

## JOBS IN ADVANCED VEHICLE TECHNOLOGIES

Transformation of the U.S. transportation sector will secure existing jobs and create new opportunities.

### Transportation Revolution

National efforts to improve our energy security, stabilize energy prices, and curtail climate impacts have created both the need and the opportunity to truly transform our transportation sector. President Obama has set an ambitious agenda to reduce the amount of fossil fuel used by our vehicle fleet and to diversify the energy sources we use to power the transportation sector. New fuel economy standards for cars and trucks will require auto manufacturers to produce models

### New Vehicle Technology Jobs

#### Technology Developers:

- Mechanical engineers
- Electrical engineers
- Chemical engineers
- Materials scientists
- Laboratory technicians

#### Technology Manufacturers:

- Factory workers
- Machinists
- Industrial engineers

#### Technology Users:

- Bus, truck and other fleet drivers
- Automotive technicians
- Fueling infrastructure installers



U.S. automakers are adapting their manufacturing processes to move America's vehicles toward a sustainable transportation future.

that consume far less gasoline and diesel. The federal government has already doubled the size of its hybrid vehicle fleet and plans to purchase the first 100 plug-in electric vehicles to roll off American assembly lines. The Administration is also seeking ways to meet the aggressive biofuel targets set in the federal Renewable Fuel Standard.

To transform the vehicle sector, the U.S. auto manufacturing industry is actively developing new technologies and products. This transportation revolution will also affect the types of jobs and skills needed in the industry. As the United States takes the lead in developing new vehicle technologies, we can maintain a vibrant domestic auto industry that retains existing jobs and creates new ones.

### DOE Supports Vehicle Manufacturing Jobs

The American Recovery and Reinvestment Act of 2009 included significant investments in advanced vehicle technologies. \$2.4 billion was invested in transportation electrification through competitive grants in 48 different projects: \$2 billion for manufacturing advanced batteries and components, \$500 million for electric drive components, and \$400 million for the purchase of plug-in hybrid and all-electric vehicles for demonstration purposes. In addition, \$300 million was invested in a variety of other vehicle technologies through the Clean Cities Alternative Fuel and Advanced Technology Vehicles Pilot Program.

Through the \$25-billion Advanced Technology Vehicles Manufacturing Loan Program, the U.S. Department of Energy provides automakers like Ford and Nissan with loan guarantees for projects to accelerate the development of vehicles and technologies that create cleaner means of transportation and stimulate the American economy. For example, DOE approved a \$1.4 billion loan agreement with Nissan North America to support the modification of Nissan's Smyrna, Tennessee, manufacturing plant to produce the Nissan LEAF, a zero-emission, all-electric vehicle, and the lithium-ion battery pack it uses. The modification includes a new battery plant and changes in the existing structure for electric-vehicle assembly. The loan will create up to 1,300 jobs when the new facilities are operating at full capacity.

## Saving Jobs and Creating New Ones

Adoption of new technologies is crucial for the long-term viability of the U.S. auto industry. With the development and integration of new technologies, the auto industry will need workers with new or updated skills. Jobs in the new vehicle technologies industry fall into three main categories:

- **Technology development:** People in these professions will be the ones developing new and advanced vehicle technologies. These jobs primarily fall within various disciplines of engineering, such as chemical, materials, electrical, and mechanical engineering.
- **Technology manufacturing:** Many jobs are directly involved in the manufacturing processes for new vehicle technologies. These professions include machine operators, other factory workers, and industrial engineers.
- **Technology use:** A broad range of professions are involved in the use of new vehicle technologies. These jobs include bus and other fleet drivers, automotive maintenance technicians, and fueling infrastructure installers.

Additional job categories are indirectly impacted by the adoption of new technologies. For example, traffic engineers and urban planners will need to take into account how the new technologies affect transportation infrastructure and planning.

## Preparing for Vehicle Technology Careers

For some employees in the vehicle manufacturing industry, the move to new vehicle technologies will have a minor impact on their job duties and require limited new training. Instead of a traditional car or truck, employees will be manufacturing new types of products with different technologies.

Jobs involved in technology development and use of new technologies will require more training and new skills. For example, engineering schools will need to provide new materials in relevant courses such as chemistry, materials science, electronics, and mechanical engineering. Automotive technicians will need to learn how to repair and maintain completely new technologies, and installers must learn how to put in new types of fueling infrastructure, such as biofuel dispensers and electric chargers. Bus drivers and

other vehicle operators will need to learn how to efficiently and safely operate their new vehicles.

The U.S. Department of Energy (DOE) actively supports workforce development in these new vehicle technology areas. Through the American Recovery and Reinvestment Act of 2009, DOE is supporting transportation electrification education at ten universities across the nation.

DOE has also established the Graduate Automotive Technology Education (GATE) Centers of Excellence to develop a new generation of engineers and scientists with the necessary knowledge and skills in advanced automotive technologies. Currently, DOE supports GATE programs at eight universities, focusing on hybrid propulsion systems, fuel cells, advanced computation and simulation, energy storage systems, biofuels, and lightweight materials.

The EcoCAR Challenge, which DOE also supports, is a three-year engineering competition aimed at promoting advanced vehicle technologies. Through the student vehicle competition program, close to 20,000 students have received hands-on engineering experience and many of them have moved on to take jobs in the automotive industry, bringing with them an understanding of and enthusiasm for advanced vehicle technologies.



Teams of engineering students design and integrate advanced technology solutions into existing vehicles as part of the national EcoCAR competition run by the U.S. Department of Energy in conjunction with General Motors.

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