

mobility 2001



executive summary





executive summary

This report provides a “snapshot” of worldwide mobility at the beginning of the 21st century and identifies major threats to mobility’s continued sustainability. The report was commissioned by the WBCSD on behalf of a group of its member firms as the first step toward developing a vision of more sustainable mobility in the future. It was prepared by a group of researchers from MIT and Charles River Associates.

Effective and efficient mobility systems are essential to modern civilization

- Mobility is an essential human need. Human survival and societal interaction depend in profound ways on the ability to move people and goods. Efficient mobility systems are essential facilitators of economic development — cities could not exist and global trade could not occur without systems to transport people and goods cheaply and efficiently.

Mobility systems need to become more efficient, more equitable, and less environmentally and socially disruptive

- Mobility systems currently are significant contributors to congestion, deaths, injuries from accidents, climate change, resource exhaustion, public

health problems created by air pollution and noise, and ecosystem collapse. Mobility systems may also perpetuate social inequities by offering a very limited range of choices to the vulnerable sections of society, such as the poor and the elderly.

Significant improvements have been achieved in transportation vehicles as a result of technological improvement

- Automobiles, trucks, railroads, and aircraft have become more efficient, cleaner, safer, and more recyclable. Though technology has enabled reduction in transportation-related emissions of pollutants, as well as significant improvements in fuel-efficiency, these improvements have been largely offset by slow fleet turnover, lack of proper maintenance, changes in the mix of light-duty vehicles, and increased driving.
- Increased adoption of fuel-efficient diesel engines in passenger cars and light trucks, and the development and deployment of hybrid electric vehicles, offer the promise of further improvements in light-duty vehicle energy efficiency. Transportation is a major user of energy and overwhelmingly dependent on petroleum-based

energy. Trains powered by externally supplied electricity are the principal current exception. Though presently quite limited, the use of technologies based on electricity and hydrogen-powered fuel cells and hybrids would be other important exceptions.

Urban areas of the developed-world have become dependent on the automobile

In virtually all developed-world urban areas, the automobile plays the dominant role in providing urban mobility. Auto ownership and use has grown substantially over the last 50 years. This, in turn, has facilitated suburbanization and lower density development, damaging public transport’s competitiveness. Though public transport remains important, especially in Europe and Japan, its share of total developed-world passenger miles has been decreasing almost everywhere.

- Emissions from motor vehicles account for much of the air pollution in urban areas and for the majority of global transportation-related greenhouse gas emissions.
- In the next two decades, aging populations in Japan, the United States, and Europe will create a significant pool of older people with mobility needs that

the current automobile-dependent system will be ill-equipped to serve.

- Congestion appears to be increasing. Though reliable cross-national data are hard to find, there are indications that levels of congestion are being perceived as increasingly disruptive by the general public.
- A range of strategies is being tried to offset the adverse impacts of motor vehicles. These include traffic management strategies, promoting the increased use of public transport, the use of Intelligent Transportation Systems to increase the capacity of existing highway infrastructure, and real-time pricing of transportation facilities.
- Development of new highway infrastructure to meet increases in consumer demand for mobility is extremely difficult, in large part because of concerns related to the environmental and social disruptions caused by transport. In many places, the existing infrastructure is also deteriorating because of inadequate maintenance
- Mobility, already poor for most developing-world urban dwellers, is declining. Pollution, much of it transport-related, is at extremely high levels and is growing worse. Transport-related carbon dioxide emissions in the developing world are growing rapidly and will surpass developed-world carbon dioxide emissions in little more than a decade if present trends continue. Deaths and injuries from transport-related accidents occur at substantially higher rates than in the developed world.
- Despite growing demand, the development of new infrastructure and the maintenance of existing facilities are difficult, often due to a lack of finances and financing mechanisms.
- Some developing-world urban areas are achieving success in dealing with these problems. Curitiba, Brazil, is a prime example. Even more than in the developed world, however, replicating these successes is proving extremely difficult.

of new airports. Airport noise is a perennial significant concern. In addition, airport-related emissions of pollutants, such as nitrogen oxides, are attracting growing attention in many urban areas.

- Air transportation is currently responsible for between 8 and 12% of transport-related carbon emissions. Since these emissions occur at high altitudes, they have a disproportionate influence on global climate compared to the same emissions on the earth's surface. Since air travel is projected to increase rapidly, the importance of aircraft-related greenhouse gas emissions is expected to grow.
- High-speed rail shows the potential of providing an alternative to short air trips (less than 500 km). However, high-speed rail needs significant investments and can compete successfully with air and auto alternatives only in a set of particular favorable economic environments.

