

As if Kyoto mattered: The clean development mechanism and transportation

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Abstract

Transportation is a major source of greenhouse gas (GHG) emissions and the most rapidly growing anthropogenic source. In the future, the developing world will account for the largest share of transport GHG increases. Four basic components drive transportation energy consumption and GHG emissions: activities (A), mode share (S), fuel intensity (I) and fuel choice (F) (ASIF). Currently, the Kyoto Protocol's clean development mechanism (CDM) serves as the main international market-based tool designed to reduce GHG emissions from the developing world. Theoretically, the CDM has the dual purpose of helping developing countries achieve "sustainable development" goals and industrialized countries meet their Kyoto emissions reduction commitments. This paper reviews overall CDM activities and transportation CDM activities to date and then presents findings from three case studies of transportation CDM possibilities examined with the ASIF framework in Santiago de Chile. The analysis suggests that bus technology switch (I) provides a fairly good project fit for the CDM, while options aimed at inducing mode share (S) to bicycle, or modifying travel demand via land use changes (ASI) face considerable challenges. The implications of the findings for the CDM and the "post-Kyoto" world are discussed. © 2007 Elsevier Ltd. All rights reserved.

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1. Introduction

Transportation is a major source of greenhouse gas (GHG) emissions related to potential global climate change. The sector accounts for one-quarter of the world's energy-related carbon dioxide (CO₂) emissions and is expected to be the most rapidly growing source over the next 30 years, increasing at an annual rate of 2–3% (Price et al., 2006). The largest share of this growth will come from the so-called developing world, with forecasted growth rates between 3.5% and 5.3% per year (as compared to 1.2–1.4% in the OECD). Given these forecasts, the developing world will shift from accounting for roughly 35% of world transportation GHG emissions in 2000 to 52–63% by the year 2030 (Price et al., 2006).

Modifying these growth trajectories will likely require a suite of technology and policy approaches, focusing on

both passenger and freight transportation at both the urban and inter-urban levels. Passenger transportation cannot be ignored: based on estimates from the International Energy Agency, passenger transportation consumes roughly two-thirds of transportation energy today, a share which is expected to remain fairly stable over the next 50 years (IEA, 2004). Nor can the metropolitan developing world be ignored: through the year 2030, developing cities will account for an estimated 95% of net global population growth, or 1.94 billion additional people (UN, 2001).¹ As such, efforts to reduce transportation GHG emissions must focus at least in part on developing world metropolitan areas.

The world's industrialized nations account for the overwhelming share of the accumulated anthropogenic GHG emissions to date. Nonetheless, efforts to mitigate

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¹To put this in perspective, during the latter half of the 20th Century, the industrialized world urban population doubled, adding "just" one-half billion people.