

# L'énergie en ville

**UNIGE**

*3 novembre 2011*

**Benoit Lefèvre, PhD**

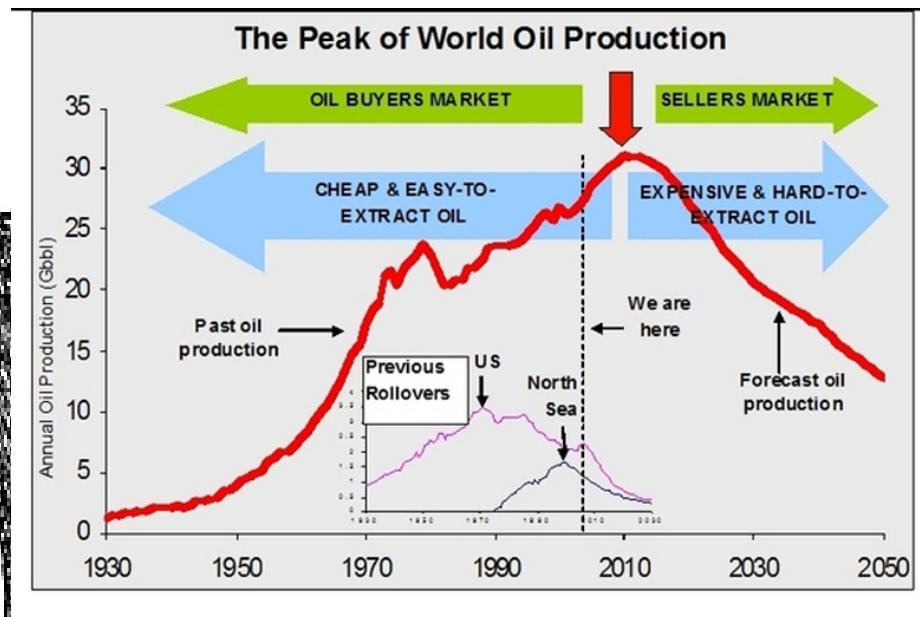
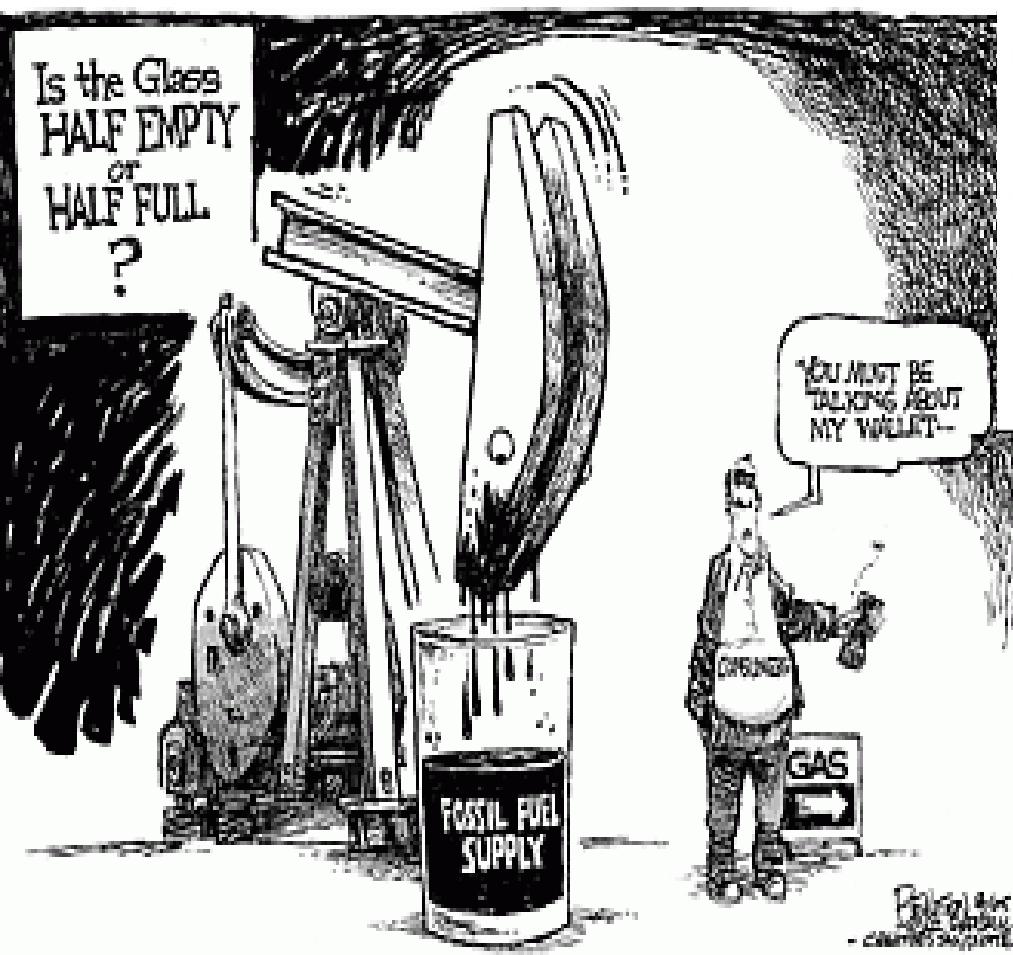
[benoit.lefeuvre@sciences-po.fr](mailto:benoit.lefeuvre@sciences-po.fr)

**Institut du développement durable et des relations internationales**

27 rue Saint-Guillaume – 75337 Paris Cedex 07

[www.iddri.org](http://www.iddri.org)

# Peak oil, prix du baril, prix à la pompe









# Plan

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## 1 – Intro

## 2 – Consommations énergétiques urbaines: où est le problème?

Répartition par secteur: aujourd’hui et demain: transport clef

Pas de fatalité

Facteurs déterminants

## 3 – Que faire ?

## 4 – Aperçu de la boîte à outil disponible

Aide à la décision: modèle pour quantifier

Aide à la mise en œuvre: cartographie institutionnelle pour  
élaborer stratégie d’action

Aide au suivi-évaluation-révision: observatoire, comité de pilotage etc

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## Trois flux d'énergie :

- - l'énergie de fonctionnement
- - l'énergie investie dans le bâti
- - l'énergie incorporée dans les biens de consommations

<b>Ville</b>	<b>année</b>	<b>Conso E sans industrie</b> Tep / hab / an	<b>Transport</b>	<b>Résidentiel</b>	<b>Tertiaire</b>
Grenoble	1999	2,08	30 %	39 %	30 %
Londres	1999	1,68	22 %	47 %	31 %
Tokyo	1998	1,44	43 %	22 %	35 %
Shanghai	1998	0,3612	52 %	29 %	19 %
Seoul	1998	1,18	34 %	42 %	24 %
Beijing	1998	0,54	20 %	40 %	40 %

## Deux sources majeures de consommation énergétique urbaines:

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### - Secteur Bâtiments:

- Solutions connues.
- Comment favoriser leur pénétration du marché de l'industrie et du bâtiment?

### - Secteur Transports:

- déjà une source d'émission majeure et avec la croissance la plus forte
- tendances alarmantes vers la “ville automobile”
- beaucoup plus complexe**
- car interactions Transport – Usage des Sols

Existe-t-il des trajectoires de croissance durable pour les villes actuelles?

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## **Les consommations énergétiques liées à la mobilité urbaine**

# Congestion

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United Kingdom

# Congestion, Accident, Attractivité

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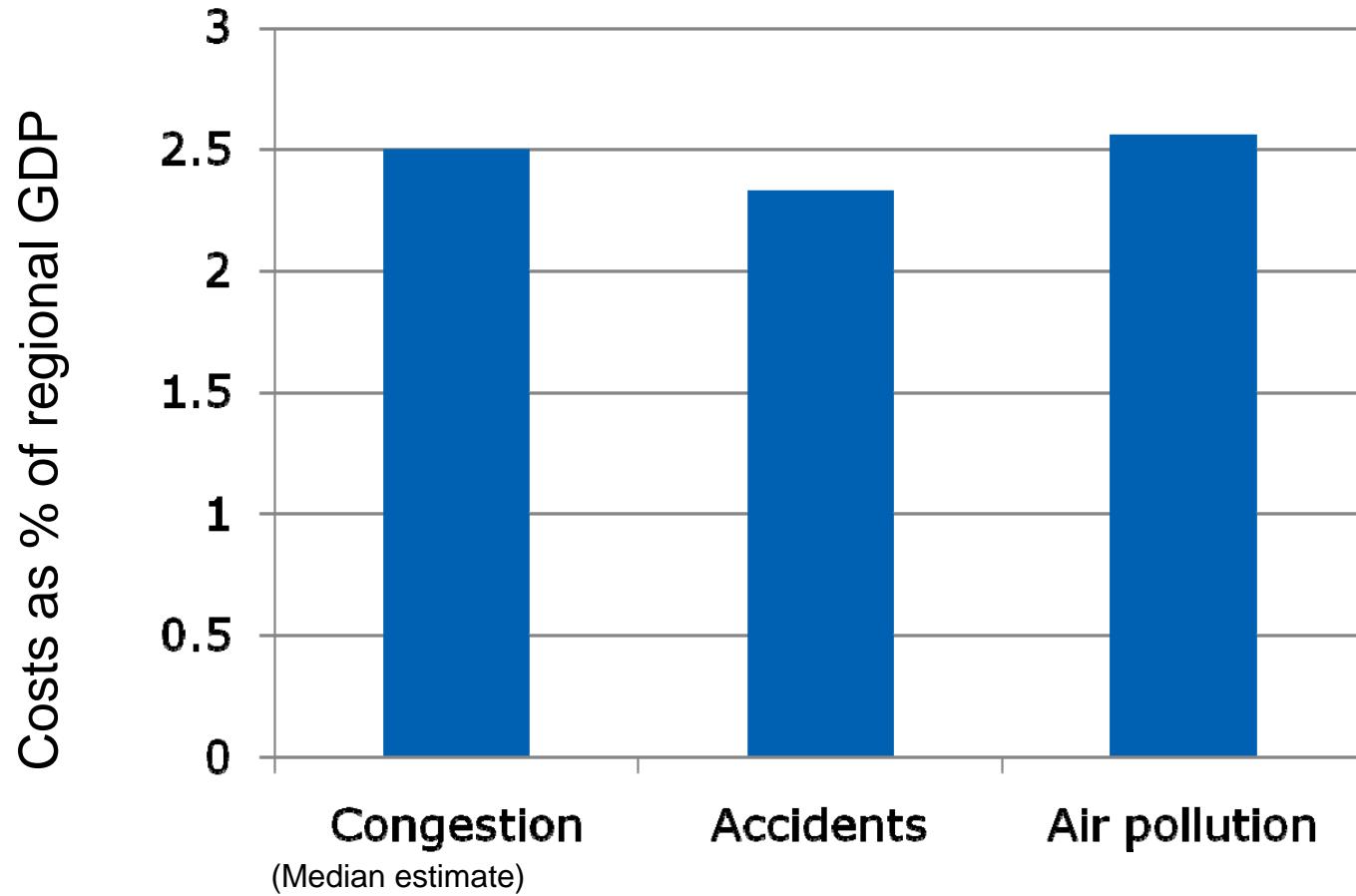
# Congestion, Accident, Attractivité, PIB



