Electric Vehicle Tourism

A White Paper

June 2014

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Electric Vehicle Tourism

Introduction
According to the U.S. Travel Association (2014), travel and tourism is America’s largest services export, accounting for $2.1 trillion in economic output, $134 billion in tax revenue, and 7.9 million jobs. The industry also contributes to climate change, and is responsible for approximately 5% of global CO$_2$ emissions 75% of which the transportation sector is accountable for (United Nations World Tourism Organization, 2014). While air travel is estimated to cause 54-75% of transportation emissions, car and rail account for around 13%.

As the tourism industry continues to develop, many organizations are aware of these negative impacts and are transitioning to sustainable$^1$ business practices that consider economic, social, and environmental impacts in decision making and planning. These three pillars of sustainability are the foundation of a viable operation in both the present and future.

The increasing popularity of hybrid and electric vehicles is an opportunity for the tourism industry to cater to a new market segment. Whether rented or traveling in a personal electric vehicle (EV), travelers are able to visit destinations and attractions while producing zero tailpipe emissions (see Table 1 for an emissions comparison table). The benefits of “EV Tourism” include:

- **Economic**: increased tourism spending due to lower fuel costs.
- **Social**: connecting communities, leveraging new technology, and decreasing dependency on fossil fuel.
- **Environmental**: zero tailpipe emissions, opportunity to use renewable energy sources like solar power, and decreased noise pollution.

However, sufficient charging infrastructure and a general understanding of EVs must exist in order to make EV Tourism a reality. Currently, charging is clustered in urban areas. While this is convenient for commuting, owners of all-electric vehicles who reside within these metro areas have little opportunity to use their EV to travel beyond their infrastructure cluster.

As with an internal combustion engine (ICE) vehicle, drive range for an electric vehicle is affected by elevation, temperature, speed, use of climate control, and so on. While ICE vehicles can easily refuel at a gas station, EV drivers require electricity. This cluster and gap dilemma gives the tourism industry a unique opportunity to connect the dots between urban and rural areas thereby providing the “range confidence” that current and potential EV drivers need to enjoy long-distance travel such as weekend excursions and road trips.

As Bronstein and MacArthur (2011) assert, “perception of tourism and long-distance vehicle travel are part of mainstreaming EVs, and the tourist industry has the power to influence this public perception.”

By highlighting best practices of early adopters of EV Tourism, this paper identifies the benefits of engaging with this growing market of travelers and provides tools to take the initial step towards EV Tourism. Now is the time for the tourism industry to lead the charge and be the catalyst in making electric vehicles a viable, convenient, efficient, and cost effective mode of transportation – with zero tailpipe emissions.

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$^1$ The World Tourism Organization defines sustainable tourism as “Tourism that takes full account of its current and future economic, social and environmental impacts, addressing the needs of visitors, the industry, the environment and host communities.”
The Electric Vehicle Market

Though hybrid vehicles have an established footing in the automotive market, EVs face the same battle that any new technology must overcome: hype and skepticism. According to the Electric Drive Transportation Association, there are nearly 90,000 EVs on the road in the United States\(^2\), with each automaker introducing their own EV to the marketplace and the Tesla Motors Model S representing 17% of luxury passenger car sales in 2013 (Klippenstein, 2014).

About “Electric” Vehicles:

While Hybrid Electric Vehicles (HEV) and Plug-In Hybrid Vehicles (PHEV) are popular and reduce emissions, this paper views HEVs and PHEVs as stepping stones to the adoption of all-electric vehicles (EV) and only examines the benefits and opportunities of EVs.

**HEV**: powered by an internal combustion engine (ICE) or other propulsion source; has a battery that is charged through regenerative braking and by the ICE. HEVs are not plugged in to charge

**PHEV**: powered by an ICE that uses energy stored in a battery. The vehicle can be plugged into an electricity source to charge the battery.

**EV**: powered by electricity that powers a motor. The vehicle is plugged into an electricity source and can also be referred to as a battery electric vehicle (BEV).

Source: Alternative Fuels Data Center

In fact, 2013 EV sales grew 245% compared to a 19% increase in hybrid sales (Gorzelnany, 2014). Most importantly, it is not only the luxury market being affected by EVs – this demographic is simply an early adopter. Green Car Reports estimates that although 75% of U.S. car-buyers can afford a Nissan LEAF, the majority of consumers do not compare sticker price with long-run maintenance and fuel savings – a knowledge issue that will dissipate over time as consumers become more comfortable with the new technology (Klippenstein, 2014).

This steady increase in annual sales combined with rising fuel prices, the increasing availability of EV models, and evolving technology has led researchers to estimate that the market will hit three million sales per year by 2020 (Martin, 2013).

Similarly, Navigant Research’s annual Energy and Environment Consumer Survey concluded that the longevity of a particular technology on the market coupled with demographic attributes (such as age, education, and income) correlate with its acceptance. Basically, early adoption by some leads to brand identity, reputation, and a trickle down of knowledge culminating in widespread adoption. This points to the known demographic of the average EV driver as the study revealed that respondents with higher income and education levels held more favorable opinions towards electric vehicles (Vyas and Hurst, 2013).

