

The Potential of Bike Sharing Systems

Serving a Population with Fewer Vehicles

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Innovations in Sustainable Urban Mobility

Estoril, PT

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About Soledad Moreno



PROFESSIONAL

- PMoD Consultant
- Bike Sharing Projects
- Public Safety Cycling Partner (London)
- Strategic Advisor
 - Economic
 - Demand
 - Planning
 - Operation
 - Innovation in Personal Mobility

PERSONAL

- Distribution at 17
- NO car driver license
- A bike in every harbor

Montreal 2008



- Endurable system
- Designed from scratch
- Wireless (no civil works)
- Social inclusion program



Lisbon 2009

- 3 Phases
- 2,500 bicycles
- 3,750 docking points
- 250 stations
- Managed by EMEL



Barcelona Metro Area 2009

- 2 Phases
- 18 Municipalities
- 12-Year Contract
- 2,150 Bicycles
- 4,300 Docking Points
- 269 Stations
- 10 M € + Advertising



Àrea Metropolitana de Barcelona

4 LA VANGUARDIA VIVIR VIERNES, 18 JULIO 2008

MOVILIDAD

El Bicing metropolitano estará listo el año que viene



La ETM extenderá el servicio a diecisiete municipios metropolitanos, con unas 440 estaciones y 3.500 bicicletas

Los nuevos kilómetros estarán acabados cuando el Bicing entre en funcionamiento y otros muchos lo estarán a punto", explicó ayer el presidente de la Entidad Metropolitana de Transporte (EMT), Antoni Poveda.

Los ayuntamientos que se espera que se sumen al servicio -ahora han de comenzar los convenios para hacerlo posible- son Badalona, Castelldefels, Cornellà de Llobregat, Esplugues de Llobregat, Gavà, l'Hospitalet de Llobregat, Montcada i Reixac, Montgat, El Prat, Sant Adrià de Besòs, Sant Boi de Llobregat, Sant Joan Despí, Sant Just Desvern, Santa Coloma de Gramenet, Tiana y Viladecans.

La EMT les presentará un estudio global sobre el servicio y, también, de forma puntual, sobre su implantación en cada una de estas poblaciones. A cada ayuntamiento, además, le hará llegar un informe pormenorizado de cómo facilitar la movilidad de las bicicletas. También una primera propuesta de estaciones, cuyo número variará según la población -en l'Hospitalet y en Badalona se contemplan 48 y 45 respectivamente, mientras que en Tiana o Mont-

gat 18-. Futuras y posibles estaciones que siempre estarán en puntos de interés como bibliotecas, colegios, estaciones de metro o de Renfe, o, incluso, llegarán hasta Aeropuerto de Barcelona. Según Poveda, se han priorizado las estaciones de transporte público, así como los principales equipamientos y servicios de cada una de las ciudades. "La idea es que sea un Bicing práctico también de forma interna en cada localidad", puntualizó. La previsión inicial es de 100.000 abonados -50.000 menos que en Barcelona- aunque los abonos serán tanto anuales, como mensuales y diarios. El precio del abono anual será similar al de la capital catalana, unos 24 euros, y la EMT contempla que la tarjeta metropolitana pueda ser compatible con la de Barcelona. "Tenemos que hacer un concurso público por lo que el servicio metropolitano, si no lo gana la misma empresa que lo tiene en Barcelona, no será igual, aunque pediremos cierta compatibilidad, como la tarjeta y crear dobles estaciones en las fronteras con Barcelona. De todas formas la mayoría de los abonados harán un consumo interno, metropolitano", señaló Poveda. "Pueden haber usuarios que vayan a Barcelona, pero quizás les es más cómodo ir en bici al transporte público y luego, en Barcelona, coger otra bicicleta del Bicing. De ahí la importancia de que las tarjetas sea compatibles", añadió. También se tratará de que las estaciones funcionen, al menos parcialmente, con placas solares y que estén, como máxima, a 400 m de distancia.■

L'Hospitalet de Llobregat y Badalona contarán con 48 y 45 estaciones de Bicing respectivamente

