C40 CITIES
CLIMATE LEADERSHIP GROUP

NY • NJ • CT Regional Plan Association

VREF
VOLVO RESEARCH & EDUCATIONAL FOUNDATIONS

TRANSIT LEADERSHIP SUMMIT

NEW YORK • APRIL 23-25, 2012

NY • NJ • CT Regional Plan Association

C40 CITIES
CLIMATE LEADERSHIP GROUP

VREF
VOLVO RESEARCH & EDUCATIONAL FOUNDATIONS

About

RPA

Regional Plan Association is America's oldest and most distinguished independent urban research and advocacy organization. RPA works to improve the infrastructure, economic competitiveness and sustainability of the New York- New Jersey-Connecticut metropolitan region. A cornerstone of our work is the development of long-range plans and policies to guide the growth of the region. Through our America 2050 program, RPA also provides leadership in the Northeast and across the U.S. on a broad range of transportation and economic-development issues. RPA enjoys broad support from the business, philanthropic, civic and planning communities.

For more information about RPA, please visit www.rpa.org.

This effort was made possible by the support of VREF and C40.

VREF – investments make a difference

VREF, the Volvo Research and Educational Foundations, is the collective name under which four foundations collaborate to finance research and education in the area Future Urban Transport (FUT): How to deal with complexity. VREF finances FUT research for the purpose of contributing to new ideas and solutions within the complex structure that lies behind the design of sustainable transportation systems in cities. The challenge is to find urban transport systems that will provide accessibility for the masses while at the same time radically reducing transportation's negative local and global environmental impacts. Through the FUT programme, VREF currently supports 8 Centres of Excellence in Africa, South and North America, Asia, Australia and Europe, and accompanying events for networking, communication and debate on critical issues for urban transport.

C40 Cities Climate Leadership Group

The C40 Cities Climate Leadership Group (C40) is a network of large and engaged cities from around the world committed to implementing meaningful and sustainable climate-related actions locally that will help address climate change globally. C40 convenes networks of cities to accelerate the identification, development and implementation of projects, programs and policies in C40 cities through city-to-city collaboration. C40 Networks are currently being developed within 7 initiative areas: transportation, energy, waste management, sustainable development, measurement and planning, water drainage and infrastructure, and sustainable finance infrastructure and green growth.

C40 works in an aligned partnership with the Clinton Climate Initiative (CCI) Cities program, which was started by the William J. Clinton Foundation. CCI Cities became the delivery partner of C40 in 2006. The closer alliance between the two organizations – announced in the spring of 2011 – brings significant resources and infrastructure that will enhance and accelerate their historic activities and positions the combined effort as one of the preeminent climate action organizations in the world.

Contents

Agenda

Monday, April 23

18:00 Opening dinner and reception
➜ Elliot Sander, Anders Brännström

Tuesday April 24

7:30 Breakfast buffet

9:00 Opening remarks
➜ Thomas Wright, Rohit Aggarwala

9:30 Transit ideas can move quickly around the world, and we will all benefit
➜ Mortimer Downey

9:45 **LOS ANGELES:** Growing and diversifying revenue sources
➜ Arthur Leahy

11:00 **HONG KONG:** People making a difference
➜ Morris Cheung

11:15 Tour of Pocantico grounds and museum

12:15 Lunch

13:00 Transit and density: the land use connection
➜ Jeffrey Zupan

13:15 **MEXICO CITY:** Sustainable mobility and transport
➜ Sergio Aníbal Martínez

13:30 **SÃO PAULO:** Balancing the need for infrastructure with environmental preservation
➜ Luiz Antonio Cortez Ferreir

14:45 Break

15:00 **SANTIAGO:** Change of regulation and contract model of bus operators and our challenge with Metro
➜ Patricio Pérez

15:15 **NEW YORK CITY:** Navigating a complicated system
➜ Joseph Lhota

16:30 Closing comments
➜ Robert Yaro

17:00 Break

18:00 Reception and dinner

Wednesday, April 25

7:30 Breakfast buffet

9:00 Opening remarks
➜ Måns Lönnroth

9:15 Without market pricing half the benefits of rail are wasted
➜ Michael Schabas

9:30 **WASHINGTON, DC:** Adopting a better fare collection system
➜ Carol Kissal

10:45 Break

11:00 **LONDON:** Strategies to improve mode share
➜ Elaine Seagriff

11:15 Climate adaptation and transit change
➜ Guy Nordenson

11:30 **SINGAPORE:** Boosting system resiliency with the next wave of data analytics
➜ Choi Chik Cheong

12:45 Lunch

13:45 **BARCELONA:** The new tramway
➜ Xavier Roselló

14:00 **MONTREAL:** From multiple transit operator fare tables to a truly integrated urban mobility fare system
➜ Daniel Bergeron

14:15 **STOCKHOLM:** Redefining the business plan
➜ Anders Lindström

15:30 Break

15:45 Discussion & closing thoughts
➜ Rohit Aggarwala

16:45 Break

18:00 Reception and dinner

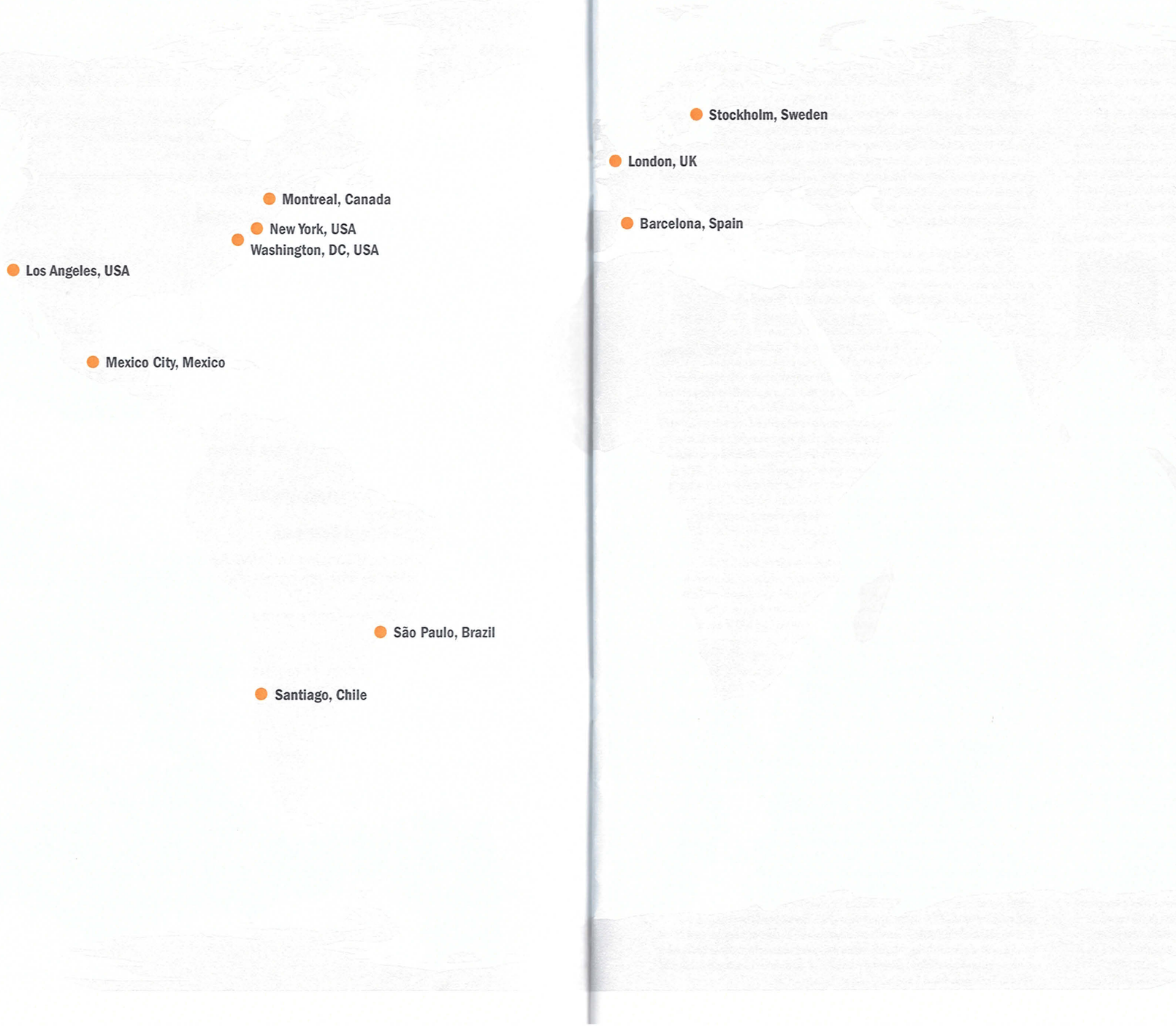
Thursday, April 26

7:30 Breakfast buffet

8:00 Technical assistance follow-up meetings

10:00 Bus leaves for Manhattan

Cities Represented



Participants

Rohit T. "Rit" Aggarwala
Special Advisor to the Chair, C40 Cities Climate Leadership Group
rohit@c40.com

Rohit T. "Rit" Aggarwala is Special Advisor to the Chair of the C40 Cities Climate Leadership Group, and Environmental Program Lead at Bloomberg Philanthropies. Rit was the Director of Long-Term Planning and Sustainability for New York City from 2006 to 2010. In that capacity, he led the development and implementation of Mayor Bloomberg's long-term plan for New York City, PlaNYC: A Greener, Greater New York. Rit holds a BA, MBA, and PhD (U.S. History) from Columbia University, and an MA in History from Queen's University in Canada. He serves as a trustee of St. Stephen's School in Rome, Italy; is a member of the board of the Regional Plan Association; is a lecturer in Urban Studies at Stanford University; and is a member of the strategic advisory council of New World Capital, a New York-based private equity firm that focuses on the green sector.

Richard E. Barone
Director of Transportation Programs, Regional Plan Association
rbarone@rpa.org

Richard Barone, Director of Transportation Programs, is RPA's principal research and policy planner for transportation. Since joining RPA in 2007, he has been charged with advocating RPA's mobility campaign, enhancing RPA's technical mapping and transportation data repository, and is the subject matter expert on freight/logistics, urban transportation systems, and aviation. Richard has taken a leading role in studies on *Goods Movement through I-278 in NY and NJ*, Upgrading to *World Class: The Future of the New York Region's Airports* and *Extending PATH to Newark Airport*. He has co-authored *Tomorrow's Transit*, a major study recommending over 40 potential transit improvements in the New York region, along with several other publications.

He received his Master of Science in Urban Planning from Columbia University and a Bachelor of Science in Labor and Industrial Relations from the Pennsylvania State University.

Daniel Bergeron
Vice-president of Strategic Information and Metropolitan Affairs, Montreal
Agence Métropolitaine de Transport
dbergeron@amt.qc.ca

Daniel Bergeron is Vice President of Strategic Information and Metropolitan Affairs at the Agence Metropolitaine de Transport (AMT). He began his career working as a transportation researcher for four years and then acted as project manager for a major consulting group in transportation planning for two years. In 1997 Daniel joined the newly founded regional transportation agency (the AMT), to build and take charge of a regional framework for transportation surveys, modelling and integrated public transportation fare revenue sharing. In addition, he now manages the financial framework linking together all the public transportation operators and municipalities of the Montreal region.
The AMT was created by the Québec government in 1996 to strategically plan and efficiently coordinate public transportation in the Greater Montréal area. The AMT plans, coordinates, integrates and promotes mass transit services. The AMT also operate express bus and commuter rail networks and is the sixth largest passenger rail transport system in North America.

The AMT territory is comprised of 83 municipalities, 12 public transportation and 13 paratransit operators to name only the principal ones.

Anders Brännström
Chairman of the Board, Volvo Research and Educational Foundations
anders@ergonor.se

Anders Brännström holds a PhD in Industrial Management from Chalmers University of Technology and a MBA from Gothenburg University. He spent his early years as Assistant Professor at Chalmers University of Technology. In the early 1980's, he left university for an assignment as Director for Corporate Development in the Swedeyards Group. He was later appointed President for Götaverken Energy, within that Group. Götaverken Energy, later acquired by a competitor, was a manufacturing company with specialities in large scale boilers, specifically black liquor recovery boilers and doing business on several continents.

After leaving Götaverken, he served two years as President for a small high tech company in robotics and before joining the Group Management of SKF, a world leading manufacturer of bearings, with headquarter in Sweden. In SKF, he held successively different positions such as Director for Business Development, as Executive Director Industrial Sales and Executive Director for Sales Company Division. In these roles he was active on all continents.

In 1999, he joined the Volvo Group to become President of Volvo Technology Transfer AB, a Corporate Venture Capital entity within the Volvo Group. The assignment was to invest in small companies of interest for the Volvo Group, where a minority shareholding was at least initially preferred, and help them to develop.

He retired in 2010 from this position and is now active as ordinary member or chairman in a number of different Boards. Among other assignments, he was appointed Chairman of the Board for Volvo Research and Educational Foundations from January 2011.

Morris Cheung
Human Resources Director, Hong Kong MTR
mcheung@mtr.com.hk

Mr. Morris Cheung has been working with MTR for 29 years. Morris started his career as an engineer and for 10 years he was responsible for safe, reliable and quality customer service performance of the entire MTR train fleet. Morris spent 2 years as the Managing Director of the cable car subsidiary company of MTR before he took up the Chief of Operations position in 2009 responsible for the operations of all transport business of MTR in Hong Kong including metro network, cross-boundary and intercity services, light rail and feeder buses. Morris then became the Chief of Operations Engineering overseeing all maintenance and technical functions for railway. In 2012, Morris was appointed as the Human Resources Director.

Choi Chik Cheong
Deputy Director of Knowledge Management, Singapore Land Transport Authority
chik_cheong_choi@lta.gov.sg

Choi Chik Cheong is Deputy Director, LTA Academy with Land Transport Authority (LTA), Singapore. He has over 15 years experience in overall integrated landuse and transport planning, covering road and rail projects. He has directed studies on bus planning, road pricing, car-parking standards and multi-criteria evaluation of transport schemes. He worked with urban planners to integrate Light Rapid Transits into both old developments and new towns, and has had over ten years experience in the building and construction of the Mass Rapid Transit system in Singapore. He is currently working on the knowledge management and documentation of institutional land transport knowledge within LTA into case studies for training. He has an MSc in Transport from Imperial College, London, UK.

Luiz Antonio Cortez Ferreira
Senior Environmental and Sustainability Specialist, São Paulo Metrô
luizcortez@metrosp.com.br

Luiz Cortez is a Senior Environment and Sustainability Specialist at São Paulo Metrô, a publicly owned company under SP State's Metropolitan Transportation Authority. He has been working with SP Metrô for 25 years and recently served as Institutional Relations Coordinator and as Advisor to the State Secretary of Metropolitan Transportation.

Mr. Cortez received his university degree of Architecture and Urban Planning (MArch + MUP equiv.) from São Paulo University. In 2000, he lived in Tokyo, Japan, where he mastered in Urban Transportation Planning. Back to Japan, in 2006, he got a post-graduation specialization in Environmental Management in Osaka. Mr. Cortez is the Environment and Sustainable Mobility Director of AEAMESP, a 21 years old non-profit advocacy association devoted to promoting efficient, environmentally sound, inclusive, and affordable transportation systems. Presently he is also a voting councilor at the State Environmental Council and at the State's Climate Change Policy Steering Committee.

He was born and lives in São Paulo, Brazil.

Mortimer Downey
Senior Advisor, Parsons Brinckerhoff
downey@pbworld.com

Mort Downey has spent five decades in the transportation profession, both public and private.

During the Carter Administration he was an Assistant Secretary of Transportation and during the Clinton Administration he served for eight years as Deputy Secretary of Transportation and since then has been associated with Parsons Brinckerhoff as well as operating his own consulting business. He served on President Obama's campaign transportation policy committee and was appointed as head of the Department of Transportation transition team.

In the public transportation area, he held various positions, including Executive Direcector, at the New York Metropolitan Transportation Authority from 1981 to 1993. More recently, he has been appointed as a federal member of the Washington Metropolitan Area Transit Authority, where he serves as Second Vice Chairman and chairs the board safety and security committee. As a consultant, he has advised a number of transit authorities, including Transport for London, New Jersey Transit, the Port Authority of New York and New Jersey, Chicago's CTA and RTA, and the Metropolitan Transportation Commission in the San Francisco Bay Area.

Jessie Feller
Senior Planner for the Energy Policy Program, Regional Plan Association
jfeller@rpa.org

Jessie came to RPA to launch and run the energy policy program. She specializes in urban-regional policy and planning, with a particular focus on sustainability and energy policy. Before joining RPA, she worked as a cluster specialist at Economic Competitiveness Group working on competitiveness strategies for global city-regions, particularly the clean-tech sector. Clients included the Inter-American Development Bank (project in Mendoza, Argentina), United Nations Development Programme (project in Southeastern Anatolia Turkey), Marin County Supervisors, and The Oakland Partnership. Prior to ECG, Jessie was selected as a Sustainability Fellow to work at Oregon's Portland Development Commission, reporting to PDC's first Sustainability Manager.

Originally from San Rafael California, she graduated Phi Beta Kappa from Vassar College with a BA in Urban Studies and Hispanic Studies and graduated with an Msc in Environment and Development Studies with Honors from the London School of Economics and Political Science.

T. R. "Tom" Hickey, AICP
Manager of Special Projects Rail & Transit, Parsons Brinckerhoff
hickey@pbworld.com

Tom Hickey is a Philadelphia-based transport strategist with 35 years of experience delivering quality bus and rail services. He spent two decades with public agencies, serving as General Manager of the Port Authority Transit Corporation, Railroad Administrator for the State of Delaware, and in various operations and planning roles at Houston METRO, the Southeastern Pennsylvania Authority, the Bi-State Development Corporation (in St Louis) and the New York City Transit Authority. As a consultant, he has contributed to transportation improvements in 34 states, Canada, Asia, and the Middle East.

Tom presently holds a number of committee leadership roles on the American Public Transportation Association and the Transportation Research Board. A graduate of Villanova University and an AICP Certified Planner, he is presently Manager of Special Transit & Rail Projects with Parsons Brinckerhoff, Inc. He just returned from managing the design of a possible high-speed regional rail system for the United Arab Emirates.

