Focus On: Electric Vehicles

The environmental benefits of electric vehicles have captured worldwide attention, but limitations and safety issues have fueled concerns about their viability.

Increasing interest in sustainability and environmental consciousness have prompted car manufacturers to explore alternatives to fossil-fueled vehicles, and electric vehicles (EVs) have generated interest worldwide as a potential solution to this concern. But the complexity of the EV market has led to widely varying views on its prospects for growth and, therefore, the impact of EV exposures to insurers.

An uncertain market

EVs initially prompted optimistic estimates about their ability to penetrate the traditional car market, but sales were sluggish until January 2012 when rising gasoline prices contributed to triple-digit sales growth.

Despite this positive trend, analysts agree that growth will be influenced by oil prices, the costs of automotive lithium battery packs, convenience/infrastructure issues like the range (distance the car can travel between charges), availability of charging stations, discounts/government incentives including tax credits or rebates, and availability of safety and reliability data.

A wide range of exposures

Electric vehicles use a battery to store electrical energy that powers a motor, but from that point, they diverge into three broad categories: plug-in, plug-in hybrid, and hybrid. Plug-in and plug-in hybrid vehicles both rely on batteries that must be plugged into an electrical grid for recharging. The plug-in hybrid also uses petroleum-based or alternative fuel to propel an internal combustion engine (ICE) or other propulsion source. Hybrid EVs, which are not plugged in for charging, combine an ICE or other propulsion source with batteries, regenerative braking and an electronic motor to power the vehicle.
service facilities. Insurers that offer homeowners, personal and commercial auto, commercial general liability, commercial property, employers’ liability, and workers’ compensation covers should understand how their policies respond.

**Charging Stations**

There are three levels of charging equipment for plug-in electric vehicles. Level 1 systems are portable and take ten to twenty hours to charge a vehicle. Level 2 chargers are typically installed in a home with a charge time of three to eight hours. Level 3 are high powered chargers used for buses and other commercial vehicles.

**Residential charging stations (Level 2)**

There are many exposures related to the installation of residential charging stations, particularly those located outside of an enclosed structure where the unit could be subject to vandalism, theft, or vehicular and weather-related damage. In addition, third-party damages related to mild injury (trip and fall) or serious injury (electrocution) as a result of contact with the charging station are also a concern.

At a minimum, to mitigate residential charging station exposures, a certified contractor should verify if permits are required and obtained, conduct a site assessment to determine if panel upgrades are necessary, and perform the installation in a location that minimizes the intersection of cords with typical walking paths.

**Commercial charging stations (Level 3)**

The US Department of Energy notes that there were nearly 10,300 public EV charging stations in the US as of May 2012. California had the largest number with 2,265 stations, followed by Washington with 854 and Texas with 825. Pike Research estimates the number of charging stations in the US at 1.5m by 2017.

Many charging stations have been installed at hotels, retail stores and restaurants in anticipation of an EV boom. Public access and use of these stations increase the exposures of a commercial entity. While insurers may not initially charge for the additional exposures, rates may begin to rise as installations and usage increase and accidents are reported.

Several critical steps to consider for mitigating commercial charging exposures include covering the charging stations with an appropriate National Electrical Manufacturer’s (NEMA) rated enclosure, protecting the charging station with bollards to reduce the risk of vehicle accidents and ensuring the charging station location meets the Americans with Disabilities Act (ADA) standards.

It’s worth noting that individual states’ approaches to developing EV infrastructure differ widely. Even as cities and regions actively investigate and implement EV charging infrastructures—with Oregon, Texas, California and North Carolina leading efforts—the lack of useful data concerning best practices for PEV charging equipment and infrastructure needs may present a challenge to insurers underwriting such exposures.

**Impact to grid**

When charging, an EV can draw as much power as a small house. Such surge in electrical demand could cause power disruptions and has prompted concerns among utilities about the potential for ‘clustering’ problems in neighborhoods or other areas where electric vehicles are concentrated.

Implementing smart grid and smart EV charging technology would enable utilities and end users to handle the increase in demand through more intelligent energy management. However, burdensome development costs for utility companies and spotty demand for EVs have resulted in a slower rollout of smart grid technology than some expected. In the meantime, insurers should note whether protections from electrical disturbances such as surges and outages are in place for electric cars plugged in to home or commercial charging stations.

**Safety Issues**

There are a number of safety issues associated with electrical vehicles that impact not only the driver, but also pedestrians, emergency responders, EV manufacturing and transport personnel and service technicians.

**Limited crash test data**

There is limited third party crash data available for EVs. Initial testing by the Insurance Institute for Highway Safety (IIHS) in April 2011 gave high marks for front, side, rear and rollover crash protections to the Chevrolet Volt and Nissan LEAF. However, further impact tests by the National Highway Safety Administration (NHTSA) resulted in a fire that consumed the Chevy Volt. The fire was attributed to intrusion damage to the battery which caused a thermal reaction. GM later made several vehicle modifications to eliminate the defect.

