Sustainable Fuel Pricing

Annex A of the Handbook 'Navigating Transport NAMAs'

TRANSfer Project – Towards climate-friendly transport technologies and measures

The concept

In many countries, the full costs of car use are not reflected in the expenses of the individual car owner. In particular, the external costs of motorised travel such as air pollution, noise, accidents, land consumption or global warming are not included in the travel costs. Some countries even reduce the direct costs of car use by subsidising fuels. This creates price distortions and sends car users incorrect signals about the real costs of car travel. In this way, low fuel costs lead to rising vehicle travel (resulting in congestion, increased pollution and noise) and influence car buying behaviour (*e.g.* preference for bigger cars leading to upsizing of vehicles). In the long run, low fuel prices also contribute to land use dispersion and increase the risk of car dependency. To mitigate such problems, national authorities have to first and foremost remove fuel subsidies. Furthermore, proper fuel taxation has to be implemented.

Elements of sustainable fuel pricing:

- Remove fuel subsidies;
- Implement proper fuel taxation.

For more details on the elements' characteristics see Box 1.

Table 1: GHG mitigation matrix of sustainable fuel pricing

	Avoid	Shift	Improve
Direct effects	☑ Reduces incentives to undertake unnecessary journeys, or to travel excessively	☑ Increases the costs for motorists and thus induces a shift towards alternative modes	☑ Sets an incentive for energy-efficient vehicles ☑ Incentivises economic driving behaviour
Indirect effects	☑ Impedes increasing motorisation and urban sprawl	☑ Potential revenue generation can be used to improve public transport (PT) services	
Rebound effect	☒ Can induce traffic due to cross border fuel tourism, if prices differ significantly between countries/states		
Complementary measures *(to achieve full mitigation potential)*	☑ Dense city structure (see Factsheet '*Dense and Transit-oriented Urban Development*')	☑ Disincentives for car use, such as parking pricing (see Factsheet '*Sustainable Parking Management*') or road tolls (see Factsheet '*Economic and Regulatory Instruments for Road Traffic*') ☑ Provision of alternatives to the private car; such as walking, cycling and PT infrastructure (see Factsheets "'*Public Transport First*' *Strategy*" and '*High Quality Walking Infrastructure*')	☑ Fuel economy standards (see Factsheet '*Promotion of Energy Efficient Vehicles*') ☑ Vehicle labelling to clarify extent of fuel use by type/mode (see Factsheet '*Promotion of Energy Efficient Vehicles*')

On behalf of

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

of the Federal Republic of Germany

Box 1: Possible elements of sustainable fuel pricing

Remove fuel subsidies

Developing countries in particular tend to subsidise transport fuels to promote economic growth and social equity (GTZ, 2009). However, in the long run fuel subsidies reduce resource efficiency and lead to social inequality. The financial resources for subsidies are often provided at the expense of investments in transport infrastructure maintenance and expansion, and other public investments. Moreover, the economic costs of importing petroleum have to be considered. Subsidies can foster social inequality, since mainly middle- and high-income citizens, who can afford to own a car, benefit from low fuel prices. They purchase less efficient vehicles and increase their transport activity. In contrast, low-income citizens only account for a small amount of fuel consumed, since most of them do not own a car. Furthermore, reduced investments in public transport infrastructure impair their mobility (Litman, 2010).

How it works and intended effects:

- Increases the cost of car use;
  - ➔ Induces a shift from automobile use to alternative modes;
  - ➔ Reduces growth in motorisation;
  - ➔ Reduces urban sprawl;
  - ➔ Increases the share of energy-efficiency vehicles in the fleet.

To be considered for implementation:

- The instrument has a key role in achieving a sustainable low carbon transport system. It can be realised with relatively little institutional effort.
- Full implementation takes several years, since a gradual increase in fuel cost is required.
- Short-term effects are lower than long-term effects (Litman, 2010).
- The instrument leads to considerable cost savings and increased fiscal/macroeconomic stability.