Carol Kissal
Deputy General Manager for Administration, Washington Metropolitan Area Transit Authority (Metro)
ckissal@wmata.com

Carol Dillon Kissal is the Deputy General Manager of Administration and Chief Financial Officer for the Washington Metropolitan Area Transit Authority, where she is responsible for Metro's financial integrity, as well as the departments of MetroAccess, Information Technology and Planning and Joint Development. Before joining Metro, she was nominated by the President of the United States to serve as Inspector General of the Small Business Administration. Mrs. Kissal also served as Deputy Director of the District of Columbia Department of Transportation, and in six years as Amtrak's Corporate Treasurer, she was responsible for $1 billion in financing for the nation's first High Speed Rail. Mrs. Kissal also spent seven years at IBM in the service organization, pricing data system outsourcing contracts for global customers. Mrs. Kissal received a master's degree in business administration from the Lubin School at Pace University and a bachelor's degree in business management from Dominican College

Arthur T. Leahy
CEO, Los Angeles Metropolitan Transportation Authority (Metro)
leahya@metro.net

Arthur T. Leahy, one of the nation's leading transportation executives who started out as a bus driver in Los Angeles 39 years ago, is the Chief Executive Officer of the Los Angeles County Metropolitan Transportation Authority (Metro). Metro is the lead transportation planning and programming agency for the county and funds construction of numerous street, highway and transit improvements. He has served in the position since April 2009.

Prior to Metro, Leahy headed the Orange County Transportation Authority (OCTA) from 2001 to 2009 where he oversaw the planning, financing and coordination for Orange County's freeway, street and transit development. Prior to OCTA, Leahy served as general manager of the transit agency in Minneapolis-St. Paul between 1997 and 2001.

Leahy began his transit career in 1971 driving a bus for the Southern California Rapid Transit District, a predecessor of Metro, while attending college. He worked his way up through the ranks to head operations for Metro, overseeing bus operations and activation of the Metro Blue Line and Metro Red/Purple Line, before taking the Minneapolis chief executive job.

Leahy earned a bachelor-of-arts degree in political science from California State University, Los Angeles and a master's degree in public administration from USC.

Lew Yii Der
Group Director of Corporate Planning & Research, Singapore Land Transport Authority

yii_der_lew@lta.gov.sg

Lew Yii Der is the Group Director of the Corporate Planning and Research Group in the Land Transport Authority (LTA), Singapore. His current portfolio includes spearheading the corporate development and strategic research, and expanding the research and training capacity of the LTA Academy. Mr Lew has been with the LTA since its formation in 1995, holding various management positions. He holds a first class honours degree in Civil Engineering from the National University of Singapore and a Masters in Public Management from the Lee Kuan Yew School of Public Policy.

Joseph J. Lhota
Chairman and CEO, New York Metropolitan Transportation Authority

jlhota@mtahq.org

Joe Lhota was nominated by Governor Andrew Cuomo and confirmed by the New York State Senate as the Chairman and Chief Executive Officer of the Metropolitan Transportation Authority ("MTA") in January 2012.

Mr. Lhota has extensive experience in both the private and public sectors. Before joining the MTA, he served as executive vice president for The Madison Square Garden Company where he was responsible for the development and execution of company-wide human resources strategies, government affairs, information technology, facilities and real estate, and an array of corporate services.

Prior to MSG, Mr. Lhota was an executive vice president of Cablevision Systems Corporation. He was Deputy Mayor for Operations in the administration of Mayor Rudolph W. Giuliani. Before being appointed deputy mayor, Mr. Lhota was the city's budget director, managing the city's $36 billion operating budget and $45 billion capital budget.

Mr. Lhota is a resident of Brooklyn Heights. He is a cum laude graduate of Georgetown University and received his M.B.A. from the Harvard Business School.

Anders Lindström
Managing Director, Storstockholms Lokaltrafik

anders.lindstrom@sl.se

Anders Lindström, born 1955, has a background in the Swedish Armed Forces and finished as Lieutenant General. Anders has among other things, served as the first Swedish liaison officer at Central Comand Florida during the war in Afghanistan and ISAF's establishment.

Anders has also been head of Sweden's international force and has regularly visited Sweden's priority areas in the Balkans, Middle East, Africa, Asia, and Afghanistan.

Over the past decade Anders has been engaged and partly responsible for great transformations in Sweden's Armed Forces.

Since January, Anders is the President for the companies responsible for public transport on land and at sea in Stockholm County.

Måns Lönnroth
Board Member, Volvo Research and Educational Foundations

m.lonnroth@telia.com

Måns Lönnroth is presently a member of the board of the VREF, Volvo Research and educational Foundations as well as of the International Institute for Sustainable Development, Winnipeg, Manitoba, Canada. He has been managing director of Mistra, a Swedish endowed foundation for strategic environment research and international vice chairman of the China Council for International Cooperation on Environment and Development.

ML has also been state secretary at the Swedish ministry of environment between the years 1994 and 1999 and a political advisor at the Prime Minister's Office between 1985 and 1991.

He has served on the boards of carious research councils and was for 15 years an elected member of the Stockholm County Council.

The common element is his interest in the meeting point between politics, policy and science. He was trained in applied mathematics and graduated from KTH in 1967.

Sergio Aníbal Martínez Sánchez
Director General of Planning and Transport, Mexico City

tabique2002@hotmail.com

Educational Review
- UNAM – Faculty of Architecture (1976 – 1980)

Work Experience at the Private Sector
- SAMS's Architect Director: Consultancy of diverse projects; enterprise which offer architectural design, construction, building supervision and technical studies (1991 - 1996)

Work Experience at the Public Sector
- Transport and Thoroughfare Secretary: Main Directorate of Planning and Road. (December 2006 - present)
- Iztacalco District: General Director of Building, Services and Urban Development (2003 - 2006)
- Coyoacan District: Sub delegate of Building and Urban Growth (1999 - 2000)
- Tláhuac District: Sub delegate of Building and Urban Growth (1998)

Juliette Michaelson
Director of Strategic Initiatives, Regional Plan Association

jmichaelson@rpa.org

As Director of Strategic Initiatives, Juliette is able to get involved in a wide range of interesting projects. She is currently focused on an initiative to bring together the chief executives of the world's most dynamic and innovative transit agencies to discuss shared challenges and opportunities.

Juliette is the author of a landmark RPA report that used statistical modeling to estimate the positive impact that improved transit service has on adjacent property values. The report is still quoted to make the case for building dense nodes of development around train stations.

Also part of Juliette's portfolio is RPA's advocacy efforts on the Far West Side of Manhattan, including Moynihan Station, Javits Convention Center and the Hudson Railyards.

Prior to joining RPA, Juliette was a Project Manager at Project for Public Spaces. She managed a range of outreach, education and training programs to help municipalities and state DOTs work together and make sustainable land use and transportation decisions.

Juliette received a Bachelor of Arts in Political Science from Princeton University and a Master in Urban Planning from Columbia University.

Guy Nordenson
Partner, Guy Nordenson and Associates, and Professor, Princeton University School of Architecture

gjpn@nordenson.com

Guy Nordenson is a structural engineer and professor of architecture and structural engineering at Princeton University. Nordenson was the structural engineer for the Museum of Modern Art expansion in New York, the Jubilee Church in Rome, the Simmons Residence Hall at MIT in Massachusetts, the Santa Fe Opera House, and over 100 other projects. Recently completed projects include two pedestrian bridges for Yale University and the New Museum of Contemporary Art in New York. Current projects include the expansion of theKimbell Art Museum in Fort Worth and the National Museum of African American History and Culture in Washington DC. He is the author of On the Water | Palisade Bay (Hatje Cantz Verlang / MoMA 2010) and Patterns and Structure (Lars Müller Publishers 2010). Nordenson is also active in earthquake engineering, including code development, technology transfer, long-range planning for FEMA and the USGS, and research. He initiated and led the development of the New York City Seismic Code from1984 to its enactment into law in 1995.

Henrik Normark
Director of Business Development, Storstockholms Lokaltrafik

henrik.normark@sl.se

Henrik Normark is a BSc in Business Administration from the University of Uppsala in Sweden. Henrik started his carrier in the healthcare industry as a Management trainee and have served several years after that in different management positions, on an operational as well as strategic level. Example of responsibilities is strategic and operational excellence, strategy and process development and implementation as well as business integration after M&A.

Henrik is now Head of Business Development at Stockholm Public Transport responsible for strategic development of SL: s business model, business strategies as well as brand and sales strategies.

Patricio Pérez
Head, Transantiago

patricio.perez@transantiago.cl

Currently, Patricio Pérez is the Head of the Santiago Public Transport System, so-called Transantiago, organism responsible for the regulation and supervision of bus operators and the coordination of the service provided by their 6000 buses jointly with the 103 kilometers network of metro in an integrated system with nearly 4 million travels per day. Patricio is Industrial Engineer, graduated with a M.Sc. in Transport Engineering from the Catholic University and holds a M.B.A from Adolfo Ibañez, both in Chile. His current position was assumed in October 2011 after been in charge of the negotiation process in order to change the contracts between the government and private bus operators of Transantiago in February 2011. Previous positions as Chief of Staff and Advisor of Minister of Transport and Telecommunication (Santiago, Chile, 2010), Senior Manager for Business Consulting at Everis (Santiago, Chile, 2009) and Principal Consultant at Steer Davies Gleave (Santiago, Chile, 2001-2009 & London, UK, 2000-2001) bring him with a fifteen years experience in business development, business strategy and project analysis in Latin-America, North-America and Europe.

Howard R. Permut
President, New York Metropolitan Transportation Authority Metro-North Railroad

permut@mnr.org

Howard Permut has been President of MTA Metro-North Railroad since July 2008. He is only the fourth President in the railroad's history and was part of the original team that created Metro-North out of the Conrail commuter operations in New York and Connecticut in 1983. During his tenure, Metro-North has had numerous achievements including historic levels of service reliability, increasing ridership which has made Metro- North the largest commuter railroad in North America, record levels of safety, over- hauling financial performance to increase efficiency and commissioning of major new facilities.

Prior to his current role as President, Mr. Permut had a series of positions of increasing responsibility at Metro-North: Senior Vice President of Planning, Procurement and Business Development; Vice President of Planning and Director of Planning. Before working for MTA/Metro-North, he worked at the Northeastern Illinois RTA during its formative years and the CTA.

He is also a visiting scholar at New York University and has completed consulting assignments for major transit agencies in London, Santo Domingo, Philadelphia, San Francisco and Los Angeles. He has served on various TCRP Research and APTA panels. He has taught the NTI Senior Leadership Course and has lectured at Yale, University of Pennsylvania, NYU, Northwestern, Simon Fraser University, CUNY and Brooklyn Polytechnic Institute.

John "Jack" M. Reilly, PhD.
Professor of Practice, Rensselaer Polytechnic Institute, and Advisor, World Bank

jackmreilly@gmail.com

Jack Reilly is a Professor of Practice in the Civil and Environmental Engineering Department at Rensselaer Polytechnic Institute where he teaches a number of transportation and engineering courses. Prior to his current position, he was on the staff of the Capital District Transportation Authority in Albany, NY where he was Deputy Executive Director, with responsibility for planning, capital project development and information technology. He has also served as a consultant to the World Bank (India and China) and several US transit systems of varying sizes. He recently completed a manual on transit capacity analysis for cities in developing countries. He is a member of the Transit Research Advisory Committee, which advises the Federal Transit Administration on the direction of transit research and has chaired a number of panels for the Transportation Research Board of the National Academies in areas such as bus rapid transit, transit capacity and transit innovation.

Xavier Roselló
Deputy Technical Director, Barcelona Autoritat del Transport Metropolità

xrosello@atm.cat

Born in 1948 in Barcelona; Doctorate Industrial Engineer and Graduate in Economic Sciences.

In Public Administration:
- From 2000, Assistant Technical Director at ATM (Barcelona Autoritat del Transport Metropolità): ATM is a public consortium of public administrations whose main mission is the coordination of public transport in the Metropolitan Area of Barcelona. Responsible for institutional representation, participation in European projects, transportation planning and supervision of mobility surveys.
- From 1998 to 2000 and from 75 to 85, Directorate General for Transport and Mobility of the Generalitat de Catalunya, (Catalan Government) participating in projects such as the Metro Plan in 1984, station design studies and design and supervision of Journey to Work survey.
- From 89 to 93 Project Leader in AIS, a private company devoted to Artificial Intelligence. Development of projects based on Neural Networks and Genetic Algorithms.

- From 85 to 89, Software Development Project Leader at the Informatics Centre of the Generalitat de Catalunya

At the University:

- Teacher in Operations Research (78 to 85), Computational Linguistics (86 to 92), Statistics (93 to 2001), and Transport (since 2001) at the Polytechnic University of Catalonia.
- Doctoral thesis: "Two heuristic algorithms for generating an urban bus network".

Elliot "Lee" G. Sander
President & CEO, HAKS

esander@haks.net

Elliot"Lee" G. Sander, President & CEO joined HAKS with over 30 years experience successfully delivering world-class infrastructure programs and projects, particularly in the field of transportation. He is responsible for directing HAKS' national and international offices as well as daily operations. Lee previously served as CEO of the Metropolitan Transportation Authority of New York and Commissioner of the NYCDOT, as well as Senior Transportation Advisor to the Mayor of the City of New York.

Lee also served in other senior level public sector positions, including Director of Transit for the NYS Department of Transportation; General Manager, (Manhattan Division), Department of Buses, NYC Transit; Deputy Commissioner, New York State Division of Housing and Community Renewal; and Executive Director of Traffic Operational Services and Director of Parking, NYCDOT.

Lee is Chairman of the Regional Plan Association; he also serves on the Board of the National Express Group, the Board of the Greater Jamaica Development Corporation, and the Board of Trustees of the Leo Baeck Institute.

Mr. Sander holds a Bachelor of Science in Foreign Service from Georgetown University.

Richard R. Sarles
General Manager and CEO, Washington Metropolitan Area Transit Authority (Metro)

rsarles@wmata.com

Richard Sarles was appointed General Manager and Chief Executive Officer by the Metro Board of Directors effective January 2011.

Sarles has more than 40 years of experience in the transit industry with WMATA, NJ TRANSIT, Amtrak, and the Port Authority of New York and New Jersey.

He was appointed Interim General Manager of Metro in April 2010 and in his short tenure at the helm of the Authority, Sarles has set the agency on a course to improve safety, reliability and financial stability. He has led dozens of actions to improve safety including strengthening the safety department, expanding training agencywide, establishing a new Roadway Worker Protection program, creating a safety hotline, enhancing a Whistleblower Protection policy, as well as establishing a new employee safety recognition program. He has spearheaded the replacement of buses and MetroAccess vehicles, and the acquisition of new rolling stock -- 7000 series rail cars equipped with advance crashworthiness technology. Under his leadership, Metro has a $5 billion six-year capital improvement program dedicated to improving safety, customer reliability and state-of good repair. To enhance transparency and public accountability, Sarles also established a new online Vital Signs performance measurement system.

Michael Schabas
Associate,
First Class Partnerships Rail Consultants

michael@schabas.net

Michael Schabas has experience planning, financing, building and operating metros and passenger railways. He has worked in more than 20 countries and been a board member of train operating companies in the UK, Germany, Australia and Nigeria. Trained originally as an architect, city planner and transport economist, in his early career he helped design the Vancouver Skytrain, Canada's first automated metro. He came to London in 1988 to conceive and promote the Jubilee Line Extension, and to upgrade the Docklands light railway, working on behalf of the Canary Wharf developers who contributed over £500m. When British Rail was privatised, he formed GB Railways which acquired Anglia Railways, doubling passenger numbers and revenues while reducing average fares over the 7 year franchise term. Currently he is working with local investors developing Nigeria's first metro system, under a 25 year PPP concession. For further details visit www.schabas.net

Elaine Seagriff
Head of London Wide Policy and Strategy,
Transport for London

elaineseagriff@tfl.gov.uk

Elaine Seagriff is Head of London-wide Policy and Strategy for Transport for London (TfL). Apart from a brief spell in California working on light rail and strategy, she has worked in the planning and provision of transport in London for around 20 years – covering major urban development, evaluation and monitoring of major investment projects, area-wide strategies for central, inner and outer London, integration of transport and land use planning policies and the development of all aspects of strategic policy. More recently she has focussed on the development and execution of the Mayor's Tansport Strategy and the transport elements of the Mayor's spatial development strategy, which set out long-term challenges, agreed goals and sets policy priorities and the vision for the transport system for the next 20 years. She leads the implementation of the Mayor's Transport Strategy for TfL through strategic policy development, working across TfL's range of modes, and with key stakeholders, with a focus on policies to support the continued sustainable development of London.

William Wheeler
Director of Special Project
Development & Planning,
New York Metropolitan Transportation Authority

wwheeler@mtahq.org

Mr. Wheeler has over 30 years of experience in transportation planning in both highway and public transportation at the local, county and regional levels. He is currently MTA Director of Special Project Development and Planning. Bill has overseen the MTA Long Range Planning Framework, the planning basis for the MTA mega projects including: East Side Access, the Second Avenue Subway; and the Fulton Street Transit Center; and has spearheaded the MTA's Regional Strategic Review, the foundation for new network initiatives in the MTA Twenty Year Capital Needs Assessment. Most recently, he is leading a comprehensive inter-railroad capacity evaluation of Penn Station and its surrounding network. Mr. Wheeler has training in Urban Planning and Transportation Engineering with a BA from Marietta College, an MPA from American University and an MS from Manhattan College.

Terri Wills
Director of Global Programs,
C40-Clinton Climate Initiative

twills@clintonfoundation.org

Terri is the Director of Global Programs for the C40, in partnership with the Clinton Climate Initiative (C40-CCI). Before taking on this role, Terri served as the London City Director for C40-CCI, working closely with the Mayor of London's office and agencies, the private sector and other partners to development and implement climate change mitigation programs and projects.

