

Transantiago: On the Development of Public Transit in Large Cities

Juan Carlos Muñoz
Pontificia Universidad Católica de Chile

Louis de Grange
Universidad Diego Portales

Thredbo 11, Delft, Netherlands
September 22st, 2009

What is Transantiago?

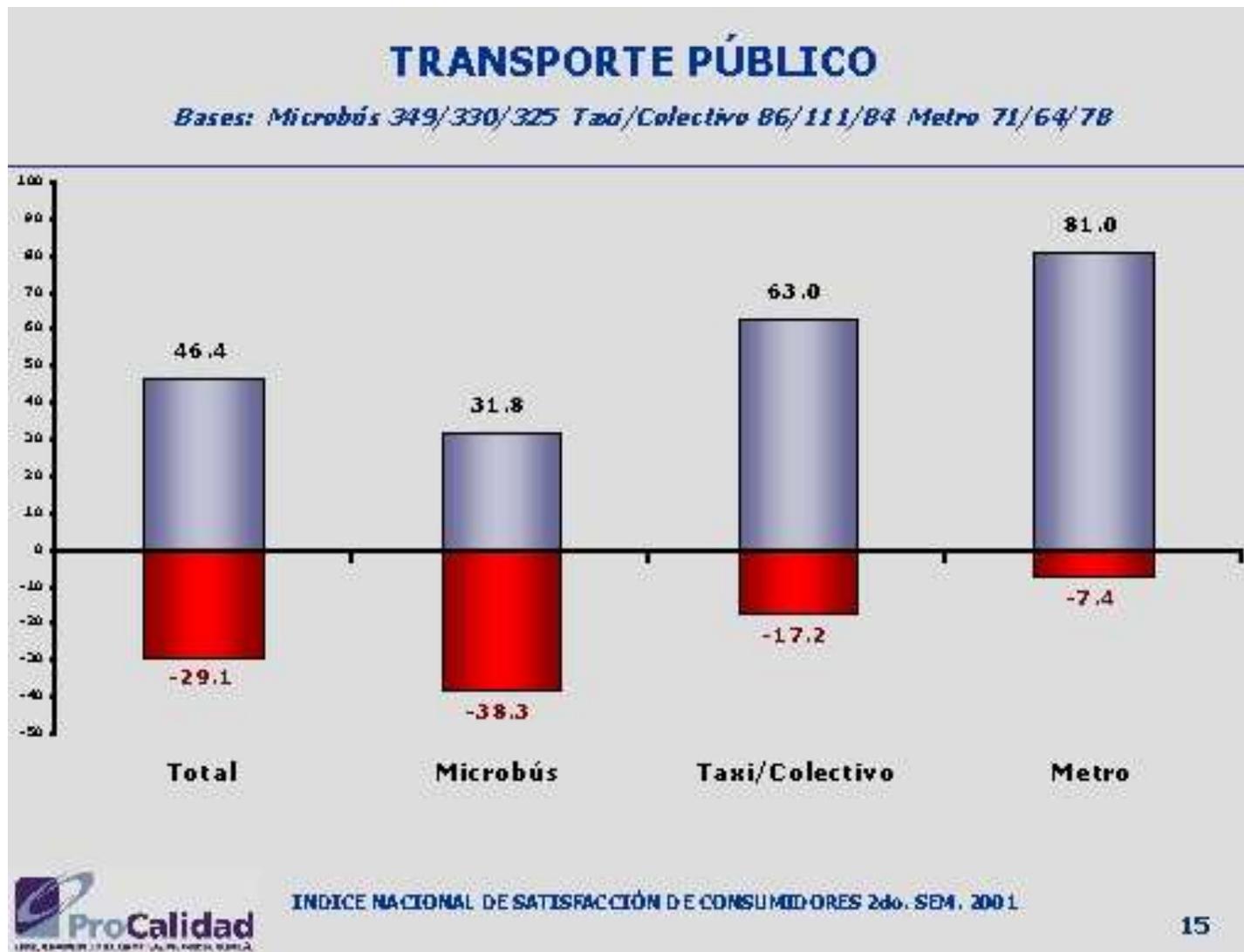
- **A major transit modernization effort as no other worldwide city has suffered.**
 - **New firms**
 - **New buses**
 - **Bus control system**
 - **Integration among services (fares, services, etc)**
 - **New services**
 - **New fare**
 - **Touchless payment card**
- **For many: “The worst public policy ever implemented in Chile”**

The bus system before Transantiago

- **Did not work as a network**
- **Excessive on-street competition**
 - Drivers paid per passenger
 - Average size of a firm: two buses.
- **High operational costs**
 - High fares for the quality of service offered
- **Severe externalities: accidents, pollution, congestion**
- **Drivers frequently assaulted**
- **Student discrimination**
- **Poor night services**

People in Santiago rated bus service very badly

Buses: worst service in Santiago



And even more ...



