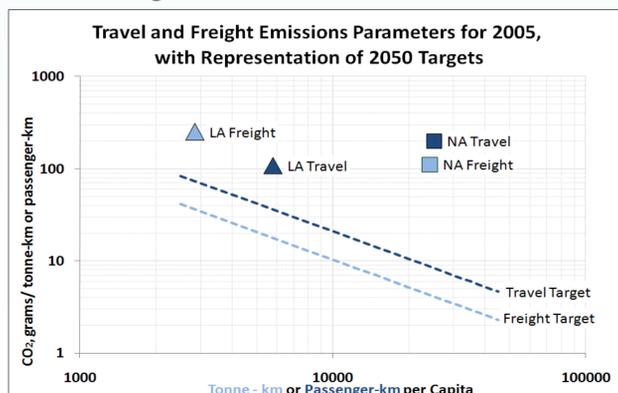


Introduction

This study focuses on transport emissions of carbon dioxide (CO₂) in Latin America and North America, and documents transportation trends and CO₂ emissions likely to result existing and future policies. The goal of the study is to test scenarios of plausible changes in both transport activity, vehicle technology and fuel combinations to explore what combination of technological changes, mode shifts, lifestyle and other changes that affect transportation would lower emissions in North and Latin Americas by 2050. The study illustrates plausible outcomes based on current development and future constraints with references to relevant policies and trends. Two sets of scenarios, Globalization and Glocalization, have been developed for each region, using a long-term projection approach, illustrating what and how different levels of CO₂ will be reached by 2050 given the various policy assumptions. We estimated levels of travel and freight activity by mode and combined them with detailed technological projections of efficient vehicle technology and low-carbon fuels to give total emissions in 2050.

Methodology

Before developing the scenarios in this study, we have estimated how much CO₂ emission reduction is required to meet the specified target of achieving half the present global absolute level of emissions in 2050 as requested by our project sponsor, ITPS (Institute for Transport Policy Studies). CO₂ emissions in transport depend on transport activities (e.g. travel and freight by mode) and the emissions intensity of each activity. Therefore, future emission targets could be composed of any combination of transport activities multiplied by the corresponding intensities to give the target emissions levels. We estimated levels of activity and CO₂ intensities that yield emission targets. The Figure below (a log-log diagram) shows hyperbolic alternatives representing approximately an 80 percent absolute reduction from 2005 emissions. North America lies a long way (shown in log-log graph) from that target, but Latin America is closer.



Carbon in Motion 2050 for North America and Latin America

Lee Schipper, Wei-Shiuen Ng, Brian Gould and Elizabeth Deakin
Global Metropolitan Studies
University of California at Berkeley

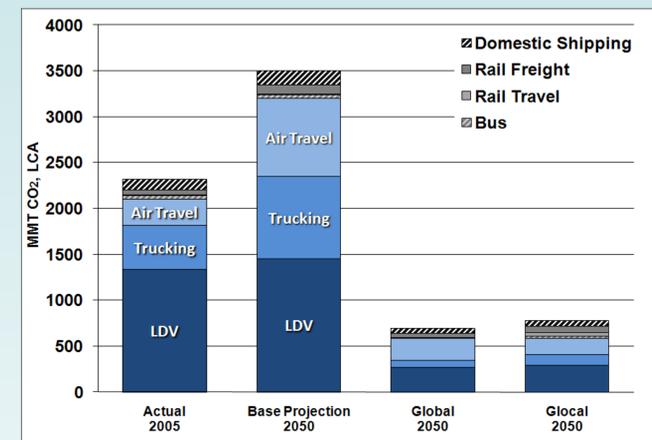
Scenarios

In a globally oriented world (Globalization), a high level cooperation on CO₂ concerns leads to rapid improvements in both vehicle technologies and the decarbonization of some propulsion sources, with modest reductions in current trends of motorized travel and freight. In a second world (Glocalization), there is much less international cooperation so that technological progress will reduce carbon emissions from Business as Usual (BAU) scenarios less than in Globalization, but local concerns for reducing transportation problems and internalizing many externalities result in considerably lower growth in air and car travel and to some extent freight shipping. Our approach assumes a set of policy options that will be implemented in Latin and North American countries over the next four decades. There are three main groups of policy assumptions, namely transportation technologies and strategies, land use planning and pricing instruments design.

