



GLOBAL ELECTRIC MOTORCARS

A Chrysler Company

Ten Years in the NEV Business – the Top 10 Success Factors

by
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Global Electric Motorcars

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History of Global Electric Motorcars

December 2000: DaimlerChrysler Corporation purchases Global Electric Motorcars.

February 2002: Global Electric Motorcars moves into its 135,000 square foot assembly plant and headquarters

April 2004: Global Electric Motorcars introduces its redesigned, automotive-engineered 2005 model year line of products

June 2005: Distribution in Europe begins after GEM receives ISO 9001:2000 Registration.

April 2006: Global Electric Motorcars introduces new e6 six-passenger model for sale mainly in the U.S.

October 2006: Global Electric Motorcars launches 2007 MY products including new eL XD (extra-duty long bed utility) model.

January 2007: GEM vehicles reach the 150 million miles driven mark.

August 2007: Global Electric Motorcars and Chrysler receive the Blue Sky Merit Award.



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Today

- Over 35,000 GEM vehicles in service in the U.S.
- Over 1,000 GEM vehicles in service in Western Europe and Asia
- Growing at a rate of approximately 4,000 vehicles per year
- Over 150 million zero emission miles driven and growing at an additional 50 million zero emission miles per year resulting in:
 - Over 4 million gallons of gas not consumed per year, and
 - Over 20 tons of ozone precursors (Nox and NMOG) eliminated per year
- Selling six models worldwide



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GEM's 2008 NEV Products



e2



e4



e6



eS



eL



eLXD



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**GEM vehicles are
Neighborhood Electric Vehicles (NEVs)
that provide clean, efficient transportation
for communities and fleets!**



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NEVs – By Definition

Low-speed neighborhood electric vehicles are designed to meet specific government standards in speed and safety for on-road use.

Required safety equipment:

- Safety glass windshield
- Lights
 - Head, tail, stop, turn
- Class 1 or 2 seat belts
- Brakes (service and emergency)
- 2 rear view mirrors
- Reflectors



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Technical & Performance Specifications

- Safety

- Three point safety belts
- 10-inch, 12-inch, or 13-inch street-rated tires
- Quartz-halogen headlamps with a 20-second delay after vehicle is turned off, front and rear turn signals, high-mount rear brake and taillights, front and rear reflectors
- Laminated, tinted automotive safety glass with windshield wiper
- Front disk and rear drum with integral cable-pull parking brake
- Rearview interior and dual exterior mirrors (driver's side standard, passenger side optional)



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Technical & Performance Specifications

- Design

- The GEM e2, eS, eL and eL XD seat two occupants with bench-style seating using molded-foam cushions covered by marine grade UV-stable vinyl coverings
- The GEM e4 seats four occupants with front bucket seats and a rear bench seat
- The GEM e6 seats six occupants with front and middle-row bucket seats and a rear bench seat
- Dual A-arm front independent suspension with coil over shock; rear trailing arm, solid rear axle with coil over shock suspension
- Automotive rack-and-pinion manual steering
- Aluminum space frame with custom alloys and extruded cross-section, clad with molded-in color thermoplastic body panels



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Technical & Performance Specifications

- Electric Powertrain Technology

- Heavy-duty DC (brush-type motor with continuous 5 (or 7*) horsepower rating and 12 (or 15*) horsepower peak during acceleration and hill climbing
- Solid-state custom motor controller with under and over voltage detector, regenerative braking, motor thermal protection and top speed regulation
- Front wheel drive with fixed gear ratio speed reducer having an integral differential
- Battery pack: Six 12-volt flooded-electrolyte batteries are standard on GEM e2, e4, eS, and eL; six 12-volt maintenance-free gel batteries are standard on the GEM e6 (optional on e2, e4, eS, and eL); nine 8-volt maintenance-free gel batteries are standard on GEM e6 with "S" Package and GEM eL XD
- On-board 72-volt DC charger that plugs into standard 110-volt AC 15-amp outlet with GEM-proprietary battery charging algorithm for extended daily range and battery life



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* Applicable on e6 and eL XD models





