For the third year in a row, the Ernst & Young Global Cleantech Center and Global Automotive Center hosted a series of Ignition Sessions – global discussions on how to advance the development of a sustainable electric vehicle (EV) ecosystem.

In sessions in Los Angeles and Brussels, we convened entrepreneurs and thought leaders from government, nonprofits, banks, venture capital firms and consumer advocates, as well as the automotive, consumer products, technology, logistics and utility industries. The discussions focused on the question of how to spur EV adoption by expanding the consumer’s EV experience along four dimensions:

- Articulating a net positive value proposition for EVs that will accelerate consumer adoption
- Aligning sales and marketing approaches with the needs and culture of the consumer
- Addressing consumers range anxiety and recognizing greater control in fueling
- Improving stakeholder knowledge sharing to promote the dissemination and implementation of best practice developed worldwide

These topics were selected in consultation with a committee made up of leading executives focused on the global EV market; please see page 3 for a list of committee members. We are grateful for their generous contributions of ideas and insight.

We would like to extend special thanks to our co-host, Bloomberg New Energy Finance, and to the Climate Group, our global strategic supporter.

To encourage dynamic and open dialogue, the sessions were actively facilitated and the Chatham House Rule applied to discussions. While insights arising from the exchanges are crystallized in this report, no comments have been attributed to a specific person or organization.
To offer insights from the meetings to the larger cleantech community and to help foster the development of the EV industry, this report provides:

- A summary of the key conclusions and priority actions arising from the discussions in Los Angeles and Brussels
- Detailed summaries synthesizing the highlights, shared findings and varied perspectives related to the sessions’ major themes
- Illustrations created during the sessions that capture the dynamism of the discussions

Over the past several years, we have observed the EV community move from product development to market entry to the challenges of adoption today. At the same time, broader public perception of EVs has moved from over-exuberance to over-skepticism. A session participant aptly compared this period in EV development to the “trough of disillusionment” in Gartner’s Technology Hype Cycle model. We are confident, however, that the commitment of diverse stakeholders will bring EVs to the next stage of growth.

We hope that our report findings, focused on consumer adoption issues, will spur creative approaches and further initiatives. Ernst & Young will continue to convene stakeholders and share insights to support the development of the EV ecosystem.
## Los Angeles

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*Note: The Los Angeles and Brussels sessions were facilitated by Christopher Meyer, Founder, Monitor Talent*
Expanding the EV experience

Ernst & Young would like to thank the following individuals for their suggestions and contributions in the development of the Ignition Session agenda topics.

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Executive summary and priority actions

For the past three years, the Ernst & Young Global Cleantech Center has convened leading stakeholders in the global electric vehicle community to discuss the critical issues in the electrification of transportation.

During this time, the focus of the EV community has shifted from the business prospects of vehicle electrification to the challenges of building an ecosystem to support the introduction of the first commercial EV models. Today the discussion centers on how to drive broad-based consumer adoption of EVs.

This question of how to spur consumer adoption was at the heart of our latest Ignition series, which consisted of events in Los Angeles and Brussels. The debate in the sessions began with the premise that the success of EV adoption is no longer dependent on battery technology, concept vehicles or demonstration projects. Rather, adoption will occur as consumers are able to insert this transportation solution easily into their lives.

Session I: Articulating a net positive value proposition to the consumer

The discussions of this theme began with the premise that automobile manufacturers have not yet succeeded in articulating a value proposition for consumers that will move the market beyond early adopters to the mainstream. What must EVs offer to consumers to persuade them to switch from internal combustion engine (ICE) vehicles? Participants observed:

- Automakers have so far missed the opportunity to overcome the EV price barrier by creating a value proposition based on consumers’ emotional responses and the intangible benefits related to driving EVs.
- There is no single customer for EVs. Therefore, there is no single value proposition. Because the EV experience is highly emotive and customers are not homogeneous, customer engagement initiative by automarket must be tailored to the market and targeted consumer segments.
- A seamless customer experience in terms of buying, financing, charging and servicing an EV is a key customer value driver.
- The EV is a fundamentally new product that requires new business models and infrastructure to enable the consumer value proposition. Continuing to try to fit this new product into old business models and infrastructure will not be successful.
- The EV transformation is going to take place over the long run, and industry stakeholders should be realistic in their expectations for adoption. That said, EV adoption is occurring faster than hybrids 12 years ago, suggesting that the market is evolving well.

To gain insight from the EV community into what needs to be done to accelerate EV adoption, the Ignition series discussion agenda was built on four major themes:

- Articulating a net positive value proposition for EVs that will accelerate consumer adoption
- Aligning sales and marketing approaches with the needs and culture of the consumer
- Addressing consumer range anxiety and recognizing greater control in fueling
- Improving stakeholder knowledge sharing to promote the dissemination and implementation of best practice developed worldwide
Graphic recording of Ignition Session discussion on “Expanding the EV experience,” drawn by Kathy Evans of Grove International.
Session II: Creating consumer markets

The discussion on the sales and marketing theme focused on the strategies and tactics needed to tap into broader consumer markets. Our participants pointed to fundamental strategy gaps and flaws in marketing the current generation of EVs. It’s the marketing, not the machine, holding back wider consumer adoption:

- EV customers can be segmented into four types: 1) the early-adopter, eager to acquire the latest “cool” technology; 2) technology enthusiasts, embracing technology change and innovation; 3) cause-oriented buyers, seeking to “green” their transportation; and 4) pragmatists, looking for cost-savings and better performance. A value proposition that justifies the cost premium of EVs based on their priorities must be formulated for each of these segments.

- The conventional dealership sales channel does not work for EVs because of information and training gaps and traditional incentives that favor ICE vehicles.