Before joining C40-CCI, Terri was a Senior Policy Advisor for the Ontario Government in Canada, supporting the administration of a large-scale cleantech demonstration fund. Terri also spent several years as a consultant in Canada advising on economic development of the creative industries. Prior to these roles, Terri lived in the UK and worked for the BBC, first as a Strategy Manager – where she led the development of partnership plans for what is now Salford MediaCityUK – and subsequently as a Head of Strategy. Terri holds an MSc from the London School of Economics and a BAH in Political Studies from Queen's University, Canada.

Thomas K. Wright
Executive Director,
Regional Plan Association

twright@rpa.org

Tom Wright is executive director of Regional Plan Association. He has steered many of the organization's key initiatives, including the Draft Vision Plan for the City of Newark (2006) and A Region at Risk: The Third Regional Plan for the New York-New Jersey-Connecticut Metropolitan Area (1996).

Mr. Wright lectures widely on growth management and regional planning. He is a visiting lecturer in public policy at Princeton University's Woodrow Wilson School of Public and International Affairs. Previously, he was deputy executive director of the New Jersey Office of State Planning, where he coordinated adoption of the New Jersey State Development and Redevelopment Plan (2001). From 1991 to 1993, he was coordinator of the award-winning Mayors' Institute on City Design, sponsored by the National Endowment for the Arts.

Mr. Wright received a BA in history and a certificate in American Studies from Princeton University, and an MSUP from Columbia University.

David Yale
Deputy Executive Officer for Countywide Planning and Development, Los Angeles Metropolitan Transportation Authority (Metro)

yaled@metro.net

David Yale is the Deputy Executive Officer of Regional Programming for the Countywide Planning Department of the Los Angeles County Metropolitan Transportation Authority (Metro). He is responsible for transportation programming and long range financial forecasting for the regional transportation system in Los Angeles County. Mr. Yale's focus has been local solutions to diminishing State and Federal transportation funds, including the development of the Expenditure Plan for Measure R, Metro's ½ cent sales tax proposal recently approved by over two thirds of LA County voters. He is responsible for development of the multi-billion dollar Los Angeles County Transportation Improvement Program and the financial planning used for Metro's $150 billion Long Range Transportation Plan.

David Yale possesses a Master's Degree in Urban Planning from the UCLA Graduate School of Architecture and Urban Planning and a Bachelor of Arts Degree in Political and Environmental Studies from Pitzer College in Claremont, California.

Robert D. Yaro
President,
Regional Plan Association

yaro@rpa.org

Robert D. Yaro is the President of Regional Plan Association, America's oldest independent metropolitan policy, research and advocacy group. Based in Manhattan, RPA promotes plans, policies and investments needed to improve the quality of life and competitiveness of the New York Metropolitan Region, America's largest urban area. Mr. Yaro Co-chairs the Empire State Transportation Alliance and the Friends of Moynihan Station, and is Vice President of the Forum for Urban Design. He serves on Mayor Bloomberg's Sustainability Advisory Board, which helped prepare PlaNYC 2030, New York City's new long-range sustainability plan.

Since 2001 Mr. Yaro has been Professor of Practice in City and Regional Planning at the University of Pennsylvania. He also taught at Harvard University and the University of Massachusetts.

He holds a Masters Degree in City and Regional Planning from Harvard University and a Bachelors Degree in Urban Studies from Wesleyan University

Jeffrey M. Zupan
Senior Transportation Fellow,
Regional Plan Association

jeff@rpa.org

Mr. Zupan serves as the Senior Fellow for Transportation for Regional Plan Association. He has led RPA's work in all facets of transportation planning and policy.

Mr. Zupan also has a consulting practice has brought him a wide range of assignments involving transportation planning with a strong focus on transit, travel demand, urban design and policy formulation. Prior to initiating his consulting practice in 1990, Mr. Zupan was Director of Planning for NJ TRANSIT (ten years), where he directed the formulation and evaluation of that agency's "new initiatives" program which directly led to over $2 billion of transit investments.

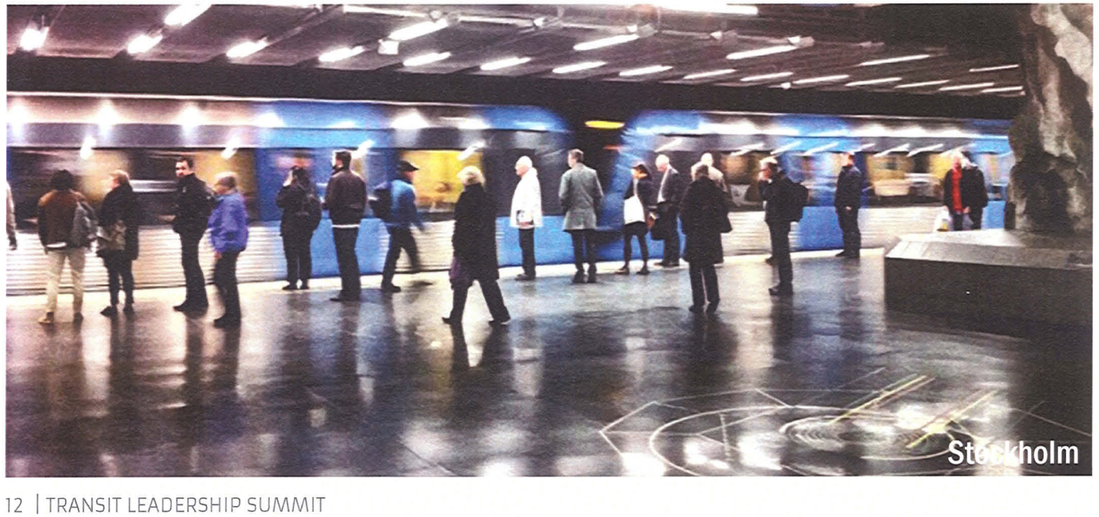
Mr. Zupan is co-author of three major books, *Urban Rail in America*, *Public Transportation and Land Use Policy*, and *Urban Space for Pedestrians*, and author of many reports and technical papers on a wide variety of transportation matters. He also is co-author of RPA's recent report, *Upgrading to World Class: The Future of the Airports in the New York Region*.


Montreal


Barcelona


London


Los Angeles


Stockholm

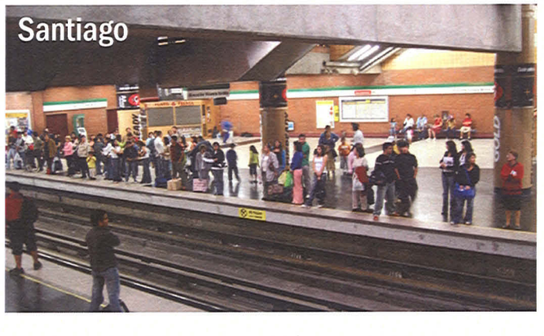

São Paulo


New York


Hong Kong


Singapore


Mexico City


Santiago


Washington, DC

Los Angeles

Growing and diversifying revenue sources

How can LA Metro further diversify its funding sources? How can it increase its modeshare? What is the appropriate farebox recovery ratio? How can LA Metro maximize its real estate holdings to generate revenue and create value in its communities?

Los Angeles, the quintessential auto-centric metropolis of the 20th century, has made great strides in the last 20 years to invest in transit and embrace density. LA Metro has grown from a bus operating agency to one that plans, constructs and operates a complex network of metro, light rail, BRT, express buses, high occupancy lanes, and local buses. The agency also now actively promotes high-density joint developments around its stations, and neighborhoods served by Metro have experienced quick revitalization. Despite these improvements, most Angelinos still rely on their cars for many of their trips, and chronic road congestion continues to plague the region.

In 2011, LA Metro adopted an ambitious plan to build 30 years' worth of transit expansion projects over the next 10 years, and reap the economic benefits of those investments on an accelerated timeline. As a result, LA Metro's annual budget, $4.5 billion in FY2012, is increasing rapidly (27% just in the last year). A capital program of this size with such an aggressive timeline is exceptional today in the U.S.

State and Local sources provide 86% of the funding, including a half-cent sales tax (Measure-R passed in 2008), other dedicated tax revenues, fares and land leases around train stations. Federal government grants account for the remainder. Despite these proceeds, there is insufficient funding to front construction of all of the projects within the accelerated 10-year timeframe. LA Metro is actively exploring innovative ways to borrow from the federal government at low or zero interest rates, including creating a new class of qualified bonds that would provide bondholders with federal tax credits in lieu of interest payments, and increasing the TIFIA loan program (which would allow Metro to borrow directly from the US Treasury on flexible terms).

There is no guarantee that the federal government will deliver, and additional sources of local revenue might be needed, particularly as the Metro continues to expand beyond the 30/10 plan.

Discussion questions

- LA Metro's farebox recovery ratio is only 27%. How much could fares increase without dramatic ridership loss? How can political barriers to raising fares be overcome?
- LA Metro's aggressive station-area redevelopment efforts now generate $20 million a year for the agency, with plans to increase that revenue to $50 million in coming years. While this is laudable, it's still less than 0.5% of the agency's annual budget. Are there strategies that could further increase lease returns? Also, are there other ways for LA Metro to recapture value from adjacent properties that benefit from new transit service?
- What are some other possible local funding options? Should LA extend or remove entirely the 30-year sunset provision of Measure-R? What is the downside of this strategy?

Left: LA Metro has actively engaged in developing the area around its stations as a way to generate revenue and ridership.

Below: Since 1990, when the first metro rail service was introduced, Los Angeles's transit system has grown to over 123 kms of new metro rail and 69 stations. Dozens of new and improved bus services have also been added.

New York City

Navigating a complicated system

How does the MTA best invest scarce dollars to develop communication strategies and technologies to help improve the experience of transit customers? How can static and dynamic signage, real-time information, and other solutions help make the MTA's system more inviting and intuitive to navigate? How does MTA stay ahead of these rapidly evolving technologies?

The MTA plans, operates and maintains numerous subway, bus and commuter rail transit services, some over a century old. The core system is made up of 26 subway lines, with connections to five other railroads and hundreds of bus services. The complexity and age of the system, the fact that it runs 24/7, as well as the fact that many of the rail lines were originally developed piecemeal by private companies, make for an intricate, often unpredictable, and sometimes challenging to navigate system.

The MTA has been making progress to improve passenger navigation, but more work needs to be done. Station rehabilitation projects have connected lines that were once only adjacent, static directional signage has improved, and real-time information about current service conditions (as well as service disruptions) is now provided across the commuter railroad and on portions of the bus and subway networks. Most recently, the MTA has even experimented with large touch-screen information kiosks and improved signage at select rail stations and bus stops.

Nevertheless, the system remains difficult to navigate, as any tourist – and many New Yorkers -- know. Even so, the MTA system continues to experience robust ridership growth, especially on the subway and the Metro North commuter railroad. This growth creates additional operational and passenger circulation challenges. The system routinely experiences planned service changes over the course of the day, service disruptions that occur frequently, and many subway stations seem to be confusing to navigate. The MTA system also has very limited WiFi and cellular connectivity, making it impossible for many customers to access information about services that the MTA makes available online. Connections between services are not always seamless and information about the status of connecting service is limited.

Most systems throughout the world have grappled with similar issues, and many have developed elegant solutions to passenger wayfinding that have made navigation intuitive and effortless. Opportunities exist to use advances in customer information systems and more "user-friendly" signage to inform and improve the customer experience and further unify the system.

Discussion questions

- What upgrades are most critical to improving the passenger experience?
- What is the best organizational structure to manage a program that integrates customer and service information across the entire system with different operators?
- How have other systems prioritized these types of investments? Should the strategy be to improve passenger communications piecemeal or comprehensively?
- How can the MTA afford these upgrades and then expedite their implementation? What is the appropriate role of partnership with the private sector? What experience have other agencies had with third-party advertising companies and outsourcing these types of upgrades?
- Have others had experience with using open source versus proprietary software when developing solutions, is one better than the other and why?
- How have other agencies rolled out WiFi or cellular service in their systems? Are there ways to install these services in the tunnels? Is retrofitting older rolling stock a cost effective option?

Left: Countdown clocks, installed at about two-thirds of the system's subway stations in the last year, have significantly improved the passenger experience.

Below: The system nevertheless remains confusing.

São Paulo

Balancing the need for infrastructure with environmental preservation

How can SP Metrô negotiate, or even reform, its onerous and lengthy environmental approvals processes, and make sure that these actually fulfill their stated goal as well as allow for new transit projects? How do different countries balance the need to build infrastructure with the need to respect the environment?

São Paulo's Metrô is one of the most advanced systems in the western hemisphere – with fully automated trains on some of the lines, headways as short as 101 seconds, and excellent passenger amenities like station attendants at the busiest stations.

The metro's biggest challenge, in a sense, is its popularity: with 4 million riders a day on just 74 kilometers (46 miles) of track, the trains are crowded at all times. And no wonder: the São Paulo metropolitan area has more than 20 million residents, its economy is booming, streets are choked with traffic, and the Metro offers an affordable, safe and quick way to get around.

In response to such strong demand, SP Metrô has been aggressively expanding its network: four lines are currently under construction, with three more lines planned. Transit is a top-line priority in municipal and state government. And yet despite the political consensus, expansion of the system is difficult and slow due in part to one major bureaucratic roadblock: the environmental review process, which has become significantly more onerous in the last decade. Three "licenses" are necessary: to bid the proposed project, to build it, and then to operate it. In 2003, the license to build used to require answering nine questions; it now includes 65 questions. Approvals take up to a year to obtain. Considering the urgent need for transit expansion, this is too slow.

SP Metrô would like to understand how other countries balance the need to build transit with environmental preservation, and how transit agencies can successfully streamline and expedite the permitting process.

Discussion questions

- Which cities or countries have the most efficient and effective environmental approvals processes?
- How can the long-term environmental benefit of building transit and getting people out of their cars be valued more in the environmental approvals process?
- What can transit agencies do to streamline and expedite the environmental approvals process? What partners are most critical in getting projects approved?
- How do agencies work with communities to get buy-in to transportation projects and avoid NIMBY-ism?

The São Paulo economy is growing rapidly, and so is transit ridership. SP Metrô is one of the busiest systems in the world, with 754 million trips a year on just 71 kms of track. Although the system has grown in recent years, more capacity is needed.

Singapore

Boosting system resiliency with the next wave of data analytics

How can travel data that is collected and analyzed with one of the most sophisticated data warehouses in the world help a transit system manage congestion, increase capacity and recover from service disruptions?

Singapore is a rapidly growing metropolis. More than 5.2 million people work and live on this small island-nation – twice as many as in 1980. In addition, more than 13 million visitors arrived into the island for business or leisure in 2011. The number of daily public transit transactions has exploded to over 12 million. The Singapore Land Transport Authority now finds itself struggling to serve all of these new commuters and continue to provide a reliable public transit service.

In response, LTA developed one of the most sophisticated data warehouses in the world. The system, known as Planning for Land Transport Network, or PLANET, analyzes all daily public transport trips, and supports queries of 4 billion records based on 3 years of historical records – all within minutes. PLANET has become an essential part of managing Singapore's transit system, helping LTA understand how the transit system is used, predict future behavior, and plan accordingly.

PLANET also helps LTA to develop Transportation Demand Management strategies to cope with existing congestion. PLANET provides LTA with real-time congestion information, giving customers the opportunity to shift their travel plans. The data warehouse has also led the agency to try several strategies to reward passengers for traveling off-peak. However, the system is essentially operating at capacity, making it less reliable and more difficult to manage effectively.

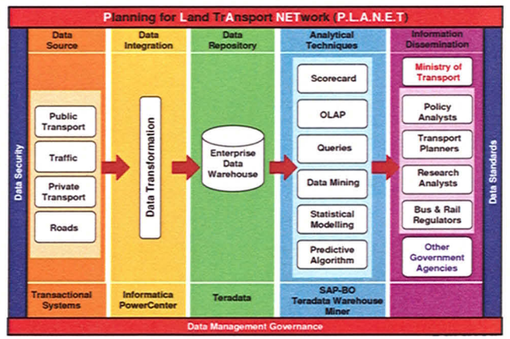
Singapore has huge plans to expand its transportation network, including transit. But until this new capacity comes online, the challenge for Singapore is how to mine its data warehouse in order to manage the growing congestion and ensure the reliability of the network.

Discussion questions

- What are other ways that PLANET can improve the efficiency of the transit system through more fine-grained reporting? How could PLANET help manage congestion and recover quickly from events?
- What other operating and pricing strategies could LTA implement to manage congestion?
- Are there other short-term "physical" options to squeeze more capacity out of their existing system (flip seats, longer trainsets and platforms)?
- What are the concerns and strategies of sharing information with the external communities?

Left: Singapore's public transit system, already one of the most heavily used in the world, is expected to increase in ridership to 14.3 million per day, from 8.9 million now.

Below: PLANET consolidates anonymized data from several different sources including public transport and roadways, and then uses it to model demand and influence travel patterns.



Stockholm

Redefining the business plan

How does SL, which is committed to low fares, pay for the system expansions necessary to accommodate a growing population? What are the more traditional as well as the more innovative sources of funding? What is the right mix of public and private investment?

Stockholm's public transit system enjoys high ridership and a very high commuter modeshare of 33% (51% if you include walking and bike riding),thanks to an expansive, convenient and affordable network of metro, trams, buses, commuter rail and ferries. But the county's population is growing – about 2% a year, or 40 000 inhabitants – and it is clear that an expansion of SL's transit system is needed in order to improve the network and maintain the market share . The fiscal situation is tight, and SL would like to explore ways to finance such an expansion.

On the capital side, expanding the light rail or heavy rail metro will of course require a huge, up-front capital investment. The investments necessary just to keep the modeshare at present levels are estimated to cost about 9 billion EUR ($12 billion) over the next 10 years. SL is at the same time committed to a low farebox ratio of 50%, both for environmental and equity reasons.

Unfortunately, the government's budget for capital investments is limited. Asking for private-sector investment has been contemplated, but poses a challenge because interest rates available to the private sector are about 20 percentage points higher than those available to SL as a public company owned by the Stockholm County Council.

SL has just begun exploring the possibilities and prerequisites of PPP models for the development of additional lines. They would also like to learn about other innovative ways to increase revenue from the private sector (such as offering government-backed low-interest loans, increased advertisements etc), and discuss how to persuade the national and county governments to increase their transit subsidies.