Technical & Performance Specifications

- Typical Performance

- Up to 30 miles driving range with six batteries (40 miles with nine batteries), but this is dependent on driving style, ambient temperature and payload
- Up to 8 hours to recharge batteries from the on-board charger from totally depleted pack; 45 minutes to 80% capacity with optional off-board fast-charger
- Top speed regulated to 24.5 mph (± 0.5 mph) in “road” range; 15 mph top speed in “turf” mode
- At least 5 mph up 30% grade at design GVW



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Options Available (Model Dependent)

- Clip-on rear cargo carriers
- Hard, soft-canvas, and framed-canvas doors
- Heated seats
- Heater/defogger
- AM/FM/CD system
- Vehicle and bed covers
- Police and patrol options
- Interior lights and accessory plugs
- Maintenance-free batteries
- Chrome and aluminum wheels
- Automobility options
- Chassis cab available for other conversion options



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U.S. Sales Outlets are Primarily Chrysler, Jeep, and Dodge Dealers



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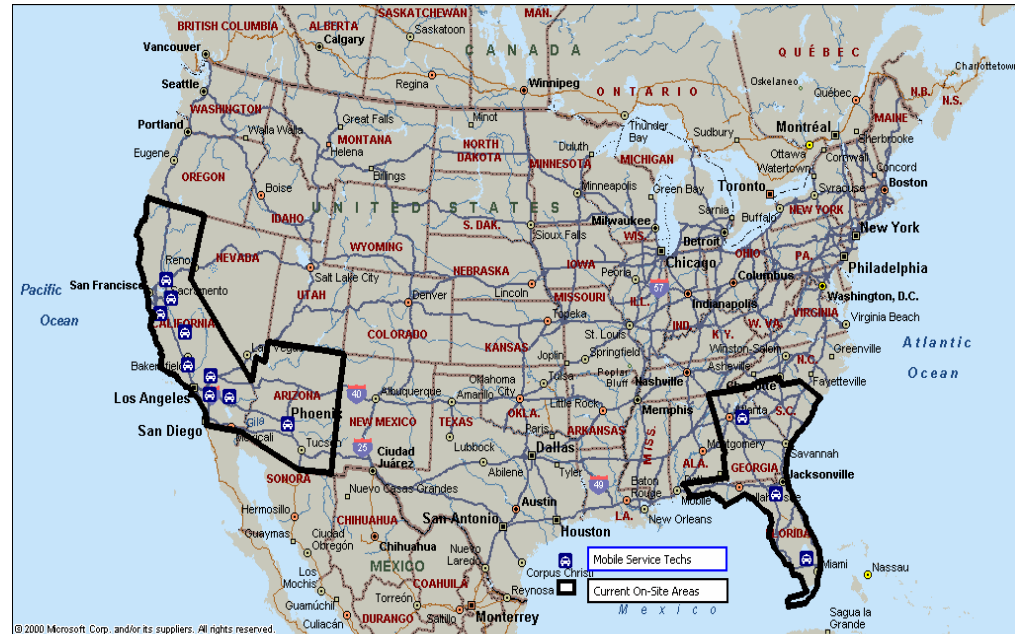
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GEM Service & Warranty

- “On-site” service by NEV Service, LLC (outlined regions) or Royal Administrative Services, LLC (all other regions) and at some dealers
- All GEM vehicles come with a 12-month limited warranty and optional extended service plans for an additional 12- or 24- months of warranty coverage



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GEM Customers

- Master-Planned Communities
- U.S. Military
- Other Federal Fleets
- State and Local Governments
- College, Industrial and Medical Campuses
- Airports
- Rental Fleets
- Resorts and Amusement Parks



Annual Cost Benefits and Total Cost of Ownership

- Visit the “Affordability” page on www.gemcar.com to calculate the annual cost benefits and total cost of ownership associated with owning a GEM vehicle
 - The following examples illustrate the annual cost savings realized by driving a GEM vehicle

GEM vs. Mid-size Gas Powered Vehicle

HOW MUCH CAN YOU SAVE?

Cost per KWH: If Other

Average Weekly Mileage:

Miles per Gallon:

Cost of Gas in Your Area:

HOW MUCH CAN YOU SAVE?

