Best practice international examples of public passenger transport services and infrastructure.

Disclaimer: This report has been prepared by Lina Mbirkou in the context of the inquiry into the investment of Commonwealth and State funds in public passenger transport infrastructure and services.

While all solutions have to be considered on a case by case basis, the following case studies are an indication of some of the new developments around the world in the field of sustainable transport. The following examples are sourced from information available on Internet and have not been checked.

Ulm, Germany : A car by the hour

The mobility concept, as Daimler, the maker of Mercedes-Benz and Smart cars, refers to its program, is called Car2go. It is the latest wrinkle in car sharing, a plan for managing short-term, on-the-spot car rentals. Daimler has distributed 50 diesel-powered Smart cars around Ulm, a city of about 120,000 people, to field-test the first major project of its Business Innovation division.

Here's how Car2go works: After enrolling, members get an electronic chip for their driver's license that lets them unlock and drive a Smart, paying about 25 cents a minute, or $12.81 an hour, or $63 a day. The fee covers fuel and insurance as well as maintenance, depreciation and administrative overhead. The cars are tracked by GPS devices; users can find the location of an available car using a computer, telephone or PDA.

Daimler is taking Car2go a few steps beyond existing efforts to hasten the acceptance of sharing.

First, the electronic tag that unlocks the car attaches to the member's driver's license, eliminating the need to carry a new card.

Second, rentals can be spontaneous. While members may reserve a car, they need not — they can simply drive off in an available car parked on the street.

Third, the Smarts don't have a home. They can be taken from anywhere in Ulm and left anywhere else in the city.

Allowing one-way trips is a big difference from the norm. Most programs require cars to be returned to the starting point, both to manage reservations and because parking is scarce. A selling point for the Caisse Commune and Mobizen car-sharing programs in Paris is that **cars have dedicated parking spaces on the street**, rented from the city and protected by a folding barrier.

The full article and complementary information are available at:

http://www.nytimes.com/2008/10/26/automobiles/26SHARE.html?fta=y

Stockholm, Sweden: parking spots using cell phones

Drivers can now search for available parking spots using GPS technology on their cell phones. After parking, they call a number, enter in the parking meter's number, and are charged to their cell phone account. If the meter is in danger of expiring, the driver will get a warning via text message. This all-electronic method of parking also is simple for parking attendants, who simply need to wave a device to see if the parked car is logged in. Residents no longer need to worry about carrying around pocket change.

The full article and complementary information are available at:

http://www.nlc.org/ASSETS/B0949551562745DA91C1FB8F1A28768A/ipissuepapertransportsolutions032608.pdf

Europe: Mobility Week and car-free day

European Mobility Week and car-free day provide the ideal opportunity to promote integrated intermodal transport solutions.

The city of Cannes in France launched "Carte d'Azur", a low-price ticket offering two days' unlimited travel anywhere within the region's urban and interurban networks. Connecting urban trams and buses with regional railways is an excellent way of increasing accessibility to towns and cities. One example is provided

by the "Train-Tram-Bus" special days in Belgium.

Intermodalism also has to integrate individual transport modes like the car, which is an important feeder to public transport interchanges, as illustrated by Park+Ride. In Ljubljana, Slovenia, people who parked on the city outskirts were given free one-day tickets valid on all urban bus routes.

Integration between cycling and public transport has huge potential since journeys are reduced in distance and time if passengers are able to cycle rather than walk to the nearest bus, tram or metro stop. During the car-free day in 2002, the public transport operator (Berliner Verkehrsbetriebe) in Berlin, Germany, allowed all passengers to bring their bicycles on board vehicles at no extra cost. Over in Paris, France, RATP rented out bikes.

The full article and complementary information are available at:
http://www.uitp.org/mos/corebrief/CB-emw-en.pdf

Drachten, Netherlands: "shared space" model of integrating vehicle traffic, cyclist, and pedestrian movement.

