

LAND TRANSPORT SUSTAINABILITY UPDATE 2014

This is the inaugural issue of Sustainability Update, showcasing the Land Transport Authority (LTA)'s commitment in building a sustainable land transport system in Singapore. The update focuses on sustainable developments and initiatives of land transport sector, reports on our strategies, practices, achievements and plans going forward.

Sustainable Stocktake 2014



360 km
of rail track by 2030



200 km
of sheltered
walkways by 2018



1,000
Government-funded
buses to be added via
BSEP by 2017



>700 km
Island wide cycling
network in 2030

Enhancing PT & Active Mobility

Maintaining Affordable Public Transport

Almost half a million
commuters benefit
from the different concession
schemes

Enhancements to the Early Turnover Scheme (ETS)



20 km
of noise barriers along
elevated rail track by 2020



The next phase of the EV
test-bed will include

fleet trials and
applications

500 roads
with LED lighting by 2018



50 POBs
with Intelligent Lighting
Detection Systems installed

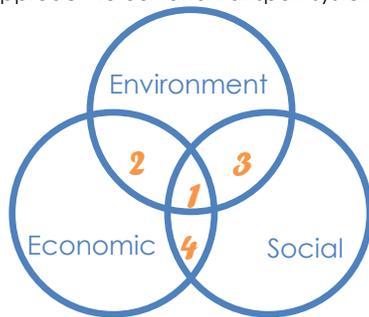
CEVS review

Improving Resource Conservation

LTA is undertaking efforts in making our land transport system sustainable in environmental, social, and economics aspects. To achieve this, there are four key strategies:

1. Enhancing Public Transport & Active Mobility;
2. Improving Resource Conservation;
3. Improving Living Environment; and
4. Maintaining Affordable Public Transport

Figure 1 How we adopt a sustainable approach to our land transport system



1. Enhancing Public Transport & Active Mobility

We aim for a “car-lite” Singapore by encouraging people to travel by sustainable

modes i.e. public transport, walking and cycling. This is the key strategy to meet the increasing travel demand and to reduce emission from transport sector.

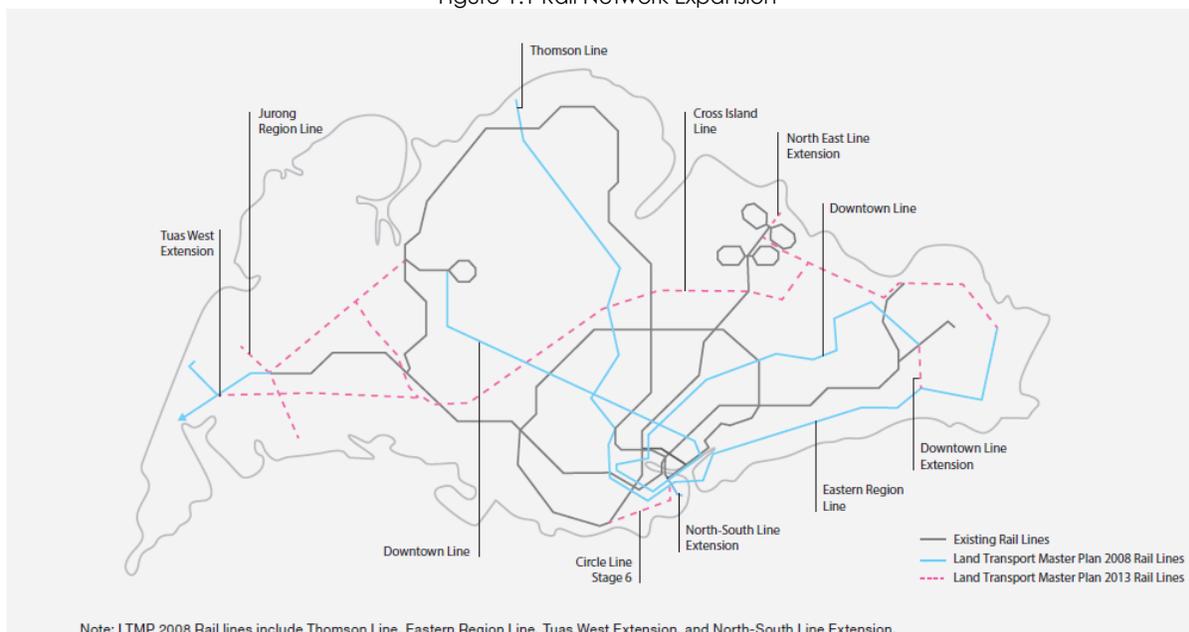
1.1. **Enhance Public Transport Services & Reducing Reliance on Private Transport**