- Automakers must pursue a bottom-up marketing approach and engage with consumers in new ways. With EVs, consumers look to other consumers, interacting through social media, as the trusted source of information, rather than the large traditional manufacturers. Additionally, early-adopter EV owners are a valuable source of knowledge about the long-term experience of driving the vehicles. Marketing the EV ownership experience will be essential.

- Collaborative marketing between automakers, utilities and technology providers will be essential for delivering the total-solution package needed to spur greater consumer adoption.

- Helping to meet the mobility needs of cities offers an immediate opportunity to put large numbers of consumers behind the wheels of EVs, both increasing sales and giving consumers exposure to the EV driving experience.

Session III: Infrastructure – moving from range anxiety to control in fueling

The concept of control in fueling enabled by EVs has not been fully exploited. Consumers have more control of time, infrastructure and, in some regions, cost when charging an EV than when fueling a conventional ICE vehicle at a gas station. However, lack of standardization in areas such as EV charging infrastructure, systems and range definitions creates consumer uncertainty that inhibits sales. Common standards and definitions are also needed to help the EV sector grow, both by increasing consumer confidence and reducing total cost of vehicle ownership. Key observations included:

- Realizing the vision of freedom of fueling through electricity will require the EV community to tackle some key challenges, such as revamping utility infrastructure, improving vehicle driving range, enhancing driver information, reducing vehicle cost, establishing charging interoperability between providers and achieving economies of scale in charging infrastructure.

- Faster progress must be made on the standards and regulatory actions needed to enable progress on these key challenges described above.

- Over the past three years, players that traditionally didn’t work together – automakers, utilities and charging companies, for example – have been collaborating because no single company can control the entire value chain. Revenue opportunities have to be pursued jointly.

- Until there is a larger number of EVs on the road, there is no business case for public charging other than addressing perceived issues of range anxiety. Since the majority of charging is likely to take place at home overnight, investments in public charging must be scaled appropriately to avoid creating infrastructure that goes unused.

- Charging must be smart. To move from range anxiety to control in fueling, the vehicle must be able to communicate intelligently with the charging infrastructure regarding the state of the battery, charger proximity and charger availability. Automakers, utilities and public charging providers must collaborate to enable the necessary dynamic feedback between the car and the charging infrastructure, as well as other transport modes in a mobility solution.

Session IV: Stakeholder dynamics

EV deployments are taking place around the globe, yet successes and lessons learned are not being widely shared. Connecting the wider EV community to disseminate leading practices can speed deployment and help to avoid potential setbacks; so can creative partnerships across the EV value chain:

- The right balance between proprietary, disruptive change and open, standards-based innovation must be found. Small groups of individually non-aligned stakeholders working together with a profit motive are most likely to drive disruptive change in the EV ecosystem. Nonetheless, broad collaboration is also required to develop standards and ensure interoperability across the EV infrastructure.
Not enough attention is being paid to the corporate fleet experience. Fleets could provide an important testing ground because their cost expectations, return on investment requirements and capital needs are more straightforward. Success in the fleet market may well have a positive ricochet effect onto the mass market by helping to reduce costs as the EV supply chain achieves economies of scale.

EV knowledge, experience and expertise are scattered among different communities globally with little structured communication among them. Similarly, standard-setting related to EV charging infrastructure is underway in different jurisdictions around the world with little coordination.

Priority actions

Based on the insights that emerged from the Ignition sessions in Los Angeles and Brussels, Ernst & Young proposes the following actions to advance the development of a sustainable EV ecosystem.

1. **Segment and conquer**: EVs offer different consumer value propositions to different market segments. Broader consumer adoption depends on automakers defining the market segments for EVs – and these are likely to be different from the ICE market segments they are familiar with – and reaching them with effective marketing messages.

2. **Integrate consumer product marketing insight**: the ways that EVs are charged and can be integrated into different aspects of consumers’ lives give them the characteristics of consumer products. Automakers should seek out consumer product-marketing insight to help them segment the market for EVs and develop marketing campaigns.

3. **Reinvent auto sales**: the traditional dealership model has not been successful in supporting EV sales due to information gaps and competing economic incentives. Moreover, the new generation of auto buyers is not looking for a traditional “bricks and mortar” sales experience. Automakers must engage consumers through social media, learn from them, and create grassroots demand through processes of direct consumer interaction.

4. **Deliver the seamless consumer experience**: the lack of a seamless consumer experience in buying, financing, charging and maintaining EVs remains a barrier. Utilities, automakers and technology providers must work together to create business solutions that provide the seamless experience that consumers need – and work hard to make consumers aware of them.

5. **Move from tax credits to rebates**: the main barrier to EV adoption is the higher point-of-sale price of EVs compared with that of ICE vehicles. Government incentives as front-end rebates on the purchase price would be much more effective than tax credits in accelerating adoption.

6. **Provide incentives for adoption, cheaply**: governments can promote EV adoption even in a period of austerity through non-financial incentives. One of the important lessons learned to date is that consumers value and respond to government incentives, such as preferred parking, priority lanes and waived congestion charges for EVs, that cost taxpayers little.

7. **Prioritize cities**: EVs offer a strong value proposition to support the sustainability agenda of cities worldwide, whether by reducing pollution or enhancing mobility. Cities, therefore, are an important lead market for EVs that can offer an opportunity to scale production and introduce EVs to large numbers of potential buyers.

8. **Don't forget fleets**: corporate and government fleets should be prioritized as lead EV markets. Fleets are natural early EV adopters, given their focus on total cost of ownership and predictable driving patterns. Fleets can also provide important testing grounds for solving EV infrastructure issues and helping to scale up EV production. Automakers, utilities, policymakers and advocates for EVs must work with fleet managers to tear down barriers to fleet adoption and develop methodologies for carrying over best practices and lessons learned to consumer markets.

