

Roundtable on Barriers and Incentives for Hybrid Vehicles in China

A Roundtable Report

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Report on a roundtable jointly organized by the Energy Technology Innovation Project of the Belfer Center for Science and International Affairs at Harvard University's John F. Kennedy School of Government and the China Automotive Technology & Research Center.

The roundtable was held at the Beijing Xindadu Hotel in Beijing, China on May 19, 2006.

Introduction and Motivation¹

On May 19, 2006, a roundtable discussion on “Barriers and Incentives for Hybrid Vehicles in China” was held in Beijing, organized jointly by the Energy Technology Innovation Project (ETIP) of Harvard University’s Kennedy School of Government and the China Automotive Technology & Research Center (CATARC). Company officials from both Chinese domestic and foreign auto manufactures participated, along with representatives from the Chinese government, and experts from academia and research institutes. The main two goals of the roundtable were to identify the main barriers to accelerated development and deployment of hybrid-electric vehicle technology in China, and to determine how those barriers could be overcome through a combination of market-based mechanisms and policy intervention.

Gasoline hybrid-electric power-trains are one kind of highly fuel-efficient vehicle technologies. Efficiency gains can also be achieved through the use of diesel engines and small, light-weight conventional vehicles that use advanced technologies and materials. Of course, hybrid-electric engines can be used in combination with diesel engines to achieve even greater levels of efficiency, and they can also be adapted as “plug-in” hybrids where the vehicle battery is charged when not in use. Although it was acknowledged that diesel engines and advanced gasoline engines can certainly provide big fuel-efficiency benefits, the focus of this roundtable was on gasoline hybrid-electric vehicles.²

Although hybrid-passenger cars and buses are selling well in the United States and Japan, they have not begun to penetrate the market in China.³ Chinese domestic manufacturers are trying to acquire and develop indigenous hybrid vehicle technology capabilities, but have not produced hybrid vehicles on a commercial basis yet. Toyota and FAW recently began assembling the Prius in China in Toyota’s first effort to produce the Prius outside of Japan, but the cost of the Chinese Prius is quite high relative to the price of other Chinese non-hybrid cars, and high even compared with the price of the Prius in the United States. Not surprisingly, sales of the Chinese Prius have been weak, with only 991 sold in 2006 as of April⁴.

New policies have been promulgated in China that may create additional incentives for the development and deployment of hybrid vehicles in China. These policies include the Ministry of Science and Technology’s support in the 863 program for cleaner vehicles, the new fuel-efficiency standards for passenger cars, and the new fiscal policies for vehicles based on engine displacement. It is not clear, however, that these policies will provide sufficient incentive to accelerate the deployment of hybrid-electric vehicles in China.

This discussion took place in the form of a “roundtable” where senior experts and officials from government, industry, and academia engaged in a not-for-attribution discussion about the

¹ This report was prepared with the input and assistance of John P. Holdren and Hongyan H. Oliver. Comments from both of them as well as co-organizers, Zhang Jinhua, Wu Zhixin, and Wang Nan of CATARC were gratefully received. The author, however, assumes responsibility for the content herein.

² Diesel engines, while more fuel-efficient than conventional gasoline engines are not necessarily cleaner because they typically have higher particulate emissions. Clean diesel technology has been developed which, when used in combination with clean diesel fuel, can result in diesel engines being virtually as clean as gasoline vehicles. This advanced diesel technology is not in use in China, nor are the clean diesel fuels available.

³ In the United States, 199,148 hybrid cars were registered in 2005, a doubling of sales over 2004. Even though these sales numbers are much more robust than in China, hybrids only accounted for 1.2% of total vehicle sales in the United States in 2005.

⁴ CATARC, “Statistics,” China Auto, April 2006.

barriers and incentives for hybrid vehicles in China. No formal presentations were made, although some participants were asked to launch discussions with short remarks to put ideas on the table. The roundtable was co-chaired by Mr. Xu Jing, Deputy Director-General of the Department of High and New Technology Development and Industrialization and Prof. John P. Holdren of Harvard University.