Cost to run your GEM electric vehicle per year:
\$23.92

Cost to run your gas powered vehicle per year:
\$130.00

Total Cost Savings: \$106.08



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Estimated Total Cost of Ownership (Over a three-year period, driving a total of 3,600 miles)

Owning a GEM Vehicle		Owning a Combustion Engine Vehicle	
Vehicle Cost	\$ 7,500.00	Vehicle Cost	\$ 20,000.00
Insurance	\$ 900.00	Insurance	\$ 3,000.00
Electricity	\$ 90.00	Fuel	\$ 450.00
		Maintenance**	\$ 120.00
Subtotal	\$ 8,490.00	Subtotal	\$ 23,570.00
Residual	-\$ 4,000.00	Residual	-\$ 10,000.00
Cost of Ownership	\$ 4,490.00	Cost of Ownership	\$ 13,570.00

Cost of Ownership based on base model GEM e2 Vehicle

* Average cost based on independent research

** Average cost based on manufacturer's recommended maintenance schedule



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Ten Years in the NEV Business: The Top 10 Success Factors



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Ten Years in the NEV Business: The Top 10 Success Factors

#10: Understand the NEV (and adjacent) marketplace, customer needs and missions and where they are going

#9: Use automotive industry experience, practices and resources

#8: Develop the right products with appropriate technology for the mission (s) of the NEV (and beyond)

#7: Sell through a capable, respected and properly located automotive dealership network

#6: Have and use a global perspective on everything



Ten Years in the NEV Business: The Top 10 Success Factors

#5: Provide On-site Service

#4: Never be satisfied. Continuously improve in every facet of the business

#3: Hire/retain dedicated, motivated and skilled employees

#2: Understand and respect (even fear) your competition

#1: Above all, treat customers like royalty



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#10: Understand the NEV (and adjacent) marketplace, customer needs and missions and where they are going

Customer has to be able to get to their destination and back, or they will not purchase

- 'Destination' is different for every customer
- Recreational outings around the neighborhood, transportation that must get them to school and back, or work and back, etc.
- What the product looks like, how expensive or inexpensive it is, whether or not it has no tail pipe emissions, etc – ultimately it's a transportation solution and if the product is not able to get from Point A to Point B, and back, the customer will likely not purchase the product

Other customer needs might include doors, or no-doors, heat in the vehicle, a utility bed on the back of the vehicle, cargo space, a specific color, etc.

- Have been resistant to look too 'car like'
- Limitations to meeting customer needs by limiting the number of options that can be added to the car-looking vehicle



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#9: Use automotive industry experience, practices and resources

With the acquisition of GEM by DaimlerChrysler in December 2000, GEM immediately gained years and years of experience in the Automotive industry

- Advanced product engineering and design resources
- Legal and regulatory resources
- Access to over 4,000 Dodge, Chrysler and Jeep dealers

Design, engineering and procurement processes significantly improved with introduction of GEM Development System (modeled after the Chrysler Development System “CDS”)

- Sign-off at strategic ‘control points’ in the development process allowed for the development and executive sign-off of the business case, product design and procurement and scheduled product endurance testing (again modeled after the CDS) at Chrysler’s Arizona Proving Grounds
- End result was higher quality vehicles, lower warranty costs per vehicle and greater customer satisfaction



#8: Develop the right products with appropriate technology for the mission (s) of the NEV (and beyond)

Prior to Chrysler, GEM was successful in introducing the 72volt e2, e4, eS, and eL models in about one-years time

- Products of decent overall quality; the design, engineering and procurement of components largely configured with components used in original 48-volt 2-passenger model; minimal focus on vehicle symmetry and overall product performance
- Vehicles were assembled in a 41,000 square foot building and wheels had to be assembled on the vehicles, so they could be pushed or pulled to the next assembly station
- After acquisition, GEM moved to 135,000 square foot facility with a 21-carrier conveyor and manipulators that allowed up to 250 vehicles per day to be produced in two shifts
- During calendar year 2006 both the e6 – 6-passenger and the eL XD – ‘extra duty’ eL were added to the lineup of GEM vehicles based on customer need