Thailand

# Case of Bangkok

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Data Source: World Bank (2002)

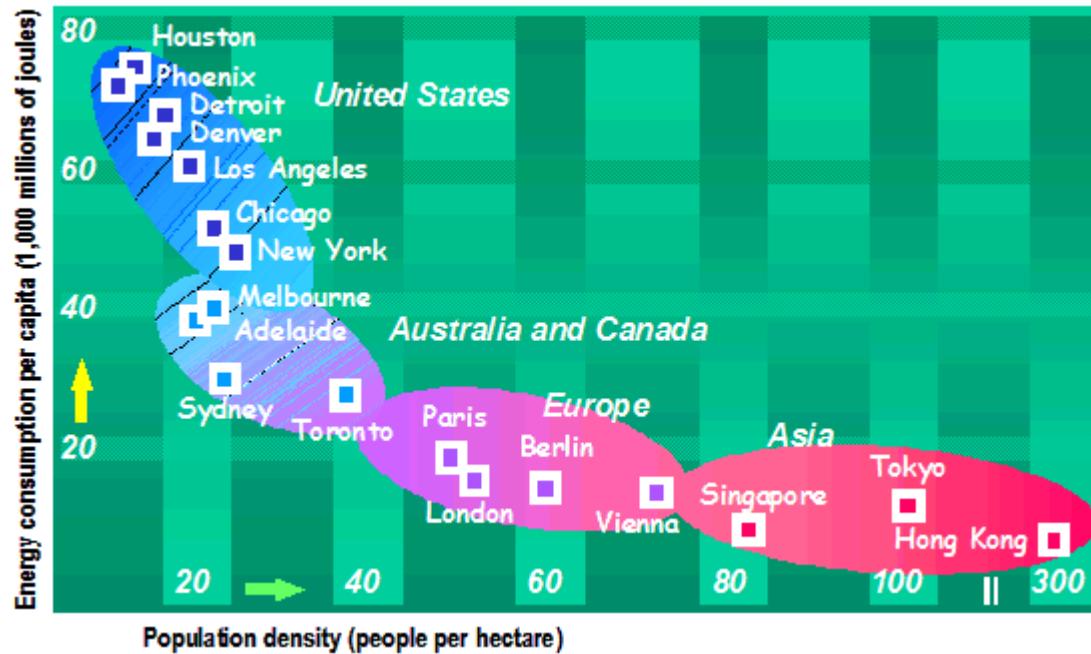
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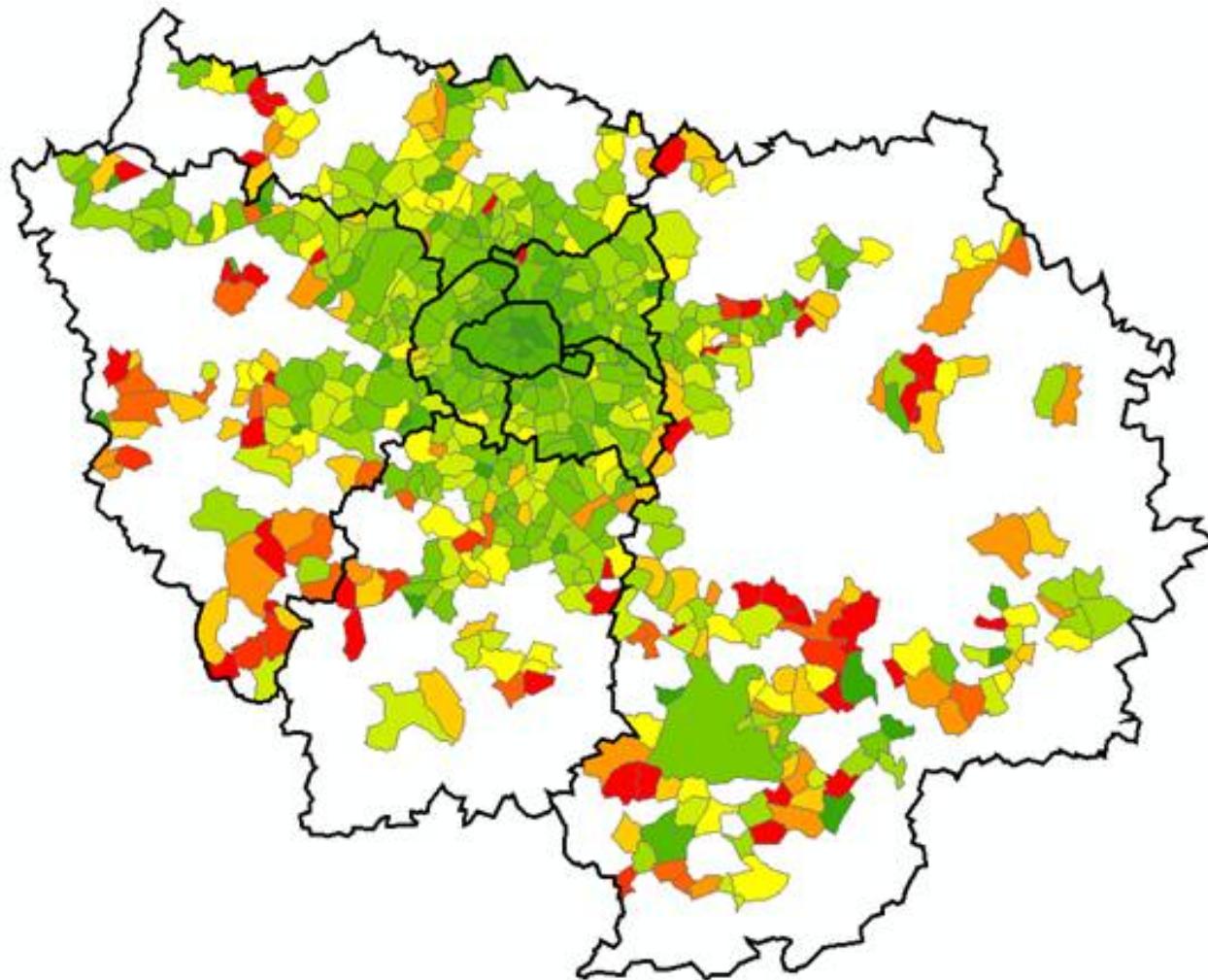
Attention à certaines simplifications:

- ↗ Richesse locale
  - ↗ taux de motorisation
  - ↗ usage de la voiture
  - ↗ consommations énergétiques
  - ↗ offre de transport en commun et d'infrastructures
- ➡ On ne peut analyser les transports urbains indépendamment des caractéristiques urbaines  
Les paramètres non-spatiaux ne suffisent pas!

