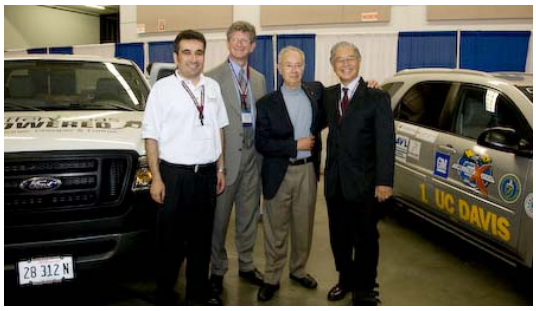
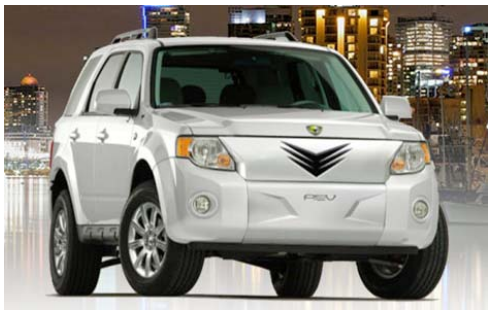
The 21st Century Car Industry: Fixed in the USA





Some of the first prototype gas-guzzler retrofits: Hybrid Electric Vehicles Technologies' Ford F-150 PHEV pickup with Founder Ali Emadi; CalCars' Felix Kramer; former Intel CEO Andy Grove, Efficient Drivetrains Inc. Founder Andy Frank with Chevy Equinox PHEV; Rapid Electric Vehicles' Ford Escape converted to EV.

Are we stuck with our oil addiction? What if millions of our middle-aged vehicles could be reincarnated as superior versions of their youthful selves, while developing new revenue streams for Detroit? What if that "fix" could start reducing the billion a day we spend on imported oil, while creating tens of thousands of local jobs in communities and cutting greenhouse gases from fossil fuels?

Automakers could do all this -- by thinking of vehicles as upgradable high-tech products. Entrepreneurs have begun to retrofit ordinary combustion vehicles into all-electrics or plug-in hybrids. A pioneering Chicago startup makes a prototype Ford F-150 pickup with an all-electric range of 30 miles per charge. After that it's a hybrid, boosting the best-selling truck's 15 city miles per gallon to 21.

In volume, this conversion could sell for $10-15,000. Converting school and transit buses could cost $35,000, with three- to five-year paybacks and reduced diesel fumes. And delivery vans that stay on the road up to 300,000 miles, with engines replaced every 100,000, could instead get partly electrified. Solutions starting in under 10-MPG niches could then spread to gas-guzzling vans, SUVs, and large passenger vehicles.

As "Cash for Clunkers" proves the pent-up demand for new vehicles, it also reveals another significant lesson: what old products are worth. Why not monetize aging assets while retaining the energy and materials used to build them? Amidst the auto crisis, it's a transformational opportunity to create a new future-facing business model for the industry.

Today's auto companies are like parents launching their millions of offspring, saying, "Bye…we don't expect to hear from you again unless something fails under warranty." Their dealers hope for service revenue and repeat sales. Except for occasional annoying recalls, they have no way to add improved technologies to vehicles that suffer from unplanned obsolescence.

Other industries create products as platforms. Some software firms make more from upgrades than from original sales. Computer companies shift from selling hardware to providing information technology systems and services. Automobiles are our longest-lifetime technology product. Why shouldn't OEMs (original equipment manufacturers), integrators, suppliers, and dealers acquire a lifetime interest in them?

That lifetime is longer than we think. First and second U.S. owners typically keep vehicles seven to ten years. Many large guzzlers -- built on durable frames, where it pays to replace rusted bodies -- are then sent overseas, where they still produce greenhouse gases.

Why electrify transportation? Compared to combustion engines that waste most of their fuel in heat and friction, over the entire cycle from fuel extraction to use, electric motors are four times more efficient, making electric miles that much cheaper. Since we generate electricity from multiple sources -- but almost none from imported oil -- we get improved energy security. Electric vehicles are the only ones that get cleaner as they get older -- because the power grid is becoming more cleaner.

And electric motors have instantaneous torque for fast acceleration.

Why not just wait for the plug-in models OEMs will introduce by 2015? Unproven demand means they won't make many. Hybrids took ten years to become 1% of all U.S. vehicles and 2% of new sales. So new plug-ins won't significantly reduce petroleum use and CO_2 for 15 years or longer.

Fortunately, we can get those benefits sooner by fixing tens of millions of over 250 million U.S vehicles -- and nearly one billion in the world.

Here's how it could look: OEMs, dealers, and partners map out new revenue opportunities. Multiple customer-service pathways extend vehicles' lives, reducing fuel and use and lifetime total cost of ownership. Electrification is the biggest but not the only fix. Dealers equip recent cars with real-time engine displays -- videogames with fuel-saving tips. Some models get improved engine efficiency and aerodynamics. Dealers offer discounted home tire inflators, remote diagnostics, and at-home component swap-outs.

Past customers get validated, warrantied retrofits, installed by dealers or on idled assembly lines. OEMs certify franchises and garages as "qualified vehicle modifiers," as they do now for customizers of everything from sunroofs to stretch limos.

The result? Hundreds of thousands of green installer jobs and a recharged supply chain for motors, electronics, batteries, and mechanical components. U.S. companies gain global leadership and licensing opportunities. Vehicles originally built anywhere get stickers, "Fixed in the U.S.A."

How do we get there? By jump-starting a conversion industry, eventually paired with automakers. OEMs help commercialize safe, reliable conversions by blessing small companies' retrofit solutions even if they're inherently not optimized.

Washington has set a goal of a million new plug-ins by 2015. As the largest fleet owner, it could offset high costs for initial prototypes. Federal procurement could spark retrofits to military and civilian pickups, shuttle vans and buses. Innovation-friendly regulations could pave the way to rapid approval of conversion designs.

"Cash for Clunkers" could expand to incentivize converting vehicles, helping companies get started. Washington put a toe in the water with a 10% tax credit for plug-in conversions, up to $4,000. With gas over $3, a conversion industry could take off if, like the Chevy Volt, the first 200,000 of each model like the Chevy Silverado could get a $7,500 credit.

This could lead to financing by automotive "energy service companies," which, like those working with building owners, could offer fleet owners one-day conversions at no up-front cost, with the installer collecting credits and sharing in fuel savings over time.

None of this depends on new technologies or infrastructure. Silicon Valley can show Detroit how continuous improvements and upgrades can accelerate the transition from foreign oil to domestic electricity. Visionary entrepreneurs can pluck the low-hanging fruit. We can finally align the interests of buyers, sellers, and get everyone rooting for great cars from a profitable industry.

-- Serial entrepreneur Felix Kramer is the founder of CalCars.org, a Palo Alto, CA-based nonprofit promoting plug-in hybrids.

Charts from White Paper: conversions bring more rapid benefits (more at top of CalCars home page)

1. Percent **Fleet Penetration** of PHEVs: *Even assuming an unlikely adoption rate 10X faster than for hybrids (22% vs. 2.1% in 10 years), new plug-ins are not a significant percent of cars on the road until 2025-30.*

2. **Oil Consumption** Percent Reduction: Minimal near-term oil consumption benefits without retrofits.