Synthesis of Discussion

A great variety of barriers and incentives for hybrid vehicles in China were identified during the course of the discussion. The barriers that seemed most daunting included the current high price of hybrids commercially available in China, the lack of qualified hybrid parts and components manufacturers in China, poor consumer understanding about hybrids, lack of policies to promote the development and deployment of hybrids in China, low fuel prices, high tariffs for importers, weak Chinese technological capabilities in this area, and the fact that the foreign companies own many of the hybrid patents already. The incentives deemed most likely to promote hybrids were government performance standards, subsidies, and incentives, fuel taxes, education of consumers, and the enhancement of Chinese technological capabilities in this area. In this synthesis, each of the barriers and incentives identified at the roundtable will be explored in more detail. In many cases, these barriers and incentives are two sides of the same coin. The lack of policies promoting hybrid vehicles is certainly a barrier, for example, but new policies could provide significant incentives.

Barriers

Cost

The current high price of hybrid vehicles in China is mostly prohibitive to the general population. There is only one hybrid car on the market to date, the Prius, which is being assembled at a FAW-Toyota plant in China. The Prius currently retails for between 288,000-302,000 RMB (US\$36,000-39,000), 60 percent more than the price of a Prius in the United States.⁵ Many participants thought the Chinese price was too high. A survey recently conducted indicated that 80 percent of the 1,000 Chinese surveyed said they would not consider purchasing any kind of car which costs more than 200,000 RMB (US\$25,000), hybrid or otherwise. In an ownership cost analysis presented by one company, the analysis shows that current low fuel prices in China make it difficult to recoup the higher price of hybrids, and of course, the cost-benefit analysis is strongly dependent on the distance traveled by the vehicle. Taxis, therefore, recoup costs more quickly because they are driven further distances (approximately 100,000 km/year). In this analysis, if the price of fuel was 10 yuan/liter and the incremental cost for a full hybrid (50% fuel efficiency improvement) was 64,000 RMB (US\$8,000), then the cost could be made up for a taxi being driven 100,000 km per year in approximately two years. Explanations given for the high price of hybrids in China varied. One reason for the higher price is because of the 10-28% tariff that is paid on imported parts and components (see below). Related to this problem is the fact that few, if any, Chinese producers can produce the key components for hybrid cars, and so the car companies are forced to source internationally for parts and components.

⁵ The base price for a Toyota Prius in the United States as advertised on the Toyota website in July 2006 is \$22,305.

Chinese Technical Capabilities and Intellectual Property

Many Chinese domestic manufacturers and research institutes believe that the lack of domestic technical capabilities to develop and produce key hybrid components and integrate these sub-systems into a complete vehicle is a major barrier. In addition, several of the Chinese manufacturers present noted that another confounding factor is that the international firms like Toyota and Honda hold many of the relevant patents for key components. The lack of Chinese intellectual property in this area is a major constraint because without their own technology, the Chinese must pay for the intellectual property or purchase foreign components. Some Chinese manufacturers said they were finding it difficult to get around the foreign patents.

Consumer Acceptance

There was general agreement that the general Chinese public has a poor understanding about hybrids. Data from a recent survey show that only 15% of Chinese surveyed know what hybrid cars actually are, and another 65% had heard of them. Many people had concerns about the maturity of the technology and the availability and adequacy of after-sales service. Although not unique to China, it appears as though Chinese consumers implicitly use high discount rates when making purchasing decisions, and therefore do not value the future savings from using less fuel very highly. It was also noted that the lack of variety in product offerings in the hybrid category is an inhibitor to consumer interest because they may have specific needs that cannot be met with the current product offerings.

Hybrid Parts and Components Manufacturers

There are few, if any, Chinese parts and components (P&C) manufacturers who are capable of manufacturing the key components of hybrid vehicles to specification. The major Chinese P&C firms may be reluctant to invest in producing hybrid components because the production volume is so small and there are no economies of scale at this time. Some suggested that the parts and components need to be standardized by the government so there is greater economies of scale and so that all the auto manufacturers can source from the P&C firms. Many participants felt that the technological capabilities of the P&C firms in China were inferior and possibly inadequate to the task of producing to specification. This situation has made localization quite difficult. Those localization policies forced the auto manufacturers to work with local Chinese P&C manufacturers to improve their quality to meet specifications. On the other hand, the Chinese manufacturers felt that the foreign P&C firms' products are too expensive.

