



**BAIN & COMPANY**

## **Automotive Electrified: Time for Action – Now!**

Key results of a  
Bain & Company study





# Automotive Electrified: Time for Action – Now!

## Summary:

- Electric vehicles powered by batteries will play an important role in the future portfolio of automobile manufacturers. They are responding to increasing customer demand for urban transportation options
- Electric vehicles have two major advantages - the low cost of operating and lack of emissions
- Their current technology-driven restrictions, including limited range, recharging times and battery cost, need to be considered for successful commercialization
- A global study by Bain & Company has identified a new and sizable "Premium 2.0" customer segment (see box at the right). These customers already are interested in purchasing an electric vehicle, often in addition to their current car
- "Premium 2.0" customers have significant purchasing power and thus lower price sensitivity, are open to new technologies, and are environmentally conscious. Demand from this segment already totals over 350,000 electric cars annually
- Battery prices are expected to fall in the mid-to-long term, paving the way for lower-priced vehicles that attract new and larger customer segments
- The auto industry must take the following steps in order to capture the potential market:
  - Manufacturers must articulate a clear "Electric Vehicle Strategy", define their role in the new value chain as well as the role of their suppliers and partners and quickly establish new processes for developing electric car products with strong consumer appeal
  - Suppliers must decide where they should position themselves in the new value chain and decide which technologies to invest in. They must gain knowledge and develop capabilities in new areas – such as battery chemistry – in order to overtake the competition

Bain & Company's global electric-vehicle study is based on primary market research comprising more than 4,000 consumer interviews in all relevant markets. These included the USA, Europe's four largest markets, China, Japan and South Korea. These interviews were carried out in the third quarter of 2008. The study describes future customer segments and their affinity to electric vehicles. The price sensitivity of the individual segments and the resulting market potential, were determined by using cutting-edge market research methods.

In addition, based on numerous interviews with experts from manufacturers, suppliers and research institutes the study describes which steps of the value chain manufacturers and suppliers need to master in order to attain the full potential of this game-changing new technology.



# Automotive Electrified: Time for Action – Now!

**Electric vehicles will play a crucial role in future urban mobility. Consumers' opinions and behavior have started to change fundamentally**

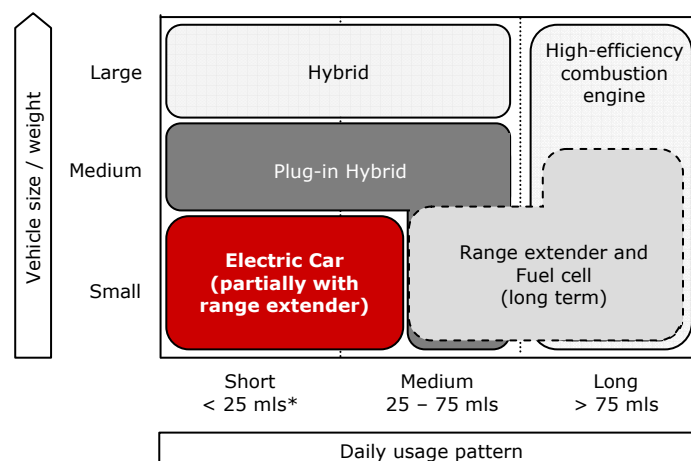
One of the most important and hotly debated questions in the automotive industry today is which powertrain technology will dominate in the future. The outcome is surrounded by uncertainty. Volatile gasoline prices, carbon dioxide-based taxation, and increasing environmental awareness are fundamentally changing consumers' attitudes and behavior. Individual transportation needs – and aspirations – are increasingly important in the actual purchasing decision.

Successful automakers will need a range of powertrain technologies to meet different consumer needs. In addition to new, highly efficient combustion engines and various hybrid electric systems, the pure electric car – in some cases supplemented by a small-sized combustion engine to charge the battery as a "range extender" – will play a significant role. Electric vehicles will fill a niche, particularly in urban transportation (see picture below).