In 2010, Nissan reviewed the first 19,000 orders of the 2011 LEAF to create an image of the average

\(^2\) As of April 2014. For more information visit http://electricdrive.org/index.php?ht=d/sp/i/20952/pid/20952
owner: a young Baby Boomer (around 45 years old), with a college education and an average household income (HHI) of $125,000 per year (Gordon-Bloomfield, 2010).

A more recent market analysis shows that EV drivers are young and affluent (Gorzelany, 2014) making this demographic of potential travelers a target market for tourism organizations, particularly those on the West Coast:

- Age: 55% are 36-55 years old;
- HHI: 21% have an average HHI of $175,000 or more;
- Indicator of above-average disposable income: $386 average monthly payment (for leased EVs);
- Top markets: San Francisco Bay Area, Los Angeles, Seattle, etc. See Table 2 in the Appendix for top 10 markets by sales and the table below by public charging outlets.

### Top States by EV Charging (Public)*

<table>
<thead>
<tr>
<th>State</th>
<th>Stations</th>
<th>Charging Outlets</th>
<th>% of total</th>
</tr>
</thead>
<tbody>
<tr>
<td>California</td>
<td>1,822</td>
<td>5,324</td>
<td>27%</td>
</tr>
<tr>
<td>Texas</td>
<td>596</td>
<td>1,580</td>
<td>8%</td>
</tr>
<tr>
<td>Florida</td>
<td>457</td>
<td>1,000</td>
<td>5%</td>
</tr>
<tr>
<td>Washington</td>
<td>450</td>
<td>1,237</td>
<td>6%</td>
</tr>
<tr>
<td>Oregon</td>
<td>375</td>
<td>881</td>
<td>4%</td>
</tr>
<tr>
<td>New York</td>
<td>369</td>
<td>811</td>
<td>4%</td>
</tr>
<tr>
<td>Tennessee</td>
<td>324</td>
<td>814</td>
<td>4%</td>
</tr>
<tr>
<td>Illinois</td>
<td>295</td>
<td>594</td>
<td>3%</td>
</tr>
<tr>
<td>Arizona</td>
<td>285</td>
<td>725</td>
<td>4%</td>
</tr>
<tr>
<td>Michigan</td>
<td>251</td>
<td>647</td>
<td>3%</td>
</tr>
<tr>
<td>U.S. Total</td>
<td>8,237</td>
<td>19,943</td>
<td>100%</td>
</tr>
</tbody>
</table>


*Does not include residential charging infrastructure.

### Electric Vehicle Tourism

As of May 31, 2014, there were 8,207 electric charging stations and 19,962 charging outlets in the U.S. (Alternative Fuels Data Center, 2014). However, as previously mentioned, these stations are typically located in urban settings with cities, office buildings, and universities being the primary influencers for installing infrastructure. To date, few examples exist of tourism entities such as lodging and destination marketing organizations (DMOs) entering the market to provide travel solutions for EV drivers.

Tesla Motors, though, has identified the EV Road Trip as a priority and continues to build its cross-continent infrastructure thereby making EV Tourism available to its Model S owners. In January of 2014, Tesla Motors completed its coast-to-coast network of charging stations, covering 80% of the population and allowing long-distance trips for Model S owners (Lienert, 2014).

#### Leading the Charge: Tesla Motors

In 2008, Tesla introduced the Roadster, an all-electric sports car with a range of 245 miles per charge and a zero to 60 miles per hour time of 3.6 seconds. The issues of range and acceleration that plagued the EV in the early 1900s were suddenly dispelled. The Roadster, though, was only step one.

Step two is the award-winning Model S, which has a range of 265 miles and accompanying infrastructure.

- As of May 2014, the company has built 92 Supercharger stations in North America, strategically placed on popular routes near amenities such as diners.
- According to Tesla, the Supercharger network is designed to encourage road trips.

Although Tesla is not the only manufacturer producing electric vehicles, they currently produce

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3 For more on the history of EVs visit [http://sustainingforward.com/2014/05/17/transitions-in-transport/](http://sustainingforward.com/2014/05/17/transitions-in-transport/).
the longest-range EV and are the only company that has enabled cross-country EV road trips.

In April 2014, Nissan announced a “No Charge to Charge” program in 25 U.S. markets, which will provide two years of “no-cost charging with the purchase or lease of a new Nissan LEAF (Sustainable Brands, 2014).

However, this still leaves owners of the LEAF and other short-range electric vehicles and consumers interested in purchasing an EV stuck within urban areas. Without the leadership of the tourism industry, range anxiety and a lack of infrastructure will keep EVs within these urban charging clusters.

Electric Vehicle Tourism Opportunities

As mentioned above, there are a number of economic, social, and environmental benefits to EV Tourism. By enabling charging for visitor use, the tourism industry opens the door to this growing market while building consumer and brand awareness. Each segment of the industry has an opportunity to enable EV Tourism and educate guests.