## 1<sup>er</sup> niveau d'analyse: Macro-urbain (Newman & Kenworthy)

densité moyenne – consommations énergétiques



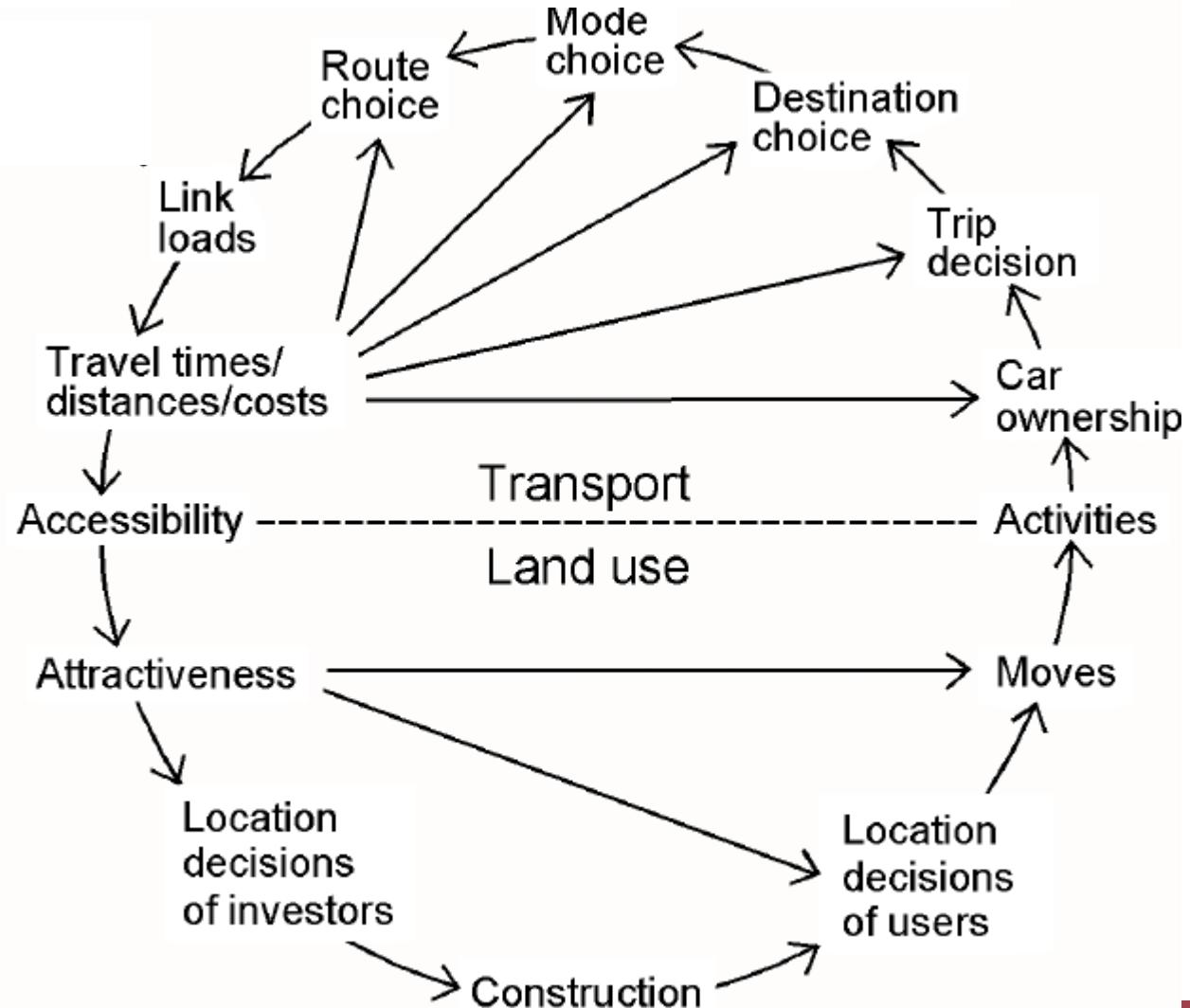


Légende

Quantité moyenne de CO<sub>2</sub>  
en g équivalent pétrole

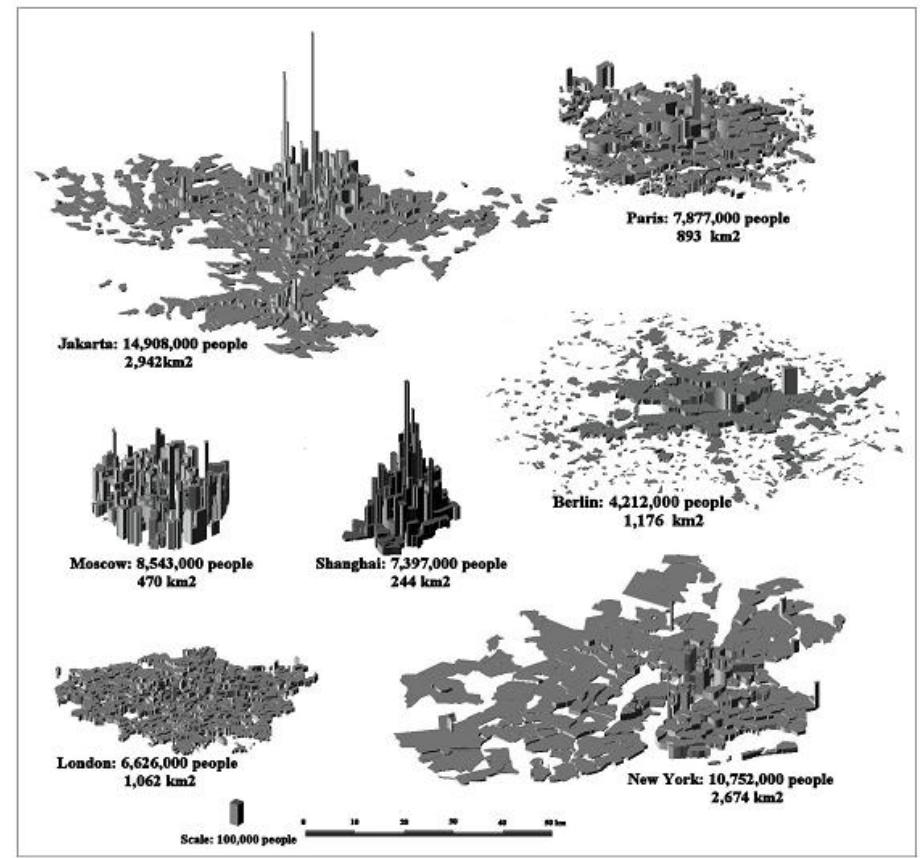
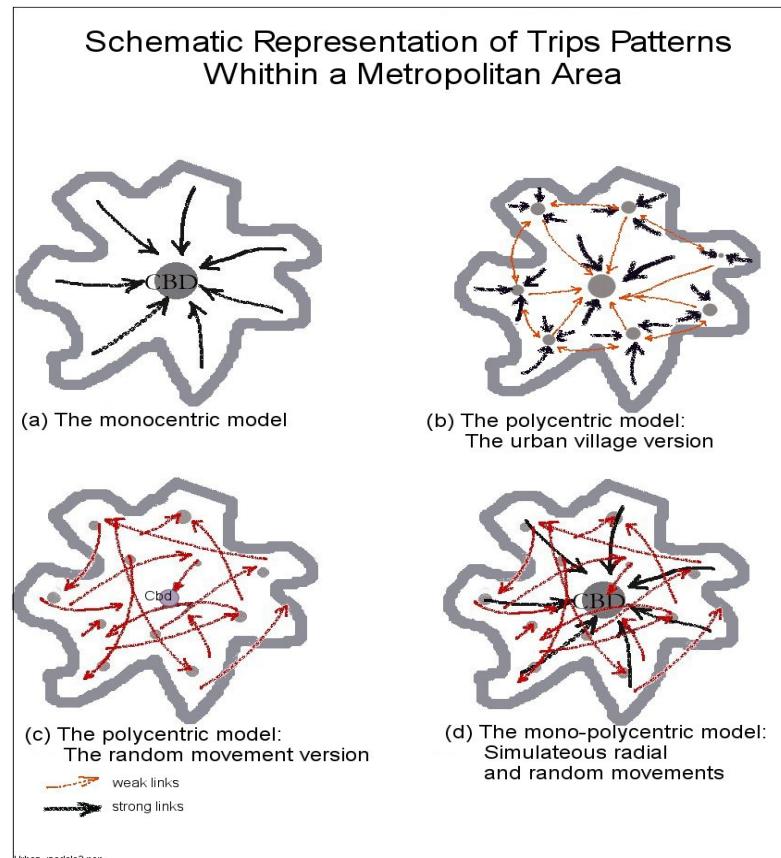
0 - 200
201 - 400
401 - 600
601 - 800
801 - 1000
1001 - 1200
1201 - 1400
1401 - 1600
1601 - 1800
1801 - 2000
2001 - 4335

- Claves
- Complejas



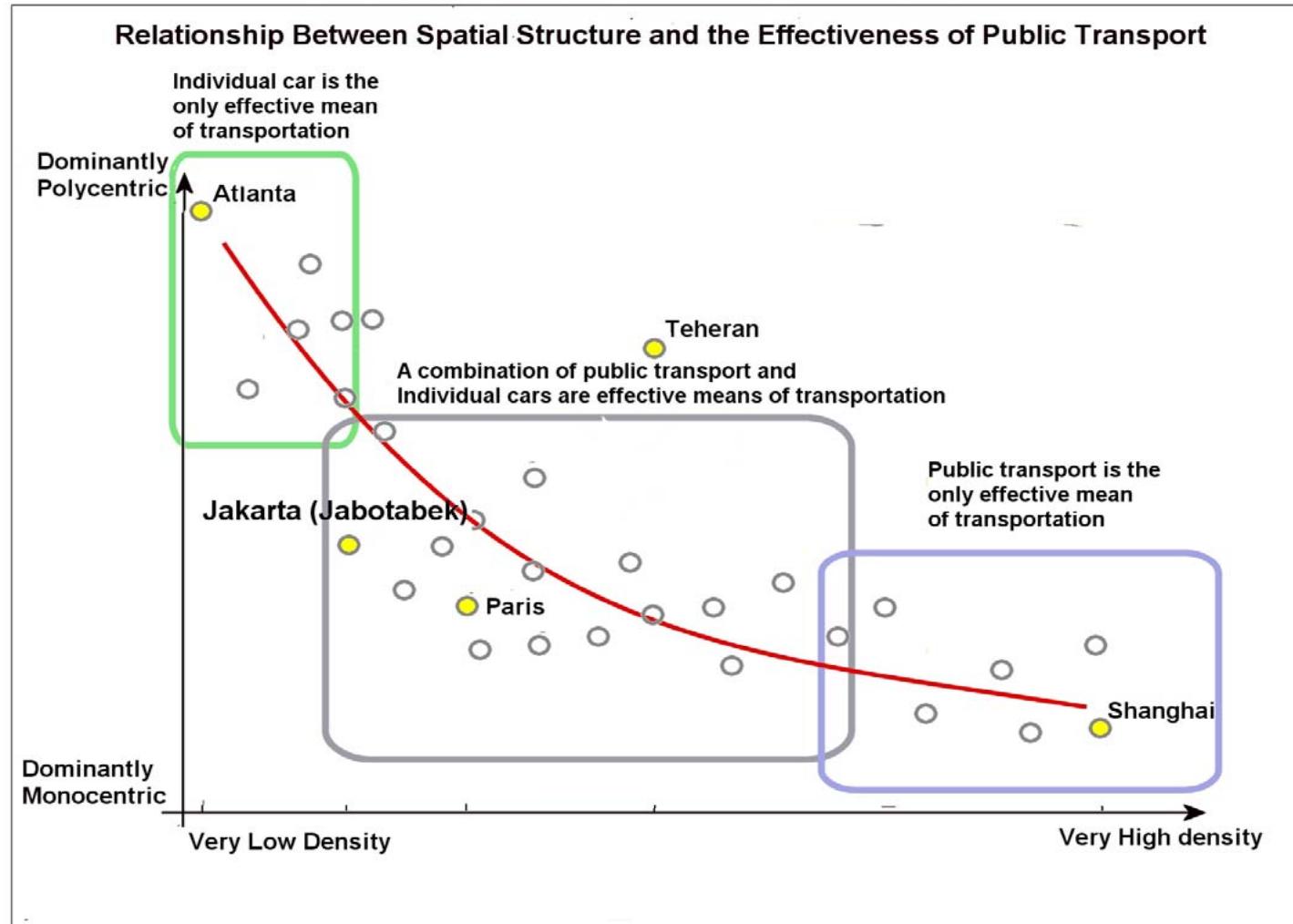
# La structure urbaine:

Distribution spatiale 1) des déplacements et 2) de la population



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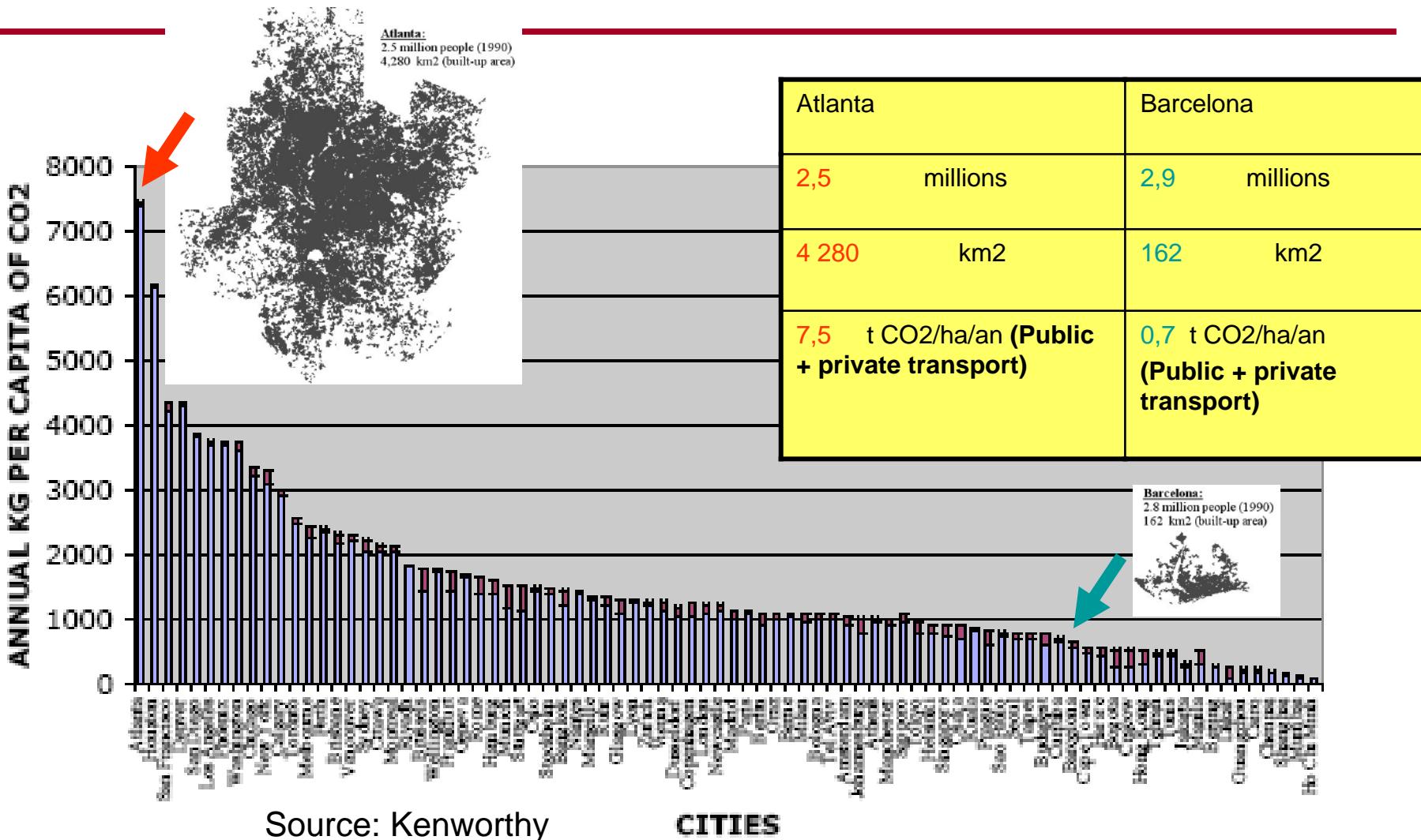
Aide au suivi-évaluation-révision: observatoire, comité de pilotage etc pour pérenniser