Electric vehicles currently are constrained by their batteries, which today carry some technological restrictions: a maximum mileage range of about 120 miles, heavy weight, and limited ability for quick recharges. However, since 80 percent of US-American cars are driven less than 50 miles per day, it's clear that the constraints are not necessarily category killers in the U.S. With limited volumes of high-performance batteries being produced in the near future, their cost of approximately € 10,000 is still highly prohibitive. That means that for the short term, electric cars can only be profitable in a premium price category.

Automakers need to answer some key questions: Does substantial demand for electric vehicles exist already? If so, who are the consumers and what do they really want? Bain's global market research study provides answers to these and other key questions that lead to practical actions.

## The powertrain of the future: No dominant technology; rather, a portfolio of diverse powertrain technologies in parallel



Note: \* 70% of Europeans drive less than 25 miles per day; 80% of US-Americans drive less than 50 miles per day  
Source: Bain



# Automotive Electrified: Time for Action – Now!

## Premium 2.0 consumers are setting new standards in mobility: The electric vehicle as a second car – dynamic, clean and cool

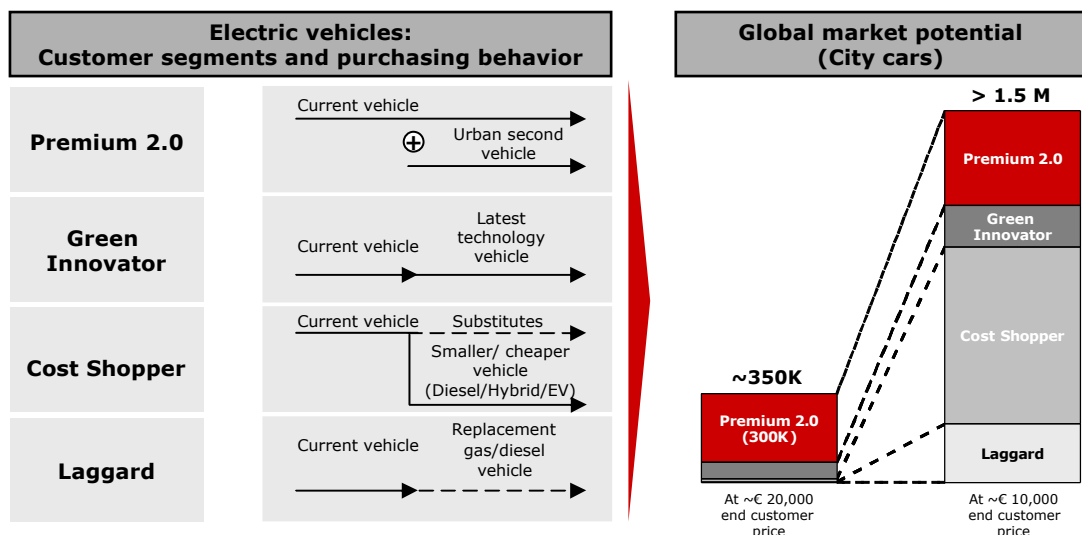
Bain's research found customer segments with varying affinity to electric vehicles in several countries. One segment, the Premium 2.0 consumer, strives to achieve what we call "eco-prestige". They are willing to trade the limited range and recharging times of today's electric cars for what they consider a larger good: a cleaner environment and the opportunity to articulate a clear and differentiated statement to the community.

Typically, today's Premium 2.0 consumers drive premium brands and are relatively affluent. They are looking for eco-friendly alternatives for urban transportation that distinguish them from mainstream drivers. Many of them use a second car for urban driving (see box below). The electric vehicle is an excellent fit for their needs and, more importantly, it fits their aspirations to be viewed as highly innovative. Silent, emission-free vehicles that are cool and distinctive are what Premium 2.0 consumers want. And they are prepared to pay a premium price for this experience.