Ripollet y Molins de Rei estudian sumarse

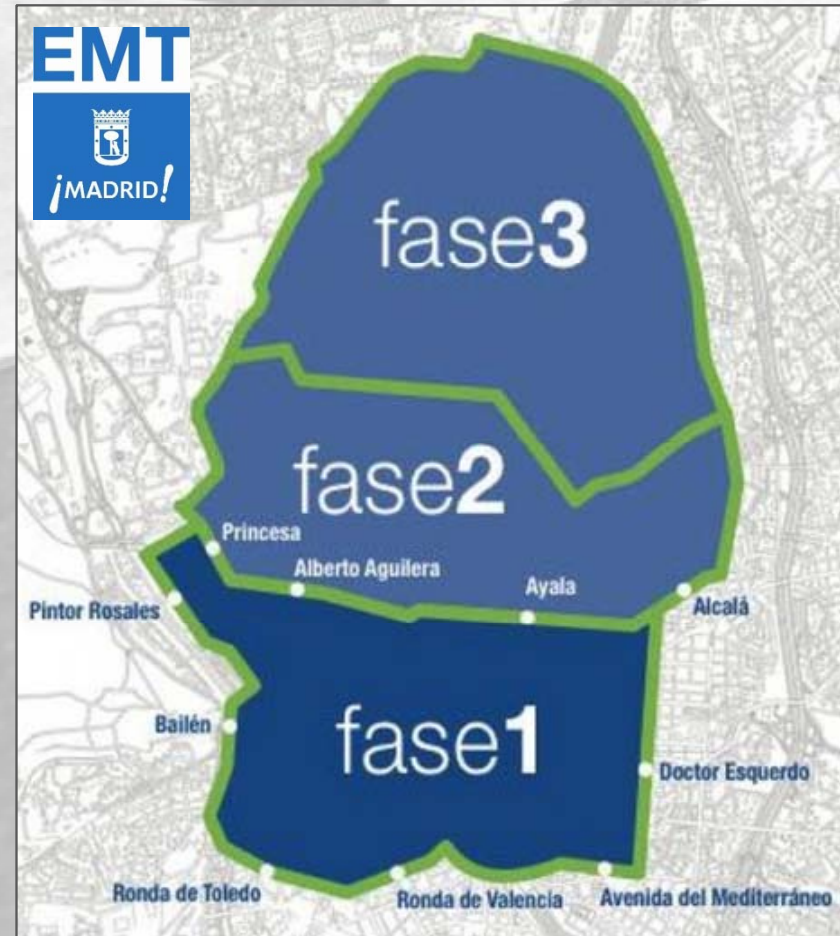
■ Las 440 estaciones iniciales, y las más de 3.520 bicicletas, se irán incrementando en función de las propias necesidades de los usuarios, pudiéndose, incluso, duplicar ese número. También los propios carriles bici -proyectos que ya tienen en marcha los diferentes municipios y de los que se beneficiará el Bicing-, aunque tampoco se descarta un aumento de municipios que se sumen a la iniciativa, caso de Ripollet y Molins de Rei. Pese a que estas dos poblaciones no se encuentran dentro del ámbito de la EMT, han solicitado a este organismo pasar a formar parte del nuevo Bicing. Algo que Poveda no descarta, aunque todavía se tiene que discutir cómo se podría hacer. Por lo pronto, según el presidente de la EMT si que se ha comenzado a realizar un estudio sobre la implantación del servicio en Ripollet, primer municipio en solicitarlo. A continuación se estudiará el caso de Molins de Rei.

Sobre ruedas. Dos usuarias del Bicing pedaleando por Barcelona. El próximo año esta imagen podrá verse en el resto de las ciudades del área metropolitana

ANA JIMÉNEZ

Madrid 2010

- 3 Phases
- 10-Year Contract
- 1,700 Bicycles
- 3,254 Docking Points
- 120 Stations
- 50 M €

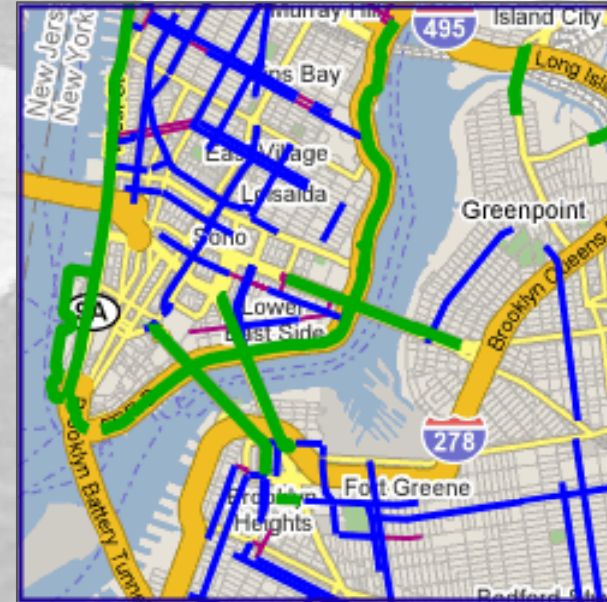


London 2010

- 6,600 bikes; 11,000 docking points; 420 stations
- 140 M £ (170 M €) over 6 years
- Sponsored by Barclays



New York 2011



- Wireless Docking Points
- On-Bike GPS
- Improved PV Solar System
- Re-distribution Algorithm





BACKGROUND

In hindsight....