Nicknamed the "Laweiplein," a four-way intersection was transformed into a square with a roundabout. The stoplights were removed and cyclists and pedestrians were given priority over motorists. Sidewalks were lowered and paved to create one seamless surface at the square. Water fountains, the height of whose water jets correspond to the number of cars in the intersection, were designed to calm motorists and improve the square's decor. Traffic moving through the intersection flows slowly but continuously; one study found that 81 percent of motorists and 97 percent of cyclists were able to move through the roundabout without having to stop. Traffic flow increased while simultaneously cutting accident rates in half.

The full article and complementary information are available at:

http://www.nlc.org/ASSETS/B0949551562745DA91C1FB8F1A28768A/ipissuepapertransportsolutions032608.pdf

Paris, France: "civilised spaces"

A network of pedestrian-priority shared streets was created, where the legal traffic speed was lowered to 15 km/h. New low-floor microbus circulators were introduced to improve local accessibility and

connections to transit stations. Free parking was eliminated altogether. Although parking permits are issued to residents for a nominal fee, they are only valid for parking spaces in the immediate vicinity. Under the program, 24 million euros were invested (about 260 euros per square meter) into widening sidewalks from 4 to 8 meters, planting trees, and building bikeways. Granite separators were put in to protect a new dedicated bus lane. To accommodate deliveries, 30 minute truck parking spaces were placed on the curb-side of the bus lane. Intersections were made safer with secured crosswalks, widened median refuge islands and extended crossing phases for pedestrians.
New pavement, landscaping, and street furniture were added to sidewalks and plazas. Businesses signed "charters of quality", harmonising displays and signs and promoting good public space practices.
The full article and complementary information are available at:
http://bikesharephiladelphia.org/PDF%20DOC/SustainableTravelMagazine-19Fall2007s.pdf

Paris, France: "Velib'" bicycle system

With a bicycle station every 300 metres or so across the whole of Paris, this is a whole new means of transport for the people of Paris. This service, available 24/7, plays an important part in reducing pollution and helps its users keep fit! No fewer than 1,451 stations and 20,600 bicycles were up and running by the end of 2007.
Since the start of 2001, Paris has seen an increase in bicycle use of over 48%. The setting up of Vélib' was the starting point of a major transformation in the way people travel around the capital. Managed by SOMUPI, a firm 66% owned by JCDecaux,the other shareholders being Médias & Régies Europe and Groupe Publicis, Vélib' provides everybody, Parisians, people travelling here from Ile-de-France to work or tourists a chance to use a bicycle to travel around the city as they see fit.
The Vélib' stations are spread out across the whole of Paris, with an increased density of stations close to major public transport nodes.
The full article and complementary information are available at:
www.paris.fr/portail/viewPDFileServlet?file_id=16272

La Rochelle, France: Electric car sharing

The LISELEC initiative is part of a wider transport policy which has been pursued in the La Rochelle area for some years now. Its objective is to provide, on a self-service basis, a fleet of 50 electric vehicles available from 7 pick-up points located in and around La Rochelle. The service is founded on two principles:
- To offer the inhabitants of La Rochelle area a clean and quiet means of urban transport;
- To offer city-dwellers a way of getting around which is both individual (by virtue of the vehicle) and public (in terms of vehicle ownership).
The service is operated by the Township Committee of La Rochelle. The vehicles in the electric fleet are Peugeot 106 and Citroën Saxo models. The vehicles are available 24 hours a day. Users "borrow" them using a proximity card issued on payment of their initial subscription to the service (5.50 euros per month). The card unlocks the vehicle's doors, the user enters his/her personal code on a keypad fitted in the dashboard, and the vehicle is ready to go. The vehicles are returned to one of the seven pick-up points using a similar procedure.
In addition to the advantages offered by electric vehicle technology (no noise or direct pollution), the LISELEC scheme also offers the following benefits:
- Total user freedom;
- Vehicles always available, free parking anywhere in La Rochelle area and reserved parking at pick-up points.
The full article and complementary information are available at:
http://www.energie-cites.org/db/la_rochelle_569_en.pdf