Discussion questions

- Traditionally, capital-intensive metro investments have been funded by governments because they are too much of a burden on private corporations, making it difficult for them to earn a profit if saddled with cost of debt service. What would constitute a mutually beneficial level of investment from the public and private sector?
- Many American transportation agencies are exploring options to i o not use the system (regressive taxes). In addition: How can a change in farebox ratios be introduced as a political strength?
- Is PPP appropriate when expanding a current system (Metro or light railway) adding additional lines in a connected system? What are the main challenges doing this and what principles are important?
- What is the justification for keeping the farebox recovery ratio at 50%? This mandate will limit the ability of the transit provider to borrow capital for expansion and potentially shift the burden for transit funding to those that do not use the system (regressive taxes). In addition: How can a change in farebox ratios be introduced as a political strength?

Hagastaden, a new community under construction, will include 5,000 homes and 36,000 jobs. It will be supported by rehabilitating and extending the Värtan railway line.

Washington, DC

Adopting a better fare collection system

What is the state of the art in fare collection technology? How can a metro agency shift to an open merchant-based fare system? What are the benefits and pitfalls of making such a transition?

Washington DC has one of the most modern and innovative metros in the U.S. WMATA was the first to implement automatic train operations, and still is one of the only systems with time and distance-based fares. In 1999, WMATA adopted the SmarTrip contactless fare card to address the shortcomings of its magnetic strip media. Today, almost 80% of metro riders choose SmarTrip over the conventional magnetic fare media because of its speed, convenience, enhanced functionality and fare discount over magnetic strip cards. SmarTrip has helped to unify and simplify complex fare structures, and it has sped up the process of riders moving through the faregates upon both entry and exit. Now, WMATA is looking to replace its aging fare collection system, and adopt a more open, "merchant-based" model.

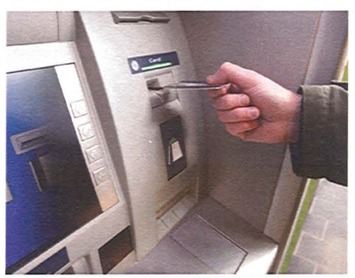
Under a merchant-based model, WMATA's role will change from a payment media issuer to more like a retail merchant. With this change, WMATA will focus on improving transit customer service and achieving operating efficiencies. Customers would enjoy the convenience of paying their fare using their bank-branded contactless payment cards (prepaid, debit or credit) near-field communications (NFC) based smart phones or federally-issued identity credentials. For WMATA, merchant-based fare collection has the potential to save money, by avoiding the costly handling of cash by employees, and by reducing vending machines and ticket booths and introducing more options to manage transit accounts, particularly over the internet. Merchant-based fare collection can also improve security, simplify fare structures, and provide greater flexibility to customers.

The SmarTrip card could be retained during the transition, and for riders who might not have banks accounts or credit cards. WMATA is in the procurement process under the New Electronic Payments Program (NEPP) and anticipates award in the summer of 2012.

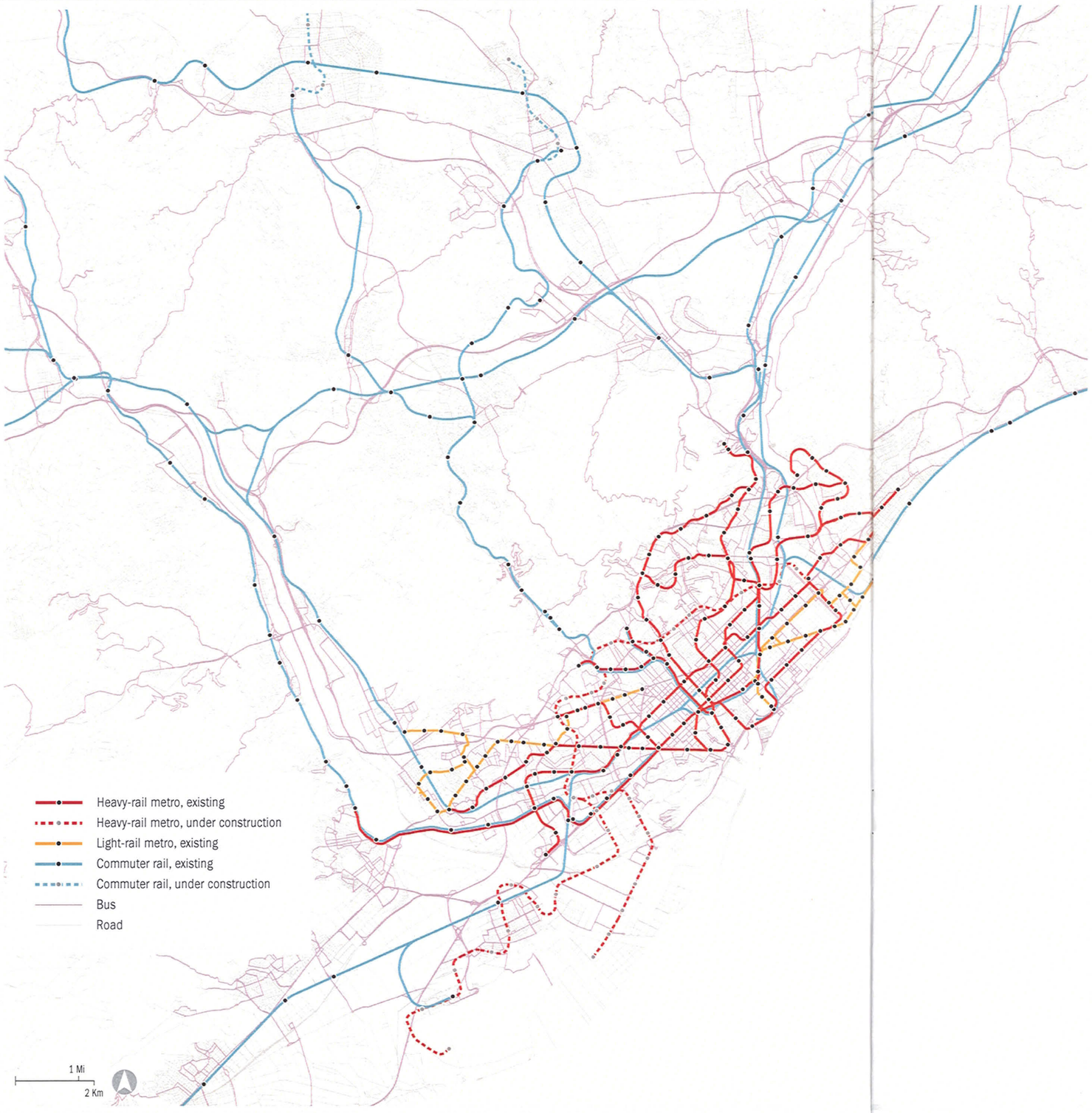
Discussion questions

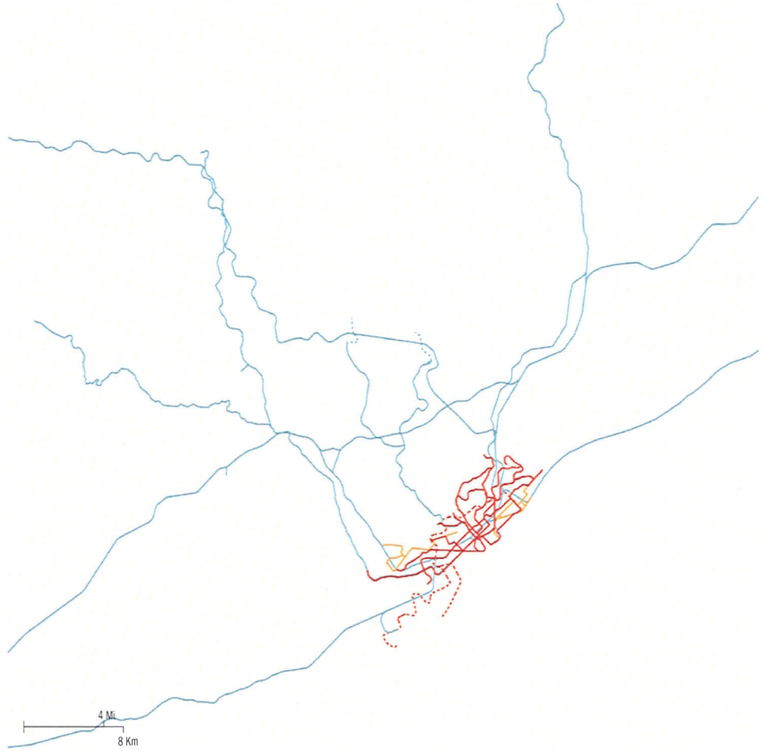
- The "merchant-based" model will shift the fare collection from a traditional prepaid based operation to a bank card based approach that inherently encourages "Pay-As-You-Go" philosophy. What potential policy changes can WMATA consider to eliminate revenue risk?
- Should WMATA focus on its core competencies of moving customers and outsource the more peripheral functions of managing a fare system and collecting fares? Should WMATA fully capitalize their investment in the system or explore a different hybrid approach wherein the vendor also has an investment in the new system and potential for gain share?
- Should WMATA and other transit agencies band together to standardize the look/touch/feel of the reader and key customer interface points to enhance the customer experience?
- WMATA intends to keep their distance-based fare system. Are there advantages to dropping this scheme and going with a flat or more simplified zonal system (cost, speed and fare structures)?
- A discounted transaction rate with the "big-three" credit card companies would need to be negotiated to make this scheme affordable (or really feasible). Can transit properties band together to negotiate better rates? Can the credit card companies and banks assume additional costs, vending machines?

By outsourcing the management of fare collection, WMATA could focus on its core competency: running transit.



Barcelona





Residents (millions)

City
1.6

Metropolitan
5.0

Surface area (km2)
City: 101
Metro: 3,239

Density (res/km2)
City: 16,000
Metro: 1,500

Metropolitan residential growth trajectory (millions)

2000	2010	2020
4.4	5.0	5.1

Annual ridership (millions)

2000

HR metro	LR metro	Commuter	Bus	BRT	Ferries
342	-	69	228	-	-

2010

HR metro	LR metro	Commuter	Bus	BRT	Ferries
401	24	140	358	-	-

Stations, metropolitan region

2000

HR metro	LR metro	Commuter
143	-	115

2010

HR metro	LR metro	Commuter
164	60	128

under construction

HR metro	LR metro	Commuter
+41	+0	+7

BARCELONA AUTORITAT DEL TRANSPORT METROPOLITÀ

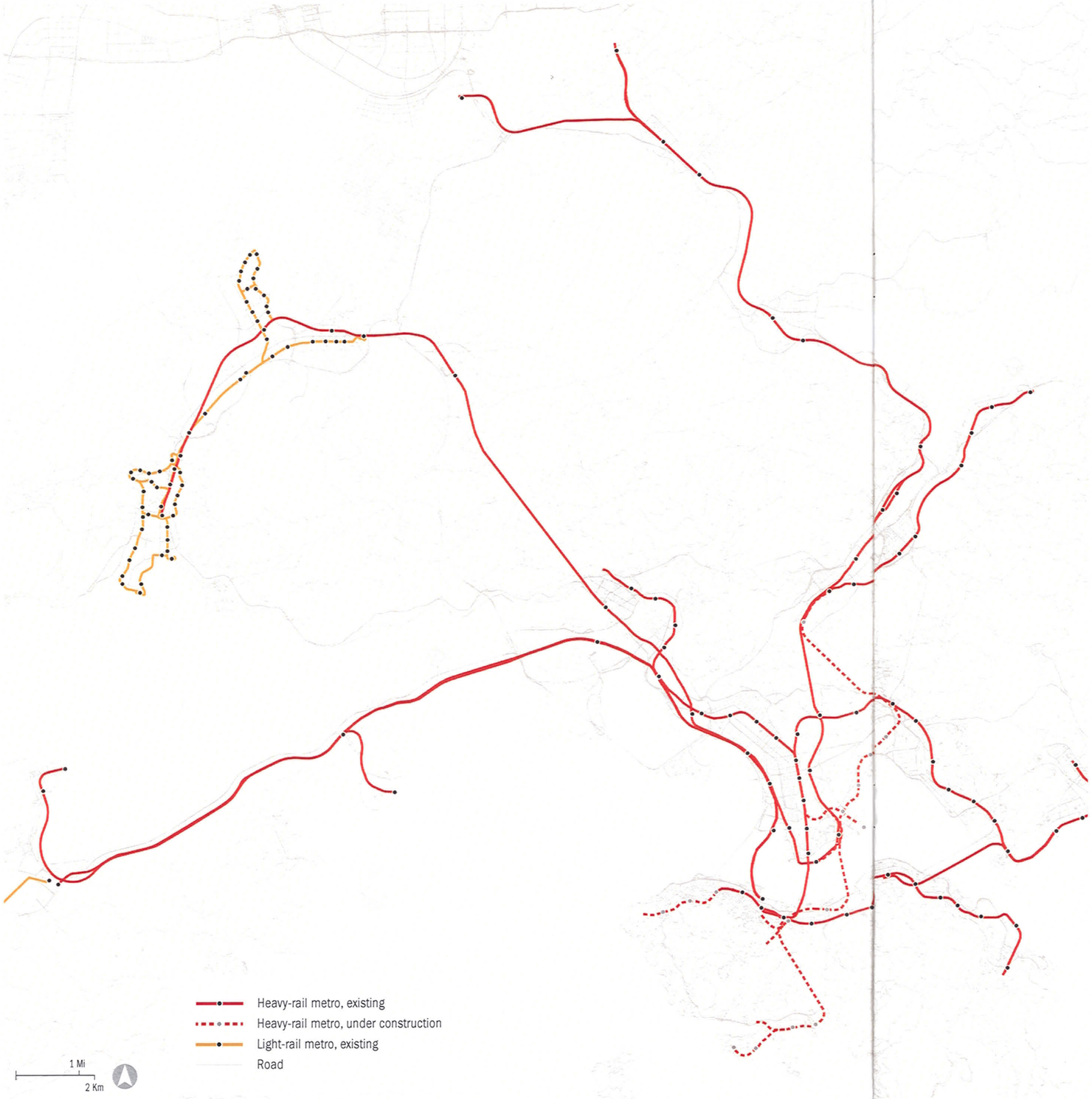
Responsibilities
ATM plans all public transit (metro, light rail, bus, commuter rail) in the region.

Other transit agencies in the region
Operations are run by various private entities: FGC operates the commuter rail, funicular, and Lines 6, 7, and 8 of the metro; TMB operates the rest of the metro and bus; RENFE operates commuter rail; TRAMMET operates light rail.

Governance
ATM is governed by a board of directors made up of representatives from the Government of Catalonia, the local administrative bodies, ATMU, and two observerving members from the central government.

Summit representative
- Xavier Roselló, Deputy Technical Director

Hong Kong



Residents (millions)

City
7.1

Metropolitan
7.1

Surface area (km2)
City: 1,104
Metro: 1,104

Density (res/km2)
City: 6,400
Metro: 6,400

Metropolitan residential growth trajectory (millions)

2000	2010	2020
6.7	7.1	7.7

Annual ridership (millions)

2000

HR metro	LR metro	Commuter	Bus	BRT	Ferries
778	-	-	2,116	-	56

2010

HR metro	LR metro	Commuter	Bus	BRT	Ferries
1,410	155	-	2,106	-	49

Stations, metropolitan region

2000

HR metro	LR metro	Commuter
44	-	-

2010

HR metro	LR metro	Commuter
84	68	-

under construction

HR metro	LR metro	Commuter
+19	+0	+0

HONG KONG MTR

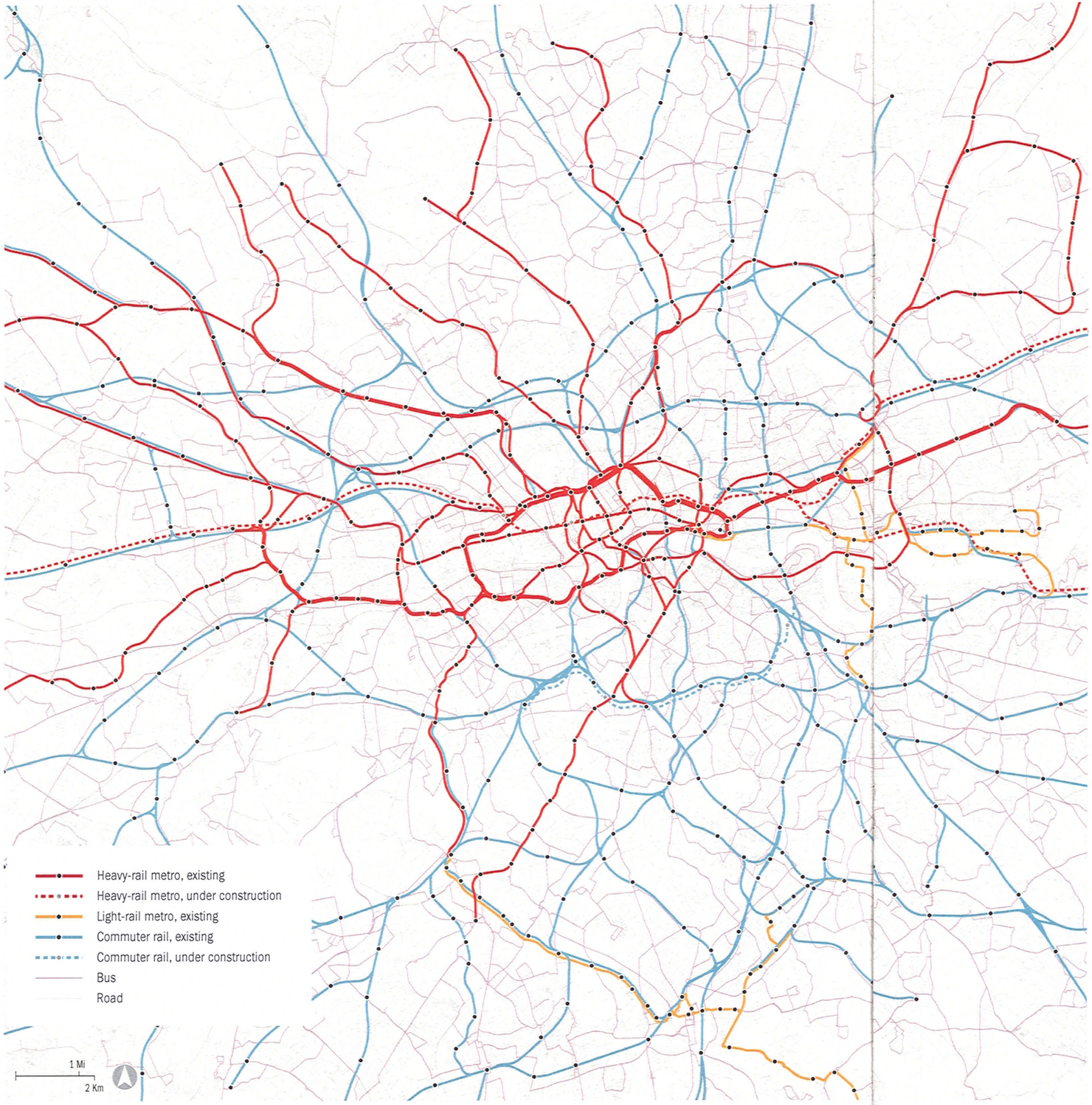
Responsibilities
MTR operates Hong Kong's metro and light rail, as well as some bus.