Other customer segments will follow their lead as prices of electric vehicles fall. Actual market penetration in the next decade is dependent on a number of factors that cannot be predicted as of now. But they can be simulated in scenarios. In the likely case for electric-vehicle development, battery cost will fall significantly as new materials are developed. Manufacturing will be automated and economies of scale will kick in. The price of oil and petroleum-based fuels will increase, at least in the long run. We also believe that recent developments, such as the dramatic drop in oil prices at the end of 2008, will not change the new mindset of conservation among most consumers, who feel a commitment to the environment and view themselves as trendsetters. In this market, the electric car business case will pay off sooner than later.

Regardless of how long exactly it takes to arrive, the electric car will play a significant role in urban transit and increasingly put its stamp on metropolitan areas.

### A market for electric vehicles already exists today



Note: Global defined as D, UK, IT, FR, USA, Japan, Korea, China; EV energy use 12.5 kWh/60 mls.  
Source: Bain primary market research (conjoint analysis)



# Automotive Electrified: Time for Action – Now!

## A market totaling as many as 350,000 electric vehicles in metropolitan areas already exists. Potential consumers are particularly interested in premium brands

Many automobile manufacturers already recognize the potential of electric vehicles and have invested in limited programs. Some are even testing small fleets of electric vehicles in the field or are close to doing so. The primary goal of these pilots has largely been to raise awareness of electric mobility in the media, while simultaneously gaining technological and consumer insights. But the larger question remains unanswered: When is the right time for full-scale production? The Bain study provides a clear answer: Now!

Our market research indicates existing consumer demand for more than 350,000 electric vehicles per year. At the outset, this market will be dominated by Premium 2.0 consumers, who will act as trendsetters. To sell effectively to this customer segment, auto companies must have thorough understanding of their specific needs. Based on our findings, these consumers say they want to make a statement with their electric car. The design of these electric vehicles must therefore be cool and distinctive enough to appeal to these consumers.

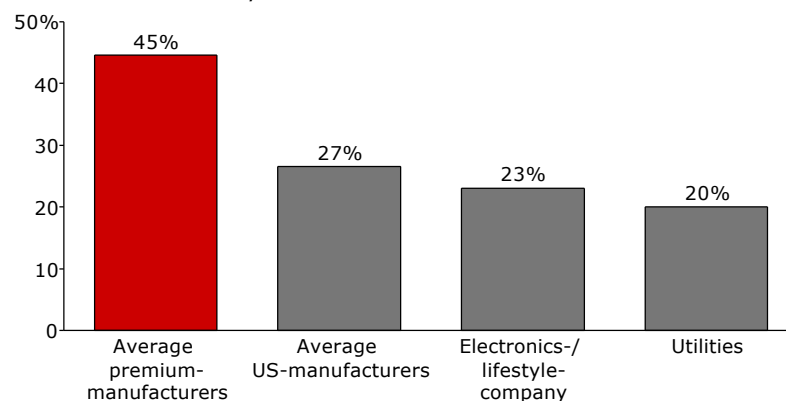
An existing car design with an electric motor installed won't pull them in.

Our market research also looked at which manufacturers these selective consumers would be most likely to buy an electric car from: In the U.S., the findings are especially relevant for premium-car manufacturers, as 45 percent of those surveyed thought that these brands were best positioned (see box below). In other words, consumers believe in the innovative power of Mercedes, BMW, Audi and Lexus.

However, some mass manufacturers are also beginning to compete for the Premium 2.0 consumers: Mitsubishi, VW, Nissan, and Toyota and Chevrolet are likely to launch electric vehicles in the near future. That creates a real threat to premium manufacturers that delay. The reason: a satisfied Toyota electric-vehicle customer might be more likely to buy a Lexus-hybrid model when replacing her primary premium vehicle.

### Premium manufacturers are well-positioned

Would you buy an electric vehicle from these firms today?