Goals of Transantiago

Goals of Transantiago

Transantiago's first goal was to modernize the transit system in Santiago:

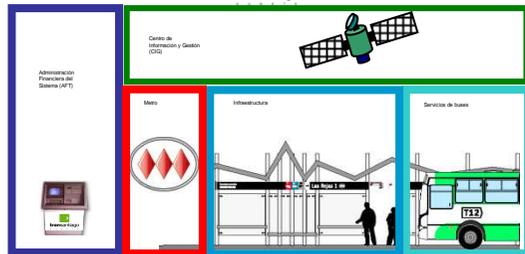


- Keep (and increase) its modal split.
- Improve quality of service.
- Offer a economically, socially and environmentally sustainable system.



Transantiago an integrated system

How would these goals be achieved?



- Bus services respond to a trunk and feeder system sing Metro as a main trunk operator
- Only corporate operators are allowed. Bus services are grouped into 15 units.
- Better work conditions for drivers.
- No passenger discrimination
- Integration among services: routes, fares, infrastructure.
- Distance travelled and necessary fleet are reduced considerably
- Intensive use of Metro
- Gradual inclusion of new buses: some articulated, smoother drive, disabled friendly, etc.

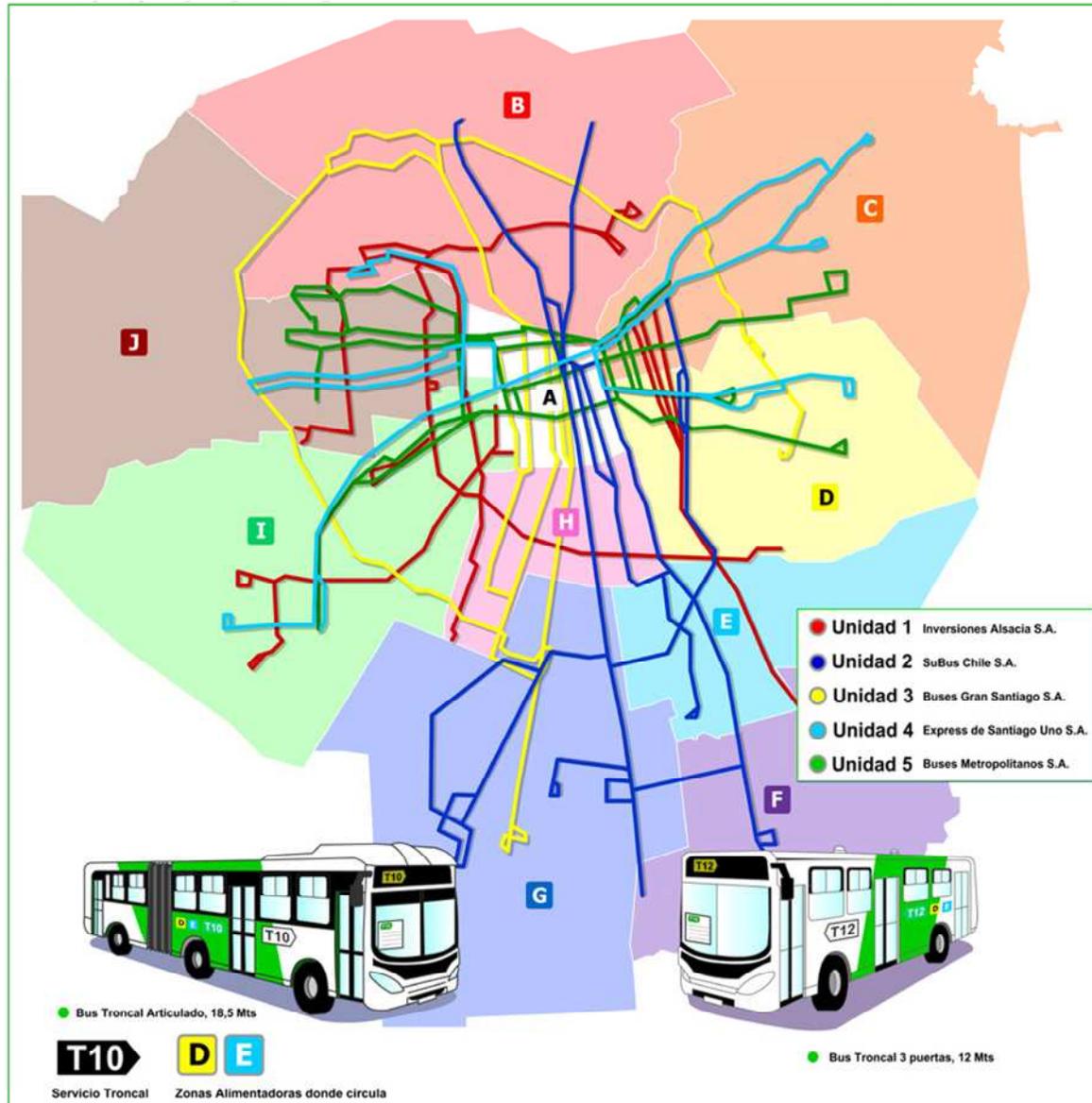
How would these goals be achieved?