Responsible actor: Ministries of finance and taxation

Implement proper fuel taxation

Fuel taxation is very useful to discourage the use of private cars. Since additional costs are directly proportional to a car's fuel economy, the tax is also favourable for the use of more efficient vehicles and for economic driving behaviour.

Fuel taxes are usually easy to collect and to enforce, since only few refineries or fuel distribution centres have to be addressed (Metschies and Thielmann, 2007).

How it works and intended effects:

- Increases vehicle cost proportionally to use;
  - ➔ Reduces vehicle use;
  - ➔ Reduces travel distances;
  - ➔ Incentivises the use of fuel-efficient vehicles (*e.g.* limits the increase in SUVs) and induces a shift to efficient modes.

To be considered for implementation:

- Little institutional investments are required;
- Considerable public revenues are generated;
- Full implementation takes several years (see above);
- Long-term effects larger than short-term effects.

Responsible actor: Ministries of finance and taxation

GHG mitigation effect and co-benefits

Comparing different studies that investigated the fuel price developments in Europe and North America, Goodwin *et al.,* (2003) identify typical effects of fuel price increases. The authors find that a 10 % fuel price increase (inflation adjusted) leads to:

- Reductions in fuel consumption of 2.5 % within one year while, in the long run, larger reductions (about 6 %) can be achieved;
- Decline in vehicle travel of 1 % within a year (3 % in the long run);
- Increase in vehicle fuel efficiency of 1.5 % within a year (4 % in the long run);
- Decline in vehicle ownership of 1 % within a year (1.5 % in the long run).

However, price elasticities vary according to framework conditions such as income level, geography and infrastructure (Litman, 2011a).

Burniaux and Chateau (2011) assess the mitigation potential of removing fossil fuel subsidies in 37 non-OECD countries. The

authors find that GHG emissions could be reduced across all sectors by 2.5 % in 2020 and by 8.2 % in 2050 compared to the baseline development if all investigated countries would remove current fuel subsidies. The estimated reduction potential varies according to framework assumptions (between 1.6 and 3.5 % for 2020 and between 1.8 and 11.3 % for 2050). Individual countries are shown to have a huge reduction potential such as Russia, where GHG emissions could be reduced by 25 % compared to the baseline scenario if subsidies are removed. In oil-exporting countries, emission savings of up to 45 % could be achieved.

Towards implementation

The increase in fuel prices targets all vehicle owners including private households, companies, logistics providers and public institutions. All of them are incentivised to reduce their fuel consumption.

Key stakeholders

- National ministries of finance and taxation:
  Typically responsible for fuel subsidies and fuel taxation; can abolish fuel subsidies gradually and introduce fuel taxes; they define the tax level and are responsible for the tax collection system.

Table 2: Potential barriers to implementation and countermeasures

Barriers	Options to overcome
Strong opposition from the public *)	■ Avoid sudden and steep fuel price increases, but reduce fuel subsidies and increase fuel taxes gradually; **) ■ Inform the public early in advance about coming price increases so that they can adapt their mobility behaviour or replace their vehicles with more fuel-efficient ones; ■ Earmark revenues from fuel taxation for infrastructure investments of alternative modes; ■ Provide targeted financial support for the mobility of low-income families; ■ Raise awareness that fuel subsidies can increase social inequality (mainly middle- and high-income motorists benefit from subsidies) (Litman, 2010); ■ Inform the public about the potential fuel cost reductions from using fuel-efficient vehicles;
Strong opposition from business lobbies	■ Provide information about the economic disadvantages of low fuel prices (*e.g.* lack of financial resources to invest in transport infrastructure, which is crucial for economic growth and reduced economic efficiency in the long run); ■ Raise awareness about the fact that fuel subsidies impose costs elsewhere in the economy (Litman, 2010); ■ Strong political leadership.

*) In the past, sudden steep fuel price increases led to political unrest and violent riots (Metschies and Thielmann, 2007).
**) Metschies and Thielmann (2007) suggest that a price increase of about 10 % is publicly acceptable.

