



Driving Forward: An Action Plan for the Electric Drive Era



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Electric drive vehicles – hybrid, pure battery electric, plug-in hybrid and fuel cell vehicles - are essential in leading the U.S. to greater energy, environmental and economic security. Electric Drive Transportation Association (EDTA) members include leading and emerging vehicle, battery and component manufacturers, as well as electricity providers, smart grid and infrastructure developers, and others advancing diverse technologies that will displace oil with electricity in transportation. Together, we are building the advanced vehicles, jobs, sustainable transportation options and energy security that comprise the electric drive future.

The U.S. is spending \$200 billion on imported foreign oil annually, which represents 40 percent of the U.S. trade deficit. According to the International Energy Agency, oil demand from developing countries will cause prices to average \$100 a barrel between now and 2015 and double by 2030.

As an alternative to oil, we can fuel our vehicles with electricity, which is domestically produced and reliable. In fact, a recent federal study projected that, with grid management, 73 percent of the light duty fleet could be fueled by electricity without having to add any new generating capacity. The change would displace an estimated 6.2 million barrels of oil a day, about 52 percent of current oil imports.

Building the electric drive fleet in the U.S. paves the way for economic growth and for the country to build a competitive edge in the global race for advanced energy technologies. New and expanded development efforts and manufacturing for batteries, microturbines, recharging infrastructure and other electric drive technologies are providing jobs today and greater economic security for the future. According to a July 2010 Department of Energy report, U.S. factories are on track to produce batteries and components to support up to 500,000 electric drive vehicles annually by 2015 and overall investment in electric vehicles, technologies and infrastructure will create tens of thousands of American jobs.

Our goals for clean transportation and a healthier environment can also be reached with electric drive. A report by the Electric Power Research Institute and the Natural Resources Defense Council found that if 60 percent of U.S. light vehicles were powered by today's electric grid, greenhouse gas emissions from this sector would drop by one-third. The Center on Globalization Governance and Competitiveness projects that putting just 60,000 hybrid trucks to work would save an estimated 52 to 130 million gallons of fuel and reduce between .6 million to 1.4 million tons of carbon dioxide emissions per year. Electric drive vehicles also reduce air pollution and smog, making our cities cleaner and healthier.

RECOMMENDATIONS

The nation is at an energy policy crossroads. We have the opportunity to lead the electric drive effort and we must take it to achieve energy security, a competitive advanced technology economy and a cleaner, healthier environment.

Key strides in policy have accompanied historic industry achievements in electric drive technology, manufacturing and deployment. Plug-in electric drive vehicles are increasingly available, with the first mass market plug-in vehicles available to consumers in the U.S. and more than 20 models coming to market in the next three years. Today's hybrid cars and trucks continue to build market share while also helping improve the fuel economy of the national fleet. Fuel cell vehicles are being demonstrated successfully across the nation.

As the collective voice of the electric drive industry, we have identified the critical next-step policies that will build on our success and help the U.S. move beyond oil dependence and lead the Electric Drive Era:

Reduce Market Hurdles to Speed Deployment of Electric Drive Vehicles

Educate Consumers, Communities and Stakeholders

Ensure U.S. Leadership in Electric Drive Manufacturing

Standardize Regulatory Policies for Electric Drive Vehicles and Infrastructure

Accelerate Technology Breakthroughs

Reduce Market Hurdles to Speed Electric Drive Vehicle Deployment

Although diverse electric drive vehicles are entering the market, vehicle and infrastructure costs present an initial hurdle to large-scale adoption. Incentives and support for private and public acquisition of electric drive vehicles and infrastructure will reduce cost challenges for consumers and help manufacturers reach the economies of scale that will bring vehicle costs down and speed the proliferation of electrification infrastructure.

Refine Tax Incentives for Electric Drive Vehicles and Related Infrastructure

- Support added flexibility in incentives for individual and business consumers, including mechanisms to bring credit benefits closer to point of sale
- Restore and expand the incentive for medium and heavy-duty hybrid vehicle purchases, including battery electric trucks
- Reinstate the original value of credit for fuel cell electric vehicles and extend its duration
- Promote diverse electric drive infrastructure options for battery electric, plug-in hybrid and fuel cell electric vehicles as well as stationary hydrogen storage and refueling
 - Provide multi-year extension of the refueling property credit at the 50 percent level, up to \$50,000 for commercial property and \$2,000 for residential property
 - Support flexibility to increase effectiveness of the infrastructure credit, including transferability and refundability of the credit
- Provide incentives for stationary and non-road applications for transportation energy storage systems (e.g., advanced automotive format batteries and hydrogen/fuel cell systems) and infrastructure to support them
- Accelerate depreciation of smart meters, which support the deployment of grid-connected vehicles
- Coordinate and promote non-financial incentives for vehicles and infrastructure at the federal and state level, including HOV lane use guidance and preferential parking initiatives
- Promote electrification of low-speed and non-road vehicles; extend tax credit for low-speed vehicles



A Hybrid Electric Vehicle (HEV) uses both an electric motor and an internal combustion engine or microturbine to propel the vehicle. A hybrid is designed to capture energy that is normally lost through braking and coasting to recharge the batteries (regenerative braking), which in turn, powers the electric motor.