We target to achieve a 75% public transport modal share during both the morning and evening peak hours by 2030, up from today’s 64%. We will continue to enhance the public transport services and connectivity to encourage the use of public transport.

We plan to expand the rail network to about 360 km by 2030 (up from 182 km today). About 100 more Mass Rapid Transit (MRT) stations will be built in the process. When completed, it will bring 8 in 10 households within a 10-minute walk of a rail station. Apart from this, with the deployment of new trains and signalling system upgrading, train commuters can expect more frequent train arrivals, more comfortable rides and better connectivity.

For public bus, Bus Service Enhancement Programme (BSEP) will add 1,000 new buses and 80 new bus services by 2017 to ease commuter crowds and shorten waiting

Figure 1.1 Rail Network Expansion



times. 3 more Integrated Transport Hubs (ITHs) will be developed by 2019 on top of the existing 7. Commuters will be able to make more comfortable transfers and enjoy the greater convenience offered by such hubs.

On the other hand, private vehicle ownership and usage are continued to be controlled by Vehicle Quota System (VQS), Electronic Road Pricing (ERP), and the imposition of various fees and taxes like additional registration fee, excise duty, road tax, petrol duty etc. To further encourage people to reduce reliance on private vehicle, we are finding ways to make car sharing more convenient and accessible (currently 300 car sharing vehicles in over 100 locations).

1.2. Facilitate Walking and Cycling

Pedestrians and cyclists can expect more and better facilities in the future. For pedestrians, more than 200km of new sheltered walkways around transport nodes by 2018 under Walk2Ride Programme, 4 times more than today's 46km. Currently all MRT stations and bus interchanges have at least one barrier-free access route, and almost all bus stops are barrier-free; LTA will progressively upgrade the remaining bus stops where feasible. Besides, more pedestrian overhead bridges will be progressively installed with elevators. Elderly and disabled pedestrians can also expect longer green man time at 500 pedestrian crossings by 2015 under the Green Man+ Programme, up from about 250 today.

Figure 1.2 More Cycling Infrastructure and Facilities



For cyclists, a cycling path network of over 700km islandwide will be completed by 2030. More bicycle racks are installed at MRT stations to facilitate MRT commuters to cycle to the stations. From 2013 to 2014, a

total of 5,800 racks were installed at 34 MRT Stations/interchanges. A bicycle sharing pilot will also be conducted.

1.3. Promote Flexi-Travel

We are also promoting flexi-travel. We extended the Free Pre-Peak Travel on MRT Scheme to June 2015, encouraging commuters to travel early before the peak periods. For employers, we are launching new Travel Smart Network, providing grant of up to \$160,000 for companies to support the adoption of flexi-travel arrangements.

Figure 1.3 Representatives from the Participating Organisations of Travel Smart Pilot Programme



2. Improving Resource Conservation

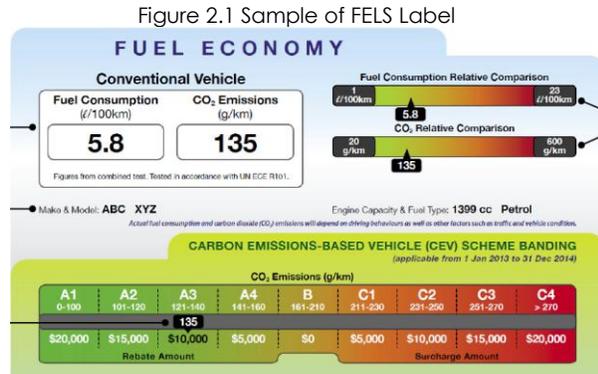
Although using public instead of private transport is one of the best ways to help protect the environment, we must also consider the existing vehicle fleets and transport infrastructure, and how they can be made more efficient and sustainable. Construction wise, we encourage greener construction by using recycled materials for construction works.