9. **Be good, not perfect**: faster progress must be made on the standards and regulatory actions needed to enable the EV market, such as revamping utility infrastructure, enhancing driver information and establishing charging interoperability. Policymakers and standard-setting organizations must focus on pragmatic solutions that can be accomplished quickly.

10. **Connect EV communities of interest**: EV trials and standard-setting processes are taking place around the globe, yet there is no structure for comparing objectives, tracking activities and sharing best practices. Regional EV associations and advocacy groups should establish a virtual clearinghouse of EV initiatives to enable important knowledge sharing among the EV communities dispersed around the world.
Articulating the net positive EV value proposition to consumers

A comprehensive value proposition for electric vehicles (EVs) has not yet been articulated to potential buyers. To date, the current value proposition, focused on “greening” automobile transportation, has sparked sales to early adopters but has failed to encourage mainstream consumers to embrace EVs. The industry needs a competitive, net positive value proposition that will allow EVs to win in the market. In Los Angeles and Brussels, Ignition Session participants took up the following key questions:

• What are the key elements of the EV value proposition? How can EVs overcome their sticker-price disadvantage over the short to medium term?
• What are the barriers to formulating the net positive value proposition?

Perspective from Los Angeles

The EV market is at a crossroad. The excitement about a vehicle powered by electricity has allowed consumers to rethink their driving experience. At the same time, the experiences of new EV owners, sellers and manufacturers are infused with anxiety as to whether the early-stage technologies, markets and consumers will be able to become a lasting ecosystem.

For the first time in more than a century, the utility industry and the automotive industry are selling to the same customer in the form of the EV owner. The market potential is significant given these two incumbent industries’ interest and investment in the EV market. However, both parties will also have to share in the engagement with the customer, a daunting proposition because of the diversity of the more than 3,000 electric utilities in the United States compared to the relative handful of automakers.

Participants in Los Angeles recounted numerous stories of consumers’ excitement surrounding their EV experience. There was consensus that EVs consistently generate a positive emotional response, and more importantly, unlike any previous automotive product, the EV experience creates a space for engagement or dialogue with new sets of stakeholders and types of consumers. The opportunity to tap into this emotive response and create a value proposition that is not anchored to price has not been seized by automakers.

The emotive value proposition

Consumers have been poorly educated about what EVs are and how their capabilities support the emotive values of freedom and choice:

• EVs are fun to drive.
• They free consumers from dependence on gas stations.
• They offer the ability to choose charging place, time and rates.
• They provide the possibility of low-cost or even free charging due to home-based renewable energy generation.
• They feature onboard telematics and the integration of smart energy solutions that give drivers more information, choices and control.
**Less for more**

By ignoring the emotional appeal, automakers have turned the substantial price differential between EVs and ICE vehicles into an even higher barrier. Rather than create EVs with the full features of ICE vehicles that target the emotive response, automakers have stripped amenities from the cars to squeeze costs, yielding a “less-for-more” scenario. Participants pointed out that most car buyers purchase a more expensive car than they really need for a variety of emotive reasons; thus, by making the cars less appealing, automakers miss the opportunity for the emotive sale.

**Different product; different business model**

Part of the difficulty in articulating the value proposition for the EV is that manufacturers are trying to fit a fundamentally new product into the old business model and infrastructure of the product it is seeking to replace. “If you look at any disruptive technology, you’ll see that the first users tried to force it into the old way of doing things,” observed one participant, giving the example of the first word processors being reserved for secretarial pools rather than given to individuals. Participants look forward to the advent of purpose-built EVs (rather than simply electric drivetrains in existing vehicles) enabled by tailor-made business models and infrastructure that would define the customer value proposition.

**Bridging to the mass market**

Participants grappled with defining who the customer of the future would be and how to access those new markets. One made the useful analogy that the current EV market was like an island – separate from the mass market of light-duty vehicles. The group debated whether it was important to grow the island on its own – keeping it distinct from the conventional non-EV market – or whether the EV market would have to create its own “bridge” to the mainstream, such as new sales or marketing strategies, to tap into the mass market. As one participant said, “It’s interesting figuring out whether the product is looking for a market or whether the market is asking for a product.”

**The EV experience beyond price**

While the overriding factor in consumer adoption is price, mainstream consumers do not normally know the economics related to EVs and how the total cost of ownership (TCO) for EVs can be lower than that of conventional gas-fueled cars.

The intangible positive value proposition of EVs was also discussed – especially the importance of the user experience. There is a disconnect between what manufacturers think consumers value and what customers actually do value. For example, car manufacturers may think the value proposition for customers is a zero-emissions vehicle, but in fact, the intangible benefits that accrue to EV drivers – incentives such as free parking or congestion-charge reductions – are often more important.

A seamless customer experience in terms of buying, financing, charging and servicing an EV was also seen as a key customer value driver. One participant looked to consumer adoption of diesel technology for a parallel. “Major uptake of diesel technology occurred in the late eighties and early nineties when it became indistinguishable from petroleum in terms of the customer experience.”

Creating the EV ecosystem that delivers a seamless customer experience is important because the sales and marketing channels for ICE vehicles are proving to be a barrier to entry for EVs. For example, dealers are avoiding selling EVs or, worse, emphasizing their negatives to consumers. The reasons for this include simple lack of knowledge, lower relative commissions and fear of losing service revenues, since EVs require much less maintenance than ICE vehicles.

One participant stated that the “revolution in the EV industry will not come by getting people to buy cars, but by getting them to use the cars.” Europeans have a distinct advantage in being able to experience EVs through corporate fleets, public transportation and municipal mobility solutions. Widespread exposure to EVs will help consumers understand the value proposition for these vehicles and act as a lever of change in consumer behavior such that the EV is seen as a commonplace means of mobility.