Improvement to the battery system, that is, the algorithms in the battery charger and selecting the very best batteries for neighborhood electric vehicles





#7: Sell through a capable, respected and properly located automotive dealership network

With the acquisition of GEM by DaimlerChrysler in December 2000, GEM immediately gained access to Dodge, Chrysler and Jeep dealers across the United States

- Without direct access to NEV markets that provide for NEV capable destinations, dealers are not likely to be successful in selling GEM vehicles
- The dealer either has to deliver the vehicle to the customer, or the customer has to provide a trailer
- Ability to deliver the product to the customer's home or business



#6: Have and use a global perspective on everything

In April 2005, GEM produced and shipped its first container load of homologated vehicles to Europe. GEMs were also being sold through a distributor in Thailand

- Global business strategy with the goal of growing its sales markets worldwide
- Procuring components from suppliers around the world provides for access to lower cost components that help ensure that product prices to customers will remain competitive



#5: Provide On-site Service

Unlike conventional vehicles, when a GEM customer's vehicle requires service, the customer is often not able to drive their GEM vehicle to the dealership for service.

- GEM has strategically committed to providing mobile service to its customers
- GEM dealer network
- GEM's mobile and customer service subsidiary, NEV Service, LLC wherein trained GEM certified NEV Service technicians go to the customers location and service the vehicles



#4: Never be satisfied – Continuously improve in every facet of the business

The first GEM 2-passenger vehicle rolled off the assembly line in April of 1998

- Painted fiberglass body, a 48-volt system, and a hodge-podge of golf cart, industrial vehicle, and automotive components
- Today, six distinct GEM models, all 72-volts, with ABS, acrylic coated color bodies, with components designed, tested and installed with both price and quality in mind

Original GEM assembly and headquarters facility was a converted 40,000 square foot hardware store

- Wheels had to be installed on the vehicles to move them to the next assembly station
- Today, GEM occupies a 135,000 square foot facility with a 21-carrier conveyor system and corresponding ergonomic manipulators, and GEM received its ISO 9001:2000 certification in June 2005



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#4 continued: Never be satisfied – Continuously improve in every facet of the business

There has also been a great evolution of the GEM vehicle marked with advances in technology, performance, and efficiency with GEM Development System (GDS)

- design, engineering, marketing and service were all organized in a series of 'decision control gates'
- require specific deliverables before the next stage of vehicle development can begin

First 'offspring' of the GDS occurred in April 2004 when GEM introduced its 2005 model year line-up of redesigned, engineered and tested automotive vehicles

- digital driver information display
- double-wishbone front suspension
- regenerative braking



#4 continued: Never be satisfied – Continuously improve in every facet of the business

Improvements in technology and performance provide for more efficient, convenient and reliable vehicle performance.

- Improved steering effort
- Increased vehicle range
- Greater payload capacity
- Three door options including 'hard doors', soft doors, and framed canvas doors
- An improved heater/defogger and
- Heated seats



#3: Hire/retain dedicated, motivated and skilled employees

During GEMs 10 years in business, we have been fortunate to find dedicated, motivated and skilled employees in all departments of responsibility

- Professionals that accept the challenges that come with working for a start up business and the complexity of creating an industry
- Mentality of start up employee requires a 'risk-taker' personality

When GEM was created in 1997, most of the employees were friends, family and acquaintances of the original owner of GEM

- The trend has been to hire more experienced, educated resources to the team
- Bottom line is that the NEV business continues to be a tough, competitive business and it takes a tough, smart, competitive resource team for the Company to be successful



#2: Understand and respect (even fear) your competition

Now that GEM has been in the business ten years and counting, we are experiencing more competition in the NEV market

- In spite of our success over the last ten years, we continue to strive to understand and respect the competition
- We ourselves can then continue to be successful in the global marketplace



#1: Above all, treat customers like royalty

In our business, there are virtually three customers

- The purchaser of our vehicles
- The dealer that sells the product to the customer
- Our employees who make certain that both the needs of the purchaser and the selling dealer are met or exceeded

We understand that in order to continue to be successful business that above all, we must continue to treat our customers like royalty.



Contact Us

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