**Pedestrian safety**

The quiet ride of EVs poses a risk to bicyclists and pedestrians, particularly those with hearing, vision or mobility impairments, who are provided little or no warning by the low humming noise of the new vehicles. According to NHTSA research, hybrid and electric cars are twice as likely to be involved in a pedestrian collision at a low speed compared to gas-powered vehicles.

The Pedestrian Safety Enhancement Act signed into law on January 2011, requires all EVs to maintain a minimum sound standard. The Act will be phased in over three years and does not require EV makers to retrofit cars that are now on the road. Many EVs travelling on US roads in the next few years do not emit warning sounds and may be more likely to be involved in an accident.
Emergency responders
The use of ultra high-strength steel, primarily boron, among EV manufacturers has proven to be a challenge for emergency responders. New or upgraded equipment is required to cut through electric vehicles. In light of tight municipal budgets, some first responders still do not have the proper tools to extricate a victim from an electric vehicle.

In addition, electric cars carry voltages far above lethal levels. It is critical for first responders to know how to quickly identify a vehicle as an EV, locate built-in cut points, and disengage electrical systems to avoid electrocution and safely retrieve an accident victim.

Lithium-ion batteries
Battery storage is a particular concern for fleets that use EVs, car makers, repair facilities, import/export locations, logistic centers, battery switching stations, dealerships, salvage yards and those responsible for transporting large quantities of batteries. With an energy density as high as six times that of a lead acid battery, lithium-ion batteries are somewhat sensitive to design and manufacturing flaws.

Concern over lithium-ion batteries centers on the potential for damage and combustion as a result of a vehicle accident or during transit or storage. Little is known about the fire hazards of the rapid self-heating capacity of the battery cells (a process known as thermal runaway), the way in which the batteries burn when in large quantities, or the best tactics for effectively suppressing a fire. The risk increases when handling aged or damaged batteries. Lithium-ion batteries also pose a risk to EV service technicians, prompting vehicle manufacturers to develop Emergency Responder Guides to educate technicians about handling these dangerous components. Guides include, among other topics, identifying voltage cables, disconnecting the battery, waiting a sufficient amount of time before working on the vehicle, wearing protective gloves, and using insulated tools.

Trends
There are several notable trends emerging in the EV market including the addition of EVs to commercial fleets and the introduction of battery leasing programs.

Commercial fleets
In April 2011, President Obama announced the National Clean Fleets Partnership program, a public-private partnership created to help large companies reduce diesel and gasoline use in their fleets by incorporating EVs, alternative fuels and fuel-saving measures into their daily operations. This initiative has prompted companies to add EVs to their fleets and install multiple charging stations.

Consumer interest, high gasoline prices and environmental sustainability have also prompted rental car and car sharing companies to add alternative-fueled vehicles to their fleets. As a result, insurers may need to examine the added exposures to these risks and verify that the insured has implemented proper design and safety precautions to mitigate losses.

Battery leasing
The EV battery’s short lifespan has had a dampening effect on EV demand, as consumers do not want to be burdened by the high cost of replacing an EV battery or see the value of their EV rapidly depreciate. Battery-leasing programs address this depreciation issue by separating ownership of the car from ownership of the battery. Pike Research analysts believe this model could significantly boost EV sales.

If leasing programs become popular, insurers will need to understand the coverage implications of dual ownership in which the driver owns the car but a manufacturer owns the battery.
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Underwriter’s Checklist

Commercial general liability

**Electrical grid**
- How does your policy respond to an insured’s “failure to supply”?  
- Is the grid prepared for the added demand of electric vehicles?  
- What measures are in place to protect against damage from fire or electrical disturbances?

**Commercial charging stations**
- Are charging stations maintained on a regular basis, and have installers and maintenance technicians been properly trained?  
- Is proper signage visible to indicate the electrical risk?  
- Are protective bollards installed around the commercial charging station to reduce the risk of vehicle accidents?  
- Are the charging station locations ADA-compliant?

**Environmental liability**
- What measures are in place for battery disposal?

**Workers’ compensation**
- Are responders using the proper equipment and aware of the built-in cut points?  
- Do responders/service technicians know how to disengage the electrical power system?  
- Are responders properly trained to address EV fires and handle batteries safely?

**Personal and commercial auto**
- Have you considered the potential increased risk associated with a low-noise vehicle?  
- Have you considered the potential for additional repair time and costs?

**Homeowners**
- Did a certified electrical contractor install the residential charging station?  
- Has the home wiring system been inspected and, if necessary, upgraded to accommodate the residential charging station?  
- Is the charging station located in a place that minimizes the intersection of cords with typical walking paths?