Low Fuel Prices

There was widespread agreement that the relatively low gasoline and diesel prices in China fail to create good incentives for manufacturers and consumers to produce and purchase fuel-efficient products. Government control of the pricing for retail fuels and the lack of fuel taxes results in the low gasoline prices in China. In May 2006, a gallon of gasoline was retailing for \$2.05 in Beijing and \$1.94 in Shanghai, as compared with an average price in the United States of \$2.91, \$6.28 in London, \$6.90 in Oslo, and \$3.71 in New Dehli.⁶

⁶ Lander, Mark, "Abroad at the Pump, Circumspection by the Barrel," New York Times, May 7, 2006.

Discussion is underway in China about whether to substitute fuel taxes for the current road maintenance taxes, which are used by local governments for road construction. The government has been reluctant to impose a fuel tax for fear that it would hurt the economy, and the agriculture sector in particular.

Tariffs

Some of the foreign companies argued that the Chinese tariffs were a significant barrier to hybrid sales in China, and that paying the tariff erodes their profit margins. In July 2006, China lowered the tariffs on cars, SUVs, and mini-buses from 28 percent to 25 percent in accordance with its WTO commitments. Import taxes on auto parts were reduced to 10 percent. To encourage localization, the Chinese government had announced a policy to impose a 25% tariff on auto parts if it is a “featured finished” vehicle. The EU and the United States have disputed this policy before the WTO.

Lack of Policies

Currently, there is a lack of comprehensive policies to promote the deployment of hybrid vehicles in China. It was argued that the government should create a “green path” for low-emission and fuel-efficient vehicles in a comprehensive fashion. The lack of a fuel tax, lack of differential purchase and ownership taxes, and lack of more stringent fuel-efficiency or carbon standards all contribute to the general lack of policy incentives for hybrids in China.

Incentives

Existing Government Policies

There was widespread agreement among the Chinese manufacturers present that the leadership and financial support provided to Chinese auto companies and research institutes by the Ministry of Science & Technology (MOST)’s High-Technology 863 program for clean vehicles had catalyzed the Chinese manufacturers to focus on hybrid vehicle development. In most cases, the Chinese companies were contributing their own funds for the R&D as well. This push from MOST has been the main government incentive for hybrid vehicles in China.

In 2005, the Chinese government issued its first fuel-efficiency standards for passenger vehicles, and these standards will be strengthened in 2008. None of the participants identified the fuel-efficiency standards as being a big motivator for hybrid vehicles in China, probably because the standards are not so stringent as to require the use of hybrid technologies.

Similarly, although the Chinese government recently approved new fiscal policies regarding the purchase of new passenger cars based on engine displacement, none of the participants identified these fiscal incentives as providing strong incentives for hybrid vehicles in China, although they do benefit more fuel-efficient vehicles. In any event, the new excise tax does not give special treatment to hybrids.

New Government Policies

A number of policies were proposed by participants to create additional incentives for hybrid vehicles in China, both at the national and local level (and it was noted that the policies at different levels need to be consistent). Many participants advocated adoption of government purchasing policies for hybrid vehicles since the government accounts for a large fraction of sales in China. Approximately 45 percent of vehicles (including trucks) in use in China in 2004 were government-owned. For passenger vehicles, 40 percent were government owned that year.⁷ Government could also affect the purchasing of municipal bus fleets and taxis, both of which are good applications for hybrid vehicles because of their high annual mileage and their city driving.

There was widespread agreement that higher fuel taxes were warranted, and would create good incentives for consumers to purchase more fuel-efficient vehicles, including hybrids. Preferential tax incentives for hybrids were also suggested, both in terms of purchase and ownership taxes, but one of the government representatives noted that it would be difficult to increase the fuel tax in the near future or adjust the purchase tax because it was still linked with national highway repair. He did suggest that China must begin by making its domestic fuel prices consistent with international prices.⁸

Although income tax credits and/or deductions appear to have been quite useful in stimulating demand for hybrid cars in the United States, most roundtable participants did not think this policy would work in the Chinese context because income tax collection is quite low. The leverage in China seems to be higher for purchase and ownership taxes and fees.

More stringent fuel efficiency standards were discussed as another mechanism for promoting hybrid vehicles. There was some discussion about the merits of converting fuel-efficiency standards into greenhouse-gas standards, as some countries are doing around the world.

Government Standardization of Parts and Components

A number of the manufacturers suggested that it would be useful to have standardization of the key components of hybrid vehicles for China so that the P&C manufacturers would have clear specifications, and the manufacturers could count on those specifications. In addition, standardization would give the P&C manufacturers greater economies of scale for their production, which might help lower the prices of expensive components such as the batteries. Standardization would also increase the reliability of the systems which would be of benefit to the auto manufacturers. Others suggested that localization requirements for hybrids might be helpful so that the Chinese P&C firms were forced to improve their products.