**Importance of lead markets**

Participants pointed out that governments and supporting organizations are increasingly focusing on lead markets as nuclei from which EV adoption will spill over to neighboring areas and regions. The uptake of the mobile phone industry and infrastructure evolved this way, and slowly the technology spread from market centers in a hub-and-spokes model. The criteria for such lead markets include the GDP per capita factor (which suggests the purchasing power of the population), the travel distance of a regular trip in a certain area, and average local temperatures, because of the effect of temperature on battery performance.
Graphic recording of Ignition Session discussion on "Articulating the net positive EV value proposition to consumers," drawn by Kathy Evans of Grove International.
Market segmentation

With different buyer segments purchasing EVs, participants stressed the importance of understanding a different value proposition for each. A retail customer and a corporation will have different value propositions, and even among corporate consumers, no two companies may have the same one. Further segmentation occurs as a result of different charging experiences, driving experiences, charge cards, usage and so forth. Regardless of the segment, the information on the performance and characteristics of EVs that consumers need in order to determine the suitability of EVs for themselves is not being disseminated effectively.

For broad consumer adoption, the industry must provide vehicles that answer a variety of value propositions. “You must be able to respond to the different demands of the different consumers — at the same time. That is the basic condition for a broad rollout of the electric vehicle,” commented one participant.

This is particularly evident in the fleet segment. Corporate fleet managers noted that their experience with EVs has been positive, and they purchase them for total cost of ownership reasons or sustainability visibility – which provides them a clear value proposition – but they have struggled to find EVs that meet their needs. There is demand, but not the right product.

Setting expectations

Part of the growing disappointment and negative messages regarding EVs are the too-high and too-early expectations set when the technology was not yet ready. Stakeholders need the patience to let the industry grow at the speed required to develop the different segments. And more partnerships are needed to create a better-integrated total consumer value proposition.
Aligning sales and marketing with consumer needs and culture

As a new product category, EV purchases tend to be even more emotive and cultural than those of traditional ICE vehicles. The EV industry has an opportunity to design and market products in new ways to tap into the broader consumer market. While some market participants have called for the creation of a breakthrough EV product that taps into the design-driven appeal of consumer electronics – call it an “iCar” – our ignition session participants pointed instead to fundamental strategy gaps and flaws in marketing the current generation of EVs. It’s the marketing, not the machine, that is holding back wider consumer adoption, they said. Key questions considered during the discussion include:

- What are we selling – vehicle, mobility solution, appliance, lifestyle product, other, all of the above?
- How can sales channels change to draw out a new buyer?

**Perspective from Los Angeles**

The customer experience and value proposition vary across markets, emphasized the LA session participants. Car buyers who decide to purchase an EV value to different degrees fuel savings, customer control, energy efficiency, the connection to the grid and the novel technology. Nonetheless, EV customers can be segmented into four groups:

1. The early-adopter: the EV experience is emotion-driven and associated with the young and trendy.
2. The technology enthusiasts: embrace the EV experience because of the technology change and innovation.
3. The cause-oriented: connect the EV experience to “green” consciousness and see it as a visible symbol of their commitment.
4. Pragmatists: the charging logistics and fuel-cost savings simply make an EV the logical choice.

EV industry stakeholders must pay more attention to the cost differential between EVs and ICE vehicles, participants said. A value proposition that justifies the cost premium according to consumer priorities must be formulated for each of these segments. But so far, the large automakers have focused only on the small group of cause-oriented consumers while hoping that early adopters would spur sufficient market demand to establish EV market presence.

**Sales channel broken**

The conventional automobile sales channel does not effectively serve the EV customer. The automaker, regional dealership and local dealership are all different companies. As a result, informational and sales and marketing initiatives for EVs are inconsistent. Consumers, thinking that automakers and dealers are one entity, become disenchanted when they do not receive integrated services.

The customer coming into the showroom may know more about EVs than the dealer does; the source of knowledge is no longer the traditional automotive channel. Therefore, greater coordination of marketing, training and product awareness is needed at the dealer level, in addition to an understanding of the dialogue taking place between customer groups.
Need to understand and engage the consumer

Automakers do not fully understand the current generation of “connected” consumers and have the opportunity to engage with this constituency. Today’s consumer generation does not trust large companies, whether utilities or automakers; the most trusted sources of information, instead, are fellow drivers via social media. These consumers also do not want to go to a physical location to purchase a vehicle, preferring online interactions.

To succeed, automakers must connect with these consumers, be part of the conversation going on among them, establish trust and restructure the way cars are sold and serviced. Moreover, some of the existing EV drivers bring 15 years of experience with EVs, having been involved with the generation of EVs introduced in the early nineties. Car makers can learn a lot from them in terms of what works and what doesn’t, whether it is in the driving experience or infrastructure.

Role of utilities

EV owners, no matter what customer segment they fall into, can ultimately all be viewed as electric utility customers when they charge their vehicles. Understanding the electricity usage profiles of EV drivers, assuring them of the reliability of the charge and linking it to the driving experience are all steps that allow electric utilities to engage with a new type of customer. Therefore, building credibility and trust on such issues as smart grid, energy management and charging will become an important part of redefining the sales channel and creating new value propositions.

Creating EV category awareness

Automakers have done a poor job of creating EV category awareness — helping consumers to understand what EVs are, how they work and what they need to know to make an informed purchasing decision. More broadly, automakers have failed to provoke excitement with the EV category, focusing instead mainly on education targeted to the cause-oriented consumer.