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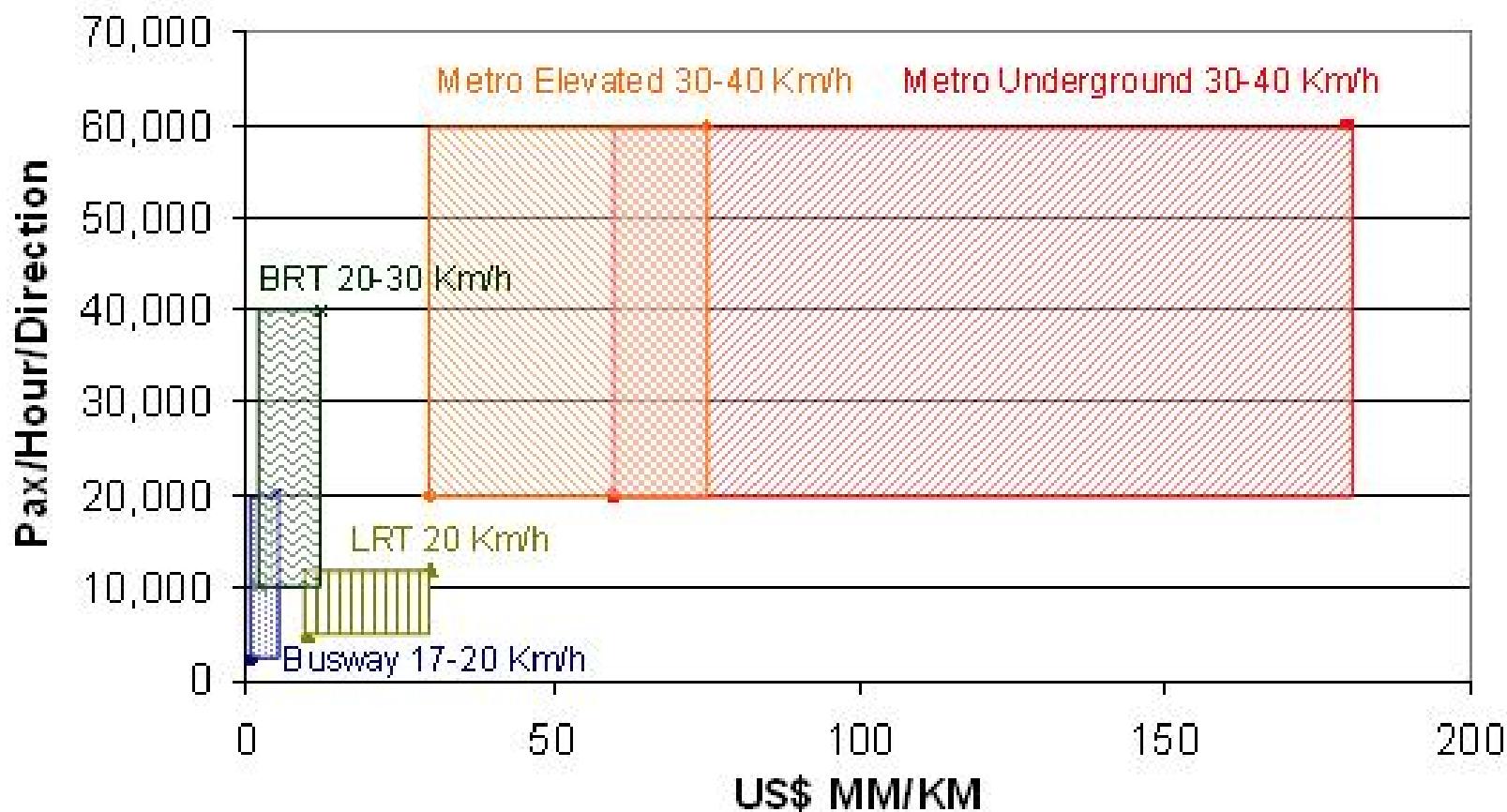


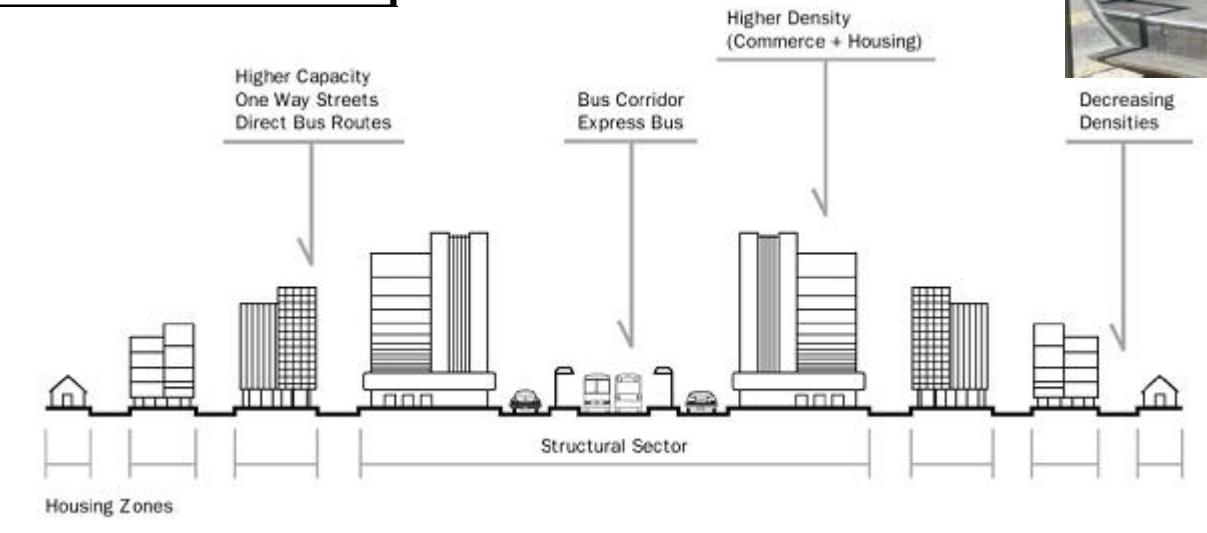
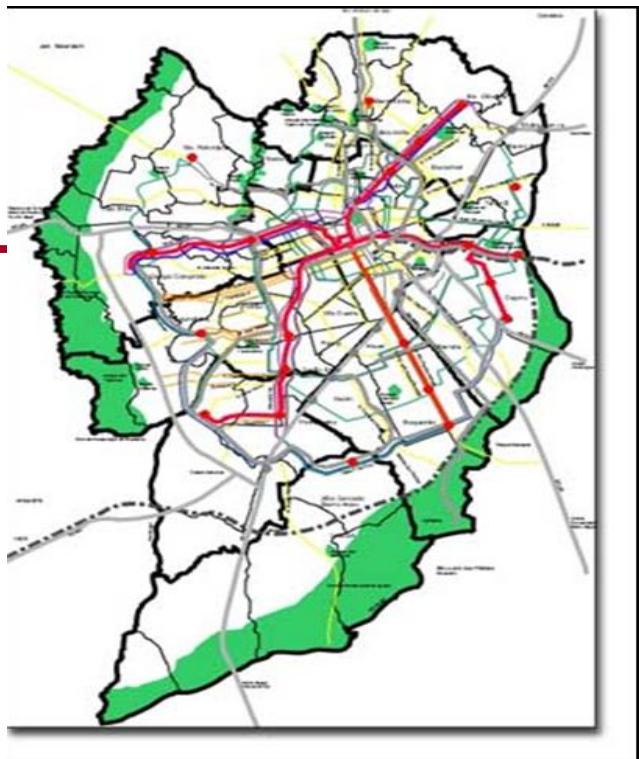
# Atlanta ou Barcelone ?





