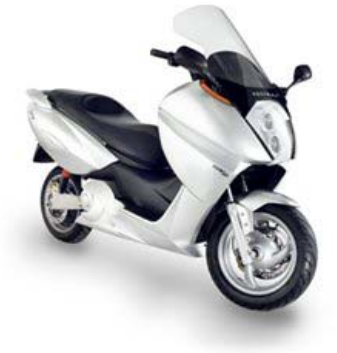

The revolution in urban transportation

PRODUCT

GreenGo! is the first advanced zero-emission, battery-powered maxiscooter that offers performance comparable to gas-powered maxiscooters.

With a top speed of over 60 mph, rapid acceleration (0-50 mph in 6.8 seconds), a range of up to 70 miles, two hours to recharge and a great handling, GreenGo redefines electric-vehicle performance. Due to the low costs of maintenance, registration tax and insurance, GreenGo offers urban commuters a cleaner, quieter and lower lifetime cost alternative to traditional gas scooters.

COMPANY PROFILE

HISTORY

Vectrix Corporation was formed in 1996 to develop, test and commercialize advanced, Zero Emission Vehicle(ZEV) platform technologies focused on 2-wheel applications.

Vectrix'management team, comprised of Andrew MacGowan, Carlo Di Biagio, Chritopher Moe and Peter Hughes has a proven track record in the motorcycle, aerospace and alternative energy industries. Strategic development partners include Parker Hannifin, Alcoa, Getrag Gears, Giner, Gold Peak Batteries, Lockheed Martin and ROBRADY design. The company has been awarded 6 U.S. patents (including a patent for a Fuel Cell/Electric Hybrid design).

The company is headquartered in Newport RI, with an engineering and test facility in New Bedford, MA.

In 2004, Carlo Di Biagio, former C.E.O. of Ducati, created Vectrix Europe in Rome, Italy, to launch GreenGo in Europe starting from 2005.

Initial distribution is planned for selected cities in Europe, as Rome, London, Milan, Florence, Paris, Berlin e Frankfurt and will be extended in 2006 in North America (New York, Los Angeles, San Francisco and Miami).

VISION/MISSION

Vectrix Corporation is dedicated to developing and commercializing advanced technologies that will make the use of zero-emission, electrically powered motor scooters practical and affordable.

Vectrix firmly believes that the increasing personal mobility throughout the world does not have to come at the expense of air and noise pollution. It also believes that sustainable mobility is not only achievable in the future, but is a near term reality thanks to Zero Emission Vehicles.

Demand for Vectrix's products and technologies will be strong as countries around the globe strive to reduce air and noise pollution, traffic congestion and fossil fuel consumption.

Vectrix's immediate goal is to launch a high-performance, long-range and affordable zero-emission executive scooter, that offers comparable performance to gas-powered maxiscooters.

Long term, Vectrix plans to expand its interest and develop environmentally sensitive technologies for other transportation applications.

TECHNOLOGY

GreenGo is different in almost every way from a traditional gas scooter/motorcycle.

The innovative design of the scooter focuses on achieving extended range and high performance through weight reduction, digital circuitry, low aerodynamic drag, and minimal friction.

GreenGo incorporates relatively few parts (250 vs. 2,500 for a gas scooter), resulting in reduced production costs and minimal maintenance.

LIGHTWEIGHT ALUMINUM FRAME

The lightweight, welded, aluminum frame, jointly developed by Lockheed Martin Advanced Structures and Alcoa Automotive Research Group, provides structural integrity for the scooter as well as space and protection for the battery pack. The stiff construction provides accurate wheel alignment and superior handling. The aluminum frame has been subjected to stringent testing of its ability to withstand extreme conditions it may encounter during its life.

DC BRUSHLESS MOTOR

The Vectrix drive train technology features an advanced brushless DC motor designed and engineered specifically for Vectrix by Compumotor, a division of Parker Hannifin, and will be supplied by Parker Hannifin's Division SBC in Milan, Italy.

The custom DC motor is lightweight, efficient and designed for optimum performance and low cost. The DC motor converts stored energy in the battery pack to drive the scooter's rear wheel through a single-stage planetary gearbox.

INTEGRATED REAR WHEEL GEARBOX AND MOTOR

The single-stage, planetary gearbox represents one of the most unique features of the Vectrix drive train technology. The gearbox, prototyped by Gertrag Gears, N.A. (exclusive suppliers of manual transmissions to Audi, Porsche, and Mercedes Benz), is integrated into the rear wheel of the scooter and provides a highly efficient gear reduction between the motor shaft and the road surface.

The integrated gearbox and electric motor provide effortless motion at all speeds, with no gear shifting required. The unit is sealed and permanently lubricated, requiring no maintenance for the expected life of the scooter. Vectrix has developed both 13" and 16" models to accommodate a variety of scooter models and sizes.