2.1. Promote Energy Efficient Vehicles

To reduce carbon emission from vehicles, Carbon Emissions-based Vehicle Scheme (CEVS) was rolled out in Jan 2013 to encourage consumers to shift to low emission models.

To assist car buyers make informed decisions, Fuel Economy Labelling Scheme (FELS) requires the fuel performance data for each car model to be provided on mandatory information labels at car

showrooms. With this fuel economy information, car buyers are able to make better-informed decisions on fuel efficiency when purchasing new cars.



2.2. Test Energy Efficient Technology

In addition to promoting energy efficient modes of vehicles, testing of energy efficient technologies in order to determine their viability in a local context is another field that we are actively involved in.

We have partnered with Energy Market Authority (EMA) to test-bed electric vehicles (EVs) assessing its benefits and feasibility. Although the economic case for mass individual ownership of EVs is currently still not strong, EVs are technically and operationally suitable for Singapore. In the next phase, test-bed will be broadened to specific fleet user groups; LTA and Economic Development Board (EDB) have already planned to trial an EV car-sharing programme which will see the introduction of up to 1,000 EVs and the charging infrastructure to support their use.

A study to reduce emissions from buses is also being undertaken in the form of a larger scale trial on diesel hybrid buses.

Figure 2.2 Electric Vehicles and Charging Station



2.3. Improve Energy Efficiency of Transport Infrastructure

To ensure a holistic package of energy efficient measures, LTA has also installed energy efficient transport infrastructure. We progressively replace street lights with more energy efficient Light Emitting Diodes (LED) lighting at about 500 roads by 2018. Intelligent Lighting Detection System (ILDS) has also been used at 50 Pedestrian Overhead Bridges to reduce energy wastage.

Figure 2.3 Intelligent Lighting Detection System (ILDS)



2.4. Encourage the Use of Green Materials for Construction

Construction wise, we have careful planning to minimise impacts to our environment. We encourage the use of recycled materials for construction works, e.g. steel slag for road construction, as alternatives to natural raw materials.

3. Improving Living Environment

We dedicate to ensure the negative impact of the land transport and our work on the community and the living environment is minimised. Our efforts in this field are largely based on improving ambient air quality by tightening the emission standards of vehicle and putting up measures to reduce noise impact of our construction works.

3.1. Improve Ambient Air Quality

For better air quality, Early Turnover Scheme (ETS) is in place to incentivise the owners to replace old diesel vehicles with models that comply with the standards set by National Environment Agency (NEA). From Sep 2017 onwards, petrol vehicles will need to meet the Euro VI emission standards by regulation.

3.2. Reduce Noise Levels

To reduce the noise impact of our construction works on the residents, we plant more trees between the roads and residential units to reduce the noise impact of our works on the residents. In addition to this, equipment designed to keep noise and vibrations to a minimum are used, barriers are placed near residential areas wherever possible and our works are scheduled so as to minimise disturbance to the public as much as possible.

To minimise railway noise near residential areas, some 20km of noise barriers at identified locations along the elevated railway tracks are to be installed by 2020, to reduce railway noise near residential areas.

We are also conducting a trial to tackle road traffic noise by installing noise barriers along road viaducts at identified locations.

Figure 3.2 Barriers to Reduce Noise



4. Maintaining Affordable Public Transport

Maintaining an affordable public transport is an important socio-economic component of sustainable development. Ensuring affordable public transport for the general public is also a pivotal factor in supporting LTA's push for greater public transport mode share.

An affordable public transport system is maintained through regular public transport fare review exercises and by providing concession schemes for select groups of individuals (e.g. students, elderly, etc.).

4.1. Public Transport Fare Review

Public Transport Council (PTC) will continue to conduct fare review exercise annually to safeguard public interest by keeping public transport fares affordable while ensuring the long-term financial viability of the public transport operators.