In 2010, hybrid cars represented nine of the ten most fuel efficient vehicles in the U.S., according to the EPA. Americans have purchased more than 1.7 million hybrid vehicles since 1999.

A plug-in electric vehicle (PEV) has a battery that charges by plugging into an electrical outlet to store electricity, providing power to an efficient electric engine to move the wheels.

Advance Public and Private Fleet Penetration and Regional Deployment Efforts

Advance public and private fleet penetration

- Expand incentives for private and municipal fleet purchases, including accelerated depreciation, expensing and tax incentive options for commercial fleets to promote fleet turnover
- Promote federal fleet penetration through expanded recognition of electric drive options in the General Services Administration schedule and work with Department of Energy's EPAAct and Federal Energy Management Programs to educate and assist federal, state and covered fleets in acquiring electric drive vehicles
- Recognize and facilitate electric drive fleet purchases in State Energy Programs, State Implementation Plans and other federally supported state and local air quality and efficiency efforts



There are three basic types of plug-in electric vehicles:

- Plug-in Hybrid Electric Vehicle (PHEV)
- Extended-Range Electric Vehicle (EREV)
- All-Battery Electric Vehicle (BEV)

A Plug-in Hybrid Electric Vehicle is similar to conventional hybrids, but its battery can be charged by plugging into an electric outlet. PHEVs can have various ranges of electric-only travel, depending on battery size. After the electric-only range is exceeded, the vehicle continues to operate as a hybrid vehicle using a gasoline engine or generator.

A Fuel Cell Electric Vehicle combines hydrogen fuel and oxygen to produce electricity used to power an electric motor that moves the vehicle. The only exhaust is water.

An Extended-Range Electric Vehicle is also propelled only by electricity. After the battery has been discharged, an internal combustion engine or other energy source, acts as a generator to power the battery, extending the driving range of the vehicle.

Filling up a plug-in electric vehicle only costs two to three cents per mile, versus an average of 15 cents per mile for gasoline per gallon. If the average American drives less than 40 miles a day, it will cost about \$1 - 1.50 a day for electricity (depending on the vehicle).

Expand National and Regional Deployment Efforts

- Support national and regional efforts to electrify transportation with battery electric, hybrid, plug-in hybrid and fuel cell vehicles, and infrastructure, including support for regional planning and technical assistance programs
- Expand existing local deployment programs, including the Clean Cities program
- Promote development of grid technologies, protocols and practices that maximize the benefits of electric fuel for consumers and for energy providers, including:
 - Research into smart vehicle/grid communication and technology development;
 - Incentives to support technology upgrades; and
 - Stakeholder development of protocols for providing utilities with early notification of plug-in vehicle adoption in their service areas

Grow Electric Drive in Transit and Commercial Applications

- Support greater role for the Department of Transportation, in coordination with the Department of Energy and state efforts, in electric drive adoption, including an expanded role in hydrogen infrastructure standard-setting, as well as implementing new hydrogen and electricity recharging infrastructure demonstration programs
- Expand support for the suite of electric drive technologies in the Surface Transportation Authorization bill including research, development, and deployment of battery electric, plug-in hybrid, hybrid and fuel cell public transit and commercial vehicles and related infrastructure



Educate Consumers, Communities and Key Stakeholders

Commercial scale adoption of electric drive technologies will also require consumer education, as well as formal training for the next generation of engineers who will be designing tomorrow's electric drive.

Credible information about the value, benefits, safety and requirements of electric drive is crucial and must be widely available to consumers, businesses and state and local policymakers.

EDTA's coordinated stakeholder outreach effort, the National Plug-In Vehicle Initiative, is providing essential information on plug-in electric drive technology to consumers and public and private stakeholders, including outreach and information to state and local legislators, regulators and utilities on plug-in technologies, infrastructure, impact and implementation strategies.



The effort includes the *GoElectricDrive.com* website, which provides consumers with everything they need to know about driving, owning and operating plug-in vehicles. We will be adding public and private partners to expand this valuable resource.