Research Results

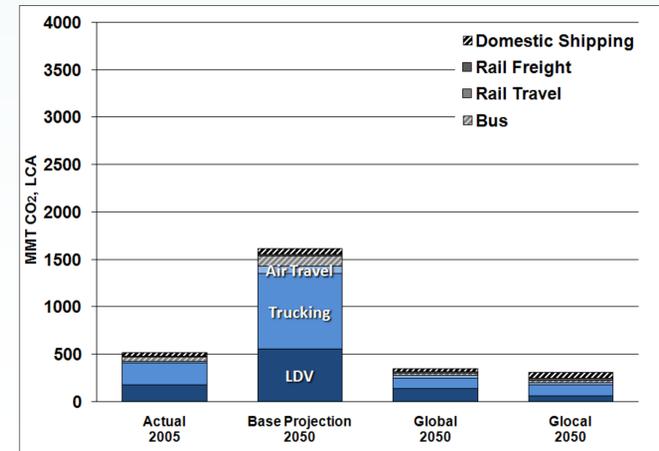
The projections for North America are 65-68 percent below 2005 absolute emission levels, compared to an increase of 63 percent in the business as usual case. In North America, cars dominate both travel and emissions, while in Latin America motorized travel is led by buses. Light duty vehicles (cars), trucks, and air travel still dominate CO₂ emissions. For both regions, the results for either scenario in 2050 are below the 2005 levels, but the relative decline compared to either BAU or 2005 is greater for North America. The decline for Latin America is relatively less, both because the various carbon intensities do not fall as much and because we expect more absolute growth in both travel and freight activity to 2050.

North America



CO₂ emissions from light duty vehicles fall to around 65 grams/km, a very low value compared to well above 200g for North America and even higher for Latin America. Some of this decline comes from widespread use of very low carbon fuel cells, but the overall fuel intensity of vehicles is around 3.5 l/100 km or a third of the on-road value today in North America. Such vehicles are more efficient, smaller and less powerful.

South America



Compared to the actual Glocalization scenario, technology changes alone leave emissions roughly 40 percent higher than both changes in technology and freight volume alone in Globalization. In Glocalization, the declines are less, leading to 41 percent of BAU in Globalization and 28 percent in Glocalization. Technology changes alone leave emissions 80 percent higher in North America and 50 percent higher in Latin America in the Glocalization scenario.

	North America			South America		
Emissions, Mt CO ₂	Travel	Freight	Total	Travel	Freight	Total
2005 Actual	1668	648	2317	259	279	538
2050 BAU	2348	1153	3501	724	870	1594
Projected 2050 Global	522	259	781	188	252	439
Projected 2050 Glocal	515	176	691	209	197	406

Conclusions

Using the best available data, we have outlined transport activity and carbon emissions in North and Latin Americas in 2050. Projecting forward from 2005, with radical but plausible alterations of present trends, gives roughly a 75 percentage reduction of emission in North America. This is consistent with some commitments made by different States in the U.S. The decline in Latin America is much smaller, but represents a radical departure from the expected increases and is consistent with recent studies of Mexico and Brazil prepared for the World Bank. A clear research priority is whether such changes in transport activity, vehicle utilization and carbon intensity can be achieved. Do vehicle makers, shippers and individual travelers agree? The second priority is more research on how much change a given policy, price change, or regulation really causes.

Lee Schipper (schipper@berkeley.edu)
Wei-Shiuen Ng (wei-shiuen.ng@berkeley.edu)
Brian Gould
Elizabeth Deakin

Global Metropolitan Studies
 University of California at Berkeley
 (510) 642-6889