This section highlights current best practices undertaken by four segments of the industry by identifying the role and benefits of engaging in EV Tourism, providing a case study, and concluding with recommended next steps.

National Parks

Established in 1916 to safeguard many of America’s most beautiful landmarks and natural areas, the National Parks Service (NPS) has an obligation to preserve the 4.5 million acres of oceans, lakes and reservoirs and 84 million acres of land that welcome more than 475 million visitors a year (NPS, 2008).

This system of 401 federally-managed parks should be leading the way in EV Tourism as this focus not only coincides with the fundamentals of park management in terms of noise and emissions reduction but also with the EV objectives set forth in President Obama’s 2011 State of the Union address to improve environmental stewardship, reduce dependence on petroleum, and improve transportation sustainability via EVs (Office of Energy Efficiency and Renewable Energy, 2011).

As a federally-operated system, the role of national parks in relation to EV Tourism is to educate visitors about emissions reduction and provide charging infrastructure for visitors driving electric and hybrid vehicles.

According to the NPS (2013), 45% of GHG emissions from park operations are from employee commuting (25%) and fleet and equipment fuel use (20%). However, it does not take into consideration the fuel use or travel footprint of the more than 750,000 visitors to national parks each day.

Since 2011, parks have worked to incorporate hybrid and alternative fuel vehicles into their fleets and educate the public about the benefits of alternative fuels (Smith, 2011). As of 2014, sustainability efforts have expanded to include 13 National Parks who have partnered with local Clean Cities coalitions.

In addition to a reduction of 16,000 gallons of gasoline use and 109 metric tons of GHG emissions, this collaboration has resulted in two Green Rides Toolkits5 – one for staff and another for the parks’ 2.7 million visitors – designed to reduce emissions at work and at home (Shea, 2013).

5 Toolkits are available at https://www1.eere.energy.gov/cleancities/green_rides.html.
Leading the Charge: Golden Gate National Recreation Area (GGNRA)

GGNRA encompasses three counties in the San Francisco Bay Area, making it one of the largest urban parks in the world. Comprised of 19 ecosystems, GGNRA is home to 192 recorded archeological sites and 1,200 historic structures, including five National Historic Landmarks.

With more than 14.5 million visitors per year, GGNRA’s Green Team has implemented a variety of Environmental Management System goals that include renewable energy, LEED certification, water conservation, recycling, green purchasing, and the reduction of fossil fuel use. In 2012, the park added four EVs operating on clean energy to the fleet, which already included hybrid vehicles. The park has an idling-reduction policy for vehicles that are stopped or parked. The park’s Bike at Work Program allows staff to check out a bicycle and helmet rather than a fleet vehicle. Visitors to Muir Woods National Monument and the Crissy Field Center are invited to drive their EV and charge at each site’s charging stations, which are listed on PlugShare. Visitors are also encouraged to use alternative transportation methods such as the Bay Area’s bike share program.

Recommendations for parks engaging in EV Tourism:

- Incorporate EV charging station locations in park maps, which may already include icons for a variety of services including canoe rental and Wi-Fi.
- Add EV charging station locations to the Alternative Fuels Station Locator as well as popular tools such as PlugShare (see Electric Vehicle Tourism Toolkit section for instructions).
- Add EV charging station information to the Plan Your Visit section for each park and recreation area. This should include:
  1. Locations of charging stations;
  2. Charging type and associated fees, if applicable;
  3. Restrictions of use, such as a time limit (in the event there are more EVs than plugs).

While the NPS has made steps towards sustainable tourism in a general sense, there is still a long way to go before all 401 parks are EV-friendly. For example, only a handful of parks offer charging to visitors and it is difficult to find information on where the stations are located.

See the Electric Vehicle Tourism Toolkit for more on first steps to becoming EV-friendly.

Lodging

“The Electric Vehicle Charger is why we chose this hotel.” – December 12, 2013, TripAdvisor

According to Smith Travel Research, there are more than 50,000 hotel properties in the United States. Owners of electric vehicles typically charge overnight while they sleep (and when electricity is cheaper). The same holds true for EV renters and owners away from home who will use the car during the day and need to charge at night.

Therefore, the role of lodging is to add charging as an amenity for overnight guests. Simply allowing an

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6 For more information on GGNRA’s sustainability efforts visit http://www.nps.gov/goga/sustainability.htm.

7 As of April 2014. This does not include smaller properties such as bed and breakfast establishments or vacation rentals, which can easily incorporate charging for guests such as by allowing garage parking or connecting to an outlet.
EV to plug in overnight will give a competitive edge over other hotels. Due to the number and distribution of hotels in the U.S., particularly chains with the ability to use economies of scale, the lodging sector can alleviate the current cluster and gap issue as depicted in the map below, which shows the availability of public charging (triangles) and hotels (dots) in Arizona.  