Heathrow Airport, London, England: Driverless taxis

Heathrow Airport is experimenting with the next generation of PRT technology. Tracks are currently being constructed to accommodate eighteen vehicles, each capable of seating four people. These electrically powered vehicles are embedded with laser sensors and are about 50% more energy efficient than standard buses. The Heathrow Airport PRT is being billed as a "driverless taxi" that will shuttle passengers between the parking lot and a terminal. Authorities even claim that the PRT system allows for quicker, more flexible transportation than personal vehicles. The current model is slated to launch in 2009 in conjunction with the opening of the new airport terminal. If the trial run goes well, Heathrow Airport may expand its PRT system to every terminal.

The full article and complementary information are available at:
http://www.nlc.org/ASSETS/B0949551562745DA91C1FB8F1A28768A/ipissuepapertransportsolutions032608.pdf

Hoboken, New Jersey, USA: Automated parking facility

A first-of-its kind, fully automated parking facility has opened in Hoboken, New Jersey. The facility operates using a computerized network of rails and pallets that handles cars with no human intervention. Developed by Robotic Parking, Inc. the system optimizes space utilization by doubling the number of parking spaces of a typical parking garage, or utilizing half the space of a conventional garage to accommodate the same number of cars.

To park a car, the driver pulls into one of four bays, locks the car and inserts a card into a computer. The car is lifted on a pallet and moved to an available slot. To retrieve the car, the driver again inserts the card in the computer and punches a secret code. The car is delivered in a bay with its front facing the street for easy exit. The process takes one to two minutes. The car is never driven once inside the facility and the driver never sets foot inside the garage or in a driveway, thus reducing the risk of personal injury. Multiple cars can be handled simultaneously. The computer allows the site to be monitored from a remote location, showing real-time vehicle movements for rapid detection of any mechanical problems. The garage is equipped with sensors, and if any unusual motion is detected (e.g., a child or a dog forgotten in the back seat), the parking system will not operate.

The full article and complementary information are available at:
http://esd.mit.edu/ctpid/cmp/observatory/supplement5.pdf

Portland, Oregon,USA: Synchronized intersections

In 2004, the city of Portland sought a method to decrease traffic, fuel consumption, and carbon emissions. Traffic engineers synchronized 135 intersections on just 16 streets within the city, resulting in more efficient traffic conditions. By coordinating the length of green lights with existing traffic flow, the city decreased the amount of time cars spend idling and accelerating. Signal timing is altered depending on the location and time in order to ease congestion. The goal is to allow cars moving at the right speed to be able to go from intersection to intersection without having to stop at a red light.

The full article and complementary information are available at:
http://www.nlc.org/ASSETS/B0949551562745DA91C1FB8F1A28768A/ipissuepapertransportsolutions032608.pdf

Bakersfield, California: bicycle "loop detectors

Bakersfield has installed bicycle "loop detectors," at intersections across the city. If a bicyclist pauses on top of the loop detector, the stoplight should turn green faster. Inductive loops, the latest version of these detectors, are more sensitive and are triggered by a break in the magnetic field. Road markings show where bicyclists must stop in order for the stoplight to react. A common problem is that signs or markings have been confusing or nonexistent. Bakersfield has advertised its bicycle detection program very well, including online directions aimed at bicyclists. It also has installed video detectors

at some intersections. Signal priority is most commonly used today for emergency vehicles and buses. Based on local priorities, such technology may be applied to efforts to increase bicycle use.
The full article and complementary information are available at:
http://www.nlc.org/ASSETS/B0949551562745DA91C1FB8F1A28768A/ipissuepapertransportsolutions032608.pdf

Cleveland, Ohio,USA: Bus Rapid Transit system

The HealthLine runs a fleet of 21 vehicles that run on a diesel-electric hybrid motor system that produce 90% less emissions than regular buses. A low sulfur diesel engine generates electrical power to run smaller electric motors mounted on each of the wheels.Each vehicle also has a GPS locator on board, which allows automated traffic signals to give the HealthLine buses priority at busy intersections, keeping them moving as much as possible. Three doors on each side of the vehicle make for fast and easy boarding and unboarding.