## Initial Cost vs. Capacity







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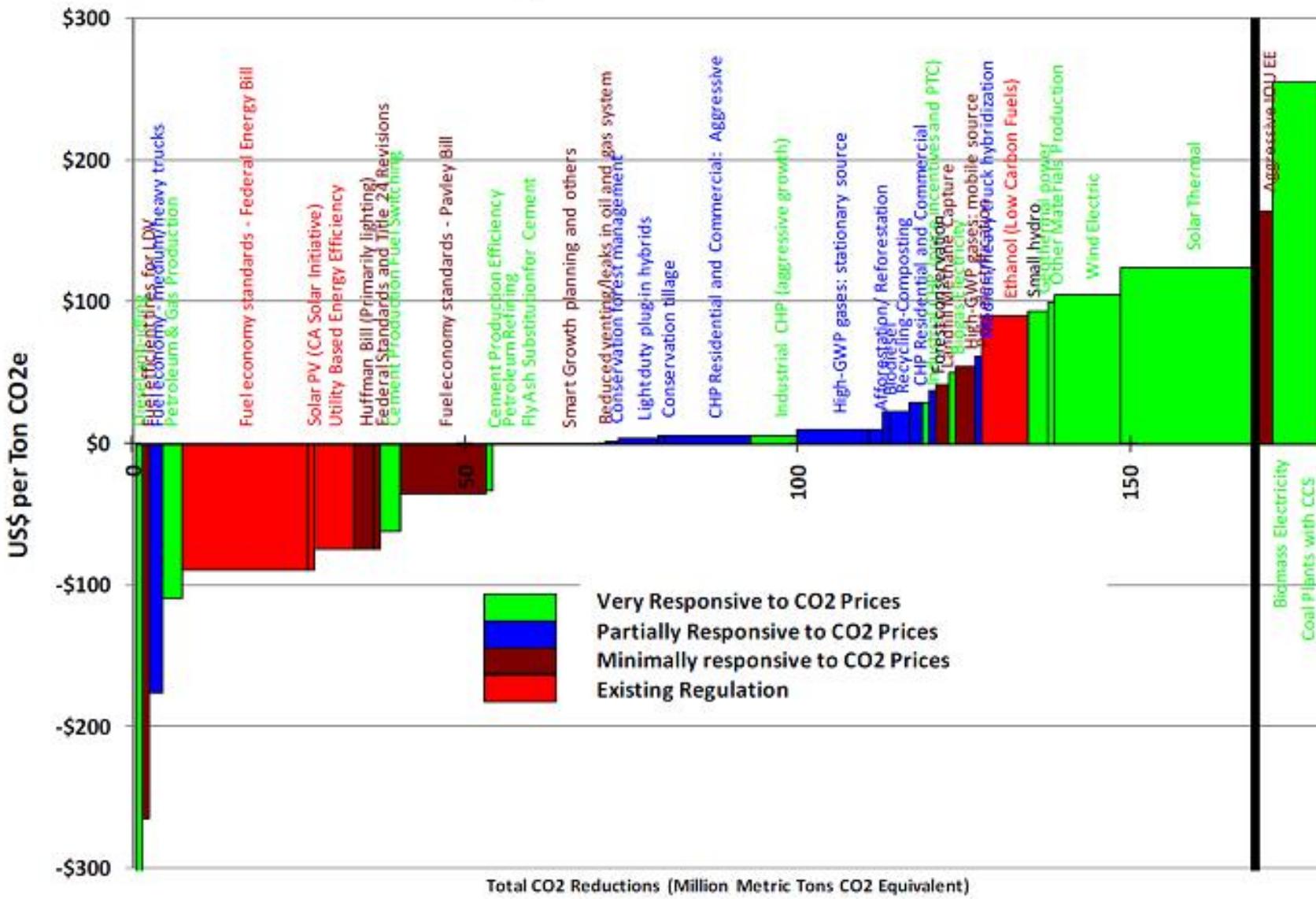
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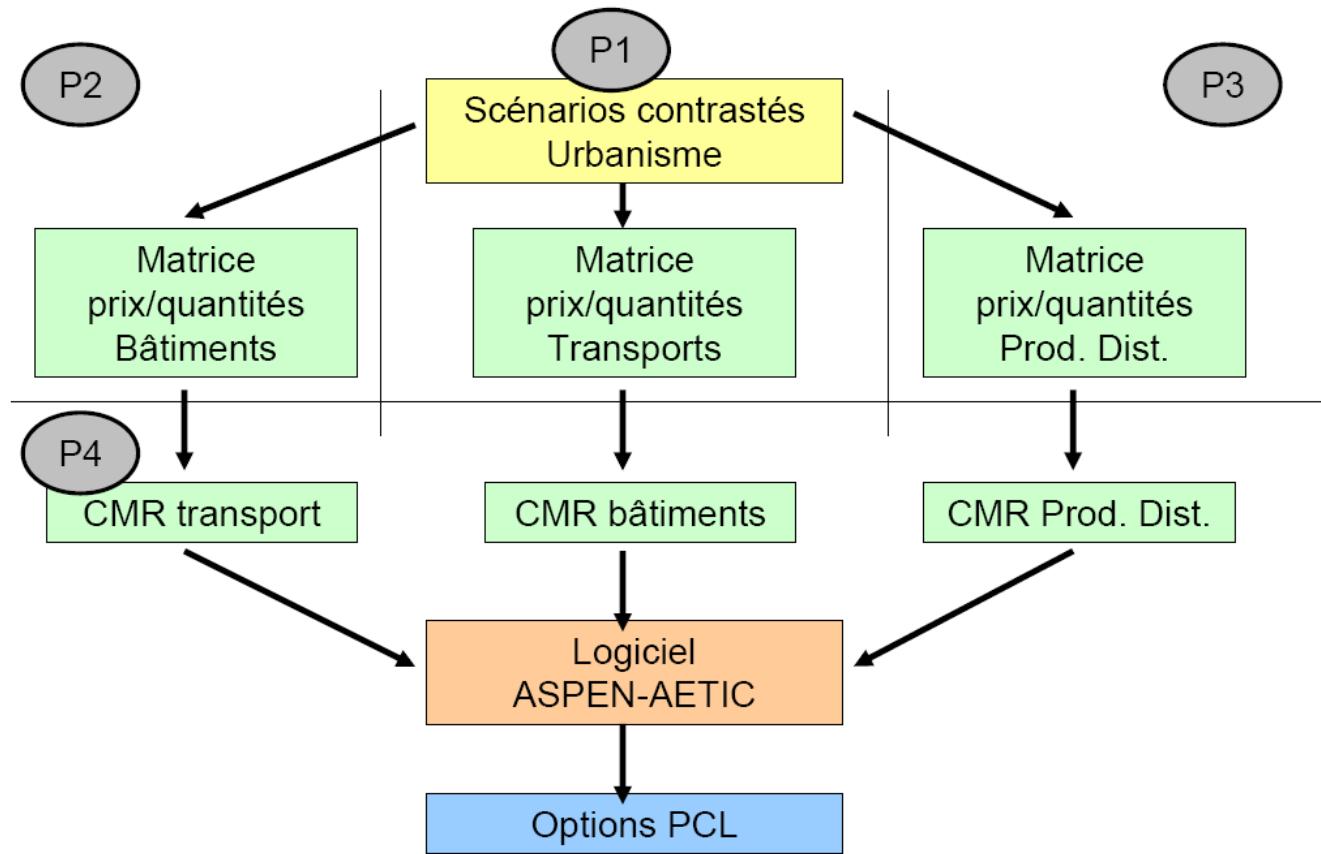
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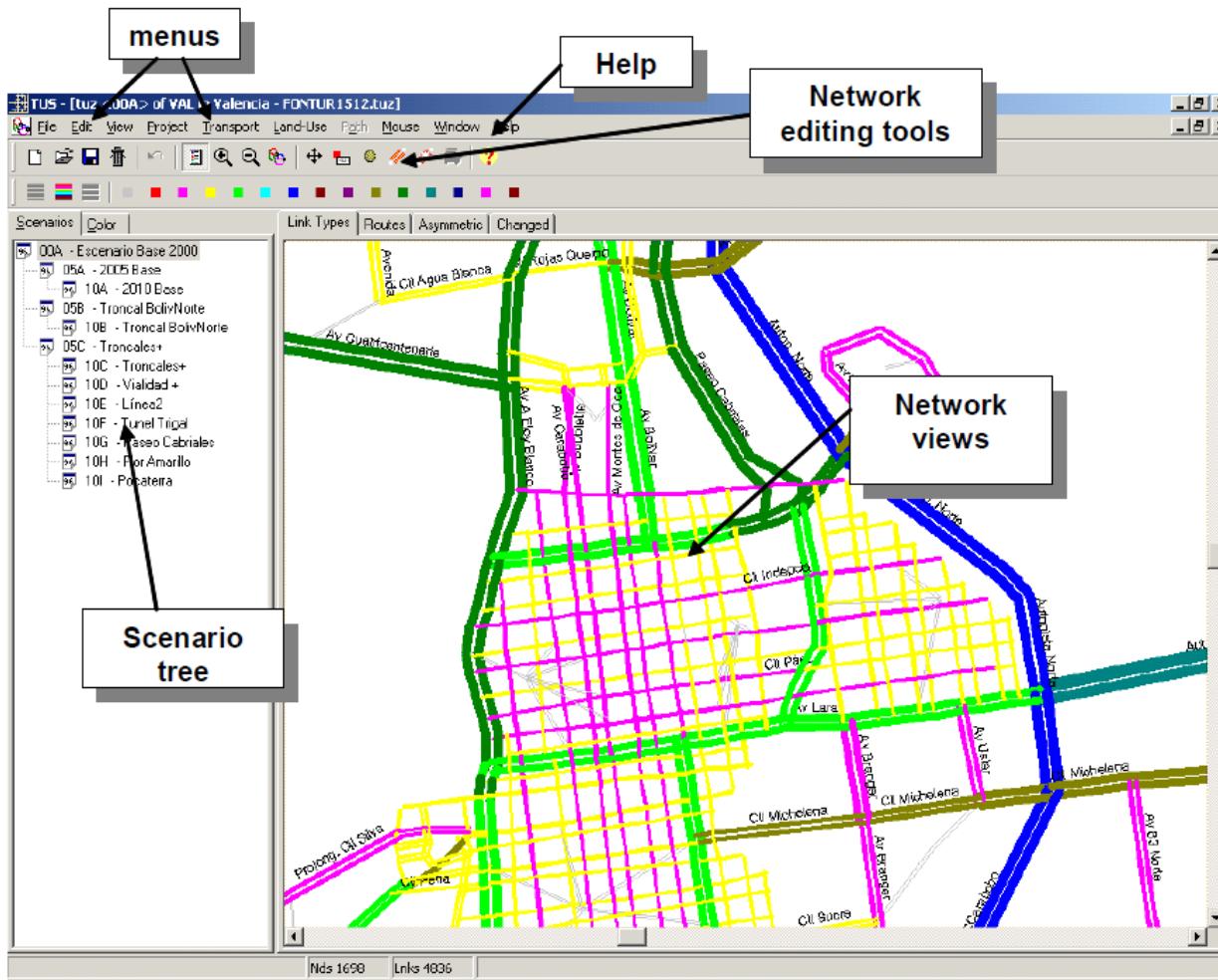
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## CO2 Marginal Abatement Cost Curve



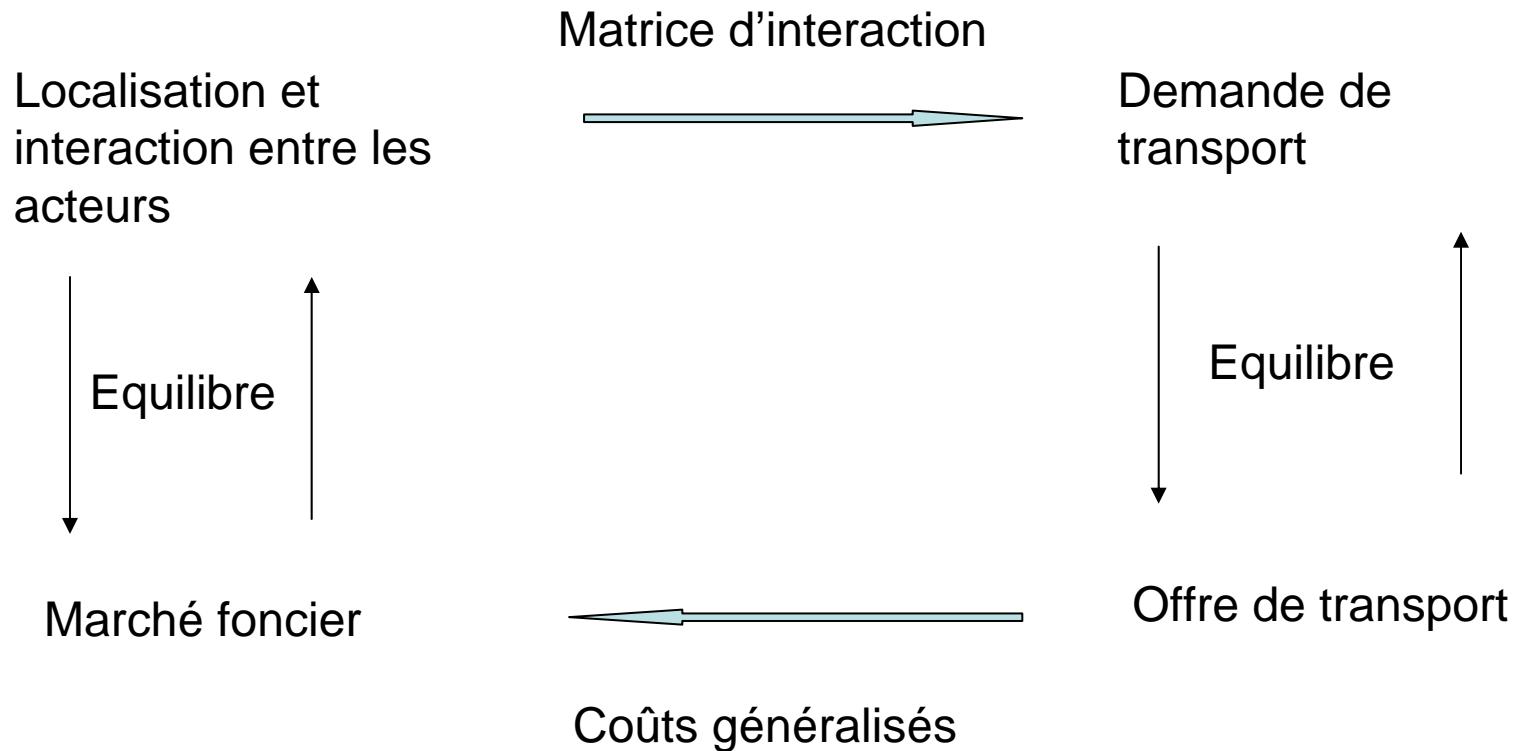
# Projet AETIC : logique d'ensemble





## Module « usage des sols »

## Module « transport »



## Logiciel en accès libre

- + 40 applications: Amérique du Nord, sud, Europe, Japon, etc
- + institutions (EPA, WB, systra, etc)

