

# ChinaFAQs

## The Network for Climate and Energy Information



# China's Transportation Revolution

## FUEL, EMISSIONS, AND AUTO TRANSPORTATION

The bike is giving way to the bus, the train and the car in China. By 2025, the rapidly urbanizing nation – once known for its throngs of pedalers -- will need up to 3 million new buses and 19,000 miles of new subway and rail tracks to carry city commuters to work, and could have some 250 million cars on its roadways.<sup>i</sup> Such eye-opening numbers are just part of a transportation revolution that is remaking how goods and people move in China – and will have a big role in determining its future oil use and greenhouse gas emissions.

Just a few decades ago, few Chinese owned a motor vehicle. Now, nearly 20 million own a car, and China's roads carry more than 69 million cars and trucks, and 91 million motorcycles and scooters.<sup>ii,iii</sup> In 2009, China became the world's largest consumer of new vehicles, and its second biggest manufacturer, surpassing the United States.<sup>iv</sup>

The explosion of drivers has helped make China the world's second largest consumer of oil (behind the United States), consuming some 7.8 million barrels a day; about half is imported.<sup>v</sup> Some 40% of this oil is used for transportation, including gasoline and jet and diesel fuel, according to U.S. Department of Energy analysts. About 2% is used to fuel private cars. By 2020, half of China's oil could be used for transportation, with 10% of the total

burned in private cars.<sup>vi</sup>

The vehicle boom is also pushing up China's greenhouse gas emissions. Transport emissions of carbon dioxide, the major warming gas, have at least quadrupled since 1990, to more than 350 million tons per year.<sup>vii</sup> To curb these emissions, and address growing energy security concerns, China has made increasing the energy efficiency of all forms of motorized transport a priority, especially in fast growing cities.

To curb fuel use and emissions, China is:

## INCREASING AUTO FUEL ECONOMY

In 2005, China began implementing more stringent fuel economy standards. Now, at 36.7 miles per gallon (mpg), China has higher standards than the United States, Canada and Australia for urban vehicles. And in 2007 it also established an average standard of 34 mpg for rural vehicles.<sup>viii</sup>

In late 2008, China's Ministry of Finance also imposed "gas-guzzler" taxes designed to create incentives to buy more efficient vehicles. Purchasers of cars with engines above 4-liter capacity pay a tax of 40% and vehicle taxes also rose from 15% to 25% on 3 and 4 liter engine vehicles. In contrast, the tax on automobiles with engines less than 1-liter capacity dropped from 3% to 1%.<sup>ix</sup>

## Key Points

- China is undergoing a transportation revolution. The number of vehicles on China's roads is rising fast, along with oil use and greenhouse gas emissions.
- To curb its oil use and emissions, China is increasing fuel economy standards, investing in mass transit and seeking to become a world leader in the manufacture of electric and hybrid vehicles.
- China has a window of opportunity to put its transport sector on a low-emissions path. Investments in transport efficiency now will produce major reductions in energy use and emissions in the future.

While vehicle use in China is growing, it is important to note that ownership rates are still very low. In China today there is roughly one vehicle for every 70 people, as opposed to nearly one per person in the United States.<sup>x</sup> This means that imposing stricter standards now will have a major impact on energy use and emissions in the future. The efficiency gains produced by tighter standards, however, could be offset in the future if China does not restrain growing sales of larger and less efficient cars, such as sport utility vehicles, and less efficient imported vehicles, which are currently exempt from China's standards.<sup>xi</sup>

## INVESTING IN MASS TRANSIT

China has launched an effort to improve its public transit systems, particularly in growing urban areas. In the last 10 years, China has undertaken at least six efficiency upgrades to its intercity rail system. The latest upgrade covered 9 major routes in 17 provinces and increased railway shipping capacity by 18 percent when the new schedule was launched in June 2007.<sup>xii</sup>

Public transportation in at least 15 major cities is being significantly improved. For example, in preparation for the 2008 Olympics, Beijing added three new subway lines, light rail connecting downtown and the airport and bus rapid transit.

By one estimate, by 2025 China is projected to have some 170 large cities with population densities necessary to support new subways, light rail or rapid bus transport lines. The central government has set ambitious goals for increasing the proportion of commuters using mass transit in urban areas. In the largest cities (over 10 million people), it aims to boost transit use to 60% from the current 35%. In medium-sized cities

(2 million), the goal is 40% from 24%, and in small cities (less than 1 million), 30% from 15%. To reach these goals, China's cities may need to build up to 9 times more subway miles than currently exist, 300 times more light rail track (21,000 to 31,000 km of track), and buy up to 3 million buses.<sup>xiii</sup> Funding this infrastructure is expected to be a major challenge, but the result could be "the greatest boom in mass-transit construction in history."