There are 59 stations along Euclid Avenue that serve the HealthLine. All stations are equipped with a fare card vending machine, 24-hour lighting, and an emergency phone. An illuminated text display informs passengers of expected arrival times. Between Public Square and East 107th Street, all stations have raised platforms that align with the floor of the rapid transit vehicle, making for very easy boarding and unboarding.

The full article and complementary information are available at:

http://en.wikipedia.org/wiki/HealthLine

Delhi, India: Transport Corporation

Delhi Transport Corporation (DTC) is the main public transport operator of Delhi. It operates buses on many bus routes. It is the largest compressed natural gas-powered bus service operator in the world. These buses have improved carrying capacity and better facilities like air-conditioning, less travel time, less congestion, more comfortable interiors, GPS navigation etc. One of DTC's many popular services is the issual of bus passes of monthly duration. It also issues bus passes for half-yearly, quarterly and monthly basis. Apart from these bus passes it also issues Green Card for a daily commuter which is a ticket valid for the whole day. DTC is very popular with its economical student bus passes. Student passes for DTC can be made for as low as Rs. 50 and is valid for four months. This makes DTC a very viable option for students.

The full article and complementary information are available at:
*en.wikipedia.org/wiki/**Delhi_Transport_Corporation***

Sao Paulo,Brazil: Courses in Bicycle Transport

In partnership with the CET (Traffic Engineering Company, http://www.cetsp.com.br), the Grupo Pro-ciclista (the municipality's inter-agency working group for the bicycle) and Brazilian NGO Transporte Ativo (http://www.ta.org.br), a total of 212 officials from Sao Paulo Municipality and State government institutions and PPPs received bicycle training, 97% of participants qualified the course as 'very good' or 'good,' and comments included 'the bicycle can help solve São Paulo's traffic problems,' and 'we need more courses like these!' Many participants said it was their first

encounter with cycle planning concepts, which have been not been received wide exposure in São Paulo until now. The city currently has 24 km of bikeways, and much of these are in parks.

The full article and complementary information are available at:

*www.itdp.org/index.php/projects/update/courses_in_**bicycle**_transport/*

Zurich, Switzerland: transport strategy

Importantly, Zurich is the only Swiss region where the share of trips by car is actually falling – and has been since the 1990 census.
Zurich is particularly significant because it's the wealthiest region in one of the wealthiest nations on earth, but also because the Canton as a whole is spatially dispersed, with around 1.3 million residents spread across 1729 square kilometres. The principal factors behind these results are:

- The provision of an excellent-quality multi-destinational integrated public transport network serving the whole Canton, delivered by a single public agency, the ZVV;
- A virtual moratorium on major new roads in the City of Zurich for around three decades;
- Implementation, in the late 1970s and 1980s, of a rigorous program of providing absolute on-street priority for trams and trunk bus routes in the City of Zurich.

This program has been so successful that there is almost no difference between peak hour and late evening running times for trams.

The full article and complementary information are available at:
www.abp.unimelb.edu.au/gamut/pdf/success-stories.pdf

Singapore : new technology applied to public transport

Singapore is planningto adopt the Connected Bus, a hybrid bus with a mobile hot spot that allows citizens to work while they ride. The Global Positioning System gives commuters an updated status of bus routes and connections; LED displays provide information on emissions saved through public transit; and an automated system reduces the environmental impact of the bus through better maintenance.

