USE-iT WP4 – Operating and Managing Transport Systems

CONCEPT 7: Traffic management

Congestion pricing using automatic number plate recognition (ANPR) (Ullén, 2010)

Vehicle fuel consumption and emission models
Developed so they can be calibrated using publicly available data.
- **Benefits**
Improved planning leading to lower emissions
- **Barriers**
Availability and accuracy of data

Speed management
Optimisation of traffic speed through the use of (poss. dynamic) speed limits.
- **Benefits**
Reduced fuel consumption and reduced environmental impacts
- **Barriers**
Increased travel time and user costs, and regulation enforcement

Measures to reduce congestion on main routes
Examples include travel time information, route advice and incident management.
- **Benefits**
Reduced environmental impacts
- **Barriers**
High initial costs

Built-in weigh-in-motion systems
To reduce the number of overweight vehicles by recording axle and gross vehicle weights as they pass over a sensor.
- **Benefits**
Reduced damage to roads
- **Barriers**
High initial costs

Digital maps with speed limits
To be installed in vehicles to provide guidance of posted speeds through SpeedAlert/ISA systems.
- **Benefits**
Reduced fuel costs
- **Barriers**
Updating databases

Eco-routing navigation systems
A vehicle navigation tool which generates a route which minimises fuel consumption, taking into account real time traffic and road information.
- **Benefits**
Reduced fuel costs
- **Barriers**
High initial costs

Vehicle connectivity functions
Use of traffic signal controllers to reduce vehicle fuel consumption levels in the vicinity of traffic signalised intersections.
- **Benefits**
Reduced fuel consumption
- **Barriers**
High initial costs

Congestion pricing
A fee is charged to use busy sections of road infrastructure, such as in cities. Usage of electrical vehicles and carpooling are encouraged as they pay no/reduced tolls.
- **Benefits**
Reduced congestion and increased use of lower carbon transport
- **Barriers**
Public opposition to schemes

Mass transit systems
The backcasting approach is used whereby a CO_2 emission target is set for the future and countermeasures are established to achieve this target.
- **Benefits**
Reduced environmental impacts and benefits to customers
- **Barriers**
Education of public

Optimising routes
System optimisation by improved road systems, freight logistics and efficiency at airports and ports.
- **Benefits**
Improved fuel efficiency
- **Barriers**
Insufficient regulatory support

CONCEPT 8: Sustainable procurement

Example of a green vehicle (TRL, 2015)

Registry and inventory based emission calculators
Applicable for standardised voluntary reporting, carbon trading and regulatory compliance.
- **Benefits**
Holistic and future-oriented approach
- **Barriers**
High initial costs

Life-cycle analysis calculators
Applicable for the pursuit of government funding and to demonstrate the benefits of public transit over private automobile travel.
- **Benefits**
Holistic and future-oriented approach
- **Barriers**
High initial costs

Life-cycle cost (LCC) added-value parameter
To facilitate procurement of the most efficient LCC-efficient alternative through fair design-build tendering.
- **Benefits**
Establishing monetary benchmarks
- **Barriers**
Integration of different considerations

Uniform criteria for evaluating and financing sustainable procurement
Rules need to be developed to encourage green procurement and usage of energy efficient vehicles and equipment-tax treaty incentives.
- **Benefits**
Tax reductions
- **Barriers**
Need for legislation

Procurement decisions
Carbon emissions included in procurement decision by public sector organisations.
- **Benefits**
Addressing the issue
- **Barriers**
Need for legislation

Education of the public about Green Procurement
Required to increase energy efficiency awareness in travelling using public transport.
- **Benefits**
To increase acceptability of measures
- **Barriers**
Public opposition

Green vehicles
These may be more expensive to purchase, but exploitation costs are likely to be lower. The use of cost benefits and energy efficiency calculators will help to convince the public of the benefits.
- **Benefits**
Low payback cost
- **Barriers**
High initial costs and public opposition

CONCEPT 9: Behaviour change

Example of a skywalk in Bangkok (Koaysomboon and Dhanasarnsombut, 2011)

In-vehicle speed limiters
Speed limitation devices can be applied to vehicles, which ensure that vehicles are not able to travel above a particular chosen speed.
- **Benefits**
Reduced environmental impacts
- **Barriers**
Increased costs and user acceptance

Telematics for improving driver behaviour
For example, telematics can be used to monitor speeding and reduce it by combining with driver intervention.
- **Benefits**
Reduced energy consumption
- **Barriers**
User acceptance

In-vehicle human machine interface (HMI) for improving driver behaviour
Additional information provided such as fuel use and economy information, which includes the more complex nature of the low-carbon vehicle.
- **Benefits**
Reduced energy consumption
- **Barriers**
User acceptance

Inter-vehicle communication for improving driver behaviour
System drivers informed about advisory speed limits in vehicles through a smartphone based IVC.
- **Benefits**
Reduced energy consumption
- **Barriers**
User acceptance and increased costs

Fiscal measures
Examples include different charges, tax incentives and fare subsidies. To encourage lower carbon options.
- **Benefits**
Reduced emissions
- **Barriers**
Adverse economic effects

Eco-driver training
Fuel efficient driving behaviour based on smooth acceleration has been delivered by training drivers and pilots already in place in many countries.
- **Benefits**
Reduced energy consumption
- **Barriers**
Applying lessons learnt from training

Internalisation of external costs
Fuel taxes can be accompanied by other economic instruments; for example, vehicle taxes to provide specific incentives for buying fuel efficient vehicles.
- **Benefits**
Reduced emissions
- **Barriers**
Adverse economic effects

Limiting the number of vehicles
For example in Shanghai, policies have been enacted which limit the sale of new vehicles by auctioning license plates, or awarding them by lottery.
- **Benefits**
Reduced emissions
- **Barriers**
User acceptance

Non-motorised transport infrastructure - modal shift
Creating infrastructure that encourages walking and cycling. Examples include pedestrian areas, cycle tracks and sky walks.
- **Benefits**
Co-benefits such as improved safety and air quality
- **Barriers**
Changing user behaviour

Domain: Technologies | Infrastructure | Governance | Customer

Mode: Road | Rail | Water | Air

Left hand side – Current application
Right hand side – Potential for future application