## PROMOTING GREEN VEHICLES.

China has launched an effort to convert publicly-owned vehicles, such as government fleets and city buses, to less-polluting fuels, and is aiming to become a world leader in the manufacture of electric vehicles.

In June 2009, government agencies launched an initiative to eliminate up to 50 percent of "official cars" and replace many with vehicles powered by non-petroleum alternatives, including biofuels, compressed natural gas (CNG) and electricity. The effort is expected to remove thousands of high-emissions vehicles from the roads.<sup>xiv</sup> Some cities, including Chengdu, are already aggressively converting bus fleets to CNG.<sup>xv</sup> Converting public fleets to CNG and hybrid electric vehicles could, by some estimates, reduce China's energy use by up to 1.6 quadrillion British Thermal Units (QBTUs) by 2025 (equal to almost 2% of China's current annual energy use).<sup>xvi</sup>

In 2009, the Chinese government announced an array of subsidies and incentive policies aimed at making Chinese companies leaders in manufacturing electric vehicles.<sup>xvii</sup> The initiative has attracted the interest of potential foreign partners, including General Motors, BMW and Toyota. China is already the world's largest maker and buyer of electric bicycles and scooters, with sales exceeding 15 million in 2007.<sup>xviii</sup>

## A WINDOW OF OPPORTUNITY

Despite these efforts, greenhouse gas emissions from China's transport sector are expected to grow in coming years as more consumers purchase vehicles. "Miles driven" could quintuple over the next three decades by some estimates, and the total number of vehicles on China's roads could grow to some 700 million by 2050.<sup>xix,xx</sup> To handle such explosive growth, China has already built some 500,000 miles of highways since 1981, and will need to add another 100,000 miles by 2025 (equivalent to nearly twice the US interstate highway system).<sup>xxi,xxii</sup>

Still, China appears to be moving to take advantage of a window of opportunity to put its transport sector on a lower-emissions path that would hold future emissions below "business as usual" scenarios. These efforts -- developing and deploying energy-efficient, low-emissions cars, trucks, buses and rail systems -- will restrain future growth in energy use and emissions.

**This fact sheet is a product of ChinaFAQs, a joint project of the World Resources Institute and experts from leading American universities, think tanks and government laboratories. Find out more about the ChinaFAQs Project at: <http://www.ChinaFAQs.org/>.**