Another application that Cisco could bring to LTA's Singapore Urban Transport Solution Framework is the Personal Travel Assistant (PTA). PTA improves the transit experience within urban environments by empowering citizens to make more informed decisions on day-to-day transportation options based on schedule, financial and environmental implications. Accessible from any Web-based interface such as a mobile phone, PTA is the first service of its kind that provides green route options, integrates with other communication needs such as calendaring, and enables city agencies to predict and manage evolving citizen transportation needs more effectively. PTA is currently being considered by the city of Seoul for pilot testing.

The full article and complementary information are available at:

http://files.shareholder.com/downloads/CSCO/0x0x171466/ce803704-0861-4234-bd5f-7a18d885ece4/295198.pdf

Munich: intergrated traffic control center and transport system

Besides an integrated traffic control center, the Munich system includes signal preemption for buses and light rail; variable message displays; beacon-based on-board traffic guidance; trip planning kiosks; real-time parking guidance; and traffic information on the Internet at http://www.bayerninfo.de. Other systems, including a hand-held "personal travel assistant" now in the demonstration stage, are coming on line to provide individual travelers with optimum trip choices and the public at large with improved traffic flows.

The full article and complementary information are available at:
www.apta.com/services/intnatl/intfocus/itsbest.cfm

Curitiba, Brazil: Innovative Public Transportation

Curitiba's highly efficient bus system transports 75% of all weekday commuters. Curitiba's "surface subway" bus system costs approximately $3 million USD/km as compared to a typical tram system ($8-12 million USD/km) or a subway ($50-100 million USD/km). Characteristics of the Bus System:

- **Bus Only" Lanes**- Curitiba has restricted bus lanes along its main roads which service the areas that were carefully zoned to contain large buildings and high densities of people. This cuts down on travel time immensely.
- **"Tube Stations"-** Bus passengers pre pay the bus fare to the station attendant and enter the bus from "tube stations" which are at an even level with the buses. This practice drastically reduces boarding times.
- **Types of buses**- Curitiba uses five different types of buses with different capacities ranging from 80 to 270 passengers. At peak hours Curitiba's buses can transport up to 20,000 people per hour.
- **Magnitude**- Curitiba's buses cover about 900km of routes in virtually every area of the city. On a typical day, 1.9 million passengers use the buses which have received an 89% approval rating.
- **Recycling**- Many of Curitiba's retired buses are used to benefit the city's low income residents. Old, converted buses travel to the city's neediest areas where they are used as mobile training centers. The retired buses are used to provide job training and education on environmental and health issues.

  The full article and complementary information are available at:
  http://www.epa.gov/innovation/international/transportation.htm

Japan: Universal Traffic Management System

UTMS 21 is a "next generation" integrated traffic management system currently being developed in Japan under the sponsorship of the National Police Agency, the public agency responsible for traffic management at the national level. UTMS 21 comprises ten subsystems :

· **ITCS – Traffic Control Center**, which is at the heart of UTMS 21, controls traffic based on information received from traffic detectors and vehicle probes;

· **AMIS – Advanced Mobile Information System**, provides motorists with real-time information on congestion, incidents, parking availability and travel time . The information is depicted on graphic map displays;

· **DRGS – Dynamic Route Guidance System,** recommends to drivers the shortest route to their destination, based on traffic conditions;

· **IIIS – Intelligent Integrated ITV System,** controls traffic signals and prevents illegal parking through closed circuit video cameras; provides traffic information to drivers through infrared beacons;