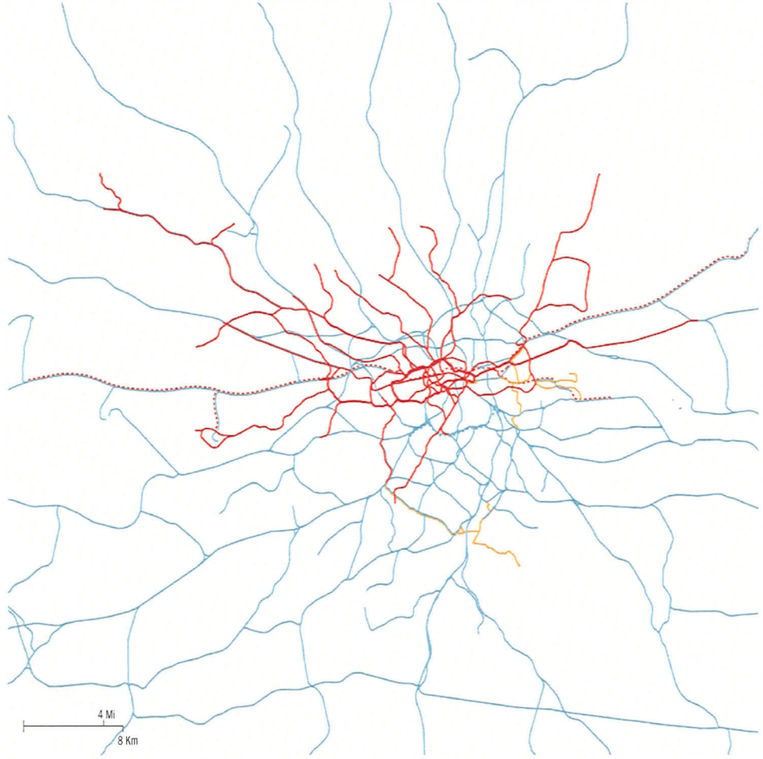
Other transit agencies in the region
Planning is handled by the Hong Kong Transport Department. Various private companies operate buses and ferries.

Governance
MTR is a private company that operates transit in Hong Kong and other world cities.

Summit representative
- Morris Cheung, Human Resources Director

London





Residents (millions)

City
7.8

Metropolitan
17.7

Surface area (km2)

City: 1,579
Metro: 27,833

Density (res/km2)

City: 5,000
Metro: 600

Metropolitan residential growth trajectory (millions)

2000	2010	2020
15.5	17.7	18.7

Annual ridership (millions)

2000

HR metro	LR metro	Commuter	Bus	BRT	Ferries
970	38	UNK	1,354	-	2

2010

HR metro	LR metro	Commuter	Bus	BRT	Ferries
1,107	106	54	2,289	-	4

Stations, metropolitan region

2000

HR metro	LR metro	Commuter
273	34	UNK

2010

HR metro	LR metro	Commuter
268	79	890

under construction

HR metro	LR metro	Commuter
+9	+0	+0

TRANSPORT FOR LONDON

Responsibilities

TfL plans and operates all metro, light rail, buses and ferries in the region. It also operates the congestion charge, traffic signals and manages many of the region's main roads. It also regulates London's taxis.

Other transit agencies in the region

Network Rail, a semi-public entity, manages the commuter rail network with services provided by private train operating companies.

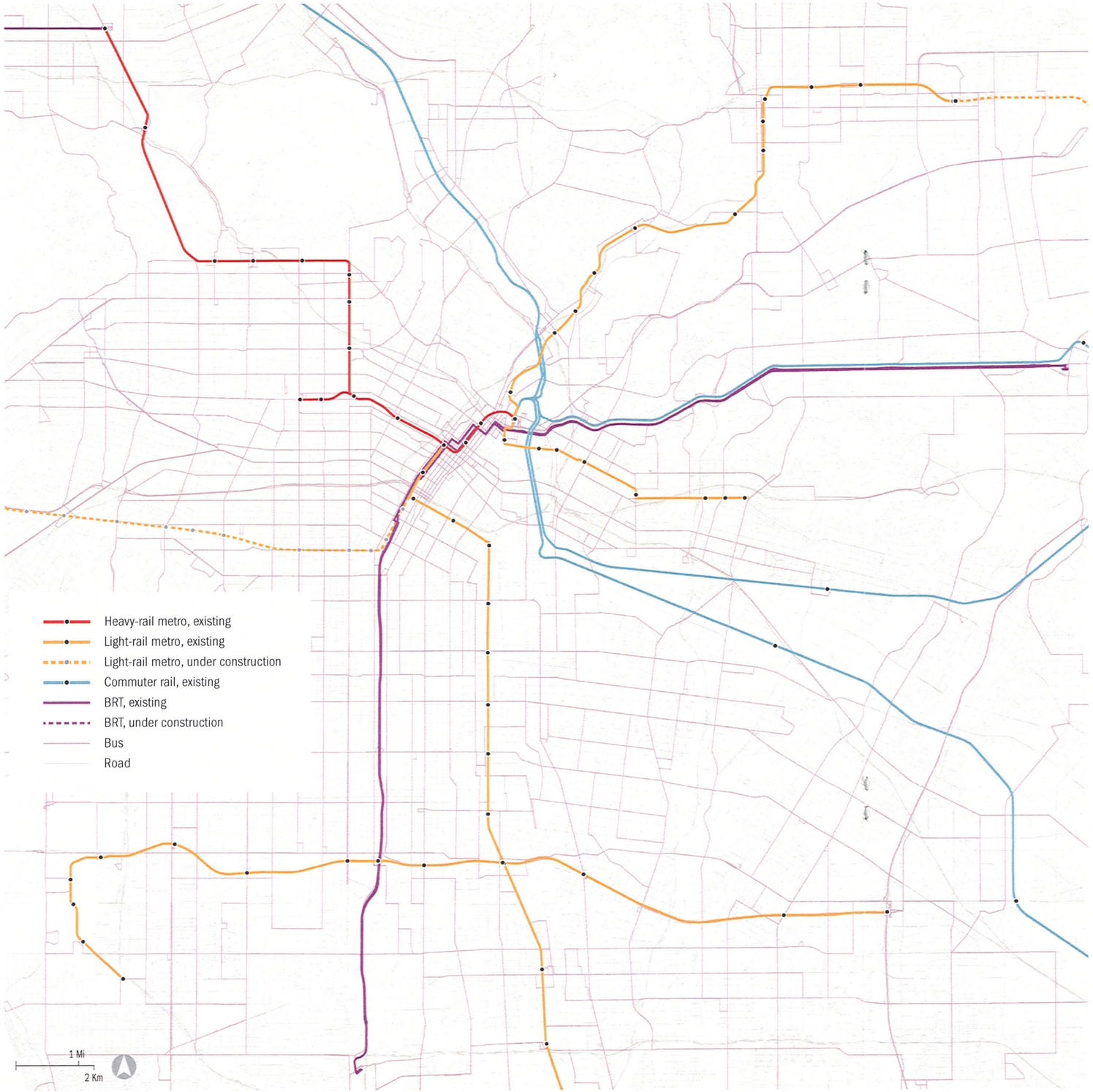
Governance

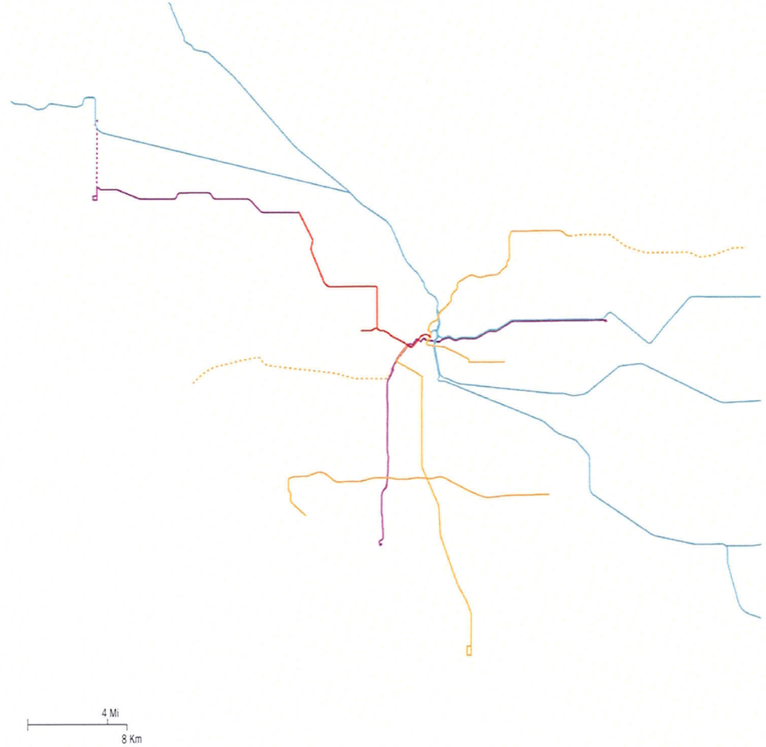
TfL reports directly to the Mayor of London who is also supported by the Greater London Authority, the strategic land-use authority for London.

Summit representative

- Elaine Scagriff, Head of London Wide Policy and Strategy

Los Angeles





Residents (millions)
City
3.8
Metropolitan
17.9

Surface area (km2)
City: 754
Metro: 86,393

Density (res/km2)
City: 5,000
Metro: 200

Metropolitan residential growth trajectory (millions)

2000	2010	2020
16.4	17.9	19.4

Annual ridership (millions)

2000

HR metro	LR metro	Commuter	Bus	BRT	Ferries
28	30	7	359	-	-

2010

HR metro	LR metro	Commuter	Bus	BRT	Ferries
48	46	12	400	8	-

Stations, metropolitan region

2000

HR metro	LR metro	Commuter
16	36	47

2010

HR metro	LR metro	Commuter
16	53	55

under construction

HR metro	LR metro	Commuter
+0	+16	+0

LOS ANGELES METROPOLITAN TRANSPORTATION AUTHORITY (METRO)

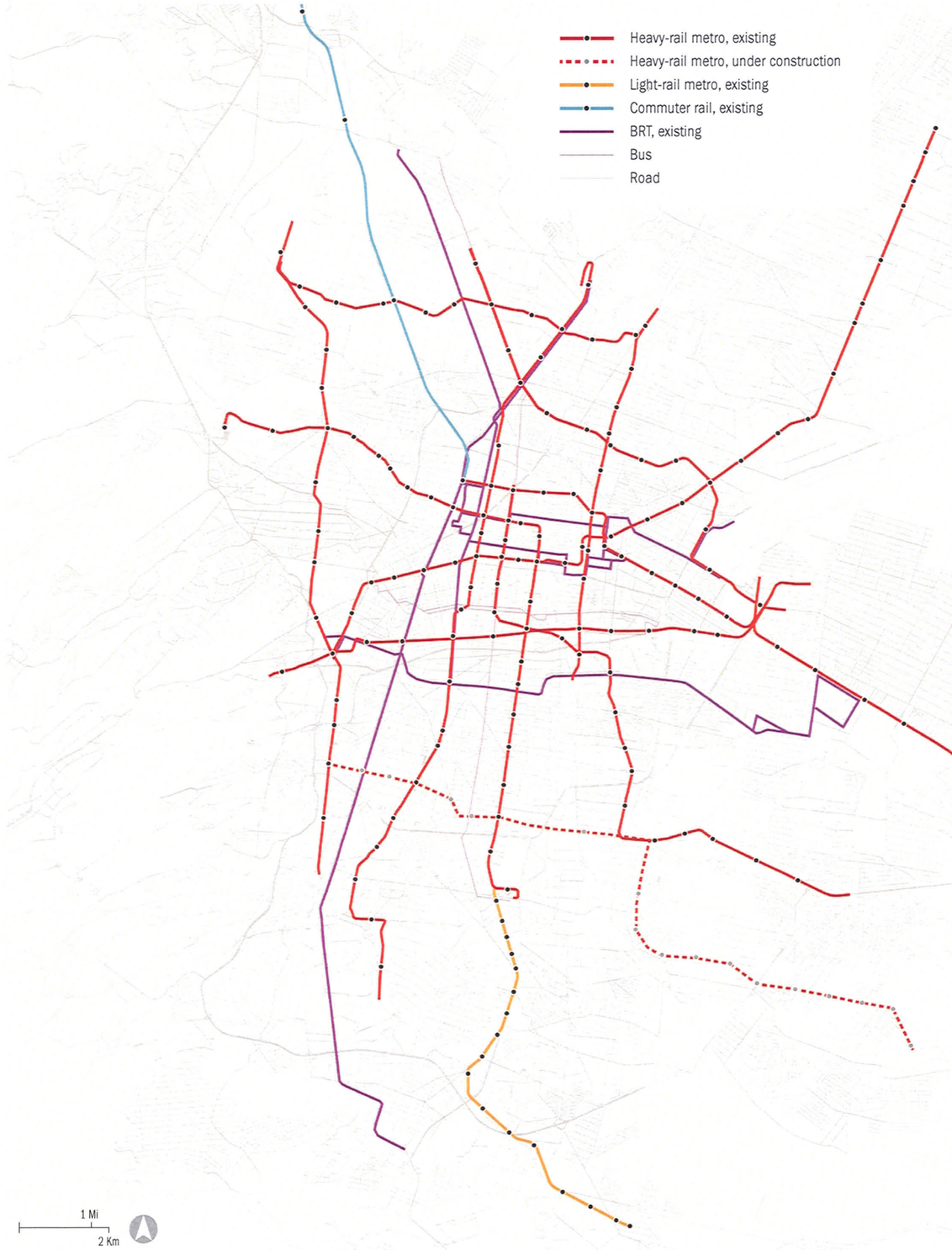
Responsibilities
LA Metro plans and operates all metro, light rail, BRT and nearly all buses in the region. LA Metro also manages HOV lanes on some highways.

Other transit agencies in the region
Metrolink operates the commuter rail. Some bus operations are assumed by Los Angeles Department of Transportation and AC Transit.

Governance
LA Metro is a state-chartered organization overseen by a board consisting of the mayor of Los Angeles, the five LA County supervisors, three mayor appointees, and rotating representatives of cities served.

Summit representatives
- Arthur T. Leahy, CEO
- David Yale, Deputy Executive Officer for Countywide Planning and Development

Mexico City



Residents (millions)

City
8.9

Metropolitan
21.2

Surface area (km2)

City: 1,486
Metro: 7,815

Density (res/km2)

City: 6,000
Metro: 2,700

Metropolitan residential growth trajectory (millions)

2000	2010	2020
18.4	21.2	unk

Annual ridership (millions)

2000

HR metro	LR metro	Commuter	Bus	BRT	Ferries
1,393	18	-	180	-	-

2010

HR metro	LR metro	Commuter	Bus	BRT	Ferries
1,410	29	5	270	147	-

Stations, metropolitan region

2000

HR metro	LR metro	Commuter
140	12	-

2010

HR metro	LR metro	Commuter
175	18	7

under construction

HR metro	LR metro	Commuter
+20	+0	+0

MEXICO CITY DEPARTMENT OF PLANNING AND TRANSPORT

Responsibilities

The municipal government of Mexico City plans the city's transit, and operates commuter rail, BRT and most bus lines within the city.

Other transit agencies in the region

The Metro is operated by the Sistema de Transporte Colectivo Metro. Light rail is operated by Servicio de Transportes Eléctricos. Some bus lines are operated by regulated private companies.

