



Plug In America[®]

WE DRIVE ELECTRIC. YOU CAN TOO.

A faint, stylized silhouette of a car is visible in the background of the top header area.

How will electric vehicles affect the transportation fuels industry?

Who are we?

- A national 501(c)3 membership organization founded in 2008, we are passionate plug-in vehicle (PEV) drivers accelerating the rollout of the cars
- The leading national voice promoting plug-in cars
- The world's deepest pool of experienced PEV drivers, with many years of experience and millions of electric miles driven

What's so great about electric cars?

- It's a fundamentally simpler, more efficient, more elegant technology for moving vehicles around
- Instead of hundreds of moving parts with internal combustion engines, its basically just an electric motor and wheels
- For 100 years, electric drive has been limited by battery technology, but that is now changing—fast
 - Battery: cost \$1000 (2010) → \$200 (today) → \$75 (2025)
 - China planning to increase production of Li batteries 600% by 2020

Why do people love electric cars?

1. They are more fun to drive.

EVs are, hands-down, a better driving experience than gas cars. They give maximum torque from a standstill, plus smooth, quiet acceleration.



Why do people love electric cars?

2. They save money

- With all of the rebates and tax credits, plus savings on gas and maintenance costs, the total cost of ownership of EVs is the same or less than comparable gas cars on a monthly basis.



Why do people love electric cars?



3. They are more convenient to fuel and maintain
 - People fuel EVs more like a cell phone and less like a gas car. Just like a cell phone, most charging happens at home or at work, while you are sleeping or doing something else, not wasting time at a gas station. When time is pressing (such as along a highway), a fast-charge takes 20-30 minutes. Because they have so few parts, drivers spend less time and money on maintenance.



Why do people love electric cars?

4. They are clean

- Pure electric cars have no tailpipe or emissions of any kind. Plug-in hybrids have extremely low emissions.
- The carbon footprint is less than petroleum and gets cleaner over time as the power mix gets cleaner.

What is the market for electric vehicles today?

- For first half of 2017, 4.6% of new cars sold in California were electric (either pure electric or plug-in hybrid)
 - About 1% nationally
- Increase of 37% in 2016
 - On track for similar increase this year
- About half of total U.S. EV sales are in California
- 36 vehicle models available in California



Where is the market for electric vehicles going?



What are the automakers doing?

“GM believes in an all-electric future....We will launch at least 20 new all-electric vehicles by 2023.”

-Mark Reuss, General Motors EVP
of Product Development,
October 2, 2017



What are the automakers doing?

- **Volvo:** From 2019, all new models will be electrified. Not developing new internal combustion engine cars.
- **BMW:** By 2025, will have 25 electrified models.
- **Daimler:** Will electrify its entire portfolio by 2022.
- **VW:** Investing \$18B. Will have 80 electrified cars by 2025 and electric versions of all models by 2030
- **Ford:** Developing 13 electrified vehicles, including Mustang and F-150. Believes that within 15 years, EVs will outsell gas vehicles.

Countries banning sales of new gas cars

2025: Norway (EVs already over 20% of sales)

2030: Germany, Netherlands, India

2040: Britain, France

- Paris will ban gas cars from its streets in 2030

China: (world's largest car market): Requiring 10% sales of EVs by 2019. Considering date for ban.

California

- Current law:
 - 15% ZEVs by 2025
 - We are on track to surpass
- Proposed legislation:
 - 100% ZEVs by 2040





- A report from UBS released last week said that by 2025, 1 in 6 new car purchases worldwide will be electric. Europe will have the highest concentration at 30%.

What does this mean for transportation
fuel markets?

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The number of cars is still increasing—especially in China, but....

- Cars are getting more efficient
- Cars are migrating to electric
- Average car lasts ten years (i.e. fleet turns over slooowly)

Global demand for liquid transportation fuel will peak and begin to decline.....

- Shell: Could be as early as 2028
- BP: 2035
- ARB: 45% reduction in demand for on-road vehicle fuel in CA by 2030

What does this mean for transportation fuel markets?

- Demand will fall fastest in largest urban areas and slowest in rural areas
 - Electric vehicles are still basically an urban phenomenon

What does this mean for transportation fuel markets?

- There is an opportunity for gas station owners, especially along highways and transportation corridors
 - Quick charging takes about 30 minutes
 - Captive customers with time on their hands
 - Networks are aggressively seeking new sites



What does this mean for transportation fuel markets?

- Electricity providers will be generating increasing volumes of LCFS credits
 - Investor-owned utilities
 - Municipal utilities
 - Others (charging station networks?)

What does this mean for transportation fuel markets?

- There is still no substitute for aviation fuel
 - Airplanes will not be electrified for a long time
 - Batteries are HEAVY
- Demand for gasoline and diesel will decline, but other uses of petroleum are unlikely to be affected
- Demand for natural gas may increase

Thank You!
Questions?