

Introduction

PERSONAL TRANSPORTATION in North America depends almost entirely on petroleum. The freedom that cars, light trucks, and sport utility vehicles (SUVs) give us comes with a price. These gasoline vehicles produce more than a third of the greenhouse gases that come from the United States and add to global warming. The need for gasoline leaves our economy at the mercy of other oil-producing nations, many of whom don't particularly like us.

Something's got to change if we're to avoid the crises that lie squarely ahead of us because of this situation — political crises, climate volatility, ecological devastation, economic hardship, and military conflicts.

One solution — the plug-in hybrid — has caught the imaginations of all kinds of people who normally wouldn't agree on much of anything else. A politically polarized America is coming together over plug-in hybrids. Why? Because plug-in hybrids will save drivers money, cut pollution and greenhouse gas emissions, and improve national security by reducing our dependence on imported petroleum.

This book explains what plug-in hybrids are, why people want them, and what you can do to get one. Plug-in hybrids get plugged into a regular wall socket at night to recharge the batteries while the driver sleeps; their engines supplement the electricity with gasoline or biofuel for long-distance driving. The cost of fueling is less than half what you'd spend to drive a regular hybrid, and plug-in hybrids reduce greenhouse gas emissions by half.

Although you can't yet walk in to a car dealer and plunk down a deposit for a plug-in hybrid, they're likely to be available soon. Your actions can help bring them to market sooner.

I began longing for a car that runs on electricity after my family put solar panels on our home in 1998. With clean electricity coming from the sun, an electric car seemed the next logical step. We've since had two electric cars made by major auto companies and loved them both. I haven't been to a gasoline station in years. By driving on electricity, I've spared the world more than 2 tons (1.8 metric tons) of global-warming emissions from the car alone, not counting the emissions reductions from our solar panels, which replace electricity from polluting power plants.

Yet now I'm excited about an electric car that *does* have a fuel tank — the plug-in hybrid — because I understand that all-electric cars have some limitations, and most Americans are not ready for them yet. Plug-in hybrids overcome those limitations while still bringing most of the benefits of electric cars in saving fuel and reducing pollution. I'm also convinced that once people become familiar with plug-in hybrids, they'll feel comfortable driving electric cars.

The story of plug-in hybrids necessarily includes the stories of both electric cars and of conventional, gasoline-dependent hybrids, because they show us not just where plug-in hybrids came from but why our actions are important for plug-in hybrids to succeed. Chapter 1 describes how auto and oil companies tried to suppress electric cars and plug-in hybrids in the late 1990s and early 2000s, and why they gave us hybrids instead.

Many Americans, if they think about electric vehicles at all, probably think of them as a flop; a perception that is understandable but incorrect. Courageous California State regulators forced the major car companies to create zero-emission electric vehicles in the 1990s, and more timid regulators later allowed the automakers to take those cars off the streets and crush them, erasing the evidence that consumers once had the option to choose clean cars. While electric cars were available, however, there were waiting lists of buyers. The zeal with which their drivers resisted automakers' attempts to destroy the cars impressed California

regulators such that they may increase pressure on automakers to create clean vehicles when they revise state rules in 2007. What California does is important to the rest of the United States. California is the only state allowed to set clean-air regulations that are tougher than US federal standards. Other states may choose to follow the federal or the California standards.

Chapter 2 explains the similarities and differences between hybrids, plug-in hybrids, and electric vehicles. It examines the various advantages to running on electricity in terms of efficiency, cost, pollution reduction, and more. Readers who want a detailed manual of the mechanics and electrical components of plug-in hybrids won't find it here, but the organizations described in this book can point you to appropriate sources.

The arrival of immensely popular hybrids such as the Toyota Prius, Honda Insight, and Ford Escape SUV introduced hundreds of thousands of consumers to cars that incorporate some electricity for power but still rely on gasoline. In the geopolitical realities of the post-9/11 world, that dependence ultimately is the fatal flaw of hybrids. Unlike cars that can't run without gasoline, plug-in hybrids can use gasoline or cleaner, cheaper, domestic electricity — or both.

Biofuels such as ethanol or biodiesel may offer a homegrown alternative to gasoline, but producing enough biofuel to power all the cars, trucks, and SUVs in America is impossible today and impractical in the future. If we replace gasoline with biofuels in plug-in hybrids, however, the amount of liquid fuel needed could be cut to a fraction, because it's a backup for the electric drive. That makes biofuels a more realistic replacement for gasoline on a large scale.