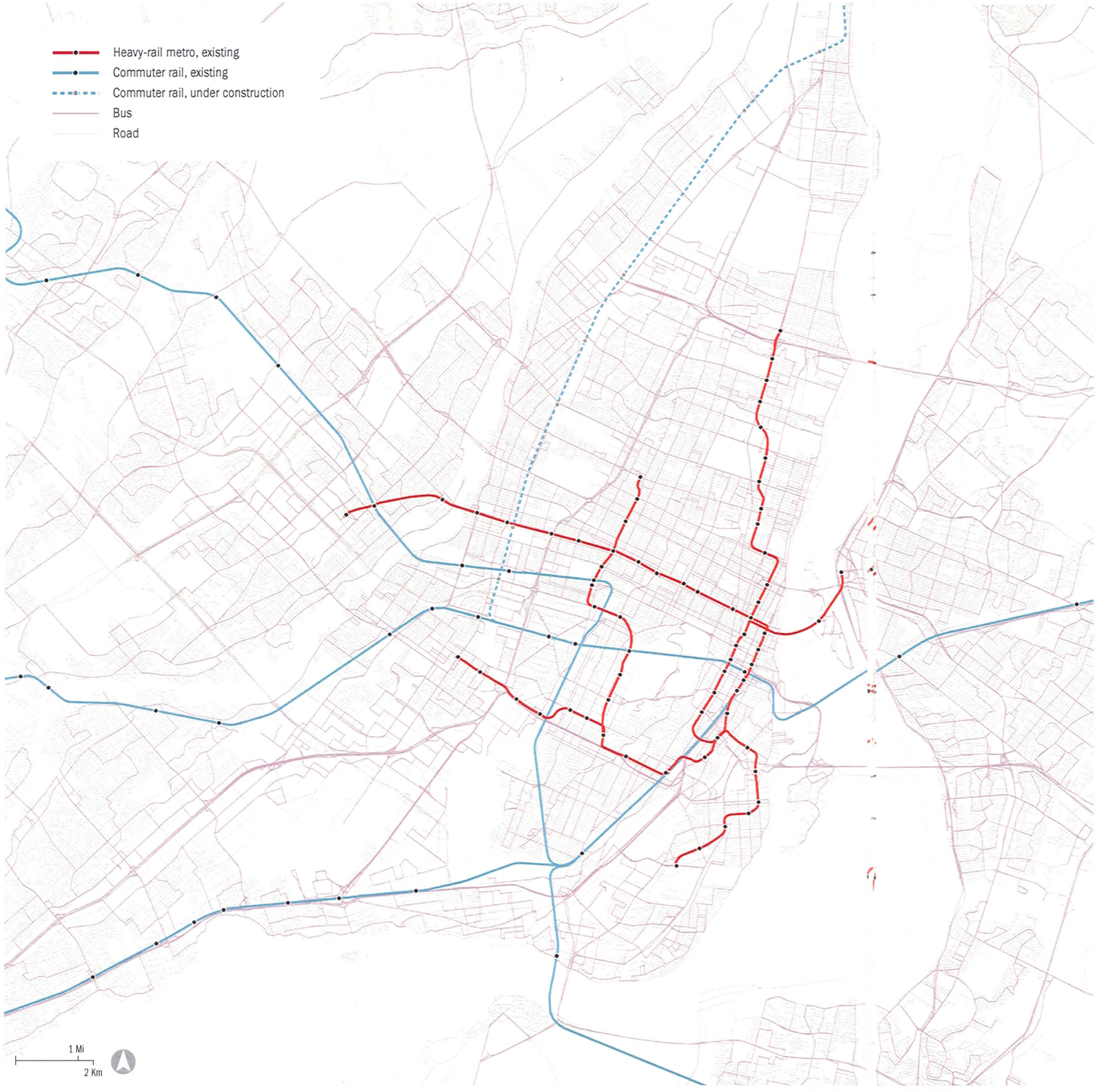
Governance

The Department of Planning and Transport is controlled by the Secretary of Transport and Roads

Summit representative

- Sergio Anibal Martínez Sánchez, Director General of Planning and Transport

Montreal



Residents (millions)
City
1.6
Metropolitan
3.8

Surface area (km2)
City: 365
Metro: 3,980

Density (res/km2)
City: 4,500
Metro: 900

Metropolitan residential growth trajectory (millions)

2000	2010	2020
3.3	3.8	4.0

Annual ridership (millions)

2000

HR metro	LR metro	Commuter	Bus	BRT	Ferries
209	-	12	423	-	-

2010

HR metro	LR metro	Commuter	Bus	BRT	Ferries
239	-	15	475	-	-

Stations, metropolitan region

2000

HR metro	LR metro	Commuter
65	-	40

2010

HR metro	LR metro	Commuter
68	-	51

2010

HR metro	LR metro	Commuter
+0	+0	+10

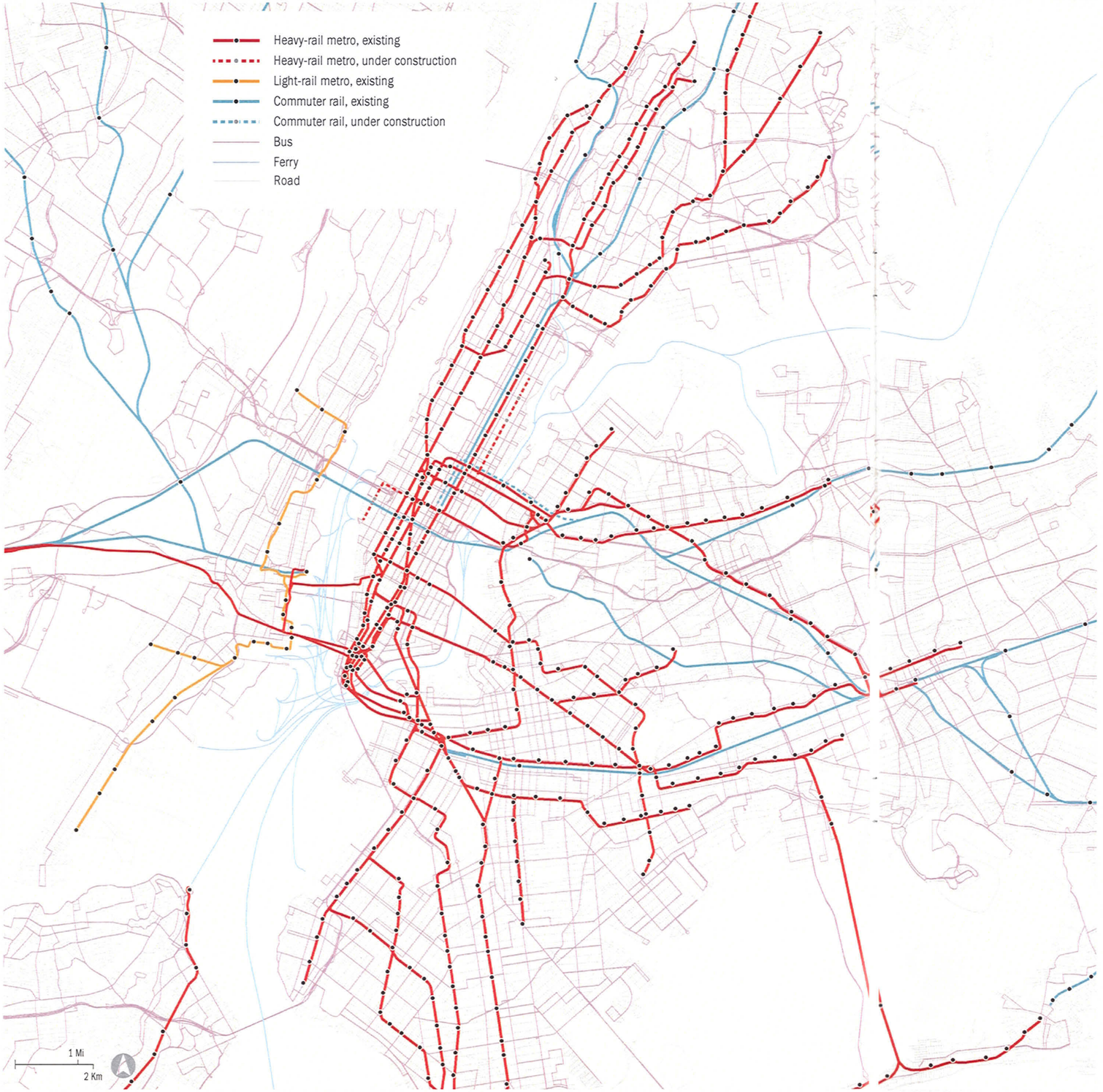
MONTREAL AGENCE MÉTROPOLITAINE DE TRANSPORT

Responsibilities
AMT plans all public transport in the region, and operates commuter rail and a few bus lines. AMT also manages HOV lanes and park-and-ride lots in the region.

Other transit agencies in the region
STM operates the Metro and most buses.

Governance
The state of Quebec oversees AMT and nominates four out of seven members of AMT's board. The other four represent Montreal and its suburbs.

Summit representative
- Daniel Bergeron, Vice-president of Strategic Information and Metropolitan Affairs



New York

Residents (millions)
City
8.2
Metropolitan
22.2

Surface area (km2)
City: 486
Metro: 33,307

Density (res/km2)
City: 16,800
Metro: 700

Metropolitan residential growth trajectory (millions)

2000	2010	2020
21.5	22.5	23.2

Annual ridership (millions)

2000

HR metro	LR metro	Commuter	Bus	BRT	Ferries
1,760	4	241	1,002	-	19

2010

HR metro	LR metro	Commuter	Bus	BRT	Ferries
2,522	21	261	1,055	-	23

Stations, metropolitan region

2000

HR metro	LR metro	Commuter
481	23	399

2010

HR metro	LR metro	Commuter
481	60	398

under construction

HR metro	LR metro	Commuter
+4	+0	+0

NEW YORK METROPOLITAN TRANSPORTATION AUTHORITY

Responsibilities

MTA plans and operates nearly all heavy-rail metro, most commuter rail and most bus in the region. MTA also has jurisdiction over many road bridges and tunnels.

Other transit agencies in the region

Commuter rail, light rail and buses in New Jersey are planned and operated by NJ TRANSIT, a New Jersey state agency. The Port Authority, controlled by New York and New Jersey, operates a small metro system between the two states. Various companies operate buses in the suburbs.

Governance

Members of the MTA's governing board are appointed by the New York State Governor and representatives of counties that MTA serves.

Summit representatives

- Joseph J. Lhota, Chairman and CEO
- Howard R. Permut, President of MTA Metro-North Railroad
- William Wheeler, Director of Special Project Development & Planning

Santiago

Residents (millions)
City
5.9
Metropolitan
6.9

Surface area (km2)
City: 641
Metro: 15,403

Density (res/km2)
City: 9,200
Metro: 400

Metropolitan residential growth trajectory (millions)

2000	2010	2020
6.2	6.9	7.5

Annual ridership (millions)

2000

HR metro	LR metro	Commuter	Bus	BRT	Ferries
208	-	UNK	1,300	-	-

2010

HR metro	LR metro	Commuter	Bus	BRT	Ferries
640	-	9	1,197	7	-

Stations, metropolitan region

2000

HR metro	LR metro	Commuter
52	-	-

2010

HR metro	LR metro	Commuter
108	-	18

under construction

HR metro	LR metro	Commuter
+0	+0	+0

TRANSANTIAGO

Responsibilities

Transantiago was created in 2007 to unify the city's bus and metro systems. It contracts out the operations of the metro and bus systems to a mix of public and private entities.

Other transit agencies in the region

The Metro is operated by the Empresa de Transporte de Pasajeros. Various private entities operate buses. MetroTren, a division of the National Chilean Railway, operates the commuter rail.

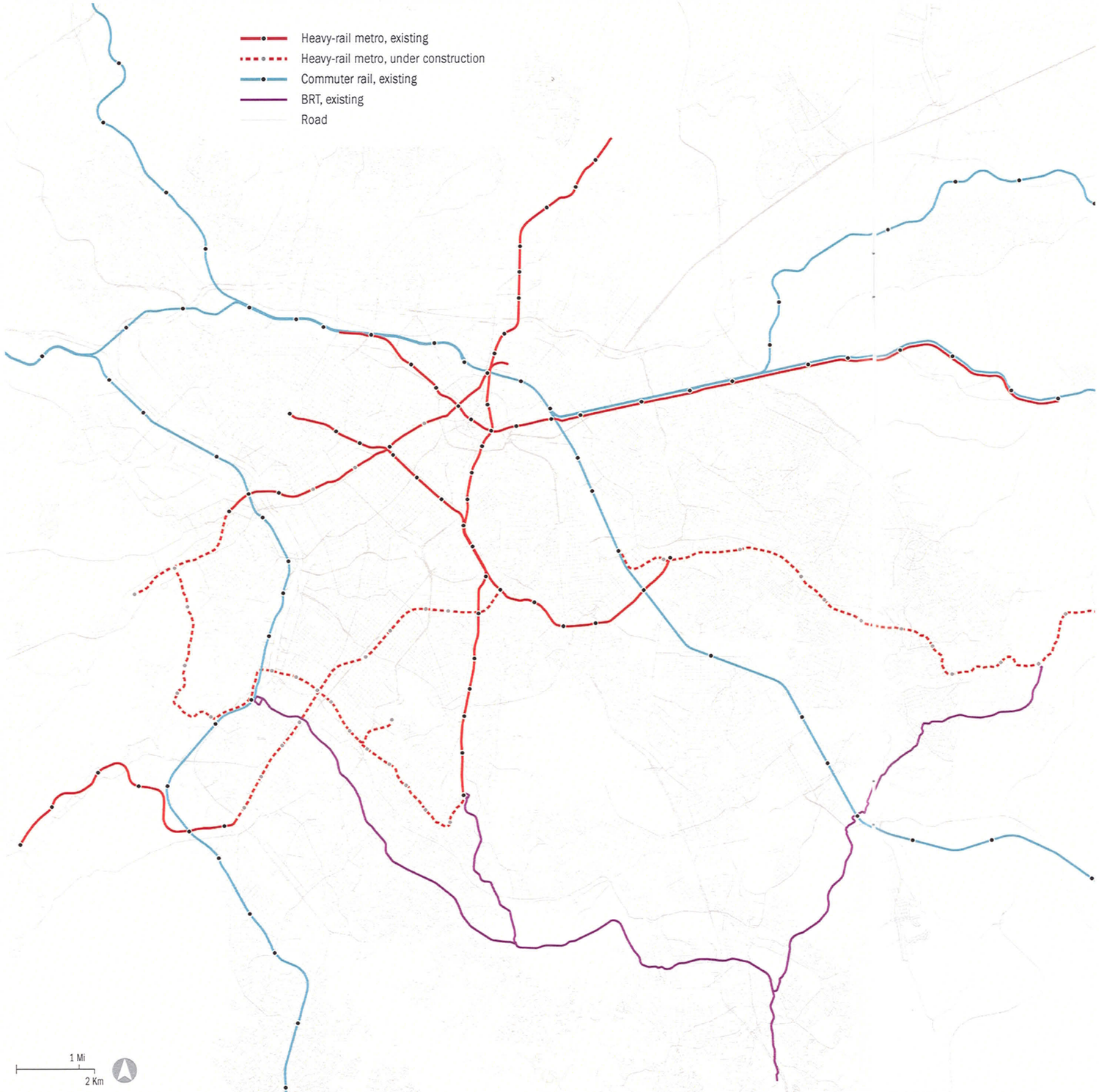
Governance

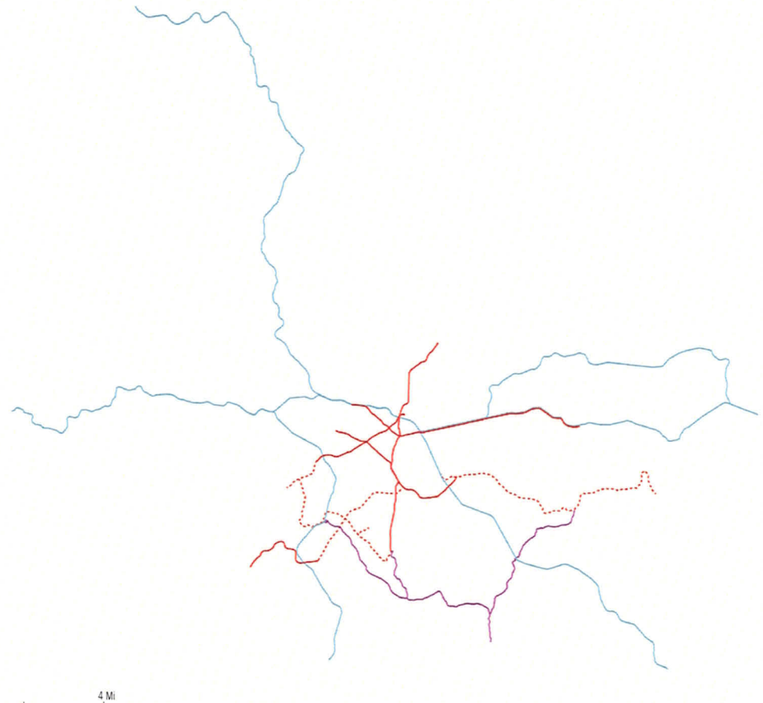
Transantiago is an administrative program of the national Ministry of Transport and Telecommunications, and reports directly to the Minister.

