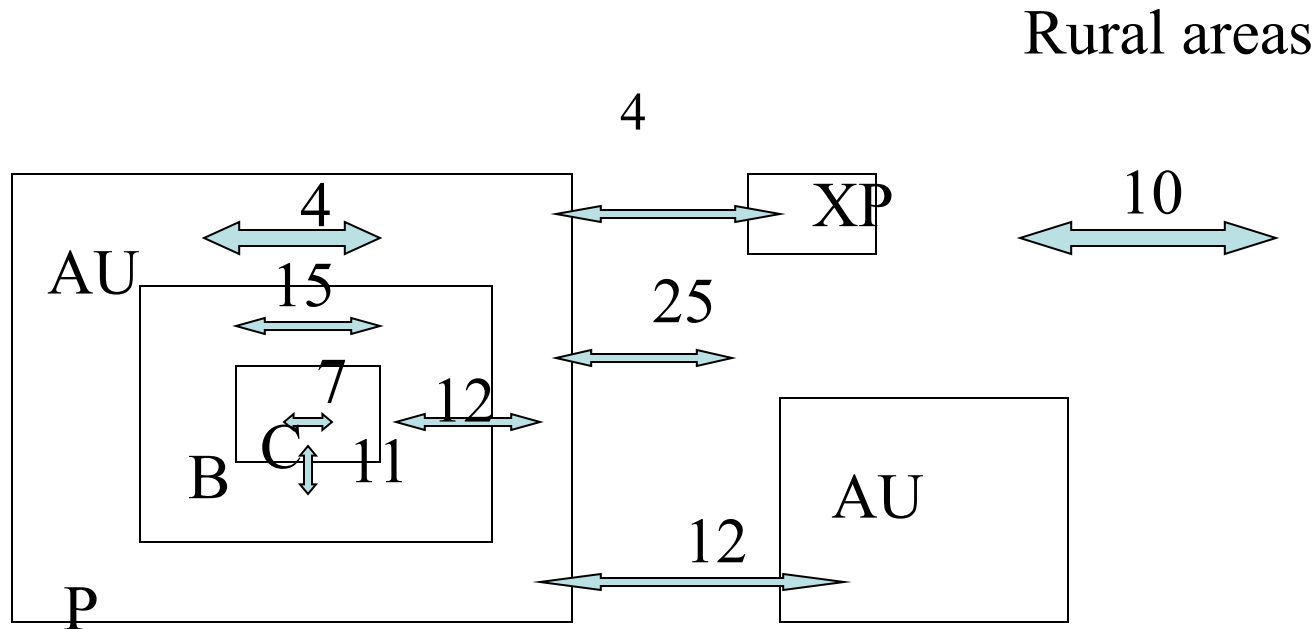
74 % / 26 %

In week day mobility, urban mobility / regional mobility

37 % / 63 %

**The car: the only means which can be used on all these markets
("Swiss knife" effect)**

**Even for ordinary weekdays, very different situations:
shares of distances travelled with car**



Urban mobility accounts for one third only of local mobility

*CC+CB (18 %): good alternatives. BB+ PP+ Rural+ XPAU
+RuralAU (58 %) : poor alternatives. AUAU+Pau (24 %):
alternatives in few cases*

**Why is it so difficult to change
personal mobility behaviour?**

**The example of the potential of car/
bike and scooter substitution**

The arguments in favour of the use of 2 wheels vehicles

Public

From 30 kg to 300 kg, instead of 1200 kg: lower energy requirements

Less congestion

A growth of users, from a low level

(France: +71 %, Paris+ inner suburbs: +127 % (bike) and +240 %
(motorbikes) from 1994 to 2008

Private

Easier to park

Higher speed and time reliability than car

A growing willingness to use

Large shares of population below 30 km / day

The barriers to the use of 2 wheels vehicles

Not a “swiss knife”.

Problems if car is needed for some trips. Need for 2 vehicles?