Success factors

- Ideally, fuel taxes are set at an adequate level, able to reduce the competitiveness of cars compared to public transport in terms of cost. (Especially in high-income countries, transport fuel demand for passenger transport is very inelastic with respect to fuel prices, indicating that a moderate price increase will only cause a relatively small change in consumption. Freight transport typically reacts more sensitive to fuel price changes) (Litman, 2011a);
- Differentiated tax level according to the environmental and health damage associated with different types of fuels;
- Ideally, fuel taxes cover not only the expenditures for road infrastructure, but also internalise, to some extent, the external costs of private road transport (reflecting negative externalities such as air pollution or accidents);
- Tailored information and communication strategies targeted at various groups affected;
- International co-ordination of fuel taxes (*e.g.* across a union of states) to avoid cross-border fuel tourism.

Practical example: Fuel taxation in the EU

Most countries in the European Union (EU) have relatively high taxes on transport fuels. In Western Europe, the average tax on petrol is USD 0.80 per litre and in several Eastern European countries the tax level even exceeds USD 1.10 (corrected for purchasing power parity). This is about ten times the tax level in the US (USD 0.10) (Sterner, 2009). Furthermore, the tax levels are harmonised among many European countries. However, there are still considerable differences in the absolute fuel prices leading to cross-broader fuel tourism. Sterner (2007) compares the European and the US tax level and concludes that the per capita fuel consumption and the associated CO_2 emission would be substantially higher in Europe if the EU had followed a similar tax policy as the US. The long run policy of high fuel taxes in Europe led to an end-user fuel price that is three times as high as in the US. It can be expected that the high fuel prices in the EU contributed considerably to the high average fuel-efficiency of the European vehicle fleet compared to the US. In most European countries, annual petrol consumption per capita is only one third of the per capita consumption in the US. Sterner (2007) assumes that Europe's fuel use and related GHG emissions would be more than twice as high if the countries had a tax level similar to the US. However, other transport and land use policies as well as historic and topographic conditions likely contribute largely to the fuel consumption levels in these countries.

Rio de Janeiro, Brazil – Photo by Manfred Breithaupt, 2011

Several countries in the European Union (*e.g.* Germany) have lower taxes on diesel fuels than on petrol, leading to a relative high share of diesel fuel vehicles. However, there is now a move to reduce the price differences, since diesel increases local air pollution due to high emissions of particulate matter and nitrogen oxides (Sterner, 2007).

Further reading

- **Goodwin, P., Dargay, J. and Hanly, M. (2004)** '*Elasticities of road traffic and fuel consumption with respect to price and income: A Review*' Transport Reviews, vol. 24, no. 3, pp. 275–292
- **GTZ – Deutsche Gesellschaft für Technische Zusammenarbeit (ed)** (2009) '*International Fuel Prices 2009*', GTZ, Eschborn, Germany
- **Litman, T. (2010)** '*Appropriate Response to Rising Fuel Prices Citizens Should Demand, "Raise My Prices Now!"*', Victoria Transport Policy Institute, Victoria, http://www.vtpi.org/fuel-price.pdf accessed 9 December 2010
- **Litman, T. (2011a)** '*Transportation Elasticities, Prices and other Factors affect Travel Behaviour*', Victoria Transport Policy Institute, Victoria, http://www.vtpi.org/elasticities.pdf accessed 31 August 2011
- **Metschies, G. P. and Thielmann, S. (2007)** '*Fuel taxes and the financing of road infrastructure*' in GTZ (ed) International Fuel Prices 2007. 5th edition, GTZ, Eschborn, Germany
- **Sterner, T. (2007)** '*Fuel taxation: An important instrument for climate policy*' Energy Policy, vol. 35, pp. 3194–3202

Contact

E transfer@giz.de
I http://www.TRANSferProject.org

Imprint

Editor:
Deutsche Gesellschaft für
Internationale Zusammenarbeit (GIZ) GmbH

P. O. Box 5180
65726 ESCHBORN / GERMANY
T +49-6196-79-0
F +49-6196-79-801115
E transport@giz.de
I http://www.giz.de