EV charging builds brand awareness, can be incorporated into corporate responsibility reports and press releases, and earns one point towards LEED certification. To meet the LEED requirement, a property must install Level 2 or greater charging in 2% of its parking spaces and clearly identify these stalls as reserved “for the sole use of plug-in electric vehicles” (LEED, 2014). Similarly, EV charging earns credit for TripAdvisor’s GreenLeaders program.

Leading the Charge: InterContinental San Francisco

In 2011, the InterContinental San Francisco became LEED Gold certified and continued its efforts to incorporate sustainable practices into daily activities, including guest charging. The property decided on a Level 2 dual-charging station, to be used by the valet staff as well as hotel and restaurant guests.

According to Peter Kohler, the hotel’s general manager, EVs were recognized as playing an important role in greening the city’s transportation options (Business Council on Climate Change, 2014).

- Total cost of the installation was $15,000 ($7,500 to install electrical circuits for the station and $7,500 for the station itself).
- The hotel estimates that a “full tank” of electricity costs about $3. This service is free, however all guests must pay to park in the lot.
- Planning and installing the station took three months.
- The station is listed on PlugShare.

Recommendations for lodging engaging in EV Tourism:

- Educate staff about electric vehicles, such as charging needs, and hotel policies regarding these vehicles. Valet staff should be particularly knowledgeable about EVs and policies.
- Add EV charging information to popular tools such as PlugShare, so that potential guests are able to find your property.

Sources:
1. Alternative Fueling Station Locator, Google Maps
2. Marriott highlights its more than 60 charging stations. For more information visit http://www.marriott.com/corporate-social-responsibility/electric-vehicle-hotels.mi.
3. For example, CarCharging and the Four Seasons Hotel Silicon Valley made industry headlines in March 2014 with the announcement of EV charging services. For more information visit http://www.traveldailynews.com/news/article/59795/carcharging-and-four-seasons-hotel.
4. For more information visit http://www.usgbc.org/leed#credits.
5. To qualify, properties must complete TripAdvisor’s online survey, which focuses on environmental practices. One point is awarded if any type of charging station is available for guest use either on property or within one mile.
• Add EV charging information to hotel information pages, including review sites. This should include:
  1. Locations of charging stations in relation to guest parking.
  2. Charging type and associated fees, if applicable.
  3. Restrictions of use, such as a time limit (in the event there are more EVs than plugs).
• Encourage websites, such as TripAdvisor, to add electric vehicle charging as an amenity option, so that travelers can easily find a property that accommodates their need.

With the growing number of EVs on the road, infrastructure companies such as ParkPod and Verdek are using customer service and competitive advantage as selling points to expand from a focus on residential and commercial property sales to hospitality and retail (see Appendix for example).

“Is there a list of ev friendly places to stay and what charge facilities they have? For me this will become an important factor in where I stay. As the ev population grows, it becomes a factor for the hotels customer draw.” – January 23, 2013, Tesla Motors Forum

The “if you built it, they will come” mantra certainly holds true for EV drivers. However, this amenity must be included in hotel information such as on property websites or as a search function on review sites, such as TripAdvisor, so that travelers can find EV-friendly accommodations and not need to turn to forums for advice.

See the Electric Vehicle Tourism Toolkit for more on first steps to becoming EV-friendly.

Car Rental

According to Auto Rental News (2013), there are nearly two million rental cars operated by 5,000 rental companies in the United States. Using the number of vehicles in the nation-wide rental fleet during 2012 along with average miles driven per car per month and average estimated miles per gallon, the car rental market can be directly linked to more than 13 million tons of CO₂ emissions each year. This calculation does not account for vehicle maintenance such as oil or cleaning chemicals, or the impact of transporting vehicles between rental locations.

Fuel efficiency is especially important to travelers and the opportunity for car rental companies offering EVs is twofold – the consumer can rent a vehicle with low cost per mile that also has low maintenance requirements per mile. Rental locations will need to decide upon an appropriate refill cost for electricity – hopefully sans a substantial convenience mark-up as is typical of most rental experiences.

Used as an educational and promotional tool, EV Tourism’s environmental and bottom line savings can then be incorporated into corporate

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13 Calculated using the 2012 industry averages (McCartney, 2013) of 37,142 miles per vehicle divided by 18 months of use, which equals 2,063 miles per month per vehicle in 2012. This was multiplied by 30 miles per gallon using the Sustainable Travel International calculator to arrive at 7.3 tons of CO₂ per rental vehicle.

14 This is especially true in Europe where Green Motion, a car and van rental company, created a fleet consisting only of hybrid, electric, and filtered diesel vehicles where additional transportation taxes exist. For more information visit http://www.greenmotion.co.uk/UK-car-hire-locations.php.

15 Annual maintenance savings estimates range from 28% (according to Drive Clean CA) and 46% (according to the Sierra Club). For case studies on city fleets and EVs visit http://sustainingforward.com/2013/12/29/electric-vehicle-fleets-webinar/.
responsibility messaging and annual reports\(^\text{16}\). For example, Enterprise made national industry headlines by adding five Nissan LEAF EVs to its Northampton fleet in 2013 (Auto Rental News, 2013, July 24). Similarly, Global Industry Analysts, Inc. (2014), reports that the car rental market is shifting towards “greener” cars including electric\(^\text{17}\).