- Extend support for education and outreach at national, regional, state and local levels
- Work with industry to develop and disseminate an electric drive value proposition analysis to quantify the national, regional, state and local benefits of electric drive, including energy security, employment and air quality returns
- Invest in the future electric drive workforce through secondary and post-secondary education of the next generation of engineers and scientists

Ensure U.S. Leadership in Electric Drive Manufacturing

Producing new electric drive vehicle fleets will require a revitalized manufacturing base and robust supply chain to build next-generation battery, hybrid, plug-in hybrid and fuel cell vehicles for consumer, commercial and government customers. Expanded support for manufacturing will increase U.S. competitiveness while growing the advanced technology workforce.

Promote Federal Support for Electric Drive Transportation-Related Manufacturing

- Provide additional funds, including grants and loans, for the Department of Energy's Advanced Technology Vehicle Manufacturing Program
- Expand federal electric drive manufacturing support to include medium and heavy-duty vehicle and hybrid system manufacturing in the Advanced Technology Vehicle Manufacturing Program
- Extend eligibility and funding for Sec. 48C credits for advanced energy investments
- Expand bonding authority for investments in electric drive facilities and electric and hydrogen-related infrastructure



Strengthen and Expand Upstream Supply Chain

- Support development and maintenance of a robust U.S. supply chain for critical electric drive related materials and components
- Increase access to low-cost capital for component suppliers, including expanded bonding authority and tooling construction loans for U.S. facilities
- Reduce unwarranted regulatory constraints on key material and component transportation
- Provide analysis and education on potential and perceived material and component constraints
- Support establishment of export program for U.S.-manufactured electric drive technologies to developing countries



Johnson Controls Inc.'s Holland Michigan plant producing lithium-ion batteries for hybrid and electric cars is projected to create 550 jobs by 2014. EnerDel is investing in battery production in Mt Comfort, Indiana that will give the company the capacity to produce enough battery packs for approximately 60,000 hybrid or battery electric vehicles and create nearly 1,400 jobs.

Nationally, utilities are leading efforts to deploy electric drive vehicles and infrastructure. Progress Energy is one of 10 utilities that have partnered with Ford to test 20 plug-in hybrid Ford Escapes. Progress Energy is also developing a 600 station pilot program. Duke Energy has made a commitment that, by 2020, all new vehicle purchases will be electric vehicles. PG&E has partnered with General Motors to take delivery of more than 100 hybrid pickup trucks, joining more than 50 Ford Escape hybrids and 2 all-electric bucket trucks in the fleet. PG&E will also add Chevrolet Volts to its light duty fleet that includes the Ford Escape PHEVs and two Toyota Prius PHEVs.

Austin Energy instituted a Plug-In Electric Vehicle (PEV) Readiness Initiative to get customers and communities ready for grid-connected transportation

Multiple efforts to deploy electric recharging infrastructure are already underway. The EV Project, led by ECoality North America, is bringing more than 40 industry and public sector partners to deploy charge infrastructure in 16 major cities in six states and the District of Columbia.

ChargePoint America, sponsored by Coulomb Technologies, will provide electric vehicle charging infrastructure to nine selected regions including Bellevue-Redmond, WA; Sacramento, CA; San Jose-San Francisco, CA; Los Angeles, CA; Austin, TX; Detroit, MI; New York, NY; Washington, DC and Orlando, FL.

Plug-in electric vehicles produced by major auto manufacturers are held to the same safety standards set by the National Highway Traffic and Safety Administration as conventional vehicles. To maximize safety, these cars also meet the electrical and safety standards set by the Society of Automotive Engineers, the National Electric Vehicle Infrastructure Working Council, and others. Electric vehicle charging equipment is tested by independent and certified testing labs, such as Underwriters Laboratories, CSA International and Edison Testing Laboratories.

Standardize Regulatory Policies for Electric Drive Vehicles and Infrastructure

Multiple regulatory and standard-setting bodies are developing policies impacting the development and adoption of electric drive, including vehicle efficiency metrics, charging and refueling equipment standards and metering and information management protocols. Federal and state regulatory requirements must advance coherent electric drive transportation goals and should promote consumer choice in services and encourage diverse market entrants.