4.2. Public Transport Concession Scheme

The Public Transport Concession Scheme is available for select groups of individuals to enjoy concessionary travel rates. These groups include children under the age of 7, students from primary to tertiary (polytechnics and universities), full time National Servicemen, senior citizens, Persons with Disabilities (PWD) and the adult monthly travel card. On average, almost half a million commuters are able to benefit from the concession schemes.

Figure 4.2 Samples of Public Transport Concession Cards



Summary of Sustainability Initiatives

Summary of Initiatives	Reference Section	Webpage Link
ENHANCING PUBLIC TRANSPORT & ACTIVE MOBILITY		
Enhancing Public Transport Services and Connectivity		
Expansion of the rail network to 360 km by 2030 from 182 km today, bringing 8 in 10 households within a 10-minute walk of a rail station	1.1 (page 3)	Link
Expansion of BSEP by 450 buses (to a total of 1,000 government-funded buses) along with doubling the number of new bus routes from 40 to 80, from 2015 to 2017	1.1 (page 3)	Link
3 more ITHs to be developed by 2019 on top of the existing 7	1.1 (page 3)	Link
VQS and ERP to continue restraining private vehicle ownership and usage	1.1 (page 4)	Link
Car sharing will be made more accessible (currently 300 car sharing vehicles in over 100 locations)	1.1 (page 4)	Link
Facilitating Walking and Cycling		
Walk2Ride will install more than 200km of new sheltered walkways around transport nodes by 2018, 4 times more than today's 46km	1.2 (page 4)	Link
Longer green man time at 500 pedestrian crossings by 2015 under Green Man Plus	1.2 (page 4)	Link
190km of intra-town cycling paths by 2020 and the creation of an island wide network of over 700km by 2030	1.2 (page 4)	Link
Installation of more bicycle racks at MRT stations (from 2013 to 2014, a total of 5,800 racks were installed at 34 MRT stations/interchanges)	1.2 (page 4)	Link
Promoting Flexi Travel		
Free Pre-Peak Travel on MRT was extended to June 2015	1.3 (page 4)	Link
New Travel Smart Network launched, with grants of up to \$160,000	1.3 (page 4)	Link
IMPROVING RESOURCE CONSERVATION		
Promote Energy Efficient Vehicles		
The CEVS encourages consumers to shift to low emission vehicle models	2.1 (page 4)	Link
FELS will continue to affix fuel economy information for vehicles for sale	2.1 (page 4)	Link

Test Energy Efficient Technology		
Joint-programme by LTA and EDB to trial an EV car-sharing programme which will see the introduction of up to 1,000 EVs and the charging infrastructure to support their use	2.2 (page 5)	Link
Planning for a larger scale DHB trial for its emissions reduction, ongoing	2.2 (page 5)	Link
Install Energy Efficient Transport Infrastructure		
Replacement of street lights with LED lighting at about 500 roads by 2018	2.3 (page 5)	Link
ILDS introduction at 50 pedestrian overhead bridges	2.3 (page 5)	Link
Encourage the Use of Recycled Materials for Construction		
Usage of recycled materials for construction works	2.4 (page 5)	Link
IMPROVING LIVING ENVIRONMENT		
Improve Ambient Air Quality		
ETS incentivises replacement of old diesel vehicles	3.1 (page 5)	Link
Enhancements to the ETS	3.1 (page 5)	Link
Reduce Noise Levels		
More trees planted between roads and residential units to reduce the noise impact of our works on residents.	3.2 (page 6)	Link
20km of noise barriers at identified locations along the elevated railway tracks are to be installed by 2020,	3.2 (page 6)	Link
Trial to tackle road traffic noise by installing noise barriers along road viaducts at 3 identified locations	3.2 (page 6)	Link
MAINTAINING AFFORDABLE PUBLIC TRANSPORT		
Public Transport Fare Review		
PTC will continue to conduct fare review exercise annually	4.1 (page 6)	Link
Public Transport Concession Scheme		
Almost half a million commuters are able to benefit from the various concession schemes being offered	4.2 (page 6)	Link



March 2015