- **Considers a smart and contactless payment card**
 - Allowing fare integration and eliminating cash from buses
- **Reaches the environmental goals (new buses, fewer kilometers traveled, filters, Diesel 50 ppm)**
- **Considers a user information system and a centralized headway control system**
- **Considers segregated bus corridors and modern bus stops**
- **Cost savings would allow keeping the fares stable.**

Traveling in Transantiago

Trunk services



The trunk network is grouped into 5 firms.

Trunk buses are colored white and green.

Metro is a sixth trunk operator

- **Unidad 1** Inversiones Alsacia S.A.
- **Unidad 2** SuBus Chile S.A.
- **Unidad 3** Buses Gran Santiago S.A.
- **Unidad 4** Express de Santiago Uno S.A.
- **Unidad 5** Buses Metropolitanos S.A.

Transition

Transition designed between systems

- Within a year, components were to be incorporated gradually
 - Operators
 - Buses
 - Infrastructure
 - Smart card
 - Card charging network
 - Headway control system
- Finally, integrated fares and new services; simultaneously in the whole city.

Implementation of Transantiago (January 10th, 2007)



tran*#%@&*

Incomplete system

- Infrastructure was not built.
 - Almost no exclusive bus lanes
 - No bus stops with pre-paid zones
- Information was very poorly provided
- Firms were not ready to start
- GPS-based control system was not ready
- Card validating devices were not trusted
- A nervous authority guaranteed the income, fixed the fare and extended trip lengths

Incomplete system

- Not enough buses, and additionally operators lacked all incentives to operate...
- Operating buses bunched consistently, losing reliability
- Metro collapsed
- Lack of services in some areas
- A financial deficit started to grow



Dramatic evidence











Recommendations by an expert panel (January 2008)

Panel

- Juan Enrique Coeymans (P. Universidad Católica de Chile)
- Pablo Allard (P. Universidad Católica de Chile)
- Leonardo Basso (Universidad de Chile)
- Ana Luisa Covarrubias (Libertad y Desarrollo)
- Joaquín de Cea (P. Universidad Católica de Chile)
- Louis de Grange (Universidad Diego Portales)
- Juan Enrique Doñas (consultant)
- José Enrique Fernández (P. Universidad Católica de Chile)
- Rodrigo Fernández (Universidad de los Andes)
- Gloria Hutt (Steer Davies Gleave)
- Marcela Munizaga (Universidad de Chile)
- Juan Carlos Muñoz (P. Universidad Católica de Chile)

Recommendations: General

- Road congestion pricing.
- Subsidies justified on grounds of efficiency (carefully designed to avoid creating perverse incentives).
- Eliminate surface parking in congested areas & periods
- Ensure marginal social productivity in transit infrastructure investment.
- Provide dedicated bus infrastructure.
- Eliminate other distortions in the transportation system (specific fuel taxes and vehicle registration).
- Implement a mechanism for trading pollution permits

Recommendations: Regulation & Competition I

- Flexible contracts for operators ensuring adequate coverage, wait times and vehicle occupancy rates.
- The authority defines a set of reference routes and minimum service levels and the operator proposes definitive routes, frequencies and types of vehicle.
- Maximum headways and overlaps between bus and metro services.
- Authority ensures service levels throughout the city.
- Payment based on demand and service quality.
- Offer users a degree of choice in order to improve coverage and guarantee service in any eventuality.

Recommendations: Regulation & Competition II

- Define indicators for conducting regular measurement of service quality that affect operators revenues.
- Allow operators to offer a range of services and vehicle types in response to different operating conditions (express, regular or other service patterns).
- Allow operators to introduce incentives for drivers as long as they apply to the service as a whole rather than individual drivers or vehicles.
- Develop a plan involving all operators to minimize fare evasion (use technology and authorize fines).
- Eliminate barriers to entry resulting from ownership of bus terminals.

Recommendations: Financing

- Define optimal fares and subsidies simultaneously.
- Carefully avoid perverse incentives when subsidizing
- Consider different fare structures: distance-based, dependent on time of day, weekly or monthly passes.
- Student subsidies should be dealt separately.
- Infrastructure construction and maintenance should be financed separately.
- New Metro projects must show social benefits when compared with segregated bus corridors.
- Designate transit (metro and bus) as an essential service that cannot be interrupted for labour conflicts.