## Notes

- <sup>i</sup> These statistics and forecasts are found in Preparing for China's Urban Billion, a report by the McKinsey Global Institute, March 2009. See: [http://www.mckinsey.com/mgi/publications/china\\_urban\\_summary\\_of\\_findings.asp](http://www.mckinsey.com/mgi/publications/china_urban_summary_of_findings.asp).
- <sup>ii</sup> National Bureau of Statistics of China, Statistical Communiqué of the People's Republic of China on the 2008 National Economic and Social Development, February 26, 2009. See: [http://www.stats.gov.cn/enGliSH/newsandcomingevents/t20090226\\_402540784.htm](http://www.stats.gov.cn/enGliSH/newsandcomingevents/t20090226_402540784.htm).
- <sup>iii</sup> Beijing Traffic Management Bureau, Statistical Analysis on China's Vehicles and Drivers in the First Half of 2009, July 08, 2009. See: <http://www.bjttgl.gov.cn/publish/portal1/tab165/info12857.htm>.
- <sup>iv</sup> Reportlinker.com, China Automobile Sector Forecast to 2012, See: <http://www.reportlinker.com/p0147087/China-Automobile-Sector-Forecast-to-2012.html>.
- <sup>v</sup> China consumed 7,850,000 barrels per day in 2008, and imported 3,877,000 per day, according to the U.S. Energy Information Administration. See: <http://tonto.eia.doe.gov/country/index.cfm>.
- <sup>vi</sup> U.S. Department of Energy, Energy Policy Act 2005 Section 1837: National Security Review of International Energy Requirements (report to Congress), February 2006.
- <sup>vii</sup> Institute for Energy and Environmental Research, Heidelberg, Germany. Transport in China: Energy Consumption and Emissions of Different Transport Modes. May 2008. See: [http://www.ifeu.de/verkehrundumwelt/pdf/IFEU\\_et\\_al\(2008\)\\_Transport\\_in\\_China\\_GB.pdf](http://www.ifeu.de/verkehrundumwelt/pdf/IFEU_et_al(2008)_Transport_in_China_GB.pdf).
- <sup>viii</sup> D. Seligsohn, R. Heilmayer, X. Tan, and L. Weischer (October, 2009) "China, the United States, and the Climate Change Challenge." World Resources Institute, p. 9. Available at: [www.wri.org/publication/china-united-states-climate-change-challenge](http://www.wri.org/publication/china-united-states-climate-change-challenge).
- <sup>ix</sup> The purchasers of cars with engines above 4-liter capacity pay a tax of 40%. The tax on vehicles with engines between 3 and 4 liters rose from 15% to 25%. In contrast, the tax on automobiles with engines less than 1-liter capacity dropped from 3% to 1%. See: Leggett, Jane A. China's Greenhouse Gas Emissions and Mitigation Policies. Congressional Research Service, Washington DC. September 10, 2008.
- <sup>x</sup> D. Seligsohn et al. (2009) "China, the United States, and the Climate Change Challenge," p. 9.
- <sup>xi</sup> Wagner, DV et al. Structure and impacts of fuel economy standards for passenger cars in China. Energy Policy 37 (2009), pp. 3803-11.
- <sup>xii</sup> Seligsohn et al. (2009) "China, the United States, and the Climate Change Challenge," p. 9.
- <sup>xiii</sup> These statistics and forecasts are found in Preparing for China's Urban Billion, a report by the McKinsey Global Institute, March 2009. See: [http://www.mckinsey.com/mgi/publications/china\\_urban\\_summary\\_of\\_findings.asp](http://www.mckinsey.com/mgi/publications/china_urban_summary_of_findings.asp).
- <sup>xiv</sup> Asia Pacific Energy Research Centre. Understanding Energy in China: Geographies of Energy Efficiency, 2009. See: [www.iecee.or.jp/aperc](http://www.iecee.or.jp/aperc).
- <sup>xv</sup> Preparing for China's Urban Billion, a report by the McKinsey Global Institute, March 2009. See: [http://www.mckinsey.com/mgi/publications/china\\_urban\\_summary\\_of\\_findings.asp](http://www.mckinsey.com/mgi/publications/china_urban_summary_of_findings.asp).
- <sup>xvi</sup> Preparing for China's Urban Billion, a report by the McKinsey Global Institute, March 2009. See: [http://www.mckinsey.com/mgi/publications/china\\_urban\\_summary\\_of\\_findings.asp](http://www.mckinsey.com/mgi/publications/china_urban_summary_of_findings.asp).
- <sup>xvii</sup> Reportlinker.com, China Automobile Sector Forecast to 2012, See: <http://www.reportlinker.com/p0147087/China-Automobile-Sector-Forecast-to-2012.html>.
- <sup>xviii</sup> Gordon, Deborah. Surviving Two Billion Cars: China Must Lead the Way. March 2009. See: <http://e360.yale.edu/content/feature.msp?id=2128>.
- <sup>xix</sup> Institute for Energy and Environmental Research, Heidelberg, Germany. Transport in China: Energy Consumption and Emissions of Different Transport Modes. May 2008. See: [http://www.ifeu.de/verkehrundumwelt/pdf/IFEU\\_et\\_al\(2008\)\\_Transport\\_in\\_China\\_GB.pdf](http://www.ifeu.de/verkehrundumwelt/pdf/IFEU_et_al(2008)_Transport_in_China_GB.pdf).
- <sup>xx</sup> Wagner, DV et al. Structure and impacts of fuel economy standards for passenger cars in China. Energy Policy 37 (2009), pp. 3803-11.
- <sup>xxi</sup> Mrasek, Volker. Grim New Report: China's Greenhouse Gas Emissions Threaten to Double. Spiegel Online, March 6, 2009. See: <http://www.spiegel.de/international/world/0,1518,611818,00.html>.
- <sup>xxii</sup> Preparing for China's Urban Billion, a report by the McKinsey Global Institute, March 2009. See: [http://www.mckinsey.com/mgi/publications/china\\_urban\\_summary\\_of\\_findings.asp](http://www.mckinsey.com/mgi/publications/china_urban_summary_of_findings.asp).

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