Summit representative

- Patricio Pérez, Head

São Paulo





Residents (millions)

City
11.3

Metropolitan
20.4

Surface area (km2)
City: 1,523
Metro: 2,914

Density (res/km2)
City: 7,400
Metro: 7,001

Metropolitan residential growth trajectory (millions)

2000	2010	2020
17.9	20.4	22.2

Annual ridership (millions)

2000

HR metro	LR metro	Commuter	Bus	BRT	Ferries
486	-	271	1,200	-	-

2010

HR metro	LR metro	Commuter	Bus	BRT	Ferries
754	-	642	4,357	90	-

Stations, metropolitan region

2000

HR metro	LR metro	Commuter
46	-	78

2010

HR metro	LR metro	Commuter
62	-	89

under construction

HR metro	LR metro	Commuter
+35	+0	+0

SÃO PAULO METRO

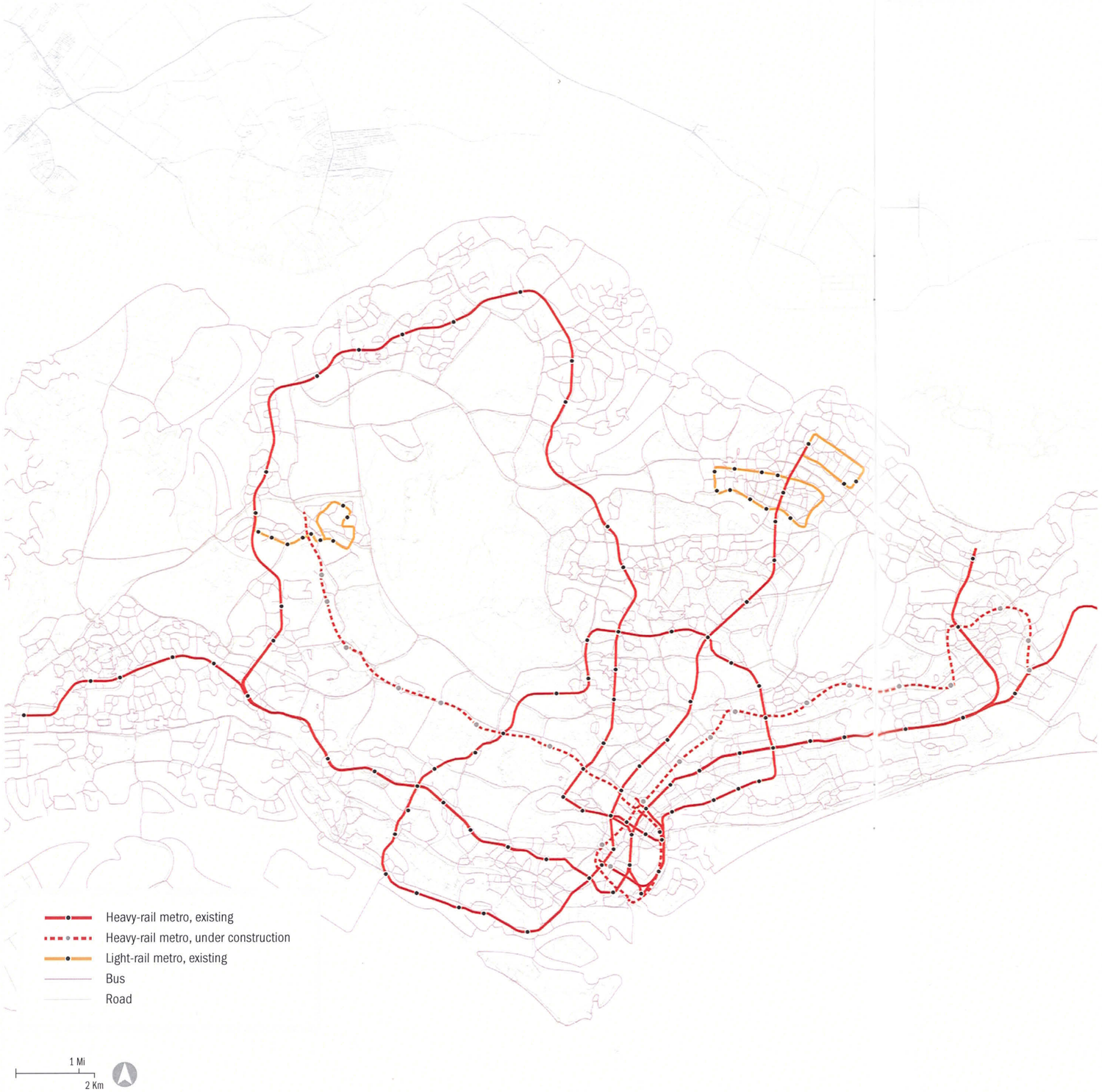
Responsibilities
SP Metrô operates all metro in the region. It shares planning responsibilities with the state of São Paulo.

Other transit agencies in the region
CPTM operates the commuter rail. Buses are operated by EMTU and a multitude of private operators.

Governance
The state of São Paulo oversees the agency through the São Paulo Metropolitan Transportation Department.

Summit representative
- Luiz Antonio Cortez Ferreira, Senior Environmental and Sustainability Specialist

Singapore



Residents (millions)

City
5.1

Metropolitan
5.1

Surface area (km2)
City: 712
Metro: 712

Density (res/km2)
City: 7,100
Metro: 7,100

Metropolitan residential growth trajectory (millions)

2000	2010	2020
4.0	5.1	unk

Annual ridership (millions)

2000

HR metro	LR metro	Commuter	Bus	BRT	Ferries
383	14	-	1,187	-	-

2010

HR metro	LR metro	Commuter	Bus	BRT	Ferries
755	37	-	1,167	-	-

Stations, metropolitan region

2000

HR metro	LR metro	Commuter
51	14	-

2010

HR metro	LR metro	Commuter
99	43	-

under construction

HR metro	LR metro	Commuter
+10	+0	+0

SINGAPORE LAND TRANSPORT AUTHORITY

Responsibilities
LTA plans all land transportation including public transit (Metro, light rail and bus) and highways in Singapore.

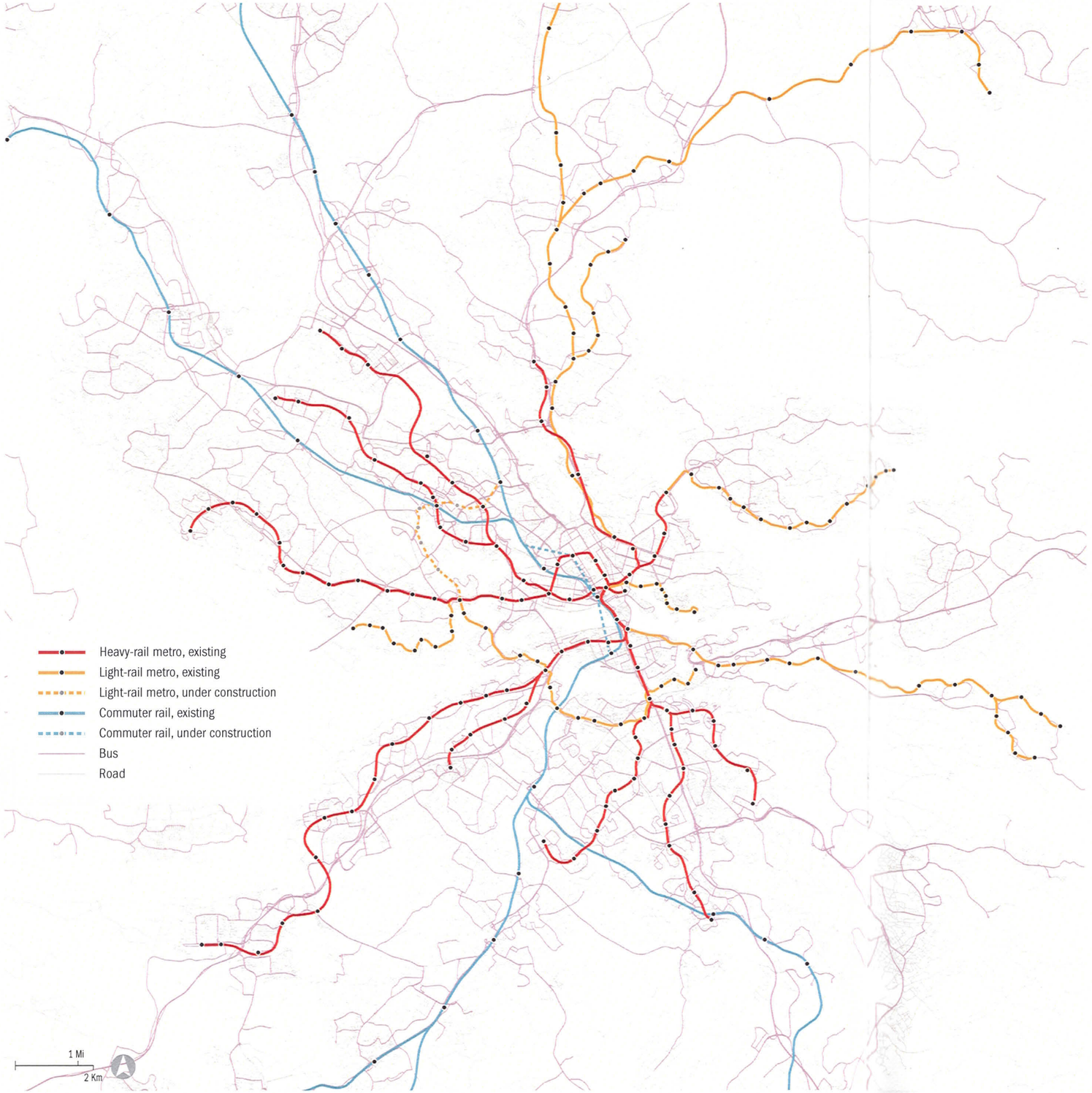
Other transit agencies in the region
The operations of metro, bus and taxi are assumed by two private companies, SMRT and SBS Transit.

Governance
LTA is an agency of the national government.

Summit representatives

- Lew Yii Der, Group Director of Corporate Planning & Research
- Choi Chik Cheong, Deputy Director of Knowledge Management

Stockholm



Residents (millions)
City
0.8
Metropolitan
1.2

Surface area (km2)	(res/km2)
City: 187	City: 4,500
Metro: 6,304	**Density** Metro: 200

Metropolitan residential growth trajectory (millions)

2000	2010	2020
1.1	1.2	1.3

Annual ridership (millions)

2000

HR metro	LR metro	Commuter	Bus	BRT	Ferries
284	22	61	259	-	UNK

2010

HR metro	LR metro	Commuter	Bus	BRT	Ferries
310	38	70	284	-	3

Stations, metropolitan region

2000

HR metro	LR metro	Commuter
100	98	50

2010

HR metro	LR metro	Commuter
100	98	50

under construction

HR metro	LR metro	Commuter
+0	+8	+2

STORSTOCKHOLMS LOKALTRAFIK

Responsibilities

SL plans all public transit (metro, light rail, bus, commuter rail) in the region. Operations are run by private operators through competitve bidding processes.

Other transit agencies in the region

The Metro is currently operated by MTR. Veolia operates the tram. Waxholmsbolaget operates ferries.

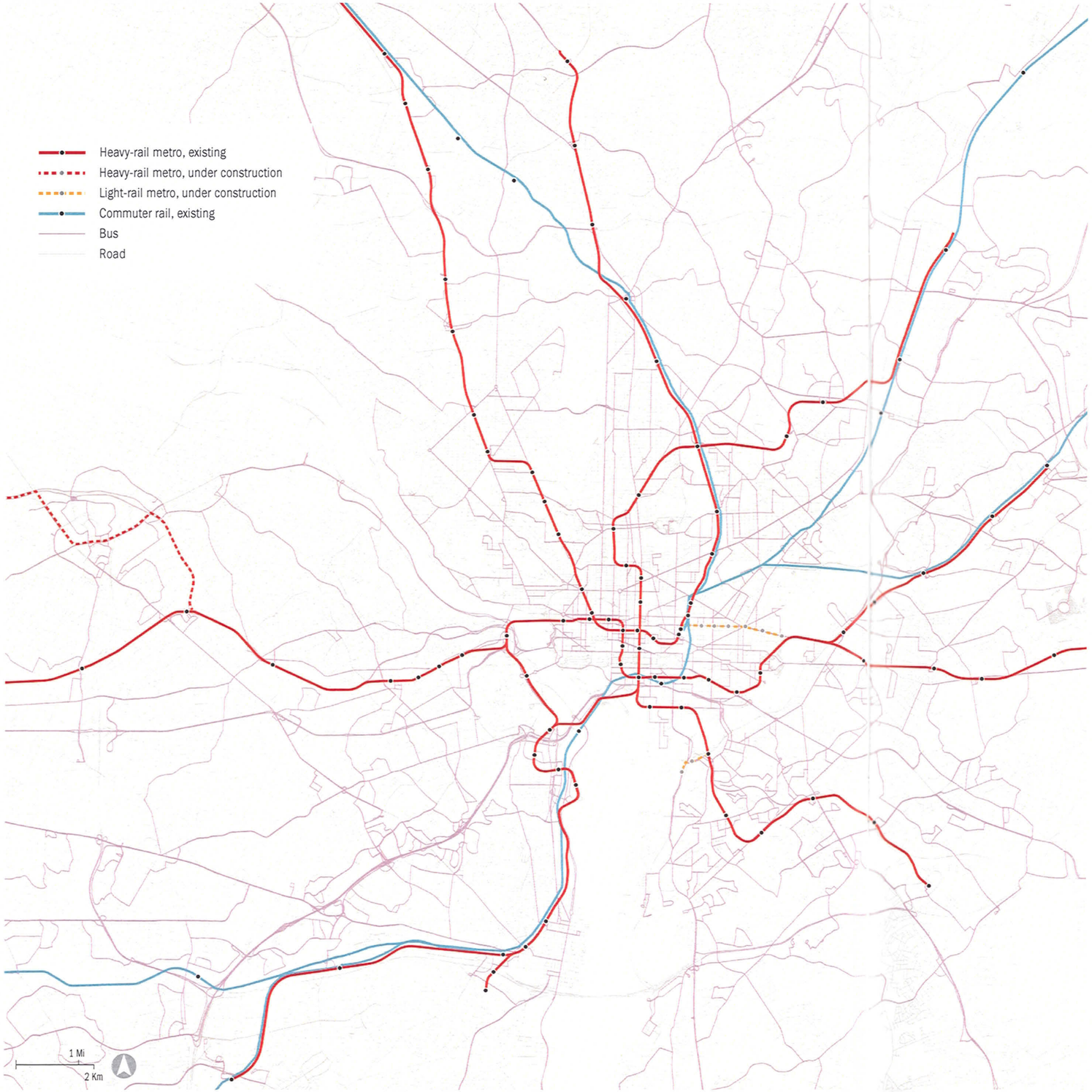
Governance

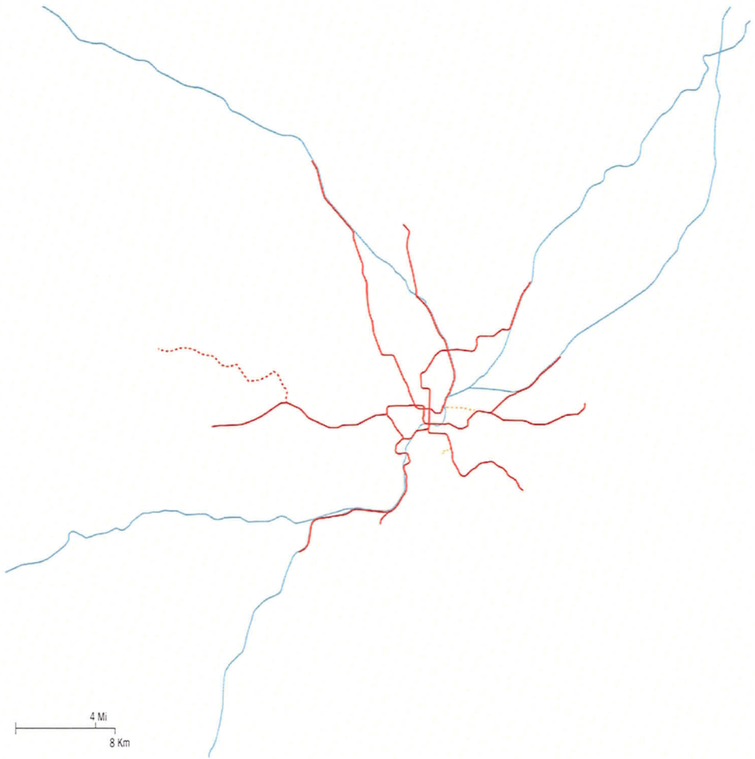
SL is owned by the Stockholm County Council.

Summit representatives

- Anders Lindström, Managing Director
- Henrik Normark, Director of Business Development

Washington, DC





Residents (millions)

City
1.0

Metropolitan
5.2

Surface area (km2)
City: 285
Metro: 21,477

Density (res/km2)
City: 3,400
Metro: 200

Metropolitan residential growth trajectory (millions)

2000	2010	2020
5.0	5.2	5.9

Annual ridership (millions)

2000

HR metro	LR metro	Commuter	Bus	BRT	Ferries
163	-	8	142	-	-

2010

HR metro	LR metro	Commuter	Bus	BRT	Ferries
217	-	12	121	-	-

Stations, metropolitan region

2000

HR metro	LR metro	Commuter
78	-	60

2010

HR metro	LR metro	Commuter
86	-	60

under construction

HR metro	LR metro	Commuter
+5	+10	+0

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY (METRO)

Responsibilities
WMATA plans and operates all metro and most bus in the region.

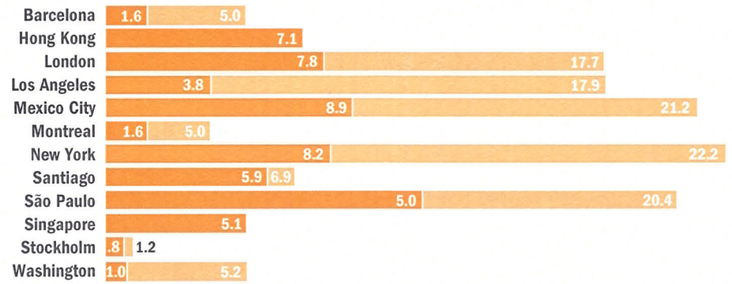
Other transit agencies in the region
Commuter rail is planned and operated by VRE and MARC, two publicly owned companies under the jurisdiction of Virginia and Maryland.

Governance
WMATA is funded by its member counties and run by a board consisting of members appointed by MD, DC, VA, and the federal government.