Talk to anyone seeking the best way to get US transportation off petroleum and they're likely to say, "There's no silver bullet." There's no single solution. I agree. Rather than searching for a single bullet to kill off gasoline, I like to think that the best minds are finding solutions that will work together to let us live well without gasoline.

Smarter urban planning, more use of public transit, bicycling, walking, car-sharing, and ride-sharing are important parts of

solving the problems that automobiles have brought us. There's more than one rung in the ladder to get us off of petroleum. By focusing this book on just one rung — plug-in hybrids — I do not mean to slight any of these other important strategies.

Chapter 3 answers a common and important question related to plug-in hybrids: What about hydrogen? Aren't hydrogen fuel-cell vehicles supposed to be the clean, green cars of the future? I argue that hydrogen will never make sense for cars. Even if you think it does, nearly everyone agrees it will be decades before there will be hydrogen fuel-cell cars and more than a few fueling stations, if ever. If we don't do something much, much sooner to decrease global warming emissions from vehicles, we're toast. Reducing our need for imported oil is a priority that can't wait decades. Plug-in hybrids can meet both those goals with technology that's here today and that doesn't require any new, expensive infrastructure like expensive hydrogen fueling stations.

Chapter 4 describes the plug-in hybrids that have been made so far and looks at the technological readiness for mass production. Bringing them to market doesn't necessarily mean they'll stay available, however, as the battle to save electric vehicles from being crushed by automakers reminds us in chapter 5.

I explore the most common concern expressed about plug-in hybrids and electric vehicles in chapter 6: Are they really that clean? What about polluting, electrical power plants? The electricity has to come from somewhere. The same is true of gasoline; it doesn't just magically appear out of nowhere. I'll present evidence that plug-in cars reduce greenhouse gases and most other pollutants compared with either hybrids or conventional non-hybrid cars, even when accounting for pollution from power plants. Plus, plug-in hybrids let us take greater advantage of renewable power from wind and solar energy and move us closer to a sustainable society.

For all these reasons, plug-in hybrids have caught the fancy of folks from all parts of the political spectrum. Chapters 7 and 8 describe how and why conservatives' concerns for national security prompted them to become champions of plug-in hybrids. They hooked up with more progressive activists and middle-of-the-

readers, and, as described in chapter 9, formed a diverse cast of characters backing plug-in hybrids.

We follow some of them in this book — an automotive insider, engineers and environmentalists, streetwise political activists, and a neoconservative former CIA director. Parts of the book are reconstructions of conversations and events based on interviews with the participants.

Many, many people are integral to the story of plug-in hybrids. The ones highlighted in this book are not necessarily the most prominent or the most important, but they played key roles that allow me to present plug-in hybrids in what I hope is an enjoyable fashion. These include:

- Chelsea Sexton, automotive insider. Working for General Motors, Sexton fought attempts to destroy the electric EV1 car. Her experience illustrates how car companies are resisting plug-in cars, and why they'll make them anyway.
- Felix Kramer and the tech squad. Geek power, in all the best meanings of the phrase, put plug-in hybrids on the public map. Hackers with expertise in computers and cars turned a Toyota Prius into a 100 miles-per-gallon (160 km-per-gallon) plug-in hybrid and brought it to the attention of the world. What they did, the car companies will do even better, and on a much larger scale.
- Marc Geller, grassroots activist. Inspired by the successful protests of Act Up, Queer Nation, and anti-war activists, Geller helped organize street demonstrations that shamed some car companies into ceasing destruction of electric vehicles. The actions put the lie to automakers' claims that nobody wants plug-in cars, and helped pave the way for plug-in hybrids.
- R. James Woolsey, former CIA director and national security hawk. Seeing the end of cheap oil supplies looming, Woolsey advocates for plug-in hybrids to wean us from petroleum and to divert former "petrodollars" away from Islamic radicals. Conservatives in high office are being influenced by his arguments.

I don't necessarily agree with all the views of the various

people described in this book, but I present them to explain why plug-in hybrids have generated such widespread support.

A convergence of forces — stretching from progressive environmental groups all the way to the ex-oilman in the White House — suggest that plug-in hybrids will soon be available, as described in chapter 10. And chapter 11 gives you some tools to help hasten their arrival.

If politics is the art of compromise, plug-in hybrids may be the most political cars of all time. The story of how their time has come is a cautionary tale, though. The oil and auto companies know how to undermine the success of plug-in car programs to protect the status quo. With the information and the tools presented in this book, readers can help ensure that plug-in hybrids not only get to market, but stay here.

Let's get to it.