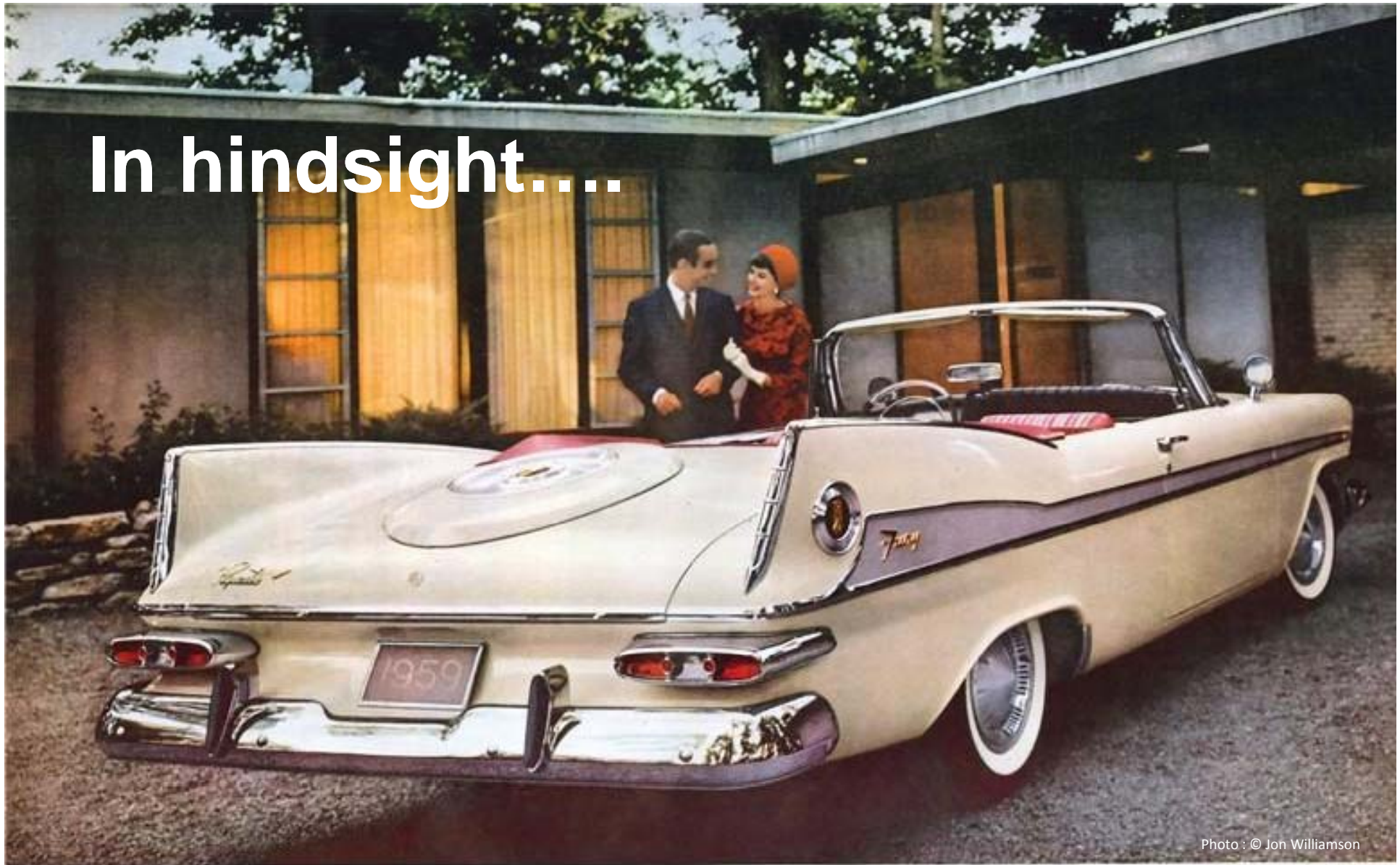


Photo : © Jon Williamson

GOOD TASTE IS NEVER EXTREME

Certain people have it. Certain things, as well—that sense of right—neither stodgy nor bizarre. It is not conspicuous. Nor is it anony.



Suddenly

IT'S 1960... **PLYMOUTH!**

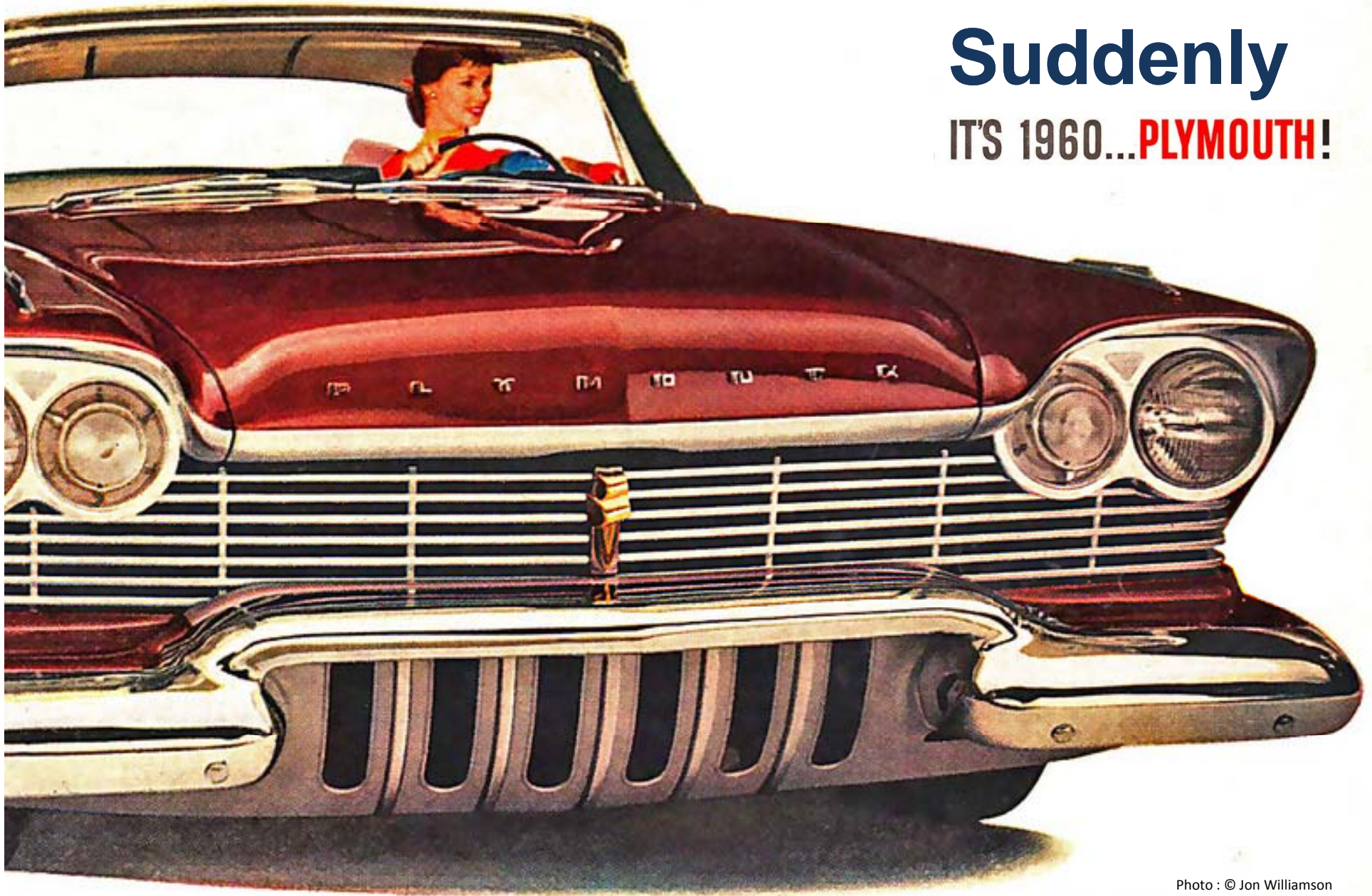


Photo : © Jon Williamson

Anybody thinking about...