2 exemples:

Bruxelles:



Rio de Janeiro:



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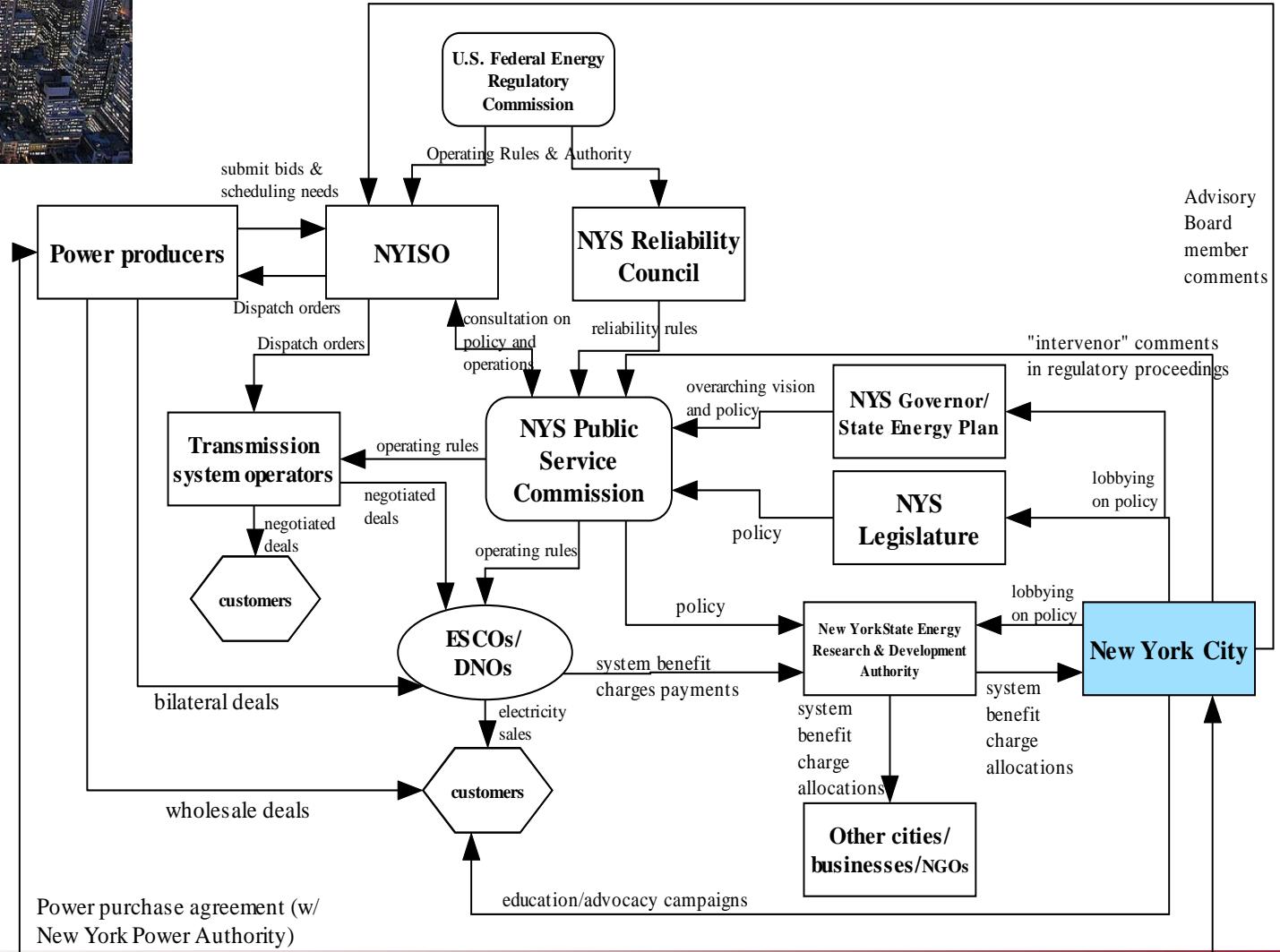
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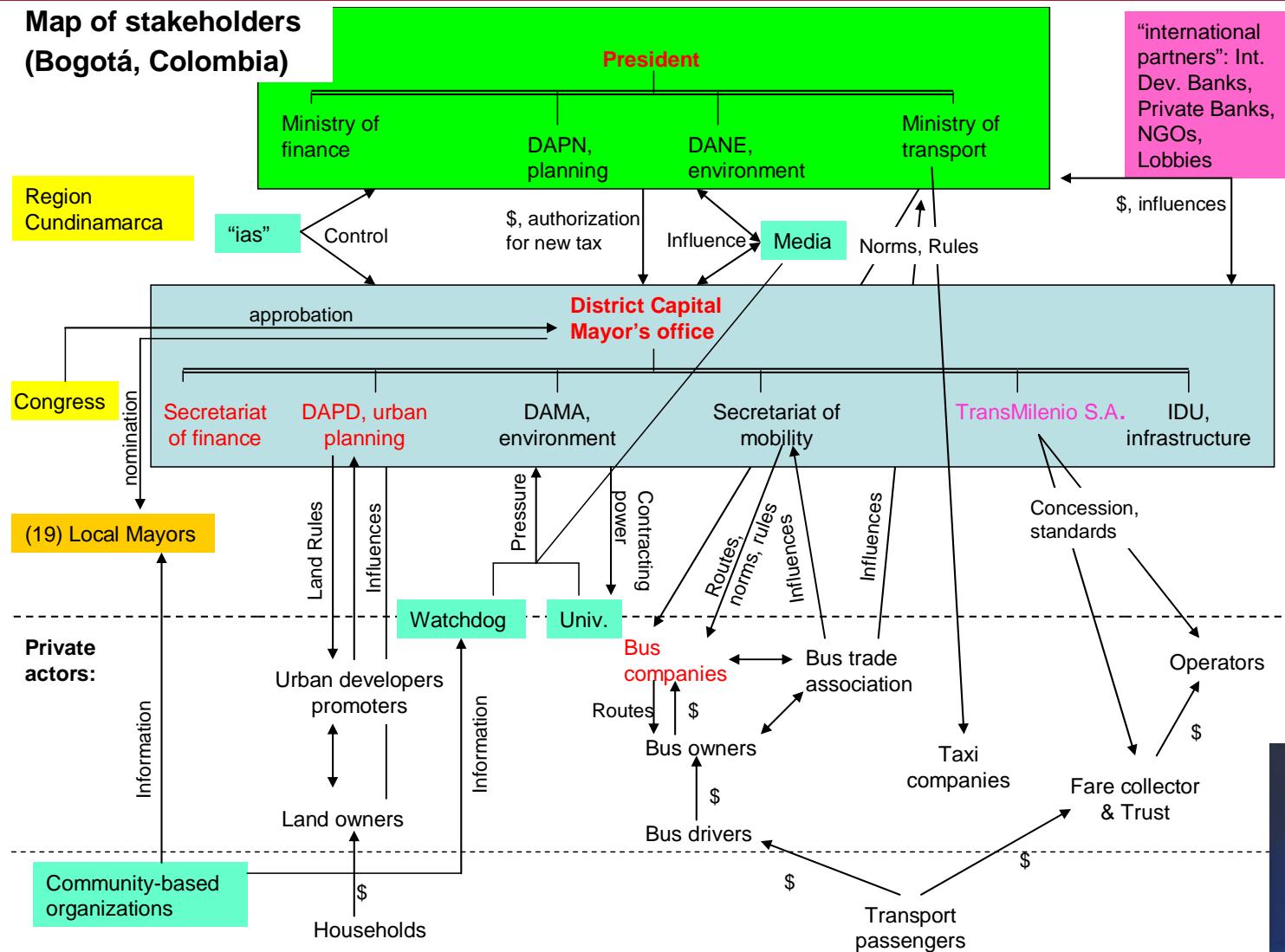
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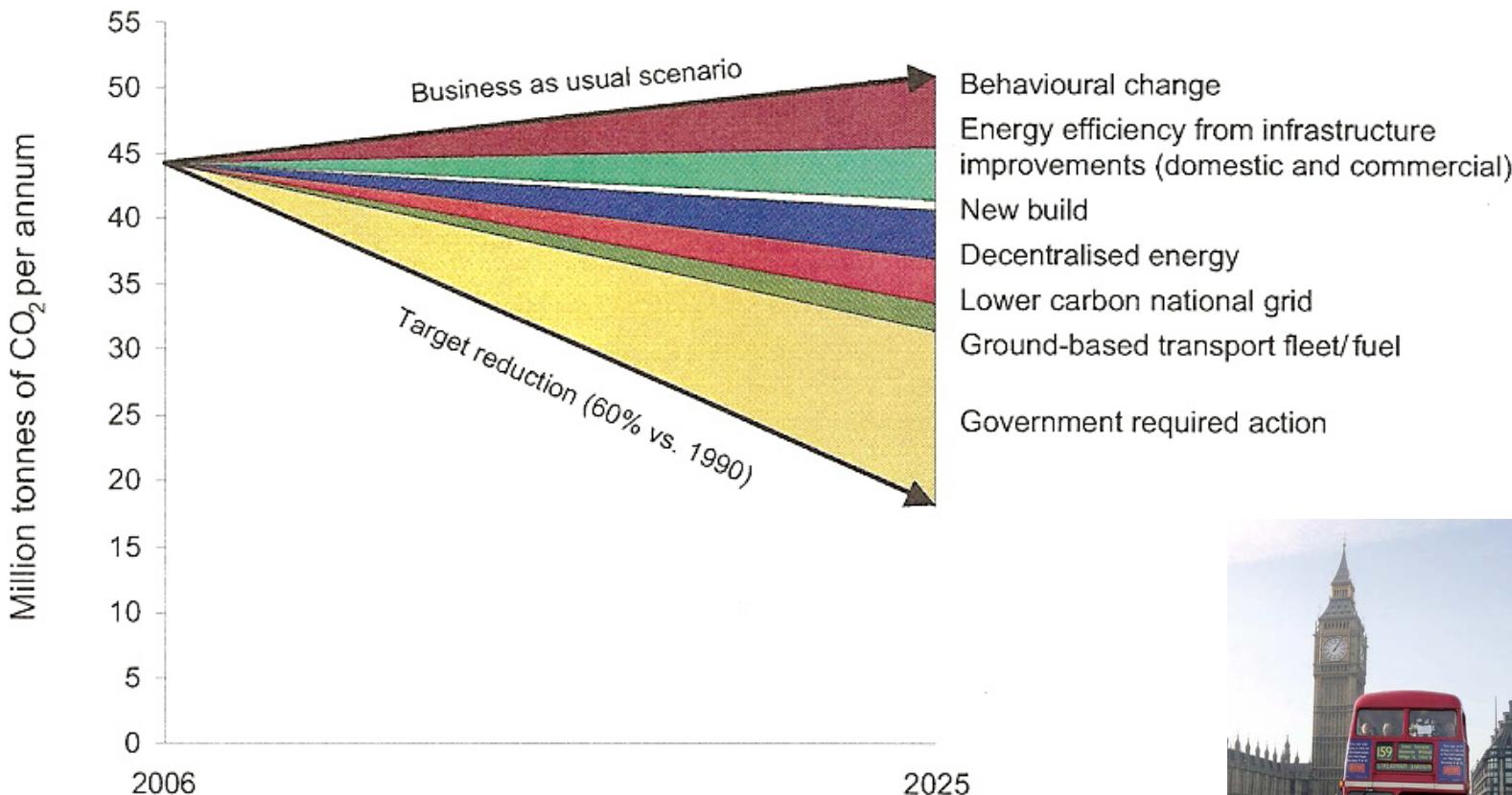
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## Map of stakeholders (Bogotá, Colombia)