NICKEL METAL HYDRIDE (NIMH) BATTERY PACK

Vectrix worked closely with Gold Peak Batteries to develop an integrated 30 Ah, 125 volt, Nickel Metal Hydride (NiMH) battery pack specifically for the Vectrix scooter. The battery pack has a rated battery capacity of 3.7Kwh and is designed for up to 1,700 full charging cycles. Based on an average distance traveled of 100 – 150 miles (160 km – 240 km) per week, and 2-3 full charging cycles per week (100 – 150 per year), the battery pack will last between 10 to 15 years. Partial charges are not expected to reduce the life expectancy of the battery pack.

The 1.5 kW on-board charger plugs into a standard single phase outlet (120 volt, 20 ampere North America, or 220 volt 10 ampere European) and provides an 80% charge in just over 2 hours.

ALL DIGITAL MOTOR CONTROLLER

The electronic control system is the “brain” of the scooter and provides the interface between the battery pack and the motor.

Designed and developed by Vectrix and produced by Parker Hannifin’s Compumotor Division, the digital controller reduces cost, size and weight by integrating the scooter controller into the motor controller, and by using a six-pack configuration of the electronic switches (IGOTS). The design uses a single circuit board for power system interconnections as well as control components and onboard power supplies.

The motor controller incorporates Digital Signaling Processing (DSP) technology as part of the proprietary Electronic Control System (ECS) which provides the flexibility to incorporate additional features as required.

DAaRT: DECELERATING, ACCELERATING AND REGENERATIVE THROTTLE

Stop and Go in One Hand! Twist the throttle toward you for instant acceleration and away from you to slow down or stop. The bidirectional throttle activates the regenerative braking system to slow the scooter smoothly and safely, and, at the same time, charge the batteries. For maneuvering in and out of tight parking spaces, the bidirectional throttle is used to activate a slow speed reverse function.

Features

Bidirectional Throttle

The Vectrix designed and patented bidirectional throttle has 3 positions:

1. Neutral (detent position)
2. Twisted toward the rider for acceleration
3. Twisted away from the rider to slow down and, if stationary, engage low speed reverse

Regenerative Braking

The throttle activated regenerative braking system reverses the polarity of the electric motor, which has three key effects:

1. Energy that is usually dissipated during braking is directed back into the batteries, extending range by up to 8% to 12%.
2. The regenerative braking system slows the scooter smoothly and safely (similar in performance to antilock brakes), without the driver needing to use the brakes under normal driving conditions.
3. This saves wear and tear on the brakes, further reducing the operating cost of the scooter.

ADVANCED DIGITAL DASHBOARD

A sophisticated instrument pod displays speed, odometer, trip mileage, time, estimated range, system status, battery status and charging status on an advanced and easy to read LCD and analog display.

SPECIFICATIONS:

Motor & Gearbox	Motor Type	3-phase brushless, radial air-gap electric motor
	Peak Power	20 kW peak power at 3000 rpm
	Max Current	275 Amps for 5 seconds
	Max Torque	65 Nm
	Gearbox	Integrated rear-wheel mounted planetary gear drive
Electronics	Controller	All-digital electronic control and motor drive system
	DAaRT Decelerating, Accelerating and Regenerative Throttle	Patented bi-directional throttle provides regenerative braking and a low speed reverse feature
	Instrumentation	Analog and twin LCD's display speed, system status, odometer, trip mileage, estimated range, battery status, charging status and time
Battery	Battery Pack	125V / 30 Ah Nickel Metal Hydride (NiMH)
	Rated Battery Capacity	3.7 kW-h
	Recharge Requirements	110V-220V,50/60Hz via standard power outlet
	Charger	1.5kW on-board battery charger
	Recharge Time (80% charge)	2 hours
	Battery Discharge Cycles (80% charge)	1,700
Performance	Max Speed	62 mph / 100 km/h
	Acceleration	0-30 mph (50 km/h) - 3.6 seconds 0-50 mph (80 km/h) - 6.8 seconds
	Range	68 miles (110 km) @ 25 mph (40 km/h)
Dimensions	Weight	436lb (198 kg)
	Wheelbase	59" (1500 mm)
	Seat Height	32.3" (820 mm)
	Wheels	Front - 120/70-14" Rear - 140/60-13"
	Storage Capacity	Under seat storage for 1 full-faced helmet Glove compartment below dash
Other	Frame	Lightweight aluminum frame
	Warranty	48 months
	Emissions	Zero

INTERVIEW

A well known Tester in the motorcycle sector, who we will call Mario, took our prototype scooter for an extensive test drive. After the test drive, we asked Mario what he thought.

(Interviewer) What do you think? Describe your first impressions.