Time for large investment

Mass market adoption in the United States will ultimately depend on several developments requiring substantial investments. An assortment of EV models must be introduced to give consumers choices — currently, there are few EV models geared to consumers between the low and the very high end. And battery price and performance must be improved to the point where an EV can be the only vehicle for an average American driver. While it is true that drivers only rarely need to travel beyond the current range of EV batteries, on the few occasions when

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Graphic recording of Ignition Session discussion on "Creating consumer markets," drawn by Kathy Evans of Grove International
they do need greater range, they lack access to the affordable alternative transportation options that can be found in Europe and Asia. With a wider selection of models and cheaper and better batteries needed, said one participant, “we’re now suffering a period of good intention, customer acceptance and basically, fear of large investment. We now need large investment, and I don’t mean a few hundred million.”

Perspective from Brussels

The conversation in Brussels focused on how original equipment manufacturers (OEMs) are selling and marketing EVs around the world, and how the traditional marketing and sales channels for vehicles may not be appropriate for EVs. One participant noted that marketing the EV has to remain simple, especially given the complexity of all the moving parts, to make sure the EV experience works seamlessly.

Inevitable market change

Any new technology or product that comes on the market goes through a number of different permutations in terms of how it’s sold or how it’s packaged, and finally, how it’s used. Participants emphasized that the marketing and sales channels will change over time as more technology and solutions come on board, and that the disadvantages will disappear over time. They compared marketing EVs to the early days of the mobile phone – the original bulky mobile phones were first marketed only to serious business users and tech enthusiasts, but within a decade, they had become ubiquitous. Similarly, EV marketing will be completely different in 10 years’ time.

Unlocking the total value proposition

As the product evolves, however, EVs will require new distribution and sales models to help the customer unlock all of the new types of value drivers embedded within the new product and its solutions. Part of the value proposition might be found in working with a municipality on driving in a certain lane or free parking or free energy. “It’s not just a new paint color; it’s an entirely new product,” averred one participant.

Participants stressed the importance of pursuing a bottom-up approach to marketing, as opposed to the top-down strategy employed by traditional OEMs. Social media was also mentioned as a potential game changer, particularly with regard to countering the negative messages related to EVs circulating among the public.

Others saw European electric utilities making better progress in positioning EVs. European utilities are pursuing better relationships with their customers because they are less regulated than those in the US and see an opportunity to position an EV as an energy management solution for their power consumers.

Mobility solution to overcome technology gaps

“Are we selling EVs as a mobility solution because of shortcomings in the technology or because of the customers’ needs?” one participant asked. The conclusion was that mobility solutions are a complicated value proposition, but they are a way to sell EVs by compensating for the current difficulties in owning and driving them. However, some questioned whether European customers would be ready to have a mobility solution instead of a personal car. While some believed that a mobility solution was a better value proposition, others pointed out how emotionally driven a car purchase can be and that consumers may not be ready to change their behavior.

Collaborative marketing

Offering a total solution package throughout the EV value chain (charging, vehicle and leasing) requires a different marketing approach for each segment, adapting the EV solution to what a customer needs and having the right partnerships and collaborations to deliver it. Additionally, partnerships must integrate both the traditional automotive players and the new entrants to leverage the networks that consumers are accustomed to, as well as to enable the new technologies.

In the UK, for example, there has been a change toward a more collaborative environment for marketing EVs. OEMs are working with the utility providers, recognizing that the OEMs are unlikely to start selling electricity and utilities are unlikely to start selling vehicles. These two conventional stakeholders now have to work with technology suppliers as well. There is more deliberation and negotiation about how to market EVs given that each conventional sector has separate business models that are not going to change. Yet they must come together and market EVs to the customer as a single solution.

Prioritize cities

Such collaborative partnerships between different stakeholders are happening across Europe, with new models of mobility emerging from leasing companies, car-share companies and railways, all of which will offer new services or products, such as mobility budgets (€/km) instead of vehicles. These solutions have an inherent business case and value to market segments such as corporations or cities facing increasing pressure to hit emissions targets and resolve congestion problems. By identifying the pressure points of cities, EVs can be marketed as mobility solutions.
Ernst & Young Belgium and iMove

The Ernst & Young Belgium practice was chosen as the host site for the June 2012 EV session because of its history and efforts in promoting and supporting the EV and cleantech markets. The practice joined others in the Belgian community to develop and deploy new solutions for electric mobility, and over the years developed its own experience and understanding of incorporating EVs into the corporate fleet. Sustainability is an important objective of the firm, and the Ernst & Young Belgium team offered some of its own perspectives as a corporate consumer, stakeholder and supporter of EVs.

Ernst & Young Belgium’s key corporate responsibility priorities include entrepreneurship, employees, community engagement and the environment. Thus, the development and growth of the electric vehicle market naturally became one of the solutions the firm invested in to drive entrepreneurship, link with employees and the community and improve the environment. In 2005, Ernst & Young Belgium began to develop a plan to green its corporate fleet and grappled with the consumer decisions employees were facing with regard to transportation and mobility choices. In late 2010, the firm invested in its first EVs, and by 2012, it had a total of 15 EVs purchased for its corporate fleet. Ernst & Young Belgium has been achieving significant results in its work on different programs to promote smart transportation. A few early success indicators are:

- 25% lower than average fleet emissions
- 10% less consumption of fuel
- 15% decrease in the total cost of ownership
- 80% of employees have taken eco-driving training

Ernst & Young Belgium is now involved in supporting a larger ecosystem to enable the adoption of EVs and broaden the EV experience in Europe. The iMove program brings together 18 companies and research organizations to create a testing ground for technological innovations in the field of energy and transportation technology, as well as to the behavior of and user feedback on EVs.