As will be seen in the following case study, the role of the car rental segment in EV Tourism is clear – consumer education by offering EVs for extended test drives. By providing a fuel-efficient fleet, car rental companies will reduce emissions, reduce travel costs for visitors, introduce what is still relatively new technology to the global marketplace, create training opportunities for maintenance employees, provide insight to local governments on consumer trends, and produce headlines while remaining competitive.

**Leading the Charge: Enterprise Rent-A-Car**

As part of their Sustainability Platform, Enterprise integrates fuel-efficient vehicles into their fleet, identifies alternative technologies, and empowers customers to make energy efficient rental choices (EVAZ, 2013). An example of this commitment is Drive Electric Orlando, a program that includes the Central Florida Clean Cities Coalition, Electrification Coalition, Nissan, and Orlando attractions, such as the Orange County Convention Center, hotels, and Walt Disney World, to introduce the global tourism market to EVs. The program is a unique, community-driven approach designed to break down myths about EVs by giving families a unique chance to take an extended test drive while renting a Nissan LEAF during their vacation.

- The program gives a competitive edge to participating tourism operations (particularly hotels) while promoting participating businesses as environmentally responsible.
- With 57 million visitors to Orlando each year the potential impact of this program in terms of consumers gaining knowledge through experience is large.
- Pricing strategy was important in the roll out of this program. Rather than charging extra for the use of an EV, Enterprise smartly priced the car around $30 per day, which includes free charging at participating attractions and hotels along with free parking and a GPS to use for navigation and locating charging stations.

Moving forward, Drive Electric Orlando participants should quantify and publicize successes and best practices so that other tourism entities can see the value in EV Tourism.

**Recommendations for car rental companies engaging in EV Tourism:**

Rental companies engaging in EV Tourism have the added responsibility of educating customers about the vehicle. Staff must be able to speak comfortably about range and charging, provide emergency services information, and answer questions about EVs. As charging infrastructure expands and gas prices go up, rental locations will continue to add EVs as an option.

See the Electric Vehicle Tourism Toolkit for more on first steps to becoming EV-friendly.

**Destination Marketing Organizations**

As demonstrated by Drive Electric Orlando, partnerships are a key to success. To that end, state


agencies along with local Convention and Visitor’s Bureaus (CVBs) and Chambers of Commerce have perhaps the greatest opportunity to make an impact on EV Tourism because they bring together each sector of tourism within their area. The role of the state or local tourism office is to educate the industry on EV Tourism, market EV Tourism within their area, create public-private partnerships, and connect EV travelers with EV-friendly destinations.

This topic is new and innovative, which creates an opportunity to reach out to constituents via research roundtables, newsletters, and webinars. The key benefits to a tourism office’s stakeholders include:

- Connecting the dots between urban and rural communities;
- Increasing out-of-state visitation;
- Increasing revenue and tourism taxes;
- Promoting sustainable business and tourism.

Leading the Charge: The Arizona Office of Tourism

In January 2014 the Arizona Office of Tourism (AOT) set out to create the first Electric Vehicle Visitor’s Guide. A survey was sent out to EV clubs and posted to online forums dedicated to electric vehicles. More than 60 responses were received and reported that a guide designed specifically for the EV Road Trip would be useful because a tool did not yet exist to connect travelers with attractions and amenities near charging.

Respondents included specific recommendations such as providing temperature and elevation information – factors that influence range of an EV.

Completed in May, the guide includes a mileage map and roadside assistance information along with two itineraries. The first route takes Tesla Model S drivers out of Los Angeles and through Northern and Central Arizona with stops highlighting Route 66, Sedona, and Scottsdale. The second route is from Phoenix to Tucson and is designed for all EVs – made possible by a GOe3 fast charger located between the cities (as seen in the PlugShare Toolkit). To view the guide and itineraries visit AOT’s EV page.

“We are thrilled to be offering such a valuable resource to this growing market. We want to take the guess work out of traveling Arizona with an electric vehicle and show EV drivers how they can enjoy our great state.” – Sherry Henry, Director of the Arizona Office of Tourism, May 2014

- Each itinerary was created based on the location of available charging and includes mileage and net elevation change between stops.
- Overnight accommodations that allow charging are called out in the itinerary. The guide includes a list of EV-friendly lodging options in the state.
- A directory of overnight lodging accommodations that offer charging is included on the EV webpage.
- AOT has created a button on the consumer homepage to guide EV road trippers directly to the EV page and is promoting the page via social media.
- AOT plans to continue reaching out to hotels and create additional itineraries for EVs including a route from San Diego, California through Yuma, Arizona.

Moving forward, AOT should consider organizing Familiarization Tours for writers to test out and publicize the routes.

