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China's electric car frustrations

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ABSTRACT

By 2020, the vehicle population in China will likely exceed 280 million—exacerbating national energy security, urban air pollution, and traffic congestion. In response, many local and regional governments in China are pursuing an expanding array of measures to restrain growth in personal vehicle ownership and, along with the central government, reducing emissions and energy use of vehicles. One prominent strategy is the promotion of new energy vehicles, especially plug-in electric vehicles (PEVs). Large subsidies were offered—up to $27,600 (171,000 RMB) per vehicle in some regions, including almost $9200 (57,000 RMB) from the central government—which suggests that China is making a major commitment to PEVs. But sales have been meager. In 2013, only 17,600 PEVs, mostly buses and utility trucks, were sold, less than 0.1% of total civilian vehicle sales. Several factors explain the failure of PEV sales to take off: (1) protectionism by local governments; (2) uncertainty over which electric-drive vehicle technologies to promote and what consumers are willing to pay, (3) lagging investments in charging infrastructure, and (4) conservative investment behavior by automakers and battery manufacturers. The central government issued directives to local governments in late 2013 to reduce barriers to out-of-town companies, resulting in modest sales increases in early 2014, but a more coherent, broader, and effective set of policies, incentives, and strategies are needed to overcome consumer and industry resistance and the lack of charging infrastructure.

Introduction

China's automotive sales soared to number one in the world in 2009, with total registered vehicles on the road on track to match the US around 2020 (Wang et al., 2011). This rapid increase in vehicles will bring economic benefits and jobs, but will also continue to threaten urban air pollution (Yan and Crookes, 2010), increase oil imports and greenhouse gas emissions, increase traffic congestion, and lead to more traffic-related deaths. The tension between these benefits and costs is a root cause underlying the failure of government to accelerate PEV sales in China.

Plug-in electric vehicles (PEVs) (and other New Energy Vehicles (NEVs) such as fuel cell electric vehicles) provide the promise of major reductions in air pollution, oil use, and greenhouse gas emissions (Delucchi et al., 2014). PEVs also provide potential for the Chinese automotive industry to leapfrog auto industries of other countries (Chu, 2011; Wang and Kimble, 2011). Indeed, a wide variety of Chinese government agencies have embraced PEVs, providing large incentives to buyers and sellers of the vehicles. The central government launched the "Ten Cities, Thousand Vehicles" (TCTV) program in 2009 to great fanfare, with a PEV sales goal of 10% of automotive sales by 2012 nationwide (Xinhua News Agency, 2010). The central

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government subsequently adopted a target of 500,000 cumulative PEV sales by 2015, and 5 million by 2020 (we refer to NEVs as PEVs since fuel cell vehicles are not included in recent policy initiatives) (State Council, 2012). In 2013, only 17,600 PEVs were sold nationwide, less than 0.1% of total civilian vehicle sales (Sohu, 2014).

As evidence of the failure of subsidies to motivate PEV purchases, note that the national government offered up to $9200 (57,000 RMB) per vehicle (Xinhua News Agency, 2014a) and many local governments offered even greater incentives. Consider the case of Shanghai, which provides cash subsidies of ~$6450 (40,000 RMB) plus free private vehicle registration plates to buyers of selected EV models, allowing them to bypass the auction. Given that a vehicle registration plate in Shanghai was worth ~$12,000 (74,000 RMB) in April 2014, the effective subsidy provided to each battery EV consumer in Shanghai could be worth over $27,600 (171,000 RMB).

Beijing, Guangzhou and Tianjin have also instituted lotteries and auctions to slow the purchase of new vehicles, also with special provisions that favor NEVs. In Beijing's lotteries for new car registrations, the probability of winning a license plate for a conventional car is only 0.8% (China Daily, 2013). But Beijing gave 1666 free PEV license plates during the city's first PEV license bid on Feb, 26, 2014. Only 1428 individuals applied for those plates, indicating very little interest in PEVs (Bloomberg, 2014). Similarly, Guangzhou and Tianjin conducted a hybrid of the auction and lottery system, also with a special provision for PEVs. Car buyers in these two cities had a 2–3% chance of winning a license plate for a conventional car through the lottery, or could pay $2100–$2600 (13,085–16,340 RMB) to buy a plate—or they get a free plate if they purchase a qualified PEV. Again, few consumers were interested, with only 100 applications for a free PEV plate each month (Dayoo News, 2014; Xinhua News Agency, 2014b).