The program centers around three key themes: renewable energy, new technologies in batteries and vehicles and mobility behavior. iMove will study and test the EV experiences of a range of employees and individuals who use 175 electric cars and 300 charging stations every day for three years in the Flanders region. The iMOVE project provides a forum for Ernst & Young to develop and test services. Moreover, as project manager, Ernst & Young plays a key role in helping to monitor and evaluate the EV experience within the region.
Expanding the EV experience

Charging and infrastructure – moving from range anxiety to control in fueling

Lack of standardization in areas such as EV-charging infrastructure, billing, software, and definitions of fuel economy and vehicle range is creating consumer uncertainty that inhibits sales. Common standards and definitions are needed to help the EV sector grow, both by increasing consumer confidence and demonstrating the vehicle’s total cost of ownership advantage. Equally, the concept of control in fueling enabled by EVs has not been fully exploited. Consumers have more control of time, infrastructure and, in some regions, cost when charging an EV than when fueling a conventional ICE vehicle at a gas station. Among the important questions considered by the participants were:

- How can the industry arrive at common standards and definitions? Who should lead in convening stakeholders? Which stakeholders need to participate?
- What consumer education is needed to increase understanding of EV metrics and awareness of current EV performance levels?

However, there was broad agreement that realizing the vision of fueling through electricity will require the EV community to tackle some key challenges. These include:

- Revamping utility infrastructure
- Improving vehicle driving range
- Enhancing driver information and value
- Establishing charging standards
- Reaching economies of scale in charging infrastructure

A feeling of impatience was clear throughout the discussions in Los Angeles as participants knew there were answers and solutions that could be deployed, but action on the ground was not happening quickly. Many participants agreed that on standards and protocols, the car companies and consumers could not wait, and that the perfect was becoming the enemy of the good.

Utility infrastructure challenge

Meeting the utility infrastructure challenge, above all, will require regulated utilities, independent utilities and regional groups together to provide direction across state and power lines. Five million new EVs represent five million new mobile demands charging in countless areas. Yet thousands of utilities with hundreds of thousands of transmission lines, handling more than one terawatt of power, will have to manage load capacity and scheduling, as well as standards and protocols.

Perspective from Los Angeles

The charging discussion in Los Angeles was centered on how to move the consumer’s EV experience from feeling range anxiety to controlling fueling. Underlying the discussion was the proposition that EVs offer freedom from the traditional way of fueling the automobile at the gas station and enable new choices for the consumer as to where and when to fuel. The driver’s freedom from the gas station may free up time, allow for different choices, costs or conveniences, and ultimately, fundamentally change mobility.
Graphic recording of Ignition Session discussion on “Charging and infrastructure – moving from range anxiety to control in fueling,” drawn by Kathy Evans of Grove International.
The reality is that the complexity of the utility system in the US and the lack of common standards are concerns the consumer does not want to deal with at the charging station, given that the current value proposition of electricity is that it is ubiquitous and commoditized. The current EV charging infrastructure will have to evolve and improve through coordination and dialogue with the consumer over time.

**Don’t overbuild**

With the majority of charging likely to take place at home overnight, top-up charging is the main opportunity for public charging. While a certain amount of public charging infrastructure is needed to overcome range anxiety and provide security, participants cautioned that investments in charging must be scaled appropriately to avoid creating infrastructure that goes unused.

**Data needed to enable new business models**

The customer experience is just as important as the availability of charging infrastructure. For this reason, the business models that arise around EV charging will be essential in providing the ease of use, interoperability and confidence needed to move from range anxiety to control in fueling. It is critical in these early days that consumers have positive charging experiences. For this reason, participants highlighted the need for automakers to share the data that they gather from their vehicles with the broader ecosystem to enable smart charging and “experience apps” that help consumers to integrate EVs into their daily lives.

**Role of government**

The Los Angeles participants emphasized the government’s role in ensuring standards and the need for regulatory actions to create an enabling environment for solutions that could be game changers for charging infrastructure. Among these are promoting standards that allow for different charging options, especially wireless.

Participants cited issues related to scheduling non-peak load charging, battery swapping, fast-charging solutions and wireless charging – all of which can radically change the nature of the charging experience but need to be enabled by regulatory actions. Another thorny issue to be resolved is how to integrate public and private charging networks, as well as the information and databases behind them.

**Role of China**

Consumer control in fueling as a result of EV adoption may become a reality in China or another emerging market before it takes hold in the US. The scale of EV adoption in China will be unprecedented, especially since the EV experience in China includes more than

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Brussels open session

In an open session, the Brussels participants suggested themes they wanted to explore further so that they could work together in groups to provide further insight on these areas. A summary of the questions and discussion insights follows:

1. What will boost commercialization of EVs?
   The group explored whether there are particular characteristics unique to the EV experience that can be marketed to certain consumer segments. The focus was on the business-to-consumer and business-to-business (B2B) segments.

   For the business-to-consumer segment, the key factors are fuel, environment and cost. Costs are still too high. Product differentiation is also an important issue that still remains to be addressed to improve consumer adoption. On the B2B side, taxation and regulatory involvement have an important impact on corporate adoption.

   The team concluded that price remains the overriding factor in the sale of EVs, which, from a marketing perspective, may be limiting. However, government policies and a number of entities, like municipalities, can help unlock the intangible value of the EV experience and enable sales to specific consumer segments.

2. Which grants and incentives are necessary, if any?
   From the team's perspective, incentives are indeed needed. But it is just as important to ensure incentives are invested in the right way as there is not yet 100% proof of success. The group also agreed that the industry should not be provided with too generous incentives, only enough to provide the right stimuli. Fees and soft incentives were discussed, such as parking fees or free parking for EVs, which can promote behavioral change.

   With regard to charging infrastructure, participants were convinced that incentives were needed not only at the country level, but also at the European level, and that the European Commission should also provide funding to accelerate deployment of charging infrastructure.

   The team also concluded that there should be a “phase-out” period for incentives so the market can adapt while governments withdraw the incentives. In the past, sudden withdrawals have destroyed entire development processes and have been counterproductive. Therefore, it is important to get the timing of incentives right.

