

DIRTY FROM CRADLE TO GRAVE

John Whitelegg

A new report from the respected Environment and Forecasting Institute in Heidelberg, Germany puts the car right back at the centre of the transport debate and raises fundamental questions about a society increasingly adapting itself to the car. The German analysts take a medium-sized car and assume that it is driven for 13,000 km a year for 10 years. They then compute its financial, environmental and health impacts 'from cradle to grave'.

Long before the car has got to the showroom, they find it has produced significant amounts of damage to air, water and land ecosystems. Each car produced in Germany (where environmental standards are among the world's highest), produces 25,000 kg of waste and 422 million cubic metres of polluted air in the extraction of raw materials alone, say the Heidelberg researchers.

The transport of these raw materials to Germany and around the country to factories produces a further 425 million cubic metres of polluted air and 12 litres of crude oil in the oceans of the world (for each car). The production of the car itself adds a further 1,500 kg of waste and 75 million cubic metres of polluted air.

Calculations of the impact of a car in use make the generous assumption that the car has a three-way catalytic converter and uses 10 litres of lead-free petrol for every 100 km. Over 10 years, the Heidelberg researchers believe that one car will produce:

- 44.3 tonnes of carbon dioxide;
- 4.8 kg of sulphur dioxide;
- 46.8 kg of nitrogen dioxide;
- 325 kg of carbon monoxide;
- 36 kg of hydrocarbons.

Each car is moreover responsible for 1,016 million cubic metres of polluted air and a number of abrasion products from tyres, brakes and road surfaces;

- 17,500 grams of road surface abrasion products;
- 750 grams of tyre abrasion products;
- 150 grams of brake abrasion products.

Each car also pollutes soils and groundwater and this calculated for oil, cadmium, chrome, lead, copper and zinc. The environmental impact continues beyond the end of the car's useful life. Disposal of the vehicle produces a further 102 million cubic metres of polluted air and quantities of PCBs and hydrocarbons.

The sum of these different life cycle stages produces some insights into the penalties societies must face if they become car dependent. In total, each car produces 59.7 tonnes of carbon dioxide and 2,040 million cubic metres of polluted air. Each car, say the Germans, produces 26.5 tonnes of rubbish to add to the enormous problems of disposal and landfill management faced by most local authorities.

While this detail is impressive (and wholly absent from the environmental claims of motor vehicle manufacturers and motoring organisations), it is still not

complete. Some of the more startling revelations are in the researchers' wider analysis of social and environmental costs.

Germany suffers from extensive forest damage attributed to acid rain and vehicle exhaust emissions. The Heidelberg researchers calculate that each car in its lifetime is responsible for three dead trees and 30 'sick' trees.

The Heidelberg researchers say that over its lifetime, each car is responsible for 820 hours of life lost through a road traffic accident fatality and 2,800 hours of life damaged by a road traffic accident. Statistically, they suggest, one individual in every 100 will be killed in a road traffic accident and two out of every three injured. Translated into vehicle numbers, this means:

- Every 450 cars are responsible for one fatality;
- Every 100 cars are responsible for one handicapped person;
- Every 7 cars are responsible for one injured person;

And into production data:

- Every 50 minutes a new car is produced that will kill someone;
- Every 50 seconds a new car is produced that will injure someone.

Land use data are also brought into the equation to show that Germany's cars, if one includes driving and parking requirements, commandeer 3,700 km² of land ~60% more than is allocated to housing. Every German car is responsible for 200 m² of tarmac and concrete.

The total impact of the car over all the stages of its life cycle also produces a quantifiable financial cost. The Heidelberg researchers estimate this to be 6,000 DM per annum per car (about \$5,000) and covers the external costs of all forms of pollution, accidents and noise after income taxation are taken into account. This is a state subsidy equivalent to giving each car user a free pass for the whole year for all public transport, a new bike every five years and 15,000 km of first class rail travel.

The car is thus revealed as an environmental, fiscal and social disaster that would not pass any value-for-money test. More importantly, the car can now be seen as a disaster in itself. It is ownership as well as use that is the problem of the car and a car used sensitively (if that is possible) is still a problem for energy, pollution, space and waste. The balance sheet's bottom line is enormous societal deficits and penalties and an assumption that we will all continue to pay the bill.

Reference

Umwelt-und Prognose-Institut Heidelberg *Öko-bilanz eines autolebens* UPI, Landstrasse 118a, D-69121, Heidelberg, Germany. Tel/fax: +(49) (0) 6221-47-35-00. Study available for 10 DM.