Solution: more car rental opportunities

Unsafe

The “road ecosystem” not prepared to accommodate proper conditions of mobility for these vehicles:

Risk to be killed in a collision with another vehicle:

X10 (bikes) X 20 (scooters) compared to car

Purchasing cost expensive for motorbikes, especially e solutions

Due to a lack of mass production, compared to cars

**Why is it so difficult to change
personal mobility behaviour?**

**Economic instruments: a real but limited
potential**

Economic instruments: a real but limited potential

Parking policies

Efficient, but limited to high pressure zones, and potential opposition of shopkeepers and residents

Road pricing policies

Efficient, but potential limited to high pressure zones

Ex in London: around 20 % traffic less in the controlled zone, 2 -3 % in the GLA area

Economic instruments: a real but limited potential

A general price growth of car mobility (fuel tax for example)

Would reduce the fluidity of markets, including job market

Ex: in present conditions, commuting by car on 20km (single trip) means 25 % of the salary at the minimum wage. A risk of “preference for unemployment”

Would make more vulnerable low income people in rural areas

Share of the full cost of daily trips by car in HH budgets

All households: 11 %

Urban households: 5 % Rural households 15 %

Rural households, 1st quartile: 20 %

**Why is it so difficult to change
personal mobility behaviour?**

**The example of classical policies in Europe
towards more “compact” city and more
Public transport usage**

“Classical policies” in Europe: the promotion of Public Transport and “compact city”

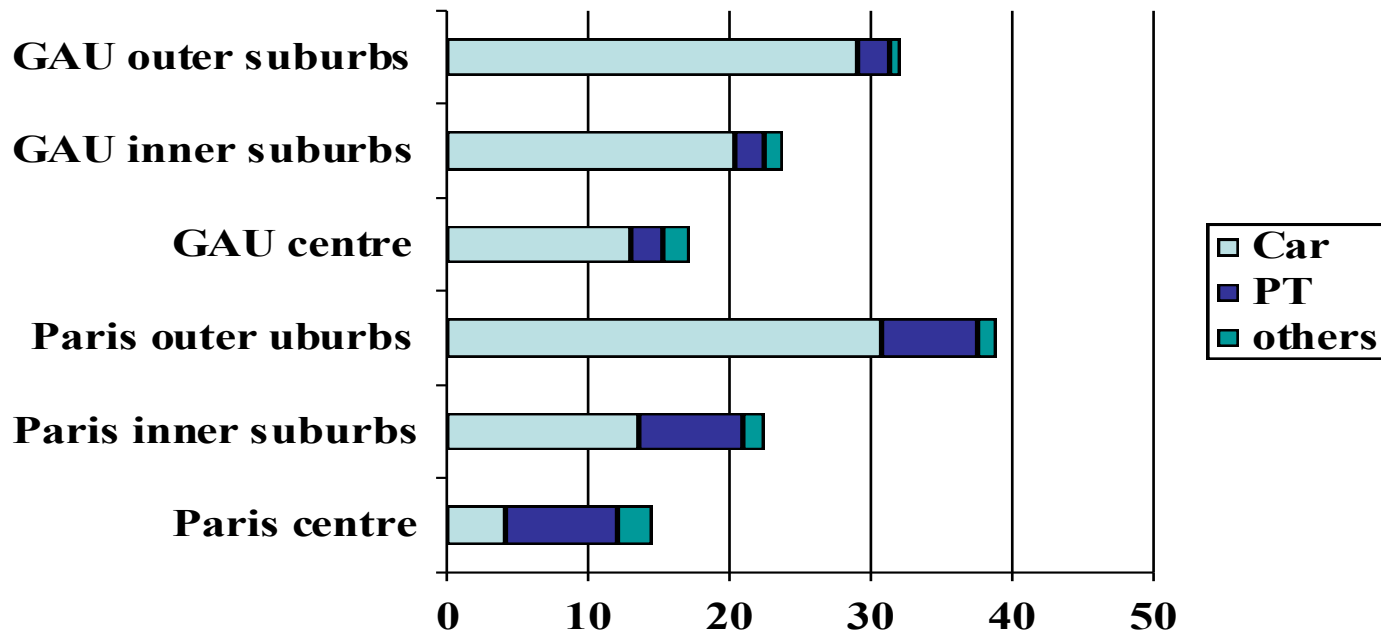
Why?