Recommendations for tourism offices engaging in EV Tourism:

The possibilities for promoting EV Tourism are limited only by the imagination. For example, tourism businesses can create packages designed for EV travelers or partner with car rental companies to put a deal together for visitors interested in trying out an EV for a few days – as is being done by Drive Electric Orlando.
See the Electric Vehicle Tourism Toolkit for more on first steps to becoming EV-friendly.

Conclusion
In its 2013 report, the U.S. Energy Information Administration (2013) noted a decline in carbon dioxide emissions over the previous year and attributed this not to a decrease in travel, but to an increased use of energy-efficient vehicles. In fact, the adoption of electric vehicles has been proven to reduce pollutants, particularly volatile organic compounds and carbon monoxide, thereby increasing air quality (Salisbury, 2013). This trend will continue as hybrid and electric vehicles continue to gain market share, which makes the tourism industry’s involvement in EV Tourism increasingly important.

According to the Electrification Coalition (2013), “the availability, or perception of availability, of electric vehicle charging stations...is critical to the widespread adoption” of EV. As demonstrated by the early adopters featured in this paper, enabling travel via electric vehicle is also a smart business choice. Drivers of electric vehicles want to be able to charge not only at home and where they work, but where they eat, shop, and vacation as well.

“It is important that our guests have the convenience and ability to continue sustainable habits during their time with us.” – Cindy Ortega, Chief Sustainability Officer of MGM Resorts International, February 2014

Through leadership in EV Tourism, businesses like MGM have strengthened their brand awareness and competitive advantage while assisting in educating consumers. By demonstrating this commitment to sustainability, tourism is able to expose EVs as a viable option to a local and visiting audience.

Additional benefits to engaging in EV Tourism include earning LEED points, being prepared for the continued increase of EVs, attracting a target demographic, providing local communities with charging, adding a new revenue model (if charging a fee for electricity use), helping the environment, creating better relationships with guests, and shifting spending from imported fuel costs to locally produced electricity along with other goods and services.

Tourism must continue this momentum. Over the next few years, knowledge will increase, infrastructure will expand, and technology will advance, allowing EVs to become more efficient, cost competitive, and prevalent (Hower, 2014), which means tourism entities from car rental to attractions to lodging must be ready.

In addition to the innovative EVTripPlanner tool, researchers are currently developing an EV route planning program that computes the most economic itinerary that considers trip information, road elevation, some weather conditions (such as wind), vehicle characteristics, and charging infrastructure (Mehar, Senouci, and Rémy, 2013). This tool will fill a void for current EV smartphone applications and will be an excellent tool for car rental companies to provide to their guests (Miller, 2014).

Electric Vehicle Tourism Action Items:

1. Refer to the toolkits on the following pages.

2. Share this information with your team to determine EV-related goals, including staff training.

3. Reach out to stakeholder groups including Clean Cities and tourism offices for assistance.

4. Work with your maintenance and operations teams to determine safe charging outlets
that can be made available to guests. Add these to PlugShare.

5. Communicate EV amenities to guests – in person and online.

6. Encourage online travel agents like TripAdvisor to add EV charging an amenity option.


The benefits of EV Tourism should continue to be explored and discussed. Increased knowledge across the tourism industry is essential and future research should focus on return on investment for adding charging as an amenity as well as the costs and benefits of marketing to the EV travel demographic.
Electric Vehicle Tourism Toolkit: The Basics

There are a variety of electric vehicles on the market. Of the all-electric vehicles (EV), the Tesla Model S and Nissan LEAF are most prevalent. However, the Chevrolet Volt and Toyota Prius Plug-in are popular plug-in hybrid vehicles as well. Below are EVs that tourism entities are most likely to assist along with their estimated range on a full charge. Keep in mind that temperature, wind, and elevation all effect actual driving range.

<table>
<thead>
<tr>
<th>Vehicle</th>
<th>Range (miles)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008 Tesla Roadster</td>
<td>245</td>
</tr>
<tr>
<td>2013 Tesla Model S</td>
<td>265*</td>
</tr>
<tr>
<td>2014 Chevrolet Spark</td>
<td>82</td>
</tr>
<tr>
<td>2014 Fiat 500e</td>
<td>87</td>
</tr>
<tr>
<td>2014 Ford Focus Electric</td>
<td>76</td>
</tr>
<tr>
<td>2014 Honda Fit EV</td>
<td>82</td>
</tr>
<tr>
<td>2014 Mitsubishi i-MiEV</td>
<td>62</td>
</tr>
<tr>
<td>2014 Nissan LEAF</td>
<td>84</td>
</tr>
<tr>
<td>2014 Toyota RAV4 EV</td>
<td>103</td>
</tr>
</tbody>
</table>

Sources: Tesla Motors, US Dept of Energy
*Range with 85 kWh battery back. Range with a 60 kWh battery back is 208 miles.

As is evident by the table above, most EVs are unable to go long distances per charge. A major goal of EV Tourism is to increase the quantity and quality of charging availability, particularly overnight charging at hotels and fast-chargers on major highways.

