

Members of the China Commission:

Today I am summarizing work done at EMBARQ, the WRI Center for Sustainable Transport. EMBARQ's work around the world is supported by our two global strategic partners, the Shell Foundation and the Caterpillar Foundation. With their support we have been working in a number of the world's largest cities, including two in China, as a catalyst for socially, financially, and environmentally sound solutions to the problems of urban mobility.

Many studies have noted the rapid growth of China's fuel needs for automobiles and projected large demands out to 2020, usually in the range of 2-2.5 mbpd. Our work suggests that fundamental constraints on motor vehicle use inherent in the nature of China's cities today and tomorrow might limit automobile use and discourage rapid ownership growth. In short, fuel demand for automobiles will not grow as many think.

Our thesis is that China could choose a much different path for urban transportation in the interests of keeping its cities thriving and livable, one that would avoid the chaos even we in the US suffer because of automobile-based traffic congestion. Whereas cities in the US and Europe have grown in adjusting to the automobile, the automobile in China may have to adjust to the fundamental constraints of China's population and cities, compounded by eventual problems of energy and pollution. The result would as a co-benefit lead to a world with greater oil demand tomorrow, but far less—only ¼ to 1/5, of what is commonly forecast.

To put things in proper perspective, China's oil use for cars today is about a fifteenth of ours in absolute terms and less than a 50<sup>th</sup> in per capita terms. The growth in oil demand for our cars and trucks in 2002, before prices started to increase, was around half of their total demand for gasoline for cars. The US remains far and wide the biggest user of road fuels, and while this hearing focuses on watching China, one knows that China is watching us carefully. So I don't think China deserves much "blame" for following in a path we defined almost 100 years ago.

We recently finished a book for the Energy Foundation and Hewlett Foundation that engaged leading Chinese and non-Chinese authors to address the clear descent of urban transport into a spiral of congestion, pollution, and traffic fatalities. While energy and fuel for transport is a concern, we found it less important than these other issues.

The background material submitted, which includes summaries of each chapter in our new book, lays plain China's transport dilemma:

- With money, people, and technology focused in rapidly growing cities, individual motorization is growing almost out of control there,
- The cost of this 'hyper-motorization', as I call it, is both obvious in terms of energy, air pollution, the lost lives of pedestrians and cyclists, and the increasing congestion the majority of travelers face at the mercy of the minority increase.
- Fuels for China's cars will come either from increased oil imports, or from greenhouse-gas intensive methanol or other synthetic fuels made from coal.

More benign alternatives cannot be mustered if the pace of motorization growth and car use continues as it has in the past few years.

- Authorities know that alternatives to imported oil are considerably more expensive. In my view they have not been able to visualize their transport system in 10 or 20 years under a regime of much higher fuel prices. They may try to subsidize development of alternatives rather than first price road fuels to represent replacement costs and externalities, no small task. But then, neither have US authorities been able to do this, and we provide little good example for Chinese to follow.
- The less obvious cost China is paying is the likelihood that “solutions” to these problems will expand cities in the unfounded hope that sprawl will solve congestion problems. As Beijing approaches its eighth ring road, nothing seems to be able to improve its traffic. In short, transportation itself is unsustainable in Chinese cities.
- Every city has big plans for metro lines, bus rapid transit and other “solutions,” yet these seem like a rear guard action, not a proactive pathway to sustainable transport. Unless cities take action to slow the rise of automobile use and reshape the car itself to fit Chinese cities, they will never succeed in building cities to fit the car.
- China looks outwardly like a market economy aimed at consumers, yet there are many fundamental pieces of the chain from energy or mobility to how consumers (and firms) act and choose that have few real market characteristics – fuel and transport access are probably under-priced, but above all streets and environment are certainly under-priced and already overburdened.

The result is clear already, as Chinese cities grind to a halt. In short, transportation itself, not energy (or CO2 emissions) is the key element of China’s transport fuels future.

We have tried to model three futures for car use and resulting fuel consumption in China. There were no real quantitative relationships or data to “prove” the viability of any of the outcomes we developed, but the cases themselves are intriguing enough to merit further study. Schipper and Ng (2004) and Ng and Schipper (2006) produced quantitative estimates of total numbers of cars, yearly use, and fuel intensity that in turn yielded total fuel use and CO2 emissions. The results alone are shown in the accompanying Figure 1 in the background paper submitted. The work only addressed automobiles in the aggregate, but suggested in strong terms that while concerns about fuel and even local air pollution would shape the future of motorization in China, it was the future of urban transport and indeed the future of cities that would hold the greatest sway over motorization.

Our traditional scenario creates a China in 2020 with the same level of motorization Korea had in 1995, about 100 cars/1000 people. Using reasonable values for driving distances and fuel economy we arrive at about 2 million barrels per day of oil, more than five times the present consumption.

