Clean Automobile in China and Its Scientific Research, Technological Development and Training

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Executive Summary

The number of automobiles in China is still small in proportion to the population. However, the Chinese government has the intention of expanding the number of automobiles as a locomotive of economic development. Since the automobile involves many industries and plays an important role in social and economic activities, the development of automobile industry will come to have a significant impact on the overall social structure. But once an automobile-based social structure is established, it is very difficult to change the structure, as many countries are suffering now. For China, then, the present is very important time to pay special attention to clean automobiles.

Automobiles are directly involved with energy and environment problems such as oil resources, environmental pollutions, noises, disused automobiles and global warming. There are also indirect impacts on the environment caused by the production of material for automobiles and construction and management of nationwide roads and facilities for automobiles. They generate other social problems including traffic accidents and traffic congestion, the latter of which will also have a great impact on energy and environmental problems. The number of automobiles is expected to reach 50 million in 20 years, but the nation has no prospects of domestic supply of oil to meet the increasing demand and will have to depend more on import.

China has to catch up with leading automobile technologies in the world and go beyond to develop a new technology concept in order to mitigate the impact on the environment. The Chinese automobile industry has many obstacles in improving its technologies, such as shortage of on-site engineers, shortage of equipment and facilities, weak infrastructure of parts industries and financial shortage. It could be said that technology is general capability of people to achieve developments and improvements. The driving force of promoting this capability is to recognize the need for product improvements and new product developments and the willingness to improve products. But in china, unfortunately, the automobile industry is not so eager for product improvement and technological development compared with foreign automobile industries. Most of the reasons for the present behind situation of Chinese automobile technology are the result of the weak consciousness of improving their products. This could be attributable to her historical background, where there has been very few need to improve products. Although the social situation is changing, this historical heritage still prevent Chinese engineers and management from taking active roles in technology development.

In order to maintain sustainable development in the Chinese industry, all efforts must be made to minimize the environmental impact by automobiles. First of all, demand for automobile transportation must be minimized by appropriate city planning considering easy access to working places and daily necessities. A convenient public transportation network in neighboring cities and towns easy-to-use for everyone must be established before the cities become excessively dependent on automobiles. High priority should be placed on bicycles, by expansion of exclusive lanes and roads.

To save energy consumption by automobiles, every factor relating to the fuel efficiency must be studied for continued improvement. Such efforts will be of great use also when advanced technologies are transferred from foreign countries. The feasibility of a natural gas automobile should be studied considering the possible application of a synthesis fuel from coal. The idea of compact car, by eliminating excessive performances and functions, and lowering the maximum speed, could become the most effective means of relieving many automobile problems. Today's automobiles have much room to be rescaled substantially without losing conveniences. Extending the useful life of automobiles and recycling of disused vehicles are important themes. Easy-to-repair and easy-to-recycle designs, and standardization of automobile components...
should be promoted. Also, an industrial system for repairing components and distributing recycled components should be strengthened as an important part of the automobile industry.

The key of promoting general power of automobile technologies in China lies in management’s and engineers’ demand and willingness to improve their products. Their continued efforts for product improvement become the basis of technological capability. Once management come to have a strong consciousness and willingness for product improvement, they will be able to increase the number of engineers at production sites, train them, and upgrade experimental equipment and production facilities. Such changes will also be transferred to parts industries and other automobile related industries. The need for product improvement should be stimulated by establishing high standard for fuel efficiency and exhaust emission, introducing free competition mechanism among automakers, publicizing each vehicle's fuel consumption values, and educating people so that they can make the right decision in purchasing an automobile.