The first step to becoming EV-friendly is to offer charging. Though it will take many hours, an EV can be charged using a wall socket. For example, some hotels allow EVs to charge overnight by plugging their vehicle into a wall socket using an extension cord or dryer outlet using an adaptor. EV drivers travel with adaptors, so the tourism business simply needs to make a plug available. Below are the different “levels” of charging.

<table>
<thead>
<tr>
<th>Charging an Electric Vehicle</th>
<th>Volts</th>
<th>Range</th>
<th>Charge Time</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level I</td>
<td>120</td>
<td>2-5 miles</td>
<td>per hour</td>
<td>Wall socket</td>
</tr>
<tr>
<td>Level II</td>
<td>240</td>
<td>10-20 miles</td>
<td>per hour</td>
<td>Dryer outlet or charging station</td>
</tr>
<tr>
<td>DC Fast Charger</td>
<td>400+</td>
<td>60-80 miles</td>
<td>20 minutes</td>
<td>Charging station</td>
</tr>
<tr>
<td>Tesla Supercharger</td>
<td>Unknown</td>
<td>170 miles</td>
<td>30 minutes</td>
<td>Tesla Supercharger</td>
</tr>
</tbody>
</table>

Sources: Tesla Motors, U.S. Department of Energy - Alternative Fuels Data Center

- Determine if you are eligible for any charging installation incentives or tax credits.
- With the assistance of your preferred electrician, choose a location on your property for EV charging.
- For step-by-step instructions for planning and installing electric vehicle stations visit the Business Council on Climate Change website [http://www.bc3sfbay.org/assess.html](http://www.bc3sfbay.org/assess.html).
- Be sure to post charging information on PlugShare.
Electric Vehicle Tourism Toolkit: PlugShare Instructions

First, what is PlugShare? With 11,000 locations and growing, it is the largest electric vehicle (EV) charging network in the U.S. and Canada. Available online and as a free smart phone application, PlugShare is used by EV drivers to find public charging stations. For more frequently asked questions and answers visit http://faq.plugshare.com/category/23-plugshare-for-web.

As a tourism business that has an available plug or has just installed a charging station, it is easy to let the world know that you are now EV-friendly. Simply visit the PlugShare website (http://www.plugshare.com/) and following three easy steps:

1. Click on “Add Station” at the top of your screen.

2. Click on “Add Public Station.”

3. Type in as much information as you can and click “Submit.” Fields include:
   - Location (such as hotel name)
   - Model (for charging stations such as ChargePoint or Blink)
   - Phone number
   - Outlet type (check the appropriate box)
   - Address
   - Description (such as location in parking lot, contact person, etc.)
   - Hours of operation
   - Fees (check box opens space for details)
Electric Vehicle Tourism Toolkit: PlugShare Charging Station Example

As stations are added and used, EV drivers are able to write reviews and post photos. Knowledge is power, so the more information about a charging station the better, as shown in the example below.
Electric Vehicle Tourism Toolkit: Creating an EV Visitor’s Guide

This toolkit describes the steps taken by the Arizona Office of Tourism in creating their Electric Vehicle Visitor’s Guide. To view the guide and itineraries visit http://arizonaguide.com/arizona-travel-info/electric-vehicles.

1. Create a brief survey that seeks input from local electric vehicle (EV) drivers. Tailor these questions to the needs of your area (state/region/county/city). Ask for suggestions on attractions and hotels that offer charging. Email the survey to EV owners and stakeholders. For additional responses try posting the survey to EV forums such as the Electric Auto Association (http://www.electricauto.org/).

2. These suggestions will come together for the “resources” section of your guide. Begin compiling the information that was requested by your survey respondents including:
   a. Average temperatures by season and region, if necessary.
   b. Elevation by city.
   c. Emergency contact information, including roadside assistance for EVs if it is available in your area (try contacting your local AAA office).
   d. Mileage map (miles between cities).
   e. Lodging directory that includes hotels and other overnight accommodations that allow charging. See the Arizona Office of Tourism’s Lodging Directory as an example.

3. Using PlugShare, zoom in on the area you want to make an itinerary for. If you have a route in mind, make sure that there are charging stations available to get your visitors from point to point. Alternatively, you can choose charging stations and build a route around them using local activities, attractions, and lodging to add fun and excitement to the trip. As you design the route, test out distance using EVTripper. This tool is built for a Tesla Model S, but is useful in providing mileage and net elevation information between two points on map. When spacing out activities make sure to keep range and the availability of charging in mind.

4. Now that you have a route that has charging with fun stops along the way, write your itinerary and include some photos. This is your chance to be creative and show EV visitors how much fun they can have in your area. Be sure to include links to websites of visitor’s centers, attractions, lodging, and so on. Including links to online maps (such as Google) and PlugShare is also helpful.

5. Send the draft around your office to get feedback and any suggestions for improvement.

6. Once your guide’s resources and itinerary are complete, save it as a PDF – or use an online viewing program – to post the file online. This will allow EV travelers to find your booklet and use it on the road.

