Asia-Pacific Research and Training Network on Trade
Working Paper Series, No. 108, December 2011

Achieving a sustainable automotive sector in Asia and the Pacific: Challenges and opportunities for the reduction of vehicle CO_2 emissions

*By Masato Abe, PhD**

* Economic Affairs Officer, Private Sector and Development Section, Trade and Investment Division, Economic and Social Commission for Asia and the Pacific.. The author is grateful to Marc Proksch and Hongpeng Liu for their comments and inputs, and to Natthika Charoenphon and Panjai Limchupong for formatted the manuscript. The technical support of the ARTNeT secretariat is gratefully acknowledged. The opinion, figures and estimates in this paper are the responsibility of the author and should not be considered as reflecting the views or carrying the approval of the United Nations or ARTNeT. Any errors are the responsibility of the author, who can be contacted at abem@un.org.

Contents

Boxes

List of figures

List of tables

Executive summary

To mitigate the level of vehicle carbon emissions in the next few decades, effective policy and technical options must be considered by the governments and automakers (and their suppliers) within Asia and the Pacific, where rapid development of the automotive sector is expected. Various factors and players, however, are also driving carbon emissions from vehicles in the region, leaving policymakers with complicated coordination tasks. At the same time, the implementation and development of most carbon emission reduction initiatives and technologies will not be cost-effective at economies-of-scale without some form of combination of support mechanisms for the sector's investments. Such mechanisms should include economic incentives and regulatory regime improvements, possibly covering taxation, subsidies, industrial standards, vehicle regulations and transport infrastructure, while additional interventions may be necessary with regard to soft issues, such as behavioural changes and demand management, working primarily with consumers.

Cutting vehicle carbon emissions also requires a region-wide approach to addressing all the critical factors while also dealing with all the key stakeholders. In this sense, for Asia and the Pacific an integrated policy approach is needed contains various measures, with priority being given to investment in energy efficient and low-carbon vehicles, in order to meet short- and long-term economic and sustainability targets of the region. The integrated approach for the region should set long-term targets for carbon emission reductions while implementing various policy measures that would reduce uncertainty and risk in the automotive sector as well as giving automakers financial incentives to invest in new technologies.

This working paper analyses the contribution of the Asia-Pacific automotive sector to greenhouse gas (GHG) emissions, and the challenges and opportunities facing the sector in efforts to reduce those emissions, primarily carbon dioxide (CO_2). The main purpose of this paper is to identify recommendations for appropriate policies and strategies as well as for regional cooperation, to ensure that future developments in the automotive sector contribute to mitigating and adapting to climate change. However, the contribution must be made without affecting the economic development of individual countries, and should be based on cooperation between the automotive sector and governments in the region.

Introduction

The challenges and opportunities facing the Asia-Pacific automotive sector in reducing GHG emissions are becoming a critical issue. Therefore, the main focus of this working paper is to identify recommendations for appropriate policies and strategies as well as for regional cooperation, to ensure that future developments in the automotive sector contribute to mitigating and adapting to climate change. However, any such contribution must not affect the economic development of individual countries, and should be based on cooperation between the automotive sector and governments in the region.

Within this context, special emphasis is placed on the drivers of vehicle CO_2 emissions and available technological options for reducing emissions in the automotive sector of the region which is facing increasingly intensified competition in developing environmentally-friendly and fuel-efficient vehicles. Based on this analysis, the future direction of the automotive sector is presented, including a policy and regulatory framework for effectively reducing CO_2 emissions. Modalities for regional cooperation are also proposed. Although this paper primarily focuses on the Asia-Pacific region, given the industry's interregional structure its global perspectives are also covered where appropriate.

The methodology for this study involved the use of extensive and diversified research resources on the development of the automotive sector and the evolution of the sector's CO_2 emissions. Qualitative and quantitative data were utilized in assessing the status of the automotive sector and its CO_2 emissions. The study presents technological options and proposes policy changes with the purpose of reducing CO_2emissions from the automotive sector at the global and regional levels.