3. Grid reliability – What should the new solutions or products be from the utilities’ point of view?
   This group described a real case study from one of its team members in which a corporation invested in a combined heat and power (CHP) plant and channeled the electricity into charging its corporate EV fleet. “From heat to EV” helped one facility save significant amounts of energy. This concept helped the group formulate a larger energy solution that included EVs.

   The team discussed other distributed generation ideas from which integrated systems for EVs could make use of renewable energy so the grid feeds into the EV but the EVs also feed back into the grid as offsite storage. However, the group acknowledged that there are many challenges in this regard, such as the high price, technical difficulties, non-standardization (i.e., too many different batteries), data sharing, information and modeling, variability across the grid and so forth.
4. Cities as EV customers – How do we market to cities?

Global cities try to solve problems with very little capital. Cities face a number of issues that could drive EV adoption, including infrastructure challenges, health, congestion, mobility integration, parking and noise control. Cities are large fleet owners and, inherently, mobility integrators.

The group asked, "If one could look at those challenges and monetize them, what would that look like?" It also noted that cities had a lot of underutilized assets, such as school bus fleets. To drive capital toward cities, the group suggested scaling up consortiums involving a large number of players, for example, infrastructure suppliers, utilities, real estate developers and a designated program manager, to create integrated solutions.

5. What are the criteria to determine the best locations for private investment in EVs in Europe?

The group identified three main criteria that would attract investment capital for EVs. First, the group discussed the importance of government as a strong advocate of electric mobility and whether it sees the longer-term potential for job creation and economic growth resulting from EV adoption, as well as whether the country has invested in the skills and capabilities need to establish EV infrastructure.

Second, one of the strongest indicators is the availability or impending availability of vehicles for the various customer segments. Vehicle availability is in turn affected by the presence of manufacturing facilities, regional mobility concepts being adopted, economic growth and consumer incomes.

The third criterion is a clustering effect where there are in-country investors and partners able to roll out and implement EV solutions. The team identified Copenhagen, Munich and Randstad as cities that meet these criteria.

20 million EV bikes and smaller light vehicles that are already on the road. Promoting EV adoption as a national policy priority, and with 20 major Chinese cities now implementing major EV initiatives, China may be able to establish a critical mass of EVs and set standards and protocols well ahead of the US. At the same time, developing standards country by country may hinder the establishment of global ones.

Brussels

While some of the key issues around range anxiety, including public awareness, navigation, compatibility, smaller time to charge and universal deployment, were discussed, the Brussels participants did not agree that range anxiety was a long-term problem.

They talked about the variety of charging experiences in Europe and recounted incidents of range problems due primarily to incompatibilities with EV-charging systems and hardware in different countries. Participants said that planning, organization and charging management are already part of the European EV driving experience and that range anxiety could be resolved with solutions that build on currently available systems.

European participants noted that over the past three years, players that traditionally didn't work together – such as automakers, utilities, charging companies and railways – are collaborating because no one company can control the entire value chain. Revenue opportunities have to be pursued jointly.

Resolving range anxiety

Participants noted several factors that suggest consumer range anxiety will not be a significant hindrance to EV adoption. For example, the average distance that people drive in Belgium or Germany is between 30 and 50 kilometers, so EVs have not had range problems. Corporate fleets, such as Ernst & Young's in Belgium, offer services to help employees who drive EVs to manage distances and charging. Moreover, experience shows that new EV drivers change their behaviors and get used to managing charging within two weeks' time. Public charging stations, at supermarkets, for example, may be good for marketing or psychological reasons, but most charging will take place at home and the office.

Business case for public charging

Yet there is still a business case for public charging, participants said, but it depends on the development of a sufficiently large market pool – one that doesn't exist at this early stage. Government must play an active role in developing the market pool by promoting EV technology adoption and charging-infrastructure investment.
Expanding the EV experience

Need for charging interoperability
Charging EVs today was compared with roaming in the early days of the mobile phone – it was expensive and didn’t work very well. This will likely be the scenario for EVs for the short term. The European Commission is developing a single European standard, but the industry must have the patience for the infrastructure-related issues to be resolved in the meantime. Once all of Europe is on a single charging standard, there will be even less reason for range anxiety.

Charging must be smart
For EVs to be part of a mobility solution, the vehicle must be able to communicate intelligently with the charging infrastructure. For example, when your battery is running low, it is not enough to know where the nearest charger is; there must also be an indication of whether the charger is currently unoccupied and available. Automakers, utilities and public charger providers must collaborate to enable the needed dynamic feedback between the car and the charging infrastructure, as well as other transport modes, in a mobility solution.

The longer-term challenge of the grid
Challenges remain in terms of developing a smarter grid infrastructure to accommodate charging during peak hours or to balance the power load. Fundamental questions remain about grid reliability, such as the degree to which fast charging during the day could cause problems for the grid. Participants emphasized a longer-term problem – the need for smart infrastructure in Europe and a wholly different utility network in place to enable it.
Stakeholder dynamics

EV deployments are taking place around the globe, yet successes and lessons learned are not being widely shared. Connecting the wider EV community to disseminate leading practices can speed deployment and help to avoid potential setbacks. So can creative partnerships across the EV value chain. Participants in Los Angeles and Brussels tackled these important questions:

- What can we learn from the knowledge-sharing practices of other industries?
- While the auto industry is global, EV experience tends to be very regional. How can we bridge this gap?
- Are there key stakeholders who need to be brought into the conversation? What new partnerships are needed?

Perspective from Los Angeles

Participants debated where the EV market was situated in its market evolution and what would be required to generate a disruptive leap, including the kinds of industry collaboration necessary.

While performance or technological issues have largely been resolved, cost and convenience challenges continue to prevent EVs from penetrating the larger conventional light-vehicle market.