7. Publicize your guide! Send out a press release, let local EV owners know that the guide is ready, and interact with travelers on social media (see Facebook screenshot to the right).
Electric Vehicle Tourism Toolkit: Resources

There are a number of resources available to businesses interested in becoming EV-friendly, including:

- Alternative Fuels Data Center: http://www.afdc.energy.gov/
- Arizona Office of Tourism: http://arizonaguide.com/electricvehicles
- Business Council on Climate Change: http://www.bc3sfbay.org/
- Clean Cities – Coalition Locator: http://www1.eere.energy.gov/cleancities/
- Department of Transportation: http://www.dot.gov/
- Driving Futures (by Enterprise): http://www.drivingfutures.com/sustainability-report/
- Electric Auto Association: http://www.electricauto.org/
- Electric Drive Transportation Association: http://www.electricdrive.org/
- Electrification Coalition: http://www.electrificationcoalition.org/
- Fleet Answers: http://fleetanswers.com/
- Navigant Research: http://www.navigantresearch.com/
- PlugShare: http://www.plugshare.com/
- Sierra Club: http://www.sierraclub.org/
- Sustainable Brands: http://www.sustainablebrands.com/
- Sustainable Travel International: http://sustainabletravel.org/
- Sustaining Forward: http://sustainingforward.com/
- Verdek: http://www.verdek.com/
- Workplace Charging: http://www.workplacecharging.com/resources.html
Works Cited


Appendix

Table 1

<table>
<thead>
<tr>
<th></th>
<th>1998 Mustang</th>
<th>Tesla Model S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Miles</td>
<td>283</td>
<td>283</td>
</tr>
<tr>
<td>Highway mpg (EPA)</td>
<td>26</td>
<td>-</td>
</tr>
<tr>
<td>Emissions (per gallon)</td>
<td>19.8</td>
<td>0</td>
</tr>
<tr>
<td>Total emissions</td>
<td>215.5 lbs.</td>
<td>0*</td>
</tr>
</tbody>
</table>


*If electricity is sourced from solar power.

Table 2

<p>| |</p>
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Top U.S. Green* Car Shopper Markets</td>
</tr>
<tr>
<td>1 San Francisco - Oakland - San José, CA</td>
</tr>
<tr>
<td>2 Charlottesville, VA</td>
</tr>
<tr>
<td>3 Los Angeles, CA</td>
</tr>
<tr>
<td>4 San Diego, CA</td>
</tr>
<tr>
<td>5 Monterey - Salinas, CA</td>
</tr>
<tr>
<td>6 Chico - Redding, CA</td>
</tr>
<tr>
<td>7 Santa Barbara - Santa Mario - San Luis Obispo, CA</td>
</tr>
<tr>
<td>8 Portland, OR</td>
</tr>
<tr>
<td>9 Sacramento - Stockton - Modesto, CA</td>
</tr>
<tr>
<td>10 Seattle - Tacoma, WA</td>
</tr>
</tbody>
</table>

Source: Gorzelany, 2014

*Buyers of both EVs and hybrid vehicles
Electric Vehicle Charging for The Hospitality Industry

**The Facts**
To remain competitive, the over 49,505 hotel properties across the U.S. must adopt greener business practices to cater to the ever-growing eco-traveler market.

As the adoption of electric vehicles (EV or PEV) becomes more widespread (1 Million predicted by 2016) the availability of EV charging stations will be more of a factor in travelers’ lodging decisions.

The installation of EV charging stations conveys a positive message in terms of environmental stewardship and encourages your staff and team of employees to also consider switching to PEVs.

EV charging stations can also help qualify for additional LEED credits as well.

**The Solution**
Verdek LLC offers complete solutions for plug-in vehicle charging with our diverse line of electrical vehicle supply equipment (EVSE). Many options from Level 1/Level 2 Combination and Level 2 Public Use Charging Stations offer hotels and the hospitality industry, high reliability plugin electric vehicle charging that’s easy-to-use and provides features that match your specific location.

Offering a 110V or NEMA 14-50 plug is not a good solution and actually adds potential liability. Through Verdek you can offer green travellers convenient on-the-go options for their PEVs. Charging stations provided by Verdek are ideal for all commercial and outdoor public applications and are backed by Verdek’s unique technical expertise, reliable and professional installation services, and continued responsive customer service and tech support.

**Get a Competitive Advantage**
- Extraordinary and bountiful amenities attract attention
- Superior customer service and guest experience separates the “good” from “great”
- Create a strategic edge over any other nearby location
- Don’t compete, simply beat the competition by adding EV charging

Some of the Industry Leaders offering EV Charging

Marriott  |  Caesars  |  Holiday Inn  |  Intercontinental  |  The Venetian
Best Western  |  Sheraton  |  Westin  |  STARWOOD  |  Hilton Garden Inn

For additional information visit www.verdek.com
or contact: Rudy Garcia - (602) 686-0347 - rgarcia@verdek.com

Courtesy of Verdek
Map 1

Alternative Fueling Station Locator

Find alternative fueling stations near an address or ZIP code or along a route in the United States.