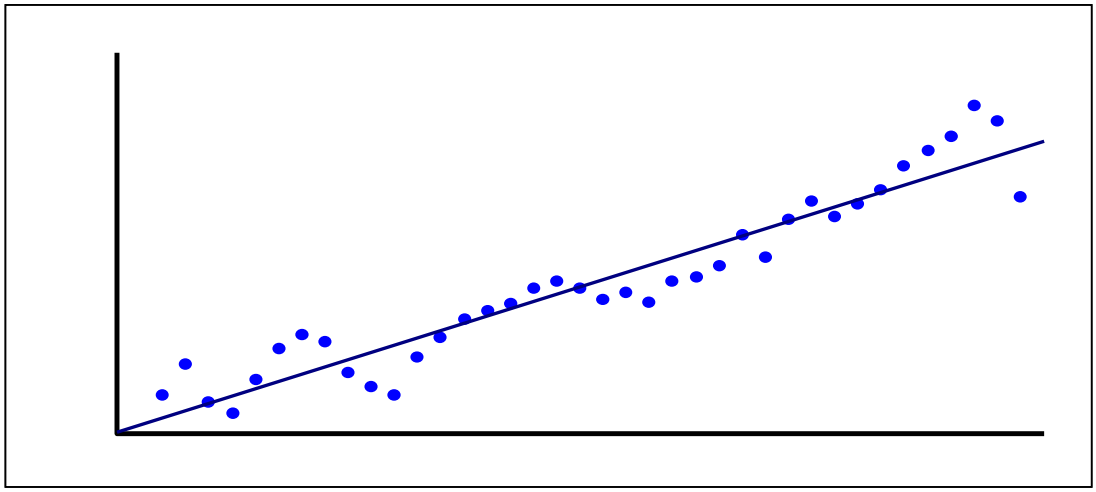
Section 1 describes the development of the Asia-Pacific automotive sector mainly in terms of its global and regional production and export capacities, and dynamism. Section 2 analyses CO_2 emissions from the automotive sector and their impact, based on emission sources and vehicle life-cycle CO_2 emissions, followed by future scenarios of vehicle CO_2 emissions. In section 3, technical options for reducing CO_2 emissions from the automotive sector are explored, based on the latest industrial data. Available policy options for countries in the Asia-Pacific region are presented in section 4, covering in particular five critical issues: (a) taxation; (b) fuel-efficiency standards; (c) fuel-efficient vehicles and alternative fuels; (d) traffic management and infrastructure; and (e) training and awareness raising. Section 5 provides recommendations for an integrated policy approach for Asia and the Pacific).

1. Developments and trends in the automotive sector

A. Global developments

The transport sector, especially cars, is the second largest contributing sector to GHG emissions after the power sector, according o the International Energy Agency (IEA) (2009a). The sector has been increasing automobile production worldwide in recent decades, although short-term declines in production have been also observed from time to time (figure 1). Between now and 2050 the global car fleet is expected to triple, with more than 90 per cent of this growth occurring in non-OECD developing countries (UNEP, 2009).