Recommendations: Operations and Infrastructure

- Provide transit with high average speeds (> 20 kms/hr).
- Improve accessibility to stops and stations, access to buses (wait, board).
- Enforce the banning of non-transit traffic from exclusive bus lanes (or streets) using fixed and mobile cameras.
- Educate motorists on the importance of cooperating.
- Control service regularity
- Continuously adjust, update and modify service networks. Avoid transfers as possible.

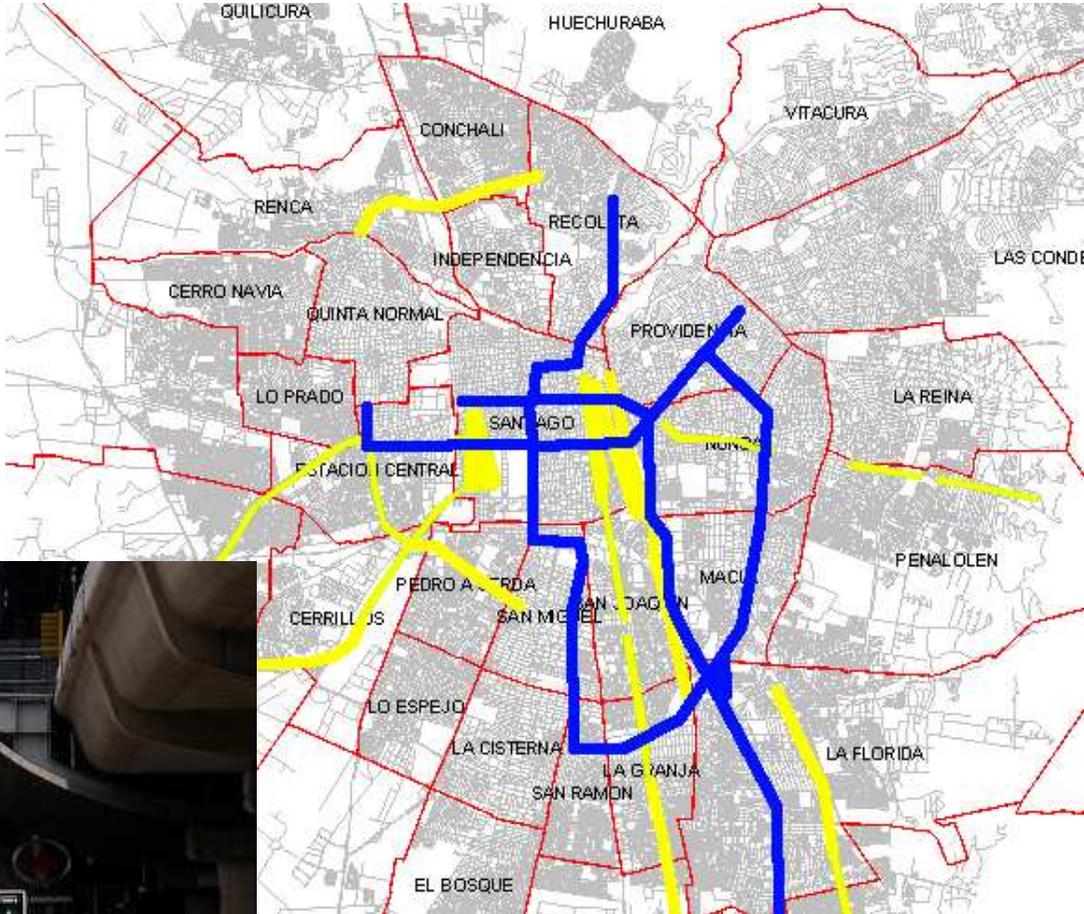
Recommendations: Operations and Infrastructure

- Provide a significant proportion of express services: either skipping selected stops or joining two very distant points through the fastest route (using urban freeways).
- Provide scheduled services during very low demand periods, eventually using low occupancy vehicles.
- Provide high quality transfers (fast, comfortable, safe and well informed).
- Implement a broad user information program.
- Conduct statistical analyses, compare and contrast data trends, carry out data matching and detect key elements to determine problems to be addressed.
- The use of bus terminals should be more flexible.