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## **Ville et Finance carbone**



S'abonner à notre newsletter



L'Association européenne des autorités locales qui inventent leur futur énergétique

# **Las ciudades – un actor reconocido indispensable**

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## **Rio – capítulo 28 del Agenda 21**

Las autoridades locales alentadas a elaborar Agenda 21 local

- Integrar principios del desarrollo sostenible
- A partir de una consulta con las poblaciones locales

## **UN-HABITAT**

1996 – conferencia in Istambul

**OCDE** : 1993-1996 Programa « ciudad ecologica »

**Comission europea**: grupo de expertos « ciudades sostenibles »

**Comission europea** covenant of mayors

# Ciudades tocan a la puerta de las negociaciones internacionales

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Multiple city and/or urban region networks lobbying in order

- “To be recognized”
- “To have a seat at the decision-making table”
- “To be supported in their actions”

## Preliminary questions :

Which level of “local government” is relevant to tackle territorial issues? Urban region or city? How to coordinate them?

## Three key questions:

What and where is the potential of significant urban CO2 emission reduction?

What are the amount and nature of costs related to these CO2 emission reductions?

What are the needs (technologies, funding, capacity building, etc) of local authorities to move towards a sustainable trajectory?

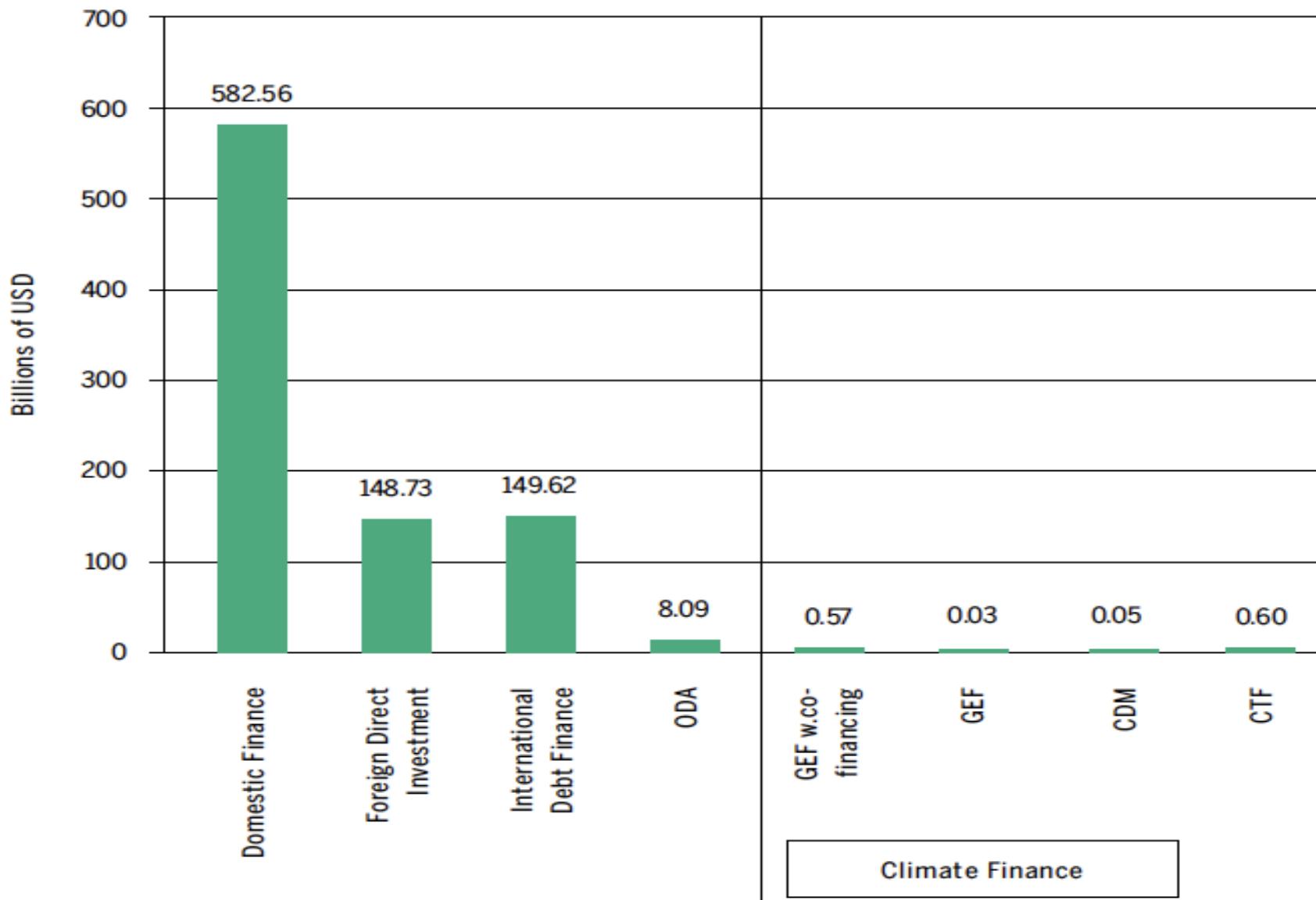
## + need to differentiate:

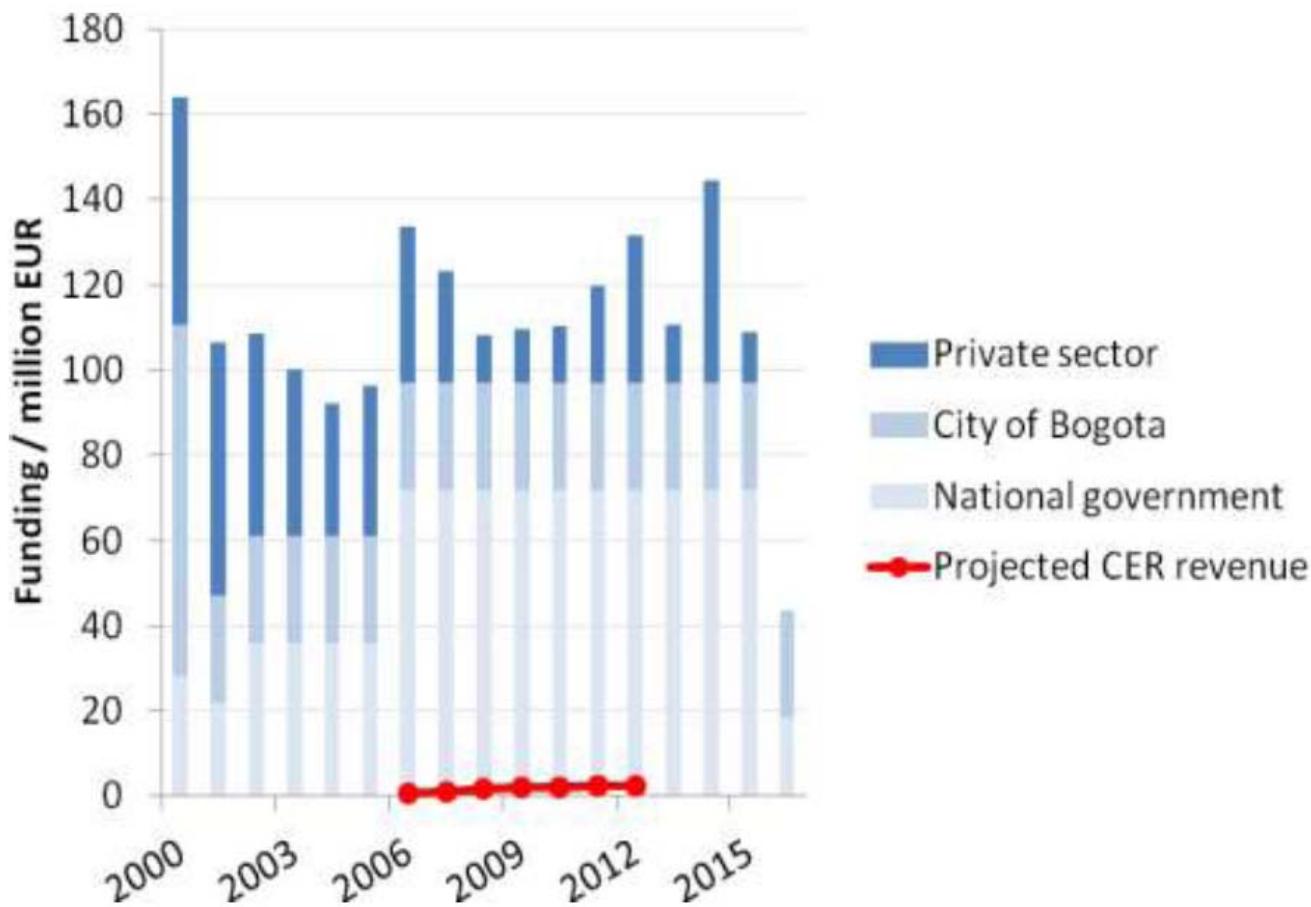
Investment cost & Maintenance and operation costs.

Middle-size cities & Mega-cities.