(Mario) Incredible! I never thought it could be so much fun to drive an electric scooter! It feels like a well designed and "mature" product notwithstanding the fact that it's still a prototype. I was impressed above all with its superior performance in pick-up and acceleration, the linear power delivery and the electric deceleration system, which is fantastic and easy to use.

(I) Lets take those one by one. Can you explain what you mean by superior performance and linear power delivery?

(M) That's easy. Superior performance because its a completely different story from the electric scooters previously available on the market. (Editor's note: GreenGo has 20kWs of power compared with 1.5 kWs of other electric scooters.) With the help of a friend I compared GreenGo with a traditional 250cc latest generation gas scooter of about the same size and weight at speeds of up to 100 km per hour. (Limited for range reasons.) GreenGo is faster than the gas scooter. So I'm curious and I will repeat the test with a 400cc gas scooter. The most amazing thing about GreenGo is that the power delivery is so smooth and has a constant thrust, even better than a scooter with a CVT (Continuous Variable Transmission), which tends to jerk when you take off, and then you definitely feel it when the driving pulleys open themselves, diluting the engine thrust. With GreenGo, propulsion is fluid all the way up to maximum velocity.

(I) This is due to the electronic management of the electric motor and to the direct connection with the wheel through the gearbox , with constant transmission ratio. Can you describe what it feels like to drive with the DAaRT deceleration system which recharges the battery as you slow down?

(M) Its not only fun, I also think its perfect for this type of bike. You have to consider that, compared to motorcycles, scooters are generally used by people who have less experience and who, especially at the beginning, have difficulty controlling the movement of their right hand and continue to accelerate a bit when braking. With GreenGo all you have to do is turn the accelerator handle backwards to decelerate progressively and safely, using the brakes only when necessary. The system is safe to use in turns as well. The scooter doesn't tend to straighten up or significantly enlarge its turning radius. It definitely works better as well as being more fun than other combined braking systems that I have tested.

(I) Yes, its really effective and among other things it allows you to recharge the battery a bit, generally between 8% and 12%, depending on the route and driving style. What do you think about the driveability?

(M) It handles really well, probably because of the low center of gravity, you can't even feel the weight. When GreenGo is stopped, by turning the handle backwards the bike goes into reverse which is really useful when parking on an incline. As far as comfort is concerned, its at the level of the best bikes on the market today. Maybe you could improve the calibration of the rear shock absorbers as they seem to have too quick a reaction in extension.

(I) Yes, we are already working on it. Consider that we are now in the process of refining the suspension settings The fork will be a bit more rigid and the shock absorbers will be a little softer. Before starting production, all the prototype details will be subject to extensive testing, which has already begun. What other thoughts do you have about the product in general?

(M) I think it is a decisive step forward in urban mobility. With the performance and comfort of a 250-400 cc bike, you can circulate with zero emissions, travel through limited traffic areas and feel that you a part, in a sense, of important social change. The scooter's range, even though obviously less than that

of a gas scooter, allows you to travel around a metropolitan area and recharge the scooter in the evening every two or three days, depending obviously on how many kilometers you travel. Its a product that is definitely avant-garde and I'm happy to have been able to have had a preview by testing it for you. Let me know when its available on the market. I'll definitely be a customer!

(I) You'll be among the first to know, I promise. Thanks very much for conducting the test for us in such a professional manner. See you soon!

BENEFITS

Fast and Safe

- Outstanding Performance – A top speed of 62 mph (100 km/h) and 0-60 mph (96 km/h) in just over 8 seconds.
- Extended Range – Up to 70 miles (110 km), depending on speed (e.g. at an average speed of 25 mph (40 km/h) the Vectrix scooter has a range of 68 miles (110 km) between charges.
- Superior Handling – A low center of gravity, stiff frame, and even weight distribution provide excellent handling.
- Extreme Comfort – The ergonomic design and contoured seat provide extreme comfort for both rider and passenger.

Easy to Use

- Stop and Go in One Hand – Just twist the throttle for instant acceleration. When it's time to slow down or stop, throttle activated regenerative braking (DAaRT) slows the scooter smoothly and safely, and, at the same time, charges the batteries.
- Easy to Park – A slow speed reverse feature makes maneuvering in and out of tight parking spaces easy and simple.
- No Gear Shifting – The integrated electric motor and single stage planetary gearbox means there is no gear shifting or clutch.
- Simple to Charge – The on-board charger recharges the battery pack to 80% in just over two hours. The charger plugs into any standard power outlet, at home or at the office.
- Instant Information – An advanced digital dashboard displays speed, odometer, energy consumption, battery status, and estimated range on a central analog display and two LCDs.