· **DSSS – Driving Safety Support System,** reduces the risk of accidents and pedestrian

casualties by providing motorists with visual alerts of stop signs, pedestrian crossings, etc;
· **PTPS – Public Transportation Priority System,** improves bus performance by giving preferential treatment to public transportation vehicles through priority signal control and dedicated bus lanes;
· **MOCS – Mobile Operation Control System,** enhances fleet management by tracking buses, taxis and trucks and providing information about their location in real time to transport operation managers and vehicle dispatch centers;
· **HELP – Help for Emergency Life Saving and Public Safety,** notifies public safety centers of accidents and other emergency situations, and facilitates medical emergency response;
· **FAST – Fast Emergency Vehicle Preemption System,** reduces accident-caused traffic tieups by reducing response time and facilitating accident clearance;
· **PICS – Pedestrian Information and Communication System,** supports pedestrian safety by providing visual and audible signals and lengthening "walk" signals to accommodate elderly, wheelchair-confined and visually impaired persons.
The full article and complementary information are available at:
http://esd.mit.edu/ctpid/cmp/observatory/supplement5.pdf

Vancouver, Canada: Transportation initiatives.

Unlike many large metropolises, Vancouver has no freeways into or through the downtown area. Although similar to most other cities in that the automobile serves as the primary mode of transport, it does have alternatives, such as the longest automated light metro system in the world and an extensive network of bike routes.

All buses are wheelchair accessible and a large number carry bike racks, able to carry one or two wheelchairs and bicycles respectively. Some older trolley and suburban diesel buses do not carry bicycle racks and are not wheelchair accessible. Unlike other North American cities which are in the process of phasing out trolleybus service, Vancouver is actively maintaining and upgrading its fleet. Vancouver is the only city in Canada other than Edmonton to still operate a trolleybus system.

With its vibrant cycling community Vancouver's monthly Critical Mass rides, on the last Friday of every month, attract hundreds of cyclists in what have become Canada's largest Critical Mass rides. As documented in the film *You Never Bike Alone* (2007), these rides have spawned similarly styled rides, including the Midnight Mass bike ride, which happens twice a month (at midnight) and World Naked Bike Ride (in June). Bike Polo, freak bikes, bicycle car-cass, and bicycle performance rides are also growing in popularity.

The full article and complementary information are available at:
en.wikipedia.org/wiki/Transportation_in_Vancouver

Appendix :

UNDERGROUND SUBWAYS

The most popular and diverse international underground transit systems are listed below, but are merely a sample of the quite eye-catching transit systems that exist throughout the world.

1. London, England
The London Underground is Europe's largest metro subway system and is the world's oldest underground system (it was inaugurated in 1863). It covers 253 miles of track and transports 976 million people yearly. The Underground is also connected to a variety of rail services to London's surrounding areas (including the Eurostar to Paris). Among these services is the Docklands Light Railway (DLR), a popular driverless light rail extension, which offers many scenic views of the Thames river and surrounding areas.
Highlights: Cushioned seats. LED time displays hanging from the ceiling in stations indicate the number of minutes you need to wait before the next train. Oyster cards allow you to touch against a subway turnstile and go -- and you can pay as you ride.

2. Paris, France
The Paris subway system is the second oldest in the world (the initial system was completed in 1900) and aids roughly 1.365 billion people with their daily commutes. Running over 133.7 miles of track and stopping at 380 stations, it has a great amount of coverage throughout the city.
Highlights: Excellent coverage: every building in the city is within 500 meters (1600 feet) of a subway station. Many stations were designed with the distinctive unique art noveau style. Modest fares.

3. Moscow, Russia
The Moscow subway system has the biggest ridership of all metro systems throughout the world, with 3.2 billion riders annually traveling on 12 subway lines to 172 stations. In total, the Moscow Metro covers approximately 178 miles. On an average weekday, the subway itself carries about 8.2 million passengers. While most of the Moscow trains run underground, some lines cross bridges and provide scenic views of the Moskva River and the Yauza River.
Highlights: Ornate architecture (at least 44 of these stations are rated as architectural sights). The system has many trains that stop frequently (trains stop at stations approximately every 90 seconds during peak hours). Fastest worldwide system (120km/h or 75mph).