Figure 1. Annual global production of cars, trucks and buses, 1972-2010



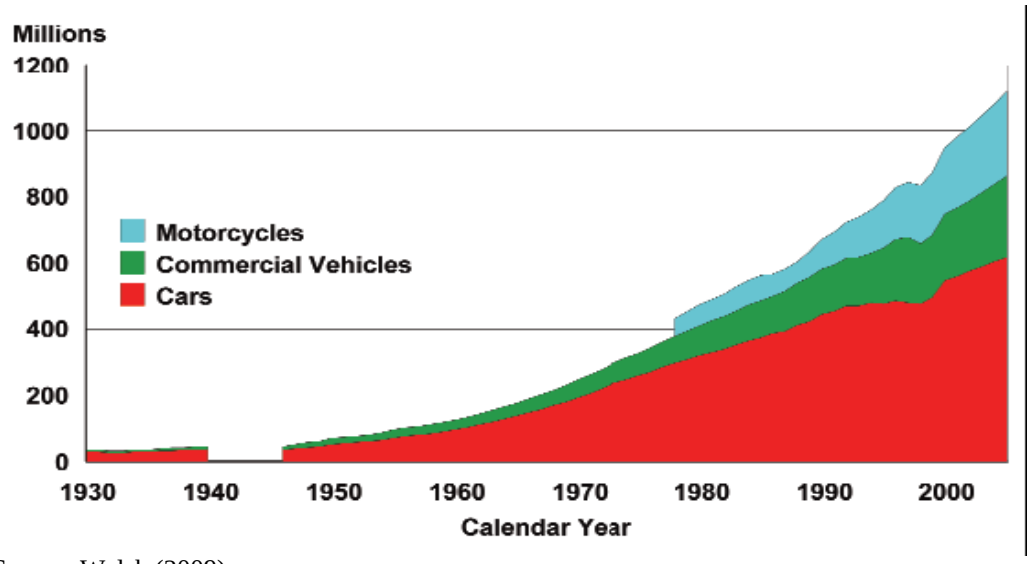
Source: Walsh, 2009, updated with data from the International Organization of Motor Vehicle Manufacturers (OICA) production statistics (accessed 7 June 2010).

In 2007, the number of vehicles produced worldwide reached 73.3 million units, with an average annual growth rate of 1.9 per cent since 1972. Although the occurrence of the global recession caused sharp production declines in 2008 and 2009 (total production fell to 70.5 million and 61 million units, respectively) a quick recovery was observed in 2010, partly as a result of various government support schemes for new clean, fuel-efficient cars, e.g., cash for scrapping old vehicles.[1] It is likely that the global market will exceed former levels of production within a few years, as emerging markets in the Asia-Pacific region (e.g., China and India) are expected to lead production in meeting global vehicle demand (ESCAP, 2009a).

As vehicle production has been increasing and vehicles have been produced faster than the rate at which they have been scrapped, the global total of vehicles in use, including private cars, commercial vehicles and motorcycles, has also increased at a growing pace (figure 2). Since 1990, each year approximately 27 million more vehicles have come on to the roads worldwide, compared with the previous year; globally, vehicles exceeded 1 billion units in 2002 (Walsh, 2009). Private passenger cars currently account for approximately two-thirds of all global vehicles in use.

[1] To reduce CO_2 emissions from motor vehicles, focus cannot be placed only on new cars and vehicle technology. To a large extent, CO_2 emissions result from an ageing car fleet (European Automobile Manufacturers' , Association, 2007).

Figure 2. Total vehicles in use worldwide, 1930-2005



Source: Walsh (2009)

B. Developments in Asia and the Pacific

One major change that can be observed in the global automotive sector is the increasing production capacity in Asia and the Pacific. Several developing countries in the region have recently exceeded 1 million in annual car production. Emerging car producing countries in the region include China, India, the Islamic Republic of Iran, the Russian Federation, Thailand and Turkey. As a result, more than one in two new cars in the world is currently produced in the Asia-Pacific region (ESCAP, 2009a).

Three regions in the world, i.e., Asia-Pacific (mainly Japan and the Republic of Korea), Europe and North America, have traditionally been the major hubs of automobile production. While Europe and North America have experienced flat growth in production since the 1990s, the Asia-Pacific region has achieved steady production growth in line with rising FDI inflows and a strengthening of automotive value chains in the region (ESCAP, 2007). In 2008, regional production of automobiles reached 34.4 million units out of a total global production of 70.5 million units (48.8 per cent), which exceeded by far the automobile production in the other four regions of the world (figure 3). Due to the continuing economic crisis, Asia-Pacific reduced its annual production to 32.8 million units in 2009, while global production also declined to 61