Improvements since February 10, 2007

Infraestructure

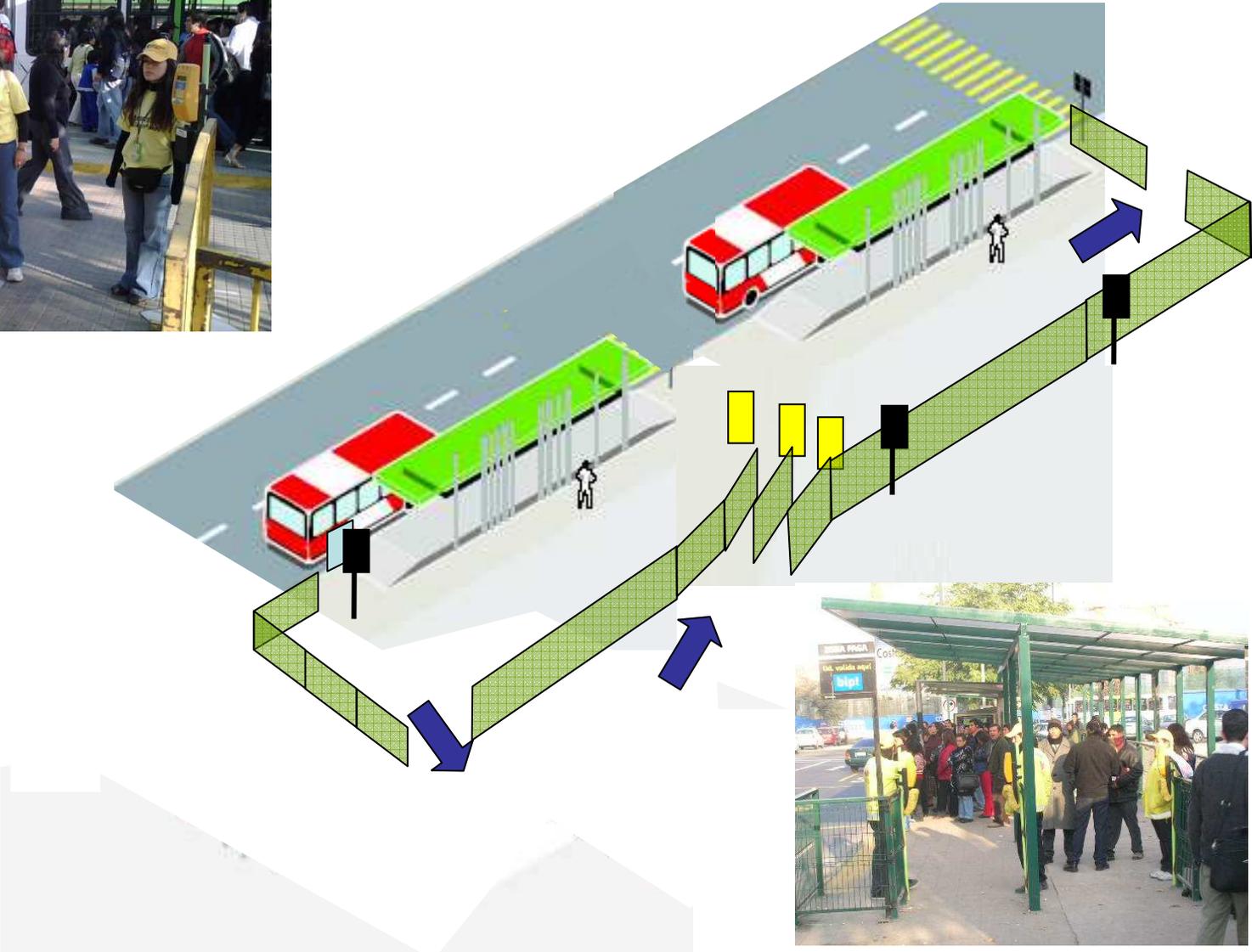
Metro network 100 kms
Transantiago bus corridors 92.1 kms.



Infraestructura



148 operating provisional prepaid bus stops



Operation

	February 2007	February 2009
Services:		
Trunk	89	141
Feeder	133	185
Total	222	326
Super express services	0	14
Roofed bus stops	3,013	7,556
Pre paid bus stops	0	155
Operating buses	4,000	5,850

Operation

	February 2007	February 2009
Average waiting per trip (adding all trip legs)	11.9 minutes	5.6 minutes
Average trip time	57.3 minutes	43.5 minutes
Passengers waiting more than 10 mins	17.4%	6.8%
Passengers waiting more than 20 mins	4.4%	0.7%

