



# Vehicle Electrification in China: Preferences, Policy, and Technology Trajectories

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In the past few years, China has become the world's biggest market for electric vehicles. At the same time, independent Chinese companies have come to dominate plug in electric vehicle sales within China. In the Energy Policy Seminar on Monday, October 2, speaker John Helveston, a Postdoctoral Associate at the Institute for Sustainable Energy at Boston University, explained how his survey and interview research helps to illuminate these recent developments.

In 2016, 45% of the world's electric vehicles were sold in China. Given China's large share of demand, Helveston asked, "What factors are shaping the development adoption of plug-in electric vehicles (PEVs) in China?"

To explore this question, Helveston compared the preferences of car buyers in the U.S. and China for (and against) electric vehicles. He used surveys to evaluate customers' "willingness to pay" for different types of vehicles, including conventional, hybrid, plug-in hybrid, and battery electric, assuming all other aspects of the car were the same. For fully battery-powered electric vehicles, willingness to pay in both the U.S. and China depended in part on the range of the car between charges—but in the U.S., willingness to pay was in all cases significantly negative. In the best-case (longest range) scenario, a U.S. customer would need a discount of more than \$10,000 to choose a battery powered car with a 150-mile range over a conventional gas car, *ceteris paribus*. The same was not true in China, where Chinese consumers were about equally willing to buy the battery powered or gas powered car. Preferences reversed, however, when comparing plug-in hybrid vehicles, with Americans more willing to buy these cars than Chinese consumers.

It's not clear why there is this difference between Chinese and U.S. drivers. One possibility is that while U.S. drivers rely on cars for long-distance travel, most Chinese rely on an extensive high-speed rail network for long-distance travel Helveston suggested.

Helveston then turned to the other respect in which China looms large in the electric vehicle sector: independent Chinese firms dominate domestic sales of plug-in electric vehicles, comprising 74% of sales in 2016. This figure is especially notable, given that "joint ventures" (government-mandated partnerships between Chinese and multinational firms) dominate sales of conventional vehicles in China. After conducting numerous interviews with Chinese automakers and industry observers, Helveston reported finding several examples of active experimentation, including the emergence of lower performing but relatively affordable electric vehicles and electric car sharing business models, as well as the adaptation of existing technologies (such as flywheels) to enhance electric vehicle efficiency. Helveston suggested that the emergence of China's independent car producers in the EV sector may point to a new understanding of the impacts of joint ventures regulations—while they may suppress innovation in existing market sectors, they may create a protected space in which emerging industry experimentation can flourish.

Helveston spoke as part of the Kennedy School's Energy Policy Seminar Series, which is sponsored by the Consortium for Energy Policy Research of the Mossavar-Rahmani Center on Business and Government.