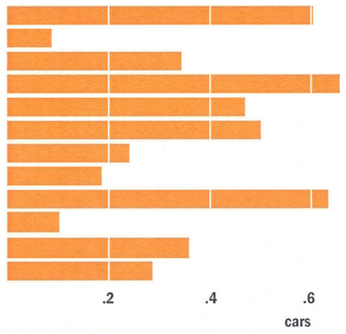
Summit representatives
- Richard R. Sarles, General Manager and CEO
- Carol Kissal, Deputy General Manager for Administration

Key Metrics

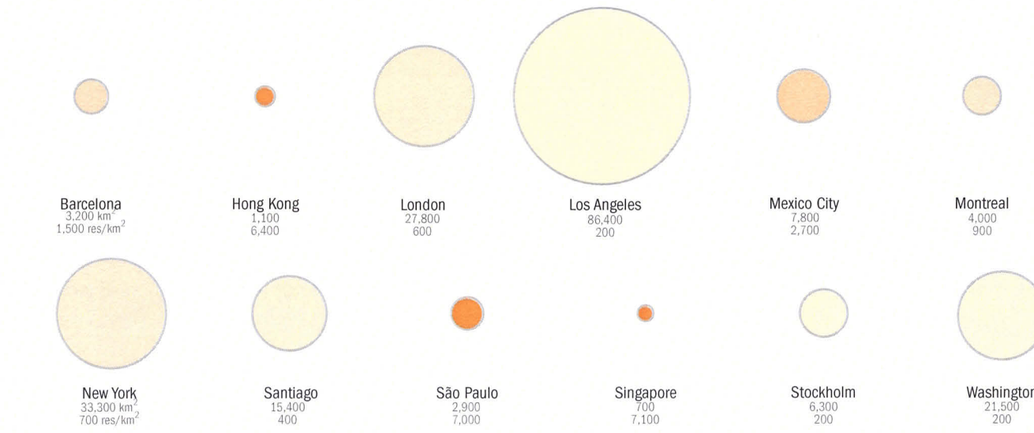
Residents, central city and metropolitan area (millions), 2010



Car ownership per capita (city)

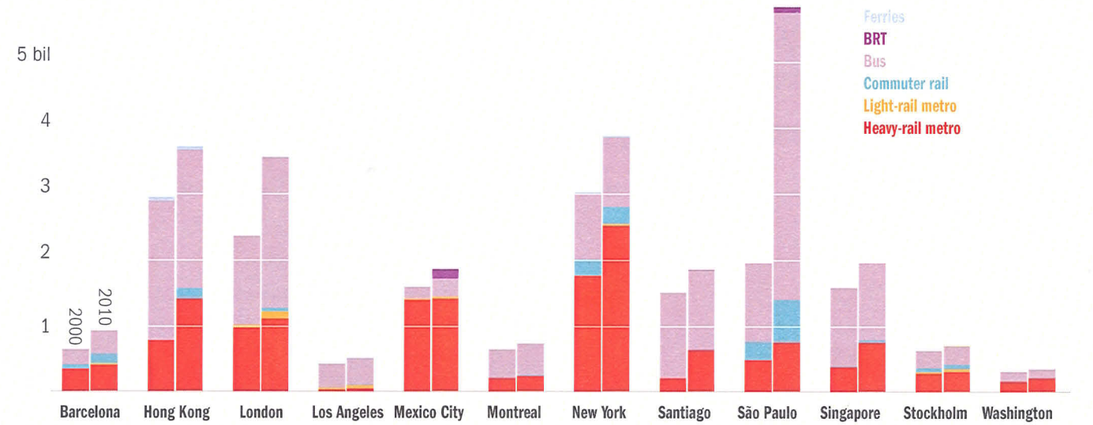


Metropolitan surface area (km2) and density (residents/km2)

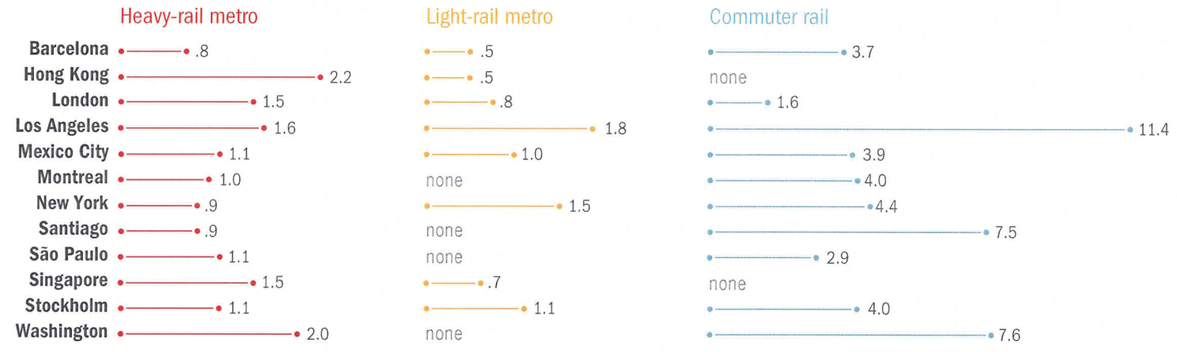


Residents, metropolitan area (millions), 2000, 2010, 2020 (projected)

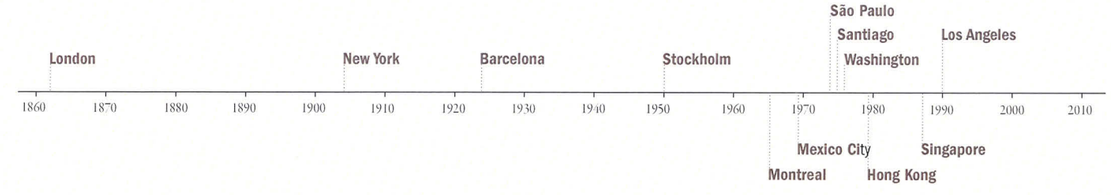
Annual ridership, by mode, 2000, 2010



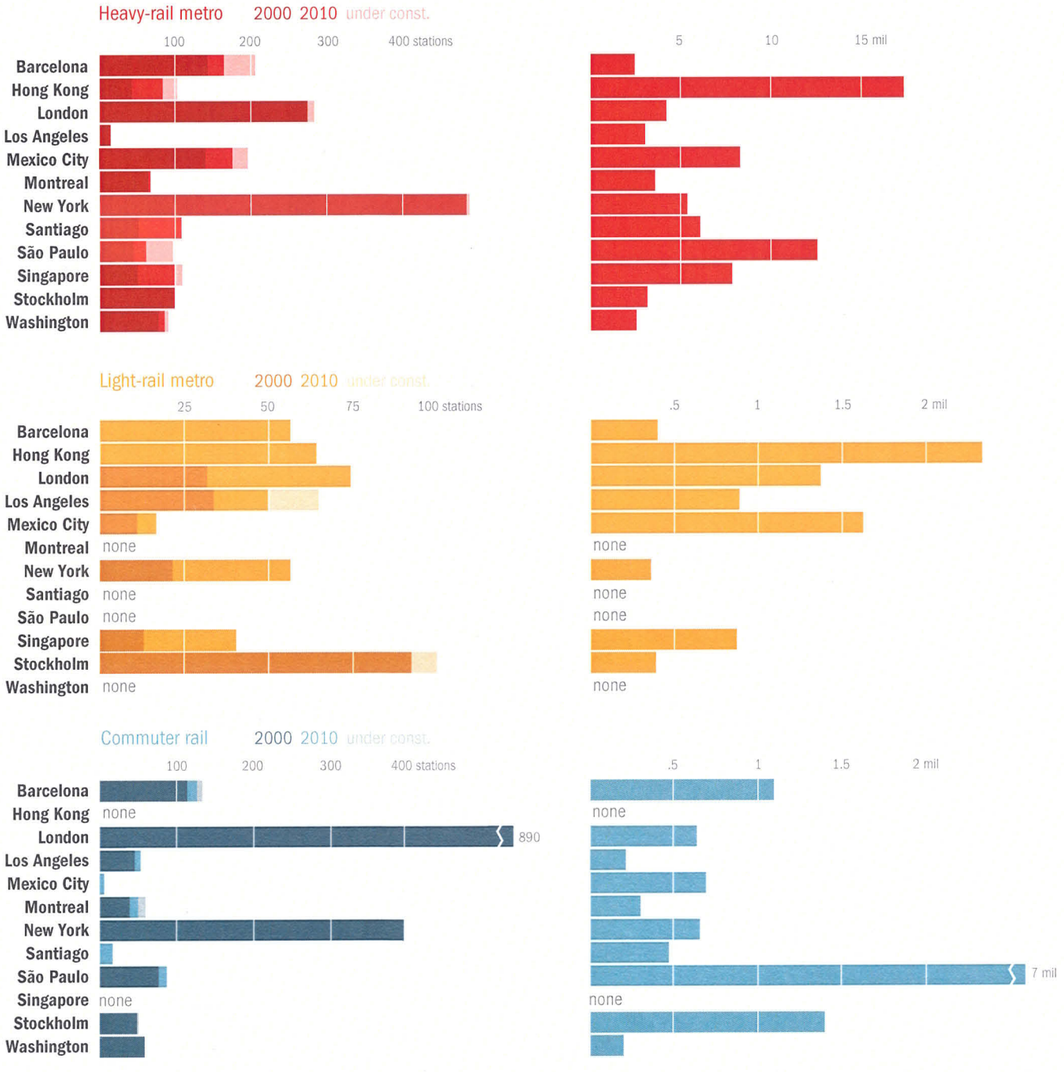
Average distance between stations (km)



Year metro opened



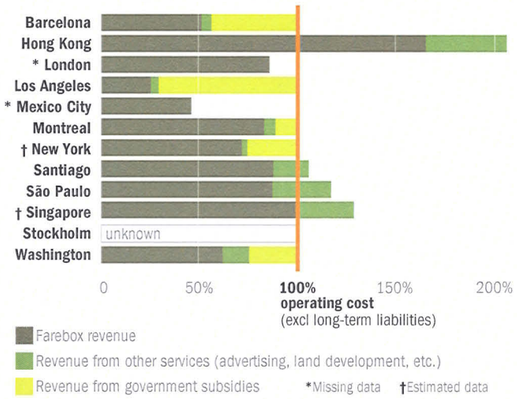
Stations, by mode, 2000, 2010, and under construction



Average annual ridership per station, by mode, 2010

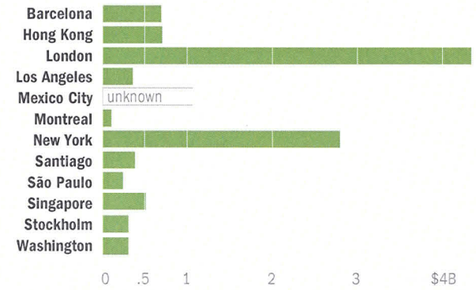
Operating budgets (heavy-rail and light-rail metro only)

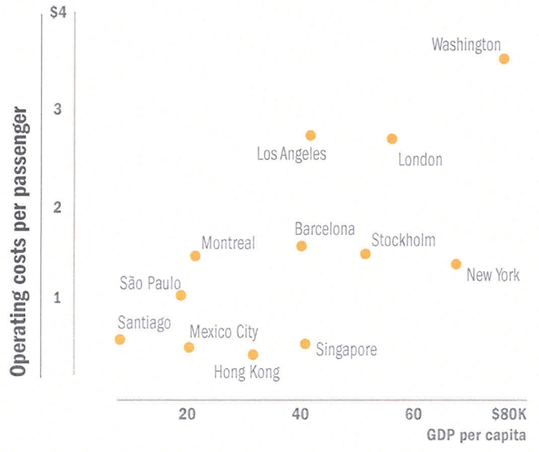
Revenues as a percentage of costs



Capital budgets (heavy-rail and light-rail metro only)

Annual capital expenditures (avg last five years, US $)





Detailed Metrics

			Barcelona	Hong Kong	London	Los Angeles	Mexico City	Montreal	New York	Santiago	São Paolo	Singapore	Stockholm	Washinton, DC
Urban Context	Residents	**City, 2010**	1,619,000	7,102,000	7,825,000	3,793,000	8,851,000	1,650,000	8,175,000	5,879,000	11,300,000	5,077,000	847,000	963,000
		Metro area, 2000	4,390,000	6,712,000	15,531,000	16,352,000	18,397,000	3,285,000	21,492,000	6,171,000	17,900,000	4,028,000	1,073,000	4,953,000
		Metro area, 2010	5,013,000	7,102,000	17,663,000	17,891,000	21,163,000	3,777,000	22,215,000	6,884,000	20,400,000	5,077,000	1,207,000	5,234,000
		Metro area, 2020 (projected)	5,120,000	7,733,000	18,687,000	19,430,000	unknown	3,972,000	23,228,000	7,461,000	22,180,000	unknown	1,347,000	5,851,000
	Surface area (km2)	**City** (excl. water area)	101	1,104	1,579	754	1,486	365	486	641	1,523	712	187	285
		Metro area (excl. water area)	3,239	1,104	27,833	86,393	7,815	3,980	33,307	15,403	2,914	712	6,304	21,477
	Regional GDP per capita		40,400	31,800	56,400	41,800	20,300	21,600	67,800	8,500	19,000	41,100	51,700	76,200
	Registered vehicles, city		982,000	608,000	2,691,000	2,500,000	4,165,000	827,000	1,961,000	1,088,000	7,187,000	511,000	304,000	275,000
Regional Transit System 2000	Annual ridership	**Heavy-rail metro**	342,000,000	777,800,000	969,700,000	27,957,650	1,393,000,000	209,403,700	1,759,771,563	208,000,000	485,600,000	383,400,000	284,000,000	163,275,000
		Light-rail metro	-	-	38,400,000	29,859,558	17,500,000	-	4,352,592	-	-	14,100,000	22,000,000	-
		Commuter rail	68,500,000	-	unknown	6,978,588	-	11,992,400	240,777,570	unknown	271,200,000	-	61,000,000	7,580,229
		Bus (incl private operators)	228,300,000	2,116,487,000	1,354,000,000	359,001,513	180,000,000	423,136,400	1,002,025,176	1,300,000,000	1,200,000,000	1,186,615,000	259,000,000	141,963,243
		BRT	-	-	-	-	-	-	-	-	-	-	-	-
		Ferries	-	56,140,000	1,573,830	-	-	-	19,000,298	-	-	-	unknown	-
	Number of stations/stops	**Heavy-rail metro**	143	44	273	16	140	65	481	52	46	51	100	78
		Light-rail metro	-	-	34	36	12	-	23	-	-	14	98	-
		Commuter rail	115	-	unknown	47	-	40	399	-	78	-	50	60
	Route length (km)	**Heavy-rail metro**	105	82	408	26	178	66	420	41	49	83	108	155
		Light-rail metro	-	-	29	66	19	-	18	-	-	8	110	-
		Commuter rail	443	-	unknown	619	-	170	1,830	unknown	261	-	200	455
		Bus (incl private operators)	8,500	-	unknown	3,251	4,200	11,137	5,124	10,000	22,500	155	9,451	11,307
		BRT	-	-	-	-	-	-	-	-	-	-	-	-
Regional Transit System 2010	Annual ridership	**Heavy-rail metro**	400,600,000	1,409,800,000	1,107,343,000	47,906,000	1,410,000,000	239,264,000	2,522,153,000	639,900,000	754,000,000	754,669,000	310,000,000	217,220,000
		Light-rail metro	23,800,000	154,522,000	106,177,000	46,409,000	28,506,000	-	21,491,000	-	-	36,740,000	38,000,000	-
		Commuter rail	140,400,000	-	53,600,000	12,006,000	4,855,000	15,472,000	261,296,000	8,500,000	642,000,000	-	70,000,000	12,129,000
		Bus (incl private operators)	357,500,000	2,105,888,000	2,288,986,000	399,928,000	269,839,000	475,239,000	1,054,567,000	1,197,000,000	4,357,200,000	1,167,458,000	284,000,000	121,102,000
		BRT	-	-	-	7,672,000	147,480,000	-	-	7,480,000	90,000,000	-	-	-
		Ferries	-	49,000,000	4,142,000	-	-	-	23,349,000	-	-	-	2,500,000	-
	Number of stations/stops	**Heavy-rail metro**	164	84	268	16	175	68	481	108	62	99	100	86
		Light-rail metro	60	68	79	53	18	-	60	-	-	43	98	-
		Commuter rail	128	-	890	55	7	51	398	18	89	-	50	60
	Route length (km)	**Heavy-rail metro**	129	182	402	26	201	71	415	95	71	149	108	171
		Light-rail metro	30	36	61	97	19	-	92	-	-	29	110	-
		Commuter rail	470	-	138	626	27	204	1,758	134	261	-	200	455
		Bus (incl private operators)	14,770	unknown	9,450	3,158	6,282	21,310	7,468	11,000	24,834	3,973	10,171	11,483
		BRT	-	-	-	32	67	-	-	61	33	-	-	-
	Route length under construction (km)	**Heavy-rail metro**	37	30	28	-	25	-	5	-	47	12	-	19
		Light-rail metro	-	-	-	31	-	-	-	-	-	-	7	4
		Commuter rail	10	-	-	-	-	52	7	-	-	-	13	-
	Stations under construction	**Heavy-rail metro**	41	19	9	-	20	-	4	-	35	10	-	5
		Light-rail metro	-	-	-	16	-	-	-	-	-	-	8	10
		Commuter rail	7	-	-	-	-	10	-	-	-	-	2	-
Focus on Metro (HR or LR)	Year metro opened		1924	1979	1863	1990	1969	1966	1904	1975	1974	1987	1950	1976
	Fare	**Base fare: range** (metro, US$, single trip)	$2.90 and up	$.45 to $6.57	$6.88 - $18.90	$1.50	$0.24	$2.94	$2.25	$1.23	$1.66	$0.68 to $2.03	$5.30 to $10.60	$1.60 to $5.20
		Fare: flat/zone/distance	zone	distance (HR), zone (LR)	zone	flat	flat	flat	flat	flat	flat	distance	zone	distance
		Surcharge at peak times	no	no	yes	no	no	no	no	yes	no	yes	no	yes
		Effective fare (average fare/trip, all customers)	$0.90	$1.01	$1.41	$0.67	$0.23	$1.22	$1.61	$0.71	$1.12	$0.87	$2.18	$2.63
	Annual system operating costs (excl long-term liabilities)		$700,321,000	$955,013,000	$3,283,485,000	$258,235,000	$734,579,000	$352,104,000	$3,345,935,000	$417,480,000	$812,831,000	$483,642,000	$532,585,000	$787,300,000
	Annual revenue	**Farebox**	$358,390,000	$1,578,959,000	$2,815,789,000	$65,708,000	$337,758,000	$292,598,000	$2,398,466,000	$366,130,000	$709,651,000	$490,224,000	unknown	$487,833,000
		Other services (advertising, land development, etc.)	$35,336,000	$392,196,000	unknown	$10,263,000	unknown	$19,590,000	$94,747,000	$74,860,000	$242,277,000	$132,149,000	unknown	$104,971,000
		Subsidies (state, city, federal government)	$306,595,000	$0	unknown	$182,264,000	unknown	$39,916,000	$852,722,000	$0	$0	$0	unknown	$194,496,000
	Capital budget (avg expenditures past 5 years)		$680,936,000	$693,556,000	$4,310,086,000	$343,176,000	unknown	$100,000,000	$2,774,201,000	$372,580,000	$234,291,000	$502,233,000	$297,830,000	$288,394,000

figures in grey are estimated

figures in grey are estimated

Notes

Notes