Same place, same day, same hour, two years later

Escuela Militar, Las Condes
08:30 am

10/02/07



Escuela Militar, Las Condes
08:30 am

10/02/09



Source: El Mercurio

Same place, same day, same hour, two years later

5 de abril con Pajaritos, Maipú
06:20 am

10/02/07



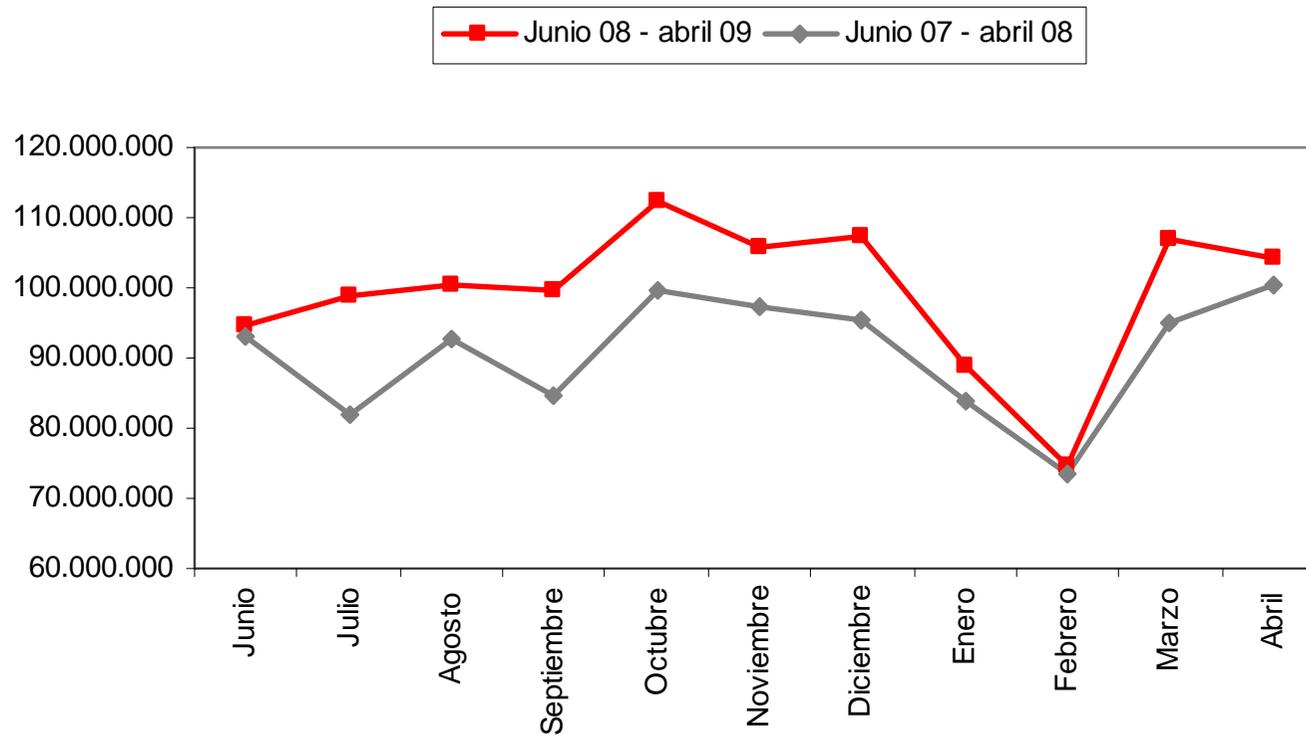
5 de abril con Pajaritos, Maipú
06:20 am