4. Madrid, Spain
The Madrid Metro is the second largest underground system in Europe and the sixth largest system in the world. It has 141.7 miles of track and an additional 27.5 miles are expected to be completed by the end of this year. The Madrid Metro is the densest metro network in the world.
Highlights: Very clean and is implementing an ecologic cleaning system. Fast rides. Affordable fares. Great progress in system expansion (47 miles of new subway lines were built between 1999 and 2003). Modern stations.

5. Tokyo, Japan
The Tokyo subway system carries approximately 2.8 billion people per year to 282 subway stations. In addition to underground subways, the Tokyo transit system consists of the Toden Arakawa light rail line and the Ueno Zoo Monorail.
Highlights: Extremely clean. Trains are on time. The seats are heated. Trains always stop in the same place alongside markers. Subway stops are announced in both Japanese and English. Modern system. The system has underground malls and customer amenities.

6. Seoul, Korea
The Seoul Metropolitan Subway is one of the most heavily used subway systems in the world with more than 8 million daily trips. It is also one of the biggest subway stations worldwide, running 179.4 miles in length. The trains mostly run underground, but 30% of the system is above ground.
Highlights: Beautiful architecture. Growth of the system has been incredible over the past few years. Utilizes T-money, a prepaid transportation card for transport throughout the city.

7. New York City, USA
The New York City rapid transit system is one of the most extensive public transit systems worldwide. It has grown from 28 stations when it was founded in October of 1904 to 462 stations presently. The subway carries 4.9 million people daily.
Highlights: Offers express services that run on separate tracks from local trains. The MTA is currently testing out LED displays in subway stations to let commuters know when the next train is expected to arrive. 24 hour service. Unique and distinct artwork (mosaics) throughout the system.

8. Montreal, Canada
The Montreal Metro is a modern system that was inaugurated in 1966. It is a small (37.8 miles reaching 65 stations on four lines) yet unique and modern system that was inspired by the Paris Metro.
Highlights: Diverse, beautiful architecture and unique station art (each station is designed by a different architect). Pleasant riding experience (smooth rides: the trains run on a rubber surface to reduce the screech of train cars). Trains are frequent and fairly comfortable.

9. Beijing, China
The Beijing Subway is a relatively new subway system that opened in 1969 and serves Beijing and the surrounding suburbs. It is currently being expanded upon in a 7.69 billion USD (63.8 billion yuan) project to prepare for the 2008 Olympic Games. The expansion project is expected to bring the current length of the subway station from approximately 71 miles to nearly 300 miles.
Highlights: Fairly easy subway to navigate (especially if you're a foreigner). Cheap fare (3 yen for most trips). Interesting architecture on the newer subway lines. A very ambitious expansion project is in the works.

10. Hong Kong
The Hong Kong subway, also known as the Mass Transit Railway (which translates to "underground railway" in English), was established in 1979. Despite its relatively small size compared (56 miles) to other transit systems, the MTR transports an average of 2.46 million rides per day. The Hong Kong system is based on a British design.
Highlights: Efficient. Frequent service, High-capacity cars. Extremely affordable. Clean and modern system with air-conditioned cars. Uses the Octopus contactless smart card for subway currency, allowing travelers to swipe their card near the turnstile for easy access to train platforms.

11. Sao Paulo, Brazil
The Sao Paulo Metro is the first underground transit system in Brazil. It works alongside a larger company called the Companhia Paulista de Trens Metropolitanos (CPTM) and together they cover 187 miles of track and transport approximately 3.7 million people daily.
Highlights: Known as one of the cleanest and safest systems in the world. Affordable fare.

The full article and complementary information are available at:
http://www.virgin-vacations.com/site_vv/11-top-underground-transit-systems-in-the-world.asp

Further readings :

http://www.apfed.net/ki/database/gp.php

http://www.streetsblog.org/2008/04/22/paris-is-the-new-london-will-new-york-be-the-new-paris/

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http://www.abp.unimelb.edu.au/gamut/pdf/greenhouse-transport-success.pdf

http://www.abp.unimelb.edu.au/gamut/pdf/success-stories.pdf

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