- World population moving to cities and towns,
- Mobility: a need, a right,
- Economic, health, and environmental impact of traffic congestion, noise pollution, and air quality

???



Population Trends

- 2008: 3.3 Billion (50%) living in cities and towns
- 2030: Urban population expected at 5 Billion
- 2050: 10.5 Billion



Photo : © ThisParticularCreg

Painful Consequences

- June 16, 2011
- Emergency closure of Mercier bridge
- Commuters stranded and delayed
- Housing prices down by C\$ 30,000



Growing Urban Concerns





Witte Fietsenplan - 1965

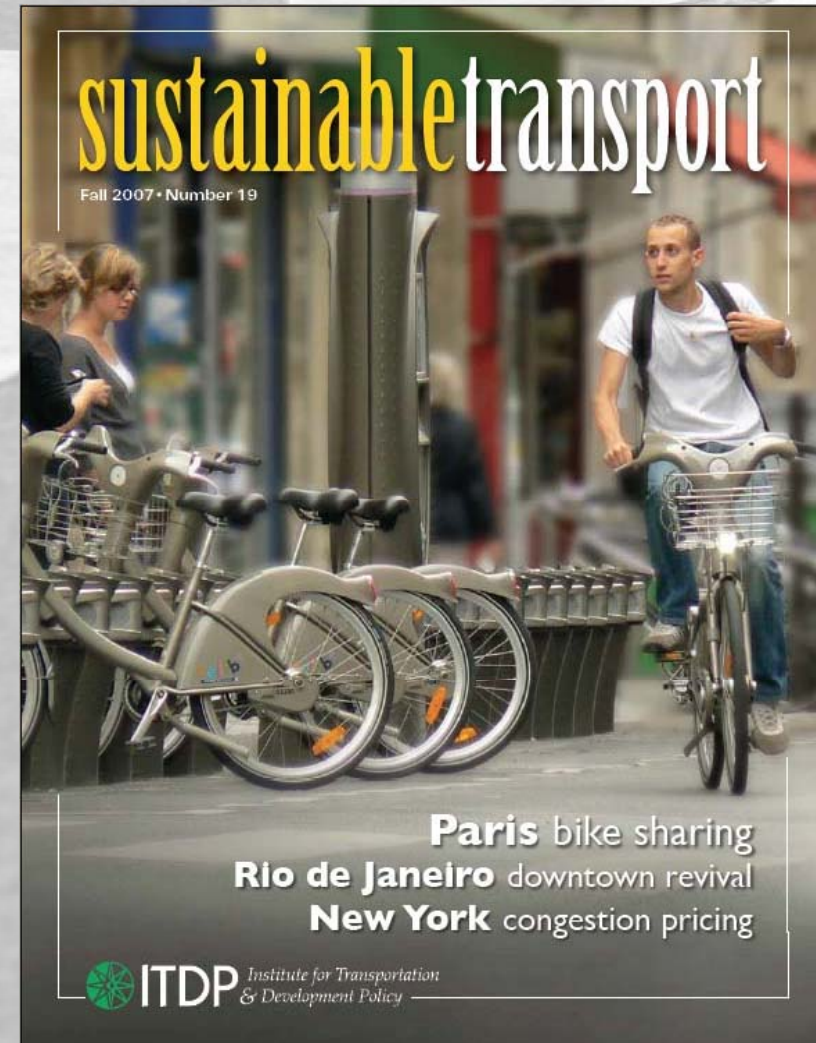
A Voice in the Desert

- 1960's Dutch Provo's
- Luud Schimmelpennink
- 10 Hand-Painted Bikes
- The plan was to stop...
 - “the car..”
 - “the destruction of the town”
 - “the pollution”
- Eventually, 10,000 bikes
- 1974: “Witkar” Project 




Fast forward 40 years

- 1965 Amsterdam
- 1974 Bicyclette Jaune,
La Rochelle
- 1994 Yellow Bike, Portland
ByCycklen, Copenhagen
- 2000 Call-a-Bike, Munich
Cityräder, Helsinki
- 2003 Citybike, Vienna
- 2005 Vélo'v, Lyon
- 2007 Velib, Paris
Bicing, Barcelona
- 2009 Bixi, Montreal



The Overarching Question

In the quest for sustainable mobility on demand (SMoD), what is the role of bicycle-sharing systems?

An aerial photograph of a paved surface, likely a plaza or parking area. A large, white, oval-shaped marking is prominent on the left side. To the right, a white graphic of a bicycle is painted on the pavement. The overall scene is captured from a high angle, showing the texture of the pavement and the layout of the markings.

BIKE SHARING SYSTEMS (BSS) TODAY

The Basic Concept



An authorized User (subscriber or casual)...

- releases a bicycle from a station in A
- rides to destination (another station, point B), and
- returns bicycle within ~30 minutes, and
- (if applicable) pays an additional fee for excess time

Early reports

- Average ride:
 - Weekday: 15-20 min.
 - Holidays: 20+ min.
- Average distance: 3 km
- Wait times:
 - Empty Station: 3-5 min.
 - Full Station: 1-2 min.