In our oil-conserving scenario, China raises fuel prices from the present level (well below even ours) to the Japanese level, about \$7/gallon. China imposes modest fuel economy

standards (which she has done already) and works to move both compressed natural gas and hybrid gasoline or diesel cars into her stock. By 2020 these actions could chop 50% off the base case value for fuel demand, with 2/3 of the need satisfied by oil and the rest compressed natural gas or even electricity. This still doubles China's oil use for cars over the present. Given the more than doubling of the price of gasoline (over the base case) we postulated for this scenario, the outcome is consistent with work we and others have undertaken on fuel prices, fuel efficiency and car use. But in this world the numbers of cars and their use are only some 10% lower. China's cities still suffer.

To address this more fundamental problem, we designed a scenario heuristically called "Sustainable Urban Transport." The key logic behind this scenario was that a common desire for a livable city with good urban transport, and strong policies could realize this scenario. In this fuel use and CO2 emissions in 2020 are barely more than twice their estimated 2000 level, and only a quarter of where trends point for that target year. While concerns over fuel are important, what drives this world is the concern over the congestion, pollution, safety and noise authorities are showing as China's cities today barely touch the threshold of motorization.

What do Chinese authorities and other stakeholders need to do to move in the direction of more sustainable transport? First of all, economic and other stimuli need to be brought to bear to place reasonable and equitable limits on auto use. These include fuel and vehicle use taxes, congestion pricing (as first Singapore, then London and Stockholm introduced and recently Mayor Bloomberg proposed for New York City), clearly defined parking policies, etc. At the same time the public and private sectors must support investments in BRT, rail transit, and above all fortification of existing pedestrian and cycle patterns.

Second, while technology is important it is in many ways the least of China's woes. What strikes me is the challenge of managing technology – and that is an issue of behavior, economics and other social factors, not one of technology itself. Let us recall, for example, that the average new car in the US today is twice as efficient as 25 years ago, but uses only about 15% less fuel. Where did all the "efficiency" go? Into more weight, power, and features. In other words, a new car gets twice as much horsepower per mile per gallon. If China worries about fuel economy, she has to ask her auto manufacturers and auto buyers about both technology and size, power, and features, lest the outcome be similar to that in the US.

Let it be clear, too, that while vehicle fuel efficiency is important, the key to a high access future for China is the strengthening of its unique blend of non-motorized transport with high speed, high capacity mass transit built on bus rapid transit and various forms of urban rail. Since 90% of urban travel in China today is not on cars, China's challenge is not to "create" mass transit but to strengthen it and speed it up by keeping too many cars from clogging the streets. And we know from US experience, once too many individuals get cars, it is very difficult to get them to leave the cars at home – if indeed Chinese families have a place to store their cars!

Cost is important here. My friend Graham Smith, who recently retired from managing the World Bank's transport work in Beijing, likes to say that underground metros cost

\$1000 per centimeter! Even at \$1000/inch, they are still an expensive way of providing access in urban areas. BRT, which provides almost the same access, speed, and capacity for a fraction of the costs, has to complement heavily the most dense corridors where metro or other forms of rail make sense. China's leaders have to understand the importance of an integrated system that combines many modes and makes transfers almost seamless.

My own view is that China can choose a different path than the present one before it is expensive to change. So little is invested in the US or European-style car-based infrastructure and so many people have not become dependent on living in the asphalt jungle. Unfortunately the US itself offers few lessons on what China can do, as we work in other parts of the Capitol and the White House to keep subsidizing fuel and transportation. The largest threat to the transportation oil market remains burgeoning US demand, not the developing countries. Supporting US companies to export energy-intensive vehicles or establish factories in China to build such vehicles exacerbates both China's and our own energy woes.

However, it is not my role to say to Chinese authorities what they should or must do, but in my EMBARQ projects I have pointed out to authorities at the local and national levels that the trends from both other Asian cities as well as Beijing and to some extent Shanghai point towards the same gridlock: no road building or focus only on expensive metro lines can dig China out of this situation. Our work with Shanghai authorities pointed out how congested that city had become in precious few years of spreading car use and really raised their eyebrows. Our sessions with the leadership of Xi'an showed key actors there how the city's sidewalks were rapidly becoming Paris-style parking lots, while one of the world's only truly walled cities and home to the nearby Terra Cotta Warriors was tottering on the brink of gridlock, something sure to scare away the tourists from both China and abroad. And the capital city itself, Beijing, is almost frozen on any ring road, the population of private cars swollen by the hundreds of thousands of company cars and government cars.

The question of assistance from the US comes up frequently, as we have many joint activities. As I noted, it is important not to export our energy-intensive patterns of living and energy-intensive vehicles as well. But we have invaluable experience with municipal planning organizations and other processes that collect data, evaluate trends, create transportation alternatives, and move ahead, all with important stakeholder involvement. We found that our China scenarios themselves opened eyes and minds in China to alternatives. Let us remember, too that our own cities and stakeholders could benefit from more examination of the alternatives we have. Sharing our approach with Chinese stakeholders helps them learn this skill, too.

One must remember that key Chinese experts my age grew up in a world without cars. Our own five years of experience working with these experts is that they have to move with all deliberate speed to understand what is engulfing them rapidly. In short, they need help acquiring the power to choose.

In short, it is up to China to choose. With improved tools they probably can choose wisely.