



ENVIRONMENT AND NATURAL RESOURCES PROGRAM



Electric Vehicles in China

“It will be a moon shot for them, a hobby for us, and you’ll import your new electric car from China just like you’re now importing your oil from Saudi Arabia.”

—Thomas Friedman, 2010

By Pinar De Neve

This policy brief is based on the discussion paper “Leapfrogging or Stalling Out? Electric Vehicles in China” by Sabrina Howell, Henry Lee and Adam Heal, published by the Belfer Center in June 2014.

Bottom Lines

- **China has set ambitious targets for domestic Electric Vehicle (EV) development and deployment:** The target is to have 5 million EVs on the road by 2020. China’s leaders want to “leapfrog” the advanced automotive industries of other countries and seize the growing “new energy vehicle” market.¹
- **Progress has fallen short of China’s targets:** In 2009, China set a goal to produce 500,000 electric vehicles by 2011, or 5% of total vehicle sales. China was producing essentially no EVs at the time. In mid-2013, China had only about 40,000 EVs on the road, more than 80% of which were public fleet vehicles.
- **China’s EV industry faces some of the same challenges as companies in the West:** High battery costs, inadequate range between charges and the lack of an obvious infrastructure model for vehicle charging are hurdles that need to be conquered before EVs can become competitive with conventional vehicles.
- **It also faces barriers specific to China:** A fragmented automotive industry lacks the capacity to develop world-class EV technologies. Trade barriers prevent foreign firms from producing or selling EVs in China. Beijing’s focus on developing high-end EVs, strains the development of a strong lower-end EV market. The government’s generous subsidies, which are at unsustainable levels, are focused more on fleets than on stimulating consumer EV purchases. Further, in northern parts of China, a shift to greater use of EVs is likely to exacerbate air pollution problems, since incremental power demand will be met by greater use of coal facilities.

China Has Set Very Ambitious Targets

The penetration of electric vehicles occupies the intersection of three critical and interlinked priorities for China: economic upgrading, environmental sustainability and energy security. First, China wants to move its economy towards higher-value added manufacturing and prevent dependence on foreign innovation.² Second, the health and environmental consequences of energy use have become barriers to further economic growth. Finally, China's dependence on foreign countries and the open seas for its oil and, more recently, its coal and natural gas, exacerbates its perception of energy vulnerability. EVs are touted as addressing all three priorities.

Progress Has Fallen Short of China's Targets

The performance, in terms of meeting the EV targets, has been less than stellar. Sales of hybrid (HEV), plug-in hybrid (PHEV), and all-electric vehicles (BEV) combined totaled 3,181 vehicles in 2011, 15,880 in 2012, and 9,720 in the first 8 months of 2013. These numbers include sales to governments for use as taxis and police cars. By comparison, 434,625 HEVs, 38,584 PHEVs and 14,251 BEVs were sold in the United States in 2012.³ Since 2009, the Chinese government has offered generous subsidies for consumers in certain regions, as well as strong pressure on local governments to purchase EVs. Yet four years into the program, progress has fallen far short of the intended targets. China, however, has not given up and continues to set a goal of 500,000 EV vehicles on the road by the end of 2015—a goal it is unlikely to meet.

The absence of EVs on China's roads is due to a confluence of internal and external factors.

The Chinese EV Industry is Facing Universal Challenges...

Production and deployment of EVs have not been easy, not only in China, but also in the United States and Europe. EV technologies are substantially more expensive than conventional vehicles; batteries represent the largest single additional cost. For example, in Shenzhen, where consumers can access the central government subsidy of ¥60,000 (about \$9,600) as well as an additional city-level ¥60,000 subsidy, the price of a BYD E6 is still ¥170,000-180,000 (\$27,200-\$28,800) which is twice the price of similar, domestically branded conventional vehicles. Another barrier is the limited driving range of EVs between charges. Lastly, the lack of an obvious infrastructure model for charging creates obstacles for deployment of EVs.

...and Some that are Unique to China

The Chinese auto industry lacks sufficient concentration to achieve the scale that generates significant R&D advancement. This fragmentation is exacerbated by local and national level policies. At the national level, significant trade barriers prevent foreign technology from entering the Chinese market. Not only are imported cars ineligible for subsidies, but there are also stringent intellectual property (IP) transfer requirements for domestic sales of foreign-branded new energy vehicles (NEVs). China's weak IP regime as well as extreme technology transfer requirements for NEV market entry, mean that Chinese consumers have only limited access to these technologies.

China's EV policies have relied on very generous subsidies, which are not sustainable in the long run, and have emphasized local government purchase of fleet vehicles, including buses and sanitation trucks as opposed to stimulating private consumers to purchase EV vehicles. Secondly, the national government's focus on developing high-end EVs undermines China's strength in the much less technically demanding sectors of

low-speed EVs and electric bikes (ebikes). Low-speed EVs, essentially upgraded golf carts aimed at consumers who cannot afford a car, are common in China's rural areas. China is also the world leader in ebike production, a sector with strong export potential. These vehicles are far less glamorous than a potential Chinese Tesla, but they offer a viable market that could be expanded and potentially upgraded to a "real" EV industry.

Finally, the overall pollution and carbon emission impact of EVs, will depend on the fuel source of electricity, power plant efficiency and pollution abatement investments, and the proximity of those power plants to population-dense areas. If coal-fired power plants are used to meet the electricity demand, tailpipe emission reductions achieved by EVs could be offset by incremental power generation emissions, hindering China's environmental sustainability goals.

To Make Good on its "Moon Shot," China Must Prioritize Goals

China must decide whether it is pursuing EV goals to gain a share of the global high end EV market or to create an EV fleet that is better suited to its domestic needs. If it is the latter, it should strive to reduce the fragmentation of its auto industry, improve its IP protection for foreign companies, eliminate barriers for intra-national sales of vehicles and seriously explore the potential to leverage its existing global leadership in small scale EV vehicle production.

Related Resources

Howell, Sabrina, Lee, Henry, and Heal, Adam. "Leapfrogging or Stalling Out? Electric Vehicles in China." Discussion Paper, Belfer Center for Science and International Affairs, Harvard Kennedy School. May 2014.

Notes

[1] State Council (*zhongguo renmin gongheguo guowuyuan* 中华人民共和国国务院). 2012. "Energy Saving and New Energy Auto Industry Development Plan (2012-2020) (*jienerg yu xin nengyuan qiche chanye yu fazhan gui Hua* 节能与新能源汽车产业发展规划 (2012—2020年))". June 28. http://www.gov.cn/zwjk/2012-07/09/content_2179032.htm

[2] Interviews with Wang Qing, Division Chief of the Market Economy Division of the State Council Development Research Center and with Fang Jin, Deputy Secretary General of the China Development Research Foundation.

[3] Data from Electricdrive.org

For the full paper, see:

<http://belfercenter.org/EVChina>