P.T. more energy efficient than car (as a mean, factor 2)

Living in high density neighbourhoods requires lower distances for daily mobility and less car oriented mobility, leading to a factor 2-3 for fuel requirements

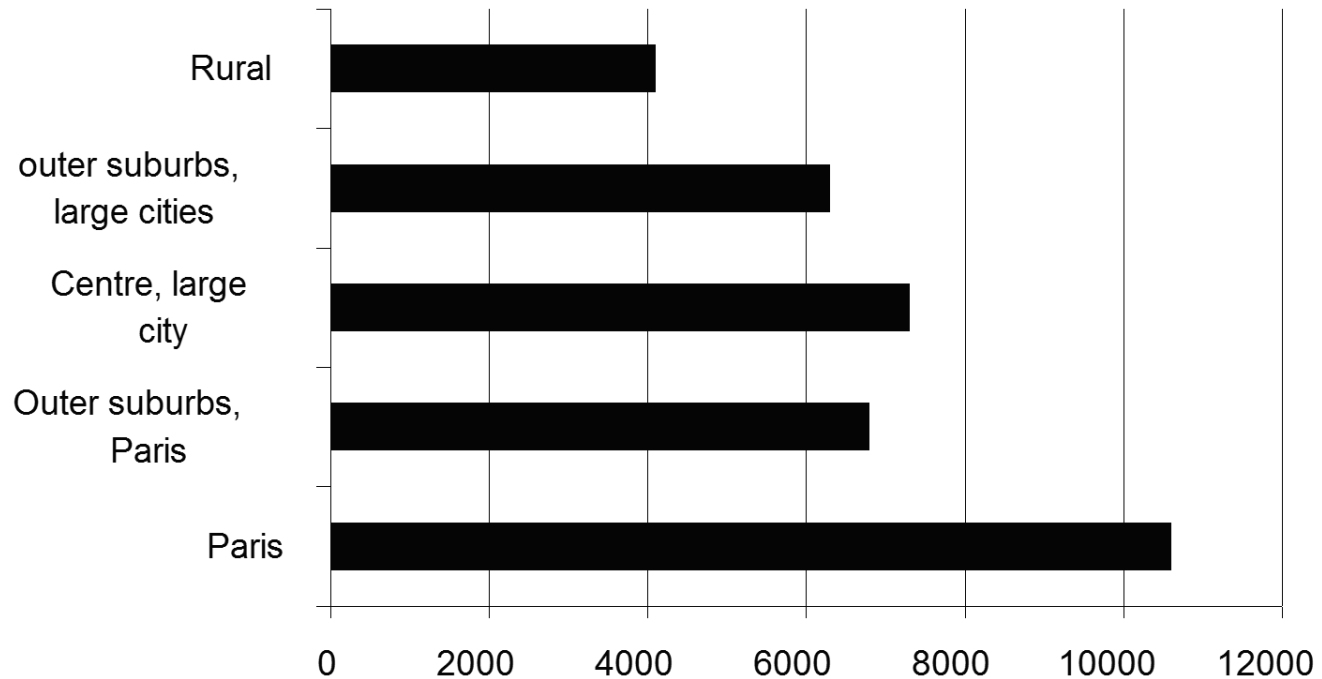
Daily mobility: differences according to residential location