In addition, participants viewed EVs as being in the “trough of disillusionment,” the period in Gartner’s “Hype Cycle for Emerging Technologies” between the “peak of inflated expectations” and the “slope of enlightenment.” In this period, the disappointment with a technology causes it to become unfashionable and it begins to receive negative press coverage where it was once hyped.

Therefore, the players in the industry should find ways to work together to advance EVs to the next stage of development and broaden the market. Debate hinged on the best way to pursue collaboration – through small groups working on proprietary offerings or through an open, standards-based approach.

Small groups can disrupt

Some participants maintained that “small groups can disrupt at great scale,” arguing that groups of traditionally non-aligned stakeholders working together with a profit motive are best suited for driving disruptive change. For example, while a single company would be hard pressed to create disruptive change in the automotive industry, a set of car manufacturers, battery makers and utilities – a group with deep pockets – could do so. Fleet managers, charging companies, energy management companies and utilities are another group that could draw on their diverse resources and expertise to create a disruptive solution.

Standards and interoperability are also important

Other participants maintained that while small groups of stakeholders can make leaps in innovation, when it comes to developing standards and establishing a platform for charging infrastructure, broad collaboration would be critical to ensure interoperability across the EV infrastructure. If the EV ecosystem is to supports larger mobility solutions, such as car sharing, battery sharing and wireless charging, broad-based industry collaboration is required.

The emerging EV ecosystem

The EV industry has typically focused on the consumer, but a larger ecosystem with different stakeholders is starting to take shape, and the role of EVs may change within a wider transportation context.
In the larger context of shifting mobility trends, other business models tied to the EV experience may disrupt the EV market. Connectivity platforms, standard payment systems, car swapping, battery swapping, wireless charging, public transportation fleets, or natural gas fleets are all scenarios that participants suggested could completely change the cost-benefit structure and the EV experience.

**Fleet ricochet effect**

The fleet experience, in particular, could provide an important testing ground because the cost expectations, return on investment calculations and capital needs are more straightforward. Fleet managers purchase vehicles on the basis of total cost of ownership and typically run their vehicles on predictable routes, which can make EVs an advantageous choice. Success in the fleet market may well have a positive ricochet effect onto the mass market by helping to raise awareness of EV technology and reduce costs as the EV supply chain achieves economies of scale. Fleet managers could also work with utilities and local authorities to develop effective approaches to charging and infrastructure build-out. Finally, consumers’ confidence in EV technology will be enhanced when they see EVs bearing the logos of trusted brands on the roads and highways.

**Education and knowledge**

The need for knowledge sharing and expanding education across stakeholder categories continued to be a recurring theme, given that knowledge, experience and expertise are scattered globally throughout the EV community. The experts gathered at the Los Angeles roundtable said they gathered market information through a variety of mechanisms because there is no authoritative clearinghouse for EV industry information. The group also realized that establishing a common language and framework for talking about the industry, as well as improving communications among different communities, could in itself be a significant way to “disrupt” the market.

**Brussels**

Rather than focusing on disruption, the Brussels session participants focused on the EV partnerships and collaborations that have been the most effective, including those led by the European Commission and iMove. The discussion highlighted the many problems beyond infrastructure, such as interoperability and the need for different corporate segments to engage.

Early experience in the EV market showed a proprietary dynamic. As EVs enter a second phase, companies and sectors are shifting to a much more open system where charge-point providers or manufacturers provide an essentially open platform in which it does (continued, page 28)
Graphic recording of Ignition Session discussion on “Stakeholder dynamics,” drawn by Kathy Evans of Grove International
not matter which company or software the EV consumer interfaces with. Leasing companies and government were also cited as important stakeholders to collaborate with.

**Collaborations on standards**

Participants recognized that, like any new technology, the market would have some diversity at the beginning. But they said collaboration on standards was the key to moving the industry forward. There has already been some work in the EU on EV technology standardization, and while more remains to be done, participants viewed establishing standards for the practical dimensions of charging equipment (plugs, sockets and others) to be easy over time.

Problems with standardization often come from lack of communication as standards for the same technology are developed in different ways as a result of separate efforts in different parts of the world. Therefore, many collaborating organizations “reinvent the wheel” in terms of standards. Consequently, participants pointed to the need for a global clearinghouse or database of information on EV standards in development. Participants also noted that even at the local level, standardization initiatives often take place without linkages among them, exacerbating the challenge of standard-setting around the world.

The European participants didn’t see an inherent conflict between the small-group approach articulated in Los Angeles and open standards development. Openness, especially around technology, could actually stifle innovation; there is only so much one can share as companies need to retain proprietary value for themselves. Companies must determine together what can be standardized and shared to provide a platform for innovation and what should be kept proprietary to promote innovation and value creation.

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**Los Angeles action agenda**

At the end of the Los Angeles session, participants were invited to make recommendations for expanding the EV experience. Below are selected suggestions.

- Move from tax credits to rebates at purchase to reduce the price barrier
- Offer more non-financial incentives, such as free or better parking, priority traffic lanes, waiving tolls or city congestion charges and accelerated vehicle licensing
- Attack paralysis in the creation of standards by focusing on residential charging where the majority of charging will occur
- Increase the price of gasoline in the US to provide a business case for massive investment
- Develop financing structures that allow buying the car but leasing the battery to reduce the potential impact of battery technology risk
- Engage a creative consumer marketing firm to develop new messaging
- Create a database of EV ambassadors, independent individuals who can talk about the EV ownership experience
- Open the technology protocols aboard the car to create an application opportunity
- Empower cities to control the types of vehicles allowed in their centers and give priority to EVs
- Ensure that opinion leaders experience EVs to demonstrate to them that the EV market works and enlist them as evangelists
- Create a “smart room” where policymakers and industry representatives could come together to solve EV-related issues
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