Promote harmonization of technical standards, environmental valuation and safety requirements

- Establish an Interagency Electric Drive Working Group that will work closely with private and public stakeholders to align and coordinate federal electric drive programs and policies
- Promote national standards for plug-in vehicles, recharging infrastructure and installation guidelines through the National Institute of Standards and Technology, the Society of Automotive Engineers and other federal standards organizations
- Support development of a competitive market for the deployment of charging stations known as Electric Vehicle Supply Equipment (EVSE) that promotes customer choice, including convening a stakeholder effort to develop standardized and streamlined permitting and inspection processes for installation of EVSE
- Maintain a unified regulatory approach to efficiency and emissions; ensure appropriate recognition of electric drive benefits in the Environmental Protection Agency/National Highway Traffic Safety Administration emissions and efficiency requirements for vehicles



Coordinate Grid-Connected Transportation with Smart Grid Development and Deployment

- Promote regulatory policies that reinforce utility participation in grid-connected transportation and related smart grid technologies
- Support demonstration of utility-scale distributed energy storage through transportation energy storage systems
- Work with regulators to address potential smart grid issues impacting grid infrastructure upgrades, privacy, cyber security, connectivity and vehicle telematics
- Establish a National Electric Fuel Task Force, a coordinated stakeholder effort that includes industry, government and consumer groups to identify grid and other deployment challenges and appropriate venues for addressing them, including:
 - Resources for utility upgrades and investments in metering and distribution systems to meet local demand for electric drive vehicles
 - An industry-wide process to provide utilities early notification of plug-in vehicle adoption in their service areas
 - Metering standards and regulatory policies that allow diverse approaches to plug-in vehicle metering and sub-metering
 - Growing competitive markets for EVSE, charging services and permitting

Accelerate Technology Breakthroughs

In combination with private sector efforts, federal research can speed the maturation of electric drive enabling technologies, bringing down costs and improving performance. The Departments of Energy and Transportation, and other federal agencies, are critical partners in technology development. A multi-year commitment to research, development and demonstration of diverse electric drive technologies will accelerate technology advances and deployment and bring us closer to achieving economy-wide adoption.

Support Coordinated Federal Research, Development and Demonstration of Electric Drive Technologies

- Establish a federal coordinator of electric drive efforts to work with Interagency Electric Drive Working Group to ensure that Department of Energy programs are aligned with other federal level efforts to promote electric drive
- Expand electric drive efforts across agencies, including the Departments of Transportation and Defense
- Provide robust support for the Department of Energy’s electric drive portfolio, including vehicles, vehicle testing, batteries, infrastructure and energy storage programs:
 - Full funding for electric transportation programs authorized in the Energy Independence and Security Act, including light and heavy-duty battery electric and plug-in electric vehicle demonstration, deployment grants for non-road electric drive applications, Energy Storage Competitiveness programs and expanded electric drive systems and component research programs
 - Refining the Department of Energy’s Fuel Cell Program goals with a focused effort to overcome remaining barriers to commercializing fuel cell technology for electric drive, including increased funding for infrastructure deployment programs in priority areas, research and development and extension of authorized fuel cell vehicle market transformation programs
 - Advancing primary and secondary use of advanced automotive format batteries, including programs to demonstrate automotive-grade batteries in stationary applications and for emergency residential back-up power, identifying applications for batteries at the end of useful vehicle life, and researching and developing recycling of advanced batteries to reclaim valuable constituent materials
 - Providing meaningful funding for grid-interaction technologies that facilitate vehicle-charger-utility communication and for off-board hydrogen refueling infrastructure development
 - Integrating incentives for grid-connected transportation objectives in smart grid equipment and demonstration programs, including the coordination of on-board energy storage and grid balancing, cost effective communication protocols and hardware to enable vehicle-to-grid interaction
 - Development of off-road, idle-reduction, rail and marine electric drive applications; establishing programs supporting their deployment



Southern California Edison’s Electric Vehicle (EV) Technical Center provides a broad range of electric transportation services, focusing on solutions for automakers, battery manufacturers, government agencies, business and industrial fleet customers and residential customers.

According to the Electric Power Research Institute (EPRI), if all American drivers switched to plug-in electric vehicles tomorrow, the U.S. electric grid could support more than three-quarters of cars charging overnight without building a single, new coal-fired plant. The benefits of plug-in vehicles are magnified when they draw upon new, clean, renewable energy sources, such as electricity generated by hydroelectric, wind or solar power. PEVs will become even more environmentally friendly as cleaner energy is added to the electric grid over time.

The Electric Drive Transportation Association (EDTA)

is the preeminent trade association representing battery, hybrid, plug-in hybrid and fuel cell electric drive technologies and infrastructure. EDTA conducts public policy advocacy, education, industry networking, and international conferences. EDTA's membership includes automotive and other equipment manufacturers, energy companies, technology developers, component suppliers, and government agencies.



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