Distances / day

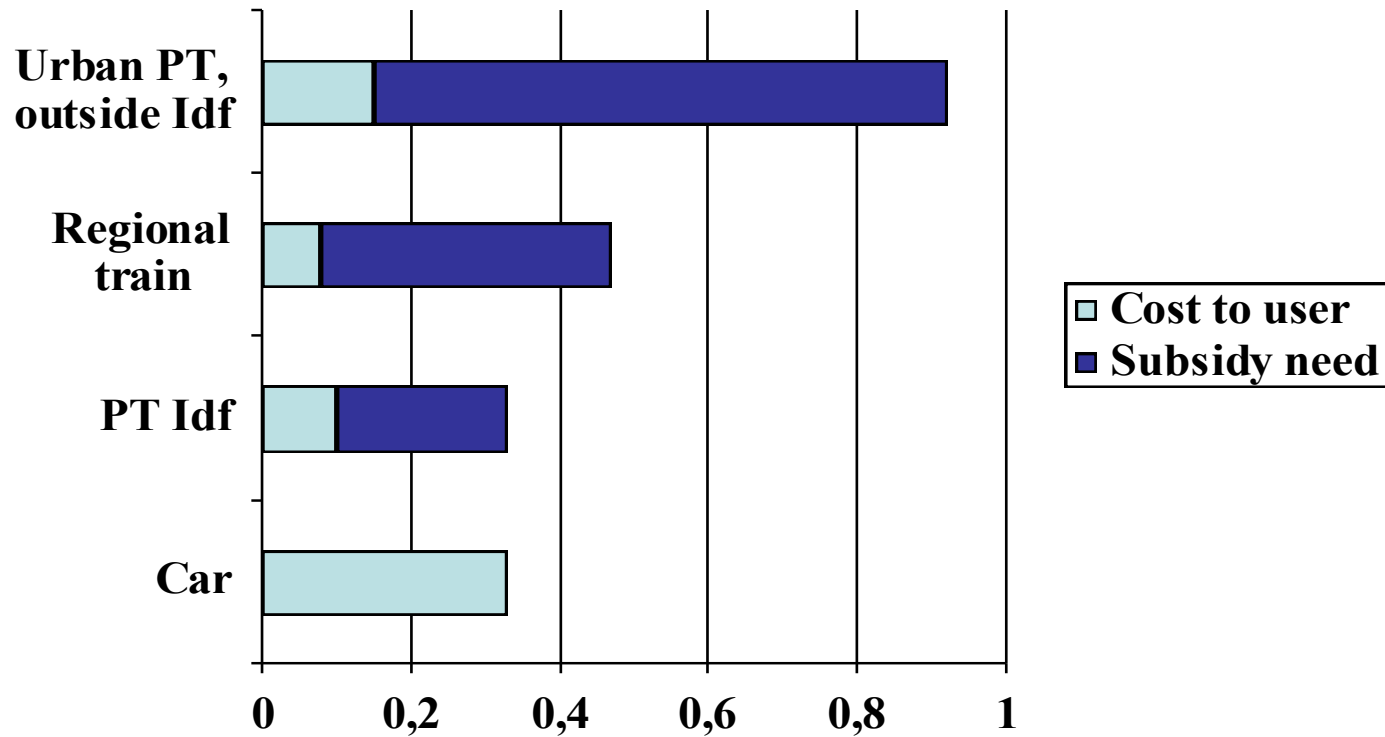


But mind to compensations!

Annual Distance for long distance trips



But mind to economic costs (observed cost/ passenger km)



But mind to travel time costs!

Because when PT is already chosen in the majority of cases where PT is better than car, most of the expected splits from car to P.T. would require a multiplication of travel time by a factor 2 to 4, generally not acceptable to users

But mind to the desires of people

Choosing a place of living also means choosing a way of life

Choosing neighbours, quality of schools

Choosing proximity to nature or to culture

Choosing a detached house instead of a flat

Choosing the opportunity to buy a home or to stay renters

**In many (but not all!) cases for suburban locations,
“choosing” the only place meeting the household’s
budget**

My personal preference and its requirements

A daily mobility system based on an extensive use of small (1-2 places), light, , 3-4 wheels, electric, with a low maximum speed, vehicles

Why?

In phase with autonomy, reactivity, fitness

How would it be possible?

Would require multiple levels of coordination / cooperation

Europe, for an industrial policy to achieve reasonable production volumes, and acceptable prices

National governments, for policies designed to discourage the use of “historical car” whenever it it possible

Cities, to redesign their road network in view of the safety of their users

Public / private partnerships, to develop much more than to day car pool, car rental, taxi for trips which cannot be made by these vehicles

Thanks for your attention