In the simplest implementation

The BSS Infrastructure includes

- STATIONS (stops)
- INTERFACE
- DOCKING POINTS
- BICYCLES

Services are indispensable



Terminal (Interface)

- Enables RELs/RETs
- Monitors subsystems
 - Credit Card Reader
 - Touch-screen Display
 - Printer
 - Battery Status
 - Docking Points
- Displays Information
- Prints tickets
- Communicates with Central Control



Docking Point

- Locks the bicycle
- Controls Releases>Returns
- Authenticates User
- Transmits data to Terminal
- Handles messaging
 - User authenticated
 - Bicycle returned
 - Itinerary / GPS Uploads
 - Status of locking mechanism

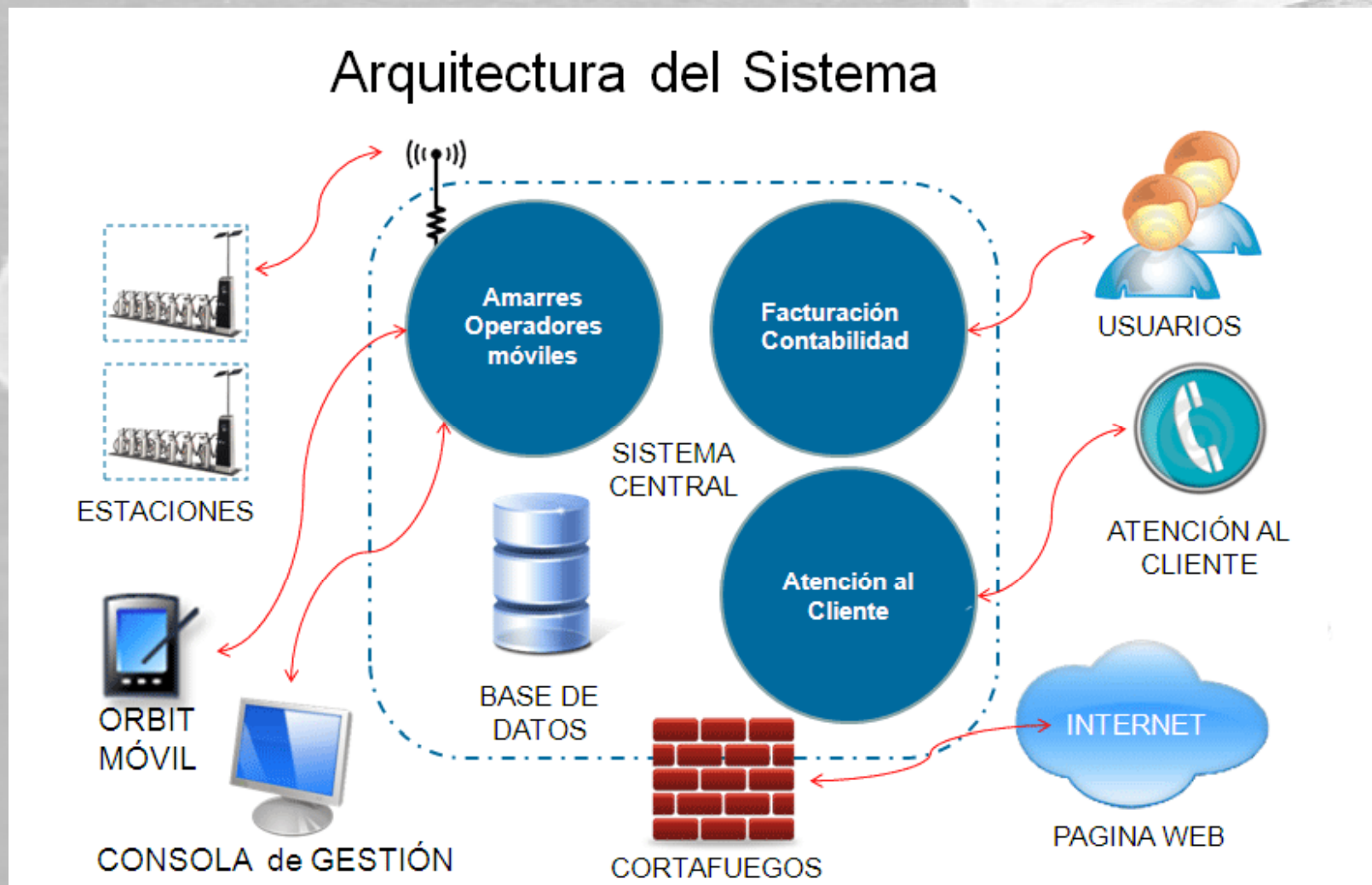


Bicycle



- Light (under 20 Kg)
- Robust
- Corrosion-resistant
- Safe
- Lockable
- 3-Speed
- Adjustable seat
- Some cargo capacity
- GPS

Then there's the software



The Complete Back-End

ASSETS & NETWORK MGMT

- Communications (M2M)
- Asset Management
- Asset Maintenance
- System Balancing / reDist
- Analytics

CUSTOMER MANAGEMENT

- Subscriber Management
- Billing Management
- End User Customer Service
- Client Management
- Sponsor Management
- Reporting and Archiving

The Holy Grail of BSS

To be (become)

- a “legitimate” piece of the mobility puzzle
- economically viable (self-sustainable)
- in “vogue”.... maybe even “chic”



Some half-truths

Bike-sharing is about

- The more bikes the more attractive the BSS
- reducing congestion, noise, and pollution
- expanding Public Transit options
- green alternatives
- healthier lifestyles
- mobility on demand
- sustainable mobility
- having fun!



Photo : © DECOBIKE

Environmentally friendly?



Mobility on Demand?