Improving Chinese Technological Capabilities and Intellectual Property

Many of the Chinese manufacturers expressed appreciation for MOST's support of hybrid research and development, and argued that this support should be continued and strengthened. Although MOST has not extensively supported R&D for P&C manufacturers, some felt that this would be useful so that their technological capabilities would improve in this area. Some suggested that an alliance between the Chinese auto and parts manufacturers should be created for hybrid development. Some participants suggested there should be more demonstration projects for hybrid vehicles so that experience could be gained and consumers gain more exposure to hybrids.

⁷ CATARC, *2005 Automotive Industry of China*, Tianjin, 2006.

⁸ Note that the National Development and Reform Commission determines domestic retail fuel prices.

Dongfeng has been operating a demonstration project for its hybrid buses in Wuhan, and there is a electric and hybrid-electric vehicle demonstration project in Shantou as well.

Although the Chinese manufacturers all expressed the desire to develop their own patents and intellectual property, some pragmatically acknowledged that a strategy where domestic and international resources were integrated was the only one likely to succeed in the short term. One Chinese firm is developing an international design team for its hybrids.

Stimulating Consumer Demand

Lowering the price of hybrids that are commercially available is the main way to stimulate consumer demand. But, it is possible that Chinese consumers are motivated by other concerns (e.g. environmental protection, fuel efficiency, or reduced noise). Some foreign company representatives commented, however, that the Chinese consumer seems mainly motivated by price.

Research Needs and Next Steps

A number of research needs were identified in the meeting. Principle among those needs were to learn which hybrid-specific policies in the United States, Europe, and Japan have been most effective, and which of these or other policies may be applicable in China. Also, better understanding why the Chinese parts and components manufacturers are not able to produce the key components for hybrid vehicles would be useful to know so that incentives could be devised to help these companies. Further in-depth study on how first costs of hybrids can be reduced in China is obviously important, as well as the optimal overall mix of policies to create incentives for the deployment of hybrid vehicles in China.

Another “next step” identified at the roundtable was to convene a meeting between automobile and parts and components manufacturers to identify the main barriers in sourcing key hybrid components from China.



Program

SIMULTANEOUS TRANSLATION PROVIDED

- 9:15 AM Registration
- 9:30 AM Welcome and Introductions by Co-Chairs
- Mr. XU Jing
 - Dr. John P. HOLDREN
- 9:45 AM Goals of Roundtable
- Dr. ZHANG Jinhua and Dr. Kelly Sims GALLAGHER
- 9:50 AM Chinese Government Perspectives (5 min. each official)
- 10:10 AM Procedure for Roundtable Discussion, Co-Chairs
- 10:15 AM Status and Costs of Hybrid Technology in Chinese Context
- Discussants: (5 minutes each)
- Prof. Wang Hewu, Tsinghua National Lab on Automobile Safety and Energy
 - Prof. Li Liguang, Tongji University
 - Dr. Wu Zhixin, CATARC
- General Discussion
- 11:15 AM Break
- 11:30 AM Identification of Barriers and Incentives for Deployment of Hybrid-Vehicle Technologies in China
- Discussants: (5 minutes each)
- Dongfeng
 - Honda
 - Toyota
 - Ford
- General Discussion
- 12:30 PM Banquet Lunch
- 1:30 PM Policy Options
- Discussants (5 minutes each):

- Dr. Zhang Jinhua, CATARC (China)
- Dr. Kelly Sims Gallagher, Harvard University (international experience)

2:30 PM

Action Items

- Policy options
- Further research needs
- Comments from government officials

3:00 PM

Conclusion, Co-Chairs

Participant List

Chinese Government

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Automobile Companies

Chinese Companies

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China Sustainable Energy Program, Energy Foundation

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L to R: Kelly Gallagher, Zhang Jinhua, Li Xinmin, Xu Jing, John Holdren, and Gao Sheng



This roundtable report was prepared by Kelly Sims Gallagher. The interpretations of the presentations and remarks made in the roundtable are her own and have not been reviewed by all roundtable participants.

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An electronic copy of this report is also available online at <http://bcsia.ksg.harvard.edu/energy>. If you have any questions about this roundtable, please contact:

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