Cities of capped countries & cities of non-capped countries

# Annual Global Transport Investment by Source

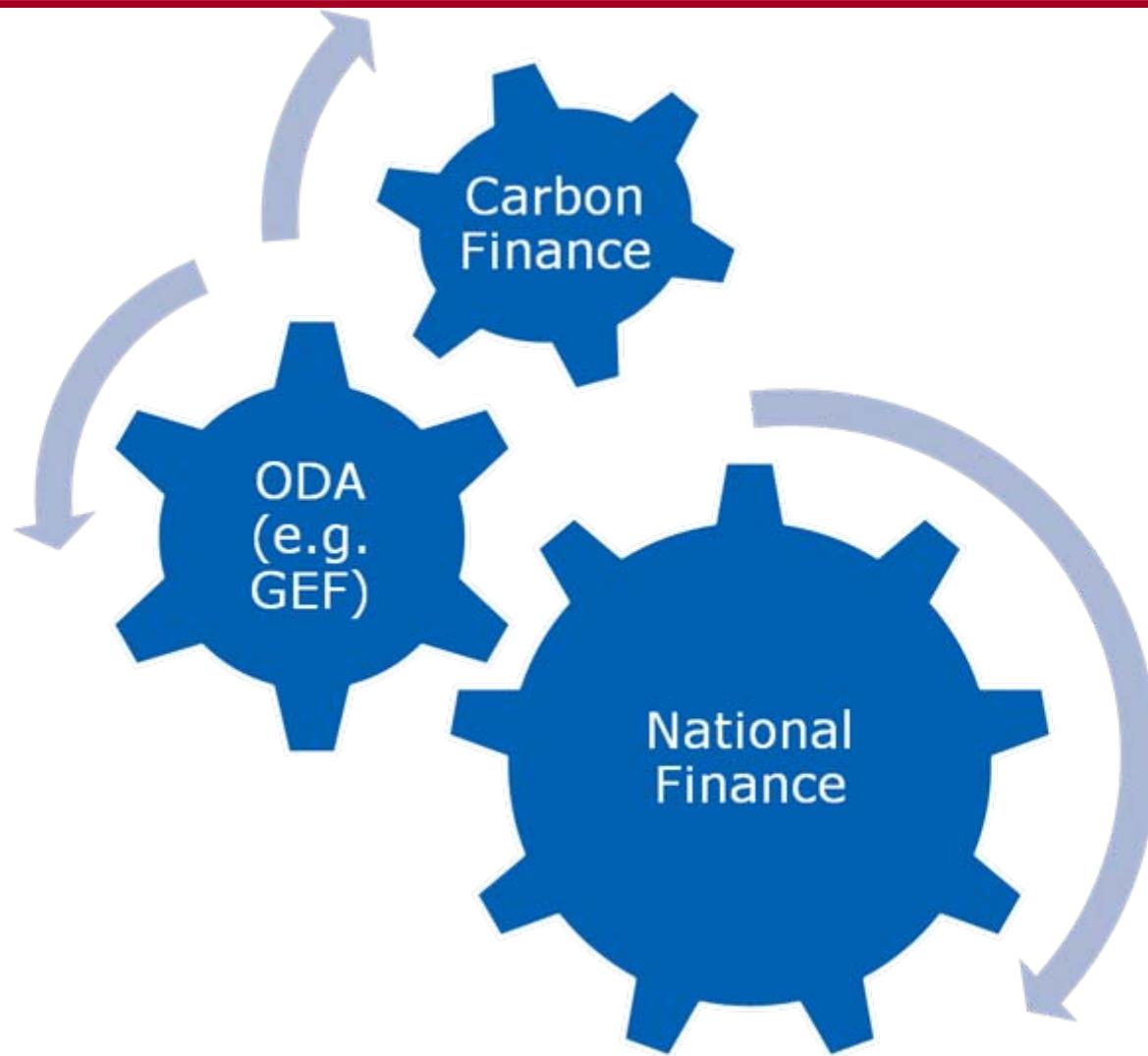




\*Projected CER revenues calculated assuming a CER price of 8.9 €/tCO<sub>2</sub>

# Carbon finance through Post 2012 as an incentive not as a silver bullet!

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## JASPER

<http://www.jaspers-europa-info.org/>.

## ELENA (European Local ENergy Assistance)

## JESSICA (Joint European Support for Sustainable Investment in City Areas)

[http://www.eib.org/products/technical\\_assistance](http://www.eib.org/products/technical_assistance)

## Smart City

## ManagEnergy

## IEE project performance indicators

[http://ec.europa.eu/energy/intelligent/tender/index\\_en.htm](http://ec.europa.eu/energy/intelligent/tender/index_en.htm)

## CEEP – Centre européen d'expertise en matière de PPP



# Merci!

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**Benoit LEFEVRE**

[Benoit.lefeuvre@sciences-po.fr](mailto:Benoit.lefeuvre@sciences-po.fr)



**Institut du développement durable et des relations internationales**  
13 rue de l'Université  
75 337 Paris (France)

# Climate Negotiations



Difficult ...

- The period of **legal uncertainty** will continue for some time
  - There is some consensus around a **transitional, stepwise approach**, but very real conflicts remain between key players.
  - One possible scenario combines an (un-ratified) second commitment period of the Kyoto Protocol with a (time-bound) mandate to negotiate a new, global legal instrument.
  - The way-points (2011, 2012, 2015, 2020) are unclear, but will likely follow the political agenda.
- 
- **Carbon market reforms** are currently hostage to Kyoto and the ALBA group.
  - It's difficult to see progress in reforming CDM or establishing new mechanisms in Durban.
- 
- It looks likely that there will be **good progress in establishing the MRV regime** for developed and developing countries in Durban.

→ Bring solutions, not new problems !

Situation is worst for urban transportation sector



## International / Climate perspectives: not satisfying

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### Transportation sector has a key role in GHG emission reductions

30% of global energy-related GHG emissions

Fastest annual growth rate of 2-3%

Developing countries' share to increase from 35% to 52-63% by 2030

### Methodological challenges:

BEI (Jessica, Elena, Jasper, Feder, etc ); UE (covenants of mayors)

Only 5 CDM methodologies: 3.3% of total 151 accepted methodologies.

Only 3 CDM projects: 0.13% of total 1224 accepted projects

TransMilenio (2006), Delhi's subway (2007), Medellin cable car (2010)

### Markets favor low-hanging fruit projects – not greatest potential to reduce GHG

→ Record of transportation-CDM projects accepted and proposed reveals that

Majority = fuel choices

Some =improvement of vehicle efficiency

Few = modal shift

None = transportation demand, standard, driving condition

# Climate Change negotiations: Emerging carbon financing instruments

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## -Programme of Activities (PoA):

bundling of CDM projects (with same methodology) → city wide approach

## -Nationally Appropriate Mitigation Actions (NAMAs) Registry:

unilateral / credited / supported

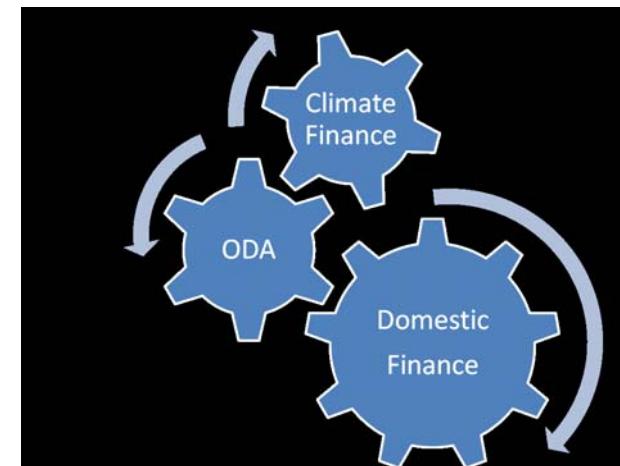
Urban / Sectoral crediting mechanisms

Of the 46 submitted to UN, 28 related to transportation sector

## -Funds: dedicated to CC adaptation & mitigation,

or « traditional » bi/multi-lateral dev. aid with new CC criteria

## -Auctioning



→ Switch from project to policies & sector approach

→ Bottom up process

→ New entry point : local needs for sustainable development trajectory

## Political aspects

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### **1) To match with post-KP negotiation timetable**

Necessary that one Party officially make the proposition for inclusion in the negotiating text

### **2) To identify relevant interlocutor(s)**

Multiple city and/or urban region networks lobbying in order

- “To be recognized”
- “To have a seat at the decision-making table”
- “To be supported in their actions”

} Bring solutions, not  
new problems

Preliminary questions : Which level of “local government” is relevant to tackle territorial issues? How to coordinate?

### **3) To bring a global perspective**

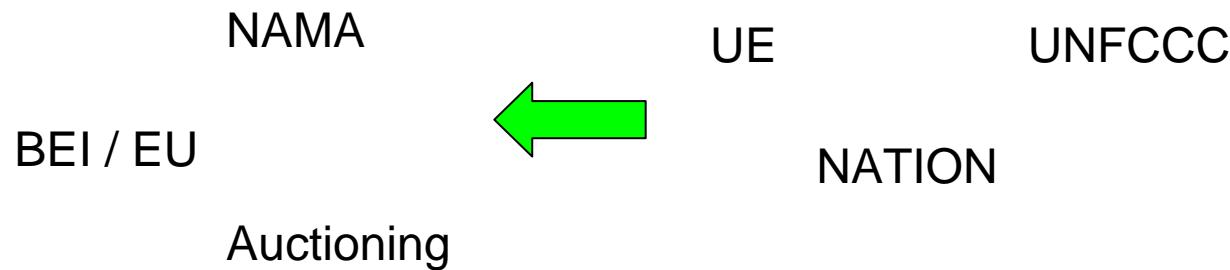
## Technical aspect: Content of the demand / “carbon contract”

### Three key questions:

- What and where is the potential of significant urban CO<sub>2</sub> emission reduction?
- What are the amount and nature of costs related to these CO<sub>2</sub> emission reductions?
- What are the needs (technologies, funding, capacity building, etc) of subnational authorities to move towards a sustainable trajectory?

#### + need to differentiate:

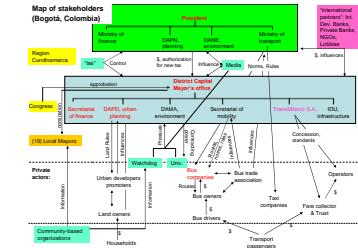
- Investment cost & Maintenance and operation costs.
- Middle-size cities & Mega-cities.
- Cities of capped countries & cities of non-capped countries



# Technical aspects: « carbon contracts »

## 1) multi-level contracts

- based on « capacity to act » analysis



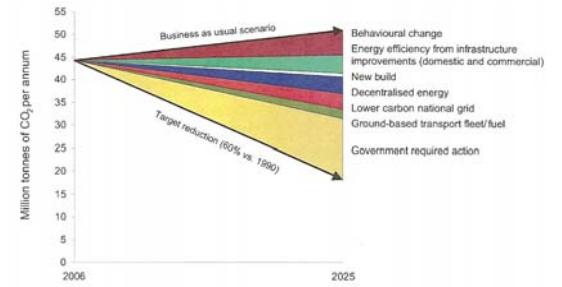
## 2) CO2 emission inventory

- Need of standardized methodologies, at least on a core set of parameters.



## 2) MRV procedures

- MRV = medium of accountability and credibility, recognizing efforts as well as political credit
- MRV requirements may vary by country and type of action.
- MRV should cover mitigation/adaptation actions in terms of performance and/or results.



# Merci!

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