Low Running Costs

- Cheap to Run – Electricity costs are less than 50 cents to fully recharge the batteries.
- Minimal Maintenance – Many of the key components in the Vectrix scooter are sealed and maintenance free. No oil or filters to replace.
- Further Savings – Government and local subsidies offer additional cost savings (up to €1,400 in some European cities).
- Reduced Insurance Costs – GreenGo has 50% savings in insurance costs.

Environmentally Friendly

- Zero Emissions – The Vectrix scooter is emission free, whereas gas scooters can produce up to 10X the pollution of the average automobile.
- Very Low Noise – The Vectrix scooter is much quieter than a gas powered scooter or motorcycle.
- Unrestricted Inner-City Access – The Vectrix Scooter can access "Gas Restricted" inner-city areas.

COMPARISONS

GreenGo has performance equal to or better then large gas-powered scooters at a lower lifetime cost with zero atmospheric or noise emission.

Compared with equivalent gas-powered scooters, GreenGo offers:

- a 90% savings in fuel costs
- a 70% savings in maintenance costs over four years
- up to 50% savings in insurance
- Additional savings are possible, as electric scooters are not subject to road tax or property tax in many countries.

Government incentives, which are currently €413 in Italy and £200 in the United Kingdom, offer further cost savings.

Comparison with Gas Scooters

GreenGo, if compared with gas scooters, was found to offer:

- Faster Acceleration – Almost 30% faster to 50km/hr than a 250cc gas scooter.
- Easier to Ride
- Innovative Decelerating Accelerating and Regenerating Throttle (DAaRT).
- No gear shifting.
- Better handling due to lower center of gravity, stiffer frame, and better weight distribution.
- Easier to Use
- Easier to recharge at home or work than hunt for a gas station in the inner city.
- Offers access to gas engine restricted inner city areas.
- Offers access to free parking at charging stations.
- Cheaper to Run
- Up to 25% cheaper to own than a gas scooter on a 4-year life cycle basis.
- At current, electricity costs are about 10% of gas costs (for many people electricity is effectively free).
- Zero maintenance expected for 4 years, very low thereafter.
- Advanced design results in longer vehicle life.
- Manufacturer guaranteed minimum residual, and market residual values are likely to be higher than gas bikes.
- Subsidies of up to €400 are available in Europe for Zero Emission scooters.
- Cleaner
- Zero Emissions, whereas gas scooters typically produce 8 –10X more pollution than the average automobile.
- None of the mess and spillage associated with gas.

- Very Low Noise – Much quieter than a gas motorcycle or scooter.
- Recyclable – Many components of GreenGo may be recycled.

The Vectrix Electric Scooter costs 25% less to own over four years than a 400cc gas scooter*			
	400cc Gas	Vectrix	Vectrix Cheaper By
MSRP - Rome	€ 6,250	€ 8,400	-34%
Km/Year	6,000	6,000	
4 Year Cost of Fuel/Electricity	€ 1,404	€ 98	93%
4 Year Cost of Maintenance/Repairs	€ 1,200	€ 400	67%
4 Year Cost of Insurance	€ 3,000	€ 1,500	50%
Road Tax and Registration	€ 210	€ 0	100%
EV Incentives	€ 0	(€ 1,400*)	
Lifetime Cost of Scooter	€ 12,064	€ 8,998	25%

*Assumes gasoline costs €1.17/liter, with a range of 20 km/liter
*Assumes electricity costs €0.15/kW, with a range of 37 km/kW
*Incentives are different from town to town

Comparison with Other Electric Scooters

When compared with other electric scooters, the Vectrix scooter offers:

- Larger Size – Accommodates two adults and feels more stable.
- Longer Range – 2 to 3 times the range depending on model.
- Higher Performance – Almost twice the acceleration and double the top speed.
- Better Handling – Lower center of gravity, larger design and longer wheel base.
- Greater Comfort – Higher seat height and larger seat.
- Faster Recharge Time – Less than 2 hours for 80% recharge.
- Longer Battery Life – Up to 10 years based on 1500 charging cycles .

COMPARISON MATRIX

For the score evaluation we have assumed a downtown path to go from home to work using different means considering traffic jam, limited traffic zones and road blocks due to pollution.

	Car	Bike	Taxi	Bus	Scooter	Metro	GreenGo
Cost							
Fast							
Easy to use							
Traffic jam							
Parking							
Free access to limited traffic zones							
Range							
Comfort							
Total score (0 – 32)	**13**	**20**	**20**	**21**	**22**	**22**	**25**

CONTACT US

VECTRIX EUROPE s.r.l
VIA PAPIRIO CARBONE 15
00178 ROMA
ITALY

TEL. 00390671280295
FAX 00390671279760

E-MAIL info@GreenGo.com
WEBSITE www.GreenGo.com
www.vectrixusa.com