Station FULL



Station EMPTY



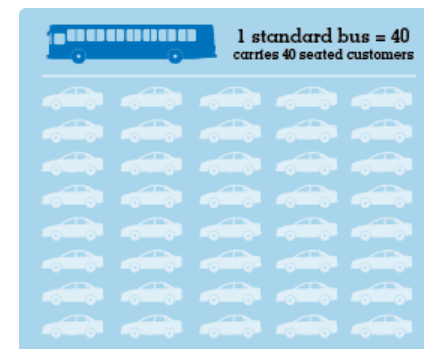
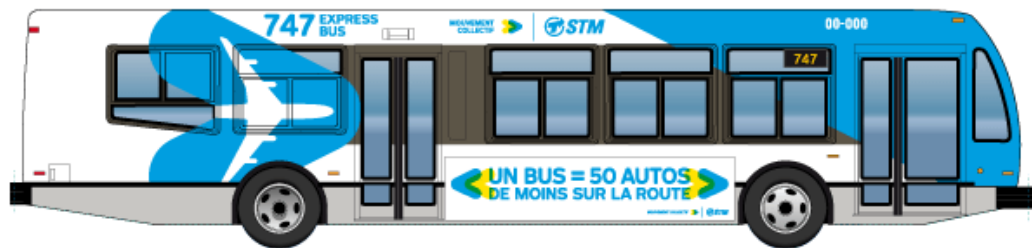
Reductions in Traffic Congestion?

- Difficult to substantiate or numerically quantify fewer drivers due to BSS.
- One-way use patterns do not compel to reduce public transit offering
- Cannibalization: A fact



1 Bus = 40 to 50 Cars

- Average car on the road carries 1.2 people
- A bus can take over 50 people
- In CO₂ terms: 1 Bus = 4 Cars



Less Congested Streets?



Economically Self-Sustained?

Real Case 1

- Funded by Municipal Services Company
- Total Planning and Deployment Cost: **Undisclosed**
- Maintenance cost per bike per annum: 3,100 €
- Annual Operating Cost: 12,5 M €

Real Case 2

- Funded by Municipal Parking Authority
- Total Planning and Deployment Cost: 20,6 M €
- Maintenance cost per bike per annum: **Undisclosed**
- Annual Operating Losses 2010: 5 M €

Truths..., and some white lies



Average BSS User

	BARCELONA	MONTREAL
Age	54% over 30	30
Income	Not reported	35,000
Marital Status	Not reported	Single
Gender	50% M / 50% F	50% M / 50% F
Frequent user of public transit?	Yes	Yes
Uses BSS on the way TO work?	Yes	Yes
Return FROM work is done using	Bus/Metro	Bus/Metro
Uses BSS for personal rides during weekends?	Yes	Yes

BSS Users in Montreal

			INDICE
Canadian Mosaic 2009 Group:Proportions	BIXI Montreal	Montréal, RMR	BIXI Montréal
% Urban & Urbane	55,26%	7,85%	704
% Éclectiques Québécois	24,27%	27,70%	88
% Suite City Life	5,19%	11,32%	46
% Cross Canada Careers & Kids	3,97%	5,49%	72
% Belle ville cosmopolite	3,66%	12,57%	29
% Single in the City	1,75%	0,81%	216
% Resident Urbain	1,32%	11,42%	12
% Foundation of the Nation	1,07%	3,91%	27
% Platinum Playgrounds	1,04%	1,14%	91
% Mid-Aged Medley	0,77%	10,08%	8
% Young & Yearning	0,53%	2,63%	20
% TransCanada Communities	0,36%	0,33%	109
% Fine Canadian Vintage	0,24%	0,99%	24
% Acadian Accents	0,19%	1,10%	17
% Rooted in Canada	0,15%	1,31%	11
% Cosmo Canadians	0,10%	0,67%	15
% Family Footprints	0,09%	0,51%	18
% Frontier Families	0,02%	0,07%	29
% East Coast Check Up	0,02%	0,08%	25
% Prairie Pride & West Coast Wisdom	0,00%	0,00%	0



CHALLENGES AHEAD

Concerns and Challenges

INFRASTRUCTURES

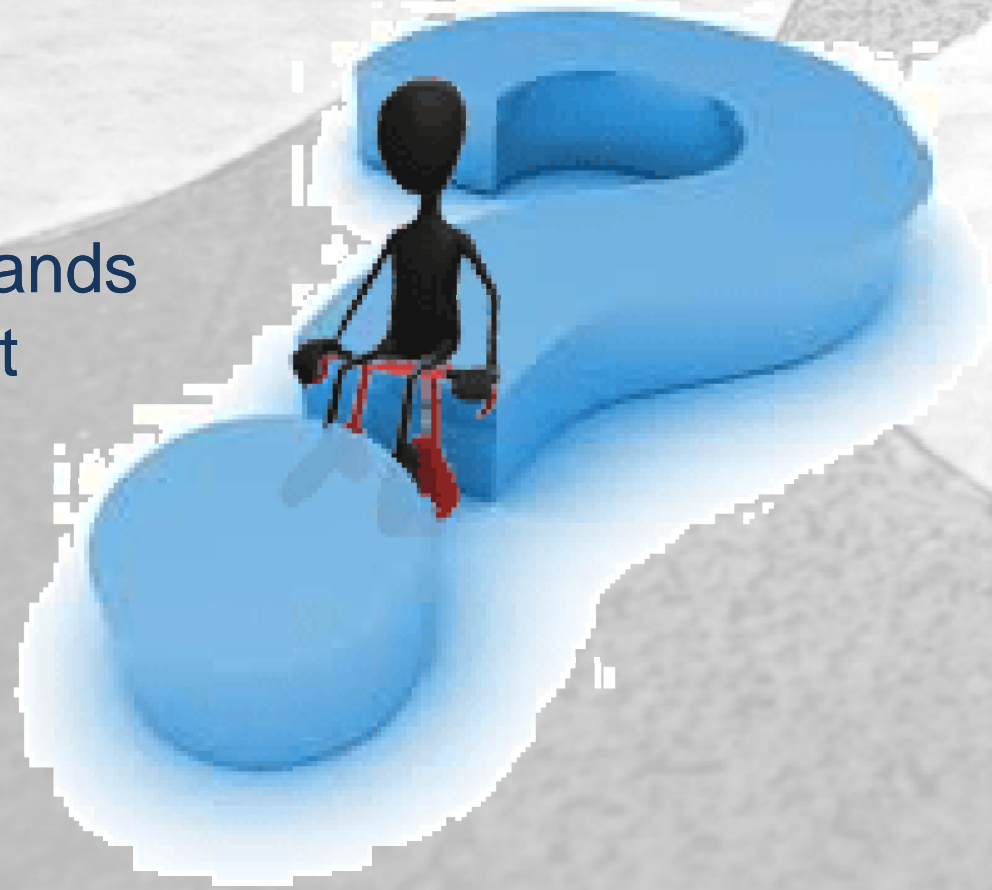
1. Functional limitations
2. Inadequate technology
3. Footprint reduction
4. Network rebalancing
5. Support infrastructures
6. Ubiquitousness