10/02/09



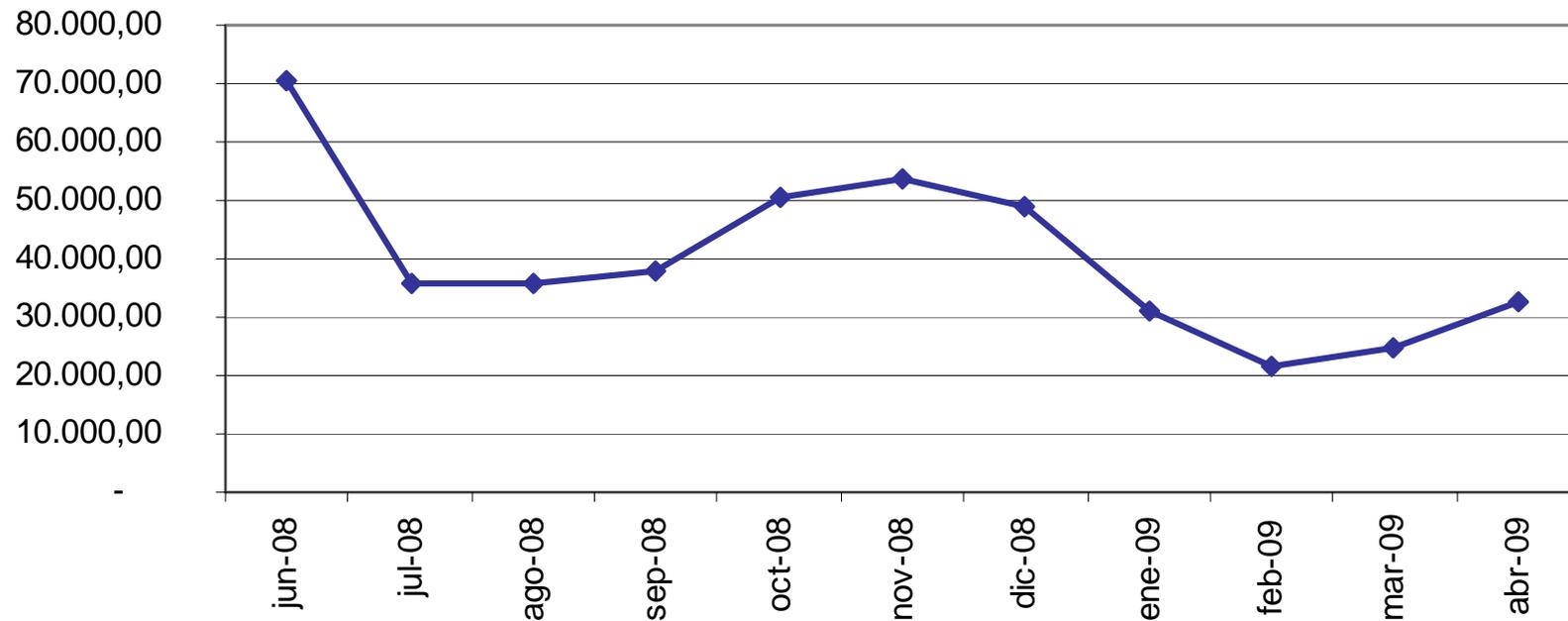
Source: El Mercurio

Monthly trip legs



Monthly deficit

Evolución deficit del sistema.

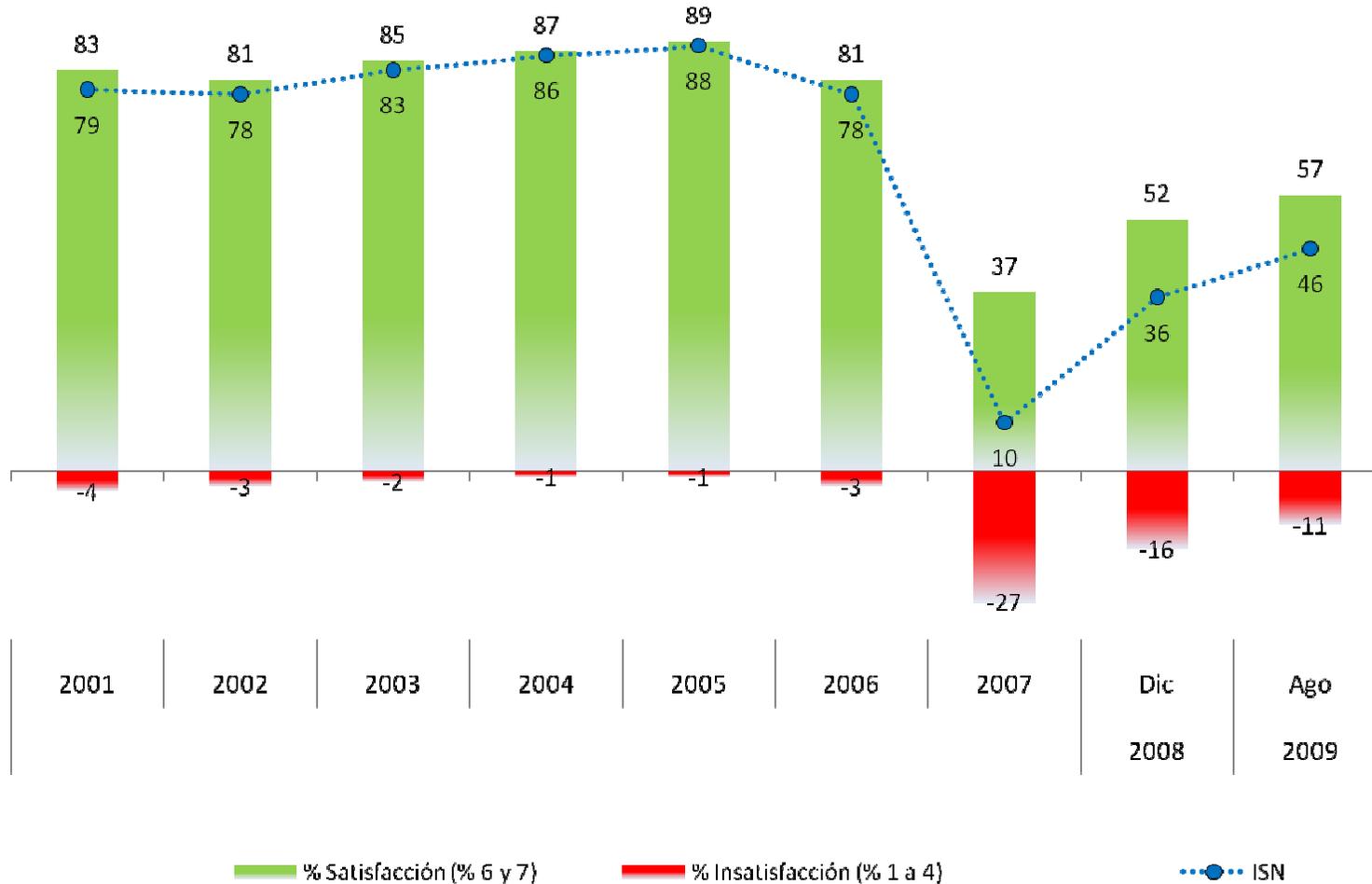


Average monthly deficit of MM US\$ 40 for the whole system (i.e. Buses, Metro, Metro infrastructure, etc.)