U.S., consolidated

Note: Detailed breakdowns by brand are available  
Source: Bain primary market research



# Automotive Electrified: Time for Action – Now!

## Many manufacturers will have to reinvent themselves – as current processes might not develop the right kind of electric vehicles

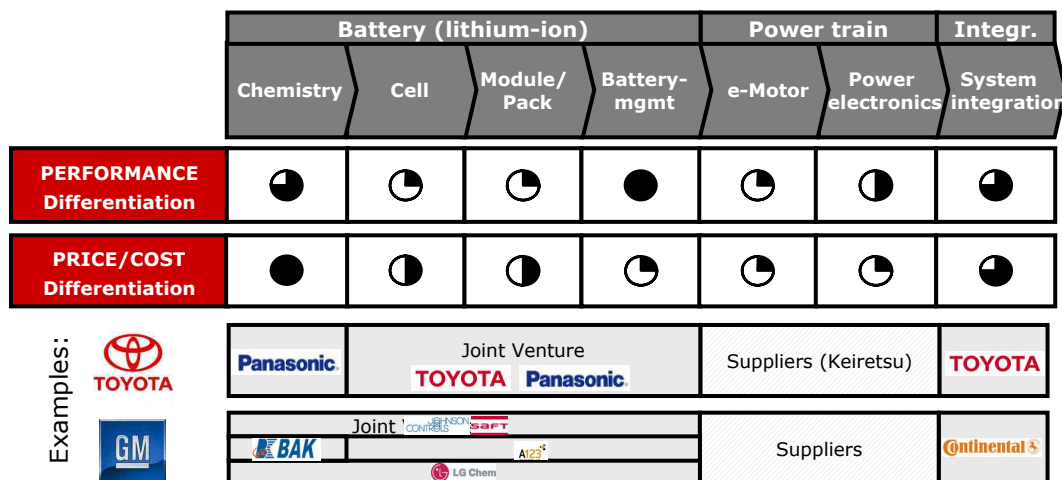
Established automobile manufacturers face some immediate hurdles to launching electric car production quickly. Ideally, near production-ready prototypes and limited series cars should be developed and ready to roll out in key urban markets. However, the standard processes at OEMs are primarily focused on constant refinements of their cars. Ironically, this admirable corporate trait could make some manufacturers too slow and inflexible to bring electric vehicles to market as quickly as the opportunity warrants. In addition, some manufacturers must overcome innate internal resistance to new technologies.

So far, only a handful of manufacturers have managed to overcome internal resistance, largely by using unconventional approaches to accelerate electric car launches. For example, smart has had a fleet of 100 electric cars on the streets of London since the beginning of 2008, and more cities will be added soon. Mini has started to lease 500 electric cars in California in early 2009. BMW and Daimler have abandoned their standard processes; they are testing prototype cars with consumers in the field to quickly develop and gather insights.

Premium 2.0 consumers represent the ideal target group for such an approach. They are much like what the technology industry calls "heat seekers", or early adopters. For instance, Apple used a similar tactic to gather feedback from the first iPhone customers, which enabled immediate product improvements.

Beyond design considerations, as original equipment manufacturers confront completely new technologies, they must clarify which parts of the value chain they will own and which should be left to suppliers. In many cases, the best solution will be partnerships. OEMs will benefit from a focus on specific elements - those that offer the highest potential for differentiation (see box below). Battery manufacturers, in particular, are under strategic pressure to act. No OEM currently has sufficient competence over this core component of the electric car. In the interim, manufacturers are trying to stake claims to the necessary technology through co-operative agreements and joint ventures with new and traditional battery-system suppliers. Thus, creating winning partnerships is becoming a core capability for future success. Tomorrow's electric car market leaders will follow a well-defined roadmap, outlined on the next page.

### The battery: The engine of tomorrow



Source: Bain expert interviews

Potential for differentiation: ● Low ● High



# Automotive Electrified: Time for Action – Now!

**The opportunities are immense, along with the pressure on automobile manufacturers and suppliers to act quickly**

## **Top priorities for automakers:**

- Develop a consistent electric vehicle strategy that incorporates long-term product planning (platforms/powertrain) into the process
- Develop, decide and implement a partnering or acquisition strategy to ensure access to key components of the value chain early on
- Establish internal communications and training (particularly in research and development) to manage internal resistance and firmly integrate new technologies into the organization
- Determine new customer requirements and develop innovative products with distinctive appeal
- Create short-term projects outside of existing processes to bring products that serve the Premium 2.0 customer segment to market faster

