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# Havana's Transportation System: Future Scenarios

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**Abstract**

This paper develops four alternative, plausible scenarios for Havana's future transportation system, once the U.S. embargo is lifted. It uses a scenario planning methodology that identifies social, technological, economic, environmental and political drivers (STEEP) and their implications to isolate the two most uncertain and important drivers of what might happen in the future: political will and availability of funds for major transportation improvements. These two drivers serve as axes to generate the narrative scenarios: Havana Gridlock—brought about by the rapid increase of private vehicles; Urban Removal—with the availability of funds, Havana struggles to accommodate the increasing private vehicle fleet by road building, widening roads and resulting housing demolition; IT-Empowered Mobility—where lack of funds but strong planning, regulation of private vehicles, and widespread IT adoption result in high levels of mobility; Leapfrog Scenario, where planning, regulation and availability of funds for transportation infrastructure result in a high mobility scenario powered by renewables. The discussion section focuses on several issues underlying the scenarios: the importance of transportation choices for tourism; the distinction between automobility and personal mobility, and alternative forms of mobility. The paper concludes with reflections on the sequencing of the scenarios and the plausibility of the leapfrog scenario.


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*Keywords:* scenario planning; gridlock; urban redevelopment; IT-mobility; sustainable transport; renewable energy

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## 1 Introduction

Cuba's transport situation has been well studied (Enoch, and Warren, 2003). It resembles that of Latin America and Europe in the 1960s with very low vehicle ownership. Intra- and inter-urban transit service is limited. Many boroughs in Havana are compact [†], with most services available within walking distance. Urban street networks are well developed with small street grids and multilane arterials feeding into the center city (Warren J et al., 2015). Unique to Cuba, however, are travel behaviors and land use planning strategies to streamline travel that are not found in other countries. The "Special Period," following the fall of the Soviet Union and the subsequent lack of fuel and capital, brought a series of reforms: people constrained discretionary travel; bicycles became an essential urban travel mode; ingenious transit vehicles were deployed; industries and other employers diversified their locations and moved closer to their employees' home neighborhoods (Enoch et al., 2004). At the national level, industries were decentralized and roads were constructed to link existing cities in order to contain migration to (and the inevitable growth of) major cities (Delgado et al., 2003; Rodriguez, and Daumy, 2004).

In the wake of the lifting of the U.S. Embargo, the normalizing of relations with the U.S.A, and the opening of Cuba to the larger outside world, major changes will take place in Cuba's and in particular in Havana's transport situation. What are likely scenarios for Havana's transport future? Will it develop along the lines of sprawling and congested Miami-Dade County with heavy reliance on private cars, and poor public transit? Or, given influx of capital, energy, and appropriate concomitant policies, can Havana achieve high levels of personal mobility at low direct costs and low environmental and health impacts (Piercy,Granger, and Goodier, 2010)? This paper develops and outlines a set of plausible scenarios for Havana's transportation futures.

### *1.1 Methodology*

We use an abbreviated scenario planning methodology to develop likely scenarios for Havana's surface transportation futures. While the term "scenario" is used throughout science and decision-making, "scenario planning" is a specific method developed originally to assist business managers facing an uncertain and volatile future (Kahn, and Wiener, 1967). Since then, scenario planning has been in wide use in business, education, environment, defense and other fields (Chermack, Lynham, and Ruona, 2001; Keough, and Shanahan, 2008). Given the uncertainties associated with climate change, scenario planning has been increasingly used to characterize emissions and climate scenarios (Houghton,Jenkins, and Ephraums, 1990; Moss et al., 2010).

Scenario planning begins by identifying focal problems or decisions. The next step is to identify a large range of "driving forces." This helps to highlight important and long-term, rather than urgent, dynamics of the system. Driving forces that are predetermined (e.g., the aging of a population) are separated out to reveal the most significant uncertainties. Driving forces are typically ranked by locally knowledgeable participants to determine which ones are most significant and difficult to know. Based on the results, a preliminary matrix can be constructed along two orthogonal axes representing each uncertainty (van't Klooster, and van Asselt, 2006). The matrix can be used to develop a set of distinct scenarios. Each scenario must then be fleshed out by considering the role of the previously identified driving forces. Plans, or decisions, which have already been proposed or are subsequently developed, are then evaluated against each scenario.

Scenarios are built around three essential components: drivers or compelling influences; relative certainties or inevitable events; and key uncertainties. The process of building scenarios starts with looking for compelling influences or major drivers, the forces that affect the outcome of events. Typically, these are characterized by the acronym STEEP, standing for Social, Technological, Economic, Environmental, and Political factors that affect events. STEEP is an alternative framework to SWOT (Strengths, Weaknesses, Opportunities and Threats) for the analysis of external factors in strategic planning. [‡] Social factors, for example, include demographic changes.

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[†] From 1976 to 2010, the metropolitan area of Havana had the status of a province in Cuba, known as the Province of the City of Havana, which was distinguished from the larger surrounding Province of Havana. As of January 1, 2011, the old Province of Havana was divided into two provinces, Artemisa and Mayabeque. Since then, there is only one Havana, the province and capital city of Cuba, which is made up of 15 municipalities or boroughs in an area of 278 sq. mi. In effect, referring to Havana today is referring to the Havana metropolitan area.

[‡] Drivers can also be characterized as PEST, which includes Political, Economic, Social and Technological drivers or more recently