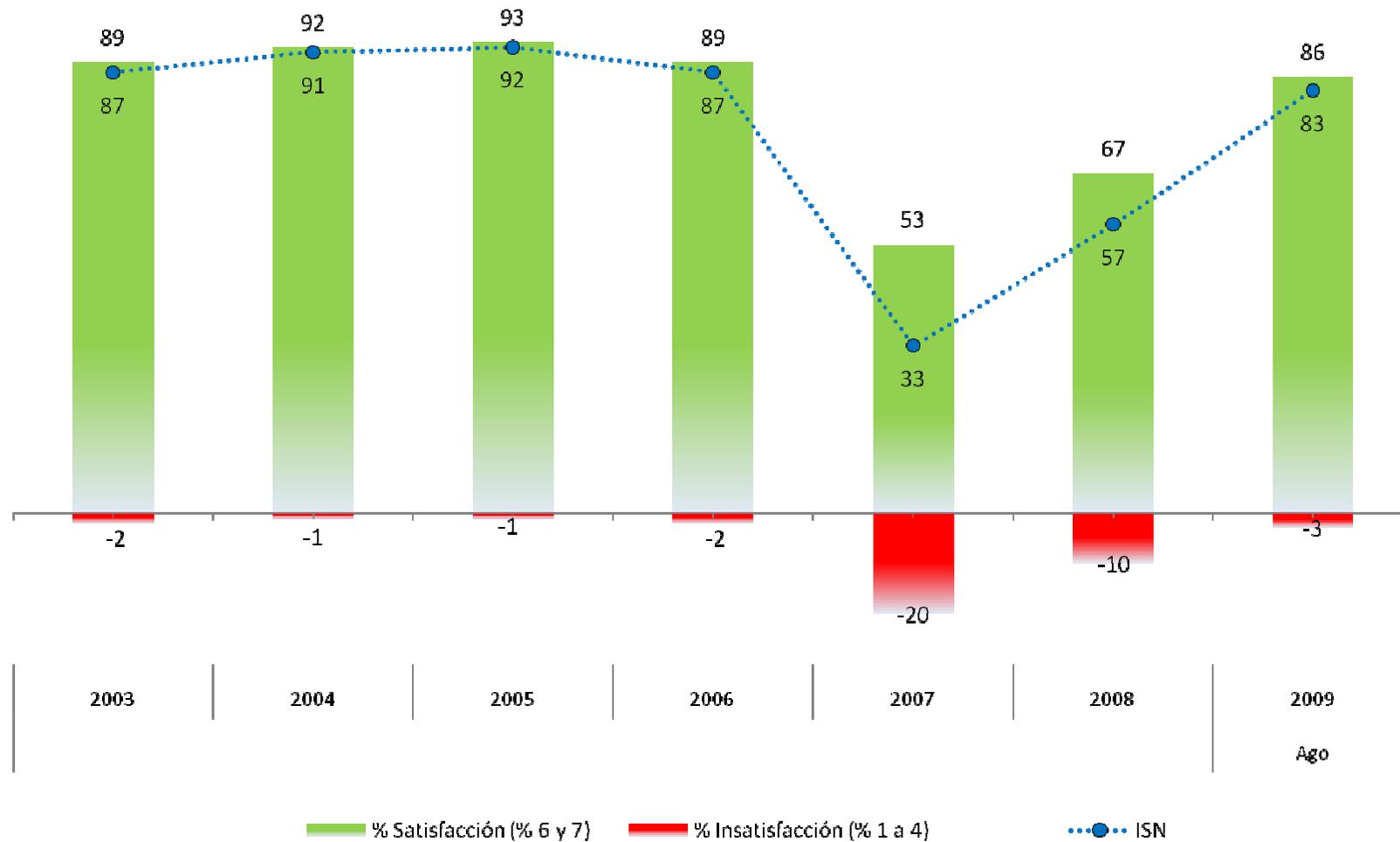
Transantiago approval rates



Satisfaction level with Metro's Quality of Service



Perception of Metro's Image



Transantiago: On the Development of Public Transit in Large Cities

Juan Carlos Muñoz
Pontificia Universidad Católica de Chile

Louis de Grange
Universidad Diego Portales

Thredbo 11, Delft, Netherlands
September 22st, 2009