## **Top priorities for suppliers:**

- Determine where and how to play in the electrification of the automobile industry
- Evaluate the mid-term risks in the supplier's product portfolio based on the changing demand structure (downsizing, electrification of the drive-train, new technologies and materials)
- Analyze risks and opportunities that grow out of supplier positioning in the new value chain for electric vehicles (build on their own capabilities, develop or acquire new technologies, position themselves as genuine partners of the automobile manufacturers)
- Search actively for collaborations and partnerships to build up new capabilities and to answer technological questions
- Develop a business plan for future investments in new areas such as battery chemistry or power and control electronics



# Bain & Company: Helping make companies more valuable



## Dr. Gregor Matthies

Partner; Head of Automotive Practice Europe  
Bain & Company, Munich  
[gregor.matthies@bain.com](mailto:gregor.matthies@bain.com)



## Dr. Klaus Stricker

Partner; Member of Automotive Practice  
Bain & Company, Frankfurt  
[klaus.stricker@bain.com](mailto:klaus.stricker@bain.com)



## Toshiya Imai

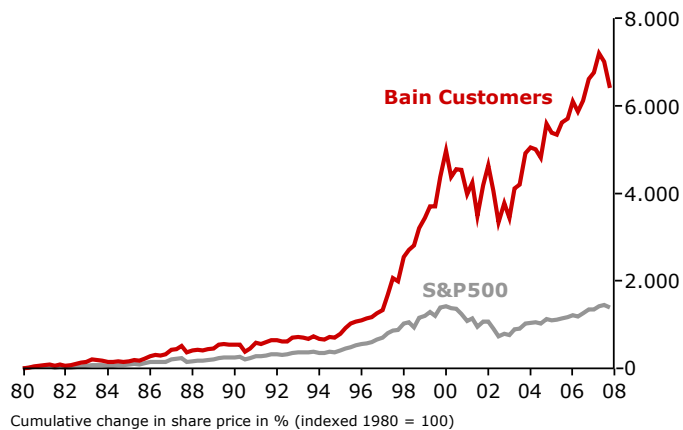
Partner; Head of Automotive Practice Asia  
Bain & Company, Tokyo  
[toshiya.imai@bain.com](mailto:toshiya.imai@bain.com)



In cooperation with:

**Dr. Jan Traenckner**, VentureCheck Company, Munich  
[jan.traenckner@venturecheck.com](mailto:jan.traenckner@venturecheck.com)

### We measure our success by our clients' results



### Bain & Company

Strategic consulting, operational implementation, measurable results. Bain & Company has become one of the leading global business consulting firms by using this entrepreneurial approach. We work together with our clients to realize competitive advantages and increase the value of their firms. Bain has rigorously measured its financial impact on its clients since 1973. We have served over 3,900 global clients ranging from medium-sized businesses to global multinationals. Bain employs 4,300 consultants in 39 offices spread over 26 countries, of which 430 work in the German-speaking area.

Bain & Company Germany, Inc.  
Karlsplatz 1  
80335 Munich  
Tel. +49 (0) 89 51 23 0  
[www.bain.de](http://www.bain.de)

Bain & Company Germany, Inc.  
Mönchenwerther Str. 11  
40545 Düsseldorf  
Tel. +49 (0) 211 424 76 0  
[www.bain.de](http://www.bain.de)

Bain & Company Germany, Inc.  
Bockenheimer Landstr. 24  
60323 Frankfurt am Main  
Tel. +49 (0) 69 667 778 0  
[www.bain.de](http://www.bain.de)

Bain & Company Switzerland, Inc.  
Rotbuchstr. 46  
8037 Zürich  
Tel. +41 (0) 44 360 860 0  
[www.bain-company.ch](http://www.bain-company.ch)

#### Publisher:

Bain & Company,  
Germany/Switzerland

#### Responsible Partner:

Dr. Gregor Matthies

#### Contact:

Leila Kunstmann-Seik,  
Marketing and Communications