DEPLOYMENT

7. Appeal
8. True SMOd
9. Legal
10. Cost

CC1: Functional Limitations

- A vehicle suitable for most population
- More Stability
- Increased Cargo
- Fewer Physical Demands
- Weather Independent



CC2: Inadequate Technology

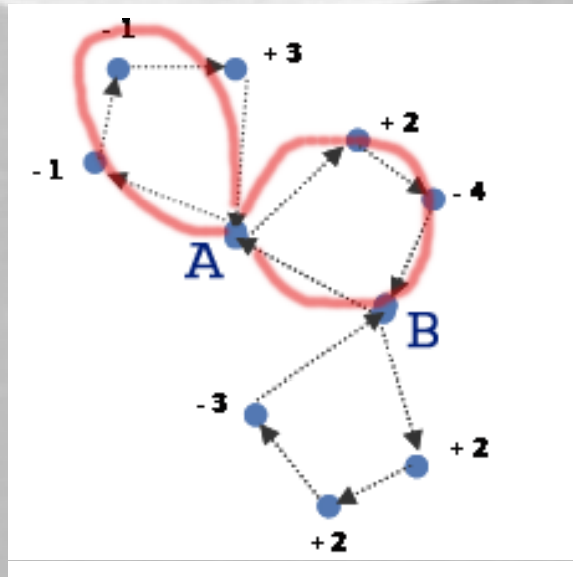
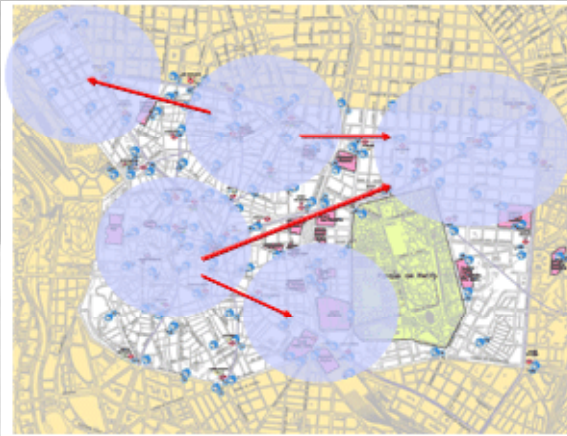
- Stand-alone / Increased PV Solar capacity
- Assisted Pedaling (e-motor)
 - Older users, Harsh topography
- Faster Battery Recharge Times