There is a large and rapidly growing unmet demand for expanded mobility in the cities of the developing world

The developing world is urbanizing and motorizing at a very rapid rate. Cities, such as the megalopolises of India and China that are already supporting a large fraction of the world's population, are growing and motorizing so rapidly that they have not had the time or the money to build new infrastructure or to adapt to new technologies. Further, the geographic spread of urban areas in the developing world is undermining the ability of public transport systems to provide the services on which most developing-world urban dwellers rely for the bulk of their mobility needs. As a result:

Intercity travel is growing rapidly, especially air travel, which has a disproportionately large influence on global climate change

Intercity passenger travel accounts for a relatively small share of total trips but for a much larger and growing share of total passenger-kilometers. Air transport accounts for a rapidly growing share of intercity travel in both the developed world (where it is already significant) and the developing world. In Japan and Europe, high-speed rail plays a significant and growing role in intercity travel (4% of all passenger kilometers in Japan and about 1% in Europe). As a result:

- Although many airports are becoming overcrowded, citizen opposition prevents their expansion or the construction

Efficient freight systems are essential to the functioning of modern society but are an unexpectedly large source of carbon emissions

The ability to transport large volumes of goods long distances at very low costs enables cities to exist, farmers to find markets for their crops, firms to reap the advantages of specialized production, and consumers to have access to a vast variety of goods at affordable prices. As a result:

- Although freight transportation is relatively energy efficient, it uses an estimated 43% of all transportation energy. Improvements in the emission characteristics of freight-hauling vehicles are being offset by the growth in freight movements, particularly growth in high-emission truck and air freight movements, often at the

expense of lower-emission rail movements.

- Vehicles transporting freight also contribute significantly to emissions of conventional pollutants, greenhouse gas emissions, traffic congestion, noise, and accidents. Further, freight-handling facilities are major users of land, especially in and near cities.

The “grand challenges”

As a result of our review of the current state of mobility across the globe, we identify a set of “grand challenges” that, if successfully addressed, would dramatically increase the sustainability of mobility. These challenges are to:

- Ensure that our transportation systems continue to play their essential role in economic development and, through the mobility they provide, serve essential human needs, and enhance the quality of life.
- Adapt the personal-use motor vehicle to the future accessibility needs/requirements of the populations of the developed and developing worlds (capacity, performance, emissions, fuel use, materials

requirements, ownership structure, etc.).

- Reinvent the concept of public transport — provide accessibility for those lacking personal motor vehicles in both the developed and developing worlds; provide a reasonable alternative choice for those who do have access to personal motor vehicles.
- Reinvent the process of planning, developing, and managing mobility infrastructure.
- Drastically reduce carbon emissions from the transportation sector, which may require phasing carbon out of transportation fuels by transitioning from petroleum-based fuels to a portfolio of other energy sources.
- Resolve the competition for resources and access to infrastructure between personal and freight transportation in the urbanized areas of the developed and developing world.
- Anticipate congestion in intercity transportation and

develop a portfolio of mobility options for people and freight.

Though each of these “grand challenges” is formidable in its own right, there is another challenge, perhaps the most formidable of all, that must be overcome if any of them are to be overcome. This is the challenge of creating the institutional capacity to address complex, long-term issues like these; the ability to develop consensus about significant changes in the structure and deployment of mobility systems across the world; and successfully designing, implementing, and monitoring such changes.

If they rely on current institutional capabilities, both the developed and developing worlds will find it nearly impossible to develop consensus around how such issues ought to be addressed, develop the plans to implement the consensus solutions, and carry these plans through to fruition. Though technology almost certainly will play a major role in addressing each of the “grand challenges,” it is likely that limits on institutional capacity, not limits on technology, will determine the speed with which the challenges will be addressed — or whether they get addressed at all.

<p>SUSTAINABLE MOBILITY PROJECT</p>					
<p>WBCSD CONTACTS:</p>					
Project Director:		A. Thorvik, thorvik@wbcsd.org			
Assistant Project Director:		M. Koss, koss@wbcsd.org			
Communication Manager:		K. Pladsen, pladsen@wbcsd.org			
Project Officer:		C. Schweizer, schweizer@wbcsd.org			
<p>COMPANY CONTACTS:</p>					
BP	P. Histon, histonpd@bp.com				
DaimlerChrysler	U. Müller, ulrich.mueller@daimlerchrysler.com				
Ford	D. Zemke, dzemke@ford.com				
GM	L. Dale, lewis.dale@gm.com				
Honda	K. Kambe, Katsunori_Kambe@n.f.rd.honda.co.jp				
Michelin	P. Le Gall, patricia.Le-Gall@fr.michelin.com				
Norsk Hydro	E. Sandvold, erik.sandvold@hydro.com				
Renault	C. Winia van Opdorp, catherine.winia-van-opdorp@renault.com				
Shell	T. Ford, Tim.T.Ford@OPC.shell.com				
Toyota	M. Sasanouchi, masayuki_sasanouchi@mail.toyota.co.jp				
Volkswagen	H. Minte, horst.minte@volkswagen.de				