

## Measuring Carbon Dioxide Emissions from Road Transport

By Lee Schipper

- **Transport is the fastest growing CO<sub>2</sub> emitter**
- **You can't fix what you can't measure**
- **Enhanced planning, use of technology, and incentives are "smart transport" options**

Present information on carbon emissions is scant and misleading. Fuel sales give aggregate measure but not details. There is little independent information on vehicles, usage, fuel, or CO<sub>2</sub> emissions per kilometer.

There is little information on the impacts of global transport policies and measures, making it hard to measure changes in fuel economy, local emissions, and vehicle use. (It would also be interesting to look into other factors that changed emissions, including incomes and urban development.)

There is little information on impacts of specific projects. How do changes in fuel or vehicle technology affect emissions of project vehicles? How do transport measures affect myriads of vehicles—travel and freight? What are longer-term impacts of ring roads, bus rapid transit, metros, etc?

Counting carbon in transport projects depends on who is counting. The agents might be third-party donors who estimate the CO<sub>2</sub> implications of transport-related projects; the mayors, governors, or prime ministers who guide transport strategy and investments; the Transport Office or Air Pollution Office tasked with reducing local emissions; or the world carbon community that monitor carbon reductions that can be sold or traded.

The issues above highlight the importance of measuring CO<sub>2</sub> emissions from road transport.

### Five steps you can follow in counting carbon emissions

**Understand the key issues that affect counting of carbon emissions (carbs).** These issues include demographic changes; top-down changes, such as fuel prices, fuel economy standards, and changes in urbanization and trade driven by economic growth. In measuring effects, one should look into the role of policies and technologies. Baseline data is important when counting carbs.

**Understand the parts of the problem and their measurements.** It is important to look into the

- activity, or how far people and freight move;
- structure, or distances covered by each mode of transport and the share of each mode in the entire transport system;
- intensity, or the level of fuel use of each transport mode; and
- fuel, or the carbon content of the fuel used.

Total emissions are computed as a product of these four components.

#### For further information

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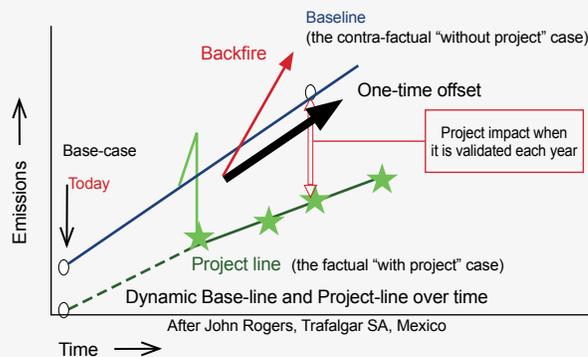
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### Measurements continue over time

Backfire or just one-time offset?



Measuring project impacts should analyze the before and after, and with or without policy scenarios.

### Establish measurement criteria for data and indicators.

For data and indicators to be useful, they should be comprehensive, accurate, comparable, transparent, frequent, and repeatable. Quality of data is important in ensuring that the carbs count is correct. If not, opportunities to mitigate carbs will be missed, impacts will not be measured until it is too late, and forecasts and scenarios will be wrong.

### Incorporate counting of carbs in various surveys.

Counting carbs can be done through

- a vehicle use survey which checks the number of vehicles in use as opposed to the number of vehicles registered; gives information on kilometer per year by vehicle type, fuel, and user characteristics; and provides some information on traffic conditions and load factors;
- fuel use diaries which reveal real use by vehicle type, fuel, and driver type; and
- passenger and freight flow surveys.

### Address CO<sub>2</sub> emissions through different approaches.

These approaches include

- direct approach or mitigation by technology and improved operations (to reduce fuel use per kilometer or encourage fuels with lower carbon per unit of energy),
- co-benefit of transport or urban development strategies (Bus Rapid Transit systems and other improvements, and congestion pricing and strategies to reduce externalities), and
- avoidance of CO<sub>2</sub> emissions (land use planning and integrated transport systems).