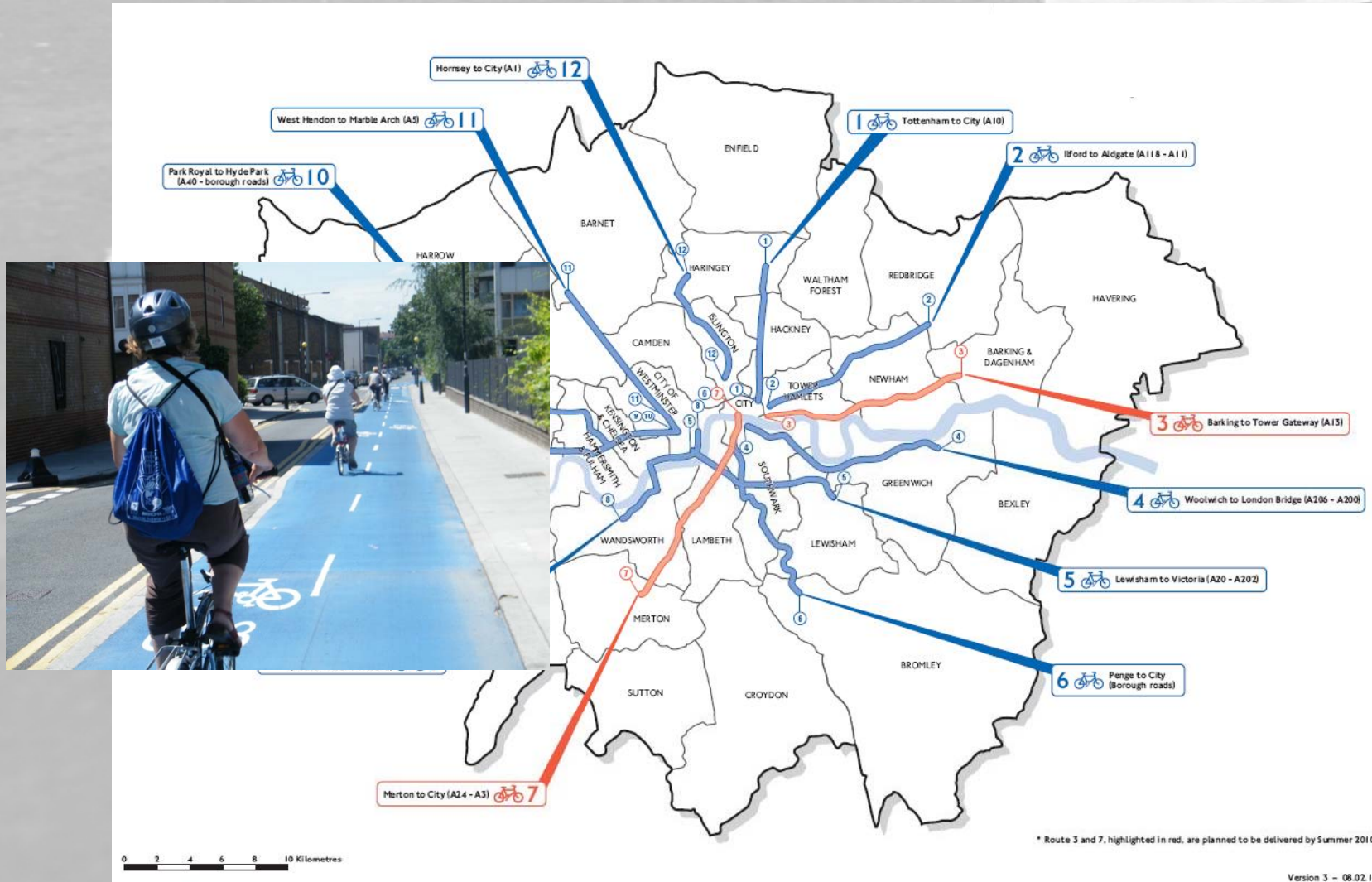
CC3: Footprint Reduction



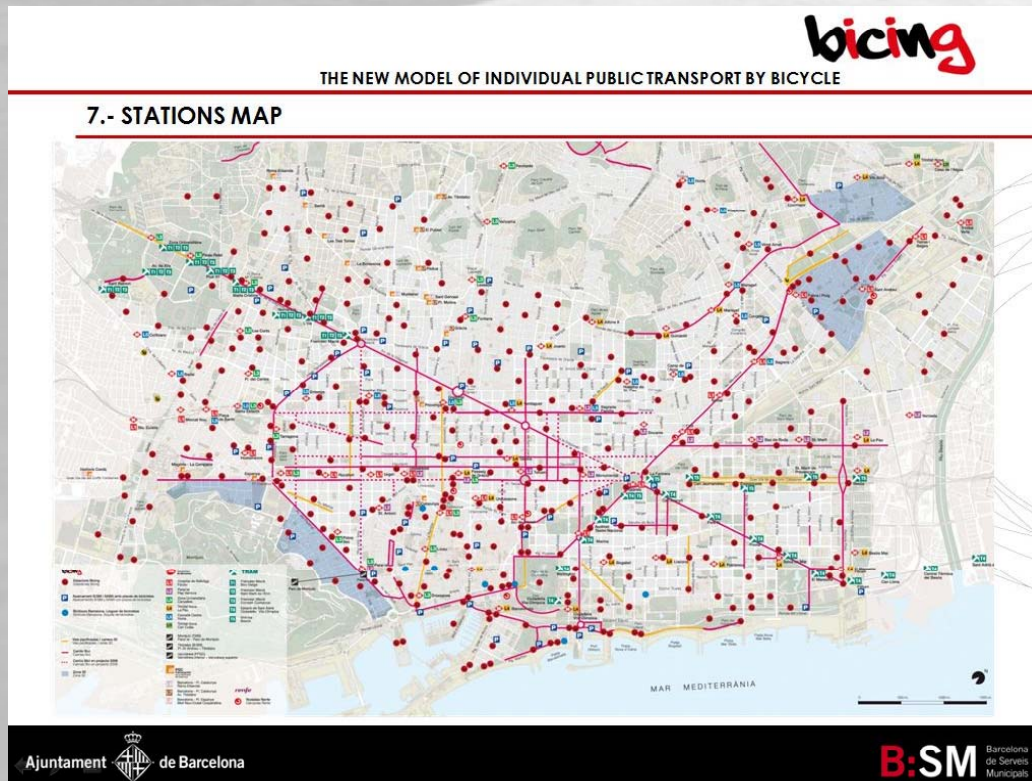
CC4: Network Rebalancing



CC5: Support Infrastructures



CC6: Ubiquitousness



- 300 m between stations
- Dimension each Station
- 2:1 Docking Points to Bicycle
- Insolation
- Preferably driveway installation

CC7: Appeal: Cycle Chic



CC8: True SMod



City of Vitoria (SPAIN)

- Redesigned collective PT
- Capillarity to the net
- Integrated Access Cards
- Integrated Tariffs

CC9: Legal

- **Service regulation**
- **Helmets?**
- **Cycling in the sidewalks?**
- **PEDELECs: How much power?**
- **Ownership of Data?**



CC10: Cost (I)

- Lower cost of infrastructure
 - Portable, stand-alone, solar powered stations
- Lower operating costs
 - Mainly through better product quality and optimization engines
- Reduce vandalism
 - Current rates range from 5% to 45%
- Grow total membership
 - More promotion, better service, more chic

CC10: Cost (II)

- **BSS Pricing tagged to Public Transit**
 - Annual subscriptions range from 0 € to 45 £ (54 €)
 - Price by passengers carried / KM traveled rather than number of quiet bicycles on the street
- **Congestion / Parking Charging**
 - And other measures that aim to discourage cars
- **Tie BSS to Health and Insurance Companies**
 - Measurable and verifiable exercise records
- **Terminals Multi-Function**
 - Parking, ticketing in general, recharging stations
- **Sponsorships**
 - A good cause to get behind



CONCLUSIONS

Bicycle-Sharing Systems ..

- growing In number and size of deployments,
- motivating the use of private bicycles,
- NOT economically self-sustainable,
- require integration into local Public Transit schema
- not “universally” appealing
- require additional bicycle infrastructures
- add an exciting new dimension to city infrastructures

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THANK YOU!