Overcoming local protectionism

The central government's "Fuel-efficiency and New Energy Vehicle Development Plan" (2012) stipulates that the country will invest in the industrial development of fuel-efficient cars and NEVs and create subsidies for NEVs. But many local governments undermine this national initiative by using the NEV program to support local auto industries against outside competitors. They do so by purchasing vehicles from local companies for government fleets, directing subsides to them, and sometimes allowing them to avoid bans (for example, helping a truck manufacturing company expand into building passenger vehicles). These local actions can greatly constrain the growth of the market.

One policy tool used by larger cities is to offer large cash subsidies to buyers of PEVs (up to $10,000 per vehicle), but with conditions that favor local producers and block producers from other cities and provinces.

Shanghai, for instance, made vehicles from BYD, China's largest and perhaps most competitive PEV producer, ineligible for the local RMB 40,000 financial subsidy and also ineligible for the waiver of an auctioned license plate. Shanghai finally approved BYD's new Qin model to receive a free registration in late February 2014, but to date have not allowed them to receive the cash subsidy. Shanghai maintains this effective discrimination by (as of March, 1, 2014) only allowing three PEV models, all manufactured in Shanghai, to be eligible to receive the local cash subsidies—out of at least 13 models commercially available in China from major automakers (Phoenix News, 2014; Gasgoo Automobile Research Institute, 2014). Beijing takes a different approach, with the same effect. They exclude Plug-in Hybrid Electric Vehicles (PHEVs) from the list of NEVs that it will support, effectively shutting out BYD's Qin, which has an all-electric range of 70 km but is not pure electric. Not surprisingly, no Beijing-based automaker produces PHEVs.

Guangzhou and Chongqing take another approach to favor local automakers. Guangzhou extended local subsidies to hybrid gasoline-electric vehicles (which do not operate on electricity) while Chongqing only offered local subsidies to its local hybrid brands, even though they did not qualify for subsidies from the central government. The explanation is that Guangzhou's local joint ventures with Honda and Toyota produce hybrids, but not PEVs (Xinhua News Agency, 2014a), and Chongqing's local Changan brand focuses on hybrids. Chongqing offered a local subsidy of 36,000 RMB and waived toll charges for three years to local hybrid brands (Chongqing Wanbao, 2010).

Local protectionism is even more extreme in the purchase of government fleet vehicles, where non-local cars and buses are usually excluded in the procurement rules. For example, Hangzhou City in Zhejiang Province purchased electric buses in 2013 from Youngman Automobile Group and electric taxis from Zotye Auto, both local companies (Xinhua News Agency, 2013). BYD has been chosen as a strategic PEV supplier for local taxis in Huizhou, because it has invested 5 billion RMB locally to construct a new factory (D1ev, 2013).

This protectionist behavior by local governments is not irrational. Local governments' fiscal revenues mostly come from local business taxes, and thus local governments have little incentive to subsidize non-local manufacturers (Wu, 2013). Protectionism is not, however, in the larger interest of the country. It reduces the market for NEVs, undermines national NEV policy, and slows efforts to reduce pollution and oil imports.

The central government began to address local protectionism in 2013 by requiring NEV pilot cities to include at least 30% non-local brands. However, such a demand is controversial because the local government cannot dictate consumer purchase behavior. This requirement has been gradually interpreted as adding 30% non-local brands to the list of car models eligible to receive local subsidies, though the vehicle selection criteria for this list are not transparent. Additional measures can be deployed to prohibit the government fleet purchase of local NEV vehicles of more than 50 percent, eliminate the local vehicles eligible list for subsidies because such list tends to favor local brands as revealed in our article. The central government also needs to continuously monitor and evaluate local NEV success by emphasizing the importance of the total number of